

# Introduction to Derivative Warrants

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# What are derivative warrants?

Derivative warrants are financial instruments (contracts) that give investors the right, but not the obligation, to buy or sell the underlying asset at a predetermined exercise price on or before the expiry date. Typically, derivative warrants in Hong Kong are issued with a life span of six months to five years but are usually traded by investors before expiry.

There are two main types of derivative warrants: call warrants and put warrants. Call warrants give holders the right, but not the obligation, to buy a specified amount of the underlying asset from the warrant issuer at the exercise price within a certain period or at expiry. Conversely, put warrants allow holders to sell the underlying asset to the issuer at the exercise price within the specified timeframe or at expiry. In Hong Kong, all derivative warrants currently traded on HKEX can only be exercised at expiry (European style) and are settled in cash (no underlying assets will be delivered).

# Characteristics of derivative warrants

#### Low entry cost

The price of derivative warrants is only a fraction of the price of the underlying asset. Currently, trading of derivative warrants is exempt from stamp duty in Hong Kong.

### **Gearing effect**

A small change in the price of the underlying asset can result in a disproportionately larger percentage change in the price of the derivative warrant, which could amplify gains or losses.

#### Flexible holding period

Although derivative warrants in Hong Kong are issued with a life span ranging from six months to five years, investors have the flexibility to sell them at any point before expiry.

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#### Volatility trading

Apart from positioning for the price movement of the underlying asset, derivative warrants also serve as tools to capture volatility changes in those assets.

#### Access various asset classes

Derivative warrants can be issued against a diverse range of eligible underlying assets, including local and overseas stocks and stock indices, currencies and commodities.

#### **Capped losses**

The maximum loss of a derivative warrant is limited to the initial investment and investors are not required to pay a margin deposit (i.e. margin calls are not applicable).

# Common usages of derivative warrants

- Leverage: To magnify returns on the price movements and volatility of underlying assets. However, leverage also heightens the risk of losses especially in volatile markets
- Short term trading: To hedge against short-term market volatility / potential losses in portfolio
- Reduced investment cost: To obtain a target level of exposure to the underlying asset with less capital investment

## Risks involved in trading derivative warrants

Trading in derivative warrants involves high risks and may not be suitable for all investors. Prior to engaging in derivative warrant trading, investors should refer to the listing documents of specific derivative warrants to understand the relevant risks. Below are some key risk factors for reference:

#### **Gearing risk**

**Credit risk** 

Derivative warrants are

(if any), nor are they

supported by collateral.

In the case of any failure

it may result in total loss

of initial investment.

to pay due to credit issues,

not secured by any assets

from the issuer or guarantor

The value of derivative warrants may fluctuate to a much greater extent than the underlying asset. In extreme case, the value of derivative warrants may fall to zero, resulting in a total loss of the initial investment.



Limited life

warrants have an expiry date and may become worthless if they are not in-the-money<sup>1</sup> at expiration.

Unlike stocks, derivative

#### Volatility

An increase in the volatility of the underlying asset, all else being equal, may lead to a higher warrant price, and a decrease in volatility may lead to a lower warrant price.



#### **Time decay**

The value of derivative warrants tends to decrease over time, assuming all other factors remain constant. Derivative warrants are not advisable as long-term investment vehicles.

#### Market forces

The prices of derivative warrants are also affected by demand and supply, particularly the case when the existing issuance of a single series of derivative warrants are almost sold out and when there is further issuance of that single series.

### Investor suitability

Derivative warrants involve a high degree of risk and investors must be comfortable with that risk before investing, including the possibility of substantial losses up to the principal investment amount within a very short timeframe. Investors should also have a strong understanding of the product and should possess a high level of knowledge and/or sufficient trading experience in evaluating concepts such as valuation, associated risks, costs and returns.

Investors can trade derivative warrants using a securities trading account as they are traded on the exchange under the same method as securities trading system. Derivative warrants clearing and settlement arrangements are also aligned with the securities market (T+2 cycle) framework (T+3 if expired on expiry date). Investors can access delayed and real-time market data of derivative warrants within the securities market data section.

