

A STUDY ON FINANCIAL DERIVATIVES WITH SPECIAL REFERENCE TO NIFTY F&O

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Abstract: Derivatives are the contracts whose value is derived from the value of some underlying assets such as equities, commodities or currencies. These contracts help the investor to reduce the risk of wearing down of his investments. The application of derivatives can be observed as an opportunity to transfer the risk from the person who wishes to ignore it, to the person who is ready to accept it i.e. risk management hedging through derivatives. In an environment, in which portfolio managers are pressured to beat the indices, need to protect the investment gains in their portfolios from financial risk. Different hedging strategies can be formulated to meet the particular hedging requirements. Various studies on the outcomes of future and option listing on the underlying asset (equity, commodity, currency market) have been done with a view to study potential of financial derivatives and intensification of derivatives as a hedging instrument. NSE traded derivatives have shown an exponential growth in market turnover, it has grown from Rs 2365 cr. in 2000-2001 to Rs. 22916531.92 cr. in 2015-16. NSE can be considered as the one of the high-flying exchanges amongst the entire emerging markets in terms of equity derivatives. The following study tries to make an understanding of operational concepts of F&O mechanism. It encompasses analysis of Nifty Index future & options one month delivery contracts to get estimation of buyers and sellers payoffs in future contracts and option holders and option writers payoffs in option contracts. The study tries to find out the opportunities of hedging and arbitrage to reduce the risk of attrition of the investments.

Key Words: Nifty, derivatives, future, option, payoff.

INTRODUCTION:

Ever since the collapse of the Breton Woods system of fixed exchange rates, the financial environment has been exposed to a greater degree of financial risk. CEOs and CFOs are now combating, not only with business or operating risk, but with financial risk. Risk, as measured by volatility, relates to changes to interest rates, foreign exchange rates, stock prices and commodity prices. In India, the degree of financial risk has increased since liberalization reforms have begun.

The questions that financial managers need to ask themselves are:

- How much exposure does the firm have?
- What tools are available to handle this exposure?
- How should one use these tools to handle this risk?

In an environment, in which portfolio managers are pressured to beat the indices, need to protect the investment gains in their portfolios from financial risk. Different hedging strategies can be formulated to meet the particular hedging

requirements. A need was there to understand what tools are available to manage the risk. According to Charles Smithson (Head of Risk Advisory Business, Chase Manhattan Bank, New York) these are called building blocks of risk management, namely, forwards, futures, swaps and options. We call them derivatives or contingent claims.

In the most simple words, derivatives are contract/financial instruments/special type of security whose value is derived the key word, from the value of some underlying assets, such as equities, commodities or currencies. Derivative trading helps the investor to reduce the risk of wearing down of his investments. In the phase of explosive growth in capital market all over the world, corporate have increasingly relied upon the derivative instruments for adding value to their capital market financing.

The end users of these include dealers themselves and just about anybody from small banks, industrial companies, insurers, other financial companies, pension funds and even government companies like municipalities. The

derivatives are regularly traded outside exchange by the financial institutions and their corporate clients in what are termed as OVER THE COUNTER markets.

They were also known as off balance sheet instruments as no asset or liability underlying the contract was put on the balance sheet as such. There is one more name of derivatives that is market for risk as there are tools used to transfer risk from those who do not want to take risk to those who are willing to undertake risk.

REVIEW OF LITERATURE:

Black and Scholes (1973) and by Merton (1973), developed option pricing models which has made it possible for derivatives markets to develop and for these financial instruments to become a potentially important tool in risk management. Derivatives are now an important part of the world economy, with a notional value of more than \$200 trillion of these derivatives traded on organized and OTC markets in 2004 (Bank for International Settlements, 2005).

Chiara Oldani(1995), defined derivatives as a contract whose value depends on the price of underlying assets, but which does not require any investment of principal in those assets. As a contract between two counterparts to exchange payments based on underlying prices or yields, any transfer of ownership of the underlying asset and cash flows becomes unnecessary

Patrick McAllister, John R. Mansfield (1998), analyzed the role and potential of financial derivatives in investment property portfolio management. The potential of financial derivatives to mitigate many of the problems associated with direct property investment is examined.

R. Dixon, R.K. Bhandari (1997) analyzed that derivative instruments can have a significant impact on financial institutions, individual investors and even national economies, resulted in an extraordinary increase in the use of financial derivatives in the capital markets which has led to calls for regulation

Jennifer Reynolds-Moehrle (2005) examined how market participants changed the way they process earnings information after learning of the implementation of hedging activities. The findings indicate an increase in the earnings-return relation in the hedging activity period.

