

Options

Options are derivative instruments giving buyers the right to buy or sell an underlying asset at an agreed-upon price and date. - Unlike futures or forwards, an option holder is not obliged to buy or sell the asset.

Call (put) options allow the holder to buy (sell) an asset at a stated price (i.e. strike price), whereby some options can be exercised any time till expiry (American style), whilst others only at expiration date (European style).

The price of an option is basically determined by:

- Current market price of the underlying,
- Strike price,
- Time to expiry (also, whether the option can be exercised any time till expiry or at expiration date only),
- Volatility of the underlying, and
- Interest rate to be applied.

Since the mid-1970s the Black-Scholes Model is applied to determine the price of an option. Whereby that price can be split into an option's intrinsic value (i.e. difference between market price and strike price of the underlying) and the price for rights granted by the contract over time, its premium: The higher the volatility of the underlying and the longer the time to expiry, the higher an option's premium.

A call (put) option is said to be in the money, if the market price of the underlying asset is higher (lower) than the option's strike price. In that case the option will be exercised. If the market price of the underlying matches the strike price, then the option is said to be at the money. Else, the option is said to be out of the money. This, however, would not necessarily imply that the option is worthless: Value could still be embedded in its time to expiry (time value), as the underlying's volatility may bring the option back into the money again prior expiration date.

Specific risk metrics (referred to as: the Greeks) describe the different dimensions of risk involved in taking an option position:

- Delta represents the rate of change between the option's price and a US\$1 change in

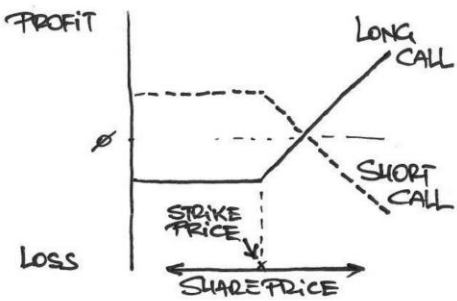
the underlying asset's price (i.e. price sensitivity of the option relative to the underlying).

- Theta represents the rate of change between the option price and time (time sensitivity, decay).
- Gamma represents the rate of change between an option's delta and the price of the underlying asset (i.e. stability of an option's delta).
- Vega represents the rate of change between an option's value and the implied volatility of the underlying asset (i.e. sensitivity to volatility).
- Rho represents the rate of change between an option's value and a 1 per cent change in the interest rate (i.e. sensitivity to the interest rate).

Options can be bought (long position) or sold (short position), with latter referred to as writing an option. Whilst the maximum loss in acquiring an option is in essence limited with its purchase price, potential losses when writing an option could be vast: In the case of a call such could (theoretically) be unlimited, in the case of a put at worst its respective strike price. – Hence, options allow speculation in holding a leveraged position in an asset at a lower cost than buying the underlying asset itself. On the other hand, an investor may also use options to hedge or reduce the risk exposure of portfolios.

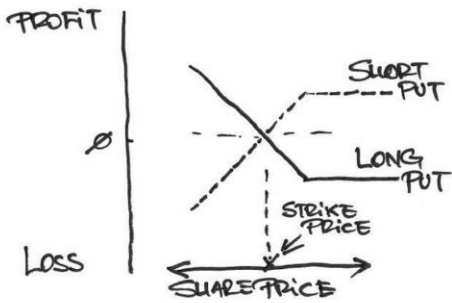
Options may be traded between private parties in Over-The-Counter (OTC) transactions, or they may be exchange-traded in live, orderly markets in the form of standardized contracts. – OTC-traded options may be individually tailored to meet specific business needs. Whereby, in general, the option writer is a well-capitalized institution (to prevent credit / counterparty risk). Options commonly traded OTC are interest rate options or currency cross rate options. - The most common way to trade options, however, is via standardized option contracts that are listed on options and futures exchanges. This comes along with a set of advantages: The credit of the exchange will back the fulfilment of a contract, counterparties remain anonymous, market regulations are enforced with fairness and transparency ensured, and orderly markets will be maintained, especially during volatile and fast trading conditions.

CALL OPTION



	<u>BUYER</u>	<u>SELLER</u>
STATUS	LONG	SHORT
EXPECTATION OF SHARE PRICE	UP	STABLE/DECLINE
MAX GAIN	UNLIMITED	PREMIUM
MAX LOSS	PREMIUM	UNLIMITED

PUT OPTION



	<u>BUYER</u>	<u>SELLER</u>
STATUS	LONG	SHORT
EXPECTATION OF SHARE PRICE	DOWN	STABLE/UP
MAX GAIN	STRIKE PRICE MINUS PREMIUM	PREMIUM
MAX LOSS	PREMIUM	STRIKE PRICE MINUS PREMIUM

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