Danske Bank

Information on currency option contracts

This fact sheet contains general information on currency option contracts traded through Danske Bank.

Currency options may be traded as OTC transactions with Danske Bank as the counterparty.

Trading in currency options gives you either a right or an obligation to buy or sell an underlying currency at a fixed rate at a specified future date (the maturity date). The fixed rate is also called the strike price or the exercise price.

The buyer of a currency option pays a premium to the issuer of the option at the date of the contract.

Using currency options
Currency options may be used to hedge currency risk.
They may also be suitable as investment instruments for the purpose of generating a profit on expected exchange rate developments.

Term
Currency option contracts typically have maturities of up to two years.

Types of options
A call option gives the buyer the right to buy the underlying currency, while a put option gives the right to sell.

When you buy a currency option, you have the right to buy (call option) or sell (put option) the underlying currency in return for paying a premium.

When you sell a currency option, you have the obligation to sell (call option) or buy (put option) the underlying currency. Settlement may be effected in cash or by payment on delivery.

An option settled on delivery is an agreement under which the buyer, on exercise, has the right to buy (call option) or sell (put option) the underlying asset by making or taking delivery on the maturity date concurrently with or following prior payment of the purchase price (the “strike price”).

An option settled by cash is an agreement giving the buyer the right, by exercising the option, to receive a settlement amount from the seller.

The settlement amount equals the difference between

- the market rate and the strike price provided the market rate is higher than the strike price (call option)
- the strike price and the market rate provided the strike price is higher than the market rate (put option)

The market price is the reference rate traded in the market at the expiry date, which is typically two business days before the maturity date.

A distinction is made between *European*, *American* and *Bermuda* options.

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- Buyers of European options may exercise their right to buy or sell at the expiry date
- Buyers of American options may exercise their right at any point until expiry
- Bermuda options are a hybrid of European and American options. Holders may exercise the option on several predefined dates during the duration of the contract – e.g. every six months.

An option can be concluded with one or more barriers. This means that if, during the contract period, the exchange rate reaches a defined barrier, the option is either triggered or lapses.

- For knock-out options, the option lapses if the barrier is reached
- For knock-in options, the option is triggered if the barrier is reached

Digital currency options are also called ”all-or-nothing options” or binary options. The return on a digital option differs from that of an ordinary currency option:

- For touch options, a pre-defined amount is paid if there is trading at the strike price during the term of the option
- For no-touch options, a pre-defined amount is paid if there has been no trading at the strike price during the term of the option

Concepts describing the value of an option

Generally, the value of an option is expressed using one of three concepts:

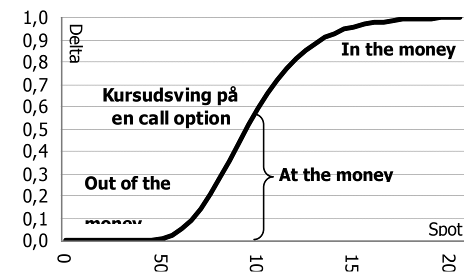
“Out-of-the-money” indicates that the strike price of a call option is higher than the current market price of the underlying asset, while the opposite applies for a put option.

“At-the-money” indicates for both call options and put options that the strike price of the option is equal to the current exchange rate of the underlying currency.

“In-the-money” indicates that a call option’s strike price is lower than the current exchange rate, while the opposite applies for a put option.

Generally, options that are in-the-money are exercised on expiry, while options that are at- or out-of-the-money are not exercised.

Price fluctuations on an option are driven by changes in the underlying asset. Option sensitivity and price fluctuations depend on the difference between the option’s strike price and the current exchange rate.



Pricing currency options

The price (premium) of a currency option is determined by the following factors:

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- Type of option (call, put, barrier, knock-out, knock-in, touch, no touch etc.)

- The spot rate of the underlying currency

- The expected risk (volatility) of the underlying currency
  If a currency's exchange rate is expected to fluctuate considerably in the future, there is a greater probability that it will deviate from the current exchange rate. By extension, this also implies a greater probability that a currency option will be of value on the maturity date, indicating a higher option premium. Hence, it will be expensive to hedge a currency with strong exchange rate fluctuations.

  The price of a barrier option or a digital option also depends on the fluctuations of the underlying currency (volatility).