<sup>1</sup> In-the-money: When exercising the warrant would result in a profit for the holder

#### **Call warrants**

Call warrants are designed for investors who have a bullish outlook on the price of the underlying asset. When an investor buys a call warrant, they anticipate that the price of the underlying asset will exceed the exercise price by the time of expiry.

#### Call warrant - illustrative purposes only

Call warrant price	\$0.2
Exercise price	\$40
Entitlement ratio	10 to 1
Number of units purchased	1,000
Initial investment	\$200

If the underlying asset's price is higher than the call warrant's exercise price at expiry, the call warrant will be exercised. In case of a cash-settled stock derivative warrant, the investor will be entitled to a cash payment equals to the positive difference between the 5-day average closing price of the underlying stock and the exercise price of the call warrant, adjusted by the entitlement ratio.



Net Profit = (\$43 - \$40) x 1,000 / 10 - \$0.2 x 1,000

If the 5-day average closing price of the underlying stock at expiry is less than the exercise price, the call warrant will expire worthless, and the investor's total loss will be limited to the initial investment.



Net Loss = \$0.2 x 1,000

#### Net profit/loss of stock call warrant =

Max [0, (5-day average closing price of the underlying stock – exercise price) x number of units of warrants purchased / entitlement ratio] – initial investment Maximum net loss is capped at the amount of initial investment.

#### **Put warrants**

Put warrants are designed for investors who have a bearish outlook on the price of the underlying asset. When an investor buys a put warrant, they anticipate that the price of the underlying asset will fall below the exercise price by the time of expiry.

#### Put warrant - illustrative purposes only

Put warrant price	\$0.1
Exercise price	\$30
Entitlement ratio	10 to 1
Number of units purchased	1,000
Initial investment	\$100

If the underlying asset's price is lower than the put warrant's exercise price at expiry, the put warrant will be exercised. In case of a cash-settled stock derivative warrant, the investor will be entitled to a cash payment equals to the positive difference between the exercise price of the put warrant and the 5-day average closing price of the underlying stock, adjusted by the entitlement ratio.



Net Profit = (\$30 - \$26) x 1,000 / 10 - \$0.1 x 1,000

If the 5-day average closing price of the underlying stock at expiry is higher than the exercise price, the put warrant will expire worthless, and the investor's total loss will be limited to the initial investment.



Net Loss = \$0.1 x 1,000

#### Net profit/loss of stock put warrant =

Max [0, (Exercise price – 5-day average closing price of the underlying stock) x number of units of warrants purchased / entitlement ratio] – initial investment Maximum net loss is capped at the amount of initial investment.

# Factors affecting the price of derivative warrants

The price of a derivative warrant generally depends on the price of the underlying asset. However, other factors also play a role during its term. The table below summarises how changes in some factors affect the pricing of call and put warrants, assuming all else is constant. Please refer to section 5 of the <u>FAQs on the Hong Kong listed structured products market</u> on HKEX's website for more information.



	Theoretical price of call warrants	Theoretical price of put warrants
Underlying asset price increases	▲ Increases	V Decreases
Closer to expiry date	▼ Decreases	▼ Decreases
Implied volatility <sup>2</sup> increases	Increases	Increases
Interest rate increases	Increases	▼ Decreases
Expected dividend increases	▼ Decreases	▲ Increases

#### How does time decay affect the price of a derivative warrant?

Time decay is a measure of the rate at which the time value of a derivative warrant erodes or decreases as the expiration date approaches. This decay accelerates as the expiration date nears. However, an out-of-the-money<sup>3</sup> call warrant nearing its expiration is likely to be especially insensitive to the changes in the underlying price because it becomes less likely to be in-the-money at expiration. This is demonstrated in the following illustrative example, where the price of a call warrant drops by 2.1% in a 5-day period even when the price of the underlying stock increases by 1% over the same period.

