Stock Markets

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Derivatives

Derivatives segment : The rising sun of the stock market

Derivatives, a term which denotes financial instruments like forwards, futures, options and swaps, constitute an important segment of stock markets in the developed world, e. g. *America and Western Europe. Derivatives made their appearance on the Indian scene only recently,* i.e., *in the year 2000.*

In this article, the author explains the meaning, nature and significance of a derivative as well as sets out the salient features of trading therein, especially in the form of futures and options, observing that derivatives, if handled properly, can reduce risk and enhance returns. The author notes that the Indian experience in the derivatives segment so far has been encouraging and forecasts a bright future for it, describing it as the rising sun of the Indian stock market - **EDITOR**

Introduction

1. The term 'derivative' originated in mathematics. It refers to a variable that derives its value from another variable. A 'derivative product' or simply a 'derivative' indicates that it has no independent value of its own and it derives its entire value from the value of the underlying cash asset, *i.e.*, the asset bought and sold in the cash market on normal delivery terms. In other words, the value of a derivative instrument is contingent upon the value of the underlying asset. The underlying asset can be any commodity, precious metal, currency, bonds, stocks, etc. Four most common examples of derivatives are Forwards, Futures, Options and Swaps.

Derivatives are tools used for transfer of risk from those who are risk averse to those who are willing to undertake the risk. Derivatives allow efficient transfer of financial risk and can help to ensure that value enriching opportunities are not ignored. Thus, derivatives can reduce risk and increase returns if they are used properly. In short, derivatives perform, *inter alia,* the following economic functions :—

(*i*) risk management,

(*ii*) price discovery, and

(*iii*) transactional efficiency.

In order to develop an appropriate regulatory framework for derivatives trading in India, the SEBI appointed a committee under the chairmanship of Dr. L.C. Gupta in November 1996. The Committee's concern was with financial derivatives in general and equity derivatives in particular. The

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Committee submitted in its report to the SEBI in December 1997 and strongly favoured the introduction of financial derivatives in India so as to provide the facility for hedging against market risk in the most cost-efficient way. The Committee recommended the introduction of equity derivatives in the Indian stock market in a phased manner so that the complex types were introduced only after the market participants had acquired some degree of comfort and familiarity with the simpler types. In order to give effect to the recommendations of the committee, a definition of the term 'derivative' has been inserted in the Securities Contracts (Regulation) Act, 1956 by the Securities Laws (Amendment) Act, 1999. The said definition is reproduced below :—

"Derivatives" includes—

(A) A security derived from a debt instrument, share, loan, whether secured or unsecured, risk instrument or contract for differences or any other form of security;

(B) A contract which derives its value from the prices, or index of prices, of underlying Securities.

The trading in the 'stock index futures', one of the most popular derivative instruments, commenced at the BSE and the NSE from 9/12-6-2000, respectively. In the year 2001, trading also started in other derivative instrument, namely, 'Index options', 'Futures on individuals stocks' and 'Options in individual stocks'. This article proposes to have a close look at the various kinds of derivative instruments that are available in the Indian stock market and how investors can effectively use them, for the purpose of hedging as well as for speculative purposes.

Use of Derivatives for hedging

2. Hedging is carried out to eliminate the risk associated with price fluctuations. In other words, hedging is an act in which an investor seeks to protect a position or anticipated position in the spot market by taking an opposite position in derivatives. Thus, it helps in locking existing profits. In general a business is subject to risks, which is a common phenomenon. Some of the risks can be avoided but not all. The risks can be broadly classified into two categories :—

(*i*) Diversifiable risk, also known as unsystematic risk or non-market risk, of a security that arises from the company specific factors like strike in factory, non-availability of power/raw materials, legal claims, etc. This component of risk can be reduced through effective planning and diversification, *i.e.*, by adding more stocks to the portfolio.

(*ii*) Non-diversifiable risk also known as systematic risk or market risk of a security that depends upon the outcome of economy related events like budget announcements, credit and monetary policies of the Central Bank, change in Government policies, etc. Such risks affect almost all the companies, irrespective of the sector in which

they are operating. Therefore, these risks can not be reduced even if the investor's portfolio is broad-based. Derivatives are there to take care of such risks.

