CaixaBank

Manual for the investor in warrants

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This manual was made by CaixaBank as an aid and support to the necessary training required to invest in WARRANTS. CaixaBank assumes no liability for the accuracy or absence of data in this information.

Brief check of the history

It might at first seem that options are a product of financial innovation, but in fact they have a long tradition.

In financial literature, we find data on how the Phoenicians, the Greeks and the Romans already negotiated contracts with option clauses on the goods they transported. The point of these kinds of contracts is to reduce the risk in case of possible adverse events.

The first relatively organised options market appeared in Holland in the 17th century, when negotiations were made with tulip bulbs in such a way that the traders could be assured a purchase price and the farmers a sale price for their tulips.

The constant evolution of the options markets has reached our days in the form of standardised contracts negotiated on organised markets, or bilaterally, in which the contracting parties agree to fulfil a series of agreements established in the contract.

Definition

Warrants are derived financial products. Specifically, they are negotiable options in the form of a security that offer the owner the right, but not the obligation, to buy (call) or sell (put) a certain amount of assets (underlying asset) at a set price (exercise or strike price price) for a period of time until a predetermined date (expiry date) in exchange for a price (premium).

Characteristics of warrants

1. A warrant, just like a share, is a security and, as such, cannot be sold if it has not been bought before; however, it is entirely negotiable, in other words it can be bought or sold as many times as you like and the corresponding profit or loss made.

2. A warrant is a derived product. This means that the warrant derives from the previous existence of another asset, which is called the **underlying asset**.

3. The underlying asset may be any kind of financial asset: index, share, interest rate, currency, basket of shares, obligations, raw materials, etc.

4. A warrant, from the time it is issued, has the underlying asset, the strike price and the expiry set. At the same time, the amount of underlying asset to which each warrant entitled is known, which is the so-called ratio. Therefore, if the ratio of a warrant on an underlying asset is 0.50, it means that a warrant entitles to buy or sell half a unit of underlying asset.

5. On buying a warrant, the right, and not the obligation, of buying or selling the underlying asset is acquired.

6. The price that is paid for the warrant is called the premium, and is what it costs to acquire the right to buy or sell the underlying asset.

7. The premium depends on several parameters: the strike price, the price of the underlying asset, the volatility, the time to expiry, the interest rate and the dividends.

8. The most important difference between the direct investment in the underlying asset and the investment in warrants is that the outlay made to buy a warrant is smaller than that required to buy the underlying asset, even though the same profit or loss is made.

9. "Exercising" a warrant is making effective the right to buy or sell the underlying asset. When a warrant is exercised, the settlement can be made either by the physical delivery of the underlying asset or by financial delivery, that is to say, the settlement by difference between the market price of the underlying asset on the day of exercise and the strike price.

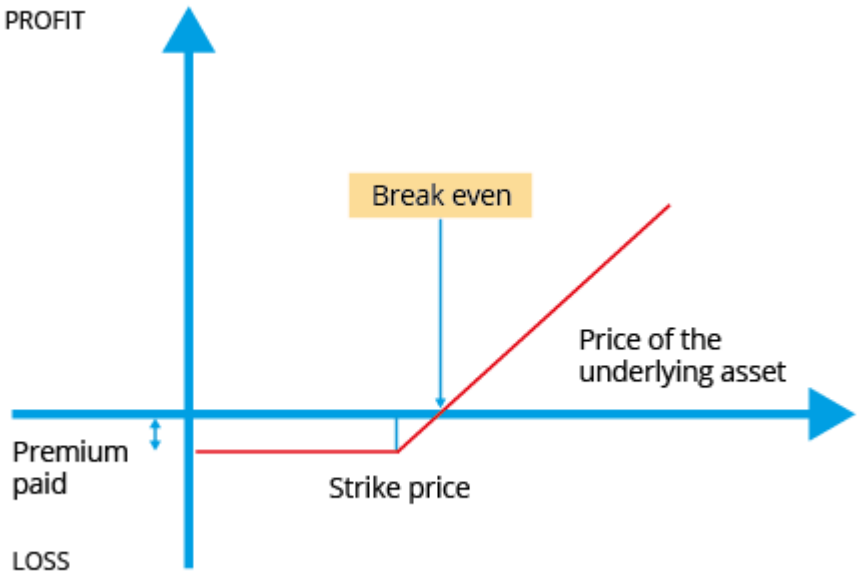
Types of warrants

- **European and American**

  - **European warrants**: those that can only be exercised on the agreed expiry date.
  - **American warrants**: those that can be exercised at any time of the life of the warrant until expiry.

- **Call warrant**

  When an investor decides to wager on a rise and purchases a call warrant, they acquire the right to buy a certain amount of the underlying asset at a set price *(strike price)* at any time from the date of purchase until the expiry *(if the warrant is American)* or on at expiry *(if the warrant is European)*.



The

graph shows the purchase of a call warrant at maturity. As shown, the value of the call warrant increases when there is a rise in the underlying asset. And if the price of the underlying asset falls, the loss will be limited to the premium paid by this call warrant, even though the market might suffer severe falls.

The break even is the price above which the call warrant begins to produce profits. It is the point where the investor neither earns nor loses money.

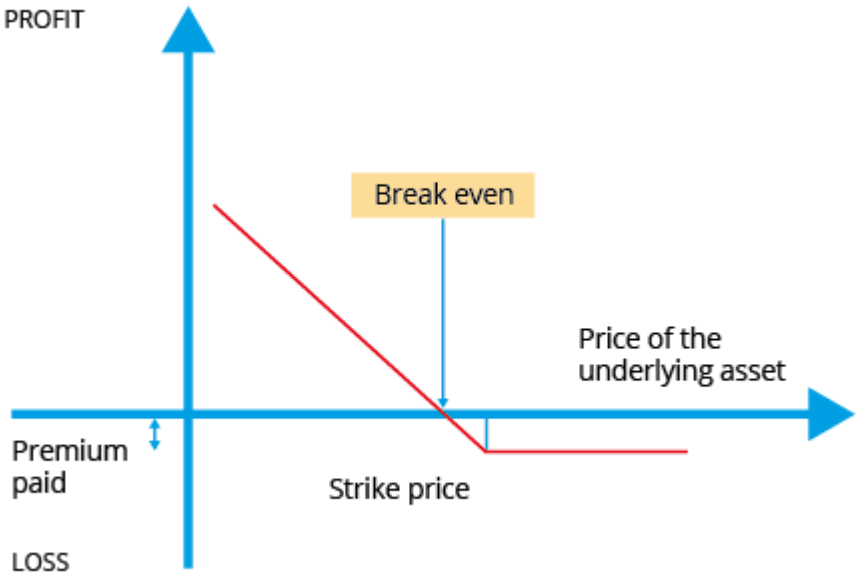
Call warrant break even
Strike price + (Premium paid / Ratio)

Example: an investor decides to buy a call warrant on Telefonica because he believes that the value will rise very soon, within 3 months. The Telefonica strike price is 9.50 euros, the ratio is 0.33 euros and the premium is 0.46 euros. What is the break even or the point from which the investor will begin to earn money if the value rises?