Dr. Premalata Shenbagaraman (2003) investigated that numerous studies on the effects of futures and options listing on the underlying cash market volatility have been done in the developed markets and the empirical evidence is mixed and most suggest that the introduction of derivatives do not destabilize the underlying market.

Ashutosh Vashishtha & Satish Kumar (2010) have analyzed that the growth of derivatives in India in the recent years has surpassed the growth of its counterpart globally. India is one of the most successful developing countries in terms of a vibrant market for exchange-traded derivatives, which are based on nationwide market access, anonymous safe and secure electronic trading, and a predominantly retail market.

Dr. Himanshu Barot & Dr. Nilesh B. Gajjar (2013), studied the role and Growth of Financial Derivative in the Indian Capital Market and concluded that this segment presents wide opportunity to the investors to get better return with hedge the portfolio and equipped to become a dominant player in the market. The problem with derivatives instruments is not with the instruments per se but the lack of understanding of their risk/return characteristics by investor.

Shalini H S & Dr. Raveendra P V(2014), Derivatives offer a prospect to transfer risk from one to another. In the recent years, the growth of derivatives has surpassed the growth of its counterpart globally. The equity derivatives market is playing a major role in shaping price discovery.

OBJECTIVES:

- 1.To make an understanding of operational concepts of F&O mechanism.
2. To find out the buyer's and seller's payoff in NIFTY future contract.
- 3.To find out the option holder's and option writer's payoff in NIFTY options contract at different strike prices.
- 4.To analyze opportunities of hedging and arbitrage..

RESEARCH METHODOLOGY:

The research design of the study is analytical research design. In analytical study, one has to make use of facts or information already available and analyze these to make critical evaluation of the material. The following work

comprises a study of future and option contracts of Nifty index. The period of study is from 1st July 2015 to 30th July 2015. Secondary data is collected from various journals, books and websites.

ANALYSIS AND INTERPRETATION:

The objective is to evaluate the pay-offs of buyers and sellers of futures & options contract. This analysis considered the one-month future contract of NIFTY futures ending on 30 July 2015 and one month option contracts at different strike prices. Market-lot of Nifty future and options is 25. The time period in which analysis done is from 1-07-2015 to 30-07-2015.

Future Payoffs:

Futures contracts have linear payoffs. In simple words, it means that the losses as well as profits for the buyer and the seller of a futures contract are unlimited. These linear payoffs are fascinating as they can be combined with options and the underlying to generate various complex payoffs.

The following table shows market price and future price of Nifty index future during the month of July.

Table: 1

Date	Market Price	Future Price
1-07-2015	8453.05	8455.20
2-07-2015	8444.90	8438.30
3-07-2015	8484.90	8488.00
6-07-2015	8522.15	8537.75
7-07-2015	8510.80	8516.60
8-07-2015	8363.05	8378.00
9-07-2015	8328.55	8346.10
10-07-2015	8360.55	8385.55
13-07-2015	8459.65	8481.95
14-07-2015	8454.10	8465.90
15-07-2015	8523.80	8542.05
16-07-2015	8608.05	8626.65
17-07-2015	8609.85	8625.05
20-07-2015	8603.45	8628.25
21-07-2015	8529.45	8545.00
22-07-2015	8633.50	8648.40
23-07-2015	8589.80	8603.70
24-07-2015	8521.55	8534.35
27-07-2015	8361.00	8372.80
28-07-2015	8337.00	8350.95
29-07-2015	8375.05	8377.65
30-07-2015	8421.80	8421.90

Source: Compiled from NSE

Pay-off for Buyer of Futures:

If a speculator buys 1 lot i.e. 25 futures of NIFTY Index on 1 July 2015 and sells it on 30 July 2015, then he will get a loss,

$$\text{Loss} = 8421.9 - 8455.2 = \text{Rs } 33.3$$

$$\text{Total Loss} = 33.3 * 25 = \text{Rs } 832.5$$

But, If he sells the future on 22 July, then he can make profit:

$$\text{Profit} = 8648.5 - 8455.2 = \text{Rs } 193.2$$

$$\text{Total profit} = 193.2 * 25 = \text{Rs } 4830$$

Pay-offs for seller of futures:

If a speculator sells 1 lot i.e. 25 futures of NIFTY Index on 1 July 2015 and buys it on 30 July 2015, then he will get a loss,

$$\text{Profit} = 8455.2 - 8421.9 = \text{Rs } 33.3$$

$$\text{Total Profit} = 33.3 * 25 = \text{Rs } 832.5$$

But, If he buys the future on 09 July, then he can make profit:

$$\text{Profit} = 8455.2 - 8346.10 = \text{Rs } 109.1$$

$$\text{Total profit} = 109.1 * 25 = \text{Rs } 2727.5$$

Option Payoffs:

Options contracts have non-linear payoff. In simple words, it means that the losses for the buyer of an option are limited, however the profits are potentially unlimited. For a writer, the payoff is exactly the opposite. His profits are limited to the option premium, however his losses are potentially unlimited. These non-linear payoffs are fascinating as they lend themselves to be used to generate various payoffs by using combinations of options and the underlying.

