UBS

Warrants

Investing with leverage

Warrants offer the opportunity to participate disproportionately in the performance of the underlying asset of your choice with a relatively low capital commitment.

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Warrants: small commitment – big impact

Are you looking for an investment with the potential of exceptional returns?

Warrants could be exactly the right choice for you. They offer you the opportunity to participate disproportionately in the performance of an underlying asset of your choice with a relatively low capital commitment – a principle known as leverage. Warrants are intended for investors who are happy to take risks; the leverage means they offer above-average opportunities for profits, but they also have a high risk of loss if the market goes the opposite direction. However, the maximum loss is restricted to the capital you have invested.

Unwilling to miss an opportunity?

With Warrants, that's no problem. Depending on which direction you expect the market to move, you can bet on rising prices with a Call Warrant or falling prices with a Put Warrant. In any way, consider that volatility affects the value of Warrants. Changes in volatility have a direct influence on the price.

Want to keep all options open?

Warrants open up an enormous range of possibilities, whether you want to invest in equities, currencies, interest rates or commodities. With so many underlying assets, you can find the right Warrant for almost every investment idea. Under normal market conditions, they can be bought and sold in the secondary market on every stock exchange trading day. This means that you define when to enter or exit the market.

Looking to hedge your portfolio against turmoil?

Then Put Warrants are just the thing for you. They offer the opportunity to hedge your portfolio, or particular parts of it, against losses with only a small commitment of capital.

Want to know more?

The following pages explain how these leverage instruments work, the return opportunities they offer, the risks you need to watch out for and how to find the suitable Warrant.

How Warrants work

In technical terms, Warrants are securitized call and put options with a range of strike prices and expiration dates that can be based on all sorts of underlying assets. A Warrant gives the buyer the right, but not the obligation, to buy (call) or sell (put) a set quantity of an underlying asset at a set price on or up to a set date.

In practice, Warrants follow a simple principle:

The value of a Call Warrant goes up when the price of the underlying asset rises and goes down when the price of the underlying falls. So, if you think the price of the underlying is going to rise, you buy a Call Warrant which will participate disproportionately in the price gains of the underlying.
The risk: If the price of the underlying falls, the Call Warrant declines in value disproportionately.
Note: The volatility of the underlying can affect the value of a Call Warrant. If volatility increases, then all other things being equal the price of the Warrant will increase too, and vice versa.

The value of a Put Warrant falls as the price of the underlying rises and rises as the price of the underlying falls. You buy Put Warrants if you expect prices to fall, since price declines in the underlying will result in leveraged gains for the Put Warrant. Puts can also be used to hedge an existing portfolio.
The risk: If the price of the underlying rises, a Put Warrant will make disproportionate losses.
Note: The volatility of the underlying can affect the value of a Put Warrant. If volatility increases, then all other things being equal the price of the Warrant will increase too, and vice versa.

Overview of features

Underlying
The underlying is the asset on which the Warrant is based. The change in the price of the underlying is one of the most important factors influencing the price performance of a Warrant. Underlying assets may be: equities, indices, currency pairs, interest rates or commodities.

Strike
The strike (exercise price) is the price at which the holder of a Warrant can buy or sell the underlying when exercising the option right. If the price of the underlying is higher than the strike, a Call Warrant is said to be in-the-money and a Put Warrant is out-of-the-money, and vice versa. If the price of the underlying is roughly the same as the strike, a Warrant is said to be at-the-money.

Conversion ratio
The conversion ratio tells you how many Warrants are needed to acquire one unit of the underlying. For example, a conversion ratio of 10:1 means ten Warrants are needed to buy the underlying at the strike.

Expiration
Warrants have a limited term. This is set by the expiration date. Warrants can be traded, i.e. bought and sold, on the secondary market under normal market conditions until they expire.

Type of exercise
With European-style Warrants, investors are only allowed to exercise their option at the end of the term. American-style Warrants can be exercised at any time during their term.

Repayment
Warrants may be repaid upon expiration either by cash settlement or physical delivery of the underlying. For Warrants with physical delivery, the investor has to proactively exercise them or sell the product in the market before expiration. Otherwise, the Warrant expires worthless, even if it is in-the-money .

