

OPTIONS

Objective

This chapter introduces the readers to the concept of options which include calls and puts. All basic concepts like option buyer and seller, European and American options, and payoff profiles have been elaborated in this chapter.

Options

- A **call option** is an option to buy a certain asset by a certain date for a certain price
- A **put option** is an option to sell a certain asset by a certain date for a certain price
- The price of the contract is known as **strike price/exercise price**
- The date in the contract is known as **expiration date/maturity**

Difference: Options & Forward/Futures

- The holder of the **option** is not obliged to honor the contract, whereas the holder of **Forward/Futures** Contract is obliged to buy or sell the underlying asset
- It costs nothing to enter into **Forward/ Futures** Contracts, but for buying **options**, upfront payment is required

Terminology

- All options of the same type (calls or puts) are referred to as an **option class**
 - For example, Reliance calls are one option class while Reliance puts are another class
- An **option series** consists of all the options of a given class with the same expiration date and strike price
- Reliance August calls with 1750 strike price are one option series

Terminology

- An **in-the-money** option is one that would lead to a positive cash flow to the holder if it were exercised immediately
- An **at-the-money** option would lead to zero cash flow if it were exercised immediately
- An **out-of-the-money** option would lead to a negative cash flow if it were exercised immediately

Options types

- An **American option** can be exercised at any time during its life
- An **European option** can be exercised only at maturity
 - The terms American or European do not refer to the location of the option

Ex:

- Index options traded in NSE are of European type
- Stock options traded in NSE are of American type

Terminology

- If **S** is the stock price and **X** is the strike price
 - A **call option** is
 - In the money when $S > X$
 - At the money when $S = X$
 - Out of the money when $S < X$
 - A **put option** is
 - In the money when $S < X$
 - At the money when $S = X$
 - Out of the money when $S > X$
- An option will only be exercised if it is in the money
- In the absence of transaction costs, an in-the-money option will always be exercised on the expiration date if it has not been exercised previously

Terminology

- The **intrinsic value** of an option is defined as the maximum of zero and the value it would have if it were exercised immediately
 - For a call option, the intrinsic value is therefore $\max(S - X, 0)$
 - For a put option, it is $\max(X - S, 0)$
- An in the money American option must be at least its intrinsic value since the holder can realize the value by exercising immediately
- Often it is optimal for the holder of an in-the-money American option to **wait** rather than exercise immediately
 - The option is then said to have **time value**
- The **total value** of an option can be thought of as the sum of its intrinsic value and its time value

Risk to Option Buyer

- The buyer of the call or put has the right to exercise if the price of the underlying is in favor
- There is no obligation to the seller of the option
- Risk is limited to the value of the premium paid (for buying the rights)

Risk to Option Seller

- The seller of the call or put has no right to exercise
- The seller is under obligation from the buyer and may be exercised upon, at the will of the option buyer
- Profit is limited to premium received whereas loss can extend to any limits, in case price continue to move in same direction

Specification of Options Traded in NSE

- **Underlying Instrument:**

- Option contracts are available on **216 securities** stipulated by the Securities & Exchange Board of India (SEBI)
- These securities are traded in the Capital Market segment of the Exchange

- **Expiration date:**

- Last Thursday of the expiry month. If the last Thursday is a trading holiday, then the expiry day is the previous trading day

Specification of Options Traded in NSE

- Trading Cycle:
 - 3 month trading cycle:
 1. The near month
 2. The next month
 3. The far month
- 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

Specification of Options Traded in NSE – Strike Price Interval

- The Exchange provides a minimum of seven strike prices for every option type (i.e Call & Put) during the trading month
 - At any time, there are three contracts in-the-money (ITM), three contracts out-of-the-money (OTM) and one contract at-the-money (ATM)
- New contracts with new strike prices for existing expiration date are introduced for trading on the next working day based on the previous day's underlying close values, as and when required
 - In order to decide upon the at-the-money strike price, the underlying closing value is rounded off to the nearest strike price interval
- The in-the-money strike price and the out-of-the-money strike price are based on the at-the-money strike price interval

Strike Price Interval at NSE

Price of Underlying	Strike Price interval (Rs.)
Less than or equal to Rs. 50	2.5
> Rs.50 to less than or equal to Rs. 100	5
> Rs.100 to less than or equal to Rs. 250	10
> Rs.250 to less than or equal to Rs. 500	20
> Rs.500 to less than or equal to Rs. 1000	20
> Rs.1000	50