The following table shows market price and premium of call option contract at the strike price of Rs 8000 and Rs 8800 during the month of July.

Table: 2

Date	CMP	8000	8800
1-07-2015	8453.05	476.9	22.25
2-07-2015	8444.90	458.6	17.95
3-07-2015	8484.90	508.75	27.3
6-07-2015	8522.15	547.75	32.55
7-07-2015	8510.80	530.6	24.75
8-07-2015	8363.05	408.0	13.00
9-07-2015	8328.55	377.05	9.00
10-07-2015	8360.55	404.4	9.9
13-07-2015	8459.65	487.2	12.15
14-07-2015	8454.10	468.95	8.1
15-07-2015	8523.80	540.2	12.4
16-07-2015	8608.05	623.55	19.9

17-07-2015	8609.85	620.3	16.45
20-07-2015	8603.45	621.5	14.65
21-07-2015	8529.45	543.4	4.3
22-07-2015	8633.50	641.6	13.25
23-07-2015	8589.80	597.05	6.5
24-07-2015	8521.55	533.0	1.95
27-07-2015	8361.00	370.85	0.95
28-07-2015	8337.00	347.4	0.75
29-07-2015	8375.05	372.15	0.4
30-07-2015	8421.80		

Source: Compiled from NSE

Pay-off for Option Holder

If a speculator have purchase call option at a strike price of Rs 8000, the premium payable is $476 * 25 = Rs\ 11922.5$

On the expiry date, the spot market price enclosed at Rs 8421.9. The exercise price is less than the spot price , the option is in the money for option holder.

$$\text{Option holder's payoff} = [(8421.9 - 8000) * 25] - (476.9 * 25) = Rs -1375$$

If the option holder exercise the option, his loss will be Rs 1375, but if he does not exercise the option then his loss will be Rs 11922.5, premium paid.

If the speculator purchase call option at a strike price of Rs 8800, the premium payable is $22.25 * 25 = Rs\ 556.25$. On the expiry date, the spot market price closes at Rs 8421.9, the exercise price is more than the spot price, the option is out of the money. The option holder will not exercise the option, his loss will be the premium only i.e. Rs 556.25

Pay-off for Option Writer:

At strike price Rs 8000, the option writer's payoff equals to Rs 1375

At strike price Rs 8800, the holder does not exercise the option, so the writer is entitled to get premium i.e. Rs 556.25

The following table shows market price and premium of put option contract at the strike price of Rs 8000 and Rs 8800 during the month of July.

Table: 3

Date	CMP	8000	8800
1-07-2015	8453.05	30.35	359.5
2-07-2015	8444.90	28.4	370.65
3-07-2015	8484.90	27.1	333.75
6-07-2015	8522.15	18.25	287.85

7-07-2015	8510.80	20.75	299.1
8-07-2015	8363.05	38.4	434.85
9-07-2015	8328.55	37.85	452.45
10-07-2015	8360.55	27.6	417.15
13-07-2015	8459.65	13.25	321.45
14-07-2015	8454.10	12.25	328.65
15-07-2015	8523.80	7.75	263.55
16-07-2015	8608.05	5.05	190.25
17-07-2015	8609.85	3.85	187.6
20-07-2015	8603.45	2.6	183.05
21-07-2015	8529.45	2.3	254.0
22-07-2015	8633.50	1.7	161.2
23-07-2015	8589.80	1.4	198.45
24-07-2015	8521.55	1.25	263.9
27-07-2015	8361.00	1.8	423.35
28-07-2015	8337.00	0.95	446.1
29-07-2015	8375.05	0.4	420.65
30-07-2015	8421.80		

Source: Compiled from NSE

Pay-off for Option Holder

If a speculator have purchase put option at a strike price of Rs 8000, the premium payable is $30.35 * 25 = Rs\ 758.75$. On the expiry date, the spot market price enclosed at Rs 8421.9. The exercise price is less than the spot price , the option is out of the money for option holder. So, holder does not exercise option and his loss will be limited to Rs 758.75.