The price of a Warrant: it's not just intrinsic value that counts

The price of a Warrant consists of two components – time value and intrinsic value.
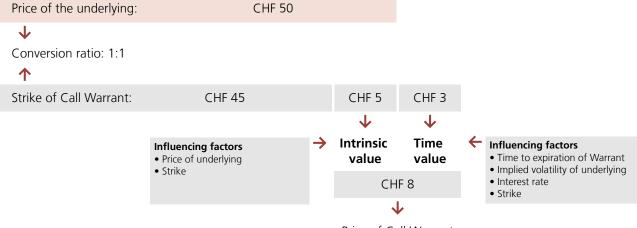
Intrinsic value

The intrinsic value of a **Call Warrant** is the difference between the current price of the underlying and the strike, divided by the conversion ratio. This means a Call Warrant only has intrinsic value if the price of the underlying is higher than the strike. It is then said to be in-the-money. If the underlying goes up, the intrinsic value increases. If the price of the underlying is below the strike, a Call Warrant is said to be out-of-the-money. In other words, it has no intrinsic value.

With **Put Warrants,** the situation is precisely the opposite: this means that the intrinsic value is always calculated as the difference between the strike and the price of the underlying. A Put Warrant only has intrinsic value if the price of the underlying is below the strike. If the price of the underlying is higher, it is out-of-the-money and has no intrinsic value.

Example of the price components of a Call Warrant:

Time value

During their term, Warrants normally trade at a price higher than the intrinsic value. This premium is called time value. To put it very simply, time value is a premium that the Warrant investor pays for the possibility that the underlying will move in the right direction over time and be in-the-money at expiration. Time value is not a constant, it changes over time. The factors affecting it include time to expiry and the expected size of price movements in the underlying, for which the technical term is implied volatility.

Price of the underlying:	CHF 50			

↓

Conversion ratio: 1:1

↑

Strike of Call Warrant:	CHF 45		CHF 5	CHF 3

↓ ↓

	Influencing factors • Price of underlying • Strike	→	**Intrinsic value**	**Time value**	←	**Influencing factors** • Time to expiration of Warrant • Implied volatility of underlying • Interest rate • Strike

CHF 8

↓

Price of Call Warrant

Call Warrants for rising prices

Here is an example showing how a Call Warrant works: You expect the price of the Bull shares (imaginary) to rise and would like to participate disproportionately in this by using a Call Warrant. At the time of purchase, the price of the Bull shares is CHF 100. Thus you buy an in-the-money Call Warrant with the features in the table on the right:

Underlying	Bull shares
Strike	CHF 95
Expiry	In six months
Conversion ratio	1:1
Price of underlying	CHF 100
Price of Call Warrant	CHF 8

The price of the Call Warrant can be calculated as the intrinsic value of CHF 5 (price of underlying CHF 100 less strike CHF 95) plus an assumed time value of CHF 3.

Example scenarios at expiry	Scenario 1 Underlying rises	Scenario 2 Underlying unchanged	Scenario 3 Underlying falls
Price of Bull shares	CHF 110	CHF 100	CHF 90
Value of Call Warrant	CHF 15 (CHF 110 – CHF 95)	CHF 5 (CHF 100 – CHF 95)	CHF 0 (no intrinsic value)
+/– Call-Warrant	87.50%	–37.50%	–100%
+/– Bull shares	10%	+/–0%	–10%

Ignoring costs and fees

**Scenario 1:
Underlying rises**

Your prediction is correct. Bull shares rise 10% to CHF 110. In this case, the Call Warrant would be worth CHF 15. As Warrants have only intrinsic value at expiry, this figure is the difference between the price of the underlying and the strike at expiry. At a purchase price of CHF 8, you would have made a profit of CHF 7 per Warrant, equivalent to 87.5%. This demonstrates the leverage. In this example, the Call Warrant gained almost nine times more than the price of Bull shares.

IMPORTANT: Warrants may contain an exercise obligation (especially with physical delivery). If a Warrant that is in the money is not exercised, it expires worthless.

**Scenario 2:
Underlying unchanged**

In this scenario, Bull shares remain unchanged upon expiration at CHF 100. The Call Warrant still has an intrinsic value of CHF 5, but the time value of CHF 3 has fallen to zero by expiration. For the investor, this means a loss of CHF 3 per Warrant, equivalent to 37.5%. Bull shares would have had to rise by at least CHF 3 to CHF 103 to avoid a loss. In this instance, the Warrant would have had an intrinsic value of CHF 8 upon expiry. Since the time value of Warrants falls over time and is zero upon expiration, investing in Warrants is always a race against time.