9.50 euros + (0.46 euros / 0.33 euros) = 10.89 euros

- **Put warrant**

Otherwise, if the investor expects a fall in the price of the underlying asset, they have to buy a put warrant. They will therefore acquire the right to sell a certain amount of underlying asset at a set price *(strike price)* at any time from the purchase date to the expiry *(if the warrant is American)* or only at expiry *(if the warrant is European)*.



As can be seen in the graph of the put warrant at expiry, the value increases as the price of the underlying asset falls. If by contrast the underlying asset should evolve positively, the put warrant would lose its value and the loss would be limited to the premium paid for this warrant.

The break even in the case of the put warrant would be equal to the formula:

Put warrant break even
Strike price - (Premium paid / Ratio)

Example: an investor decides to buy a put warrant on Telefonica because they believe that the value will fall within 3 months. The Telefonica strike price is 9.50 euros, the ratio is 0.20 euros and the premium is 0.14 euros.

What is the break even or the point from which the investor will begin to earn money if the value falls?

9.50 euros - (0.14 euros / 0.20 euros) = 8.80 euros

Conclusion

When they buy a warrant, whether it is call or put, investors know the maximum loss (the premium paid) they assume in this purchase from the beginning, and can benefit from sharp market movements.

The price of the warrant: the premium

The premium is the price paid for buying a warrant. The investor acquires the right to buy (call warrant) or sell (put warrant) the underlying asset.

There are different factors of influence in calculating the premium or price of the warrant. We give the most important below: price of the underlying asset, strike price, volatility, time to expiry, interest rate and dividends.

Factors affecting the price of a warrant

- **Price of the underlying asset**

  The price of the underlying asset is one of the most important factors of the premium. The upward or downward movement of the underlying asset are those which fundamentally induce investors to take up a position with call warrants or put warrants.

  For instance, if the price of the underlying asset increases, the value of the premium of the call warrants also increases and the premium of the put warrants falls. On the other hand, the premium of the call warrants falls and that of the put warrants rises if the price of the underlying asset should fall.

- **Strike price**

  Is the price on which investors have the right to buy or sell the underlying asset. This price is fixed and is decided at the time of buying the warrant.

  In the case of call warrants, the lower the strike price, the higher the premium and therefore, the more expensive the right to purchase. It is logical that this should happen, because it is always preferable to have a lower strike price to allow the underlying asset to be bought at a lower price. As the strike price increases, the premium of the call warrant will fall.

  The case of put warrants is the opposite. The higher the strike price, the higher the premium and therefore the more expensive the right to sell. This happens because it is always better to have a higher strike price to allow the underlying asset to be sold at a higher price. Falls in the strike price reduce the premium of the put warrant.

- **Volatility**

  Is another of the most important factors determining the value of the premium, and more difficult to understand. The volatility measures the market variability and instability and is a percentage measure of its speed.

Market trends or direction must not be mistaken for variability. The volatility measures the market variability, not the trend.

If an asset fails to move fast enough, in other words it is more or less stable, the warrants on this asset will have low volatility. On the other hand, an asset with great speed or strong movements on the market has a very high volatility.

When the volatility rises, the price of the warrant also rises, both in the case of a call warrant and of a put warrant. This increase in the price is due to the increased uncertainty on the price of the underlying asset. Similarly, and following this reasoning, when the market is stable the price of the warrant falls, as the uncertainty on the price of the underlying asset falls. Regardless of the fact of whether the price of the underlying asset rises or falls as expected, a fall in the volatility might bring the warrant price down.

By way of example and under normal circumstances, shares in the technology sector will be more volatile than all others, because the uncertainty surrounding these values is normally a higher than the rest.

There are different methods for predicting volatility, but a first approach to determine the value is to examine what has happened in the past. The historical prices of the underlying asset give the historical volatility, with which it is possible to predict future movements.

So what is the real volatility of an asset? This is the question everyone asks when assessing the price of a warrant, because it is really the only unknown factor a priori. On the market warrants are bought and sold with the volatility that both the buyer and the seller consider is right, which is the so-called implicit volatility. This volatility reflects the market expectations of the volatility of the underlying assets to the date on which the warrant expires.

- **Time to expiry**

  The longer the period of time to expiry, the higher will be the value of the premium of a call warrant or a put warrant, as it will be more difficult to predict the price of the underlying asset up to the date of expiry. As the expiry date approaches, the warrants will lose value in a fall that will be accentuated in the last days.

- **Interest rates**

  The interest rate also has an influence on the calculation of the premium, but the effect is relatively small compared with the other factors above.

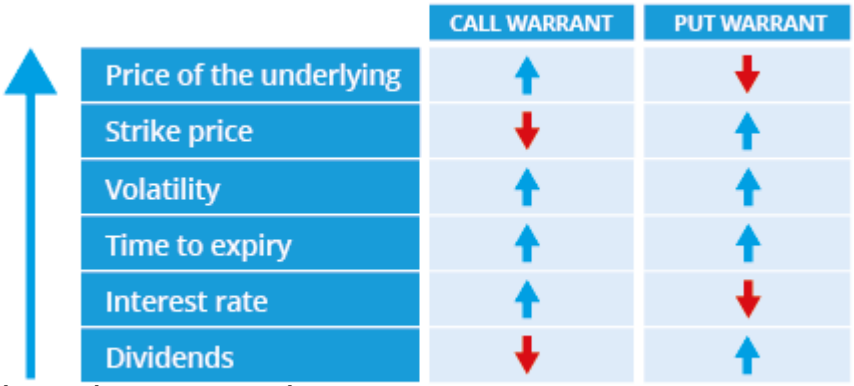
  An increase in the interest rate translates into an increase in the value of the premium for a call warrant, but in the case of the put warrant this increase causes a fall in the premium. Similarly, a fall in the interest rate is reflected in a fall in the premium of the call warrant and an increase in the premium of the put warrant.