If the speculator purchase put option at a strike price of Rs 8800, the premium payable is $359.5 * 25 = Rs\ 8987.5$, the spot market price closes at Rs 8421.9, the exercise price is more than the spot price, the option is in the money. The option holder will exercise the option, his profit will be: $\{(8800 - 8421.9) * 25\} - 8987.5 = Rs\ 465$

Pay-off for Option Writer

At strike price Rs 8000, the option writer's profit is limited to Rs 758.75 i.e. the premium received.

At strike price Rs 8800, the option writer's loss is Rs 465.

INTERPRETATIONS

1. The future price of NIFTY Index moves along with the spot price.
2. As the expiry date approaches, the difference between future price and spot price becomes less and less.

3. Buyer of the future contract suffers loss of Rs 832, if he buys the nifty index at the time of expiry, but if he buys it before expiry, then he could earn a profit of Rs 4830.

4. Seller of the future contract enjoys profit of equals to buyer's loss i.e. Rs 832 at the time of expiry, but if sells the contract before expiry, then his payoff would be Rs 2727.5

5. In Option contract, it is analyzed that call premiums are very high for Low Strike price and low for High Strike price, indicates bearish signal for the market.

6. Indication of bearish signals results in loss to call option holder in any ways. Investor suffers loss of Rs 1375 at strike price Rs 8000 and loss of Rs 556.25 at strike price Rs 8800.

7. The loss of option holder is the loss of option writer, the loss of holder at strike price of Rs 8800 is Rs 556.25 (Premium paid). This is the profit of option writer. Thus, it can be seen that the loss of option holder is limited to the premium paid and profit of option writer is limited to premium received.

8. As spot price increases, the call premiums at different strike prices increase and vice versa.

9. As spot price increases, the premiums on put option at different strike prices decrease and vice versa.

10. If the investor buys the 25 nifty index in cash market and sell its future in derivatives market, the loss suffered in cash market is Rs 781.25 and the profit is received in future market is Rs 2727.5. So, his risk will be hedged.

11. We can also analyze that when future price is higher than the spot price, arbitrage opportunity arises, as futures are overpriced. In this case, speculator can sell the nifty futures and buy spot nifty to make delivery.

CONCLUSIONS:

The price-movement of Nifty index shows a bearish trend in the market results in more profits for future sellers and call option writers. As the payoffs completely depend on the value of underlying asset in the derivatives contract. By using hedging and arbitrage strategy, the investor can enjoy huge positive payoffs with a limited downside. To reduce the risk of wearing away the investments, the investor should use hedging strategy i.e. to buy the nifty index in the cash market and take the opposite position by selling nifty futures contract or by writing the nifty call option. Also, the investor must keep a close eye on the market prices and book the

profits on right time, if the buyer of future contract sells nifty on expiry date, then he may foregone the profit which he could earn to sell the nifty before expiry.

REFERENCES:

1. Ashutosh Vashishtha and Satish Kumar, "Development of Financial Derivatives Market in India- A Case Study", International Research Journal of Finance and Economics, Issue 37, 2010, pp. 15-29
2. B. Brahmaiah and Rao P. Subba, Financial futures and option, Himalaya Publishing House, New Delhi, 1998, PP.25-147
3. Derivatives Dealers Module Work Book - NCFM (October 2005)
4. Dr. Premalata Shenbagaraman, Do Futures and Options trading increase stock market volatility, nse-india.com/content/press/jan2003
5. Jagdish Raiyani - Financial derivatives in India, New Century Publication, New Delhi, 2011.
6. Jennifer Reynolds-Moehrle, Management's disclosure of hedging activity: An empirical investigation of analysts and investors reactions, International Journal of Managerial Finance, Vol.1 Issue 2, 2005, pp. 108-122
7. Patrick McAllister and John R. Mansfield, "Investment Property Portfolio Management and Financial Derivatives: Paper 2", Property Management, Vol. 16, Issue 4, 1998, pp.208-213
8. R. Dixon and R.K. Bhandari, Derivatives, risk and regulation: chaos or confidence?, International journal of Bank Marketing, Vol. 15 Issue 3, 1997, pp. 91-98
9. R.P. Rustagi, Investment analysis and portfolio management, Sultan Chand & Sons, New Delhi, 2007, PP.459-596
10. S. Kevin, Security analysis and portfolio management, 6th Pr., PHI Learning Private Ltd., New Delhi, 2009, PP.232-270
11. S.L. Gupta, Financial derivatives, 6th Pr., PHI Learning Private Ltd., New Delhi, 2009, PP.3-551.
12. Shalini H S & Dr. Raveendra P V, A Study of Derivatives Market in India and its Current Position in Global Financial Derivatives Markets, IOSR Journal of Economics and Finance, volume 3, Issue 3. (Mar-Apr. 2014), PP 25-42
13. http://www.nseindia/content/equities/eq_historicaldata_fo.htm.