



Option Mechanics

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Option Mechanics



Exercise Styles

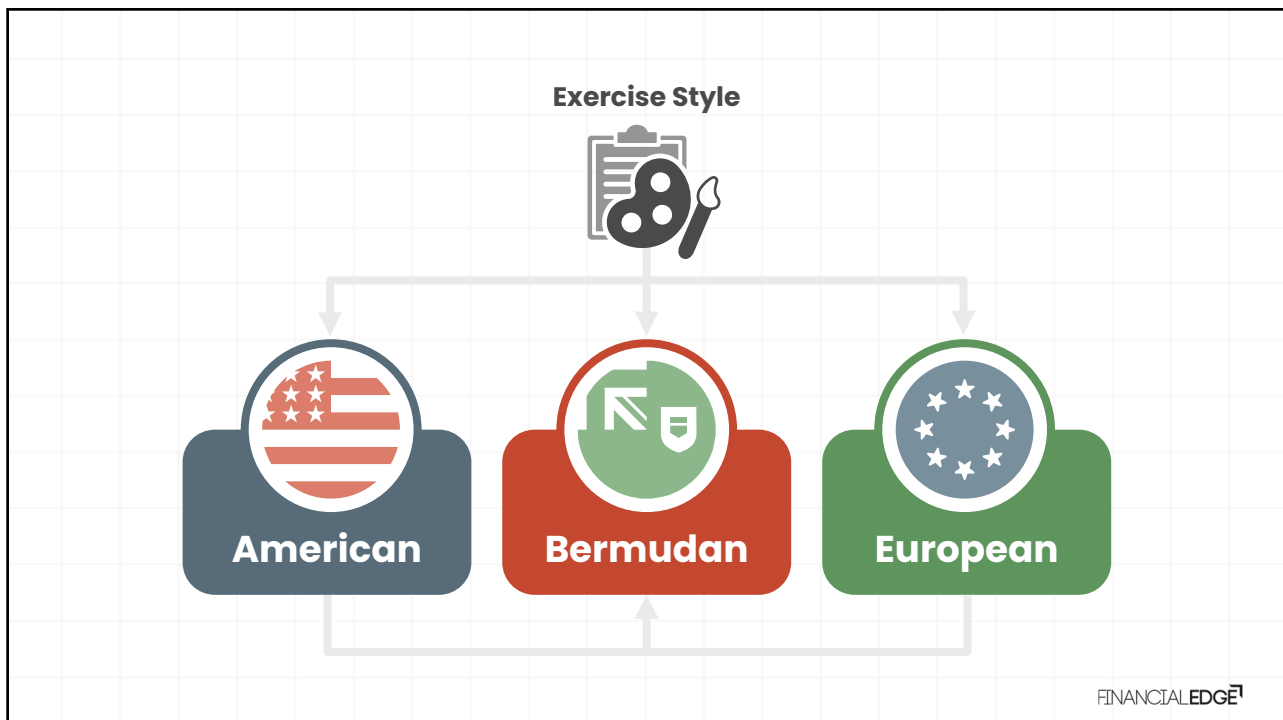
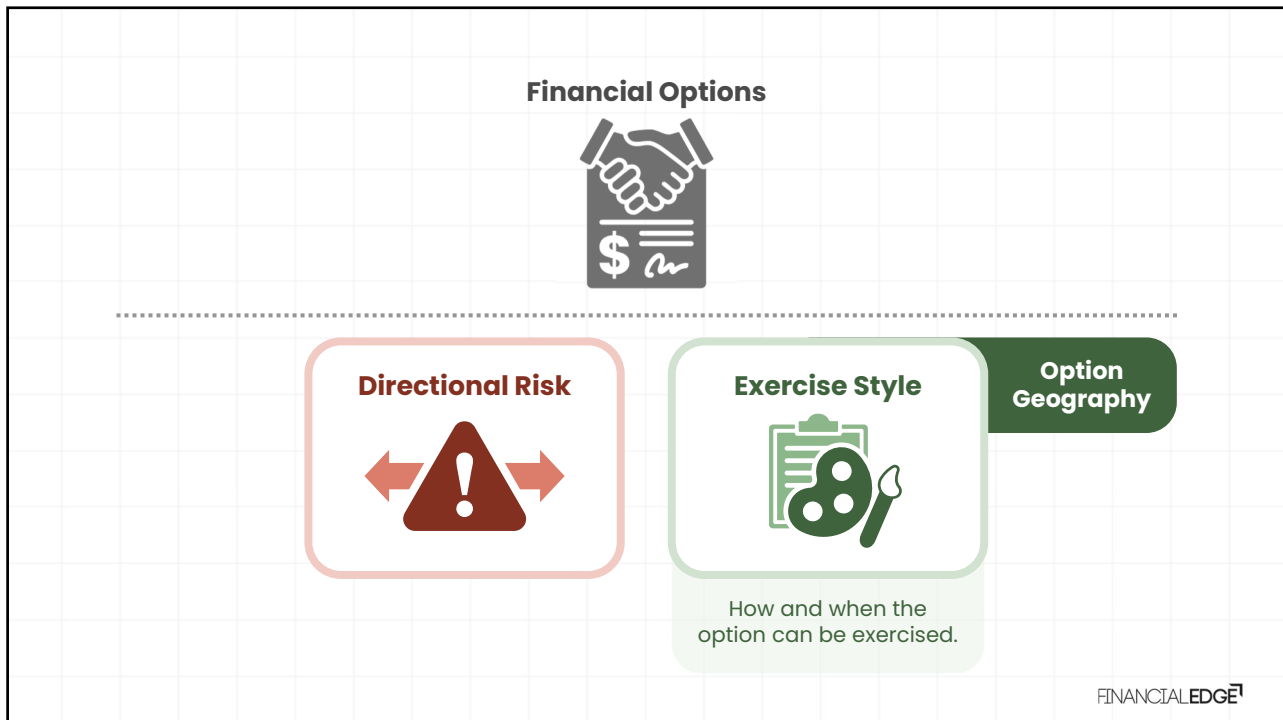


Option Premium



Option Strategies

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Buyer can **exercise at any time** up to and **including the expiry date**

Maximum flexibility – the holder is not limited to a specific exercise date



Can **only be exercised on the expiry date**

More straightforward timing – holder cannot choose another date



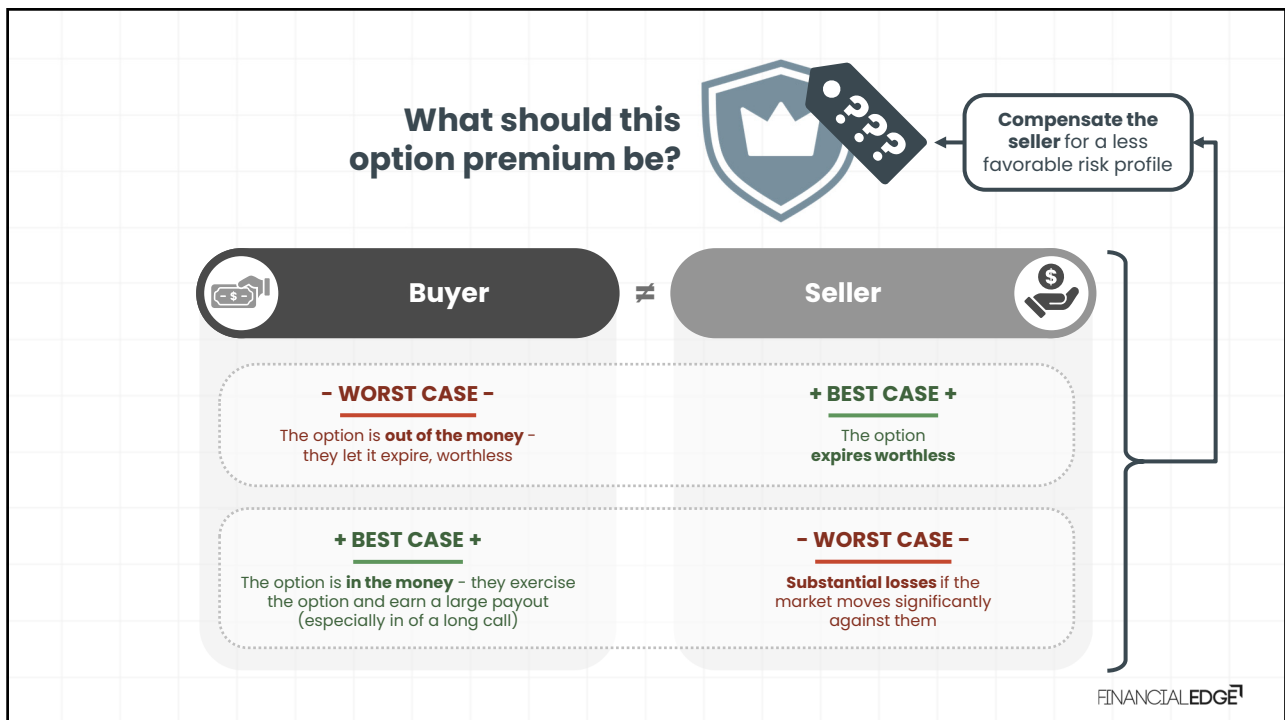
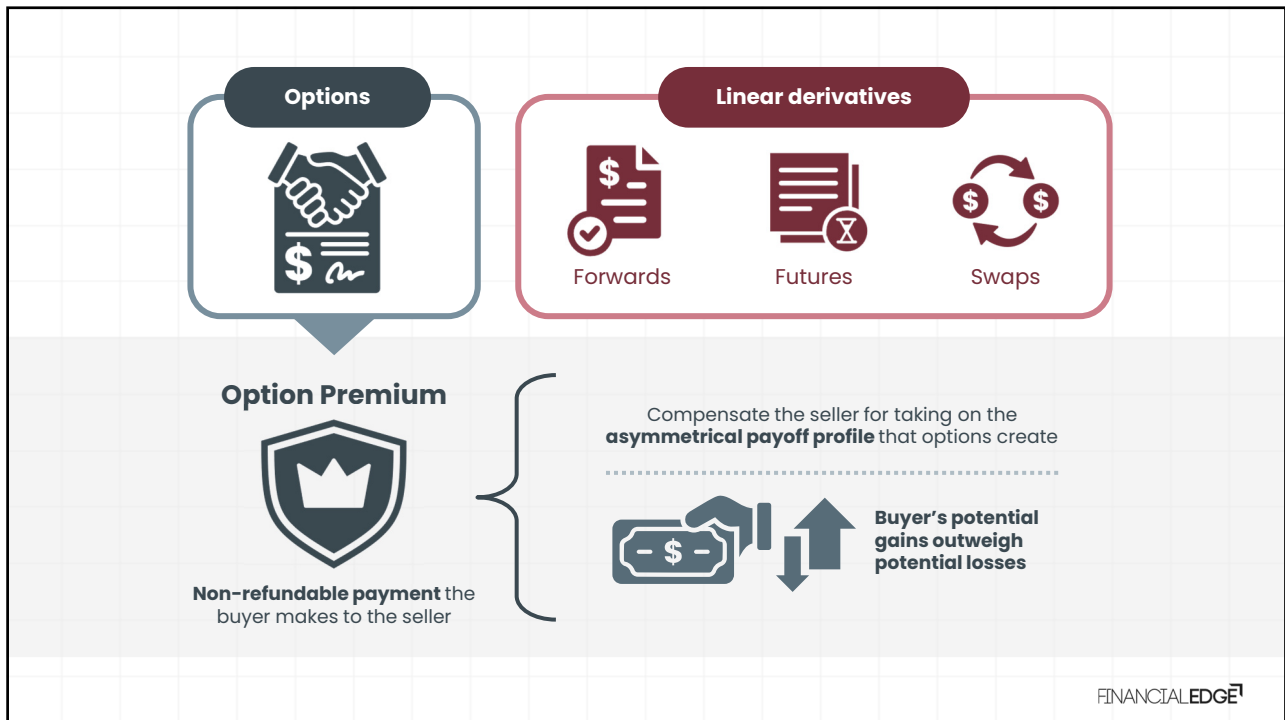
Can be exercised on **specific, predetermined dates** before expiry, as well as **on the expiry date** itself

More flexible than European but **less than American**



All options **can always be traded** at their current market value **before expiry**

Even if an option can't be exercised early, the holder still has the **flexibility to sell the option and exit their position**, in return for the **option price (or premium if needed)**



Option premium should equal the **seller's expected losses**



= Probability of losing x Anticipated amount lost

\$1

50%

50%

How much should I charge you to play?

My expected loss:

\$0.50 = 50% x \$1

You guess **correctly**

- \$1
+ \$0.50

= -\$0.50

You guess **incorrectly**

+ \$0
+ \$0.50

= \$0.50

(Avg. \$0)

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1

What is the probability that the option will be exercised?

2

If it is exercised, how much will the seller have to pay out?



The **future price** of a stock can theoretically be **anywhere between zero and infinity**

Option Pricing Models

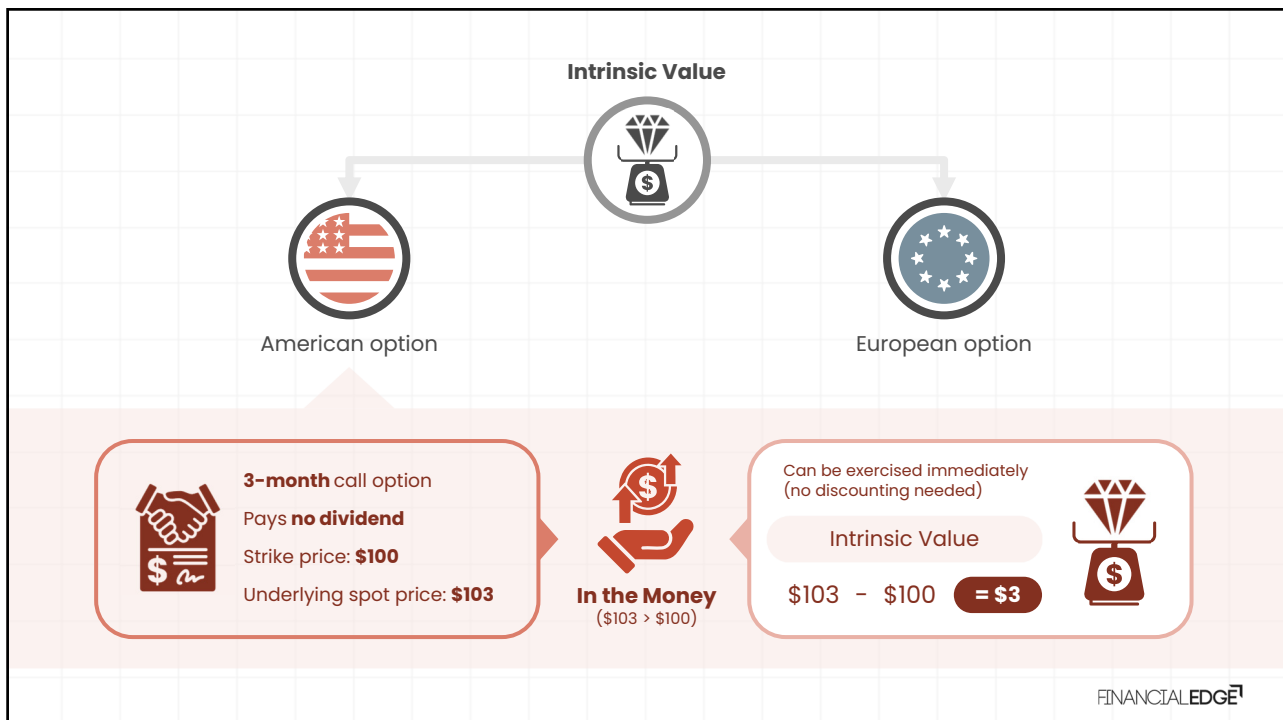
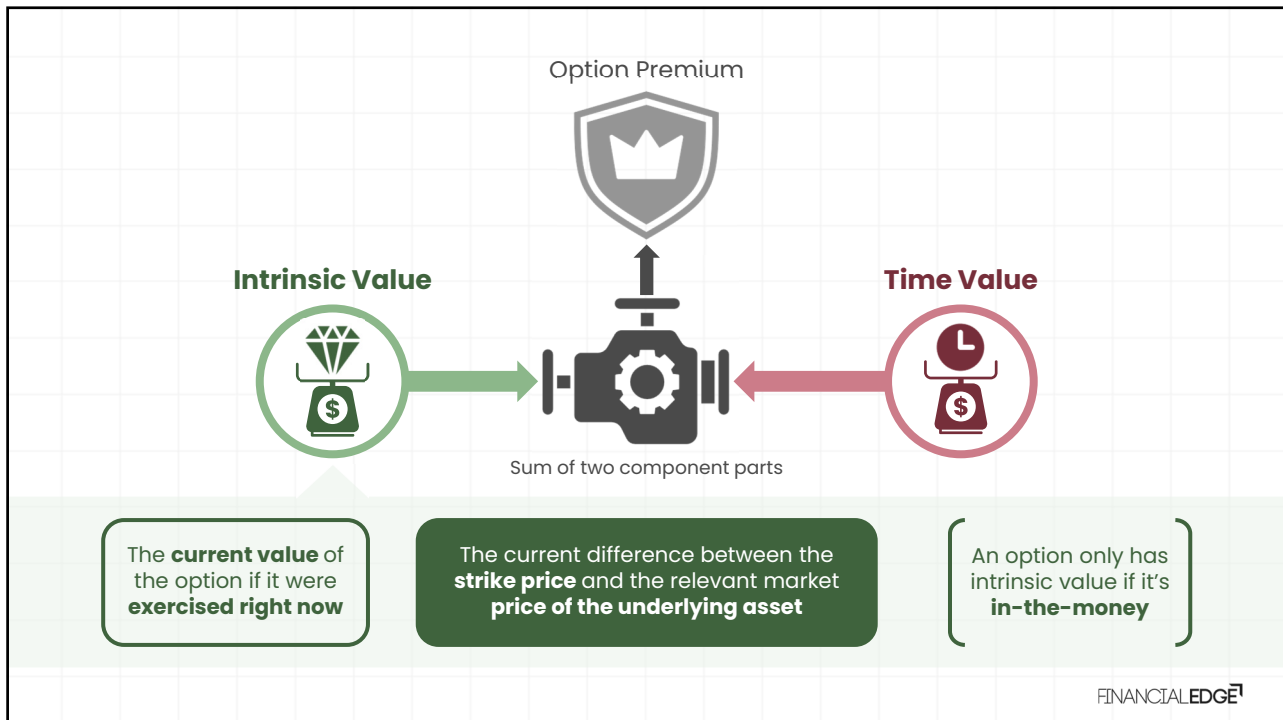
Black-Scholes model