- **Dividends**

  When the underlying asset is a share and pays dividends, the market discounts the payment of these dividends and the price of the share therefore falls.
  The fall in the share price, as we have explained before, will cause a fall in the price of the call warrant and increase in the premium of the put warrant. A smaller dividend payment will have the opposite effect: an increase in the premium of the call warrant and a fall in the premium of the put warrant.

Conclusion

In the case of an increase in the factors explained above, the behaviour of the warrants will be as follows:



Intrinsic value and temporary value

Interest rate

Dividends

The premium is the sum of two components: Intrinsic value (**Vi**) and temporary value (**Vt**). Each of the factors above (price of the underlying asset, strike price, volatility, time to expiry, interest rate and dividends) influences one or another component of the premium.

Premium = Intrinsic value + Temporary value

- **Intrinsic value (Vi)**

  The intrinsic value of a call warrant or a put warrant is the value the warrant would have if it were exercised, and represents the gross earnings that would be obtained at that time.

  a) Intrinsic value of a call warrant

Vi = (Ps - Pe) × Ratio	
Vi	Intrinsic value
Pe	Strike price
Ps	Price of the underlying asset
Ratio	Quantity of underlying asset for each unit of warrant

  b) Intrinsic value of a put warrant

Vi = (Pe - Ps) × Ratio	
Vi	Intrinsic value
Pe	Strike price
Ps	Price of the underlying asset
Ratio	Quantity of underlying asset for each unit of warrant

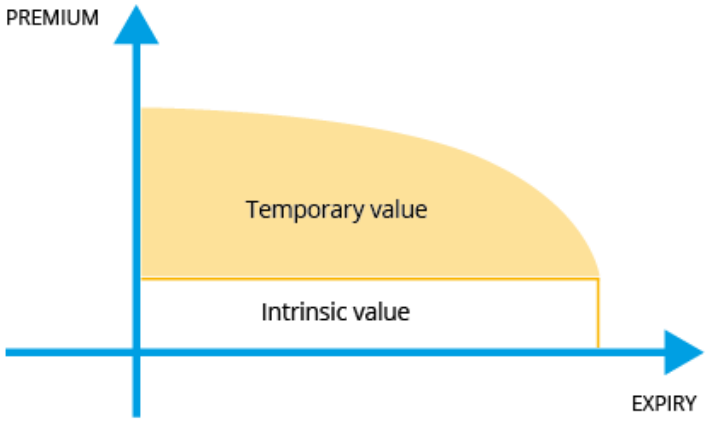
  The intrinsic value is zero if the differences are negative.

- **Temporary value (Vt)**

The temporary value, which is also called the *extrinsic value* of a warrant is the difference between the premium of the warrant and its intrinsic value. This difference measures the degree of uncertainty on the evolution of the price of the underlying assets throughout the life of the warrant.

The longer the time remaining to expiry, the larger the temporary value of the premium will be, given that there will be more time to know how the underlying assets will evolve upon expiry.

Therefore, as the expiry approaches, the temporary value of the warrant will fall, as the possibility that the price of the underlying asset is over (call warrant) or under (put warrant) the strike price will be smaller.



The temporary value of a warrant will be higher the closer the price of the underlying assets is to the strike price. On this point, the intrinsic value will tend to be near zero.

- **What factors determine the intrinsic value and the temporary value?**

Vi = (Pe - Ps) × Ratio	Temporary Value
Strike price	Time to expiry
Price of the underlying asset	Volatility
	Interest rate
	Dividends

Example

An investor wants to buy a call warrant of a certain share that has a market price of 19.00 euros. What would the value of the premium be for each strike price shown in the following table?

Premium = Intrinsic value + Temporary value

Price of the underlying asset = STRIKE PRICE

STRIKE PRICE	INTRINSIC VALUE	TEMPORARY VALUE	PREMIUM (Vi + Vt)
22.00	0	2.41	2.41
21.00	0	2.74	2.74
20.00	0	3.12	3.12
19.00	0	3.53	3.53
18.00	1.00	3.00	4.00
17.00	2.00	2.51	4.51
16.00	3.00	2.05	5.05

NB: The calculations in the example have been made with a ratio of 1. The intrinsic value of a call warrant is calculated as follows: Intrinsic value = (Underlying price – Strike price) × Ratio.

"In the money", "at the money" and "out of the money"

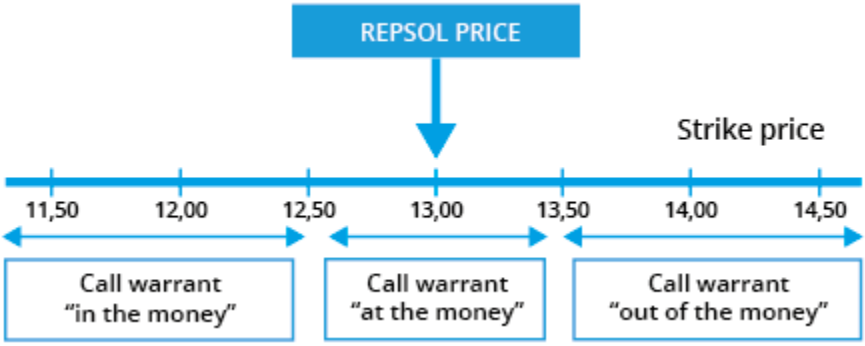
Depending on the price of the underlying asset with respect to the strike price, we can distinguish three situations in which a warrant might be:
"in the money", "at the money" and "out of the money"

Only in one of these situations does the value of the warrant have intrinsic and temporary value at the same time. This happens when the warrant is "in the money". In the other two situations "at the money" and "out of the money", the warrant only has temporary value.

