Options Markets

Call Option and Put Option

A call option is the right without the obligation to buy an asset at a predetermined price in a certain time period. A put option is the right without the obligation to sell an asset at a predetermined price in a certain time period.

Terminology

1. **Underlying asset**: This is the asset one can buy or sell using option. Underlying asset is standardized for exchange traded options. The underlying asset can be a physical commodity like wheat or iron, a financial security such as stock or bond, or a cash amount whose value depends on a future outcome such as interest rate or the amount of snowfall.
2. **Exercise/strike price (X or K)**: This is the predetermined price at which the option owner can buy or sell the underlying asset.
3. **Exercising the option**: An option owner exercises the option when he/she exercising the right granted by the option to buy or sell the underlying asset at the exercise price.
4. **Expiration date**: The last date by which option must be exercised.
5. **Maturity**: This is the time remaining before the expiration date.
6. **European option**: European options can be exercised only on the expiration date.
7. **American option**: American options can be exercised at any time on or before expiration date.
8. **Spot price (S)**: The spot price is the market price of the underlying asset.
9. **Moneyness**: An option is **in-the-money** if exercising the option results in a profit. A call option is in-the-money if $S>K$ while a put option is in-the-money if $S<K$. An option is **out-of-money** if exercising the option results in a

loss. A call option is out-of-money if $S<K$ while a put option is out-of-money if $S>K$. An option is **at-the-money** if exercising the option results in zero profit or loss. Call and put options are at-the-money if $S=K$.

10. **Intrinsic value**: Intrinsic value of an option is the profit from exercising the option if the option is in-the-money and zero otherwise.
11. **Writing an option**: Writing an option is the same as selling an option.
12. **Option price / premium (C, P, c, p)**: This is the price an investor pays to buy an option or the price an investor gets by writing an option.

Use of Options

An option owner can profit in some future situations without incurring any future losses. This means that an option has positive value and the option owner pays a price to acquire the option. Buying futures and forwards does not require initial payments because the possibility of profit is offset by the possibility of loss.

Trading

Exchanges list options. They do *not* create options. Once an option has been listed on an exchange, investors can trade in the option. A trade occurs when one party agrees to buy and another agrees to sell. The number of long positions equals the number of short positions. This common number is called the **open interest**. Open interest increases when an investor buys an option to increase his long position in the option and another investor sells the option to increase his short position in the option. Open interest can decline if investors trade to close their prior positions. It is also important to realize that corporations have no special role in the options written on their stock. For example, Microsoft is not involved in creation or trading of options on Microsoft stock. Market makers in an option post bid-ask quotes for that option.

Specification

There are often multiple options on an underlying asset. These options may differ in the months in which they expire. The expiration date in a given month is determined by the convention used by the exchange that lists the option. Even for a given expiration, there may be multiple options with different strike prices. For stocks, strike prices are usually near current stock price. If price moves significantly, new strikes may be introduced.

Contract Specification Example

- **PHLX World Currency Options® Euro Product Specifications**
- **Description**: PHLX U.S. dollar-settled Euro currency options are quoted in terms of U.S. dollars per unit of the underlying currency (Euro) and premium is paid and received in U.S. dollars.
- **Contract Size**: 10,000 Euros
- **Trading Symbol**: XDE
- **Settlement Value Symbol**: EDY
- **CUSIP® Number**: 69336Y
- **Exercise Style**: European
- **Expiration Date**: Saturday following the third Friday of the expiration month.
- **Expiration Cycle**: Quarterly on the March cycle plus two additional near-term months (six months at all times).
- **Settlement**: U.S. dollars
- **Settlement Value for Expiring Contracts**: Based on the 12:00 Noon (Eastern Time) Buying Rate, as determined by the Federal Reserve Bank of New York on the last trading day prior to expiration (usually a Friday). If the Noon Buying Rate is not announced …
- **Last Trading Day for Expiring Contracts**: The third Friday of the expiration month.
- **Contract Point Value**: $100 (i.e., .01 x 10,000)

- **Exercise (Strike) Price Intervals**: The Exchange shall determine fixed-point intervals of exercise prices. Generally, the exercise (strike) price interval shall be set at half-cent intervals.
- **Premium Quotation**: One point = $100. Thus a premium quote of 2.13 is $213. The minimum change in a premium is .01= $1.00.
- **Position Limits**: 200,000 contracts on the same side of the market. Hedge exemptions are available.
- **Trading Hours**: 9:30 a.m. to 4:00 p.m. (Eastern Time)
- **Issuer and Guarantor**: The Options Clearing Corporation (OCC)

