



## **A STUDY ON FACTORS AFFECTING DERIVATIVE FINANCIAL OPTION PRICE WITH REFERENCE TO NIFTY50**

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### **Abstract**

*The 50 stocks that are traded the most frequently in India make up the Nifty50 index, which serves as the benchmark for the National Stock Exchange of India. The study will employ multiple regression analysis to identify the significant factors influencing the price of derivative financial options using secondary data gathered from the NSE and various financial websites. Additionally, the study will investigate the connection between these elements and the price of the option. The spot price of the Nifty50, the amount of time until maturity, implied volatility, interest rates, and dividends are some of the aspects that will be examined. The review will dissect the effect of each variable on the cost of subordinate monetary choices, and will endeavor to recognize the main element influencing choice costs.*

**Keywords:** NSE, Nifty50, financial options, volatility.

### **Introduction**

Financial instruments known as derivative financial options enable traders to purchase or sell an underlying asset at a predetermined price, known as the strike price, at a later date. The price of the underlying asset, the amount of time until the option expires, interest rates, volatility, and dividend yield all have an impact on the option's price. In India, the top 50 companies listed on the National Stock Exchange (NSE) are represented by the NIFTY50 stock market index. The file is broadly utilized by financial backers as a benchmark to assess the exhibition of the Indian value market. The review expects to dissect the elements influencing subsidiary monetary choice costs regarding NIFTY50. The Black-Scholes model, a mathematical formula for calculating the theoretical price of an option, will be used in the study to identify the most significant factors that influence option prices.

Index, stock, and option contracts are based on contracts that expire on the fourth Thursday of each month. While futures contracts have advantages like hedging, low-cost execution, and liquidity, the disadvantages can include uncontrollable future events, complicated issues for new investors, leverage issues, and timing. Option contract, in which the option holder is free to buy or sell an asset but is not required to sign the contract. Using weekly options as a tool to take advantage of short-term shifts, minimize the effects of time decay, and hedge event-related risk were added as a crowning touch. It was discovered that trading volumes for futures and options instruments were significantly high on expiration days.

The futures market is a significant component of the derivatives market. Prospects markets' two essential jobs are value disclosure and chance administration. These two reasons have started a great deal of examination on the connection between these two business sectors. The underlying spot market also benefits from a thriving futures market. The significance of the file prospects market has been concentrated on widely in created nations, with most of studies zeroing in on the US. Spot-prospects connection, right off the bat, was examined with regards

to cointegration or related mistake amendment. Second, the lead-lag relationship between the index futures market and the spot index market was investigated. In the majority of developed nations, the index futures market leads the spot index market and leads price discovery. A bidirectional relationship between the spot market and the futures market was also found in some studies. It is vital that regardless of whether the connection between the spot and prospects market is bidirectional, the connection from fates to detect markets is more grounded. From the developed markets, it is said that the futures market plays a major role, but the evidence from the emerging markets is mixed.

### **Literature review**

Various examinations have been directed on the Indian Capital Market and its patterns. The markets for Indian securities are the subject of numerous books, reports, and studies. The findings of a few studies that were carried out on the Indian derivatives markets are presented in this section of the study.

**Swapna. According to H.R. et al. (2020)**, the use of financial derivative instruments has increased dramatically. The value subsidiary incorporate investment opportunities, file choices, stock prospects and list fates. Due to the importance of option pricing models in the derivatives market and risk management, index options have grown at a remarkable rate among these products. When deciding whether to buy or sell, accurate pricing is of the utmost importance. There are different valuing models like corridor and White model, model of Heston, etc, yet for this study Dark and Scholes model is utilized, since it is the most All around acknowledged model in estimating choices. Using the Black and Scholes model, the Blacks model, and the Binomial option pricing model with theoretical and GARCH space volatility, the study aims to determine the theoretical price of stock options. Additionally, the research aims to determine whether an option's actual market price and model price differ significantly.

**Nalini R. (2019)** The growth of the derivatives market is one of the most significant developments in the Indian capital market over the past two decades. The subsidiaries market in India began in the year 2000 and the prospects exchanging was begun in 2000 in the Public Stock Trade of India Ltd (NSE) and the exchanging choices started in the NSE in 2001. From that point forward the value subordinates market has shown dramatic development both as far as volume and number of agreements exchanged. The primary objective of this paper is to investigate how the equity derivatives market in India has fared since its inception. The information connecting with value subsidiaries in fates and choices were gathered from the authority site of NSE [www.nse.org](http://www.nse.org). In order to track the expansion of the equity derivatives market, the data that was collected have been analyzed using percentage analysis.

