

An Analytical Study on Derivatives Trading in India with specific emphasis on Equity Derivative Trading of NSE

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Abstract—Derivatives are popular Financial Instruments whose value is derived from an underlying asset or a group of assets. The underlying asset may be Stock, Bond, Commodity, Currency, Crude Oil or Interest Rate or Market Indices. This market is a financial market where derivative contracts are executed. Derivatives are of four types namely, Forwards Futures, Options and Swaps. These are considered to be contracts to manage risk and used to enhance portfolio returns. The National Stock Exchange is considered as the pioneer in this area and it commenced trading in derivatives in the year 2000. The current study focuses on the trading process of Derivatives listed in Nifty Index Futures and Options contracts. A comprehensive analysis is done to understand the quantum of volume traded and the study also focuses on how the trading volume affects the fluctuations in the market. The study has revealed that the day trades are about 37% and 48% of total trades for futures and options contracts. Therefore, it is concluded that there are high fluctuations in these two categories of contracts.

It is observed in the process of analysis that the volume traded by individuals is much higher in categories such as Intra-Day and Non-Trade Trades. The study has considered variance as the unbiased tool to measure the fluctuations. Logit Regression function is used to measure the effect of volume on trade size and inventory on volatility. It is envisaged during the course of the research work that option contracts are weaker in volume estimates than the future contracts.

This work is an analysis of volume and volatility estimates for future and option contracts on NIFTY Index.

Index Terms—Options, Futures, Volatility, Volume Dynamics, Logit Regression, Nifty

I. INTRODUCTION

Derivatives are Financial Contracts which derive their value from an underlying asset. These Derivative will take the form of Options, Futures Forwards and Swaps. This type of Financial Contacts is used for

Speculation, Hedging, Arbitration or Margin Trading. These instruments are traded on the bourses as well as bilateral understanding also. The Derivative Trading Can be broadly discussed under the following classifications.

Options: These are the Contracts that give the buyer the right, but not the obligation to buy an underlying asset at a specified period mentioned in the contract. There are two types of Option Contracts, American contract can be exercised at any time before the expiry of its option period, whereas, European contract can only be exercised on its expiration date.

Futures Contracts are considered to be standardized contracts that allow the holder to buy or sell the underlying asset at an agreed price on a specific date. Future contract comes with both right and obligation to carry out the agreed contract. Whereas, in case option contracts it is only right but not the obligation to carry out the contract.

Forwards: This is very much similar to Futures Contract as such, the holder of the contract possesses both the right and obligation to carry out the contract as agreed. However, Forwards are traded on OTC (Over the Counter) exchanges. It indicates these are not regulated and are not bound by specific rules and regulations.

Swaps: These Contracts involve two holders and they will have financial obligations. Interest rate swaps are most commonly used swaps and they are not traded on a recognised stock exchange. Again, they are traded on OTC exchanges because they are considered as customised contracts.

A. Derivatives Market History

Derivatives can be tracked back to Second Millennium BC in Mesopotamia. But it became popular during 1970s. With the introduction of new valuation techniques this market became very vibrant. It has grown to that extent that modern finance world can not be imagined with out the discussion of Derivatives.

These instruments also might cause a crisis to the market. Very recently in 2008 there was a crisis in United States housing market which were directly linked to the housing and credit instruments which were taken as underlying assets. The well-known firms such as Lehman Brothers, Bear Stearns and Merrill Lynch were forced to liquidate their business because of mis-handling of Derivative Instruments.

II. REVIEW OF LITERATURE

Barents Group LLC (1997) studied that India's household savings and foreign investors are key sources of this capital and can and will be increasingly attracted to more efficient, safe and transparent market. Retail investors in India are mostly short-term traders, and day trading is not uncommon. To the extent that buying publicly traded equities is perceived as a risky and speculative short-term activity, many potential investors will simply avoid capital market instruments altogether in deciding to allocate savings. R. Dixon and R.K. Bhandari (1997) said in their study that consequently derivative instruments can have a significant impact on financial institutions, individual investors and even national economies. Using derivatives to hedge against risk carries in itself a new risk was brought sharply into focus by the collapse of Barings Bank. There is a clear call for international harmonization and its recognition by both traders and regulators. There are calls also for a new international body to be set up to ensure that derivatives, while remaining an effective tool of risk management, carry a minimum risk to investors, institutions and national/global economies. Considers the expanding role of banks and securities houses in the light of their sharp reactions to increases in interest rates and the effect their presence in the derivatives market may have on market volatility.

Makbul Rahim (2001) argued in his speech that the regulatory framework must provide the right environment for the development and the growth of the market. High standards of probity and professional conduct have to be maintained and reach world class standards. Integrity is very important as well confidence. The development of a proper free flow of information and disclosure helps investors to make informed investment decisions.

Prof. Peter McKenzie (2001) in his speech at seminar investors have a choice instead of placing their money in only one company they can pick areas of growth and move their money, buying and selling and placing it where it is going to be most profitable. The individual investor does not have to make an individual decision where to place his savings. These decisions are made by an expert fund manager, which would spread the risk by spreading the investments across different sectors of the economy.

Narender L. Ahuja (2006) expressed Futures and options trading helps in hedging the price risk and also provides investment opportunity to speculators who are willing to assume risk for a possible return. They can also help in building a competitive edge and enable businesses to smoothen their earnings because non-hedging of the risk would increase the volatility of their quarterly earnings. At the same time, it is true that too much speculative activity in essential commodities would destabilize the markets and therefore, these markets are normally regulated as per the laws of the country.