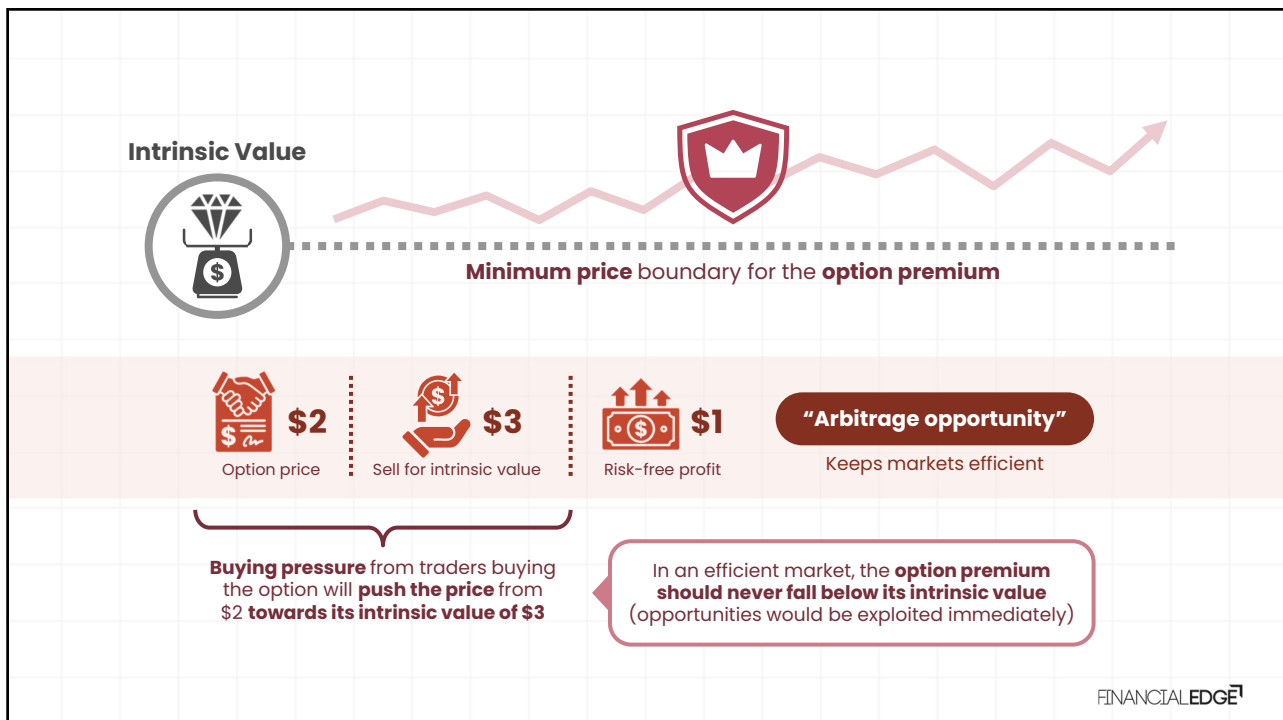
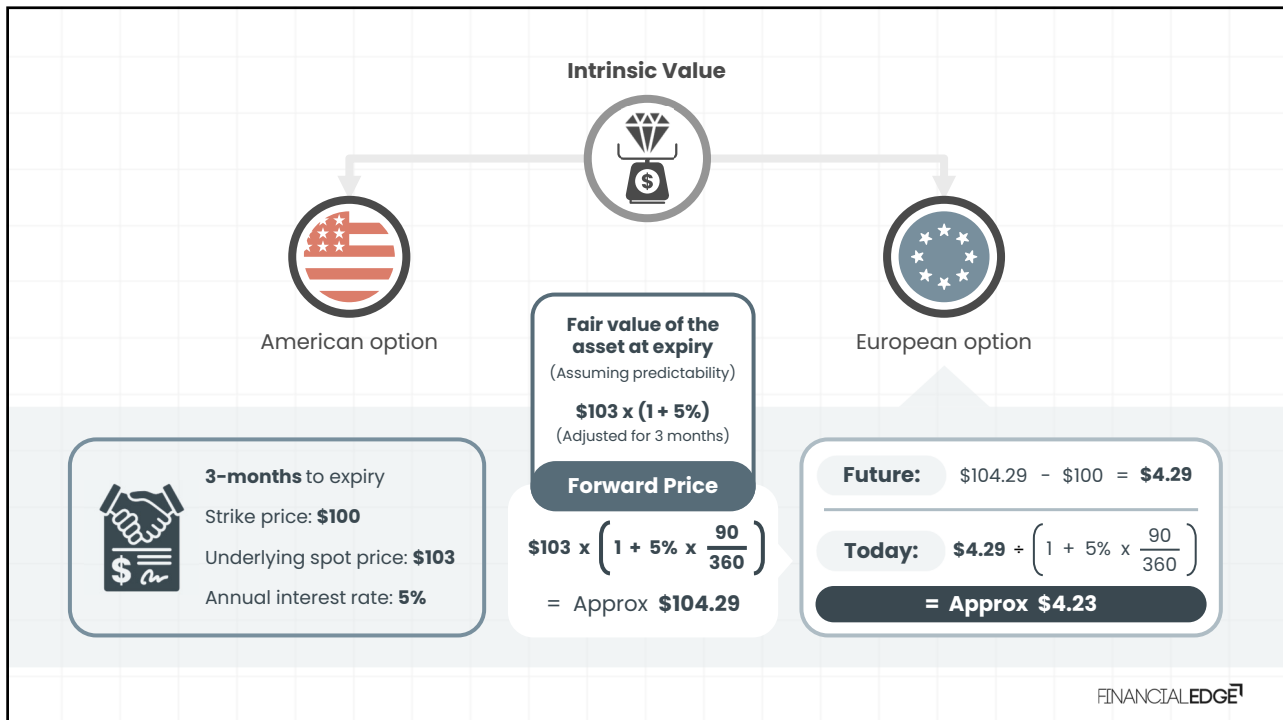
Binomial trees

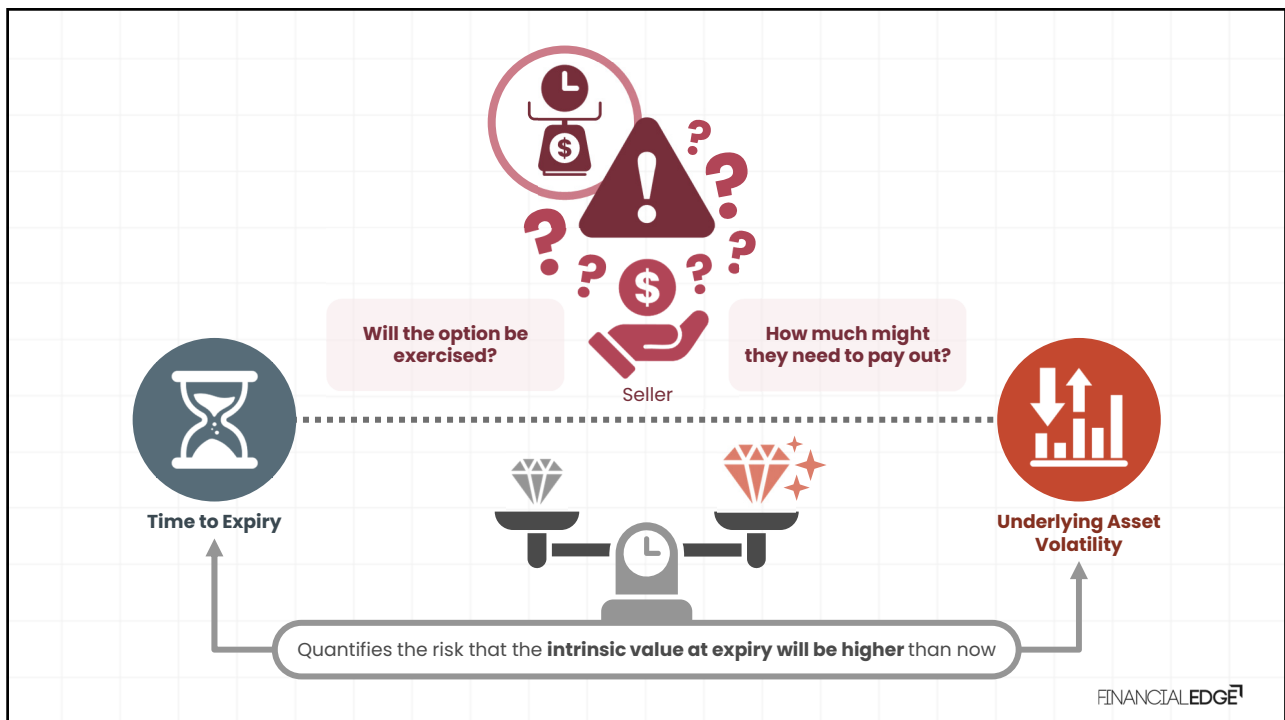
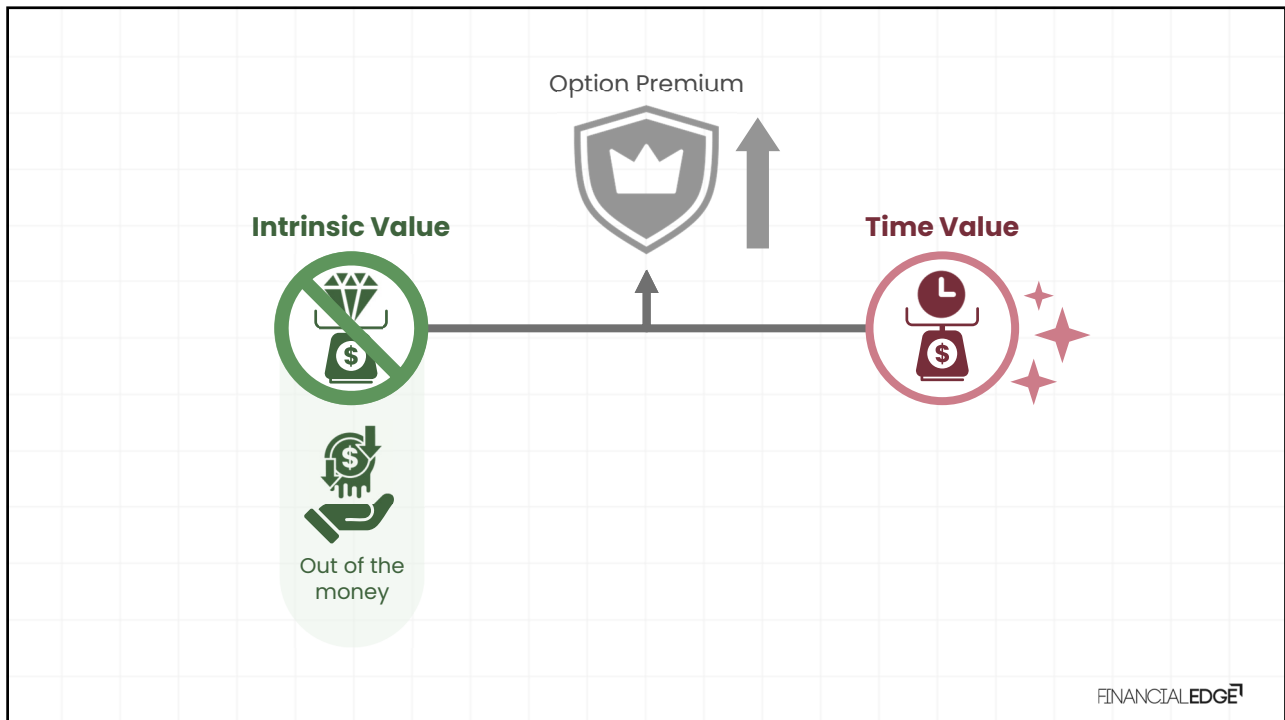
Monte Carlo simulations

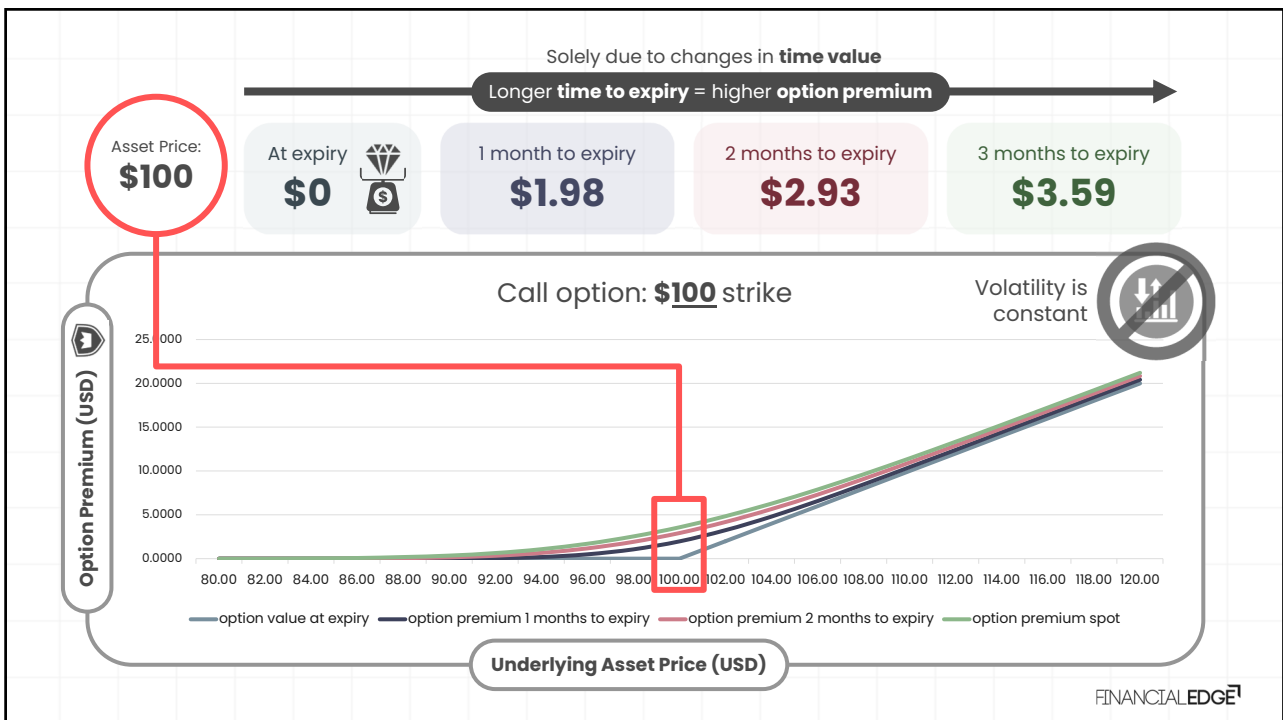
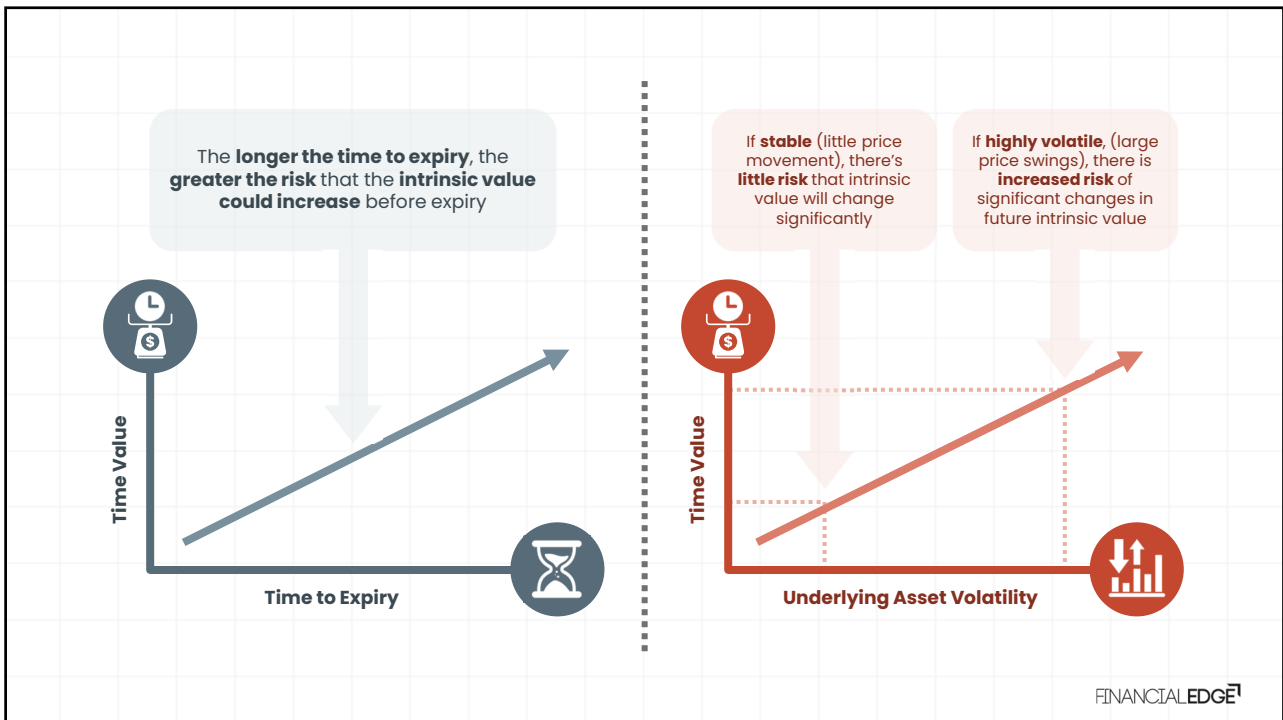
Using **assumptions** about **price movements** and **probability distributions**