The use of forwards/futures as hedging technique is a very old practice in commercial and industrial transactions. However, its application to financial transactions is only around 25 years old. An example of hedging is that of a wheat farmer, forward selling his harvest at a known price to eliminate the price risk. Conversely, a bread factory may want to buy wheat forward so as to effectively plan its production schedule without any risk of price fluctuations. Thus, the hedging transaction is beneficial to the farmer as well as the bread factory.

Participants in the Derivatives Segment

3. Generally, banks, corporates, financial institutions, individuals and brokers are seen as regular participants in the derivatives segment. On the basis of the motives and the strategies adopted, the participants can be classified into the following three categories :—

- *Hedgers :* Hedgers wish to eliminate or reduce the price risk to which they are exposed. They provide the economic substance to the market, as without them the markets will merely become a place for gambling.
- *Speculators :* Speculators are basically traders who enter into 'futures' or 'options' contracts so as to make profit from subsequent price movements. They do not have any risk to hedge; rather they operate at a high level of risk in anticipation of making profits. Although excessive speculation is not desirable, but to some extent speculation is necessary since it imparts liquidity to the market.
- *Arbitrageurs :* The act of obtaining risk-free profits by simultaneously buying and selling similar instruments in different markets is known as 'arbitrage'. The person who does this activity is known as an 'arbitrageur'. *For example* : - A person can buy shares at the BSE at a lower price and sell them at the NSE at the same time at a higher price. In the case of derivatives, the arbitrageurs help in maintaining consistency in the value of the derivative and the price of the underlying security.

Futures

4. The development of futures trading is an advancement over 'forward trading', which has existed for centuries and has grown by *leaps and bounds* as a result of the need for hedging the price risk involved in commercial transactions. 'Futures' can be broadly classified into two categories - 'Commodity Futures' and 'Financial Futures'. The basic difference between the two is in the nature of the underlying asset. In case of 'commodity futures', the underlying asset is a commodity, *viz.*, wheat, rice, cotton, pepper, crude oil, gold, silver, etc. Such contracts began trading on the CBOT (the Chicago Board of Trade) in 1860's. In India too,

futures on soyabean, pepper and spices have been trading for long. On the other hand, in case of 'financial futures' the underlying asset is a financial instrument, *viz.*, treasury bills, bonds, stocks, stock-index, foreign exchange, money market instruments, interest rates, etc. Among financial futures, the first to emerge were currency futures in 1972 at the Chicago Mercantile Exchange in the U.S.A. Interest rate futures soon followed these. Stock index futures and options first emerged in the year 1982.

A financial futures contract can be defined as an agreement to buy or sell, on any recognised exchange, a standard quantity of a specific financial instrument at a future date and at a price agreed to between the two parties. Although the contract is between the buyer and the seller, their obligation is not towards each other but to the clearing corporation, of the exchange, that guarantees the performance of the contract. The standardised items in any futures contract are as follows :

(*i*) quantity of the underlying;

(*ii*) quality of the underlying (not required in financial futures);

(*iii*) the date and month of delivery;

(*iv*) the units of price quotation (not the price itself) and minimum change in price (tick-size); and

(*v*) location of the settlement.

Difference between Forward & Futures Contract

5. As both the forward contracts and futures contracts are used for the purpose of hedging, it is important to understand the distinction between the two and their relative merits and demerits. Forward contracts are private bilateral contracts and as such are exposed to risk of default by the counter party. Each forward contract is unique in terms of contract size, expiration date and the asset type/quality. Moreover, as the contract price is not publicly disclosed, it is not transparent.

In sharp contrast to this, 'futures contracts' are standardised tradeable contracts. As futures are traded on specially designed exchanges in a highly sophisticated environment and under stringent financial safe-guards, they are not only transparent but liquid also. Their market price and trading volumes are regularly reported. As the clearing corporation guarantees performance of each and every contract, there is no risk of default by the counter party. Moreover, a forward contract can be reversed only with the same counter party with whom it was entered into, whereas a futures contract can be reversed (squared off) with any member of the futures' exchange.

