

## Introduction to Derivatives (Part two)

### Option Basics

An option is simply the **right**, but **not the obligation**, to buy or sell something at a predetermined price within a specified time period. It is a contract between two parties wherein the buyer receives a privilege for which he pays a fee (premium) and the seller accepts an obligation for which he receives a fee. The premium is the price negotiated and set when the option is bought or sold.. An option, just like a stock or bond, is a security. It is also a binding contract with strictly defined terms and properties.

A **CALL gives** the buyer the right to **BUY** an asset, while a **PUT** gives the buyer the right to **SELL** an asset. An option buyer is paying a premium for the right to make a choice sometime in the future on whether he wants to complete the transaction at the agreed upon terms, or just walk away from the deal.

**For example**, an option on a piece of property gives the buyer the right, but not the obligation, to purchase the property during a stated period of time at a stipulated price. If the buyer decides to exercise his option to purchase, the seller is obligated to turn over the property at the agreed upon price. An option, which is left unexercised, expires worthless after a stated period of time.

### Calls ... The Right to Buy

A **Call option** gives the holder the right to purchase the underlying asset at the stated strike price on or before the expiration date. Calls are similar to having a long position on a stock. The Buyer of the call option hopes to profit from an increase in the price of the underlying asset before the option expires.

### Puts ... The Right to Sell

A **Put option** gives the buyer the right to sell the underlying asset at the strike price on or before the expiration date. Puts are very similar to having a short position on a stock. The Buyer of the put options hopes to profit from a decrease in the price of the underlying asset before the option expires.

Option Type	Buyer of option	Writer of Option
<b>Call</b>	Right to buy the asset	Obligation to the sell asset
<b>Put</b>	Right to sell the asset	Obligation to the buy asset

## Underlying Asset

The asset that can be bought or sold with an option is known as the underlying asset. An option is merely a contract that deals with an underlying asset. For this reason, options are called derivatives, which means an option *derives* its value from something else. In our case, the underlying asset is a stock or an index.

## Types of Options

There are two main types of options based on the exercise styles:-

- **American options** can be exercised at any time between the date of purchase and the expiration date. Most exchange-traded options are of this type.

- **European options** are different from American options in that they can only be exercised at the end of their life i.e. on the date of expiry.

The distinction between American and European options has nothing to do with geographic location.

In India, we have: -

- **Index Options-European Options**

- **Stock Options-American Options**

**In fact, India is one of the few markets which has both European and American options.**

**Buyer of an Option:** The buyer of the option is the person who pays the option premium upfront and buys the right, but not the obligation, to exercise his option with the writer of the option.

**Option Writer:** The seller / writer of an option is the person who sells the right to of exercising the option to the buyer and receives an option premium upfront in return and is thereby obliged to buy / sell the underlying asset if the buyer exercises his option.

**Strike Price:** It is also called the exercise price. The strike price denotes the price at which the buyer of the option has a right to purchase or sell the underlying asset. This price is a fixed number and does not change during the life of the option.

### **Expiration Date**

All Options have specified date for maturity; known as expiration date. If the last Thursday is a trading holiday, the contracts expire on the previous trading day.

After this date, the options are worthless. Options contracts have a maximum of 3-month trading cycle - the near month (one), the next month (two) and the far month (three). On expiry of the near month contract, new contracts are introduced at new strike prices for both call and put options, on the trading day following the expiry of the near month contract. The new contracts are introduced for three month duration.

**In India, last Thursday of every month's contract is taken as the expiration date**

<b>Option Contract</b>	<b>Expiry Date</b>
Jan 2003	30Jan2003
Feb2003	27Feb2003
March2003	27Mar2003

At any given point of time, 3-month contracts would be available for trading. In the beginning of January; Jan, Feb and Mar option contracts are available. After the expiry of Jan Option we would have Feb, Mar and Apr option contracts available and so on.

### **Option Premium**

Option Premium is the price the buyer has to pay the seller to purchase the right to buy/sell the asset at the strike price. This consists of two parts: Intrinsic value and Time value.

### **Intrinsic value**

The amount an option holder can realize by exercising the option immediately. Intrinsic value refers to what the option is actually worth. Intrinsic value is always positive or zero.

