WHAT ARE OPTION CONTRACTS?

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An option contract is a derivative which gives the right to the holder of the contract to do 'Something' but without the obligation to do that 'Something'. The 'Something' can be either buying the underlying asset or selling the underlying asset. In the world of options the underlying asset, generally, is a company share (stock option) or a foreign currency (currency option). Thus, the holder of a stock option reserves the right to either buy or sell a particular share, the underlying asset. Likewise the holder of a currency option reserves the right to buy or sell a foreign currency, the underlying asset.

The right also specifies the price at which the asset can be bought or sold. This is called the Strike price of the option. It also specifies the date till when the right can be exercised and it is called the Maturity date or Expiry date. The price paid to buy the right is called the Premium or simply, the Price of the option.

An investor can buy the right to buy a particular share at a particular price by a particular date by paying some premium. Such an option is called a Call option.

A Call option gives the holder the right to buy the underlying asset at a certain price at a certain future date without an obligation to buy it. The holder has to pay a price (premium) to buy this right.

In the same manner an investor can buy the right to sell an underlying asset, say a company share, at a certain price by a particular date in the future by paying some premium. Such an option is called a Put option.

A Put option gives the holder the right to sell the underlying asset at a certain price at a certain future date without an obligation to sell it. The holder has to pay a price (premium) to buy this right.

Having made it clear that the holder of an option has the right to either buy or sell the underlying asset but no obligation to do so, it is then necessary to lay down the circumstances under which he would exercise the right and when he would not. The assumption is that the investor would exercise his right if it is profitable to him and that he would let go his right if by exercising it he would incur a loss.

When would a Call option be exercised?

The holder of a call option has the right to buy an underlying asset but no obligation. Let us take the case of an investor who has bought a call option where the underlying asset is a company share. The situation can be explained best with a diagram.

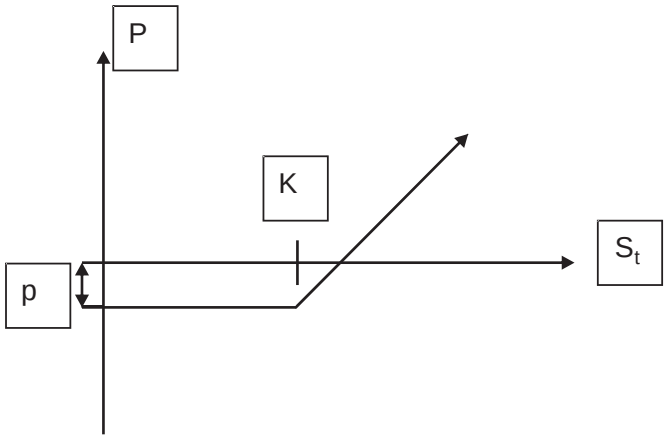

Fig. 1: Profit from a Call Option

P = Profit; S_t = Terminal Stock price; p = Premium; K = Strike price

Referring to the Fig 1 we can make following statements;

- The holder of the call option has paid a price 'p' to buy the option i.e. to buy the right to buy the underlying asset (share) at some future date (expiry date).
- The price at which the share will be bought is 'K'; the strike price.
- The x-axis gives the stock price in the stock market.
- The y-axis gives the profit made by the holder.

Now let us take a numerical example. Imagine that the investor (the holder of the option) has paid Rs. 5 for the call option where the strike price is Rs. 50.

Now let us imagine following situations:

Situation 1: Stock price Rs. 60

- The holder can exercise his right to buy the share at Rs. 50.
- Sell the share in the stock market for Rs. 60
- Pocket the profit of Rs. 5 after deducting the premium paid in the beginning to buy the option.

Situation 2: Stock price Rs. 40

- The holder will not exercise his right because by exercising his right he will be paying Rs. 50 for the share which then could be sold in the stock market for Rs. 40 thereby incurring a total loss of Rs. 15 (Rs. 10 on the exercising of option and Rs. 5 on the premium.)
- By not exercising the right the holder will incur a loss of Rs. 5 only which is on account of the premium paid.

Situation 3: Stock price Rs. 53

- The holder can exercise his right and buy the share at Rs. 50
- Sell the share in the stock market for Rs. 53 and make a profit of Rs. 3 on the share.
- This is done to reduce the loss incurred on paying the premium. The total loss will now be Rs. 2.
- If he had not exercised his right the loss would have been Rs. 5.

The three situations mentioned above give us an important rule for the Call option. It is that:

A Call option must be exercised if the stock price exceeds the strike price.

This is so because when the stock price exceeds the strike price it will either lead to a net positive cash flow if the stock price exceeds the sum of strike price and the premium paid. If the stock price exceeds only the strike price but not the sum of the strike price and the premium paid it will at least reduce the negative cash flow.

When would a Put option be exercised?

The holder of a Put option has the right to sell an underlying asset but no obligation. Let us take the case of an investor who has bought a put option where the underlying asset is a company share. The situation can be explained best with a diagram.