'Futures' relating to stock market

6. As far as the stock market is concerned, futures are of two kinds - (*a*) 'stock index futures' and (*b*) 'futures on individual stocks' also known as 'stock futures'. In case of stock index futures, the underlying variable

is a stock index. Thus, a 'stock index future' derives its value from the value of the stock index. Stock market index is a composition of select securities traded on that stock exchange. A stock market index not only acts as a barometer for measuring the market behaviour but also serves the purpose of benchmarking portfolio performance. In India the BSE Sensex (comprising of thirty stocks) and the S&P CNX Nifty (comprising of fifty stocks) are being used as stock indices for the purpose of trading in stock index futures. Theoretically, an investor who buys a stock index future agrees to buy all the stocks comprised in the stock index and an investor who sells such a contract agrees to sell the entire stock index. 'Stock Index Futures' are used to hedge the stocks of shares by acquiring a short position during an anticipated fall in prices. Similarly, a long position can be acquired in case prices are expected to rise. Thus, 'stock index futures' can be used for speculative purposes also.

There are around sixty exchanges in the world where trading takes place in stock index futures. Worldwide, stock index futures are very popular because of the following reasons :—

- Institutional and other large equity holders need portfolio-hedging facility.
- They are difficult to manipulate as compared to individual stock prices.
- They are much less volatile, being an average of a number of stocks.
- In case of individual stocks, the positions that remain open on the expiration day have to be settled by physical delivery. However, stock index futures are cash settled since it is virtually impossible to deliver all the stocks comprising the stock index and that too in the proportion in which they appear in the index on the date of settlement.

In the case of 'stock futures', equity shares of any of the selected companies are the underlying asset. Trading in stock futures commenced in India on 9-11-2001 and at present such contracts are available for shares of 31 companies. It is worth noting here that trading in 'stock futures' is permitted in very few countries. In the USA, 'stock futures' were banned around 18 years ago. However, recently the ban has been lifted and it is expected that trading will commence in this derivative instrument from April 2002. Moreover, in the countries in which trading in stock futures is permitted, the trading volume is not much, as investors prefer to trade in stock index futures due to the advantages of trading in index futures cited above. However, in India, within a short period, the trading volume in 'stock futures' at the NSE has grown more than five times of the trading volume in stock index futures.

One of the reasons for such an overwhelming response to this derivative instrument by Indian investors is that the product is very much similar to the erstwhile 'badla' system, as both of them allow carry forward of

positions. Similarly, both the 'badla' and 'stock futures' also allow trading on margins. Thus, a speculator can take a position on a particular stock by depositing a small amount as margin as compared to the amount which he needs to invest in the case of purchase of shares directly from the cash market. It seems that the market has very easily understood the intricacies of stock futures and has started looking at this instrument as a good alternative to the erstwhile 'badla' system that was banned by the SEBI *w.e.f.* 2-7-2001 in view of the stock market crash in March 2001.

Till now, both the stock index futures and the stock futures are cash-settled. However, there is a possibility that in order to give depth to the cash market and also for the purpose of integration of the derivatives' market and the cash market, the SEBI may allow settlement of 'stock futures' through physical delivery of shares. If this is allowed, the trading volume in stock futures will rise further as even the conservative investors may also venture into this new area. Such an amendment will also provide a golden opportunity to institutional investors and mutual funds that have portfolios of thousands of crores.

Trading in 'Futures'

7.1 *Experience of BSE and NSE* - Trading in stock index futures with the 'BSE Sensex' or the 'S&P CNX Nifty' as the underlying assets is just like trading in any other security. As far as futures' trading at the NSE on Nifty is concerned, the minimum lot size is 200 and an investor can choose from any of the three series of contracts that are available in the market. The three series of contracts are of nearly one month, two months' and three months' duration. A contract expires on the last Thursday of the expiry month or the previous trading day, if the last Thursday is a holiday. New contracts are introduced on the next working day. Thus, the following three series of contracts were available for trading in the month of February 2002 :—

Category	*Expiry/Settlement**
One Month Nifty Futures	28-2-2002
Two Month Nifty Futures	28-3-2002
Three Month Nifty Futures	25-4-2002

*Contract expires on the last Thursday of the expiry month.