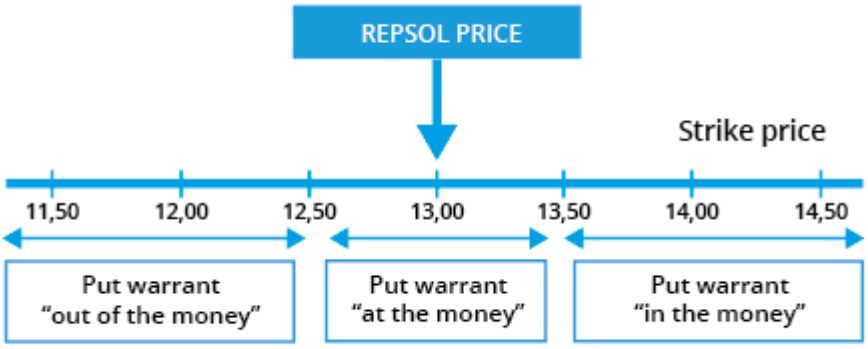
	IN THE MONEY (ITM)	AT THE MONEY (ATM)	OUT OF THE MONEY (OTM)
Call warrant	**The strike price is smaller than the price of the underlying asset** **P strike price < P underlying**	**The strike price strike price is the same as the price of the underlying asset** **P strike price = P underlying**	**The strike price is larger than the price of the underlying asset** **P strike price > P underlying**
Put warrant	**The strike price is larger than the price of the underlying asset** **P strike price > P underlying**	**The strike price is the same as the price of the underlying asset** **P strike price = P underlying**	**The strike price is smaller than the price of the underlying asset** **P strike price < P underlying**
Vi / Vt	**Intrinsic value + Temporary value**	**Only Temporary value**	**Only Temporary value**

Example

An investor wants to buy a call warrant on Repsol because their expectations of the value are very positive and they believe that the share will rise. The price of the share at that time is 13 euros and there are different strike prices at which they might buy the call warrant, so:



If the investor wants to wager on a fall because their expectations of Repsol are negative, then they will buy a put warrant and can choose between different strike prices depending on the price at which they want to sell the underlying assets of a certain date:



Warrant sensitivities

Having analysed the variables with an influence in calculating the premium, it is important to explain how the effect or variation of these variables in the price of the warrant is measured. These parameters are called *sensitivities* and identified with the Greek letters. The principal sensitivities are: *delta*, *vega and theta*.

- **Delta**

  The *delta* sensitivity indicates the variation of the warrant premium in the case of a one-unit movement of the underlying asset. The variation of the premium must be adjusted by the ratio to maintain the ratio of the quantity of underlying asset per warrant.

  Premium variation = Variation in underlying price × Delta × Ratio

  The purchase of a call warrant has a positive delta, so when the underlying asset rises by one point, the premium of the warrant increases in the amount indicated by the delta. In turn, the purchase of a put warrant has a negative delta, so if the asset were to rise by one unit, the premium of the warrant would fall by the amount set by the delta.

  The delta can be defined as the probability of the warrant ending up "in the money" upon expiry, that is, ending up with an intrinsic value. Therefore, a warrant with delta 0.8 means that it has an 80% probability of ending up "in the money" upon expiry.

  The value of the delta varies between 0 and 1 depending on whether the warrant is "in the money", "at the money" or "out of the money". An "in the money" warrant has a delta near to 1, whereas "out of the money" will be near 0. An "at the money" warrant has a delta near 0.5.

  The value of the delta is dynamic, in other words it will vary as the underlying assets and the time to expiry move.

- **Vega**

  The *vega* sensitivity indicates the variation of the premium of a warrant in the case of the variation of 1% in the volatility of the underlying asset.

  Premium variation = Variation in volatility × Vega × Ratio

  An increase in volatility translates into an increase in the premium of the call or put warrant, and a fall would occur if this premium should drop.

  Depending on the strike price and the expiry of the warrant, the vega also changes. Therefore, the volatility movements affect the premium of the warrant in a different way.

- **Theta**

The *theta* sensitivity measures the variation in the premium for each day passing until the expiry of the warrant.

Premium variation = Time variation × Theta × Ratio

As we explained before, the shorter the time to expiry, the smaller the value of the premium of the call or put warrant will be, given that there is a smaller probability that the underlying assets will move in the required direction.

The effect of the theta on the value of the premium of a warrant is much larger as expiry approaches.

- **Other sensitivities**

In addition to the delta, vega and theta sensitivities, there are other less important with respect to the value of the premium:

- **Gamma**: represents the variations of the delta of the warrant by movements in the underlying asset.
- **Rho**: represents the variations in the premium of the warrant due to changes in the interest rate.
- **Phy**: represents the variations in the premium of the warrant due to changes in the dividends of the underlying asset.

Conclusion

PRINCIPAL SENSITIVITIES	VARIABLE
Delta	Price of the underlying asset
Vega	Volatility
Theta	Time to expiry

Example

Initial situation:

Underlying		Type	Price Strike price	Ratio	Warrant price	Sensitivities		
Share	Price	warrant				Delta	Vega	Theta
Repsol	12,00	Call	12,50	0,50	1,05	0,510	0,033	0,003
Endesa	13,00	Put	12,00	0,50	0,84	0,344	0,038	0,003

If in one month (31 days), the price of **Repsol** rises to 13.30 euros and its volatility falls by 1%, how will each of the sensitivities affect the value of the premium of the call warrant? What will be the new value of the premium?

- Delta

  Variation underlying price × Delta × Ratio = 1.30 × 0.510 × 0.50 = 0.332 euros

- Vega

  Variation volatility × Vega × Ratio = (-1) × 0.033 × 0.50 = -0.016 euros

- Theta

  Variation days × Theta × Ratio = (-31) × 0.003 × 0.50 = -0.046 euros

- New premium value

  Premium + Delta + Vega + Theta = 1.05 + 0.332 - 0.016 - 0.046 = 1.32 euros

What would happen with **Endesa** one month (31 days) later for a fall in the price to 11.50 euros and a 2% increase in volatility?