Clearing

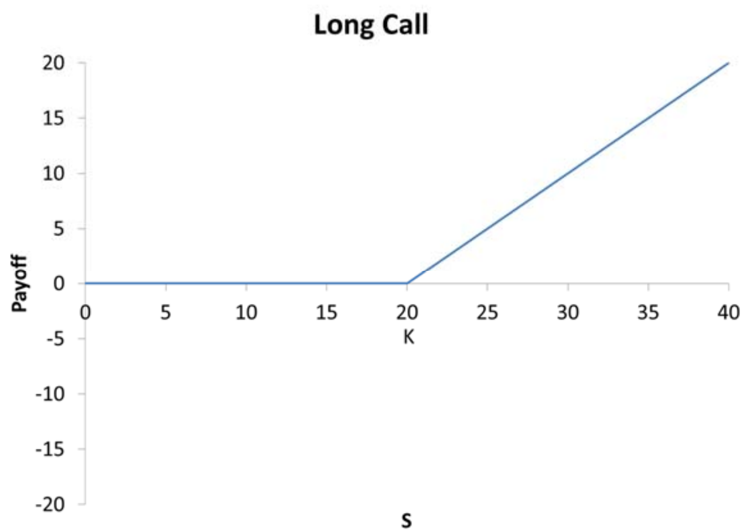
Option traders may need to post margin depending on their position and portfolio. **Options Clearing Corporation (OCC)** clears all option positions. That is, OCC acts as a counterparty to each (exchange traded) option trade.

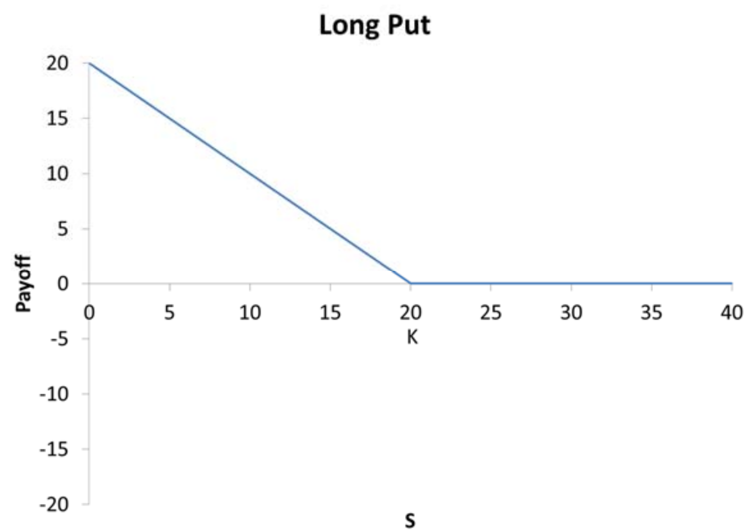
Option Payoffs

Option payoff at expiration depends on spot price S.

Long Call: max(S-K,0)

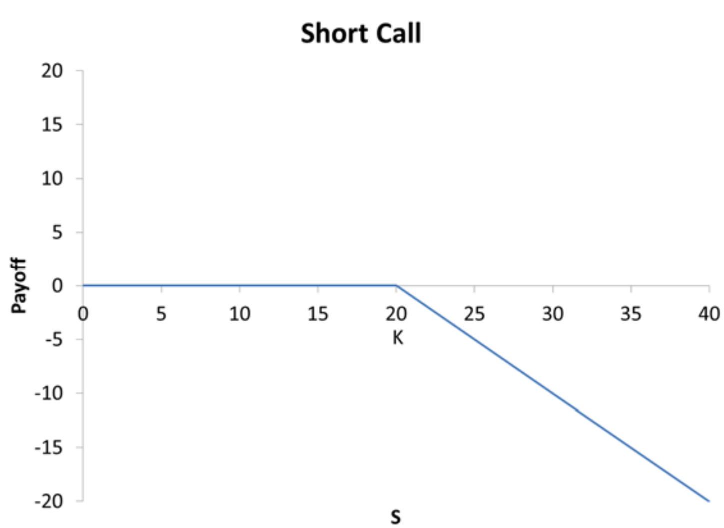
Long Put: max(K-S,0)