  An increase in volatility makes a knock-out option cheaper because of the greater risk of the barrier being reached and the option lapsing. On the other hand, an increase in volatility makes a knock-in option more expensive, because of the greater risk of the barrier being reached and the option being triggered.

Term

The term of an option has a large impact on the amount of the premium. The longer the period, the more expensive the option.

- The strike price and possible barriers
  The difference between the strike price and the current market price impacts the amount of the option premium.

  For call options, the lower the intended strike price, the higher the premium. The lower (better) the exchange rate at which you want the right to buy the currency in question, the more expensive the option will be.

  The opposite applies to put options. The higher (better) the strike price at which you want to sell the currency in question, the more expensive the option will be.

  For barrier options, the choice of barrier has a big impact on the size of the premium.

  For knock-out options, the premium falls the closer to the market exchange rate the barriers are fixed when the contract is entered into. For knock-in options, the premium increases the closer to the market exchange rate the barriers are fixed when the contract is entered into.

- Interest rates of the underlying currencies
  The interest rates of the two currencies influence the size of the premium.

  If interest rates in the base currency (such as USD) are higher than in the variable currency (such as DKK), call options will be cheaper and put options will be more expensive. If interest rates in the base currency (such as USD) are lower than in the variable currency (such as DKK), call options will be more expensive and put options will be cheaper.

Early settlement of currency options

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You can close a currency option before expiry by establishing an off-setting option contract on the basis of the current market rates. The maturity of the off-setting option should equal the remaining term to maturity of the original option. All other terms should be identical to the original terms.

Using currency options to hedge risk
In the following, we explain how currency options can be used to hedge a currency risk.

Standard currency options
A Danish company exporting goods to the USA and receiving income in USD can hedge the exchange rate risk by buying a put option to sell USD against DKK.

When entering into the contract, the company pays a premium in return for the right to sell USD against DKK at the strike price. The strike price is set by the company.

If the spot rate is lower than the strike price at the time of expiry, the company will sell the USD amount received at the strike price. If, on the other hand, the spot rate is higher than the strike price at the time of expiry, the company will sell the USD amount received at the current spot rate. In other words, the option will not be exercised in the latter case.

Barrier currency options
A Danish company exporting goods to the USA and receiving income in USD can hedge the exchange rate risk by buying a put option to sell USD against DKK.

If the acquired put option lapses if the DKK/USD exchange rate appreciates to a pre-defined barrier level, this is a barrier currency option (a knock-out put-option).

The barrier option will be less expensive than an ordinary put option. The company obtains a discount, because the option will lapse if the barrier is reached during the life of the option. In this example, however, the barrier is higher than the current spot rate. This means the company will be better off renewing the hedge if the option lapses, because the spot rate is now higher than it was when the transaction was entered into.

Digital currency options
Let us assume that a Danish company needs to make a payment in a country with the currency “ISO”. Payment is due in three months and the current 3M forward rate on ISO/DKK is 100 (see separate fact sheet on forward exchange contracts).

The company hedges its obligations by making the following transactions:

- It buys ISO against DKK at the forward rate of 100.
- It buys a digital no-touch currency option at a strike price of 120. The option is priced at 10 points and it pays 20 points if the strike price is not reached.

If the ISO/DKK exchange rate does not increase to the level of 120 or higher during the life of the option, the company will have hedged its payment obligation at price 90, or 10 points better than the current forward rate.

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The net price of the hedge is determined as follows:

Forward price	100
Cost of premium paid	- 10
Option gain	+ 20
Net price	90

If the ISO/DKK exchange rate increases to the level of 120 or higher during the life of the option, the company will have hedged its payment obligation at price 110, or 10 points worse than the current forward rate.

The net price of the hedge is determined as follows:

Forward price	100
Cost of premium paid	- 10
Option gain	0
Net price	110

Examples of return profiles when using currency options

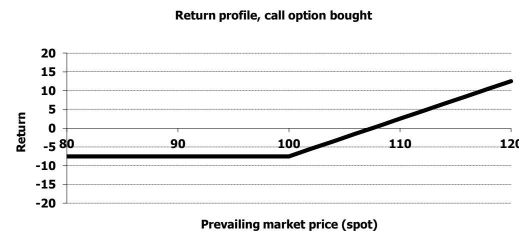
This section provides a number of examples of return profiles that show whether or not a transaction is profitable.