**Simmi Khurana (2017)** asserts that financial market volatility is unavoidable. The risk factor of volatility emerged as a result. Unsystematic risk and systematic risk are two types of risk that businesses face today. Unpredictability in the market goes under orderly gamble which can be assessed with the assistance of standard deviation. Future volatility will either increase or decrease based on market sentiments, emotions, and other fundamental stock market concepts. How we can reduce risk or mitigate systematic risk is a major issue. Diversification cannot reduce volatility; only hedging and the appropriate asset allocation strategy can.

Derivatives were created as a means of hedging risks and bringing more liquidity to the market.

### **Definition of Financial Derivatives**

Before explaining the term financial derivative, let us see the dictionary meaning of 'derivative'. Webster's Ninth New Collegiate Dictionary (1987) states Derivatives as:

- A word formed by derivation. It means, this word has been arisen by derivation.
- Something derived; it means that some things have to be derived or arisen out of the underlying variables. For example, financial derivative is an instrument indeed derived from the financial market.
- The limit of the ratio of the change is a function to the corresponding change in its independent variable. This explains that the value of financial derivative will change as per the change in the value of the underlying financial instrument.

### **Bank Nifty Options Tips and Strategies**

The 12 bankstacks with the highest market capitalization and highest liquidity make up the Bank NIFTY index. This 2009-launched index is now heavily traded on the stock market, and many traders make a living solely from trading Bank NIFTY. The market is now littered with Bank NIFTY tips and tutorials on how to trade in Bank NIFTY because many traders who have focused on trading Bank NIFTY options have devised a plethora of bank option trading strategies over the course of the years.

This article will give a succinct synopsis of two Bank Clever choice exchanging methodologies as well as give many Bank Clever tips and Bank Clever choice tips that might possibly assist you with understanding how to improve exchanges what's in store.

Volatility: The price of Nifty options is also affected by volatility, or the change in the price of the underlying asset. Because there is a greater possibility of significant price changes in the underlying asset, higher volatility results in higher option prices.

### **Equity Derivatives**

The National Stock Exchange of India Limited (NSE) commenced trading in derivatives with the launch of index futures on June 12, 2000. The futures contracts are based on the popular benchmark Nifty 50 Index. The Exchange introduced trading in Index Options (also based on Nifty 50) on June 4, 2001. NSE also became the first exchange to launch trading in options on individual securities from July 2, 2001. Futures on individual securities were introduced on November 9, 2001. Futures and Options on individual securities are available on securities that meet the eligibility criteria stipulated by SEBI. The Exchange has also introduced trading in Futures and Options contracts based on Indices. Currently, Derivatives on NIFTY 50, NIFTY Bank, NIFTY Financial Service and NIFTY Midcap Select are available for trading. This section provides you with an insight into the derivatives segment of NSE. Real-time quotes and information regarding derivative products, trading systems & processes, clearing and settlement, risk management, statistics, etc. are available here Since the launch of the Index Derivatives on the popular benchmark Nifty 50 Index in 2000, the National Stock Exchange of India Limited (NSE) today have moved ahead with a varied product offering in equity derivatives. The Exchange currently provides trading in Futures and Options contracts on – 4 major indices and more than 100 securities.

### **Nifty 50**

Nifty 50 Index is a broad-based index consisting of 50 blue chip large and liquid stocks listed on the National Stock Exchange of India. Since inception, the Nifty 50 Index has successfully become the 'stock of the nation', helping investors gauge the pulse of Indian capital market. It has lived up to its core purpose of providing a fair representation of the Indian equity market focusing on portfolio diversification, liquidity and replicability. Over the years, the Nifty 50 has become the most widely used benchmark for exchange traded products on Indian equity market.

### **Evolution of Nifty 50**

Nifty 50 Index has an inception date of November 3, 1995. The index was constructed using a unique concept of impact cost, which helps in the selection of highly liquid stocks and results in the creation of a replicable index. Initially, index constituents were weighted based on their full market capitalization, however, starting June 26, 2009, the index computation was changed to free float methodology. At inception, Nifty 50 constituents captured 33.7% of full market capitalization and 62.2% of turnover of active traded equities on NSE. Over the years, market representation in terms of full market capitalization by Nifty 50 constituents has grown to 53.2%, and in terms of turnover, representation is currently 32.5% of active traded equities on NSE.