Position Limits and Exercise Limits

- **Position Limit** defines the maximum number of option contracts that an investor can hold on one side of the market.
 - For this purpose Long calls and short puts are considered to be on the **same side** of the market and Short calls and long puts are considered to be on the same side of the market
- **Exercise Limit** defines the maximum number of contracts that can be exercised by any individual (or group of individuals acting together) in any period of 5 consecutive business days
- Position limits and exercise limits are designed to prevent the market from being unduly influenced by the activities of an individual investor or group of investors

Example of European long call option

- Suppose an investor purchases **1 NIFTY-May-4500-Call** at premium 50
 - One contract consists 50 index share.
 - The contract is cash settled
- If at the end of this option life NIFTY value is more than 4500
 - He exercises the option and receives the amount by which NIFTY exceeds 4500 for one index share times Rs. 50

Example of European long call option

- Suppose the final day value of NIFTY is 4600.
 - By exercising he gets $(4600 - 4500) = 100$ per index share or Rs. $50 \times 100 =$ Rs. 5,000 for one contract
- However, if the final day value is below 4500
 - He will not exercise the option
- For this privilege, he pays a fee of Rs.2500 (Rs.50 a share for 50 shares)

Example of American long call option

- Suppose an investor purchases **1 Reliance-May-1600-Call** at premium Rs.60
 - Lot size is 150
 - The contract is cash settled
- **This contract allows him to buy 150 shares of Reliance at Rs.1600 per share at any time between the current date and the option expiry date of May**
- If the price goes above Rs. 1600 he can exercise the option

Example of American long call option

- Suppose the **price goes to 1670** and he exercises the option
 - This is equivalent to buying the option @ 1600 and selling it @ 1670
 - He will get Rs. $(1670 - 1600) = \text{Rs. } 70$ per share or $\text{Rs. } 70 * 150 = \text{Rs. } 10,500$ for one contract
- If the price remains below Rs. 1600 over the life of the option
 - He will not exercise the option
- For this privilege, he pays a **fee of Rs.9000** (Rs.60 a share for 150 shares)

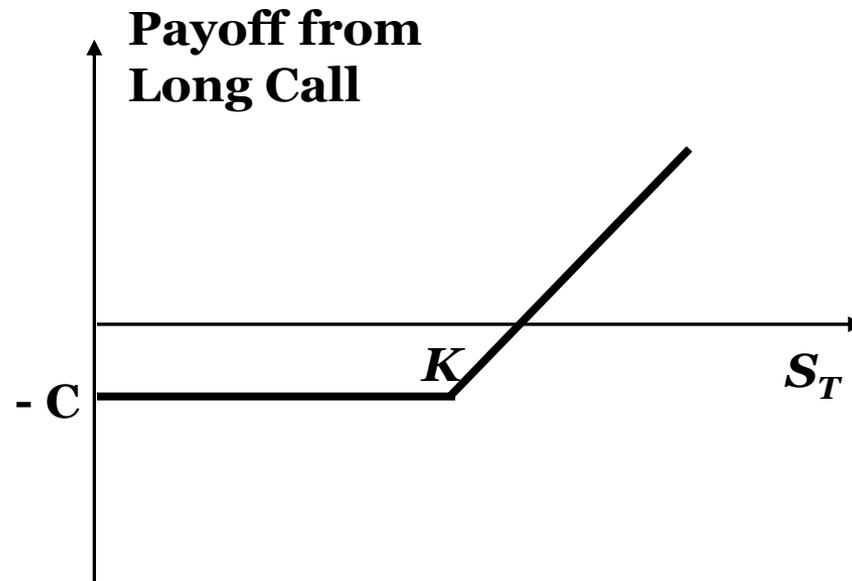
Example of American short call option

- Suppose an investor writes/shorts **1 Reliance-May-1600-Call** at premium Rs. 60
 - Lot size is 150
 - The contract is cash settled
- **This contract gives an obligation on him to sell 150 shares of Reliance at Rs.1600 per share at any time between the current date and the option expiry date of May**
- If the price goes above Rs. 1600 long position holder will exercise the option