Buying a call option

A buyer of a call option has a right, but not an obligation, to buy the underlying currency at an agreed rate.

If on expiry the rate is higher than the strike price, exercising the option produces a profit.

If on expiry the rate is lower than the strike price, the buyer will not exercise the option, because it would be more beneficial to buy the underlying currency in the market.

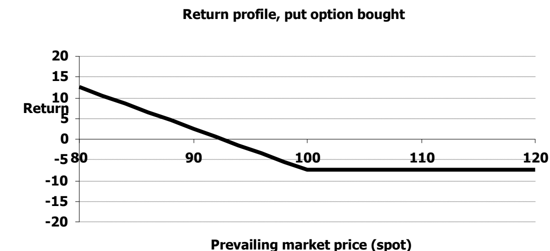


Buying a put option

The buyer of a put option has a right, but not an obligation, to sell the underlying currency at an agreed rate.

If on expiry the rate is lower than the strike price, exercising the option produces a profit.

If on expiry the rate is higher than the strike price, the buyer will not exercise the option, because it would be more beneficial to sell the underlying currency in the market.



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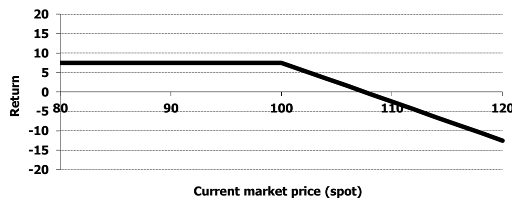
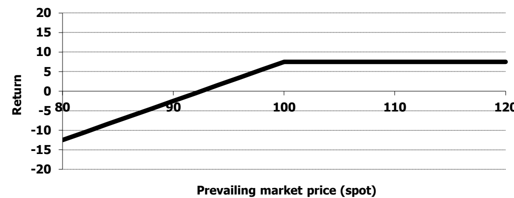
Selling a call option
The seller of a call option is under an obligation to sell the underlying currency at an agreed rate, if, on expiry, the rate is higher than the strike price and the buyer exercises the option.

If on expiry the rate is lower than the strike price, the option will not be exercised, because it would be more beneficial to buy the underlying currency in the market.



Selling a put option
The seller of a put option is under an obligation to buy the underlying currency at an agreed rate, if, on expiry, the rate is lower than the strike price and the buyer exercises the option.

If on expiry the rate is higher than the strike price, the option will not be exercised, because it would be more beneficial to sell the underlying currency in the market.



Examples of investment strategies using currency options

Covered call
A covered call consists of a sold call option with simultaneous ownership of the underlying currency. In other words, the seller has hedged his obligation to deliver the underlying currency if the buyer exercises the option.

The seller receives a premium for selling the call option in return for waiving the right to a potential appreciation gain on the underlying currency in excess of the strike price.

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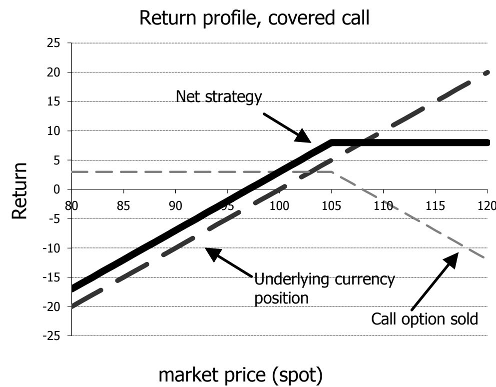
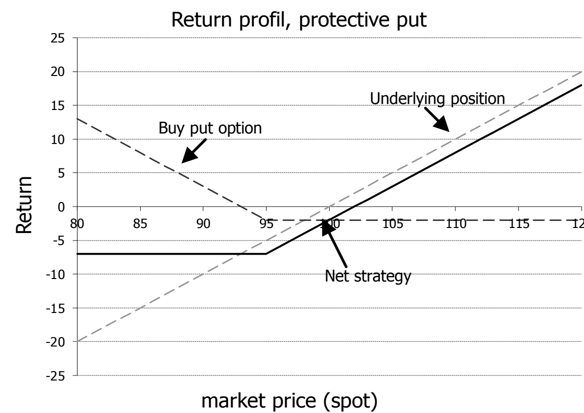


The investor should not expect the return to exceed the strike price plus the premium received, as this marks the break-even point for the strategy.