IMPORTANT: Warrants may contain an exercise obligation (especially with physical delivery). If a Warrant that is in the money is not exercised, it expires worthless.

**Scenario 3:
Underlying falls**

If the underlying falls, Call Warrants lose disproportionately. In our example, Bull shares fell by only 10% to CHF 90. However, the Call Warrant expired worthless. The worst case occurred: Bull shares were trading below the strike of CHF 95. This means that the Call Warrant had no intrinsic value. To put it another way, the Warrant expired worthless.

Put Warrants for falling prices

You expect the Bear shares (imaginary) to encounter difficulties in the near future and want to hedge Bear shares in your portfolio against falling prices. You are looking to profit from this using a Put Warrant. Bear shares currently trade at CHF 80. To implement your strategy, you buy an in-the-money Put Warrant with the features in the table on the right:

Underlying	Bear shares
Strike	CHF 84
Expiry	In six months
Conversion ratio	1:1
Price of underlying	CHF 80
Price of Put Warrant	CHF 6

The price of the Put Warrant can be calculated as the intrinsic value of CHF 4 (strike CHF 84 less price of underlying CHF 80) plus an assumed time value of CHF 2.

Example scenarios at expiry	Scenario 1 Underlying falls	Scenario 2 Underlying unchanged	Scenario 3 Underlying rises
Price of Bear shares	CHF 72	CHF 80	CHF 88
Value of Put Warrant	CHF 12 (CHF 84 – CHF 72)	CHF 4 (CHF 84 – CHF 80)	CHF 0 (no intrinsic value)
+/– Put Warrant	+100%	–33.3%	–100%
+/– Bear shares	–10%	+/–0%	+10%

Ignoring costs and fees

Scenario 1:
Underlying falls

As anticipated, Bear shares come under pressure. When the Put Warrant expires, they are trading at just CHF 72. They have fallen by CHF 8, which is equivalent to 10%. The price of the Put Warrant, on the other hand, would have doubled. Upon expiration, it would have an intrinsic value of CHF 12. This is calculated as the difference between the strike and the price of Bear shares at expiry. By committing CHF 6, the investor would have enjoyed a profit of CHF 6 per Put Warrant, which is equivalent to 100%. If Bear shares were being hedged, the profit would have compensated for the loss on the shares.

Scenario 2:
Underlying unchanged

Contrary to expectations, the price of Bear shares does not fall. Instead, they are trading at the same price at expiry as they were when the Put Warrant was purchased. In this case, the Put Warrant still has an intrinsic value of CHF 4 upon expiration. However, the time value is lost. In this scenario, the Put Warrant loses the CHF 2 time value. With a purchase price of CHF 6, this is equivalent to a loss of 33.3%. To reach break-even, Bear shares would have had to fall by at least CHF 2 to CHF 78.

Scenario 3:
Underlying unchanged

When the underlying rises, the Put Warrant loses disproportionately. In this particular case, Bear shares rose by 10% to CHF 88. Because Bear shares were trading above the strike of CHF 84, the Put Warrant would have no intrinsic value and expire worthless. The total amount invested would thus have been lost.

Hedging with Warrants: protecting your portfolio

Warrants are a way for investors to make large profits while committing relatively small amounts of capital. This leverage creates a range of exciting possible uses, which are not all necessarily speculative. For example, you can use Put Warrants to hedge existing assets in your portfolio.

To calculate how many Put Warrants you need to hedge an investment in the SMI™, for instance, you divide the value of the position to be hedged by the level of the index (adjusting for the conversion ratio of the Put Warrant). For an investment of CHF 10,000 in the SMI™ when the index is at 9,000 and the conversion ratio is 100:1, you need (roughly) 111 Put Warrants on the SMI™ (CHF 10,000/(CHF 9,000/100)). To get the most protection, the strike of the Put Warrant should be at the money, i.e. at the current index level, around 9,000. You also need to decide when the protection should apply. This determines the (remaining) term of the Put Warrants.

Scenarios for protecting your portfolio

The table on the following page shows the calculations for a number of scenarios for hedging an investment of CHF 10,000 in the SMI™.

