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# Role of Greeks in Derivatives – I (Delta)

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.

To make the concept of Greeks easier for you, we have created individual series for each of them. In this series, we first learn about Delta.

**Delta**

The first and most commonly used Greek is "delta". For the record, and contrary to what is frequently written and said about it, delta is NOT the probability that the option will expire ITM. Simply, delta is a number that measures how much the theoretical value of an option will change if the underlying stock moves up or down ₹1.00. Positive delta means that the option position will rise in value if the stock price rises, and drop in value if the stock price falls. Negative delta means that the option position will theoretically rise in value if the stock price falls, and theoretically drop in value if the stock price rises.

The delta of a call can range from 0.00 to 1.00; the delta of a put can range from 0.00 to –1.00. Long calls have positive delta; short calls have negative delta. Long puts have negative delta; short puts have positive delta. Long stock has positive delta; short stock has negative delta. The closer an option's delta is to 1.00 or –1.00, the more the price of the option responds like actual long or short stock when the stock price moves.

So, if the IFCI Mar 50 call has a value of ₹ 2.00 and a delta of +.45 with the price of IFCI at ₹ 48, if IFCI rises to ₹ 49, the value of the IFCI Mar 50 call will theoretically rise to ₹ 2.45. If IFCI falls to ₹ 47, the value of the IFCI Mar 50 call will theoretically drop to ₹ 1.55.

If the IFCI Mar 50 put has a value of ₹ 3.75 and a delta of -.55 with the price of IFCI at ₹.48, if IFCI rises to Rs.49, the value of the IFCI Mar 50 put will drop to ₹ 3.20. If IFCI falls to ₹ 47, the value of the IFCI Mar 50 put will rise to ₹ 4.30.

*An ATM option has a delta close to .50. The more ITM an option is, the closer its delta is to 1.00 (for calls) or –1.00 (for puts). The more OTM and option is, the closer its delta is to 0.00.*

*The delta of an option depends largely on the price of the stock relative to the strike price. Therefore, when the stock price changes, the delta of the option changes.*