# Introduction to Forex Options

Swissquote Bank

**«Luck is what happens when preparation meets opportunity.»**

Seneca

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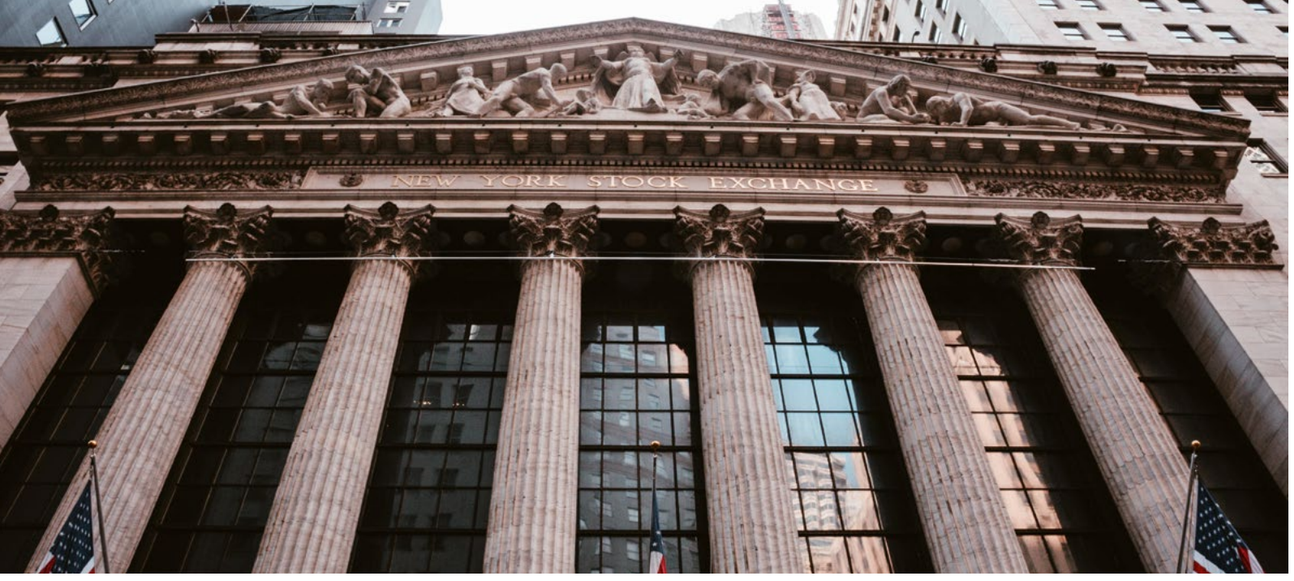



# History of options

Before delving into more detail about the instrument itself, it is worth starting with a brief history of options to understand what led to the creation and development of these popular derivatives. To do that, let's go back to the late 1600s, when tulips became so popular among the Dutch aristocracy that their value shot up dramatically. To hedge the risk of a bad harvest, tulip growers began to protect their profits with put options through agreements signed with their bank (meaning they actually owned the underlying asset, i.e. the tulips). Meanwhile, many tulip wholesalers took out call options, in an effort to ride the incredible bullish market that had formed. (Tulip Mania is the most famous market bubble in history.) However, at the time, the options market was brand new and still immature. To get the supply and demand of sellers and buyers to align, brokers and dealers had to go out and negotiate the different prices and expiry dates individually.

Some historians consider that evidence of the first options contracts dates back to the 4th century. In his book Politics, the Greek philosopher Aristotle recounts how the astronomer and mathematician Thales of Miletus made enormous profits from the olive harvest. Instead of buying land, he bought rights to use it when harvest time came around.

Now let's jump forward a few years to 1791, when the New York Stock Exchange was founded. A regulated options market did not yet exist, but trading volumes gradually started to grow. Eventually the «Put and Call Brokers and Dealers Association, Inc.» was formed to help facilitate trading and create a more efficient market. But no standard formula yet existed to determine prices, and options were almost always traded at-the-money.