<b>Nifty 50 Attributes across years</b>				
<b>Nifty 50 Attributes across years</b>	<b>2021</b>	<b>2015</b>	<b>2005</b>	<b>1995</b>
Market Representation by Full MCAP (%)*	53.2	57.6	57.9	33.7
Market Representation by Average Turnover (%)*	32.5	45.1	42.2	62.2
Cumulative weight of top five stocks (%)	41.2	34.7	38.5	31.7
Cumulative weight of bottom five stocks (%)	2.2	1.7	2	1.8

### **Methodology**

The Nifty 50 Index tracks the performance of a portfolio of 50 largest and most liquid Indian securities. Top 50 companies are selected from the universe of Nifty 100 based on free-float market capitalization and liquid companies having average impact cost of 0.50% or less for 90% of the observations for a basket size of Rs. 10 Crores. The constituents should have derivative contracts available on NSE. Nifty 50 is re-balanced on semi-annual basis. The cut-off date is January 31 and July 31 of each year, i.e. for semi-annual review of indices, average data for six months ending the cut-off date is considered. Four weeks prior notice is given to market from the effective date.

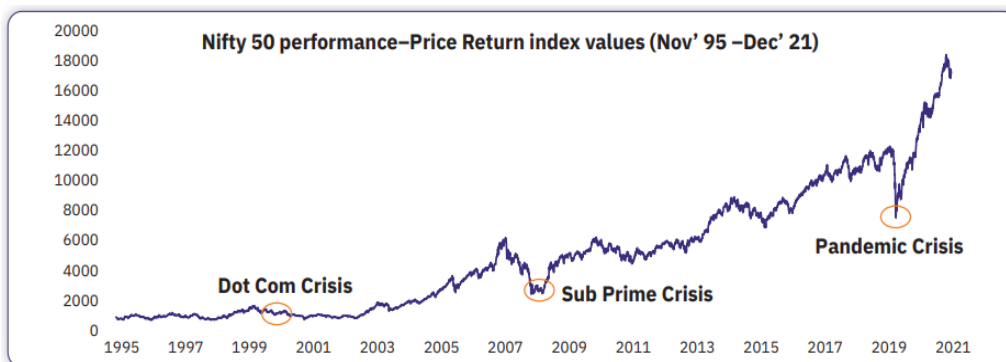
**Results and Discussion**

**Nifty 50 Total Return index Performance**

Since June 30, 1999, the Nifty 50 Total Return (TR) index has given annualized returns of 14.2% CAGR with annualized volatility of 22.9%. TR index assumes dividends are reinvested in the index and hence represent both Price Return (PR) and Dividend return. The Nifty 50 TR index has returned 11.8% CAGR, 17.6% CAGR and 28.4% CAGR over the last 15 years, 5 years and 1 year respectively. Volatility has been 22% over the last 15 years, 18.2% over the last 5 years and 15.8% over the last 1 year. All data are as of December 15, 2021.

Table: Return and Volatility Profile of Nifty 50 TR index (As of Dec 15, 2021)

Period	Returns	Volatility
Since June 30, 1999	14.2%	22.9%
15 Years	11.8%	22.2%
10 Years	15.2%	17.0%
7 years	12.5%	17.5%
5 years	17.6%	18.2%
3 years	18.2%	21.7%
1 Year	28.4%	15.8%



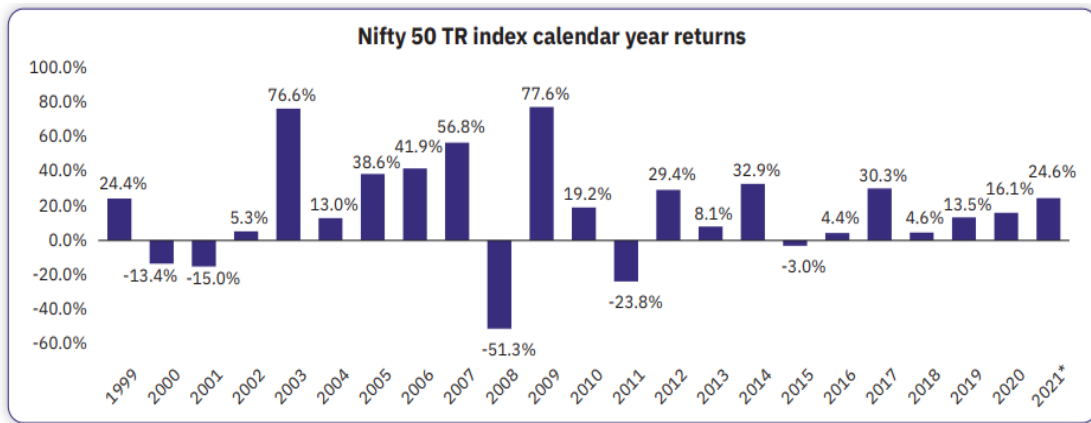
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Table: Percentage of total instances of positive and negative returns on a daily rolling basis