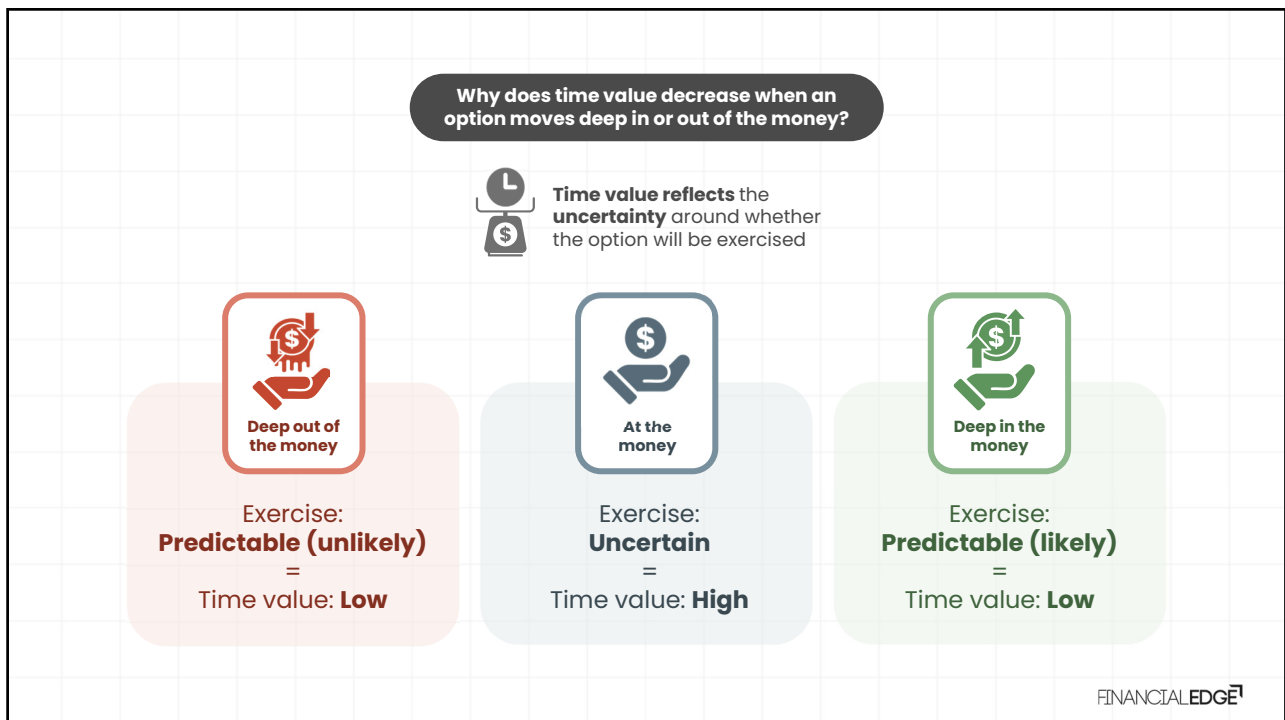
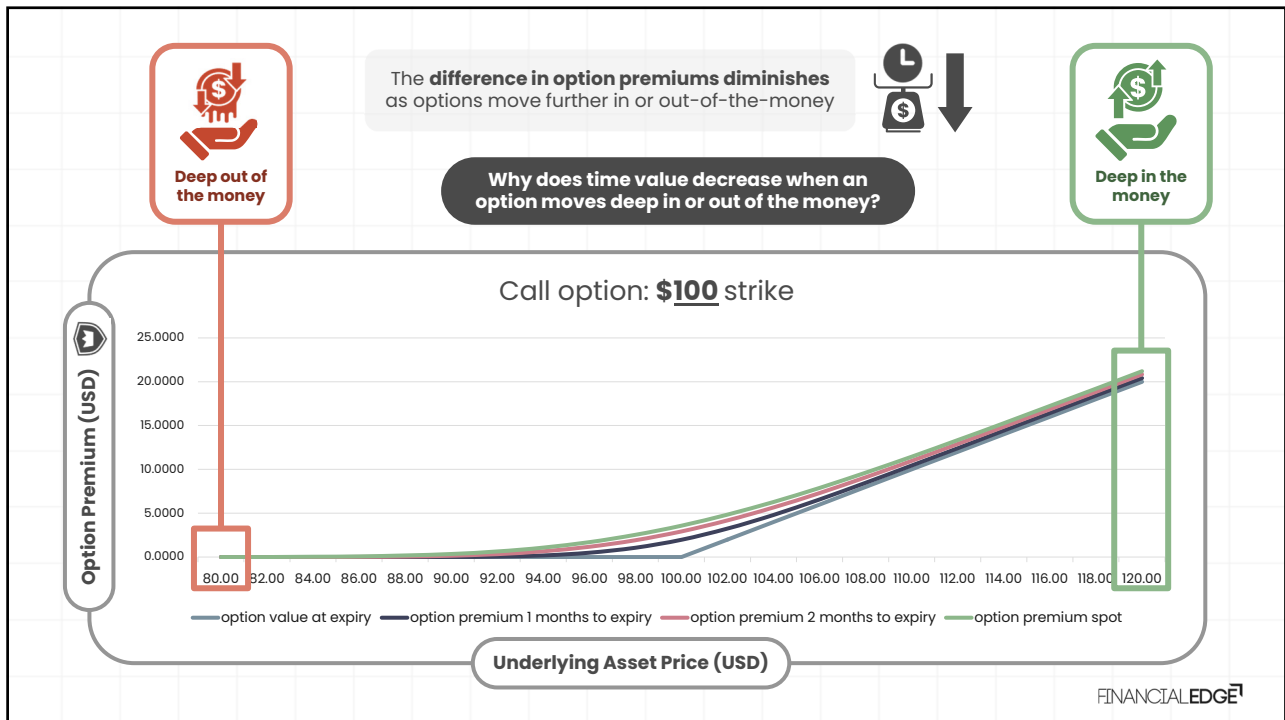
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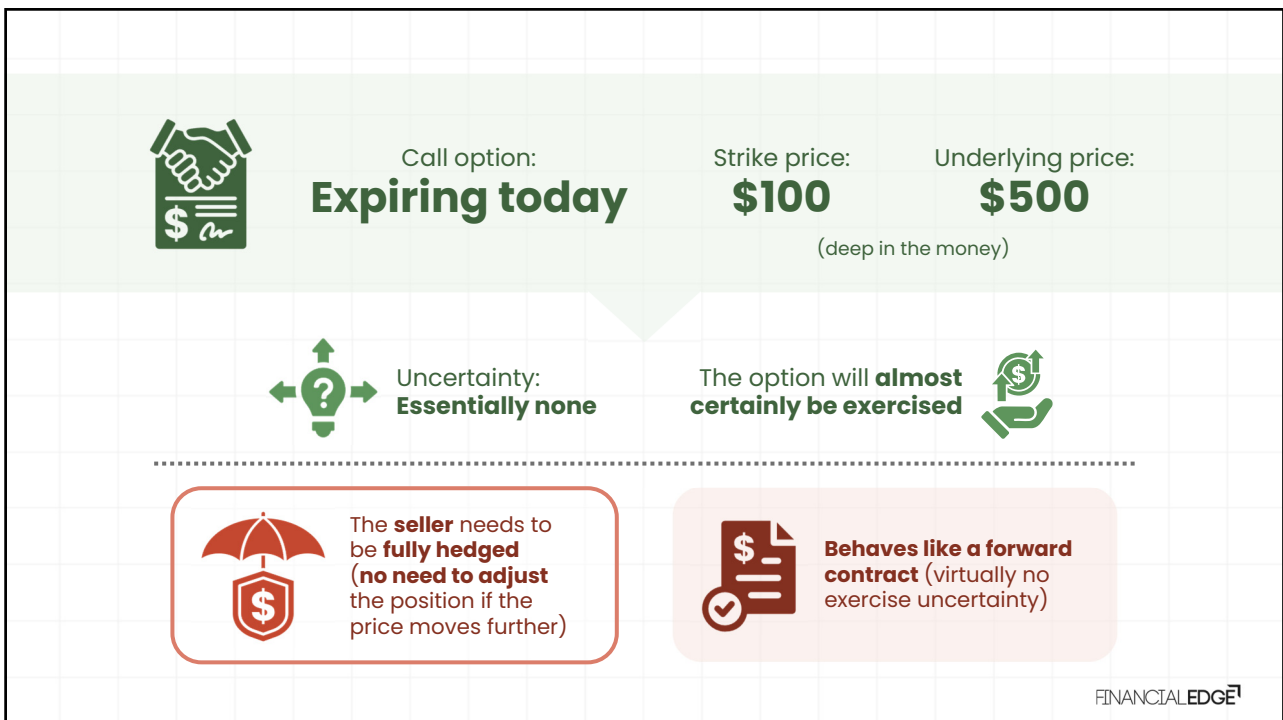
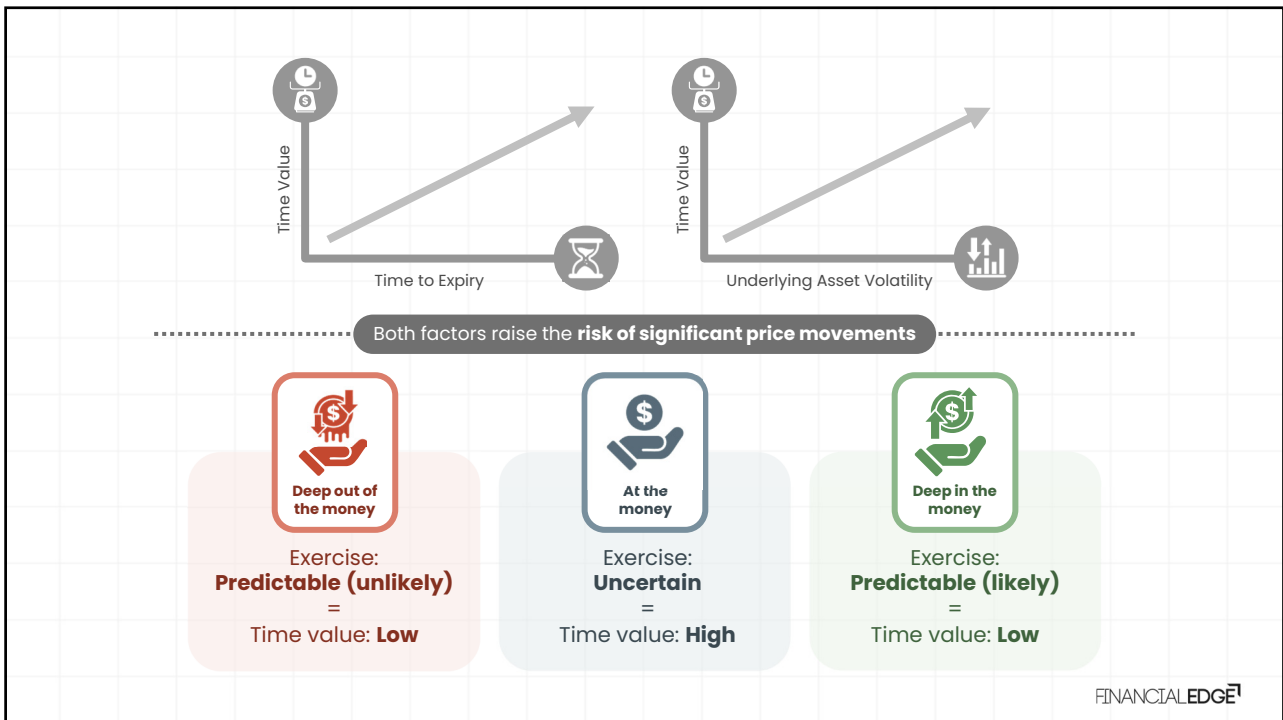


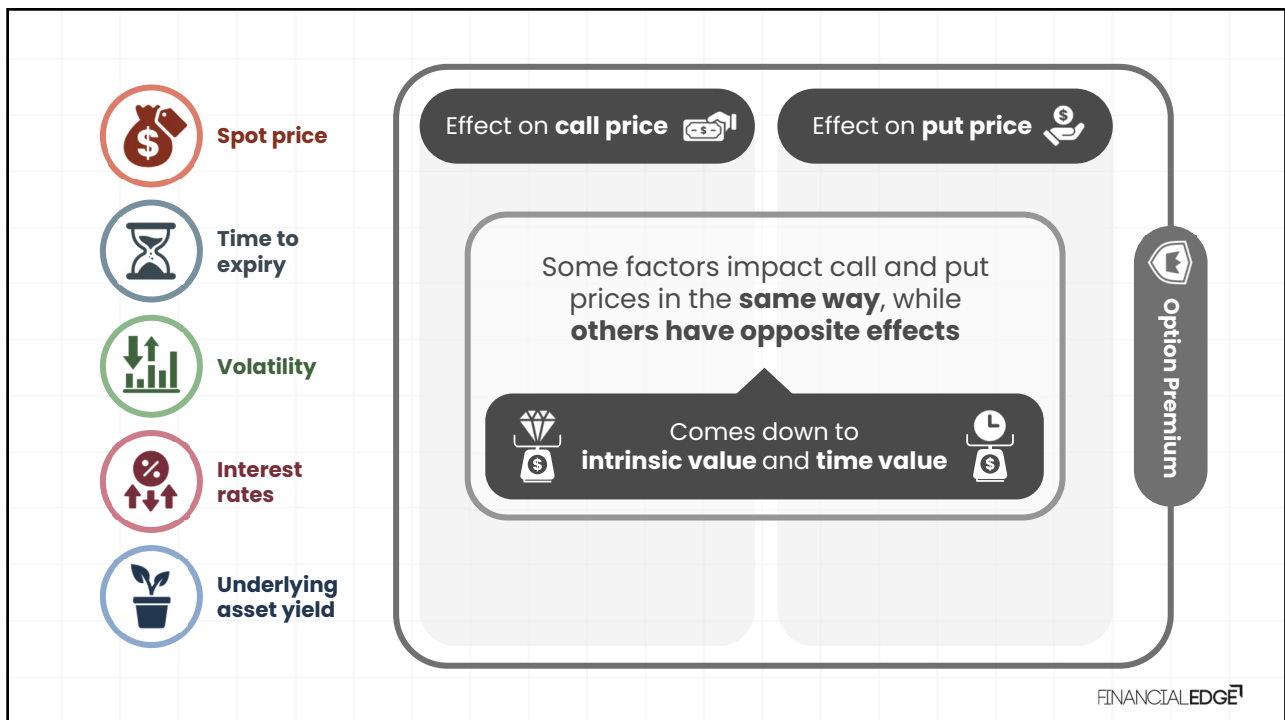
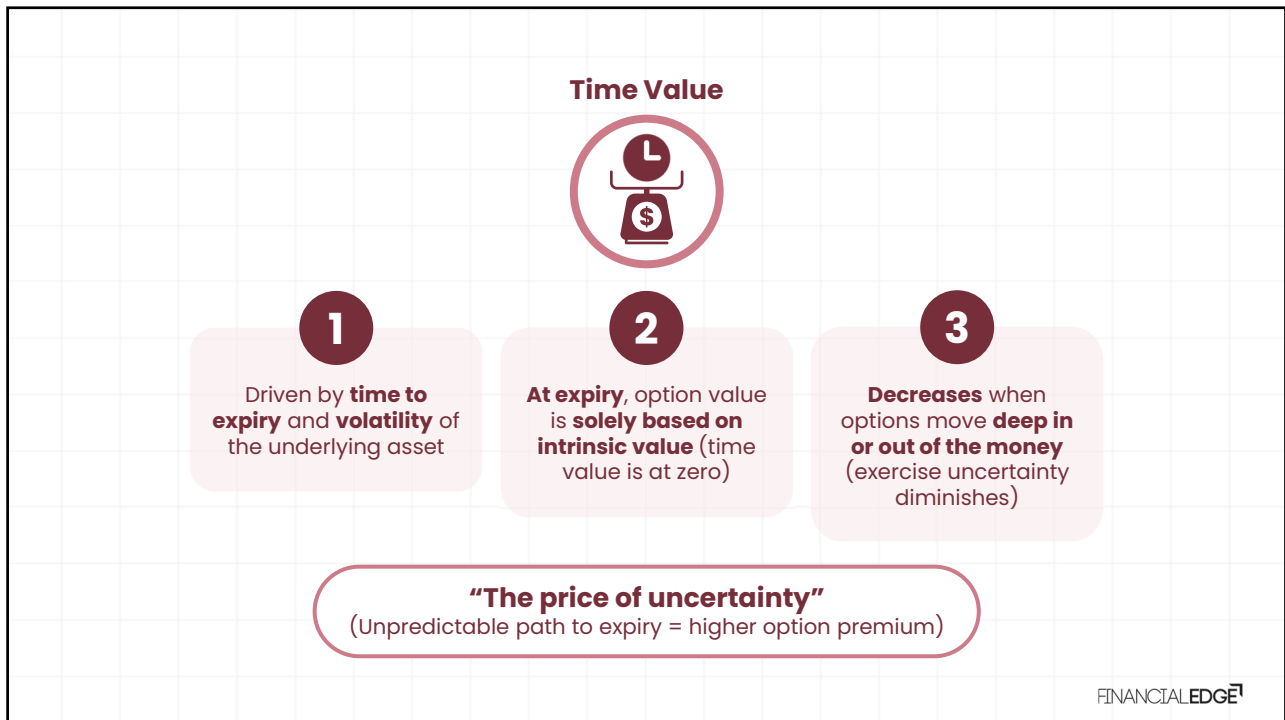