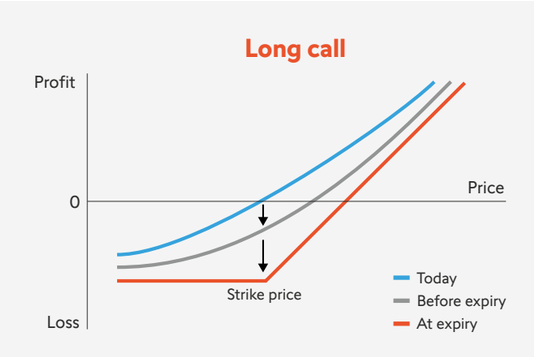
## Advantages of options

Options trading offers countless ways of **diversifying strategies, improving risk management** both of individual positions as well as the overall portfolio, protecting earnings, cutting losses, and exploiting both directional and sideways price movements. Other advantages include control of a considerable monetary value of the underlying security simply by paying a premium and creating diverse strategies based on a range of characteristics to meet the investor's requirements.

After the market crash of 1929, the United States Congress decided to intervene and regulate financial markets, creating the Securities and Exchange Commission (SEC). In 1935, the SEC granted the Chicago Board of Trade (CBOT) license to register as a national stock exchange. In 1968, the low volume in commodity futures drove CBOT to look for other ways of developing its business. It created a new exchange for trading stock options, and the Chicago Board Options Exchange (CBOE) came into being. A regulated market thus developed, with firm rules and standardised contracts, strike prices and expiry dates. Centralised clearing was also established.

In 1973, Fischer Black, Myron Scholes and Robert Merton (1997 Nobel Prize winners) published their fundamental research in the University of Chicago's Journal of Political Economy («The Pricing of Options and Corporate Liabilities»). They developed a model for options prices that drew on the principles of thermodynamics to determine a theoretical price for European-style options based on the stock price, expected dividends, strike price, expected interest rates, time to expiry and expected volatility. All these characteristics are explained below, with the idea that the underlying of an option can be any financial asset, including a stock, equity index, interest rate, commodity or currency. In particular, the number of trades made on Forex Options over the last ten years has soared. We will now explain what these types of contract are and how to benefit from them in trading.

# What are options




Options are **derivative contracts that grant the buyer the right** (but not the obligation) **to buy** (call) **or sell** (put) **a financial instrument at a fixed price,** also called the strike price, **by a scheduled expiry date.**

Given that definition, we will take the most basic concept and look at the risk and reward diagram for buying a call option.

When you buy a call, you are granted the right to buy the underlying asset at a fixed price by a scheduled Expiry date. Let's take an example. Today is 7 March 2019 and EUR/USD is trading at 1.1310. We buy a EUR/USD call with strike price 1.1320, expiring on 14 March (more specifically, Forex Options listed by Swissquote expire at 10:00 a.m. New York time). If we want to trade the equivalent of €100.000 in value, we pay a premium of 450. By paying a premium of $450 (market price at the time of the call), we are granted the right to take a long position on EUR/USD at a trading price of 1.1320 (strike price) at the selected expiry date. It is therefore clear that:

- Our maximum risk is restricted to the premium paid (but make sure you manage the assignment of the underlying asset if the option expires, many traders usually prefer to close the transaction before expiry);
- If the price rises significantly before expiry, we make a (theoretically unlimited) profit;
- The break-even point in our trade, i.e. when we would generate a profit equal to zero on expiry, is 1.1320 (strike price) + 0.0045 (premium) = 1.1365;
- If, on expiry, the EUR/USD price is higher than the strike price, we are «in the money», i.e. we have a long position open with the market price equal to the strike price. In this case, we must make sure we have adequate liquidity on our trading account both to keep the position open and manage it. Positions on options are generally closed before expiry.

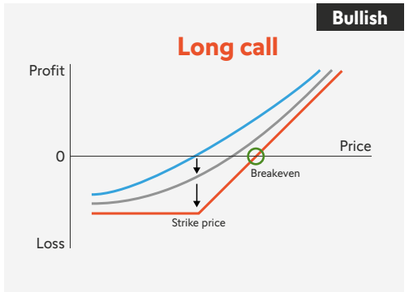
This is one scenario. Buying put options would imply a similar scenario, but instead put options grant the buyer the right to sell at a fixed price by a scheduled expiry date. Please note that the arrows on the chart indicate the impact of time decay of options prices over time, till the expiry date.