	Day T	Day T+5
Warrant price	\$0.048	\$0.047 (-2.1%)
Exercise price	\$350.2	\$350.2
Stock price	\$322.6	\$325.8 (+1%)
Entitlement ratio	100 to 1	100 to 1
Interest rate	1%	1%
Dividend yield	Nil	Nil
Implied volatility	35%	35%
Time to expiry	35 days	30 days

<sup>2</sup> Implied volatility: Metric that estimates the future volatility of the underlying asset's price

<sup>3</sup> Out-of-the-money: When exercising the warrant would not result in a profit for the holder

#### How does implied volatility affect the price of a derivative warrant?

Implied volatility reflects investors' expectation of the movement of the underlying asset price. If the market anticipates an increase in the underlying asset's future price volatility, implying a higher probability for the derivative warrant to become in-the-money, this is generally favourable to the warrant price.

Other factors being equal, an increase in the volatility of the underlying asset may lead to a higher warrant price, and a decrease in volatility may lead to a lower warrant price. In this illustrative example, two index put warrants with identical terms – such as the same underlying asset, expiry date, and exercise price – are issued by different firms. The discrepancy in their pricing can largely be explained by implied volatility – put warrant B with a higher implied volatility typically commands a higher price.

However, a higher implied volatility does not necessarily result in a higher price if other factors are not identical. In this illustrative example, the price of put warrant B is lower than put warrant A despite having higher implied volatility. This can be due to multiple factors, such as time remaining until maturity, exercise level, among others. For instance, put warrant B, with a shorter time to expiry but higher implied volatility, may still be priced lower than put warrant A.

	Put warrant A	Put warrant B
Warrant price	\$0.157	\$0.161
Exercise price	18,600	18,600
Index level	17,832.82	17,832.82
Conversion ratio	6,800 to 1	6,800 to1
Interest rate	1%	1%
Dividend yield	3%	3%
Implied volatility	28.2%	29.5%
Time to expiry	30 days	30 days

	Put warrant A	Put warrant B
Warrant price	\$0.164	\$0.161
Exercise price	18,600	18,600
Index level	17,832.82	17,832.82
Conversion ratio	6,800 to 1	6,800 to 1
Interest rate	1%	1%
Dividend yield	3%	3%
Implied volatility	28.2%	29.5%
Time to expiry	35 days	30 days

# Why do two warrants with the same product terms have different closing prices and daily price changes?

The discrepancy in closing prices and daily price changes of two warrants with identical terms can be influenced by a range of factors, such as the price of the last recorded trade, as well as the bid/ask range upon market closure. Therefore, investors should consider the theoretical price for a more accurate comparison, as the percentage change in price may not fully reflect the warrants' values. For instance, call warrants A and B, despite having the same product terms, experienced different price changes of +14% and +18% respectively upon market open. However, both are quoted at \$0.2 at market open, suggesting that their theoretical prices were aligned.

	Call warrant A	Call warrant B
Previous close price	0.175	0.170
Open price today	0.200 (+14%)	0.200 (+18%)



# Trading derivative warrants on HKEX

In Hong Kong, all derivative warrants are settled in cash when exercised at expiry. This means that instead of the physical delivery of the underlying asset, the warrant holder receives or pays a cash amount based on the difference between the settlement price of the underlying asset and the exercise price of the warrant.

The stock short name of derivative warrants indicates some basic information about the product only. While the naming conventions generally apply, there may be exceptions depending on the circumstances. Investors should refer to the relevant listing documents of the product and consult their brokers or investment advisers before trading.

#### Naming convention of derivative warrants (English stock short name)

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Each derivative warrant is backed by one designated liquidity provider responsible for maintaining market liquidity. Their obligations are outlined in the listing documents, with certain conditions allowing for exemptions from these obligations. For more information about liquidity provision, please refer to section 4 of the <u>FAQ on the Structured Product</u> <u>market in Hong Kong</u> on HKEX's website.

# Useful resources

HKEX website: <u>Structured Product Overview</u> Derivative Warrants FAQ: <u>FAQ</u> Warrant Calculator: <u>Warrant Prices</u>

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