

Introduction to Options

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Options Definition

- The right, but not the obligation, to enter into a transaction [buy or sell] at a pre-agreed price, quantity, time [by a specified date in the future], and terms.
- The option buyer typically pays the seller an upfront fee (the premium) for the option rights.

Basic Options Structures

- *Calls* – Options acquired by a buyer (holder) and granted by a seller (writer) to buy at a fixed price
- *Puts* – Options acquired by a buyer and granted by a seller to sell at a fixed price
- All option products & strategies are some combination of buying or selling of calls or puts

Basic Options Provisions - Strike

- Strike Price – Fixed price to be paid if option exercised, as specified in the options agreement
- Set in intervals on exchange traded options
- At any preferred level OTC

Basic Options Provisions - Premium

- *Premium* – Price of the option that buyer pays and seller receives at the time of option transaction
- Consideration paid for rights
- Non-Refundable

Types of Options

- *American:* Buyer (Holder) may *exercise at any time prior to expiry*
- *European:* Buyer (Holder) *may exercise only on expiry date*
- *Asian: Payouts dependent on the history of the price*
 - Average Price Options (APO's), Path Dependency, Barriers, Look-Backs, KO's
- *Bermudan*

Key Measure: Volatility Factor

- Measure Of The Degree Of Change In The Value Of The Underlying Asset

The “Greeks”

- Very common jargon in financial trading
 - Delta
 - Vega
 - Gamma
 - Theta

The “Greeks” - Delta ⊗

- The Most Commonly Watched Factor
- The Degree Of Change In Option Value In Relation To A Change In The Value Of The Underlying Asset

The “Greeks” - Vega

- The Degree Of Change In Option Value Relative To A Change In The Price Volatility Of The Underlying Asset
 - Measures Effect On Premium Of A Change In Perceptions Of Future Volatility
 - Vega Is Closely Followed By Traders Since Trading Options Is Viewed As Trading Volatility

The “Greeks” - Gamma γ

- The Rate Of Change Of Delta
 - An Indicator Of How Stable Delta Is
 - If A Position Or Portfolio Has A High Gamma, What Might That Suggest?

The “Greeks” – Theta ∪

- Measures Effect On Premium Of A Change In Time To Expiry
- The Degree Of Change In Option Value In Relation To A Change In The Time To Expiry
- Becomes More Important Closer To Expiry
- Time Value Decreases At A Faster Rate As Option Expiry Date Is Approached

The “Greeks” – Rho ρ

- The Degree Of Change In Option Value In Relation To A Change In Interest Rates
- Of More Importance In Very Long-Term Options

Options Pricing

- Various Methodologies For Determining
- Theoretically The *Net Present Value Of All Potential Outcomes For The Option*

Options Pricing Theory

- Black-Scholes Formula
- Numerical Computational Techniques
 - Monte Carlo
 - Lattice Probability Tree Methods
 - Binominal, Trinominal Methods
 - Assumes Price Follows Stochastic Process

Monte Carlo Methodology

- Simulation Of Possible Outcomes
- Probability Assessment
- Various Methodologies
- Computer Resource Intensive

Historical Volatility

- Historical Volatility Is Determined From Past Price Data
 - Selection Of Appropriate Time Period
- Historical Volatility Can Be Estimated By Calculating The Square Root Of Variance

Implied Volatility

- Implied Volatility Is Determined Mathematically From Option Pricing Formulas When Premium Is Known
- Implied Volatility Is Closely Watched By Traders
- Reflects Market Perceptions Of Future Volatility, Not Necessarily Historical Levels