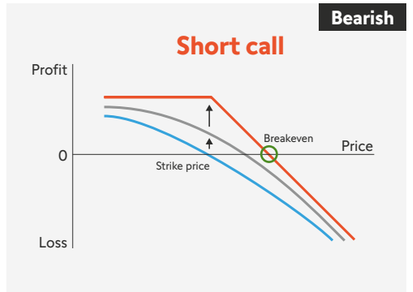


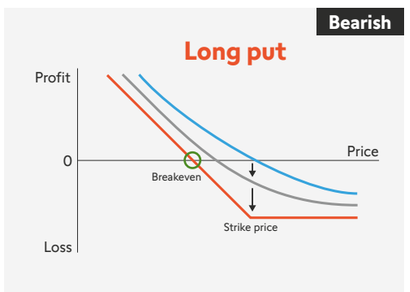
# Forex Options basics

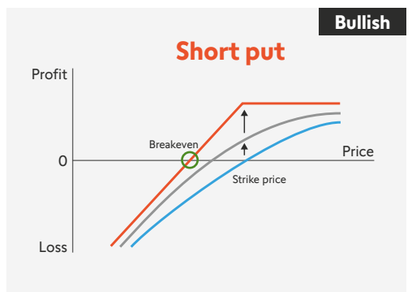
As we saw, options grant the buyer the right to buy (call) or sell (put) the underlying asset at a fixed price, called the strike price. **Forex Options are «European» options, meaning that the right to exercise the option only applies on the expiry date.** In contrast, American options can be exercised at any time until the expiry date.
If the position remains open until expiry and expires in-the-money, as either buyer or seller of the option, you have an open position on the underlying asset for an amount equal to the amount selected when the trading transaction was taken out, with the market price equal to the strike price.

| | Buyer | Seller |
|---|---|---|
| Call option | MAX Profit = ∞<br>MAX Loss = Premium | Max Profit = Premium<br>Max Loss = ∞ |
| Put option | MAX Profit = (Strike - 0) * Notional value<br>MAX Loss = Premium | MAX Profit = Premium<br>MAX Loss = (Strike - 0) * Notional value |

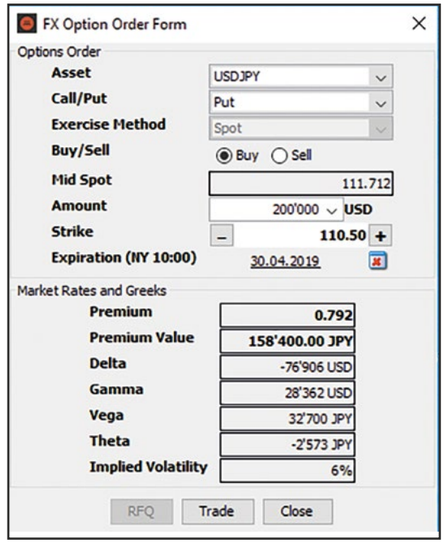


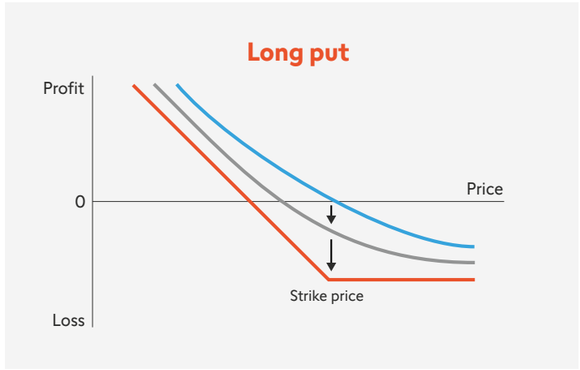
**WARNING!** Should the option remain open until expiry, **the underlying asset will be delivered (spot delivery) if the option expires with intrinsic value.** In this case you need adequate free margin, or your financial intermediary could close all or part of the position. Traders usually prefer to manage their positions before the actual expiry.




Now, let's take an example with USD/JPY to explain what a PUT option is. Bear in mind that if you buy a call you have a bullish view on the market, if you buy a put you have a bearish view.
It is 7 March 2019 and the exchange rate is 111.71. We think the price will fall considerably and want to buy a put option at a strike price of 110.50, expiring on 30 April.
Let's take a closer look at the order from our platform Advanced Trader. After manually selecting the desired amount ($200.000) and strike price, and clicking on RFQ to request a quote, we see that the premium value is 0.792.