S. Gupta, P. Chawla and S. Harkant (2011) stated financial markets are constantly becoming more efficient providing more promising solutions to the investors. Study also proved that occupation of the investor is not affected in investment decision. The most preferred investment avenue is insurance with least equity market. The study also argued that return on investment and safety are the most preferred attributes for the investment decision instead of liquidity.

A. Data Analysis and Investigation

For the purpose of this analysis the traders were identified under Four broad categories, namely, Individuals, Private Companies, Foreign Institutional Investors and others. The data was taken from Nifty Index Futures and Nifty Index Option contracts for a period of FIVE years from 1st January 2020 to 31st December 2024.

Data Set: The Data Set for the purpose of this research included the direction of the transaction, the number of contracts traded, transaction price and volatility for different trades were taken into consideration. Data was analysed both for the perspective day and non-trade days.

Following table showing NIFTY Futures and Options Pattern (JAN-2020 TO DEC-2024)

Year	Contract Type	Expiry Dates	Trading Volume Pattern	Open Interest Trends	Notable Events Impact
2020	Nifty Futures	Last Thursday of each month	High volatility, with significant peaks during market corrections due to COVID-19.	Increased open interest during March-April (market crash), followed by recovery in May onwards.	COVID-19 pandemic, global market crash, sharp recovery post-March.
2021	Nifty Futures	Last Thursday of each Month	Strong bullish trend throughout the year; occasional corrections.	Stable open interest with steady growth as market rally continued post-2020 recovery.	Positive market sentiment, gradual economic recovery post-COVID.
2022	Nifty Futures	Last Thursday of each Month	Volatility in mid-2022, with bear market signals, followed by recovery.	Decreasing open interest during major market dips, followed by a buildup in the latter half.	Impact of inflation concerns, tightening of interest rates globally, geopolitical tensions (Russia-Ukraine war).
2023	Nifty Futures	Last Thursday of each Month	Strong rally in early 2023, followed by moderation in growth.	Open interest stayed stable, with some rises during major market rallies.	Recovery from 2022 lows, concerns over global inflation moderating.
2024	Nifty Futures	Last Thursday of each Month	Stable and moderate volatility. Some fluctuation with global events.	Relatively steady open interest, with no sharp spikes, except during high volatility periods.	Possible global slowdown, India's economy performing better than expected, and geopolitical uncertainty.

B. Observations:

- 2020: The market faced significant turmoil during the COVID-19 crisis. Volatility was at an all-time high, and both Nifty Futures and Nifty Options contracts saw enormous volume as traders sought to hedge or capitalize on the market downturns.
- 2021: After the COVID crash, the market witnessed a strong bullish rally with sustained growth throughout the year, leading to stable trading volumes and open interest in Nifty contracts.
- 2022: A more volatile year with geopolitical tensions and rising inflation led to corrections and recovery patterns, keeping traders on alert, with high interest in both futures and options.
- 2023: A year marked by moderation in growth after the initial rally, with options traders continuing to take advantage of market

fluctuations, especially during corporate earnings season and global events.

more balanced trading environment following past market cycles.

- 2024: Expected to be a more stable year with moderate volatility, with traders adapting to a

Table Showing Number of Contracts traded for day trades and all trades by trader type

Number of Contracts Traded Volume:

Trader Type	Day Trades	All Trades	Percentage
Individuals	54,36,221	94.54,328	57.41
Public and Private Companies	43,25.643	98,99,543	43.69
FII	7,54,654	43,44,564	17.37
Others	10,11,992	2,54,34,894	3.97

Table showing Correlation between Volume Traded, Number of Trades and Average Trade Size

	Index Futures		Index Options			
	Day Trades	Non-Day Trades	Ce	Pe	Ce	Pe
			Day Trades		Non-Day Trades	
Correlation Between Volume Traded and Number of Trades	0.74	0.82	-0.021	0.82	-0.012	0.345
Correlation Between Average Trades and Volume	-0.22	-0.09	0.732	0.831	0.81	0.324
Correlation Between Average Trade Size and Volume Traded	-0.45	-0.012	-0.032	-0.024	-0.015	-0.731

Table Showing Regression Co-efficient of volume trade size and inventory on volatility

	Volume		Trade Size		Inventory	
	Day Trades	Non-Day Trades	Day Trades	Non-Day Trades	Day Trades	Non-Day Trades
Index Futures	11.34	-7.53	3.67	-3.22	6.08	14.24
Index Options	0.44	-0.46	-12.27	32.75	28.86	41.01

The frequency of trading is seen to be positive, with respect to the volume traded on daily basis and non-day basis for futures contracts. Therefore, it is concluded that number of trades is considered to be a powerful tool to measure the volume of trade in case

of Nifty Index Futures. Again, the measure of correlation between average trade size and volume traded is positive for all call options as well as put options. Therefore, it is noted that for option contracts average trade size is considered as powerful indicator.

It observed in the process of analysis that for Nifty Index Futures with respect to non-Day trade the volume and trade size is showing negative coefficient. A trader with larger quantity with larger trade size are likely to trade during the fluctuating days. With respect to day trades the volume coefficient is positive indicating more fluctuations resulting in more trade. For day traded index futures, trade size is positive indicating that the traders gain. Trade size and inventory seems to be statistically insignificant.

III. CONCLUSION

In the process of evaluation, it is observed that there is large participation of retail investors in this type of market. The retail investors trade more than 45% compared to other classes of traders. It is also concluded that during market momentum period the retail investors speculate more try to benefit out of price fluctuations. For further research purposes it is advised to adopt volatility models using variance unbiased estimators to measure the level of volatility.

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