- Delta

  Variation underlying price × Delta × Ratio = 1.50 × 0.344 × 0.50 = 0.258 euros

- Vega

  Variation volatility × Vega × Ratio = 2 × 0.038 × 0.50 = 0.038 euros

- Theta

  Variation days × Theta × Ratio = (-31) × 0.003 × 0.50 = -0.046 euros

- New premium value

  Premium + Delta + Vega + Theta = 0.84 + 0.258 - 0.038 - 0.046 = 1.09 euros

The warrant and the share: Leverage

The principal difference between investment in warrants and direct investment in shares is that investment in warrants requires a much smaller outlay to replicate the same position as with shares.

The leverage measures the number of times that the position in shares can be replicated by investing in warrants. It is therefore a question of an approximate measurement of the multiplying effect that the investment in warrants can have with respect to the direct investment in shares.

The leverage related to the price of the underlying asset with the warrant price adjusted by the ratio.

$$\text{Leverage} = \frac{\text{Share price}}{\text{Price of the warrant}} \times \text{Ratio}$$

This ratio is not linear, as the warrant leverage will vary with the price of the underlying asset. Therefore, the more "out of the money" the warrant might be, the greater will be the leverage.

Example

Share purchase: Investor "A" buys 100 shares in Telefonica at 10.00 euros and pays 1,000.00 euros. Six months later, the Telefonica is quoting on the market at 12.50 euros. The investor decides to sell the shares and obtains a yield of 25%.

Profit = (Sale price – Purchase price) × Number of shares = (12.50 - 10.00) × 100 = 250.00 euros

$$\text{Yield} = \frac{\text{Profit}}{\text{Outlay}} \times 100 = \frac{250{,}00}{1.000{,}00} \times 100 = 25\ \%$$

Purchase of call warrants: Investor "B" decides to make the same outlay of 1,000.00 euros by buying call warrants at the same strike price as the Telefonica price (10.00 euros) and with the same term (6 months). If the ratio is 1 and the warrant premium is 1.25 euros, what will be the leverage on the investment in warrants? What will be the profit and what will be the yield?

$$\text{Leverage} = \frac{\text{Share price}}{\text{Warrant price}} \times \text{Ratio} = \frac{10{,}00}{1{,}25} \times 1 = 8$$

Due to the effect of the leverage of the warrants, with the same outlay made to buy a Telefonica share, it is possible to control 8 shares through the warrants. In other words, with the same outlay made by investor "A", investor "B" will be entitled to buy 800 warrants in Telefonica to allow them to exercise control over 100 shares (equivalent to those bought by investor "A").

$$\text{Number of warrants} = \frac{\text{Capital to invest}}{\text{Warrant price}} \times \text{Ratio} = \frac{1.000{,}00}{1{,}25} \times 1 = 800 \text{ warrants}$$

$$\text{Profit} = [(\text{P Sale} - \text{P Strike price})] \times \text{Ratio} \times \text{N. warrants}] - \text{Outlay} =$$

$$= [(12.50 - 10.00) \times 1 \times 800] - 1{,}000.00 = 1{,}000.00 \text{ euros}$$

$$\text{Yield} = \frac{\text{Profit}}{\text{Outlay}} \times 100 = \frac{1{,}000.00}{1{,}000.00} \times 100 = 100\ \%$$

Both investors made an initial outlay of 1,000.00 euros. Under the same market conditions, investor "A" made a gain of 250.00 euros, which represents a yield of 25%, which is equal to the revaluation of the share.

Whereas investor "B" made a profit of 1,000.00 euros, in other words a yield of 100%, four times higher than the yield of investor "A" in the same market scenario and with the same initial outlay.

Strategies with warrants

Speculation: calculating the elasticity

The speculation may be upwards by buying call warrants, or downwards with put warrants.

The best way to take advantage of the upwards and downwards market movements and to limit losses is through warrants which, as we have said before, allow the investment to be maximised due to its leverage effect.

Once warrants are chosen as a form of investment in order to speculate on the market in both rising and falling positions, which should be chosen? On the one side, there is a tendency towards warrants with a higher delta ("in the money" warrants), because these are those whose absolute price rises most with variations in the price of the underlying asset. Furthermore, the warrants with the highest leverage are chosen, in other words those which allow control to be held over a larger amount of underlying asset ("out of the money" warrants). Both the delta and the leverage are borne in mind through a single selection criterion: the elasticity.

$$\text{Elasticity} = \text{Leverage} \times \text{Delta} = \frac{\text{Underlying price}}{\text{Warrant price}} \times \text{Ratio} \times \text{Delta}$$

The elasticity measures the percentage variation of the warrant price in the event of a 1% variation in the price of the underlying asset. In the case of percentage increases in the price of the underlying, there will be percentage increases in the price of the call warrant and price drops in the put warrant and, on the other hand, the percentage falls of the price of the underlying asset will bring down the price of the call warrant and increase the price of the put warrant.

The elasticity is a fundamental element to determine the degree of speculation to be confronted, as greater elasticity offers more possibilities of speculation. This translates into more potential profit in exchange for assuming greater risk. Investors who want to speculate with high risk, because they want to aim at larger potential profits, will choose high-elasticity warrants; on the other hand, conservative investors with low risk profiles and less profit potential will choose low-elasticity warrants.

Example

An investor believes that the Repsol price is far below its real value and that in the coming 6 months Repsol will be strongly revalued. They therefore decide to take advantage of the situation and invest in call warrants.

The investor has two warrants with the Repsol share as the underlying asset. Both expire at the same time, but with different strike prices. The investor wants to invest in the warrant with the largest degree of speculation, the one of greater elasticity. Which of the following two warrants has the greatest elasticity?

WARRANT REP 13.50	
Repsol price	12.00
Strike price	13.50
Expiry	6 months
Call warrant price	0.30
Delta	0.40
Ratio	0.50

WARRANT REP 11.50	
Repsol price	12.00
Strike price	11.50
Expiry	6 months
Call warrant price	0.76
Delta	0.65
Ratio	0.50

Elasticity calculation:

$$\text{Elasticity d} = \frac{\text{Underlying price}}{\text{Warrant price}} \times \text{Ratio} \times \text{Delta}$$

- Elasticity of warrant REP 13.50:

$$\text{Elasticity d} = \frac{12.00}{0.30} \times 0.50 \times 0.40 = 8.00\ \%$$

- Elasticity of warrant REP 11.50:

$$\text{Elasticity d} = \frac{12.00}{0.76} \times 0.50 \times 0.65 = 5.13\ \%$$

The elasticity of the warrant REP 13.50 is larger than that of the warrant 11.50; therefore the investor will invest in the former.

