

Role of Greeks in Derivatives – IV (Vega)

The Greeks are various functions that show the sensitivity of Fair Value of an option to changes in market conditions. These functions are very helpful in assessing and comparing various option positions. They show what effect different variables will have on the fair value price of an option. There are ways of estimating the risks associated with options, such as the risk of the stock price moving up or down, implied volatility moving up or down, or how much money is made or lost as time passes. They are numbers generated by mathematical formulas. Collectively, they are known as the "Greeks", because most use Greek letters as names. Each Greek estimates the risk for one variable:

- ✓ **delta** measures the change in the option price due to a change in the stock price,
- ✓ **gamma** measures the change in the option delta due to a change in the stock price,
- ✓ **theta** measures the change in the option price due to time passing,
- ✓ **vega** measures the change in the option price due to volatility changing, and
- ✓ **rho** measures the change in the option price due to a change in interest rates.

Further in the series of concept of Greeks, we now learn about Vega.

Vega

Vega (the only greek that isn't represented by a real Greek letter) is an estimate of how much the theoretical value of an option changes when volatility changes 1.00%. Higher volatility means higher option prices. The reason for this is that higher volatility means a greater price swings in the stock price, which translates into a greater likelihood for an option to make money by expiration.

Long calls and long puts both always have positive vega. Short calls and short puts both always have negative vega. Stock has zero vega – it's value is not affected by volatility. Positive vega means that the value of an option position increases when volatility increases, and decreases when volatility decreases. Negative vega means that the value of an option position decreases when volatility increases, and increases when volatility decreases.

Let's look at the IFCI Mar 50 call again. It has a value of Rs.2.00 and a vega of +.20 with the volatility of IFCI stock at 30.00%. If the volatility of IFCI rises to 31.00%, the value of the IFCI Mar 50 call will rise to Rs.2.20. If the volatility of IFCI falls to 29.00%, the value of the IFCI Mar 50 call will drop to Rs.1.80.

Vega is highest for ATM options, and is progressively lower as options are ITM and OTM. This means that the value of ATM options changes the most when the volatility changes. The vega of ATM options is higher when either volatility is higher or there are more days to expiration.

$\Delta\gamma\theta\nu\rho$
 $\gamma\theta\nu\rho\Delta$
 $\theta\nu\rho\Delta\gamma$
 $\nu\rho\Delta\gamma\theta$
 $\rho\Delta\gamma\theta\nu$