Example of American short call option

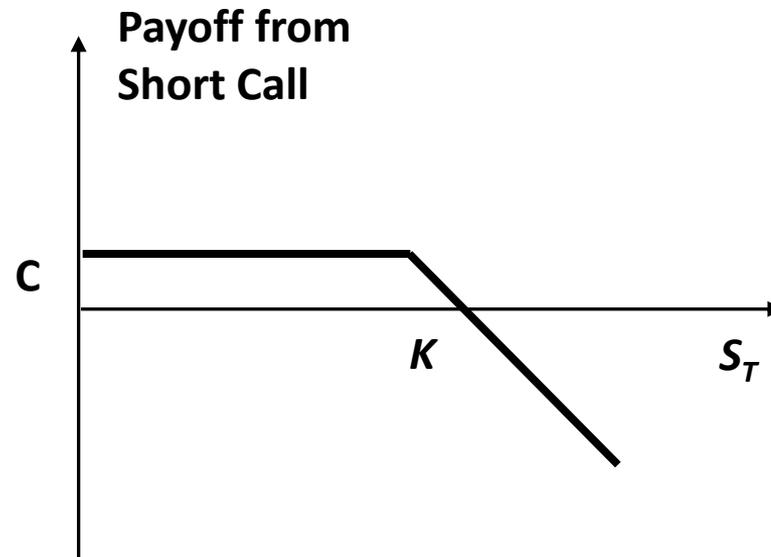
- Suppose the price goes to 1670 and long position holder exercises the option
 - For short position holder this is equivalent to selling the option @ 1600 after buying it @ 1670
 - He will make loss Rs. $(1670 - 1600) = 70$ per share or RS. $70 * 150 =$ Rs. 10,500 for one contract
 - However, he receives a fee of Rs.9000 (Rs.60 a share for 150 shares) from long position holder
- However, if the price remains below 1590 over the life of the option
 - Long position will not exercise the option
 - The entire fee of Rs.9000 (Rs.60 a share for 150 shares) is the profit of short position holder

Payoff Diagram – Long Call



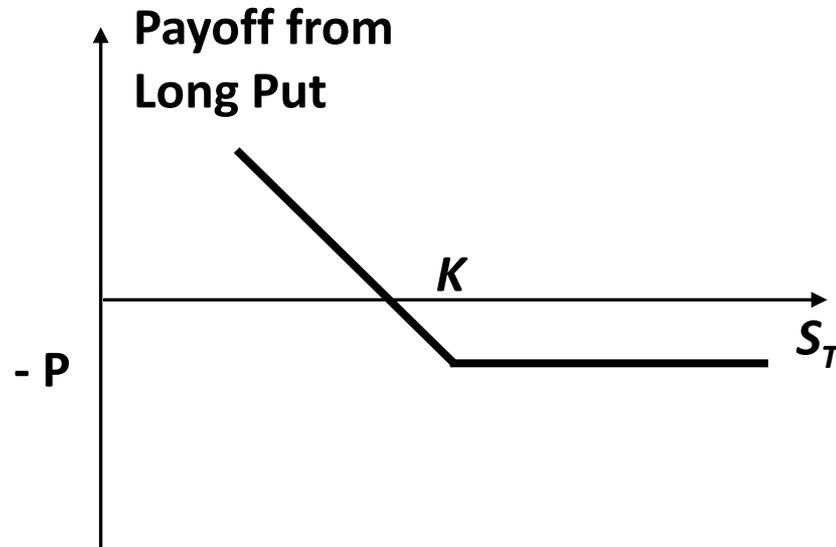
The payoff from a long position in a call option
= $\text{Max}(S_T - K, 0) - C$ (K = Strike price, S_T = Price of the underlying security at maturity, C = Call option premium)

Payoff Diagram – Short Call



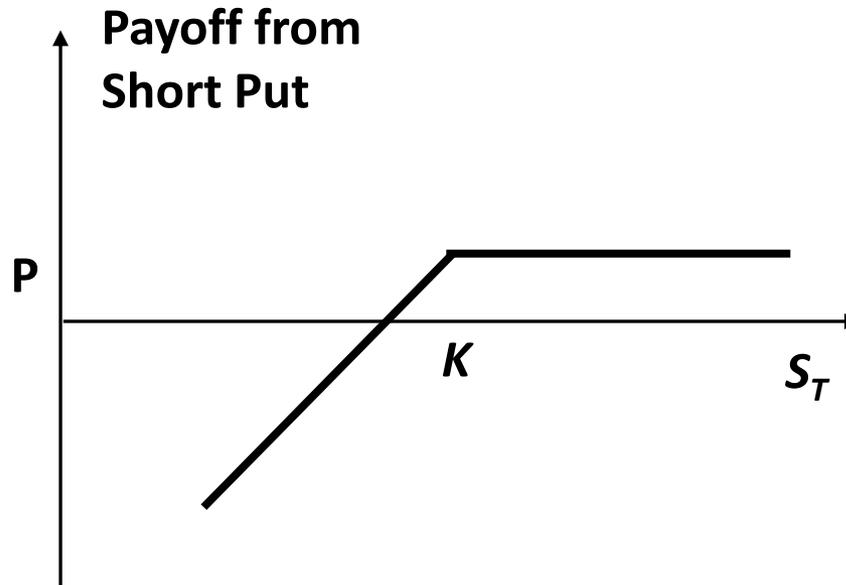
The payoff from a short position in a call option
 $= - \text{Max} (S_T - K, 0) + C = \text{Min} (K - S_T, 0) + C$ (K = Strike price, S_T = Price of the underlying security at maturity, C = Call option premium)