To make sure the choice is right, what should be the state of the game with either warrant if the Repsol share price in one month was 14.00 euros?

To make the calculations, the investor is supposed to purchase call warrants with a value of 1,000 euros.

How many call warrants can they buy?

Warrant REP 13.50

$$\text{Number of warrants} = \frac{\text{Investment}}{\text{Warrant price}} = \frac{1{,}000}{0.30} = 3.333$$

Warrant REP 11.50

$$\text{Number of warrants} = \frac{\text{Investment}}{\text{Warrant price}} = \frac{1{,}000}{0.76} = 1.315$$

One month later, the investor decides to sell the warrants without waiting for expiry. At this time the Repsol price is 14.00 euros.

WARRANT REP 13.50	
Repsol price	14.00
Strike price	13.50
Expiry	5 months
Call warrant price	0.72
Delta	0.63
Ratio	0.50

WARRANT REP 11.50	
Repsol price	14.00
Strike price	11.50
Expiry	5 months
Call warrant price	0.46
Delta	0.85
Ratio	0.50

Profit calculation:

$$\text{Profit} = (\text{Premium sold} - \text{Premium purchased}) \times \text{Number of warrants}$$

Warrant REP 13.50

$$B = (0.72 - 0.30) \times 3{,}333 = 1{,}400 \text{ euros}$$

Warrant REP 11.50

$$B = (0.46 - 0.76) \times 1{,}315 = 920 \text{ euros}$$

It is demonstrated that if the Repsol share moves invariably, it is more beneficial to invest in the warrant with greater elasticity than in the other.

However, what would the profits have been if the 1,000 euro investment had been made directly in Repsol shares?

$$\text{Number of Repsol shares} = \frac{\text{Investment}}{\text{Repsol share price}} = \frac{1{,}000}{12{,}00} = 83$$

$$\text{Profit} = (\text{Sale price} - \text{Purchase price}) \times \text{Number of shares} = (14.00 - 12.00) \times 83 = 166 \text{ euros}$$

The investor would always have obtained a larger profit if they had invested in warrants than directly in shares. And inside the warrants, the one of greater elasticity.

Coverage of a share portfolio

The risk of a share or a portfolio of shares falling can be covered by buying put warrants on the most representative share or index of the portfolio of shares. For a portfolio of Spanish shares, a warrant is chosen on the Ibex-35 index.

The aim is to assure the present value of the share or portfolio of shares without renouncing future profits, in exchange for the payment of a premium.

The cost of the coverage will be the value of the premium of the warrant multiplied by the necessary number of warrants to cover the effective volume of the share or portfolio of shares.

The following steps have to be taken to ensure perfect coverage:

- Select the maturity and the right strike price. The expiry term of the warrant is the time for which the share or portfolio of shares is to be covered. The price at which the shares are to be sold is taken as the strike price. This sale price may be the closest to the market price of the share or index at the time of making the coverage ("at the money" warrants).

- Calculation of the number of warrants to buy. Depending on whether the coverage is made on a share or portfolio of shares, the number of warrants must be:

  - For a share:

$$\text{Number of warrants} = \frac{\text{Number of shares to cover}}{\text{Ratio}}$$

  - For a portfolio of shares:

$$\text{Number of warrants} = \frac{\text{Portfolio value}}{\text{Index value} \times \text{Ratio}} \times \beta\text{eta}$$

Where βeta is the level of correlation between the reference index and the portfolio of shares:

- If βeta = 1, the correlation between the index and the portfolio is perfect.
- If βeta < 1, the percentage variation of the portfolio is smaller than the index.
- If βeta > 1, the percentage variation of the portfolio is larger than the index.
- If βeta = 0, there is no correlation between the index and the portfolio.

Example

An investor has a portfolio of 1,000 Endesa shares bought years ago at a price of 8.00 euros. The Endesa price is now 13.00 euros. The investor believes that in the year the market price might fall.

Profit not made = (P. Endesa - P. Purchase) x N. Shr. = (13.00 - 8.00) × 1,000 = 5,000.00 euros

The investor does not want to lose the accumulated gain and therefore considers doing one of the following operations:

- Selling the shares and obtaining the profit of 5,000.00 euros, but renouncing all possible future profits.

- Making a coverage by purchasing put warrants, to keep their shares in the portfolio and to take advantage of possible rises in Endesa shares if the market does not behave as they expect.

As they cannot be sure that the Endesa shares will fall within a year and maybe, contrary to their opinion, the shares increase in their value, they decide to cover themselves against falls in the market by buying put warrants expiring at one year with a strike price of 13.00 euros. In this way, they do not renounce potential profits and ensure the accumulated profit of 5,000.00 euros up to this time.

The investor addresses the market where the put warrants on Endesa are quoted with expiry at one year and strike price of 13.00 euros with a premium of 0.70 euros and a ratio of 0.50 euros.

How many put warrants do they have to buy to make the coverage?

$$\text{Number of warrants} = \frac{\text{Number of shares}}{\text{Ratio}} \times \frac{1{,}000}{0.50} = 2{,}000$$

What is the cost of coverage?

Cost of the coverage = Number of warrants × Premium = 2,000 × 0.70 = 1,400.00 euros

Expiry scenarios (1 year):

- Scenario 1: Endesa rises 3.00 euros from 13.00 to 16.00 euros.

In shares, the profit would be:

Profit = (Endesa Price - Purchase price) × Number of Shr. = (16.00 - 8.00) × 1,000 = 8,000.00 euros

In warrants there would be no more lost than the premium paid at the initial time of starting the coverage, that is to say, 1,400 euros.

Therefore the total profit of the operation with coverage would be 6,600 euros.

As we can see, the share has been revalued, allowing us a profit of more than 1,000 euros with respect to a possible sale before the coverage begins. Furthermore, the portfolio has always been assured, as we knew the possible maximum loss a priori.

- Scenario 2: Endesa drops 3.00 euros to 10.00 euros.

In shares, the profit would be:

Profit = (P. Endesa - P. Purchase) x N. Shr. = (10 - 8.00) × 1,000 = 2,000.00 euros

In warrants there would be a profit due to the difference between the strike price and the Endesa market price.