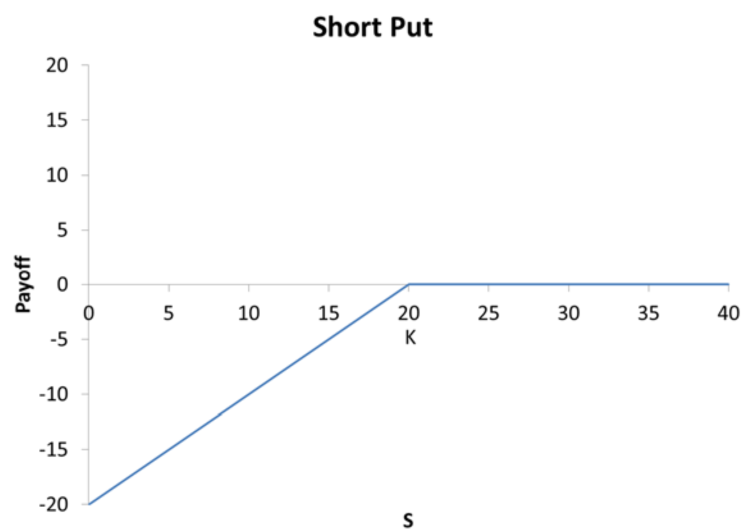




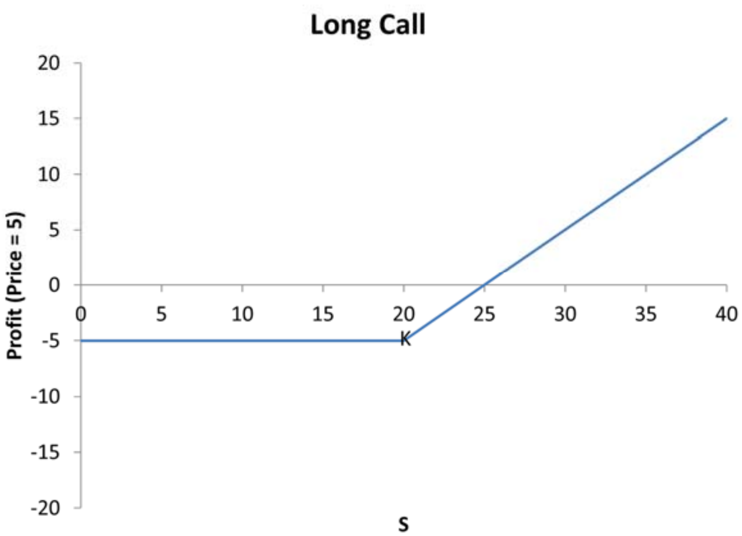
Short Call: -max(S-K,0)

Short Put: -max(K-S,0)





Such charts are very useful in understanding how the payoffs of an option depend on the underlying asset. These charts can be created for combinations of multiple derivatives. Note that each option results in a change in slope of +1 or -1 around the exercise price. For a long call position, the slope increases by 1 to the right of the strike price. For a short call position, the slope decreases by 1 to the right of the strike price. For a long put position, the slope decreases by 1 to the left of the strike price. For a short put position, the slope increases by 1 to the left of the strike price. The above payoffs do not account for the price (premium) paid for the option. Incorporating option price shifts the payoffs slightly as shown in the following profit charts.


Long Call
Profit (Price = 5)
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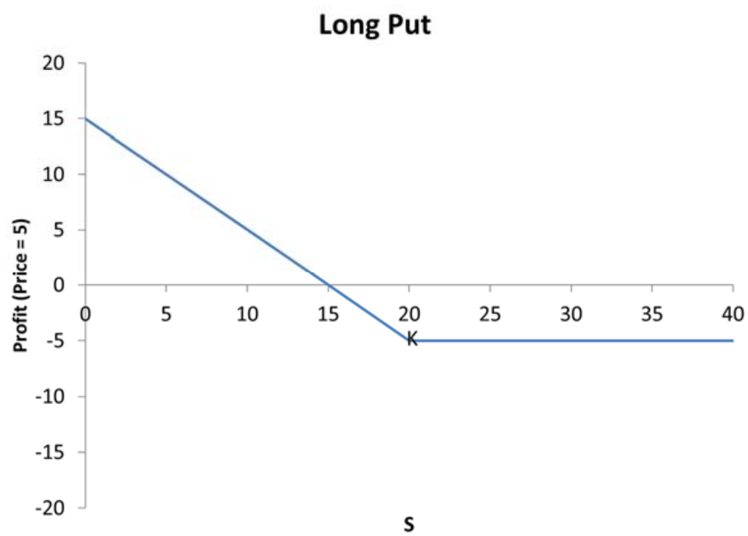
0
-5
-10
-15
-20
0 5 10 15 20 25 30 35 40
K
S