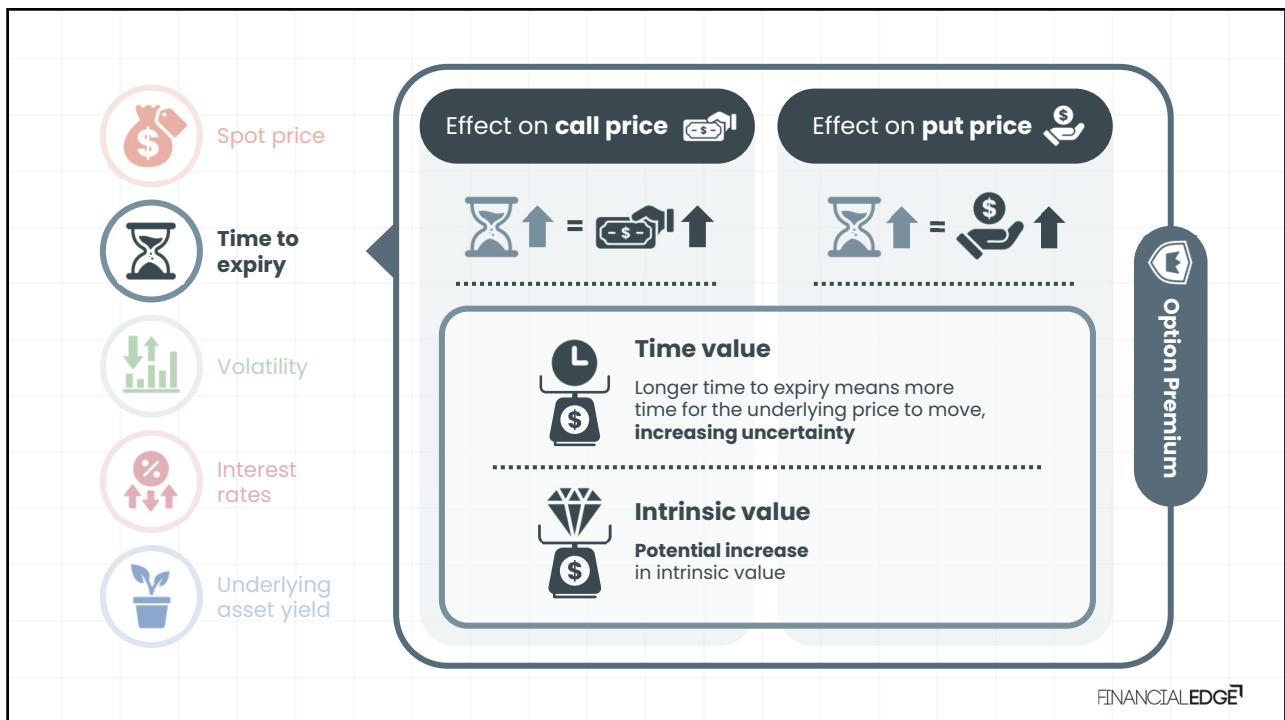
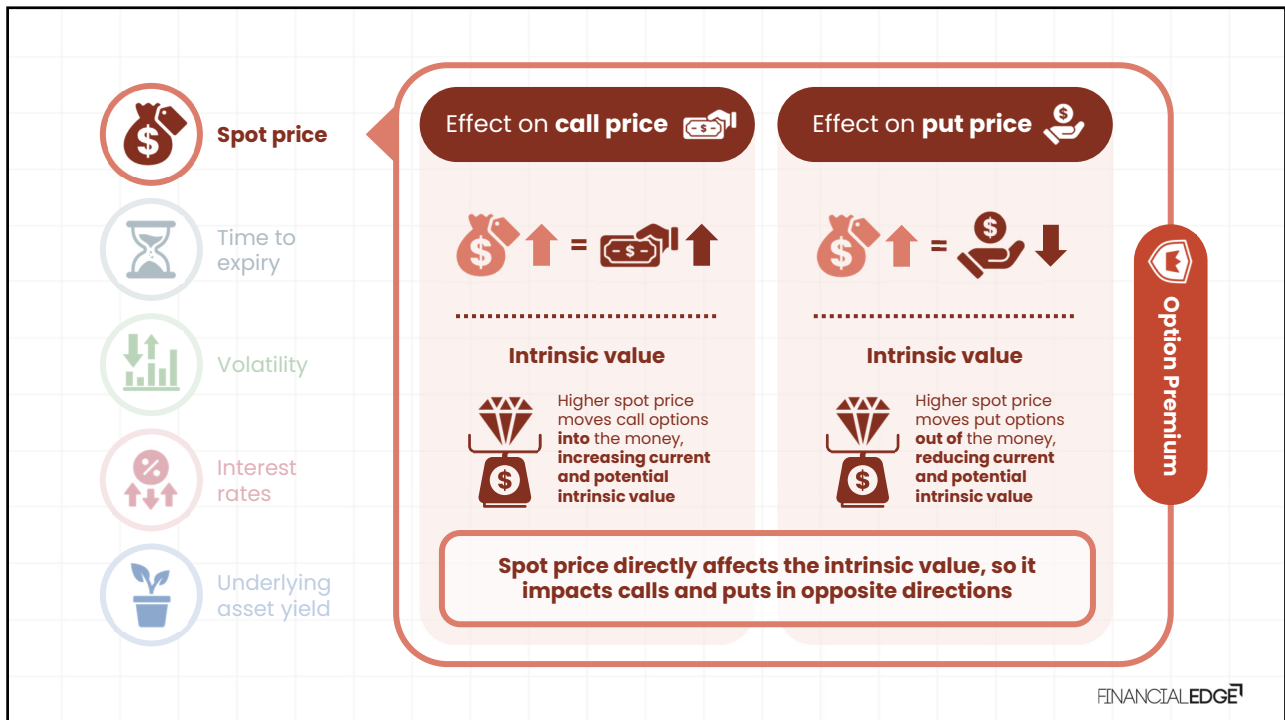


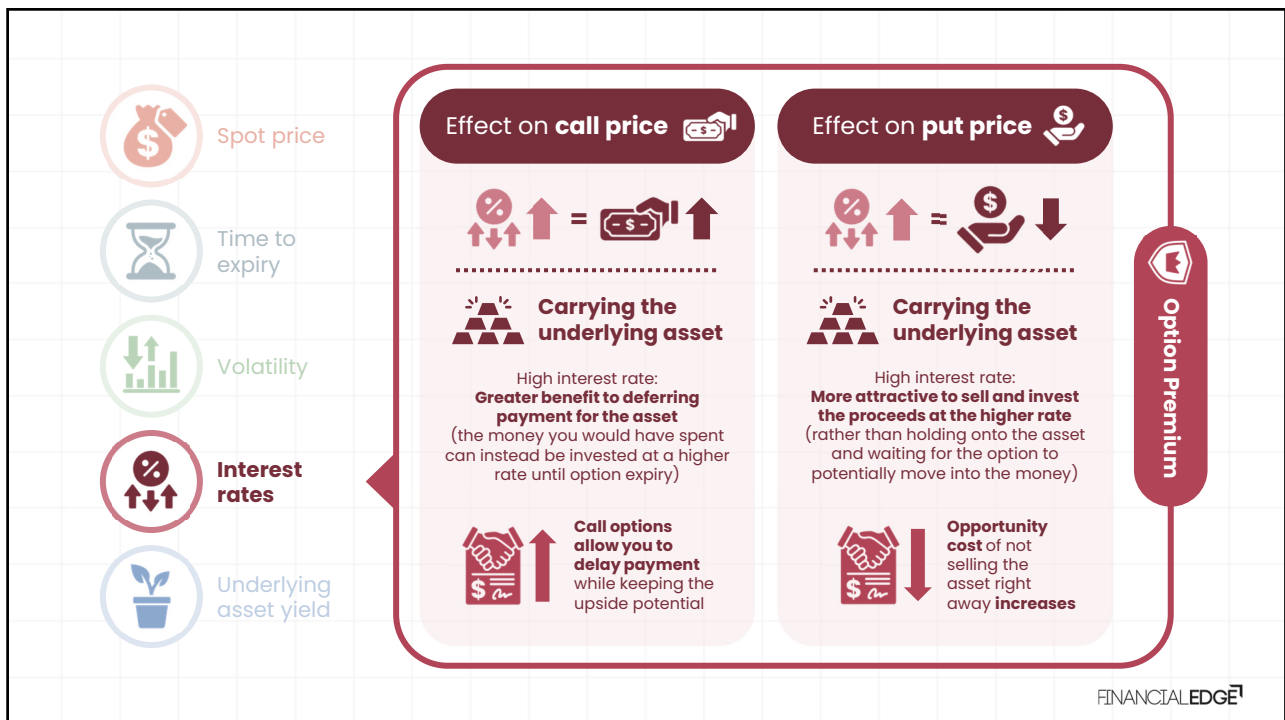
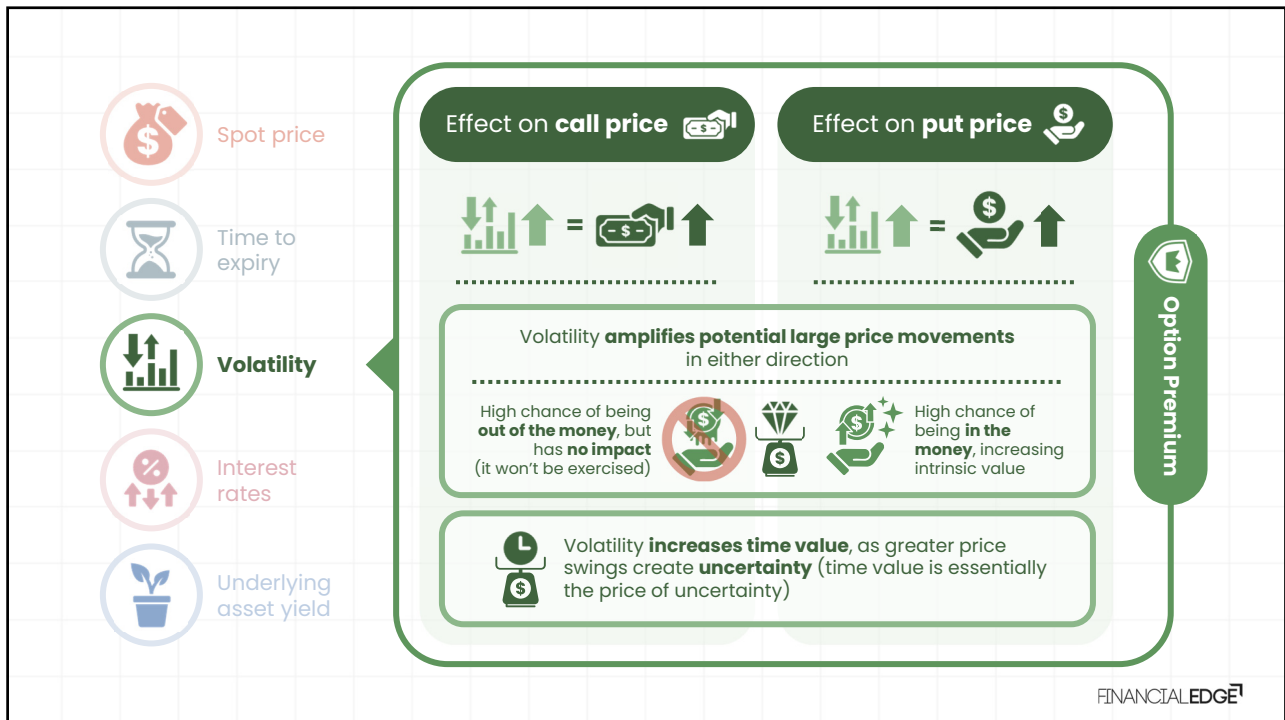


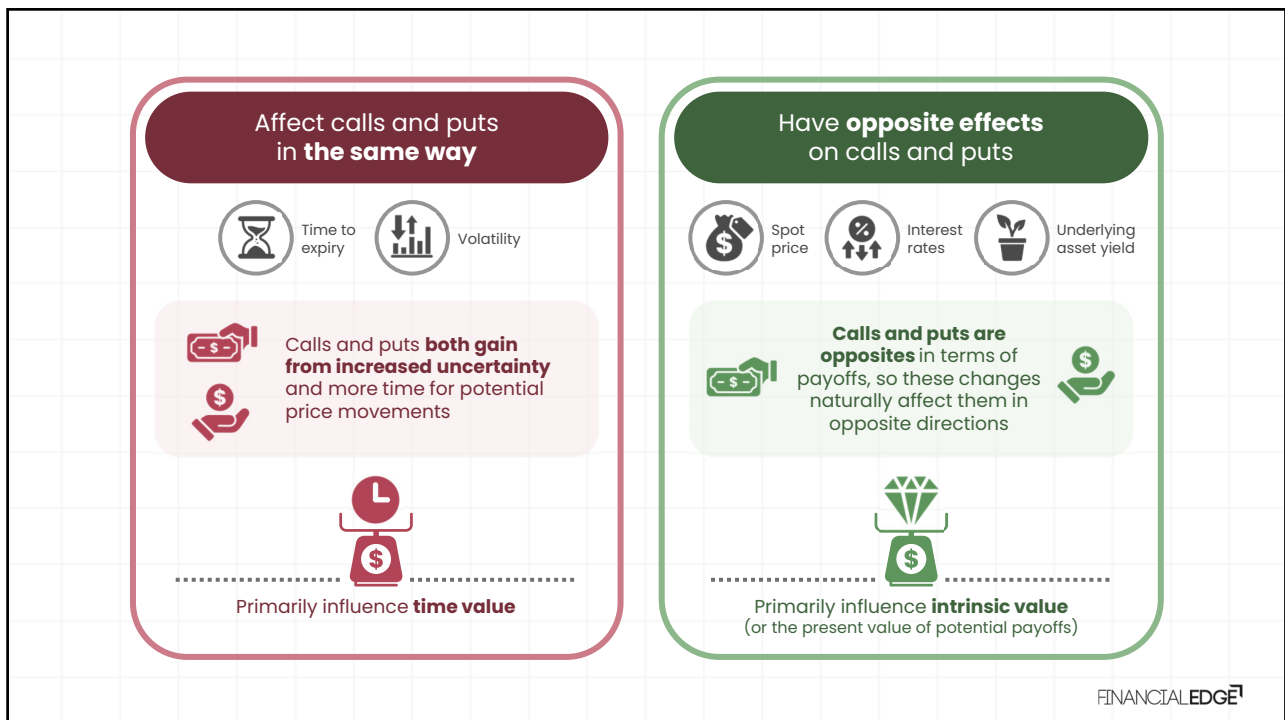
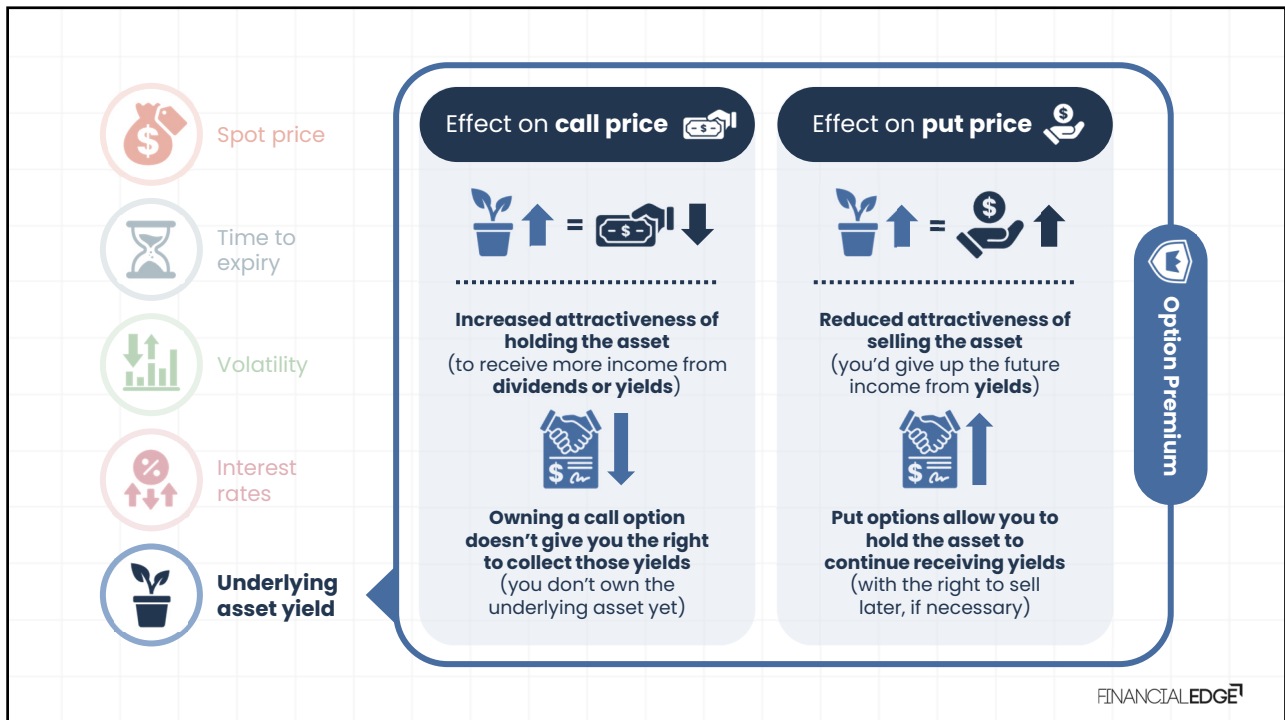


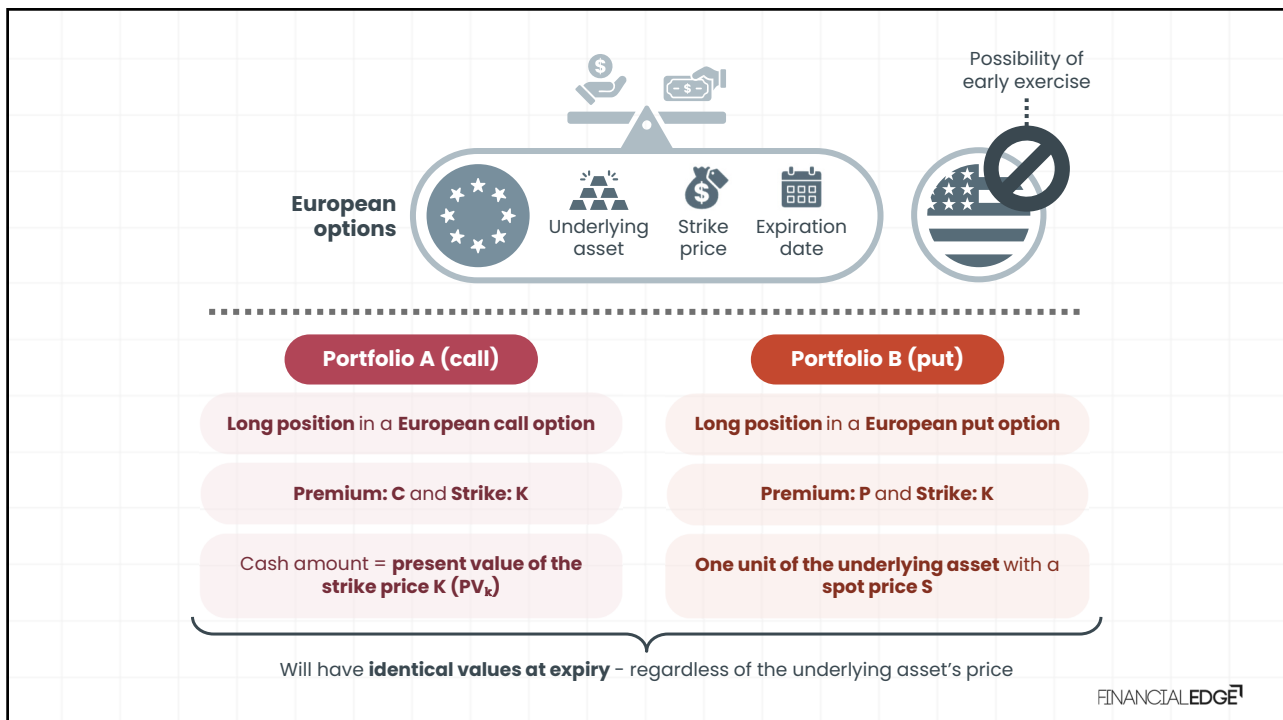
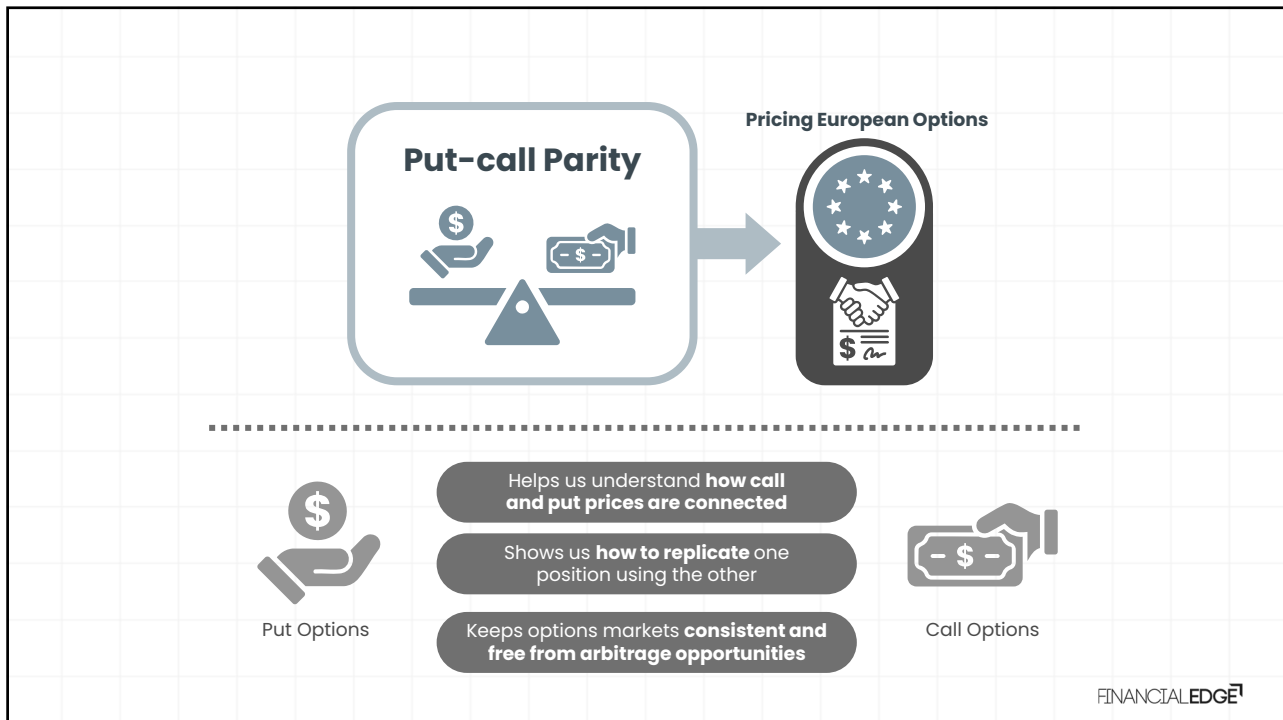