B = (P (St.- P Endesa) × Ratio × Number of warrants = (13.00 - 10.00) × 0.50 × 2,000 = 3,000.00 euros

The total profit of the operation with coverage would be:

B total = B Shr. + B Warrants - Cost of coverage = 2,000.00 + 3,000.00 - 1,400.00 = 3,600.00 euros

Without making the coverage, the profit with shares would have fallen by 3,000.00 euros to 2,000.00 euros. However, the purchase of put warrants allow us an additional gain of 1,600.00 euros to be made, leaving the total profit at 3,600.00 euros.

How is a warrant contracted?

Warrants issued in Spain quote on the stock market through a special contracting module in the SIBE (Spanish Stock Market Interconnection System), and the negotiation is electronic. The contracting is made with the same ease as when shares are bought or sold.

The warrant purchase or sale orders can be entered using the same types of orders as in negotiating shares, in other words, with a limit exchange on the market and at best.

However, given that on the market there may be situations of little liquidity in negotiating the warrant, it is highly recommendable to avoid both market orders and orders at best, and it is therefore convenient to introduce limited orders.

Precautions when investing in warrants

The investor must be aware that investing in warrants is not the same as direct investment in an underlying asset. Small fluctuations in the price of the underlying asset have a larger effect on the price of the warrants. Therefore, **knowledge, caution and wisdom are required in investing in these kinds of products.**

There are different aspects which the investor must take into account when buying warrants:

- Discipline: the investor must establish assumable loss levels. They will therefore be attentive to the value of the warrant in order to limit the losses at a point established a priori.

- The investor must remember that the loss is limited to the premium they paid in purchasing the warrants.

- The warrants cannot be sold or bought beforehand, that is to say, warrants cannot be sold in overdraft.

- The investor must know that these products involve a high risk and are generally used for speculating; therefore they must not invest money that they cannot risk losing.

- As we have mentioned before, the price of the warrant does not only depend on the evolution of the underlying asset. For example, the time passing makes the investment lose its value. Therefore if the investor does not want to exercise their right to purchase or sale, the warrant will have to be sold before expiry.

- The investor must never buy warrants on credit, because they might end up with a debt if the market should fail to meet their expectations.

- These financial assets are not intended for long-term investments and are therefore not good as savings products.

Tax treatment of warrants

The following is based on the Spanish tax regulations in force on the date on which this manual is drawn up, notwithstanding any possible modifications to accommodate later legal provisions and notwithstanding the local tax regimes on Economic Agreements in force in the historical regions of the Basque Country and the Autonomous Community of Navarra or any other exceptional regime that could be applied due to the specific characteristics of the investor, or that could be established by an Autonomous Community regarding taxes on which they have legislative competence.

Once the investment in warrants has been made, the physical person or legal entity making the investment will be a taxpayer in one or several of the following tax categories:

Indirect taxation

The acquisition, transfer or exercise of the warrants are exempted from the Tax on Capital Transfers and Documented Legal Acts and the Value Added Tax.

Direct taxation

Personal income tax (IRPF)

Applicable legislation: Law 35/2006, of 28 November, on the Personal Income Tax and Royal Decree 439/2007, of 30 March, which approves its Regulations.

The positive or negative income that is revealed when a warrant is sold, exercised or expires, pays income tax on the gain or loss. The amount of the gain or loss is calculated by the difference between the purchase value and the transmission value.

Therefore, if the warrant is sold before expiry, a gain or loss may be obtained in wealth, depending on the difference between the purchase price and the sale price. In these operations, the purchase price of the warrant will be the premium or price paid for the warrant plus all expenses or fees inherent to the purchase and the sale price will be that received for the sale after deducting all expenses or fees inherent to the sale.

However, if the warrant is exercised either at expiry or before, a gain is produced through the difference between the market value of the underlying asset and the price settled for the underlying asset, having deducted the premium that was paid when the warrant was bought.

Finally, if the warrant is maintained until maturity and is not exercised, a loss is obtained which is equal to the purchase price or the premium paid for the warrant.

The capital variation will be included in the taxable savings base of the IRPF (income tax) on which, in the year 2015, the following scale of charges applies:

19.50% on the first 6,000 euros
21.50% between 6,000 and 50,000 euros
23.50% thereafter.

We foresee that a new scale will have to be applied from 1 January 2016:

19% on the first 6,000 euros
21% between 6,000 and 50,000 euros
23% thereafter.

If the difference between gains and losses of the savings tax base results in a negative balance, it will be possible to compensate it with the positive balance arising from aggregating income allocations and yields, with a limit of 10% in 2015, 15% in 2016, 20% in 2017 and 25% thereafter.
To determine which securities have been sold in a homogeneous securities portfolio, the oldest securities are to be always deemed as sold, taking into account to this end all the securities owned even if they are deposited in different financial institutions.

The revenue that generates a warrant will be classified as business performance when they are obtained by businesspersons or professionals in the scope of their business activity.

Finally, we would like to emphasise that the income deriving from the warrants, is not subject to be withheld for IRPF (income tax) purposes.

Corporate tax

Applicable legislation: Law 27/2014, of 27 November, on the Corporate Tax and Royal Decree 634/2015, of 10 March, which approves its Regulations.

Generally, legal entities investing in warrants have to account the premium paid for the purchase in their assets, bearing in mind the expenses and fees inherent to the operation as a larger purchase price.

If the warrant is sold, the difference between the book value and the sale price of the warrant is taxable income.

If the warrant is exercised either at expiry or before, a taxable income is produced on the difference between the market value of the underlying asset and the price paid for the underlying asset, once the book value of the premium has been deducted.

If the warrant is maintained until expiry and is not exercised, a negative income equal to its book value is obtained.

Non-resident income-tax

Applicable legislation: Rewritten text of the Income Tax Act approved by Legislative Royal Decree 5/2004 of 5 March and Royal Decree 1776/2004 of 30 July, in approval of its Regulation.

Taxpayers subject to this tax are the physical persons, companies and entities not resident in Spain. In this sense, "resident" is all person who by virtue of the legislation of their state of residence is subject to taxation by reason of their address, residents, activity headquarters or any other criterion of a similar nature.