Long Put
Profit (Price = 5)
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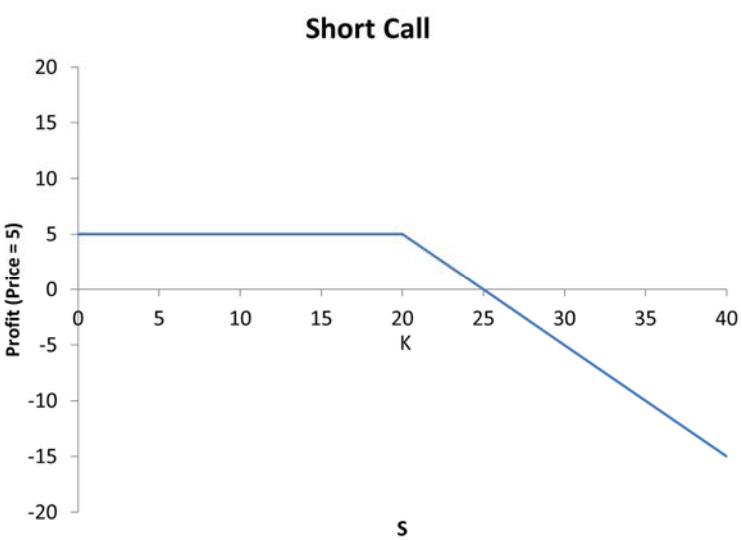
0
-5
-10
-15
-20
0 5 10 15 20 25 30 35 40
K
S


Short Call
Profit (Price = 5)
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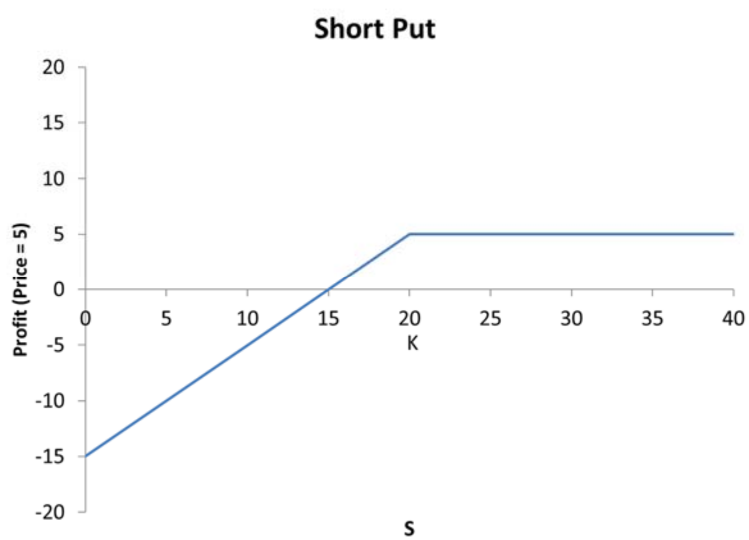
Short Put
Profit (Price = 5)
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-15
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0 5 10 15 20 25 30 35 40
K
S

Underlying Assets

Options on several thousand stocks are traded on the CBOE, NYSE Euronext, International Securities Exchange, and Boston Options Exchange. Each contract is for 100 shares of a stock. CBOE also trades options on Exchange Traded Products such as Exchange Traded Funds (ETFs). ETFs track performance of an equity index of a bond index. Options on foreign currency options are mostly traded in over-the-counter market but are also traded on some exchanges such as Philadelphia Stock Exchange. These are European-style contracts. Options on indices are also very popular. CBOE trades options on S&P 500 index, NASDAQ-100 index, and Down Jones Index. These options are also usually European. Futures options are options on prices of futures contracts.

Contract Specification

Expiration Dates are usually monthly. Stock options in US are typically traded for first two months, and then three and six months from current month. LEAPS are longer-term equity options with initial maturities in several years.

Strike prices for stock options in US are typically $2.50, $5, or $10 apart. Usually exchanges introduce contracts with strike prices close to the current price.

All options of the same type (Call or put) on a stock are referred to as an option class. All options in an option class with the same expiration date and strike price form an option series.