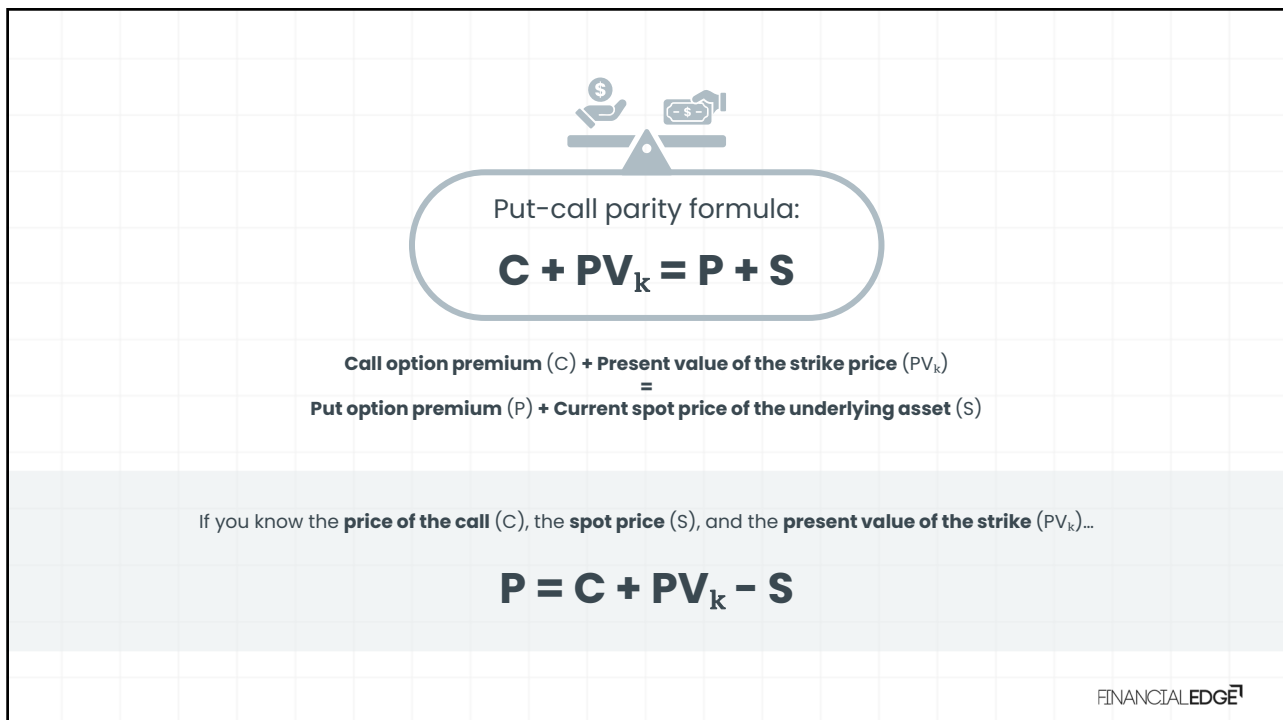
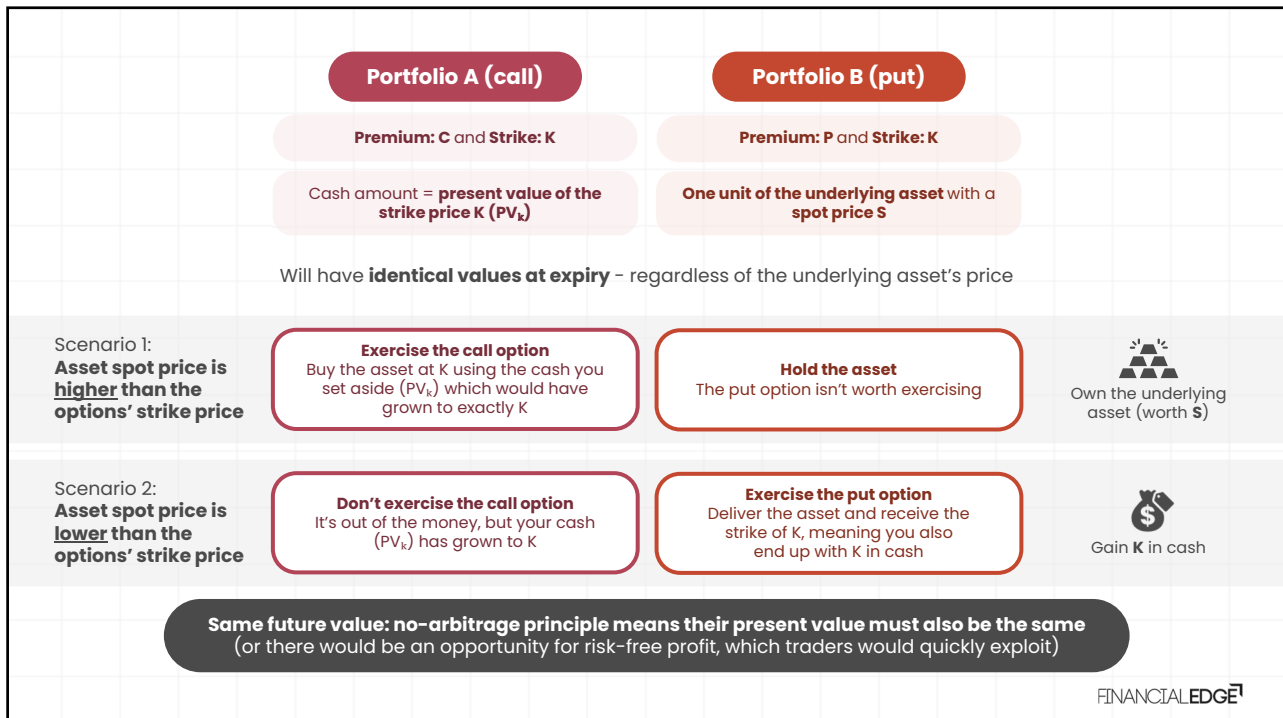














What is the **practical relevance** of put-call parity?



Ensures pricing consistency

If put-call parity didn't hold, traders could create **risk-free arbitrage strategies**



Put overpriced relative to call

A trader could **sell the put, buy the call, and hedge with the underlying** to lock in a **risk-free profit**



Allows traders to create synthetic positions (mimic the payoff of another position)

At-the-money forward strikes:
Strike price (PV_k) = forward price (S)

Call and put premiums must be identical

$$(C + PV_k = P + S)$$

$$(C = P)$$

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At-the-money forward strikes:
Strike price (PV_k) = forward price (S)

Call and put premiums must be identical

$$(C + PV_k = P + S)$$

$$(C = P)$$



Buy an at-the-money forward call



Sell an at-the-money forward put

Positive P&L if the spot price is **above** the forward price

Long forward position

Negative P&L if the spot price is **below** the forward price

Long forward position

=

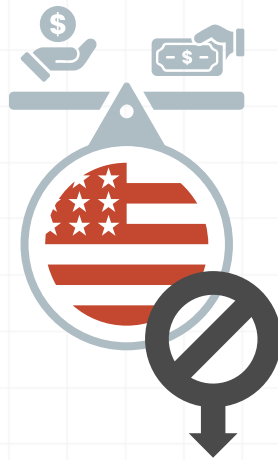
Long (at-the-money) forward call and a short (at-the-money) forward put

Short (at-the-money) forward call and a long (at-the-money) forward put

=

Short forward position

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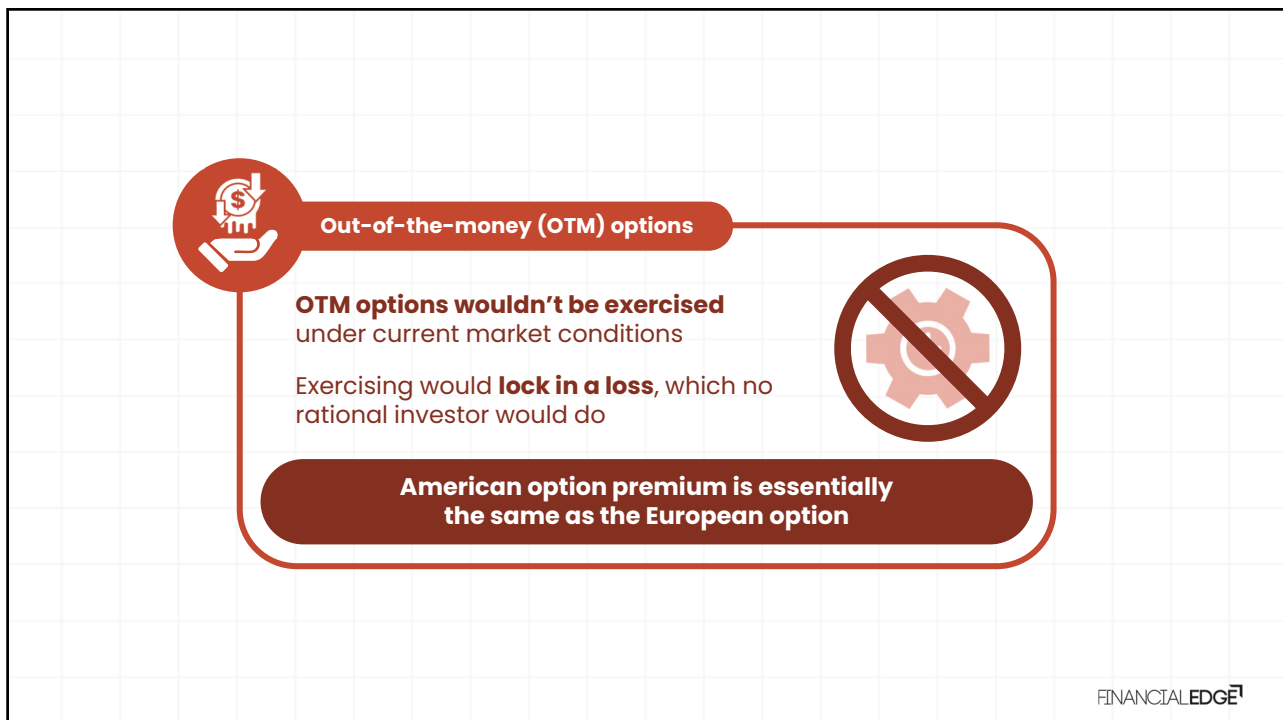
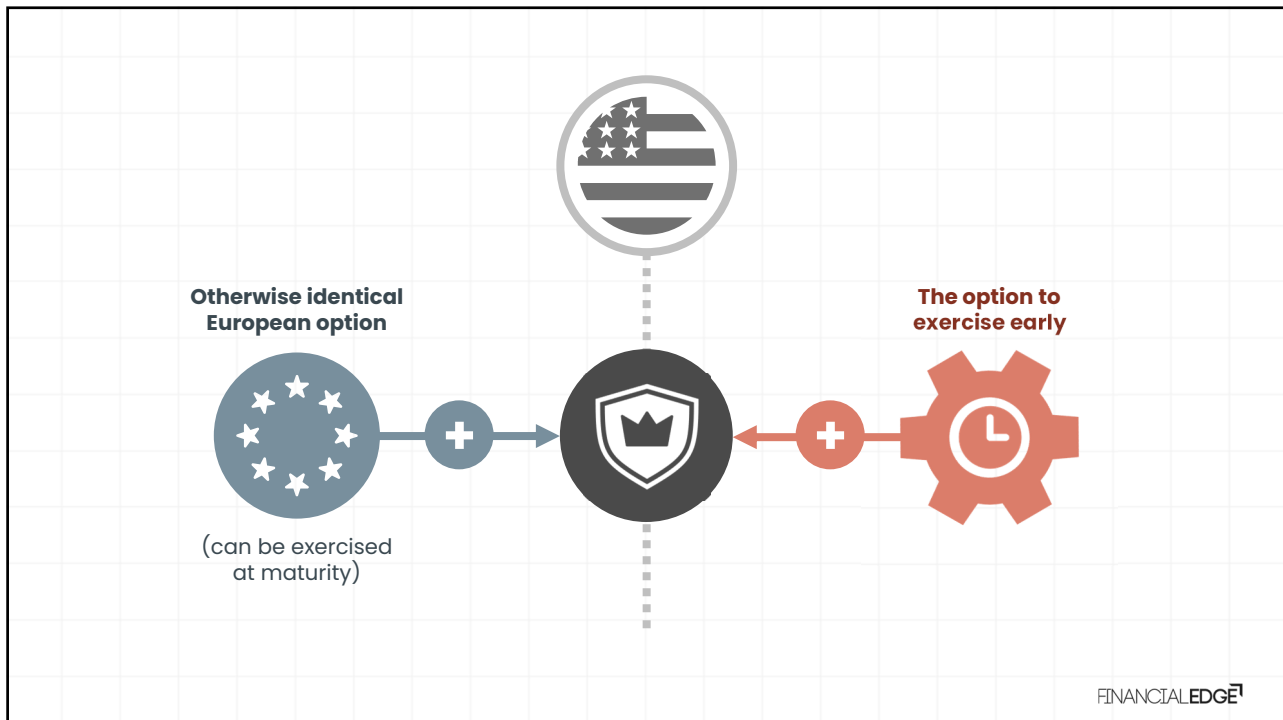


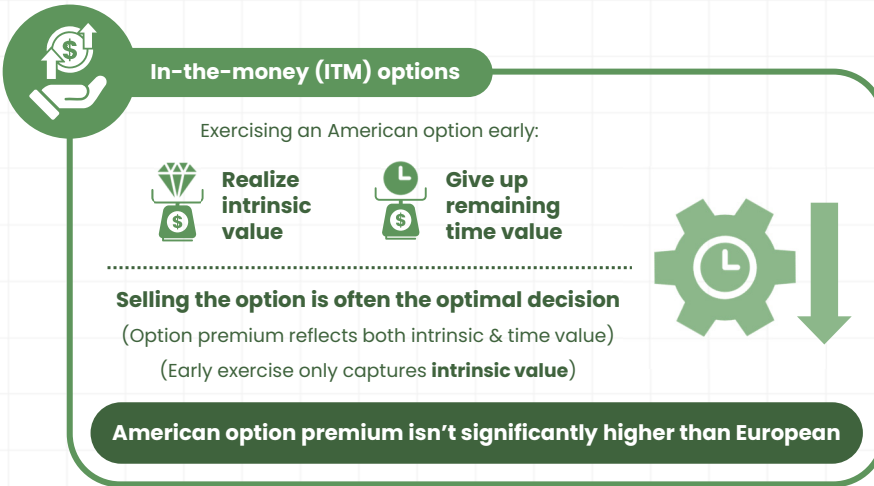
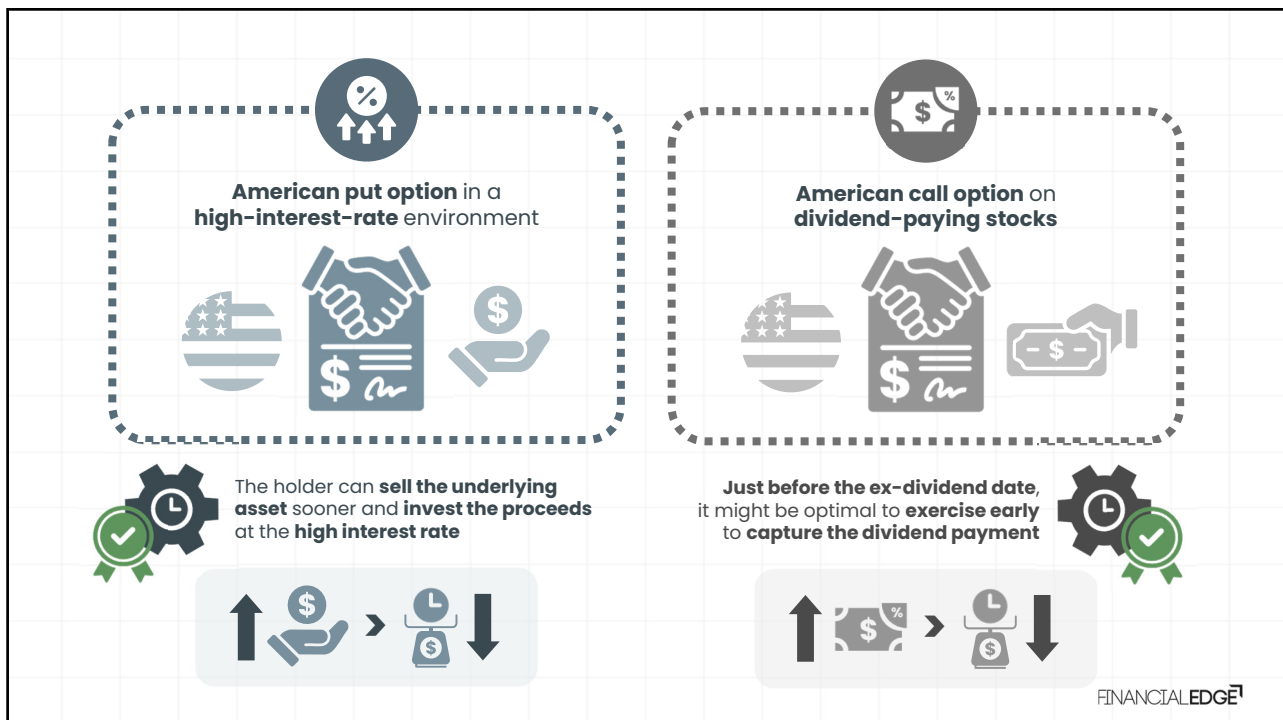
Put-call parity doesn't hold for American options because they **can be exercised early**
(early exercise changes the timing of cash flows, breaking the symmetry required for parity to exist)