Thus, on 1-3-2002, futures contract expiring in March, *i.e.*, on 28-3-2002 became one month futures contract, futures contract expiring in April became two months' futures contract. A new contract having three months duration and expiring on last Thursday of May 2002, *i.e.*, 30-5-2002 was introduced. Therefore, we can say that at any point of time, there are three series of futures' contracts running simultaneously and an investor can choose from any of these contracts.

7.2 *Margin Requirements* - Traders in the stock market have to deposit margin money with their brokers before they are allowed to commence trading in the futures' market. The objective behind the deposit of margin money is to minimise the risk of default. The margins are of the following kinds :—

- *Initial margin :* It is the margin amount required to be deposited before any transaction is entered into. The initial margin has to be deposited with the broker, and the broker, in turn, deposits the same with the stock exchange.
- *Maintenance margin :* It is the minimum amount of margin that must be maintained in the margin account. In other words, whenever the margin amount dips below this level the trader is required to deposit more amount as margin, so as to bring back the total amount equal to the initial margin.
- *Variation margin :* It is the amount of margin which is required to be deposited by the trader, when the balance in the margin account dips below the maintenance margin.
- *Additional margin :* In case of a sudden spurt in the volatility level, the exchanges may also impose additional margin. Such margins are imposed in order to avoid a situation of crisis like a payment crisis.

After paying the initial margin as aforesaid, an investor can enter into a futures contract. The contract so entered into can be kept open until the expiry of the contract or, in the alternative, it can also be squared off before the expiry of the contract by entering into a reverse transaction. *All the open positions in the futures market are 'marked-to-market'.* In other words, every day the open positions of investors are revalued on the basis of the value of the underlying security and whatever the profit or the loss is, the same is credited or debited to the margin account of investor. This process ensures that the actual daily loss incurred on all open positions is paid up by the losing member and is credited to the account of the gaining member on a T+1 (Trading day + 1) basis.

For example: If Mr. Smart had bought 200 Nifty April expiry, futures on 11-2-2002 at the rate of Rs. 1,000 per unit and the broker had demanded a margin of 20 per cent on the value of the contract, then Mr. Smart must have deposited a margin of Rs. 40,000. If on February 12, the index (S&P CNX Nifty) closed at 1010 points, then Mr. Smart's margin account will be credited by Rs. 2,000, *i.e.*, 200 units × (1010 - 1000). Thus, the margin account will stand at Rs. 42,000. However, if due to some unfavourable news, the index falls down to 970 points at the end of trading hours on 13 February, then Mr. Smart's account will be debited by Rs. 8,000, *i.e.*, 200 units × (1010-970). Thus, his margin account will

show a balance of Rs. 34,000 only, *i.e.*, (Rs. 42,000 - Rs. 8,000). If the stock market continues to go down, the margin account of Mr. Smart will go on being debited and in case the balance in the margin account falls below the maintenance margin, Mr. Smart will be called upon to pay such an amount as will bring back the total amount in the account to Rs. 40,000.

In such a situation, in order to avoid further losses, Mr. Smart may take a decision to square off his position which is possible by entering into a reverse transaction, *i.e.*, by selling 200 Nifty April expiry futures. Suppose he enters into such a transaction on February 14 at the rate of Rs. 960 per unit, then he will further lose Rs. 2,000, *i.e.*, 200 units × (970-960). Thus, his broker will ultimately return to him an amount of Rs. 32,000 (Rs. 34,000 - Rs. 2,000).

In the alternative Mr. Smart could have waited until the expiry of the contract, *i.e.*, up to 25-4-2002 and if the index had closed on that date at 1030 points, then Mr. Smart would have made a profit of Rs. 6,000, *i.e.*, 200 units × (1030-1000).