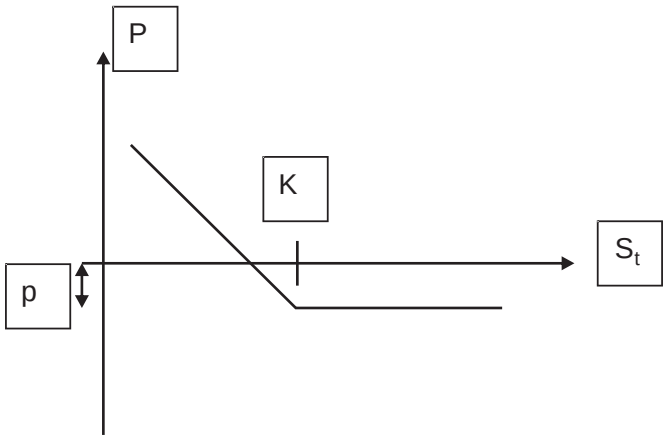

Fig. 2: Profit from a Put Option

P = Profit; S_t = Terminal Stock price; p = Premium; K = Strike price

Referring to the Fig 2 we can make following statements;

The holder of the put option has paid a price 'p' to buy the option i.e. to buy the right to sell the underlying asset (share) at some future date (expiry date).

The price at which the share will be sold is 'K'; the strike price.

The x-axis gives the stock price in the stock market.

The y-axis gives the profit made by the holder.

Now let us take a numerical example. Imagine that the investor (the holder of the option) has paid Rs. 5 for the put option and that the strike price is Rs. 50.

Now let us imagine following situations:

Situation 1: Stock price Rs. 40

The holder can exercise his right to sell the share at Rs. 50.

Buy the share back in the stock market for Rs. 40

Pocket the profit of Rs. 5 after deducting the premium paid in the beginning to buy

the option.

Situation 2: Stock price Rs. 60

The holder will not exercise his right because by exercising his right he will be buying the share at Rs. 60 in the stock market and selling it at Rs. 50 while exercising the option, thereby incurring a total loss of Rs. 15 (Rs. 10 on the exercising the option and Rs. 5 on the premium.)

By not exercising the right the holder will incur a loss of Rs. 5 only which is on account of the premium paid.

Situation 3: Stock price Rs. 47

The holder can exercise his right by buying the share in the market for Rs. 47 and selling it at Rs. 50 as part of the option contract.

He will then make a profit of Rs. 3 on the share.

This is done to reduce the loss incurred on paying the premium. The total loss will now be Rs. 2.

If he had not exercised his right the loss would have been Rs. 5.

The three situations mentioned above give us an important rule for the Put option. It is that:

A Put option must be exercised if the stock price is less than the strike price.

This is so because when the stock price is less than the strike price it will either lead to a net positive cash flow if the stock price is less than the difference between the strike price and the premium paid. If the stock price is only less than the strike price but not the difference of strike price and the premium paid it will at least reduce the negative cash flow.

Two types of options on the basis of when they can be exercised

If an option, either Call or Put, can be exercised on any day before the expiry date it is called an **American option.**

If an option, either Call or Put, can be exercised only on the date of expiry, it is called a **European option.**

Thus on the above basis we have four types:

An American Call option
An American Put option
A European Call option
A European Put option

Though the above arguments for Call and Put options are the same for both types the difference becomes apparent when certain other properties are studied. These will be taken up in future chapters.

The two sides of an option contract

There are two sides to every option contract. On one side is the investor who has taken the long position (i.e. has bought the option). On the other side is the investor who has taken a short position (i.e. has sold an option or 'written' an option.)

The above statement needs further clarification. An investor, when he buys a Call option, buys the right to buy the underlying asset but this right has no meaning unless there is someone who agrees to sell the underlying asset if the first investor decides to

exercise his right. Similarly an investor, when he buys a Put option, buys the right to sell the underlying asset but this right has no meaning unless there is another investor who agrees to buy the underlying asset if the first investor decides to exercise his right.

In option trading following terms are used:

Investor who buys an option is said to have a **Long** position and he is called the buyer or the holder.

Investor who sells an option is said to have a **Short** position and he is called the seller or the writer.

This gives rise to four positions which are as follows:

A long position in a Call option: **Long Call** (Position of the buyer of a Call option)

A short position in a Call option: **Short Call** (Position of the writer of a Call option)

A long position in a Put option: **Long Put** (Position of the buyer of a Put option)

A short position in a Put option: **Short Put** (position of the writer of a Put option)

Figures 1 and 2 show the profit in a long call and a long put respectively. Fig. 3 shows the profit from writing a Call option (a short call).