The Premium Value is then calculated as: 200.000 x 0.792 = JPY 158.400 or USD 1.418.

To keep things simple, we will discuss the meaning of the Greek terms (delta, gamma, vega, theta) later. For now, let's focus on the pay-off diagram for this strategy.




At the expiry, this option will have an intrinsic value only if the price of the underlying asset is below the selected strike price, i.e. 110,50. Let's suppose that the price will be 109.00. The value of the put option at expiry is then equal to 110.50 - 109.00 = 1.50.
Now we multiply this value with the amount invested => 1.50 x 200.000 = JPY 300.000, or USD 2.752.

Compared with the premium initially paid, our performance exceeded 90%, but a strong directional move was needed in the underlying asset.

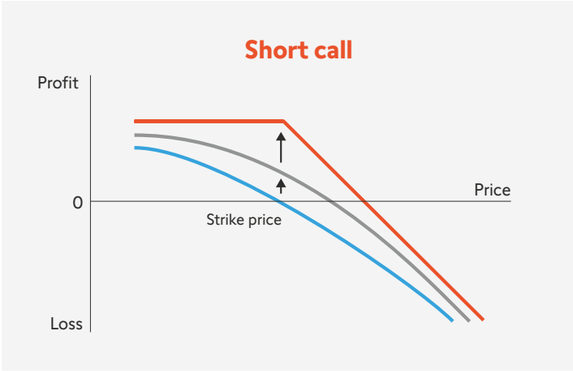
## When to buy and sell options

As the option premium tends to fall in value as expiry draws closer, many traders prefer to take advantage of the time decay by selling the option to collect the premium. It is common belief that 75% of options expire with no intrinsic value, but that is not true. According to data from OCC statistics, 70% of positions close before expiry, and only about 20% of options expire worthless. The option is exercised the other 10% of the time.

As selling a naked option theoretically implies unlimited risk, you should build strategies that combine the various strike prices and/or expiry dates, or that hedge the risk of the underlying asset. Keep up to date and learn about the different strategies by checking **swissquote.com/education**

# Pay-off in selling options

If you sell a naked option, the risk and reward diagrams will be symmetrical to the diagrams presented above. Instead of featuring limited risk and potentially unlimited profit, maximum reward is represented by the premium collected with potentially unlimited loss. You quickly realise how important it is to hedge the risk of the underlying asset, by making dynamic adjustments based on its performance. You can also hedge the risk of selling the option alone by buying options with different strike prices or expiry dates.




Let’s begin with examining the pay-off diagram for selling a naked call option.

In this example, while the AUD/USD currency is trading at 0.7028, we sell a call with a strike of 0.7028. Bear in mind that with Swissquote you can select the strike price that you want, with a precision of 1 pip! Suppose you want to profit from a faster time decay, so you sell the call with expiry tomorrow. The premium is 0.0022 and you decide to invest AUD 100.000.

You get the maximum reward for any value below the strike price, which is equal to the premium you collect for selling the option. When you sell a naked option, your broker will request a margin on your trading account (as when you keep a position open directly at the spot rate). In this case, check our website or contact us for further information.

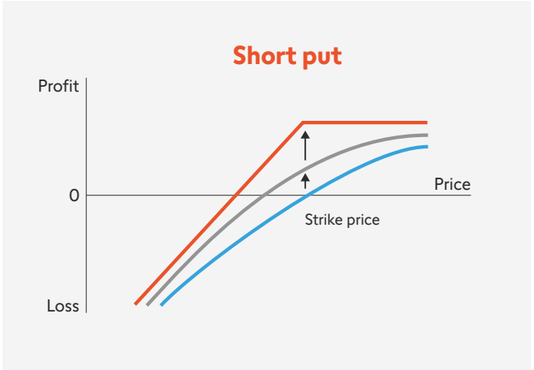
The break-even point in the strategy, i.e. the point where profit is zero at expiry, is 0.7028 + 0.0022 = 0.7050. Above that point, you incur a loss, just as if you were shorting the underlying asset (to hedge the risk of this strategy, you can buy the underlying asset or take a different position, as explained in our webinars on this situation).