To certify tax residence in a different country, a certificate of tax residence issued by the tax authorities of the country of residence must be provided.

In relation to this tax, the following are considered exempt income:

- Income derived from securities issued in Spain by non-resident physical people or entities without the mediation of a permanent establishment, unless the holder of the securities is an entity resident in Spain.

- The income derived from the transmission of securities effected in Spanish official secondary security markets, obtained by non-resident physical people or entities without the mediation of a permanent establishment in Spain, provided they are residents of a state which has signed an agreement with Spain to avoid double taxation with a clause concerning the exchange of information.

- The income derived from the transmission of companies, entities or physical people not resident in Spain but resident in any other member country of the European Union, operating without a permanent establishment in Spain, and which have not been obtained through a tax haven.

The income derived from securities issued by private entities resident in Spain, obtained by companies, physical people or entities not resident in Spain or the European Union, if there is an agreement to avoid international double taxation, will be taxed according to the provisions of the mentioned agreement.

If such Agreement does not exist, the income obtained in Spain without permanent establishment by taxpayers residing in another Country of the UE or the European Economic Areas will be taxed at 19.5% (24% for the rest of non-residents), as well as in those cases in which the revenues obtained are not tax-exempted.

Wealth tax

***Applicable legislation**: Act 19/1991 of 6 June, concerning wealth tax.*

Taxable subjects of this tax are the physical people who have their habitual residence in Spain and also physical people who do not have their habitual residence in Spain and are holders of goods or rights which are situated, may be exercised or have to be fulfilled in Spain.

When the holder of a warrant is a tax subject of this tax, it must be integrated in the tax base at market value at 31 December, the date on which this tax is due.

Inheritance and Donations Tax

The transfers of warrants free of charge (both in inter vivos and mortis causa acts) in favour of individuals, residing or not in Spain, are subject to the Inheritance and Donations Tax, being whoever acquires the warrants the taxpayer.

Glossary of terms

"At the money"	A call warrant is "at the money" when the strike price is the same as the price of the underlying asset.
"In the money"	A call warrant is "in the money" when the strike price is lower than the price of the underlying asset. A put warrant is "in the money" when the strike price is higher than the price of the underlying asset.
"Out of the money"	A call warrant is "out of the money" when the strike price is higher than the price of the underlying asset. A put warrant is "out of the money" when the strike price is lower than the price of the underlying asset.
American warrant	A warrant that can be exercised at any time of the life of the warrant until expiry.
Ask	This is the offer price of the warrant, in other words the price at which the warrant may be bought.
Automatic exercise of the warrant	The exercise of a warrant is automatic when the settlement of expiry is positive without the holder of the warrant having to declare it.
Bid	This is the asking price of the warrant, in other words the price at which the warrant may be sold.
Break even	This indicates the price of the underlying asset that produces neither profits nor losses in the exercise of the warrant, bearing in mind the premium that has been paid.
Call warrant	An option which gives the right to buy a certain amount of the underlying asset at a certain price for a period or on a set date in exchange for the payment of a premium. The buyer of a call warrant expects there to be a rise in the value of the underlying asset.
Coverage	A strategy performed with put warrants which attempts to eliminate or reduce the risk associated with downward trends in the underlying asset.
Delta	A coefficient which measures the warrant's sensitivity to variations in the underlying asset. It indicates how much the warrant price varies when the price of the underlying asset changes by one unit, with the remaining factors constant.
Elasticity	The elasticity measures the percentage variation of the warrant price in the event of a 1% variation in the price of the underlying asset.
European warrant	This is a warrant that can only be exercised on the agreed expiry date.
Exercise of the warrant	An act by which the buyer of the warrant uses their right to call or put the underlying asset.

Expiry date	The last day in the lifetime of a warrant, and therefore for its exercise.
Gamma	The sensitivity of the warrant which measures the variations of the delta for movements in the underlying asset.
Greek	A set of warrant sensitivities which are identified with letters of the Greek alphabet.
Intrinsic value	The value that can be obtained by exercising the warrant. It is the positive difference between the present price of the underlying asset and the warrant strike price.
Leverage	The leverage measures the number of times that the position in shares can be replicated by investing in warrants. It is therefore a question of an approximate measurement of the multiplying effect that the investment in warrants can have with respect to the direct investment in shares.
Liquidity	The commitment of the warrant issuer to maintain purchase and sale prices for the warrant at all times.
Market creator	The warrant issuer who guarantees purchase and sale prices at all times with a reduced difference defined as a spread.
Parity	This is the inverse of the ratio, in other words the number of warrants needed to call or sell a unit of underlying asset.
Phy	The sensitivity of the warrant which measures the variations in the premium of the warrant for changes in the dividends of the underlying asset.
Premium	This is the price the warrant buyer pays for having acquired the right it grants them.
Put warrant	An option which gives the right to sell a certain amount of the underlying asset at a certain price for a period or on a set date in exchange for the payment of a premium. The buyer of a put warrant expects there to be a fall in the value of the underlying asset.
Ratio	The amount of underlying asset to which a warrant entitles. It is the opposite of parity.
Rho	The sensitivity of the warrant which measures the variations in the premium of the warrant for changes in the interest rate.
Sensitivities	See "Delta", "Gamma", "Phy", "Rho", "Theta" and "Vega".
Settlement by differences	The settlement is made by differences between the strike price and the price of the underlying assets of the date on which the warrant is

	exercised, provided it is positive.
Spread	The difference between the purchase price and the sale price of a warrant.
Strike price	The price set in the warrant for calling or putting underlying asset.
Temporary value (extrinsic value)	This is the difference between the premium of the warrant and its intrinsic value. It represents the value that the buyer of a warrant has to pay for the expectations of future games. The temporary value of the warrant falls as expiry approaches, which is when it reaches zero.
Theta	A sensitivity of the warrant that measures the variation of the price of the warrant depending on time.
Underlying asset	This is the asset to which the warrant is benchmarked.
Vega	The sensitivity of the warrant which measures the variations warrant price when the volatility of the underlying asset changes.
Volatility	A parameter which measures the price fluctuation of the underlying asset in a certain time period. If it is based on past data, it is "historical volatility"; if it is calculated according to market prices, it is "implicit volatility".
Warrant	An option issued in the form of a security which quotes officially on the stock market.