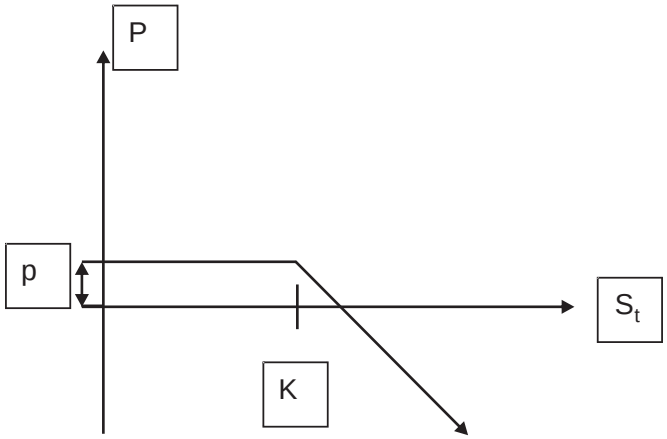

Fig. 3: Profit from writing a Call Option

P = Profit; S_t = Terminal Stock price; p = Premium; K = Strike price

The writer of a Call option has sold the right to the holder to buy the underlying asset but the holder has no obligation to do so. Consider following points:

The holder will exercise the right only if the stock price exceeds the strike price (recall the arguments made for Call options and refer Fig 1.)

When holder exercises the right the writer will have to procure a share from the market at the stock price and sell it to the holder at the strike price. The writer will incur a loss equal to the profit of the holder.

If the holder does not exercise his right then the writer keeps the premium paid. In this case his profit (the premium received) is equal to the loss of the holder (the premium paid).

In the same manner we can examine the case of a short put. The writer of a put option has a short put position and has given the right to sell the underlying asset to the holder of the Put option (long put position). Fig. 4 shows the profit from a short put position.

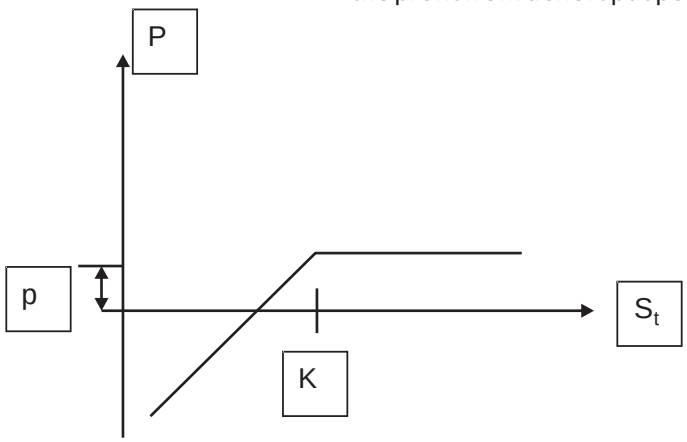

Fig. 4: Profit from writing a Put Option

P = Profit; S_t = Terminal Stock price; p = Premium; K = Strike price

The writer of a Put option has sold the right to the holder to sell the underlying asset but the holder has no obligation to do so. Consider following points:

The holder will exercise the right only if the stock price is less than the strike price (recall the arguments made for Put options and refer Fig 2.)

When holder exercises the right the writer will have to buy the share from the holder at the strike price and resell it in the market at a lower price. The writer will incur a loss equal to the profit of the holder.

If the holder does not exercise his right then the writer keeps the premium paid. In this case his profit (the premium received) is equal to the loss of the holder (the premium paid).

It is often useful to characterize the option positions in terms of the terminal stock price (S_t) or the payoff to the investor on maturity. The initial cost (premium) is then not included in the calculation. If, then, the strike price is K and the terminal stock price is S_t then payoffs for the four positions are as given below:

For long call position: max (S_t – K, 0). This means that the option will be exercised if S_t > K and will not be exercised if S_t < K or S_t = K.

For short call position: min (K – S_t, 0);

For long put position: max (K – S_t, 0). This means that the option will be exercised if S_t < K and will not be exercised if S_t > K or S_t = K

For short put position: min (S_t – K, 0)

We must understand that an option once bought or sold (written) can not be traded again. However, we can neutralize the position by going into the opposite direction.

So the holder of an option contract can neutralize or offset his position by writing an option contract or vice versa. Thus a long call can be neutralized by a short call and vice versa and a long put can be neutralized by a short put and vice versa. It is very important to remember that a Call option cannot be neutralized by a Put option.

Imagine that an investor has bought a Call option with a strike price of Rs. 50 by paying a premium of Rs. 5 and he wishes to cancel out his position. To cancel out he will now have to write the same Call option. Now, the strike price may have remained the same but the premium may have changed. Since we know that the profit of a holder is the same as the loss of the writer our investor's gain and loss will cancel out. However he may either make a small profit or loss on the different prices paid and received for buying and writing at different time. Same argument is applicable to Put options.

So, if we do not consider the premium and if the stock price is higher than the strike price the gain in long call will be the loss in short call. If the option is not exercised then it is zero. Note that the premiums paid at different times are overlooked in this argument.

When investors offset their positions it affects what is termed **'Open Interest'**. Open Interest is the number of outstanding positions in a particular option of either the long or the short type. If, when an option contract is traded neither investor is offsetting his existing position then the Open Interest increases by one contract. If one investor is offsetting an existing position but the other is not then the Open Interest remains the same. If both are offsetting their existing positions then the Open Interest goes down by one contract.