For variant A (full hedge), the potential loss on the SMI™ is almost balanced by the Put Warrants. Almost, because the purchase price of the Put Warrants has to be treated as a cost. For variant A, hedging costs the investor CHF 403, i.e. around 4% of the volume of the hedge. It's cheaper when a hedge has a lower level of protection. However, this means that the investor has to bear a certain amount of the losses on the SMI™ investment (variants B and C). But what happens if the value of the SMI™ investment goes up? Even better, because the investor is still fully invested. However, the purchase price paid for the Put Warrants is lost. As with all insurance, protection against losses comes at a price.

Scenarios: Hedging with Put Warrants

SMI™ investment	Buy Put Warrants on the SMI™ Conversion ratio: 100:1 Expiry: In six months					
Level of the SMI™ at time of hedging: 9,000 Portfolio value (SMI™ investment): CHF 10,000	**Variant A: 100% hedging** Strike: 9,000 (strike = index level) Purchase price per Put Warrant: CHF 2.80 Quantity: 111 **Capital commitment: CHF 311** (= cost of hedging)		**Variant B: 95% hedging** Strike: 8,550 (strike = index level x 95%) Purchase price per Put Warrant: CHF 1.10 Quantity: 111 **Capital commitment: CHF 122** (= cost of hedging)		**Variant C: 90% hedging** Strike: 8,100 (strike = index level x 90%) Purchase price per Put Warrant: CHF 0.30 Quantity: 111 **Capital commitment: CHF 33** (= cost of hedging)	
Level of SMI™ in six months in points	Value of SMI™ investment in six months in CHF	+/− in CHF	Value of Put Warrants in six months (expiration) in CHF	Portfolio value (= value of SMI™ investment + value of Put Warrants) excluding hedging costs in CHF	Value of Put Warrants in six months (expiration) in CHF	Portfolio value (= value of SMI™ investment + value of Put Warrants) excluding hedging costs in CHF	Value of Put Warrants in six months (expiration) in CHF	Portfolio value (= value of SMI™ investment + value of Put Warrants) excluding hedging costs in CHF

Level of SMI™ in six months in points	Value of SMI™ investment in six months in CHF	+/− in CHF	Value of Put Warrants in six months (expiration) in CHF	Portfolio value excluding hedging costs in CHF	Value of Put Warrants in six months (expiration) in CHF	Portfolio value excluding hedging costs in CHF	Value of Put Warrants in six months (expiration) in CHF	Portfolio value excluding hedging costs in CHF
7,500	8,333	−1,667	1,665	9,998	1,166	9,499	666	8,999
8,000	8,889	−1,111	1,110	9,999	611	9,500	111	9,000
8,500	9,444	−556	555	9,999	56	9,500	0	9,444
9,000	10,000	+/−0	0	10,000	0	10,000	0	10,000
9,500	10,556	556	0	10,556	0	10,556	0	10,556
10,000	11,111	+1,111	0	11,111	0	11,111	0	11,111

Note: The degree of protection does not take into account the costs of hedging, i.e. the purchase price for the Put Warrants. The price of the Put Warrants (European style) was calculated using the Black & Scholes model. The implied volatility assumed for the SMI was 12% and the risk-free interest rate was 1.00%. It was also assumed that the performance of the SMI™ investment exactly matched that of the SMI™. Upon expiration, the value of the Put Warrants is the difference between the strike and the index level, divided by the conversion ratio. If the index is above the strike upon expiration, the Put Warrants are worthless.

Caution: prices are always changing

The price of a Warrant is not a constant, it changes over time. Intrinsic value is affected by movements in the price of the underlying, but time value is impacted by two factors in particular:

Time to expiration

Assume you have a choice between two identical Call Warrants on the same underlying. The only difference is that one expires in six months, the other one in a year. If the price of the two Warrants was the same, you would probably chose the one with the longer term. The reason behind this is that the probability of the underlying moving in the right direction is greater, simply due to the longer time horizon. The Warrant with the longer remaining term is therefore more valuable and has a higher time value.

Conversely, but equally logically, time value always declines over time, until it reaches zero upon expiration. The price of the Warrant is then the same as the intrinsic value. The loss of time value can only be compensated by an increase in intrinsic value.

