Derivative Stock Market Analysis in a National Stock Exchange – An Overview

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Abstract

This paper studies Derivative stock market within national stock exchange. Commodity Derivatives markets are a good source of critical information and indicator of market sentiments. Since, commodities are frequently used as input in the production of goods or services, uncertainty and volatility in commodity prices and raw materials makes the business environment erratic, unpredictable and subject to unforeseeable risks.

Volatility in raw material costs affects businesses and can be significant given that commodity prices are driven by supply and demand from domestics as well as global markets. Ability to manage or mitigate risks by using suitable hedging in commodity derivative products, can positively affect business performance. Futures & Options are by far the most common Commodity Derivatives products offered on an Exchange, that are well structured and regulated through robust mechanisms and controls.

The National Stock Exchange of India Limited (NSE) commenced trading in Commodity Derivatives with the launch of bullion futures on October 12, 2018. For 25 years, shaped the equity market. Launched the Derivatives contracts on the popular benchmark Nifty 50 Index in June 2000. NSE has now embarked a journey to shape the commodity market, with the introduction of futures on Commodity Derivatives. With the aim to increase return and reduce risk, derivatives are among the prominence innovation in the financial market. Derivatives facilitates investors enjoy huge profits with limited downside. Derivatives market of India has become a central contributor to the financial system. Despite of this, the derivatives market in India has not yet, accomplished its full potential like other developed capital markets. In terms of derivatives trading NSE has emerge as a winner in comparison to BSE. A lot of trading in futures and options segment in Indian stock market has seen and the number of market participants increased phenomenal in a short period. This paper makes an attempt to examine whether there is significant difference between the growth rate of derivatives in terms of no. of contracts traded and turnover in Equity Derivatives Segment of NSE & BSE, to find whether there is strong correlation between them or not and to forecast the total turnover of FO segments of NSE & BSE. Derivative trading is essential tool for the health of markets as they enhance price discovery and supplement liquidity. Although derivatives have been introduced very late in Indian equity markets they picked up prominence very quickly. In June 2000, index futures were introduced as the first exchange traded equity derivative product in the Indian markets. In a span of a year and a half after that index options, stock options and lastly stock futures were introduced.

Key words: Derivatives, Financial Market, Capital Market, NSE, BSE, Equity Derivatives Segment.

Introduction

Since then, derivatives volumes have grown to multiples of cash market volumes and have been a mode of speculation and hedging for market participants, not possible otherwise through cash markets. In 2007, Statistics from the NSE show that retail investors have been the largest participants in the derivatives markets in the past four-five years, accounting, on average,

for around 60 per cent of all derivatives based activity. Although derivatives are good instruments to expresses complex non linear views on markets, lack of sophistication and understanding has given rise to investments into structured products, which have derivative like payoffs but are bespoke and not exchange traded. With the advent of structured products, many retail and HNI investors have been able to invest for more exotic payoffs compared to linear payoff they used to realize from their cash investments. In 2007, there were numerous institutions offering structured products to their clients and that has lead to growth of the institutional presence in derivatives segment. While the investor invests for a certain period, the issuer of the product constantly uses derivatives segment to hedge his positions to create the desired payoff for its clients. Before the arrival of structured products the main avenues of investment for individual investors have been either investing directly in stocks or equity based mutual funds or in certain cases investing in fixed income securities like corporate and government bonds. Structured products have been created as an alternative to directly investing in underlying asset to give additional benefits to the investor.

All the economic activities or transactions that take place in this uncertain environments of globalization give birth to the different types of financial risks. In order to reduce these financial risks or to manage such risks, various innovative financial instruments have been developed by the endeavors of the financial markets, which are popularly known as financial derivatives. Derivatives are basically instruments used for hedging the risk involved in buying, holding and selling assets whose prices fluctuates. The contract made for hedging the risk of an underlying asset is termed as 'derivative' because it is derived from underlying asset. Thus, the need to hedge the risk of an underlying asset creates a d These are specialized contracts that are designed for a no. of purposes such as enhancing the yield on assets, modifying the payment structure of assets, reduction of funding cost by borrowers. They come up with three important economic functions: Risk Management, Price Discovery & Transactional Efficiency

	NSE		BSE	
Year	Index Futures	Growth Rate	Index Futures	Growth Rate
2003-04	554446		3082.63	
2004-05	772147	39.26	13599.66	341017
2005-06	1513755	96.04	5	-99.96
2006-07	2539576	67.77	55490.86	1109717
2007-08	3820667.3	50.45	234660.2	322.88
2008-09	3570111.4	-6.56	11757.22	-94.99
2009-10	3934388.7	10.2	96	-99.18
2010-11	4356754.5	10.74	154	60.41
2011-12	3577998.4	-17.87	178448.8	115775.9
2012-13	2527130.8	-29.37	122429.8	-31.39
2013-14	3083103.2	22.09	63493.84	-48.14
2014-15	4107215.2	33.2	48632.35	-23.4
2015-16	4557113.6	10.95	13097.16	-73.06
2016-17	4335941	-4.85	2266.86	-84.95
2017-18	4810454	10.94	3217.51	-81.89

Source: Compiled from NSE & BSE websites.