Investment Horizon	Nifty 50 TR index	
	Negative returns	Positive returns



	<0% CAGR	>=0% CAGR	0-5% CAGR	5-10% CAGR	10-15% CAGR	>15% CAGR
10 years	0.0%	100.0%	0.0%	20.0%	32.1%	47.9%
7 years	0.0%	100.0%	0.1%	19.9%	40.3%	39.8%
5 years	0.1%	99.9%	6.5%	24.3%	31.4%	37.7%
3 years	7.6%	92.4%	10.1%	20.2%	24.6%	37.5%
2 years	20.0%	80.0%	10.7%	12.9%	11.1%	45.4%
1 year	25.8%	74.2%	8.0%	9.0%	11.4%	45.8%



In terms of calendar year returns between 1999 and 2020, the Nifty 50 TR index has given positive returns in 17 out of 22 calendar years. Returns were between 0 to 20% in 8 calendar years, 20 to 40% in 5 calendar years and exceeded 40% in 4 calendar years. Out of the 5 calendar years where the Nifty 50 TR index had negative returns, returns were between 0 to -20% in 3 calendar years and less than -20% in 2 calendar years.

**Passive funds launched on Nifty 50 Index**

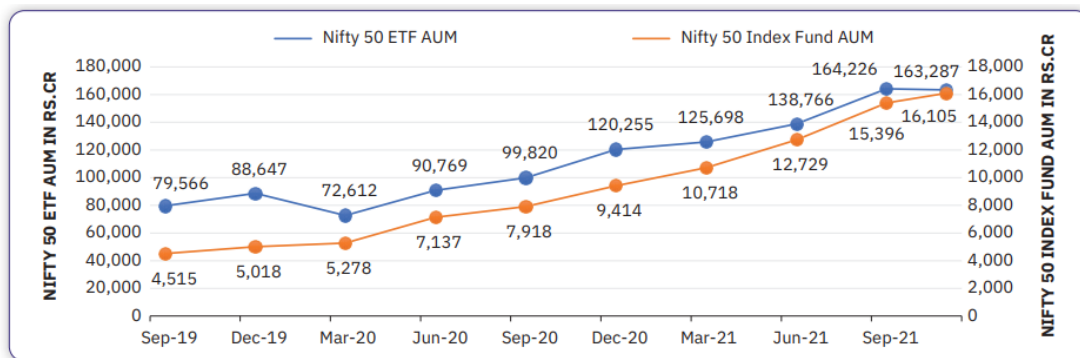
**Domestic Presence – ETFs**

Sr. No	Scheme Name	Aum (in Rs. Cr.)
1	SBI ETF Nifty 50	118,703
2	UTI-Nifty ETF	31,396
3	Nippon India ETF Nifty BeES	5,113
4	ICICI Pru Nifty ETF	3,088
5	Kotak Nifty ETF	1,581
6	HDFC Nifty 50 ETF	1,123
7	Mirae Asset Nifty 50 ETF	649
8	LIC MF ETF NIFTY	625
9	Aditya Birla SL Nifty ETF	443
10	Tata Nifty Exchange Traded Fund	371
11	AXIS Nifty ETF	64
12	Invesco India Nifty ETF	60
13	Motilal Oswal M50 ETF	27

14	Indiabulls Nifty50 Exchange Traded Fund	16
15	IDFC Nifty ETF	16
16	Quantum Nifty ETF	12

Nifty 50 is the most widely used ETF benchmark in the Indian domestic market with 16 ETFs accounting for 52% of total equity ETF AUM tracking Indian domestic markets. The total AUM of all the ETFs tracking the Nifty 50 index is Rs. 163,287 Cr as of November 30, 2021.

**ETF and Index Fund AUM trend of Nifty 50**



The total AUM of ETFs on Nifty 50 stands at Rs. 163,287 Cr as of November 30, 2021 as against Rs. 79,566 Cr as of September 30, 2019, which has grown at ~39% CAGR. The total AUM of Index Funds on Nifty 50 stands at Rs. 16,105 Cr as of November 30, 2021 as against Rs. 4,515 Cr as of September 30, 2019, which has grown at ~80% CAGR.

**Conclusion**

In light of the review led on factors influencing subsidiary monetary choice costs regarding Nifty50, the accompanying ends can be drawn: Instability is a vital component influencing choice costs. Option prices rise in response to volatility, and vice versa. The option's price is also significantly influenced by the strike price. Options typically have higher prices if their strike price is closer to the current market price. Another important aspect of option pricing is the time until expiration. Because they provide more time for the underlying asset to move in the desired direction, options with a longer expiration date typically have higher prices. Loan fees additionally influence choice costs, in spite of the fact that their effect is somewhat little. Option prices can be affected by the overall performance of the Nifty50 index as well as stock market movements, according to the study. In conclusion, the factors that influence option prices are interconnected and complex. When pricing options, option traders must take all of these factors into account, and appropriate risk management strategies must be implemented to minimize losses.

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