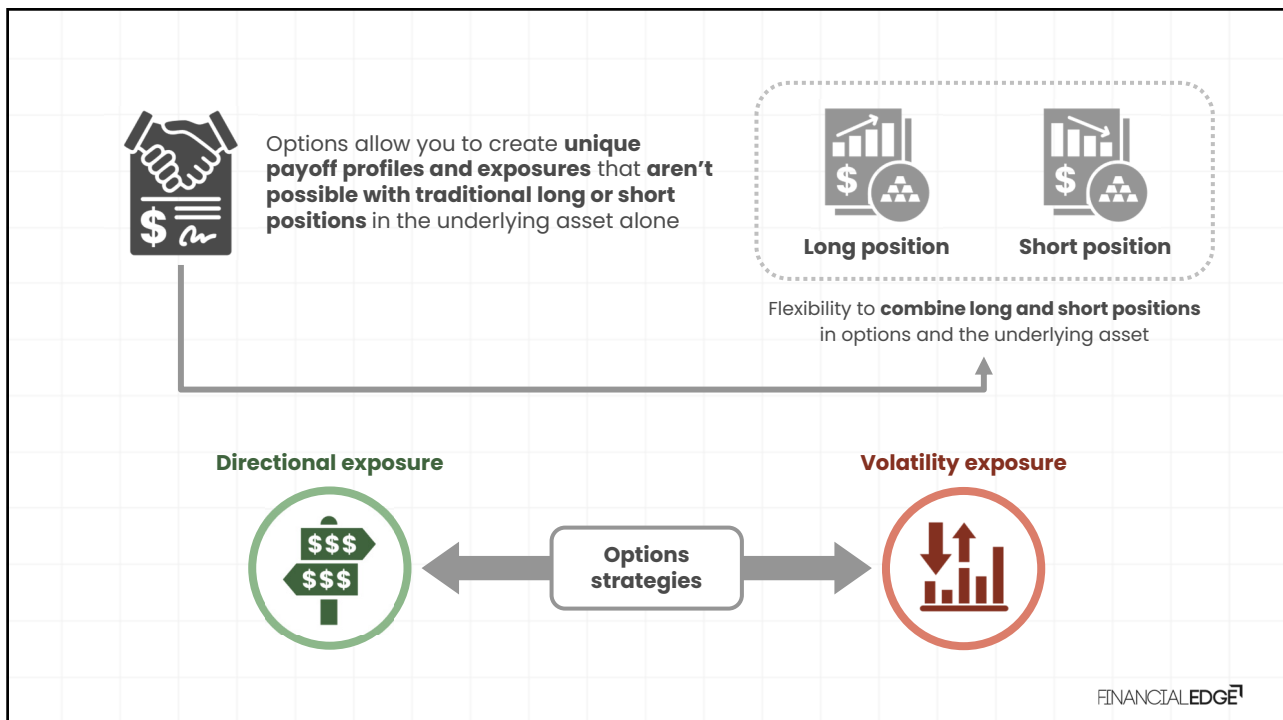
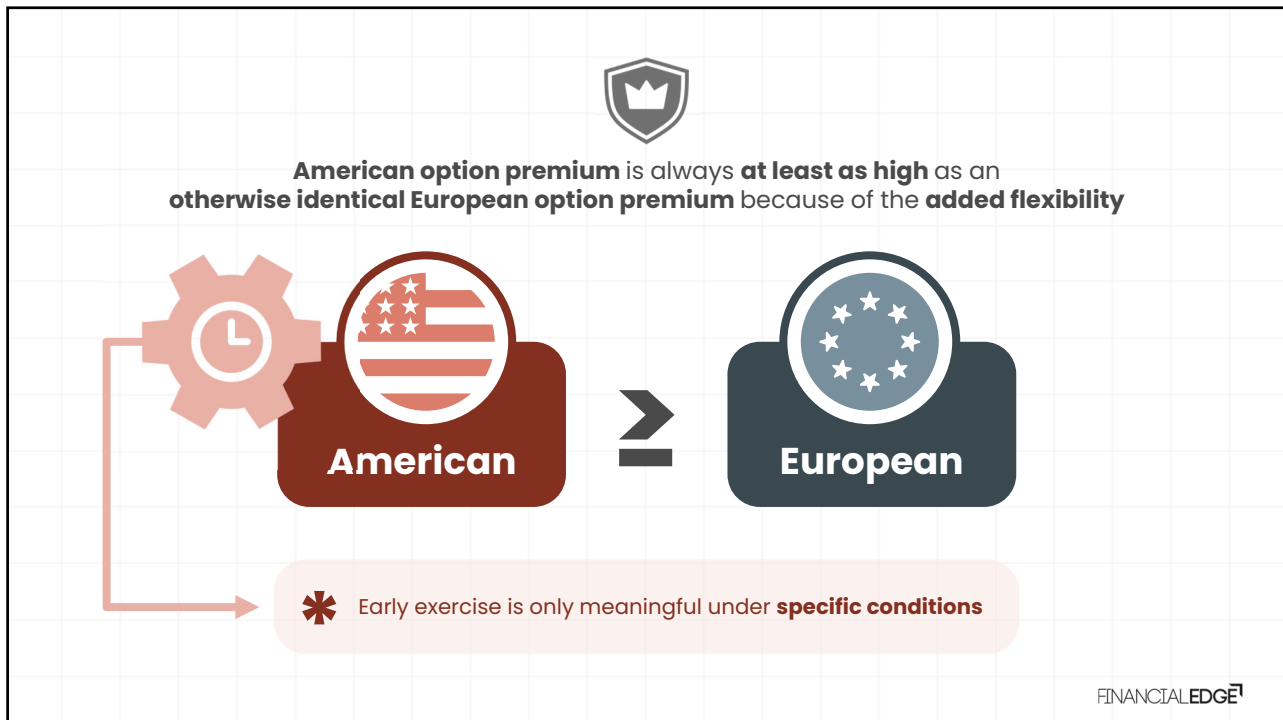
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Greater
flexibility
around
exercise

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Directional exposure**Volatility exposure**

Take views on the **direction of the underlying asset's price**

(Added benefits compared to just buying or selling the asset outright)

**Long positions with a predefined maximum loss**

You know exactly how much you could lose, providing unique **risk control**
(traditional stop-loss orders risk getting stopped out during temporary price dips)

Monetize specific price targets:

Automatically capitalize on movements toward or beyond those targets
(Instead of relying on the asset to reach a certain price and then executing a manual trade)

Directional exposure**Volatility exposure****Profit from the market's volatility**

(even if you're uncertain about the overall direction of the price change)

**Positions driven solely by the magnitude of the underlying asset's price change (regardless of the direction)**

Something you can't achieve with traditional long or short positions in the underlying asset

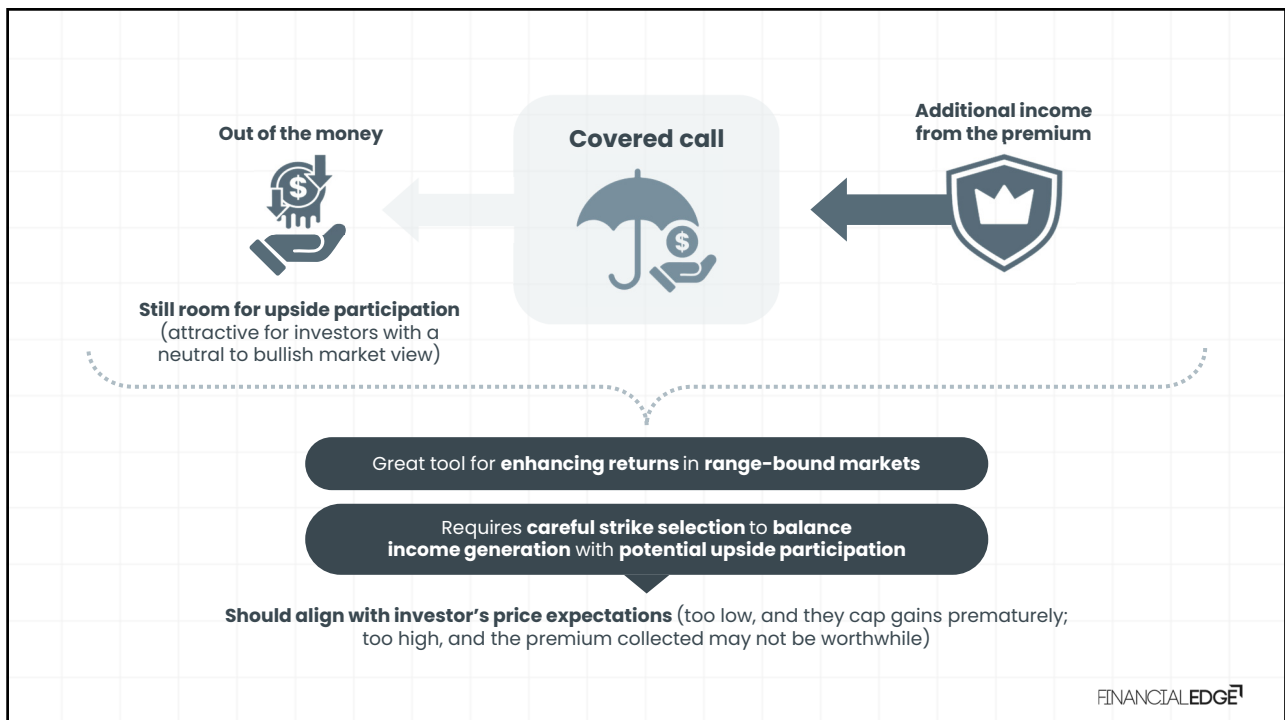
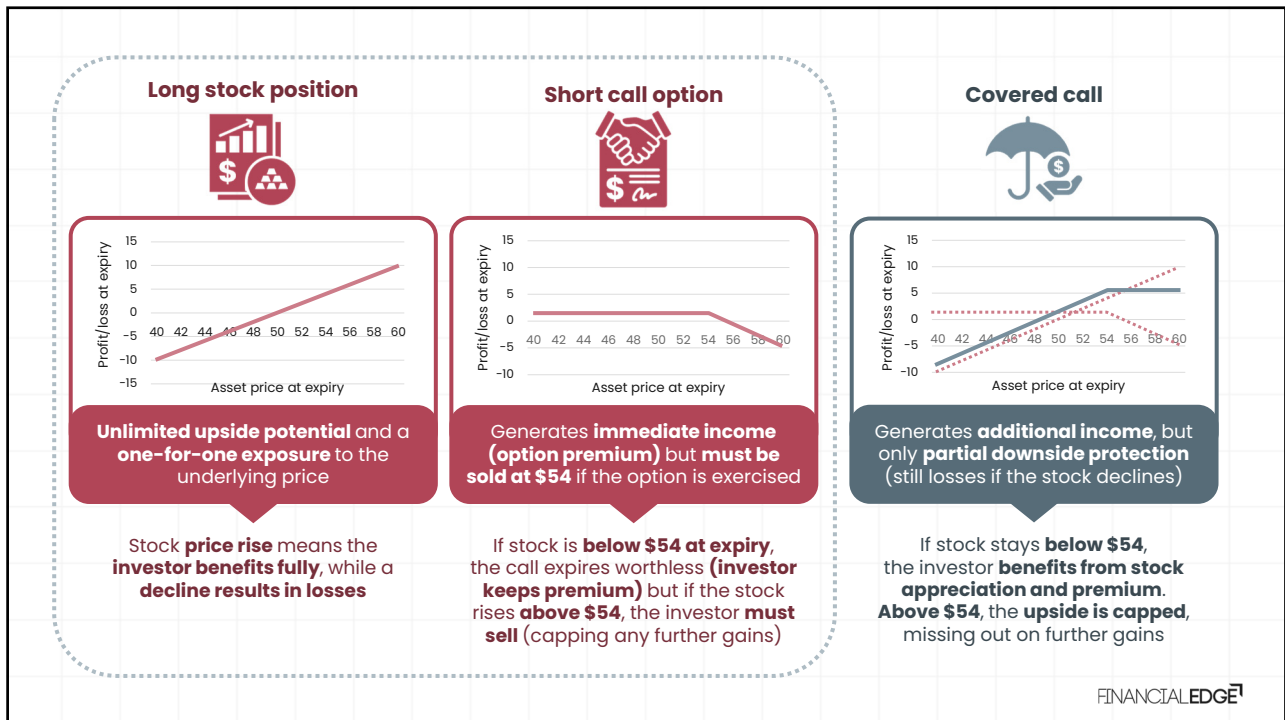


Popular strategy **for investors who own an asset, want to generate additional income** and are **willing to give up some upside potential** in return

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Different from selling an uncovered (naked) call - where the investor sells a call without owning the stock, exposing them to theoretically unlimited losses if the price rises significantly

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Protective put



Strategy designed **for investors who own an asset** and want to **protect against downside risk** while **maintaining upside potential**

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Owns
stock
priced
at **\$50**



Concerned about
potential downside
over the next
3 months



**Protection from falling
stock price, without
exiting the position or
risk getting stopped out
from short-term declines**

If stock price **drops below \$46**, the **put option limits their losses** (they can still sell at that price)



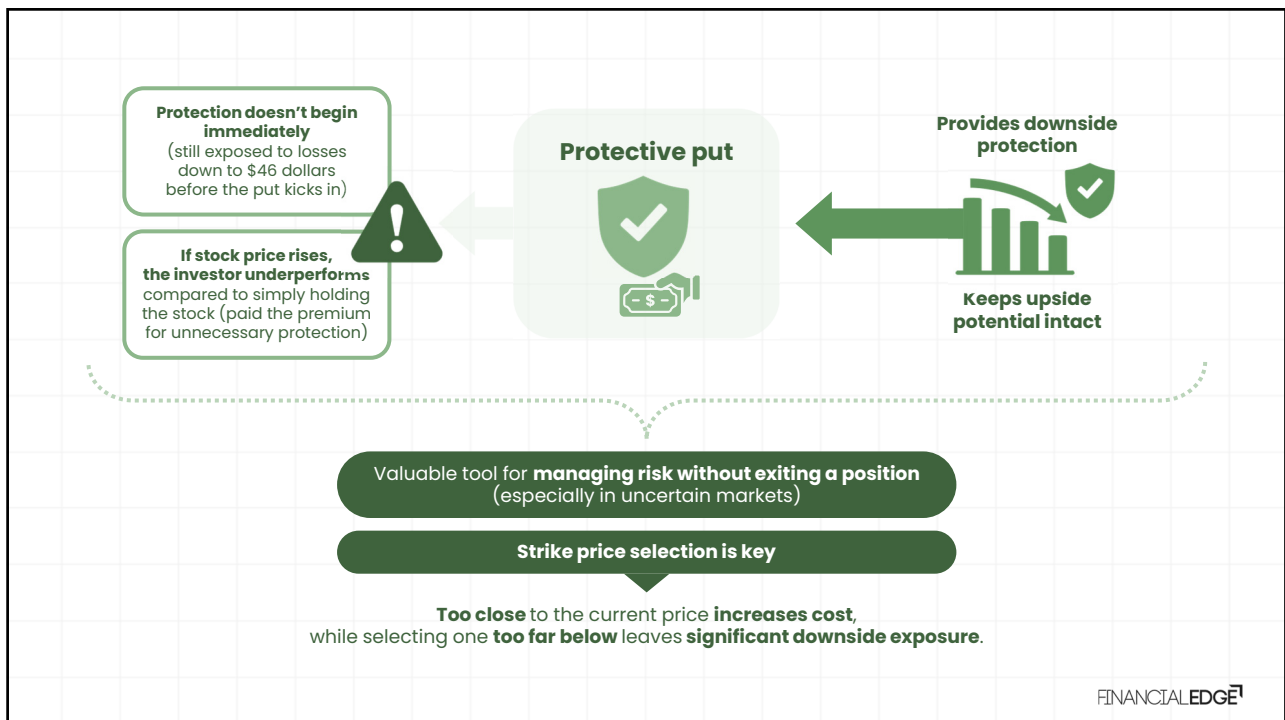
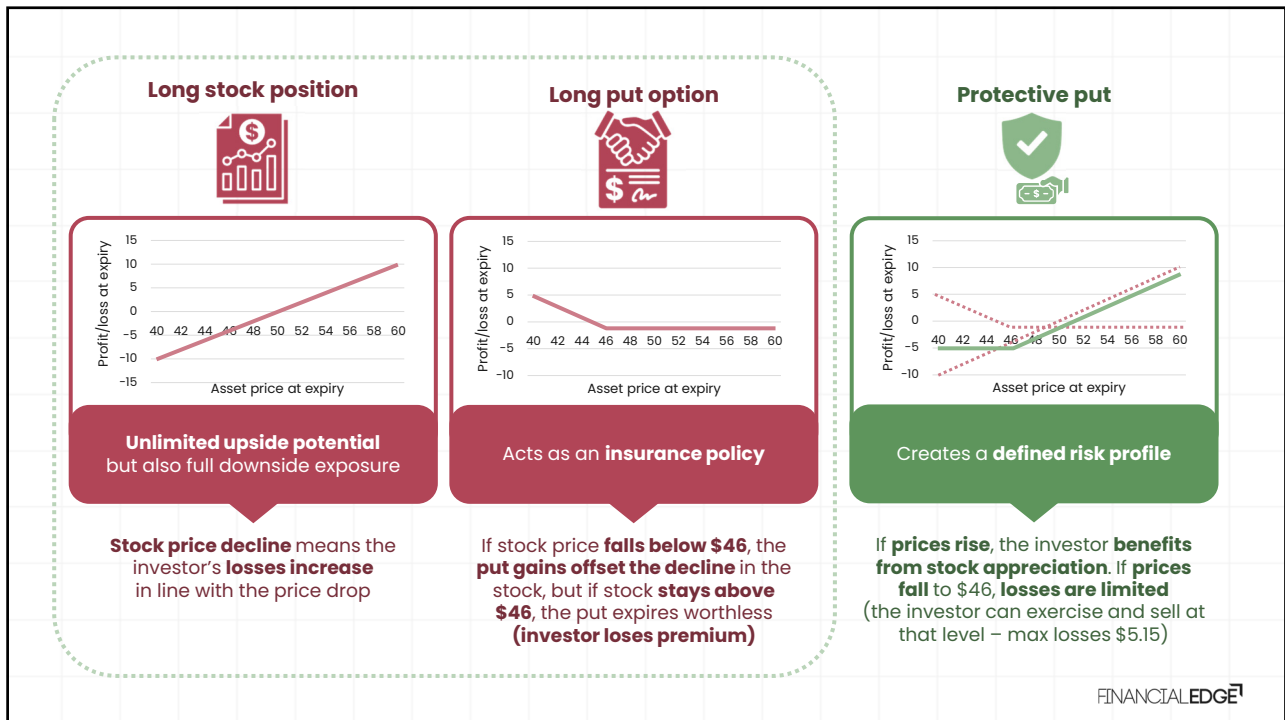
Investor **buys** a
3-month put
option with a
strike price of **\$46**