Objective:

This paper intends to explore and review the business growth profile of financial derivatives segment of NSE. Also to reveal the state of correlation between the growth rate of variables between FO segments of NSE

Composition of the Structured Product Market

Prudential ICICI introduced India's first capital-protected constant proportion portfolio insurance (CPPI) product for Indian investors, dubbed the Principal Protected Portfolio (PPP). Developed with Deutsche Bank in London, the product was one of the biggest innovations to hit the Indian market Prudential ICICI's CPPI has since been copied by a host of other issuers keen to tap the demand for principal protection. Typically, these products are issued within the portfolio management services (PMS) line offered by banks to their high-net-worth clients, although the growing appeal of capital protection has also seen the CPPI structure filtering into retail market. Subsequent to that another major development has been the issuance of structured products in note format, created using 'synthetic' options. The first of these was issued by Standard Chartered and structured by Merrill Lynch, offering investors an option-based payoff. The synthetic options are hedged by dealers with international branches and issued in debenture format1 . As demand for these products developed the market saw several issuers coming up with a range of products to suit the needs of the investors. Currently the suite of products available for investors is very rich in variety and innovation.

The existing structured products in the equity space can be broadly classified into the following categories:

• Equity linked notes (debentures) with capital protection

• CPPI and related structures

• Range accruals on Equity index/basket of stocks

• Autocallable notes and other exotic structures

• Structured on baskets of stocks

Range Accruals

Range accrual security is a kind of structured product where the interest is accrued only on days when the underlying equity/index is within a range. The capital is protected in most structures only the interest/coupon is variable. The coupon of the range accrual is paid according to a pre-agreed formula: The fixed % and the range are agreed at the start of the investment. The observation days could be daily, monthly, quarterly or even a single observation at the maturity of the product. Products with single observation at the maturity have been the most popular amongst range accrual notes. In this case the coupon is digital, as in if the underlying ends up within the range the investor gets a fixed coupon or else he just gets his principal back. The chart below shows the payoff of range accrual note for various values of underlying.

Evolution of Structured Notes in India

Although there are no concrete numbers available, the structured product industry is estimated to house products worth more than Rs 10,000 crore, with Citigroup, Merrill Lynch and Kotak accounting for a sizeable chunk of the market4 Prior to May 2005, issuers had been prohibited from explicitly marketing capital-protected products to investors. In August, however, partly as a result of the stock market falls SEBI relaxed these rules allowing issuers to offer funds with a rating agency seal of approval 5 The CPPI structures executed in India are mostly PMS based trading strategies without explicit guarantee of capital return. The capital is guaranteed through dynamically managing the portfolio and when the bond-floor (the minimum amount required to return capital at the maturity) is hit the strategy is liquidated and the proceeds are returned to the investor

or invested in risk-free securities. As volatility in the markets increased in 2007 some of the CPPI products issued earlier got monetized in 2007. Most of the remaining structures got unwound in 2008 when markets fell significantly and bond prices went up (because of fall in interest rates).

Next wave of structured products came in the form of simple capital guaranteed structures with participation in the upside. These structures were very popular in the first half of 2007 when markets were exhibiting volatility. Initially the participation was around 90% with no cap on upside or very high cap. But as the markets sold off significantly in 2008 investors preferred more participation in the upside with a cap. Range accruals were also prevalent around that time as investors did not see much upside or downside in equity markets and as a result of high interest rates they preferred fixed coupon if the market remained in a range.

Aggregation of Risks

The values are for typical products on the basis of a survey done amongst primary issuers. Initially when the products were issued the total delta would have been around 50% of the market size of structured products. This would have amounted to buying demand from issuers to the amount of 5000crore notional in Nifty. Currently almost all the products are trading at close to 0 delta. Thus as we sold off from the peak the issuers are forced to unwind their hedge thus a supply of close to 5000crore notional in Nifty came from the dynamic hedging of these products. This could have further accentuated the fall in the market. The gamma of capital protected notes is positive (unless in the case of a huge rally). Thus hedging of these products would have been one of the causes of market volatility. Also the gamma of range accruals at the time of issuance would have been negative but as we sell off and nifty crosses the lower barrier (which is around 20% lower than the level at the time of issuance) the gamma of the product flips sign and becomes positive. Thus in a sell off the hedging of range accruals is also supportive of volatility.

Effect on Exchange Traded Products

Findings on the effect of the hedging on some of the exchange traded products.