## Moneyness (ITM, ATM, OTM)

The price of a Forex Option depends on the underlying asset price, instrument volatility, time to expiry, and interest differential.

An option is «in the money» if its strike price is higher than the spot price of the underlying asset (i.e. has intrinsic value), or «out of the money» if it is lower (has no intrinsic value).
By convention, the strike price closest to the price of the underlying asset is defined as «at the money».

Let's now look at the last example: we have not yet examined the sale of a naked put option. Having then examined the four cases (purchase of a call, purchase of a put, sale of a call, sale of a put), we will be able to understand a strategy's logic and risk. By mixing purchases and sales of calls and puts, with different expiries and strike prices, or also holding the underlying, we can consequently create a series of speculative or hedging strategies in our portfolio, depending on our needs. Or, if we have specific ideas on a currency, we can simply act on the individual option alone.




The strategy payoff is similar to that of the sale of a naked call option, but with **unlimited risk in the event that the price of the underlying falls.**

It is important to understand that the objective of traders who sell options is to collect the value of the premium, in full or partially. In fact, the closer we are to the expiry of the option, the quicker the time value decreases. When options are sold, there is a positive theta (see the box on the Greeks), i.e. there is a gain with the passage of time, owing to the time decay characteristic (obviously the other two main variables in options still need to be checked, namely the price of the underlying and the volatility).
Managing positions dynamically is always possible, for example by 'delta hedging' and opening short positions directly on the underlying to hedge against the downside risk.



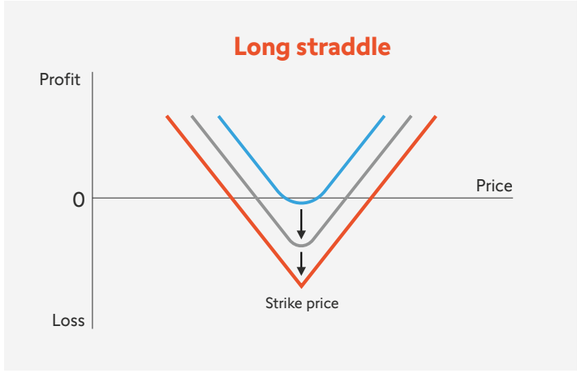
# Building strategies

There are only two types of contracts: calls and puts. But you can buy and sell them at countless strike prices and expiry dates (Swissquote lists expiries from the next day to one year out). This means that the number of potential options strategies you can create is endless. As mentioned above in this ebook, you can diversify significantly in building strategies and optimise your risk management. You can benefit from the passing of time, volatility performance or directional changes in price. You can also use options in simpler ways, for example to better manage overall portfolio risk.

The most common strategies can be classified as taking positions on rising volatility (straddles and strangles), directional price changes (vertical spread), or sideways price movements (calendar spread, butterfly, iron condor).

Our webinars can teach you more about these strategies.

Now let's quickly analyse the pay-off of a straddle. This strategy is built by temporarily taking a position on both a call and a put at the money, with the same expiry date. Let's suppose that USD/CAD is trading at 1.2900 and we **buy both the call and the put at the same strike price and same expiry date** in two weeks. We expect the underlying asset price to register a directional move, but we don't know which direction. As a result, we are neutral regarding market direction and will profit whether the price moves up or down before expiry.



In the diagram above, the orange line indicates the pay-off at expiry, just as in the previous examples. The blue line indicates the pay-off of the day of the position opening, the grey line the time decay effect. Please be aware that also a drop or rise in volatility can affect the options prices before the expiry date.

We will close the option in the money before expiry to avoid owning the underlying asset. However, if the price remains within the two break-even points, we risk the amounts of the premiums paid.

## The Greeks

The Greeks measure the sensitivity of an option's price to various factors:

- directional price changes (delta and gamma);
- time (theta);
- volatility (vega);
- interest rates (rho).

Delta represents the change in an option's value for each unit of change in the underlying asset. Gamma expresses the rate of change in delta for each unit of change in the underlying asset.

Theta measures the change in the value of an option with the passing of time. The value of theta tends to increase as the option's time approaches expiry.
Vega shows how the price of an option changes with each one percentage point move in volatility.

Rho is the rate at which the option's value changes for each percentage point change in interest rates.

To find out more about the Greeks, please visit our website and register for one of our webinars.
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