Options

8. An option is a contract that confers upon its holder a right, but not an obligation, to buy or sell an underlying asset at an agreed price during a specific time period. The underlying asset can be any commodity, currency, security, stock-index, individual stock, etc. The holder (buyer) of options has a right but no obligation, while the writer (seller) of options has an obligation but no right. There are two types of options, *viz.*, call option and put option. A call option is a contract that gives the holder the right to buy the underlying asset at a pre-determined price known as the strike price during a specific time period. A put option is a contract that gives its owner the right to sell the underlying asset at a pre-determined price known as the strike price during a specific time period. The owner of the option has to pay a certain premium to the writer of the option that is determined by the market forces.

When the owner of a call or a put option decides to use the right to buy or sell the underlying instrument, he is said to be exercising his option. The owner has the choice whether to exercise his option or not, but the writer of the option has no choice. In other words, the writer is obliged to sell (in case of an exercised call) and to buy (in case of an exercised put), the underlying asset. The owner of the call option will exercise his option only if the market price of the underlying asset rises above the exercise price. Similarly, the owner of a put option will exercise his option to sell only if the market price of the underlying asset is less than the exercise price. Thus, the risk of the buyer of option is limited to the amount of premium already paid. On the other hand, the risk of the seller of the option is

unlimited since the market price of the underlying asset which he is bound to deliver or acquire at the exercise price can go up to any level.

From the above submissions, we can make out the difference between 'Futures' and 'Options'. The basic difference is that 'futures contracts' are agreements to make or take delivery of a specified amount of an asset at a specified price on a specified future date. Thus, a futures' contract binds both the buyer and the seller whereas in case of an 'options contract' there is no such binding obligation on the part of buyer. In other words, he takes a decision whether to exercise the option or not on the basis of the market price of the underlying asset.

There are two categories of options depending upon the exercise style, *viz.*, the American style option and the European style option. In the American style option, the owner of the option can exercise his right at any time during the lifetime of the contract, while in the case of a European style option, the right can be exercised only on the last trading day of the expiry month. The reasons that may prompt an investor to purchase options are the benefits of option, *viz.*, high leverage, known limited risk, and large profit potential.

Trading in options

9. In India the options' trading has commenced at the BSE & the NSE in the form of (*a*) 'index options' and (*b*) 'stock specific options' also known as 'stock options'. Index options are available for trading at the BSE on the 'BSE Sensex' and at the NSE on the 'S&P CNX Nifty' from 1/4-6-2001 respectively. Stock specific options are presently available for fifteen stocks from July 2001. Just like futures, both the abovementioned kinds of options are also available in the maturity periods of the nearest one, two and three months. The option contract expires on the last Thursday of the expiry month. The exercise style of index options is the European style, whereas exercise style of 'stock options' is the American style.

An option transaction that is not exercised simply dies on the expiry day with the loss of the buyer of the option being limited to the amount of premium already paid by him to the seller of the option. This happens when the market price of the underlying security does not cross the strike price.

Pricing of options : The price of an option contract, *i.e.*, option premium, consists of two parts :— (*i*) intrinsic value and (*ii*) extrinsic value. The price mainly depends upon the following factors :—

- *Strike Price* v. *Underlying Price* : The difference between the strike price and the prevailing market price of the underlying asset determines the intrinsic value of the option. The higher the intrinsic value,

the higher will be the premium to be paid for acquiring the option and *vice versa.*

- *Time to maturity :* The longer the time period that remains for an option to expire, the higher is the premium payable, since the risk involved is more. Therefore, option contracts for three months duration are more costlier than option contracts for one or two months.
- *Volatility of the underlying security :* The greater the volatility of the underlying security, the greater is the premium, since the risk involved is more.
- *Demand and Supply :* As the premium is determined by market forces, it is ultimately the demand and supply position that has a significant role to play in determining the price of an option contract.