Volatility of Nifty: Hedging has been supportive of volatility on nifty. In a huge rally this support might wane and hedging could become volatility suppressing beyond 4700 Nifty level.

Nifty cash/futures basis: As futures are the preferred way of hedging, the volatility caused by hedging is transferred more to the futures market than the cash market. Hence the futures could trade more volatile than the cash market. This implies the futures could trade at huge discount in sell off and at a premium in a rally.

Digital Options: Unlike linear Puts/Calls which pay a linear pay off if the option is exercised, digital options pay a fixed coupon if the strike condition is met. These options are a straightforward hedge to the range accruals. Also these options are extremely useful expressing certain views on the underlying (like a range bound view or a mild rally/sell off view etc).

Variance Swaps/futures

Variance swap/future is an instrument to hedge/take exposure to the realized volatility of the underlying. In this instrument one of the counterparties receives the floating leg which is the variance of the underlying and pays a predetermined fixed

price. The other counterparty pays the variance and receives the fixed leg. Variance swaps are useful instruments to hedge Gamma exposure without trading short-dated options.

Variance is a measure of how spread out a distribution of daily returns is. It is computed as the average squared deviation of each day's returns from its mean. An example of such a product in the developed markets is the "CBOE S&P 500 Three-Month Variance Futures". These are cash-settled, exchange-traded futures contracts based on the realized variance of the S&P 500 Composite Stock Price Index11. The CBOE S&P 500 Three-Month Variance futures contract is quoted in terms of variance points. Variance points are defined as realized variance multiplied by 10,000. For example, a variance calculation of 0.06335 would have a corresponding price quotation in variance points of 633.50. A "continuously compounded" daily return (Ri) is calculated from two reference values, an initial value (Pi) and a final value (Pi+1), using the following formula:

Ri = ln(Pi+l/Pi).

Daily returns are accumulated over a three-month period, and then used in a standardized formula to calculate three-month variance.

This three-month value is then annualized assuming 252 business days per year:

∑ = 252 * N i i N R V

Where N is the actual number of Nifty values used to calculate daily returns during the three-month period. Futures on VIX: Future contracts on Volatility Indices are extremely useful to hedge the volatility exposure of structured products. These instruments are especially useful to hedge the Vega exposure as VIX is directly linked to the implied volatility. An example of futures on volatility indices is the set of CBOE DJIA Volatility Index (VXD) Futures.12 GAP risk swaps: The gap options are a class of exotic equity derivatives offering protection against rapid downside market moves (gaps). The floating leg of these swaps is paid out if there is a huge move in the underlying beyond a certain trigger/strike (lets say 10% downward move in a day). These options have close to zero delta, allowing to make bets on large downside moves of the underlying without introducing additional sensitivity to small fluctuations, just as volatility derivatives allow to make bets on volatility without going short or long delta. The market for gap options is relatively new, and they are known under many different names: gap options, crash notes, gap notes, daily cliquets, gap risk swaps etc. The gap risk often arises in the context of constant proportion portfolio insurance (CPPI). The CCPI market in India is in nascent stages and might see an increased interest from retail players if there is an instrument available to hedge the Gap risk.

NSE Growth trajectory

1. The turnover value of index futures of NSE is better than the turnover value of index futures of BSE, and there is a weak relationship between two variables and statically there is a significant difference between them.

2. The turnover value of stock futures of NSE was better than turnover value of stock futures of BSE, and they had a weak relationship and statistically there was a significant difference between them.

3. The turnover value of index options of NSE was better than the turnover value of index option of BSE and they had a weak relationship, and statistically there was a significant difference between them.

4. The turnover value of equity options of NSE was better than the turnover value of equity option of BSE and they had a weak relationship, and statistically there was a significant difference between them.

5. The growth rate of turnover value of index futures of BSE is better than the growth rate of turnover value of index futures of NSE, but statically there is no significant difference between them and there is a weak relationship between two variables.

6. The growth rate of turnover value of stock futures of BSE is better than the growth rate of turnover value of stock futures of NSE but statically there is no significant difference between them and there is a weak relationship between two variables.

7. The growth rate of turnover value of index option of BSE is better than the growth rate of turnover value of index option of NSE but statically there is no significant difference between them and there is a weak relationship between two variables.

8. The growth rate of turnover value of equity option of BSE is better than the growth rate of turnover value of equity option of NSE but statically there is no significant difference between them and there is a moderate relationship between two variables.

9. There is a strong chance of following the same trend line by the total turnover in FO segment of NSE.

10. There is a very less chance of following the same trend line by the total turnover of FO segment of NSE due to its over fluctuating nature.

Conclusion

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 136 securities stipulated by SEBI.

The Exchange has also introduced trading in Futures and Options contracts based on Indices. Currently, Derivatives on NIFTY 50 and Nifty Bank 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.

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