Pays a
premium
of **\$1.15**

Strike price of \$46
reflects where the
investor wants
downside protection
to begin

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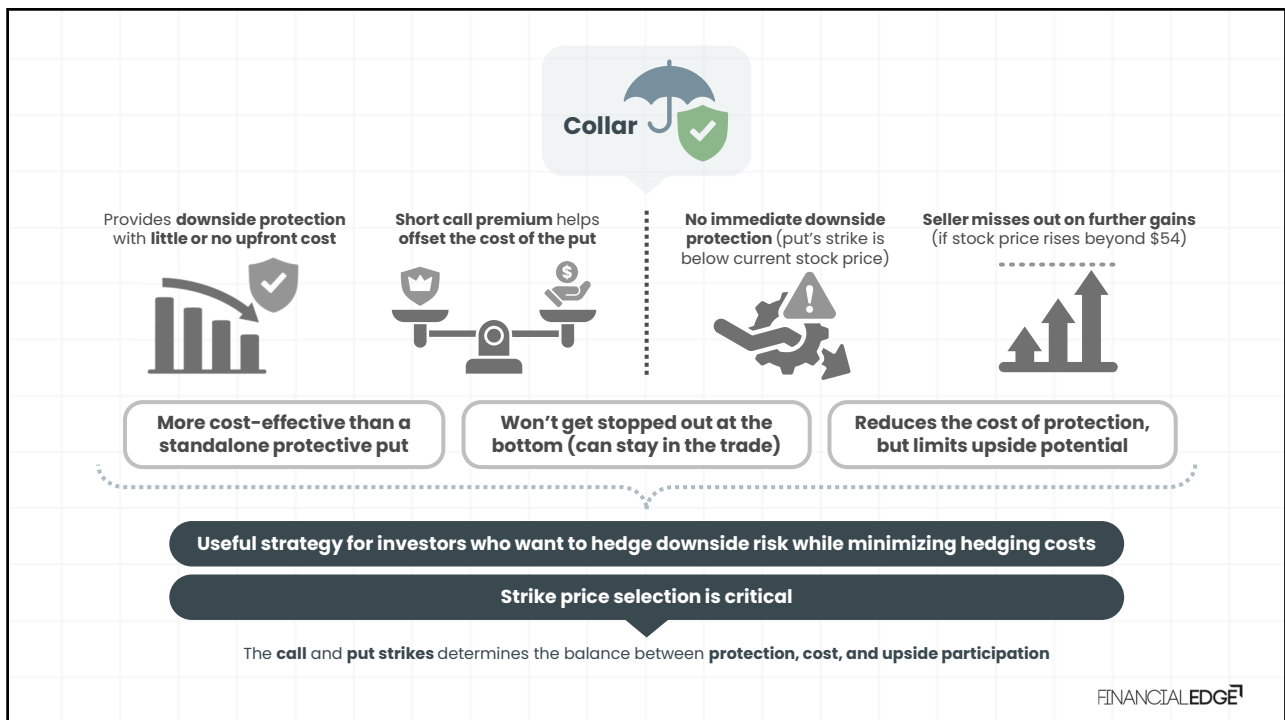
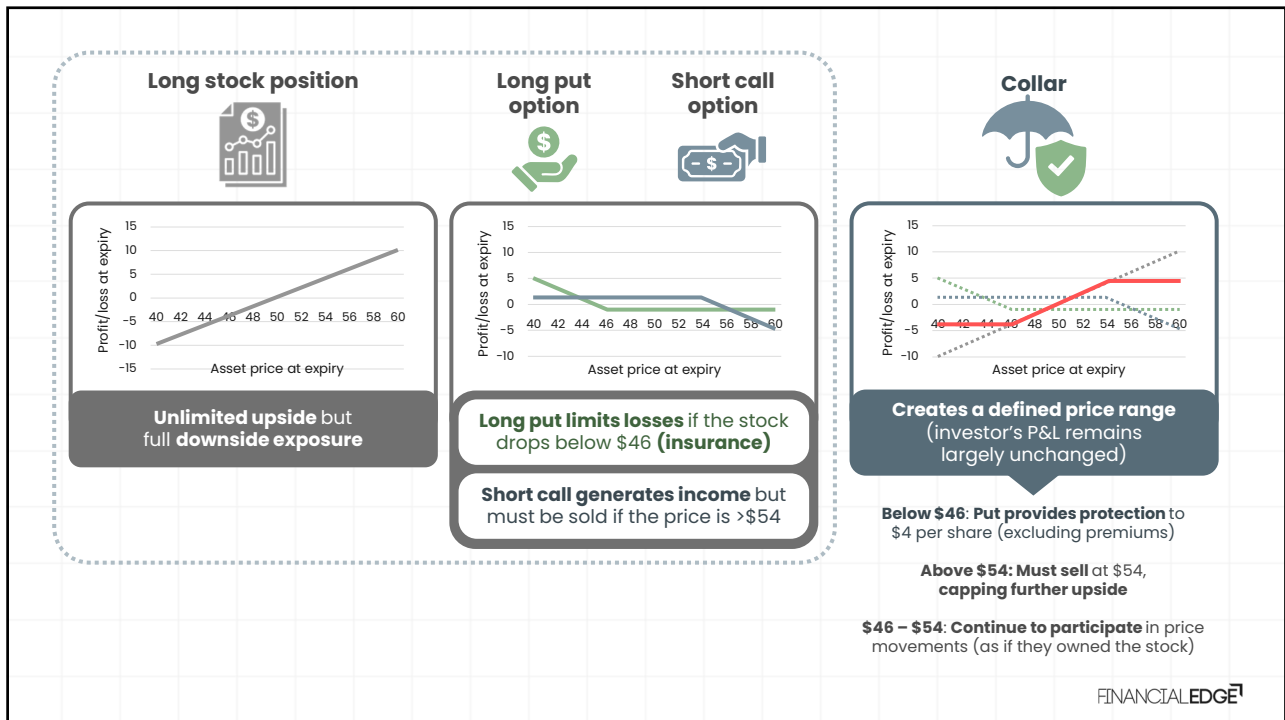




Combines elements of both a **protective put** and a **covered call**

(typically used by investors who want **downside protection** while also **reducing the cost of hedging** by **giving up some upside potential**)

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Risk-reversal



Strategy for investors looking to **gain directional exposure** with **reduced premium outlay**



Unlike covered calls, protective puts, or collars,
risk-reversal doesn't require holding the underlying asset

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**Long out-of-the-money put and a
short out-of-the-money call**



Express a **bearish view**
(while accepting some upside risk)

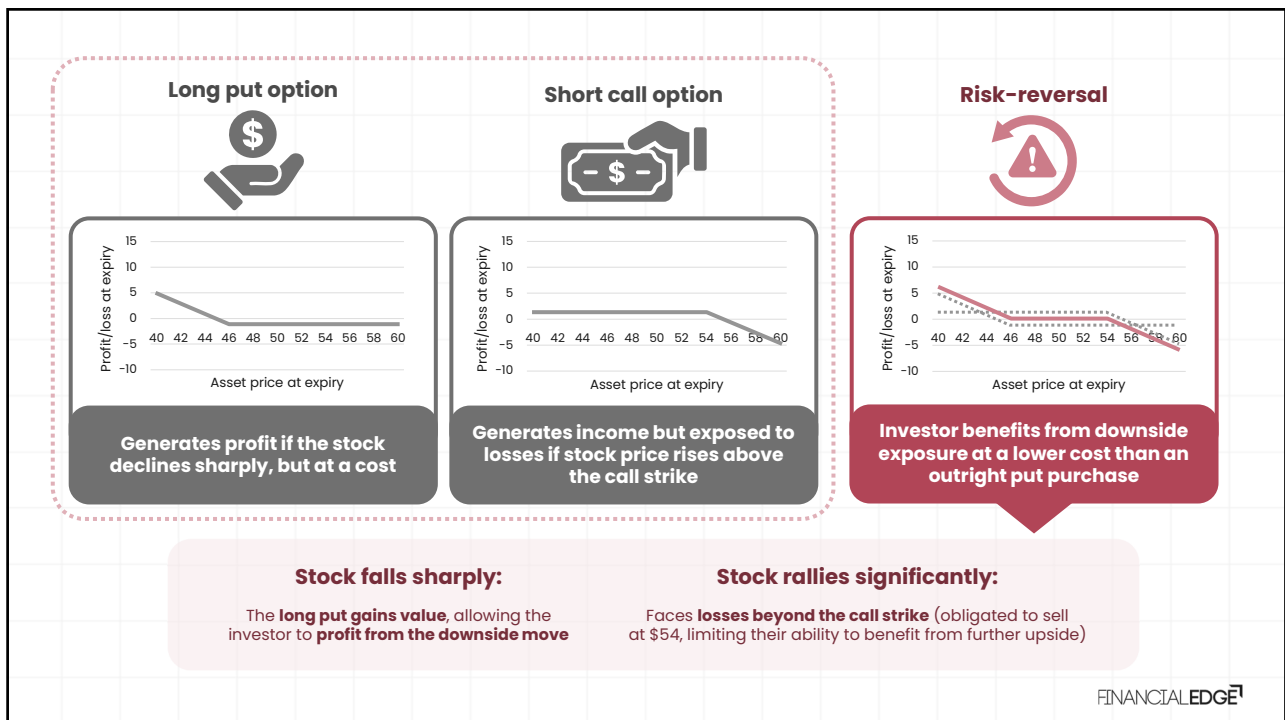
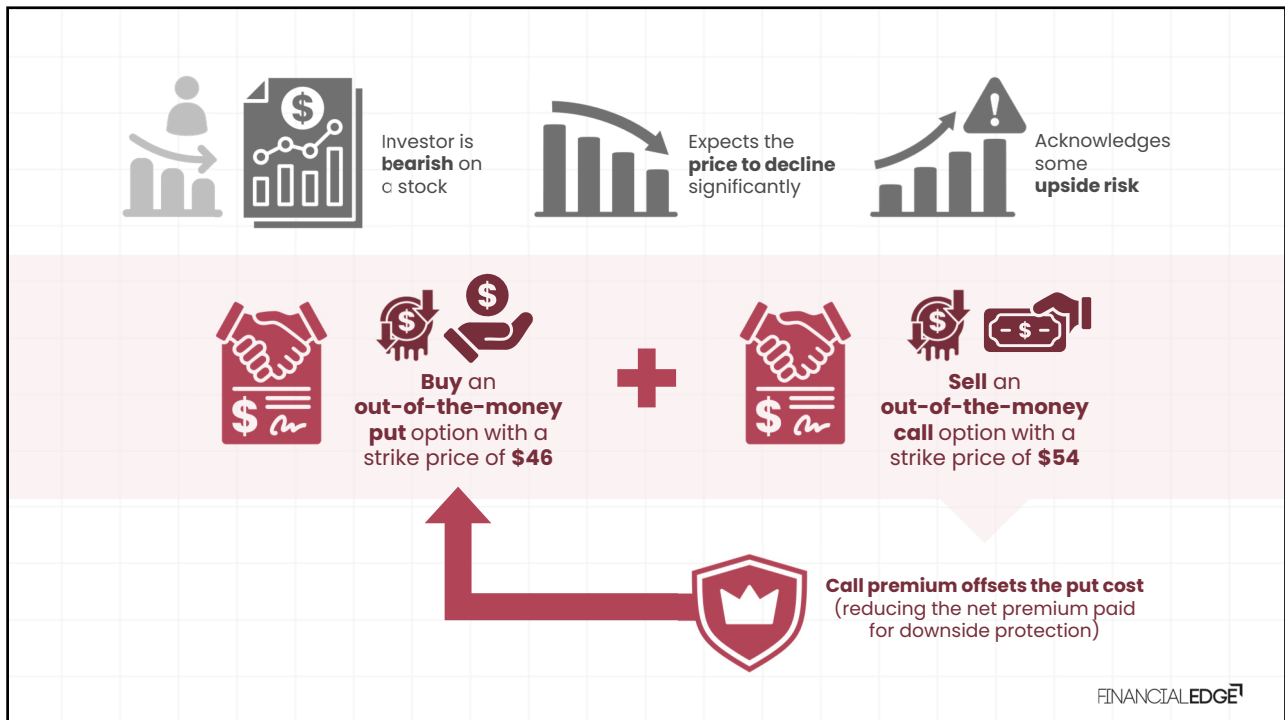


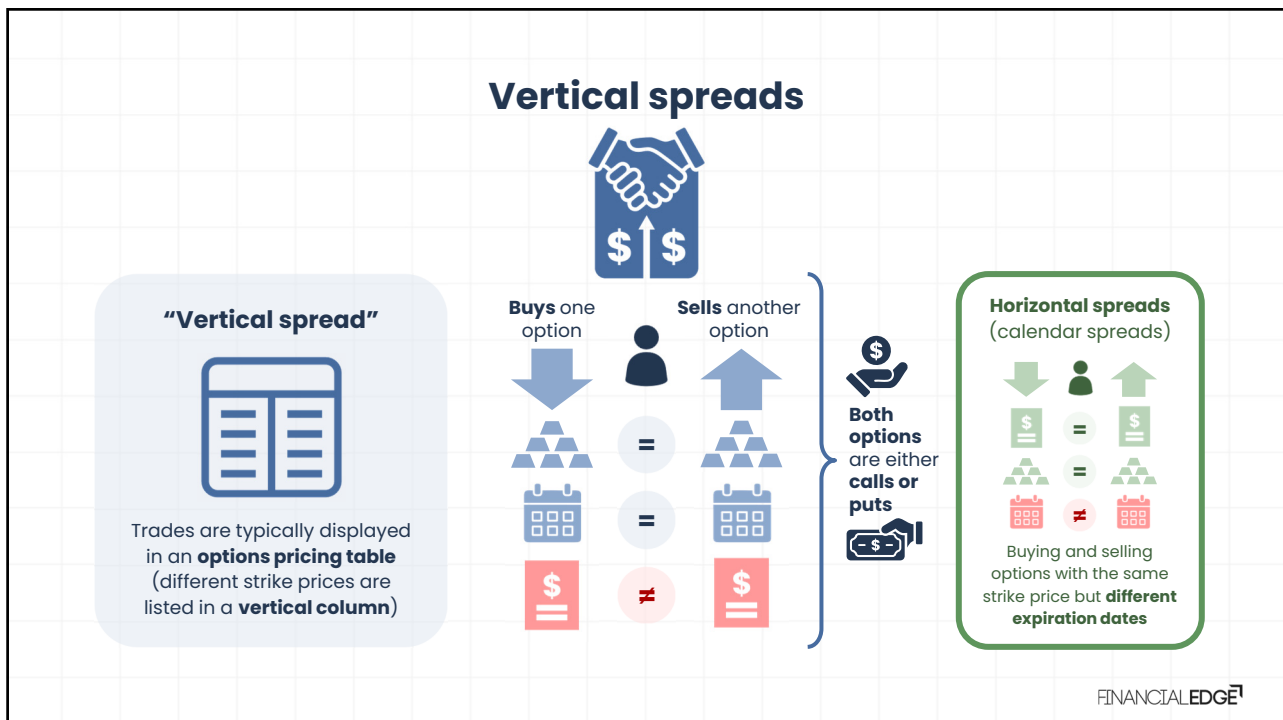
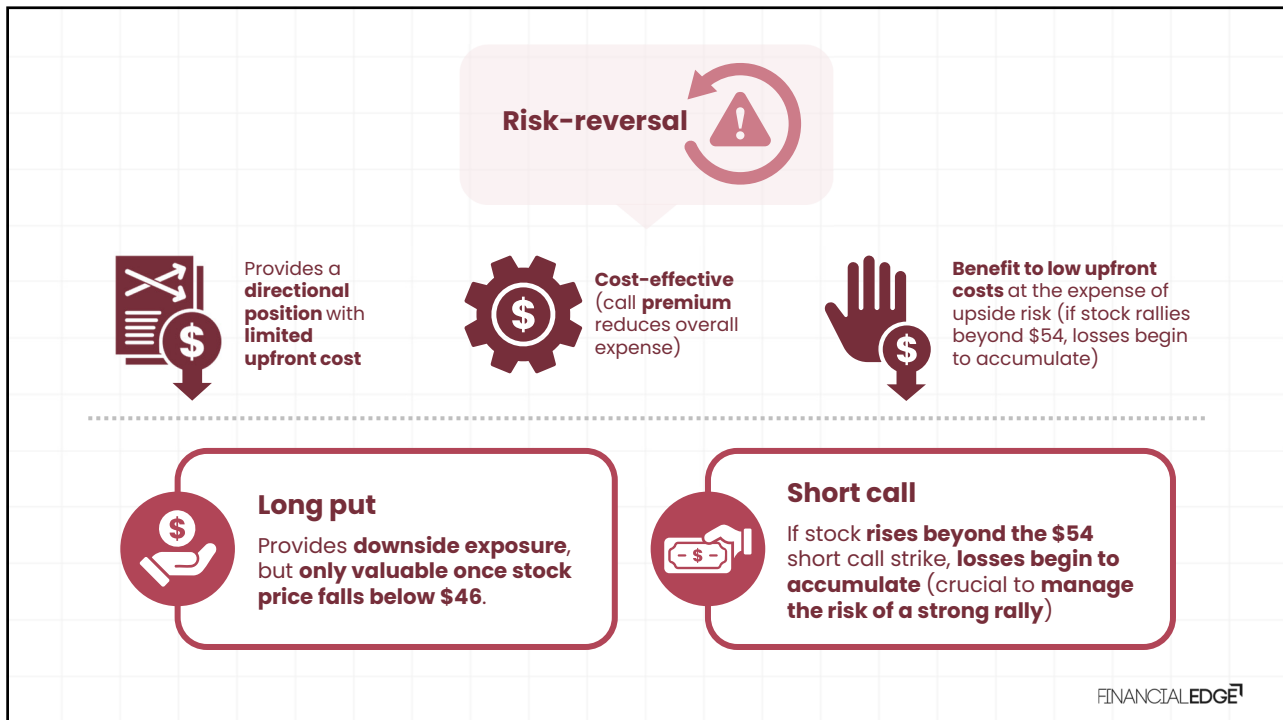
**Short out-of-the-money put and a
long out-of-the-money call**

