

OPTION PRICING MODELS

Objective

Higher level option analysis involves calculating theoretical option prices based on certain parameters. These concepts have been outlined as part of advanced options analysis.

Option Pricing Models

There are two common methodologies for pricing options: -

- Black and Scholes: This methodology is more analytical, is faster to compute and is mainly used to price European options
- Binomial pricing: This methodology is more computational, taken more computing power and is mainly used to price American options

Important Aspects

- Volatility: It is a measure of the magnitude of the change of prices (up or down) of the underlying asset. Higher the volatility, higher is the option premium and vice versa
- Please note that volatility does not measure direction

Important Aspects

- Time to expiration: It measures the time to maturity of the option. Higher the time remaining, the chances of achieving the price target increases. Thus, option premium increase with increase in number of days

Option Greeks

- The change in option price when a particular price determinant changes is expressed as option Greek
- For every price determinant, there is a Greek
- Because the Greeks indicate the price sensitivity of option to change in price determinant, they are used for risk assessment and management

Greeks.....

- Delta: It is the rate of change of option price with respect to the price of the underlying asset. Delta of a long call option (and/ or short put) is always positive and ranges between 0 and 1 and for a long put (and/or short call) is always negative and ranges between 0 and -1

Greeks.....

- Gamma: The gamma of an option indicates how the delta of an option will change relative to a 1 point move in the underlying asset. In other words, the Gamma shows the option delta's sensitivity to market price changes
- Gamma is important because it shows us how fast our position delta will change as the market price of the underlying asset changes

Greeks.....

- Vega: It measures the rate of change of option value to change in volatility of the underlying asset. It is always positive for long options (both for long put and long call) and negative for short options (both for short put and short call)

Greeks.....

- Theta: It measures the change in the value of the option with respect to the passage of time. Thus if you bought an option i.e., you are long on an option, you are short theta: all other things remaining the same, the option would lose value with passage of time
- Rho: It measures sensitivity of option value to the risk free interest rate; Rho is the change in price of an option for a 1 % change in the risk free interest rate