



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 2, February 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

An Empirical Study on the Performance of Derivative Instruments in the Indian Stock Market

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ABSTRACT: This study examines the performance of derivative instruments traded in the Indian stock market with specific reference to futures and options contracts of selected companies such as HDFC Life Insurance, IDFC First Bank, Axis Bank, Bajaj Finserv, and Vodafone Idea. Using secondary market data for the period January 2025 to March 2025, the study applies quantitative techniques to evaluate payoff, intrinsic value, and profit or loss from futures and options trading. The findings reveal that while futures contracts provide moderate hedging opportunities with relatively stable intrinsic values, options contracts, particularly call options, exhibit higher risk and persistent losses due to premium erosion. The study contributes to empirical literature by offering comparative insights into derivative instruments and highlights implications for investors, regulators, and financial intermediaries.

KEYWORDS: Derivatives, Futures, Options, Intrinsic Value, Payoff, Indian Stock Market

I. INTRODUCTION

Derivatives are financial instruments whose value is derived from underlying assets, including equities, commodities, currencies, or interest rates. These instruments play a vital role in financial markets by allowing investors to hedge against risk, speculate on price movements, and enhance market liquidity. In India, the derivatives market has witnessed substantial growth since the introduction of index futures in 2000, followed by the expansion of options trading in equities and commodities. Futures and options are the most widely used derivative instruments. Futures contracts obligate the buyer or seller to transact an asset at a predetermined price on a future date, whereas options provide the right, but not the obligation, to buy or sell an asset at a specific price within a certain period.

Despite their advantages, derivatives are complex and inherently risky, especially for retail investors who may not have sufficient expertise or risk management knowledge. Factors such as time decay, leverage, and market volatility can lead to significant losses if derivatives are traded speculatively. The profitability of derivatives depends on careful timing, market analysis, and understanding of intrinsic value. This study aims to conduct an empirical analysis of selected futures and call option contracts of five major Indian companies, focusing on their payoff structure, profitability, risk exposure, and practical utility for investors. By examining these dynamics, the study seeks to provide insights that can help investors adopt informed strategies in derivatives trading.

II. REVIEW OF LITERATURE

The literature review highlights research on the performance, risk, and market behavior of derivatives. Lakonishok et al. (2017) studied investor behavior in options markets and found that speculative trading is limited, indicating cautious participation among investors. Alexakis (2018) observed that stock index futures contribute to reducing spot market volatility, demonstrating the stabilizing effect of futures on financial markets. Reddy (2019) found a positive relationship between futures price changes and open interest, suggesting that increasing open interest can serve as an indicator of market trends.

Hull (2018) emphasized derivatives as effective risk management tools, enabling hedging against unfavorable price movements. In contrast, Bodie et al. (2019) highlighted the leverage risks inherent in derivatives trading, showing that small price fluctuations in the underlying asset can cause disproportionately large gains or losses. Kumar and Pandey (2020) studied the Indian derivatives market and reported that the introduction of F&O contracts improved market liquidity and enhanced trading volumes. SEBI (2022) reported significant losses among retail F&O traders, highlighting the risks faced by inexperienced investors.



Chance and Brooks (2015) discussed the complexities in option valuation, particularly regarding factors like volatility, strike price, and time to maturity. Mishra (2021) found that while futures contracts are effective for hedging purposes, options carry higher risk for speculative trades due to premium costs and time decay. Varma (2020) emphasized that derivatives play an essential role in price discovery, helping reflect market expectations and underlying asset values. Collectively, this body of literature underscores the dual nature of derivatives: they are powerful tools for risk management but require informed decision-making and risk awareness to prevent losses.

III. RESEARCH QUESTIONS

The study is guided by the following research questions:

1. How do futures and options contracts perform in terms of payoff and profitability over a short-term period?
2. What are the differences in risk-return characteristics between futures and options contracts for selected companies?
3. Can intrinsic value analysis help investors optimize the timing of entry and exit decisions to improve profitability in derivatives trading?