Payoff Diagram – Long Put



The payoff from a long position in a put option
= $\text{Max}(K - S_T, 0) - P$ (K = Strike price, S_T = Price of the underlying security at maturity, P = Put option premium)

Payoff Diagram – Short Put



The payoff from a short position in a put option
 $= - \text{Max} (K - S_T, 0) + P = \text{Min} (S_T - K, 0) + P$ (K = Strike price, S_T = Price of the underlying security at maturity, P = Put option premium)

Dividends & Stock Splits

- Suppose you own N options with a strike price of K :
 - No adjustments are made to the option terms for cash dividends
- When there is an **n-for-m stock split**,
 - the strike price is reduced to mK/n
 - the no. of options is increased to nN/m
- **Stock dividends** are handled in a manner similar to stock splits

Dividends & Stock Splits

- Consider a call option to buy 100 shares of a company for Rs.30 per share. Suppose that the company makes a 2-for-1 stock split
 - The terms of the option contract are then changed so that it gives the holder the right to purchase 200 shares for Rs.15 per share
- Consider a put option to sell 100 shares of a company for Rs.15 per share. Suppose that the company declares a 25% stock dividend
 - This is equivalent to a 5-for-4 stock split
 - The terms of the option contract are changed so that it gives the holder the right to sell 125 shares for Rs.12

Margins – For Writing Naked Options

- **Margins** are required when options are sold.
- When a naked option is written the margin is the greater of:
 - A total of 100% of the proceeds of the sale plus 20% of the underlying share price less the amount (if any) by which the option is out of the money
 - A total of 100% of the proceeds of the sale plus 10% of the underlying share price
- For other trading strategies there are special rules

Margins – For Writing Covered Call Options

- **Writing covered calls** involves writing call options when the shares that might have to be delivered are already owned
- Covered calls are far less risky than naked calls since the worst that can happen is that the investor is required to sell shares already owned at below their market value
- If covered call options are out of the money, no margin is required
 - The shares owned can be purchased using a margin account as just described, and the price received for the option can be used to partially fulfill this margin requirement
- If the options are in the money, no margin is required for the options
 - However, the extent to which the shares can be margined is reduced by the extent to which the option is in the money

Commissions

- For retail investors commissions vary from broker to broker.
- Below is an **example**:

Illustration
Strike price - 1000
Premium - 50
Lot size - 600

	New
Basis	On premium only
Rate	1% (min 100 per contract)
Formula	$(\text{Premium} * \text{Lot Size}) * \text{Rate}$ OR Min. Rs 100/-
Charge On a Contract	$(50 * 600) * 1\%$ OR 100, Whichever is higher = 300

As per NSE circular no. NSEIL/LEGAL/8319/2007 dated 2nd January 2007 and NSE/INSP/2006/56 dated 5th January, 2007 on brokerage charged for option contracts, the brokerage should be charged on the Premium amount at which the option contract is bought or sold and not on the notional price (Strike price + Premium) of the option contract

In case of options positions squared off within the day of taking the same, brokerage shall be chargeable on single leg.

Commissions

Here is another **example**:

Options		
Total Eligible Premium Value per month	Flat brokerage per contract lot (Rs.)	Effective Flat Brokerage On Intra Day Square Off (Rs.)
Above Rs. 20 lacs	65	32.5
Rs. 10 Lacs - Rs. 20 lacs	70	35
Rs. 5 lacs - Rs. 10 lacs	75	37.5
Rs. 2 lacs to Rs. 5 lacs	85	42.5
Less than Rs 2 Lac	95	47.5