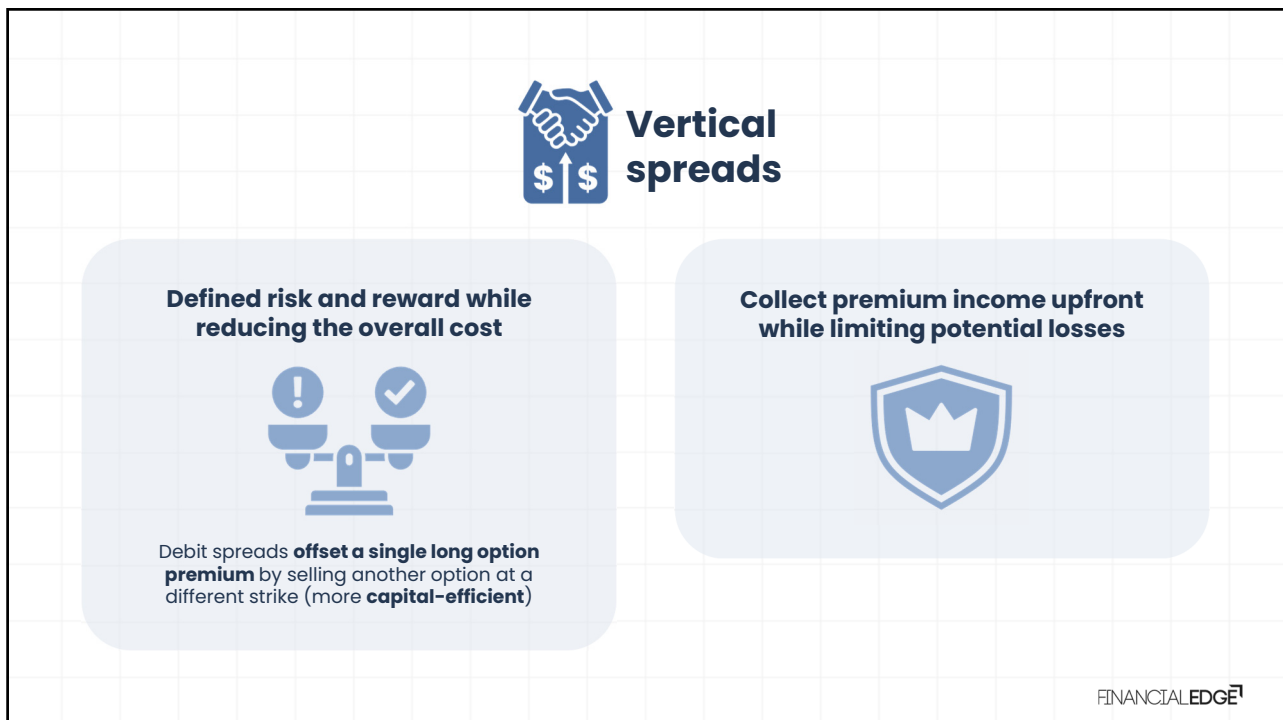
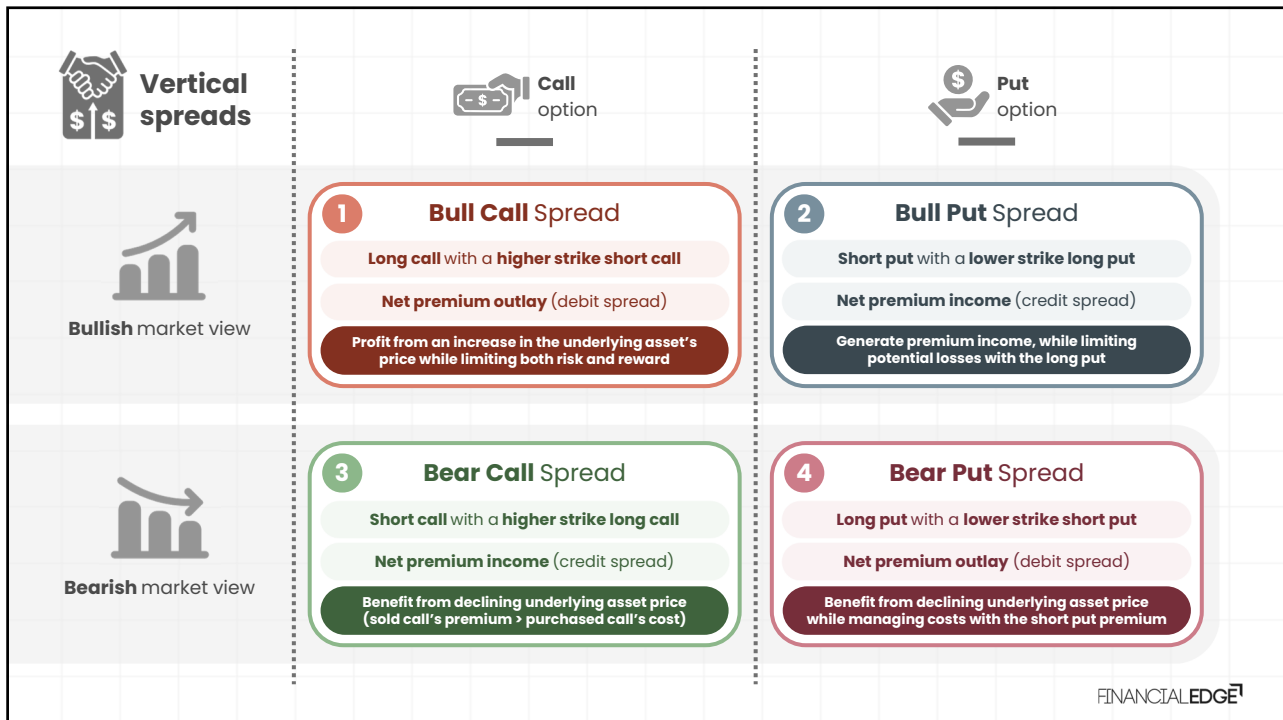


Express a **bullish view**
(while accepting some downside risk)

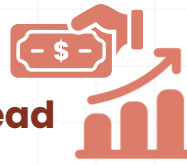
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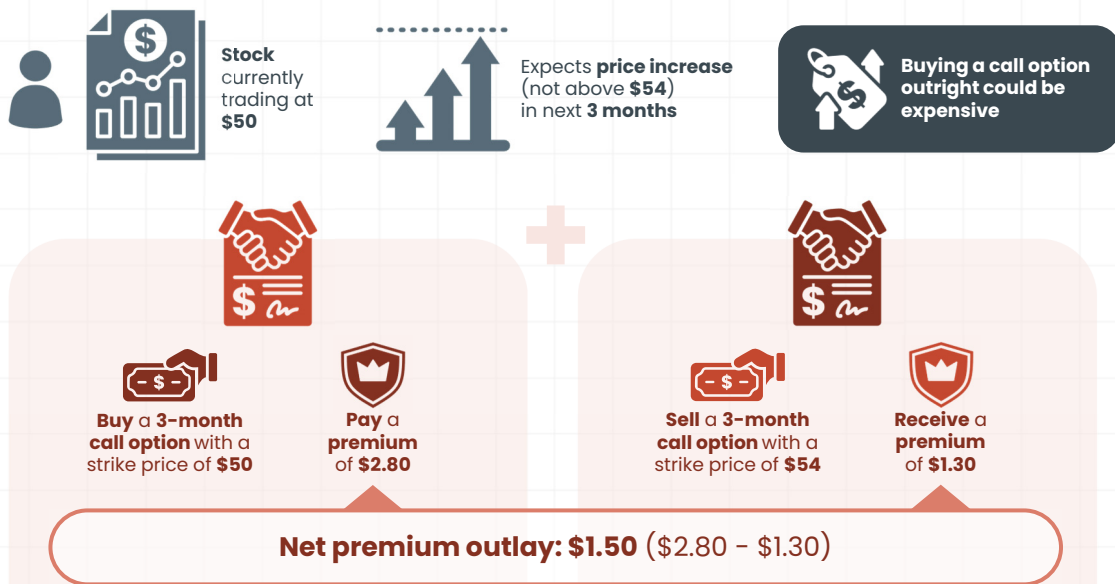


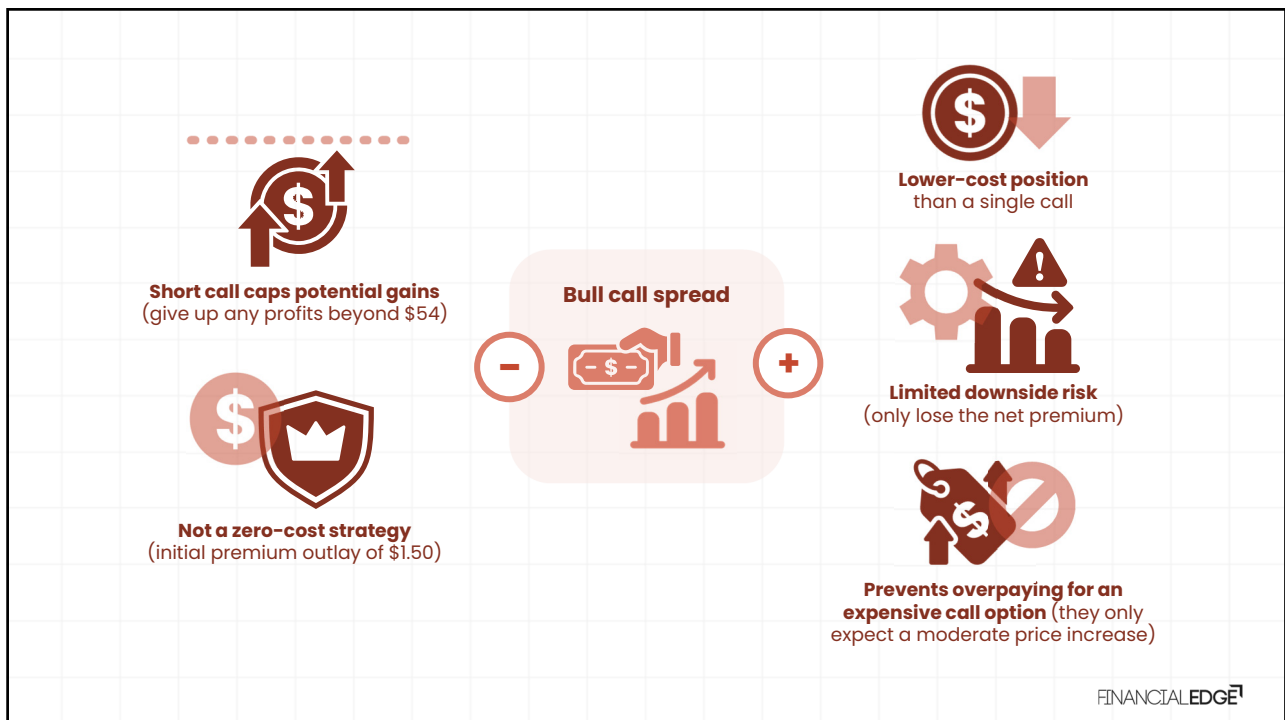
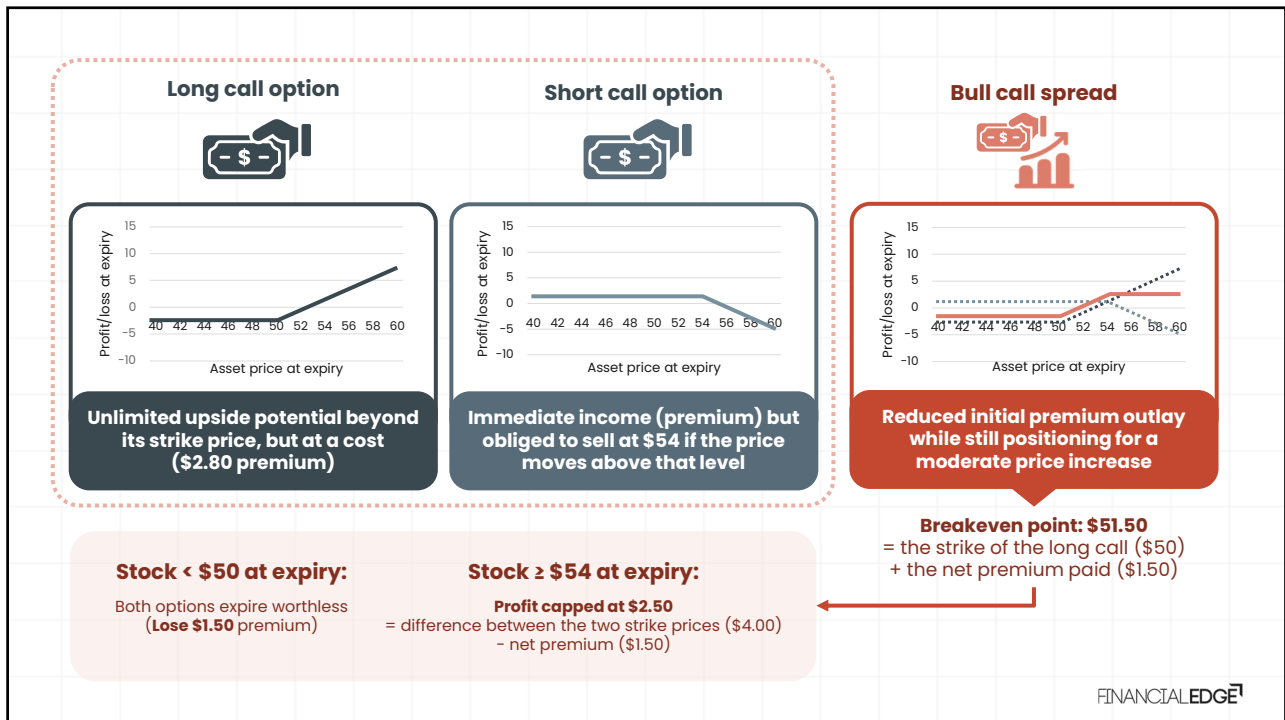


Bull call spread



Used by traders who **expect a moderate increase in the underlying asset's price** but want to **reduce their upfront premium** compared to buying a call option outright

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Volatility Strategies



Profit and loss
**depend on the
magnitude**
of the asset's
price movement
(not its direction)

Directional Strategies



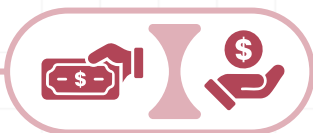
Collars



Vertical
spreads

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Straddle



Simultaneous long call and put option
(same underlying asset, strike price, and expiration dates)

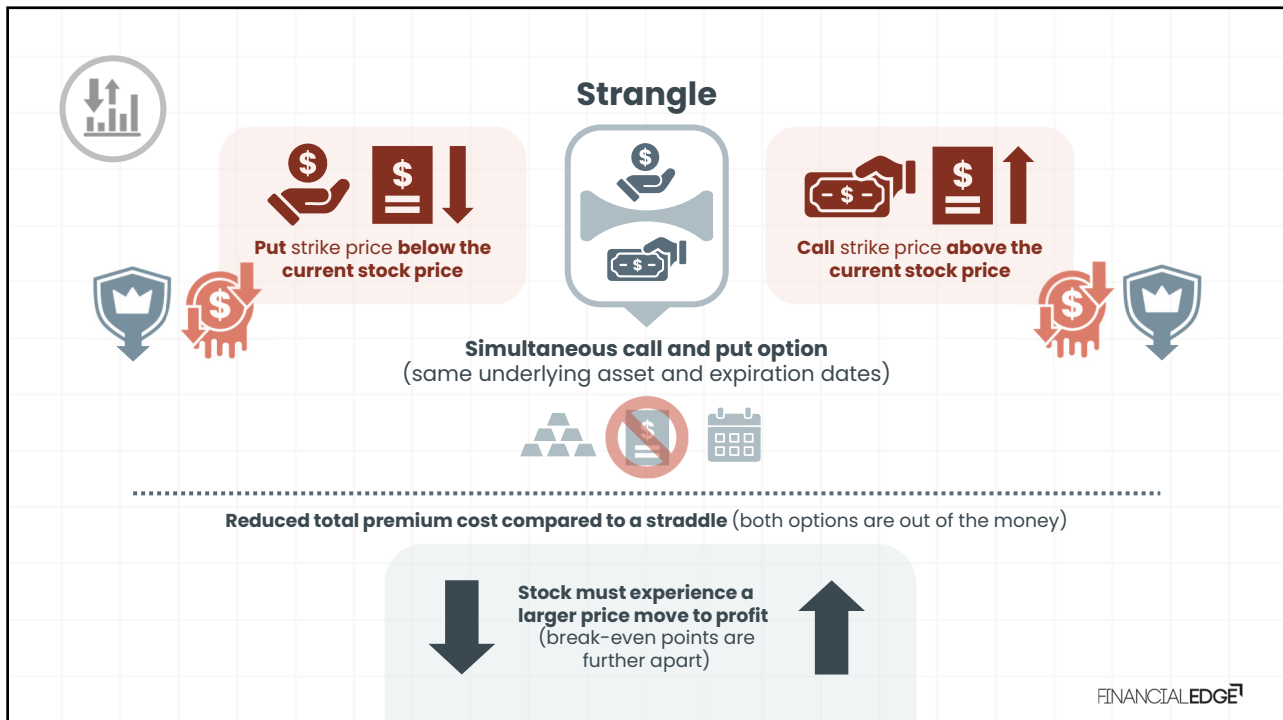



Profits if the stock moves significantly in either direction




Stock **must move far enough to cover the cost (Premium)**

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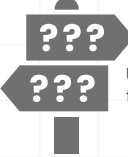





Long straddle




Expects **significant movement** over the next **3 months**



Unsure about the **direction**




Stock trading at **\$50**




Buy a 3-month \$50 call option for a \$2.80 premium

+




Buy a 3-month \$50 put option for a \$2.80 premium



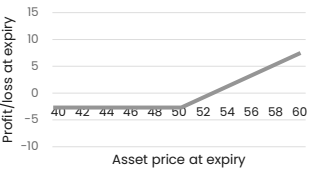
\$5.60 total net premium outlay

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Long call option




Profit/loss at expiry



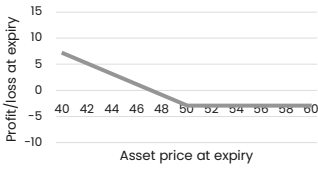
Asset price at expiry

Unlimited upside potential if the stock rallies

Long put option




Profit/loss at expiry




Asset price at expiry

Benefits from a sharp decline

Long Straddle



Profit/loss at expiry



Asset price at expiry

Gains exposure to a large price move in either direction

Stock moves significantly above or below \$50:

One option becomes profitable while the other expires worthless (profits of **\$55.60 on the upside** and **\$44.40 on the downside**)

Stock remains close to \$50:

Both options decay in value (trader suffers a **loss equal to the premium paid**)

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