Sensitivities and Greeks

Risk sensitivities, also referred to as Greeks, are the measure of a financial instrument's value reaction to changes in underlying factors. The value of a financial instrument is impacted by many factors, such as interest rate, stock price, implied volatility, time, etc. Sensitivities are risk measures that are more important than fair values.

Risk sensitivities or Greeks are vital for risk management. They can help financial market participants isolating risk, hedging risk and explaining profit & loss.

Financial sensitivities are also called Greeks, such as Delta, Gamma, Vega, Rho and Theta. Delta is a first-order Greek that measures the value change of a financial instrument with respect to changes in the underlying asset price.

Vega is a first-order Greek that measures the value change of a financial instrument with respect to changes in the underlying implied volatility.

$$Vega = \frac{\partial V}{\partial \sigma} = \frac{V(\sigma + \Delta\sigma) - V(\sigma)}{\Delta\sigma}$$

where σ is the implied volatility.

Gamma is a second order Greek that measures the value change of a financial instrument with respect to changes in the underlying price.

$$Gamma = \frac{\partial^2 V}{\partial S^2} = \frac{V(S + 0.5\Delta S) + V(S - 0.5\Delta S) - 2V(S)}{\Delta S^2}$$

Reference:

https://finpricing.com/lib/EqConvertible.html