> The longer the residual term of a Warrant, the greater its time value. Time value falls to zero as expiration approaches.

Implied volatility

Another factor affecting time value is the (implied) volatility in the underlying expected by the market. This shows the future price fluctuations in the underlying that market participants are expecting. It is important to bear in mind that implied volatility is not static, but changes over time. It can rise or fall every day. The higher the implied volatility, the greater the expected price fluctuations and the higher the probability that the Warrant will move in the right direction before expiration. Implied volatility gives no indication of the direction prices will move in, but clearly an underlying that moves around a great deal has a better chance of moving in the right direction than one which simply stagnates.

> This means that the higher the implied volatility of the underlying, the higher the time value of a Warrant and the higher its price. If volatility falls, all other things being equal, the value of the Warrant will fall too.

Overview of factors affecting the price

The table shows the impact different variables have on the price of Call and Put Warrants. Some factors, like implied volatility and the length of the remaining term, have the same impact on both types. Others, like the direction in which the underlying moves, cause opposite changes in price.

Factor			Call Warrant		Put Warrant	
Price of underlying	up	↗	up	↗	down	↘
	down	↘	down	↘	up	↗
Strike	up	↗	down	↘	up	↗
	down	↘	up	↗	down	↘
Term to expiration	up	↗	up	↗	up	↗
	down	↘	down	↘	down	↘
Implied volatility	up	↗	up	↗	up	↗
	down	↘	down	↘	down	↘
Risk-free interest rate	up	↗	up	↗	down	↘
	down	↘	down	↘	up	↗
Expected dividends	up	↗	down	↘	up	↗
	down	↘	up	↗	down	↘

Why falling prices can pay off twice: If the price of the underlying falls by a huge amount very quickly, its implied volatility rises rapidly. In this situation, a Put Warrant profits twice. Firstly, the intrinsic value goes up, and secondly, the time value goes up because volatility has increased. The same applies in reverse: if volatility decreases, which is normally the case when prices stagnate or rise moderately, then a Put Warrant can lose time value as well as intrinsic value.

Other things you need to know about Warrants

Cash settlement vs. delivery

Upon expiration, Warrants may essentially be repaid in two different ways, depending on the terms of the product:

1. cash settlement: the investor is credited with the value of the Warrant on the redemption date.

2. physical delivery of the underlying, based on the conversion ratio: delivery here means the underlying is transferred to the investor's custody account in exchange for payment of the strike price per share.

For Warrants on indices, currencies and commodities, cash settlement is standard. For Warrants on individual shares, cash settlement is still the rule, but in some cases there may also be provision for the delivery of the underlying shares. The repayment type for a Warrant can be found in the termsheet or prospectus.

American options vs. European options

With European-style Warrants, investors are only allowed to exercise the Warrant at the end of the term. American-style Warrants can be exercised at any time during their term.

That makes this type more valuable. As a result, American-style Warrants tend to be more expensive than comparable European ones. Regardless of their type, Warrants do not have to be held to expiration; they can be bought or sold at any time under normal market conditions.

Trading in Warrants
One advantage of Warrants is that until expiration they can be bought or sold on- or off-exchange at any time subject to trading hours. The issuer usually acts as market maker, ensuring a liquid market and posting bid and ask prices on an ongoing basis. The investor buys Warrants at the ask price and sells them at the bid price. The range between these is known as the bid-ask spread. This is a cost factor, so should be kept as low as possible. It is important to note that at times of high market volatility or unusual events, the bid-ask spread may widen significantly and, in extreme cases, the issuer may temporarily cease posting bid and ask prices.

Summary

Your investor profile

- Opportunistic
- Willing and able to take risks
- Stock market experience
- Experience with leverage products

The key benefits at a glance

- High potential return on capital committed (leverage)
- High flexibility
- Hedge against price fluctuations
- Can be traded at any time

Market expectation

- Call Warrant: underlying will rise
- Put Warrant: underlying will fall

Time horizon
- Short to medium term

Risks you have to monitor

- Disproportionate losses if the underlying moves the wrong way. Total loss upon expiration is possible.
- Time value falls every day
- Regular monitoring needed
- Issuer risk

Payout profile

Our offering

UBS is one of Europe's leading providers of Warrants and Structured Products. The range covers thousands of products on numerous underlyings.

You can find our offering online:
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