These questions aim to bridge the gap between theoretical knowledge and practical implications, particularly in understanding how risk and payoff differ between futures and options.

IV. RESEARCH OBJECTIVES

The objectives of the study are:

1. To analyze the performance of futures contracts of selected companies, focusing on payoffs and intrinsic value trends.
2. To evaluate the profitability of call option contracts, considering the effect of premiums and time decay.
3. To compare risk-return characteristics between futures and options, using metrics such as cumulative payoff and volatility.
4. To provide practical insights for investors regarding effective derivatives trading strategies, highlighting tools and techniques for risk management and strategic decision-making.

By addressing these objectives, the study seeks to provide both empirical evidence and actionable recommendations for investors operating in the Indian derivatives market.

V. HYPOTHESES

The study tests the following hypotheses to validate the research objectives:

- H1: Futures contracts provide more stable returns compared to options contracts. Futures are generally less sensitive to time decay and have a linear payoff structure, making them more predictable.
- H2: Call option contracts result in higher losses due to time decay (theta), as the option premium decreases over time even if the underlying asset moves favorably.
- H3: Intrinsic value significantly influences profitability, meaning that strategic entry and exit based on intrinsic value trends can improve risk-adjusted returns.

These hypotheses are designed to investigate both the risk and performance differences between futures and options in a controlled, empirical setting.

VI. RESEARCH DESIGN

The study adopts a descriptive and analytical research design, employing secondary data collected from the NSE records and brokerage platforms. The sample includes futures and call option contracts of five companies over a three-month period. Key variables examined include:

- Open price, close price, settlement price of contracts
- Payoff (profit or loss realized during the period)
- Intrinsic value (difference between underlying price and strike price)

Data were analyzed using descriptive statistics, including trends, averages, and comparative metrics, to evaluate performance and volatility. The design allows for empirical comparison between futures and options, offering insights into how different derivatives behave under short-term market fluctuations.



VII. RESULTS AND DISCUSSION

Table 1: Performance Summary of Selected Futures Contracts (Jan–Mar 2025)

Company	Contract Type	Intrinsic Value Range (₹)	Cumulative Payoff (₹)	Daily Volatility (%)	Observations
HDFC Life	Futures	581 – 678	-52	1.8	Intrinsic value relatively stable; short-term payoff negative due to price fluctuation.
IDFC First Bank	Futures	45 – 52	-21	2.1	Moderate volatility; futures hedge potential visible but short-term losses exist.
Axis Bank	Futures	775 – 828	-37	2.3	Fluctuating daily returns; cumulative payoff slightly negative.
Bajaj Finserv	Futures	1,295 – 1,368	-63	2.5	Higher volatility observed; intrinsic value trend more stable than payoff.

Table 2: Performance Summary of Selected Call Option Contracts (Jan–Mar 2025)

Company	Contract Type	Strike Price (₹)	Option Premium (₹)	Cumulative Profit/Loss (₹)	Time Decay Impact	Observations
HDFC Life	Call Option	650	15	-48	High	Consistent negative profits due to premium and theta; time decay erodes profitability.
IDFC First Bank	Call Option	50	3	-19	Moderate	Premium cost and short-term volatility contribute to losses.
Axis Bank	Call Option	800	12	-42	High	Losses observed consistently; call options riskier than futures.
Bajaj Finserv	Call Option	1,350	25	-57	High	Significant negative profits; option holder loses value over time despite intrinsic value trends.

The analysis of selected derivatives contracts reveals clear differences in risk and return characteristics between futures and call options. Futures contracts for companies such as HDFC Life, IDFC First Bank, Axis Bank, and Bajaj Finserv display relatively stable intrinsic value ranges, indicating that these instruments can serve as effective hedging tools. Despite this stability, cumulative payoffs over the short-term study period were negative, reflecting the impact of market volatility on short-term returns. Daily volatility for futures contracts ranged from 1.8% to 2.5%, suggesting that while some fluctuations occur, the risk is moderate and more predictable compared to options.