Protective put
A protective put consists of a bought put option with simultaneous ownership of the underlying currency. This gives the party the right to sell the underlying currency at the option strike price.

The investor pays a premium in order to buy the put option, while the upside potential of the underlying currency is intact.

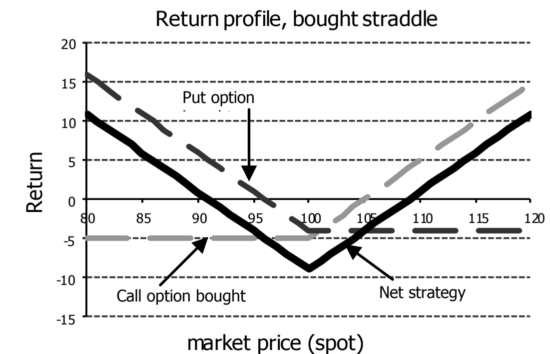


The strategy is used to hedge against depreciation of the underlying currency.

Bought straddle
In a bought straddle, a party buys a call option and a put option at identical strike prices. This gives the party the right to buy and/or sell the underlying currency at the option strike price.

The investor pays a premium to buy the options.

The strategy is used to hedge against an expected appreciation or depreciation in the exchange rate of the underlying currency.



Sold strangle
In a sold strangle, a party sells a call option and a put option at different strike prices. This gives the party an obligation to sell and/or buy the underlying currency at the option strike price.

The investor receives a premium for the options sold.

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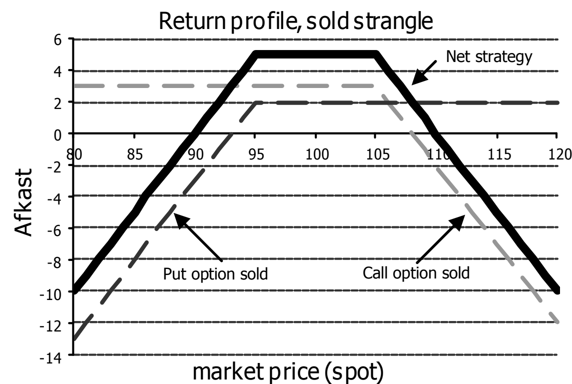
The strategy is used in a situation of expected stable exchange rate developments in the underlying currency.



Risk factors
You should be aware that trading in currency options involves substantial risk.

Under the executive order on risk-labelling of investment products, this product type is in the "RED" category.
The "Red" category consists of: "Investment products involving a risk of losing more than the amount invested, or product types which are difficult to understand".

The risk-labelling categories defined by the Danish Financial Supervisory Authority ("DFSA") can be found at www.danskebank.dk/risikomaerkning [(in Danish only)].
The risk-labelling system should not form the exclusive decision-making basis of an investment. It is only intended as a supplement to the information you should obtain before making an investment or to the advice you receive from the bank after defining your investment profile.

Selling currency options

For options involving delivery, a sale involves the risk of an unfavourable difference arising between the strike price at which delivery of the underlying currency must be made (call option) or taken (put option) and the rate at which the underlying currency can be acquired or sold in the market.

For options with cash settlement, a sale involves the risk that the option must be settled at an unfavourable strike price relative to the market price. In both cases, the loss could exceed the option premium received, as shown in the return profiles above.

In a worst-case scenario, the seller of a call option could suffer an unlimited loss.

In a worst-case scenario, the seller of a put option could suffer a loss equal to the difference between the strike price less the premium and nil.
During the life of the option, the exchange rate, expected exchange rate fluctuations, and the money market rate will impact the market value of the option. The impact on the market

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value will depend on the type of option.

In the event of early closing, the seller may suffer a loss equal to the absolute value of the negative market value plus the spread on the off-setting transaction.

Buying currency options
When you buy a currency option, the loss is limited to the loss of the premium paid.

Collateral
When you enter into transactions with Danske Bank as the counterparty, we may require that you provide collateral.

Special market conditions
Under special market conditions, it may be difficult or impossible to close a position; for example if, during periods of frequent price fluctuations, prices rise or fall to such an extent that we are unable to provide a price.

Tax
The tax treatment of gains or losses on currency options depends on whether you are trading as a private individual or on behalf of a company.

Due to the complex nature of this area, we recommend that you consult an accountant or other professional adviser to clarify the tax and accounting consequences to you of engaging in such trading.

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