*Intrinsic value of a Call Option = underlying product price - strike price*

*Intrinsic value of Put Option = Strike price - underlying product price*

An Option is **In-the-Money** when there would be profit exercising it immediately and **Out-of-The-money** when it would be worthless if exercised immediately. A call option is in-the-money when the underlying price is higher than the strike price and out-of-money when the underlying price is lower than the strike price. A

put option is in-the-money when the underlying price is below the strike price and out-of-the-money when the underlying price is higher than the strike price.

The option with the strike price closest to the prevailing market price of the underlying products is At-The-Money.

**Say if the Equity Price of Infosys is 4000;** then call options below this price would be ITM and put options above this price would be ITM. And the call options above this price would be OTM and put options below this price would be OTM.

<b>3900 Call</b>	<b>3900 Put</b>	<b>4000Call</b>	<b>4000Put</b>	<b>4100 Call</b>	<b>4100 Put</b>
ITM	OTM	ATM	ATM	OTM	ITM

The Exchange provides a minimum of five strike prices for every option type (i.e. call & put) during the trading month. At any time, there are two contracts in-the-money (ITM), two contracts out-of-the-money (OTM) and one contract at-the-money (ATM).

### **Time value (extrinsic value)**

Time has value, since the longer the option has to go until expiry, the more opportunity there is the underlying price to move a level such that the option becomes in-the-money. The time value is the premium value that exceeds the intrinsic value. Generally longer the time to expiry, the higher the option's time value.

Options are “**wasting assets**” which means that the value of an option declines over time. The time value declines at an accelerating rate as the expiration date approaches. If we buy an option that is not in-the-money, i.e. no intrinsic value, the entire premium is being paid for time value.

### **Factors affecting option prices**

1. **Current Asset Price** –If a call option is not exercised in the future, the return from a call option is the amount that the asset price exceeds the strike price. Call options become more valuable as the asset price increases. As the strike price increases, the call value decreases. The opposite is true for a put option. The return from a put option is the amount by which the strike price exceeds the asset price. Put options become less valuable as the asset price increases and more valuable as the strike price increases.
2. **Strike Price** – As the strike price increases, the call value decreases as the intrinsic value of the option goes down and conversely, put options become more valuable as the strike price increases as the intrinsic value of the option is increasing.
3. **Time to Expiration** – Both American call and put options become more valuable as the expiration time increases. For European options the result is not as straight forward.
4. **Volatility** – A measure of the price movements of the underlying instrument of that option. Option prices increase as volatility rises and decrease as volatility falls. More the volatility of the underlying instrument, the greater the time value will be. The greater will be the uncertainty faced by the option seller, thereby resulting in a higher option premium.

There can be other factors, such as interest rates or dividends (in the case of equities), that weigh on options prices. But each of the four factors indicated above has a direct effect on the value of an option, causing the option to become more or less expensive as the factor changes.

### **Options to Option Holders**

Options trade just like stocks, commodities and bonds. These contracts can be bought and sold the same way you buy and sell other financial assets. Once an option has been bought there are three ways you can get out of a long position:

- **Exercise the option**
- **Offset the position**
- **Let the option expire**

### **Exercise the option**

The decision to exercise at expiration of the option is clear. The call owner should exercise the option if the strike price is less than the value of the underlying asset. The option has intrinsic value, the difference between the price of the underlying asset and the strike price of the option. Conversely, the owner of a put should exercise the option if the strike price is greater than the price of the underlying asset. The intrinsic value of the put is the difference between the price of the underlying instrument and the strike

All Stock Options listed in India are American style options, which means that they can be exercised (converted to the underlying asset) on any day until the option expires. That “exercise is one of several rights held by the owner of an option. But there is no reason to exercise before expiration day because an option has time value in addition to intrinsic value; time premium that would be lost on exercise. There is no time premium left at expiration but until then the best way to get out of a long option position is to sell the option and capture the remaining time premium.

### **Offset the position**

This is the most common method of closing out an option position. If we bought an option initially, we close the position by selling a call or a put identical to the

call or put originally bought. By offsetting before the expiration date we will recover the remaining time value of the option and avoid any costs or risks associated with option exercise. The profit or loss on the transaction is the difference between the premium paid when buying the option and premium received when selling the option, less commissions and exchange fees.