In contrast, call option contracts consistently generated negative cumulative profits across all companies. This pattern can be attributed to the combined effects of high option premiums and time decay (theta), which gradually erodes the option’s value over the holding period, even when the underlying asset price moves favorably. The higher daily volatility observed in options, coupled with the cost of premiums, further amplifies the risk, making call options considerably more sensitive to market timing and short-term price movements.

Overall, the data indicates that futures contracts offer more stable and lower-risk exposure, making them suitable for hedging and cautious investment strategies. On the other hand, call options carry higher risk and are prone to short-term losses, especially if intrinsic value and market trends are not carefully monitored. These findings emphasize the importance of strategic entry and exit decisions, risk management, and investor education for effective participation in derivatives trading. In summary, while both futures and options serve important roles in financial markets, futures are relatively safer for short-term investors, whereas options require greater expertise and timing to achieve profitability.

The results indicate that futures contracts provide better hedging potential compared to options. Although short-term losses are present, the stable intrinsic value trends suggest opportunities for strategic entry and exit, supporting informed decision-making. Options contracts, however, consistently generated losses, aligning with H2 and confirming the adverse impact of time decay on profitability.

These findings are consistent with SEBI reports highlighting retail investor losses in F&O trading, emphasizing that inexperienced traders are prone to losses without adequate risk management knowledge. The analysis also reinforces the critical role of intrinsic value in timing trades and optimizing returns. Overall, the results highlight that while derivatives can be effective financial tools, they require careful planning, monitoring, and risk assessment to achieve desirable outcomes.

VIII. FINDINGS OF THE STUDY

The study reveals several key insights into the performance and risk characteristics of derivatives contracts. Firstly, futures contracts are less risky than options, offering a more predictable payoff structure and making them suitable for hedging and cautious investment strategies. Secondly, intrinsic value plays a critical role in determining profitability, as it guides investors in making informed entry and exit decisions, helping mitigate potential losses. The analysis also shows that call options frequently result in losses if not traded strategically, primarily due to the combined effects of premium costs and time decay, which erode value over time. Additionally, the study identifies that retail investors often lack sufficient risk management skills, which increases their likelihood of incurring losses in derivatives trading. Finally, while short-term volatility impacts both futures and options, futures contracts demonstrate comparatively lower sensitivity to market fluctuations, highlighting their relative stability for short-term investment decisions. Overall, these findings emphasize the need for informed strategies, risk awareness, and careful monitoring of derivatives markets.

IX. RECOMMENDATIONS

Based on these findings, the study provides several recommendations for investors and regulators in the derivatives market. Investors are advised to prefer futures contracts for hedging purposes rather than speculative trading, as futures offer more predictable returns and lower risk exposure. For trading options, it is essential to analyze intrinsic value and monitor volatility indicators, which can help minimize losses and improve timing decisions. The study also highlights the importance of formal training in derivatives trading for retail investors, enhancing their understanding of risk management techniques and trading strategies. Regulators are encouraged to strengthen investor education programs and ensure transparent disclosure norms for futures and options contracts to protect inexperienced participants. Finally, investors should adopt strategic entry and exit planning, avoiding short-term speculative decisions that may lead to unnecessary losses. Collectively, these recommendations aim to improve risk-adjusted performance, safeguard investor interests, and promote responsible participation in derivatives markets.

X. CONCLUSION

Derivatives are crucial instruments in modern financial markets, providing hedging, price discovery, and risk management tools. However, their complexity and inherent risks necessitate careful analysis and informed decision-making. The study concludes that while futures can be effectively used for hedging, options trading carries high risk due to time decay and leverage effects. For sustainable participation in derivatives markets, investors must rely on prudent strategies, intrinsic value analysis, and comprehensive risk assessment. Proper training, market knowledge, and disciplined trading approaches are essential to capitalize on the benefits of derivatives while mitigating potential losses.

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