Concept of 'In-the-Money', 'At-the-Money' and 'Out-of-the-Money' options

10. There are three different terms used for describing as to where an option is trading in relation to the prevailing market price of the underlying security. These terms are 'in-the-money', 'at-the-money' and 'out-of-the money'. A call option is said to be 'out-of-the-money' when the strike price is greater than the prevailing market price of the underlying security. In such a case, the buyer of the option will not derive any benefit by immediately exercising the call option. He has to wait until the market price of the underlying security crosses the strike price. Suppose in the case of 'stock options', current market price of Reliances's share is Rs. 320, then an option to purchase the share at any time during the next two months at Rs. 340 per share will be 'out-of-the-money' by Rs. 20. Similarly, an option to purchase the share at Rs. 310 will be 'in-the-money' by Rs. 10 as strike price is less than the current market price by Rs. 10. Thus, the intrinsic value of this option is Rs. 10 as the buyer of the option can get a profit of Rs. 10, if he immediately exercises the option. Therefore, the premium to be paid is the highest in the case of 'in-the-money' options. If it is an option to purchase the share at Rs. 320 itself within the next two months, then the option will be 'at-the-money' since the strike price is equal to the prevailing market price. As 'at-the-money' and 'out-of-the-money' options do not have any intrinsic value, their price is entirely based on the extrinsic value or time value.

Conversely, a put option will be 'out-of-the money', if the strike price is lower than the prevailing market price of the underlying asset. A put option will be 'in-the-money', if the strike price is greater than the prevailing market price of the underlying asset.

Risks associated with derivatives

11. A common misconception about derivatives is that they are highly risky and complex. It is not correct, because derivatives themselves are not risky, rather they are tools that can be used for reducing the risks inherent in other investments. The risks that are associated with derivatives can be broadly classified into the following categories :—

- *Market Risk :* Market risk of a derivative product is the risk of adverse price movement in the underlying asset.
- *Credit Risk :* Credit risk is the risk that the counter party may commit default in meeting its obligation. However, in case of exchange traded derivative products like futures and options, there is no credit risk as the clearing corporation of exchange guarantees performance of each and every contract.
- *Liquidity Risk :* Liquidity risk can be of two kinds - (*i*) Market liquidity risk, *i.e.*, an entity may not be able to unwind or square off a derivative transaction and (*ii*) funding liquidity risk, *i.e.*, an entity may not be able to meet its obligations on the settlement date or net margin calls due to mismatch between inflows and outflows of funds.
- *Legal risk :* It arises from the fact that an entity may not be able to enforce a hedging contract, because it is not legally enforceable.
- *Operational risk :* It is the loss arising from human error, management failure and fraud or from shortcomings in internal systems and controls.

As long as derivative instruments are used for the purpose of hedging, they are not at all risky. The element of risk comes into the picture only when derivatives are used for the purpose of earning speculative profits. Derivatives related disasters such as the collapse of Barrings and Orange County bankruptcy have put a question mark on the ability of the individual participants in the derivatives' segment in effectively managing their risk. This has also highlighted the need for stringent regulations and effective supervision by the regulator for ensuring timely detection and control of potential derivative losses. However, most experts feel that regulators can not do much in the matter and it is only self-regulation and properly laid down policies and procedures and well established internal control systems that can help in controlling the losses resulting from excessive speculation in the derivatives' market.

In a country like India where stock market scams come to light after every few years and the SEBI has put the blame of the stock market crash in March 2001 on excessive speculation due to erstwhile 'Badla system', the need for effective supervision is still greater. The regulator must super-

vise as to how the market participants are using various derivative products, especially the 'stock futures'.

Conclusion

12. The year 2001 was very eventful for the derivatives segment of the Indian stock market as three new derivative products, namely, 'index options', 'stock options' and 'stock futures' were introduced. During the last year the interest in the derivative instruments increased tremendously, especially after the terrorist attacks on the WTC in the USA on 11-9-2001. This is because the players who had kept their open long positions hedged by using derivative instruments were substantially able to mitigate their losses, whereas the other players were caught unaware. After the introduction of 'stock futures' in November 2001, there has been a significant rise in the turnover in the derivatives' segment at the NSE and at present the daily turnover is more than Rs. 1,000 crore. It is expected that, with the passage of time, more and more investors will gain knowledge of and confidence in derivative instruments. The SEBI has also cleared the decks for trading by FIIs in the derivatives segment. Thus, it is expected that by the end of 2002, the turnover in the derivatives segment might go up to 50 per cent of the turnover in the cash market. In view of these facts, we can conclude that the derivatives segment is the rising sun of the Indian stock market.