### **Let the option expire**

Why? If the option is not in-the-money at expiration, it has no value. That is precisely why people choose to write options ...*to capture the premium and have the option expire worth-less*. Option buyers pay for the right to hold their option until expiration knowing that the most they can lose on the transaction is the initial premium paid. Approximately 98% of options positions are closed out with an offsetting transaction or by letting the option expire worthless. Even options that have value are usually offset, rather than exercised, before expiration except for the last few trading days of the contract.

The seller has the option to either offset the deal or let it expire. He doesn't enjoy the right to exercise as the holder of the option has acquired this right.

### **Writing of an Option**

Option buyers pay (in option terms the amount paid is called "premium") for the right to buy (call) or sell (put) at the strike price to option seller, or option writer, who is the person that guarantees the buyer's rights. In return for guaranteeing the buyer's right to buy (call) or sell (put) at a pre-determined price within a specified time period, the option writer gets to keep the premium paid by the

buyer. That amount, the option premium, is the maximum money that the option writer can make on the transaction. If the option expires worthless, then the writer gets to keep all the money. However, there's a huge risk involved in this trade; therefore; one is required to pay up margins as long as the position holds. There are 3 ways to exit a short position

- **Buy back the option**

The option writer is not locked into holding the option he wrote until it expires or is exercised. The writer can always buy an option with the same strike price and expiration date as the one he sold to offset his position, just as a trader who is short the futures or stock market can cover his short position.

- **Let it expire**

If the option expires worthless then the writer would keep the entire premium.

- **Being assigned a underlying asset position**

If the writer is short on an in-the-money option then there's a risk of the option holder choosing to exercise his/her right to either buy/sell the underlying asset (stock). Consequently, the writer may be assigned a position in the underlying asset marked from the strike price.

Say, the writer sold Infosys 4700 Jan Put Option for Rs 111.25 on 1<sup>st</sup> Jan 2003. Here, the writer has sold the right to sell to the option buyer who may sell the underlying to the writer at the strike price. If the price were above 4700 at the expiration date, the writer would make money. If the price were below 4700; say 4411.25, then the option writer would incur a loss of Rs  $(4411.25 - 4700 + 111.25)$  i.e. Rs. 177.5.

Option Writing is not for everyone. Few points have to be kept in mind while writing options: -

- Make sure that you have adequate margin for the trade.
- Don't let the short position runaway from you. You must always have a stop-loss and be disciplined about the same.

When we would sell either call/put and receive premium; we would fix a stop to the extent of the break-even price i.e. if the price goes beyond the break-even price we would liquidate our position limiting our loss the premium received.

## **Option Strategies**

We have earlier discussed profits or losses that could be generated by buying a single call or put option. In the following pages, a full range of profit making patterns shall be discussed using a combination of two or more options. One of the main attractions of using options is that they can be used to create a very wide range of payoff patterns. The various option strategies can broadly be classified into 3 broad categories-

### **BUYING OUTRIGHT OPTIONS**

**Buying a Call:** This is done when the market is expected to move higher in a short period of time. The advantage is the opportunity of unlimited profits with a limited risk. However, time-value depreciation and other extrinsic forces work against this position.

**Buying a Put:** When the market is expected to move lower in a short period of time, simply buying a put option gives the advantage of unlimited profit potential with limited risk. The disadvantages are the extrinsic forces of time decay and volatility working against the position.

## **SPREADS**

A spread trading strategy involves taking positions in two or more options contracts of the same type. There are four main spreads: Bear, Bull, Butterfly, and Calendar spreads.

**Bear Spreads:** A bear spread is created by a short position in a put option with a strike price  $X_1$ , combined with a long position in a put option with a strike price  $X_2$  where  $X_2$  is greater than  $X_1$ . For a call option, a long position in a call option with a strike price  $X_1$ , combined with a short position in a call option with a strike price of  $X_2$  where  $X_1$  is greater than  $X_2$ .

This strategy looks for maximum profit when the price of the underlying security declines. The strategy involves the simultaneous purchase and sale of options; puts or calls can be used. A higher strike price is purchased and a lower strike price is sold. The combination is prepared in a way that both the options have the same expiration date. As a result, profit is made from this strategy if the underlying stock goes down and a loss is incurred if the underlying security rises in price.

**Bull Spreads:** A bull spread is created by a long position in a call option with a strike price  $X_1$ , combined with a short position in a call option with a strike price  $X_2$ , where  $X_2$  is greater than  $X_1$ . For a put option, a short position in a put option with a strike price  $X_1$ , combined with a long position in a put option with a strike price  $X_2$  where  $X_1$  is greater than  $X_2$ . An option strategy in which maximum profit is attained if the underlying security rises in price. The options have the same expiration date.

**Box Spreads:** A spread that is created with a bullish call spread plus a put bearish call spread, with the two spreads having the same pair of strike prices. A box spread consists of a long call and short put at the same strike price  $X_1$  plus a short call and a long put a higher strike price  $X_2$ . At expiration, box spread will pay the difference between the high and low strike prices,  $X_2 - X_1$  irrespective of the price of the underlying security at the time of its expiration. The present value of the box spread needs to be considered to avoid potential arbitrage opportunities.

**Butterfly Spreads:** A spread that is created with a long call option position with a strike price  $X_1$ , a long call option position with a strike price  $X_3$ , and a short position with two call options having the same strike price  $X_2$ , where  $X_3 > X_2 > X_1$  and  $X_2$  is half way between  $X_1$  and  $X_3$ . For a put option, a position is created by taking a long position in a put option with a strike price  $X_1$ , a long position in a put option with a strike price  $X_3$ , and a short position in two put options with a strike price  $X_2$ , where  $X_1 > X_2 > X_3$  and  $X_2$  is half way between  $X_1$  and  $X_3$ . Generally,  $X_2$  is close to the current asset price.

This is an option strategy combining a bull and bear spread. It uses three strike prices. The lower two strike prices are used in the bull spread, and the higher strike price in the bear spread. Both puts and calls can be used. *This strategy has limited risk and limited profit.*

**Condor Spreads:** A condor spreads is a position created by four options on the same asset with the same expiration date, but with different exercise prices. For a long condor position, a trader buys an option with a relatively low strike price  $X_1$ , sells an option with a somewhat higher strike price  $X_2$ , sells an option with a higher strike price  $X_3$ , and buys an option with the highest strike price  $X_4$ , where  $X_1 > X_2 > X_3 > X_4$ . For a short condor position, a trader takes the opposite side of the long position selling the lowest and highest options and buying the two options between them.

Similar to a butterfly spread, a condor is an options strategy that also has a bear and a bull spread, except that the strike prices on the short call and short put are different. *The purpose of this option strategy is to earn limited profits, regardless of market movements, with a small amount of risk.*

## COMBINATIONS

A Combination is a strategy that involves taking a position in both calls and puts. Four of the most commonly used combinations are: Straddles, Strips, Straps and Strangles.

**Straddles:** The straddle position is created by buying a call and a put option (a long straddle), or by selling a call and a put option (a short straddle), where both options have the same strike price and expiration date. A long straddle position is appropriate when a large price shift in either direction from the options exercise price is expected in the market

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**Strips and Straps:** A strip is created by a long position in one call option and two put options with the same strike price. A long strangle (short) position is created with long (short) positions in a call and a put with different strike prices, where the call strike is higher than the put strike. The long strangle, like the long straddle, is a position where the trader is anticipating a large price movement but is uncertain which direction it will be. The asset price of a strangle position has to move farther than in the straddle to make a profit. The short straddle may be used if the trader anticipates that a large price movement is unlikely. This position, like the straddle, is a risky strategy that exposes the trader to a potential of unlimited loss.

A strap is created by a long position in two call options and one put option with the same strike price. A strip position may be created by a trader who thinks that there will be a large stock price move and believes that a decrease in the stock price is more likely than an increase in price. A strap position a trader also believes that there will be a large stock price move, but an increase in stock price is considered to be more likely than a decrease.

**Strangles:** In a strangle, a trader buys a call and a put with same expiration date and different strike prices. Both the options purchased are out of the money options and the trader buys the options keeping the volatility of the markets in mind and thus, reducing his cost by buying out-of-money options.

We have covered only the basic trading strategies. There are other strategies like risk management, hedging strategies; arbitrage techniques and other advanced trading strategies. For more information please feel free to [contact us](#).

