

# OPTIONS WORKSHOP

Spring '17

# BRAINTEASER

How many trailing zeros are in 100 factorial (100!  
= 100 \* 99 \* 98 \* ... \* 2 \* 1)

# SOLUTION

A trailing zero is formed when a multiple of 5 is multiplied with a multiple of 2. Now all we have to do is count the number of 5's and 2's in the multiplication.

Let's count the 5's first. 5, 10, 15, 20, 25 and so on making a total of 20. However there is more to this. Since 25, 50, 75 and 100 have two 5's in each of them ( $25 = 5 * 5$ ,  $50 = 2 * 5 * 5$ , ...), you have to count them twice. This makes the grand total 24.

# WELCOME!

Options 101

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A few things before we start....

# Expectations

1

## INTELLECTUAL HONESTY

Raise your hand if you don't know what's going on – it's okay!

1

## Typos / Misspeak

Please correct me if this happens – I will respect you more for that

2

## TAKE NOTES

I will go over a lot – and it is probably best to write some of the stuff down

2

## Purposeful Approximation

Purposefully approximate definitions or teachings for the sake of simplifying tough concepts

3

## PARTICIPATION

I will be sprinkling some questions between the slides – don't be afraid to be wrong (:

3

## Less Math / More Intuition

I'm not a math guy, and I know some of you aren't as well. If you are – come talk to me, I can teach you the math too.

## Definition of an Option

# Option Definition:

An option is a contract which gives the buyer (the owner or holder of the option) the right, but not the obligation, to buy or sell an underlying asset or instrument at a specified strike price on a specified date.

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# OKAY, LET'S BREAK DOWN THIS DEFINITION...

RIGHT

UNDERLYING  
ASSET

STRIKE PRICE

Right – I don't have to buy or sell the asset if I don't want to (i.e. option is not exercised)

Underlying Asset – What is the option on? Is it on AAPL Stock?

Strike Price – Parties will agree on a set price... Example: I want to the right to buy AAPL stock at 150 dollars for the next 100 days.



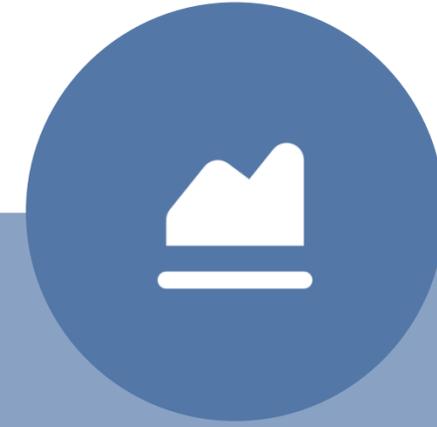
## BUY CALL

The right to buy underlying at a specific strike price for a specified time.



## BUY PUT

The right to sell underlying at a specific strike price for a specified time.



## WRITING (SELL OPTION)

You are selling the right to someone – which means you **MUST** take obligation. You can sell both a put and call.

# THREE EXAMPLES

BUY AAPL STOCK @ 130

BUY CALL @ 130 STRIKE

This will cost something (~\$1 for 5 day option)

BUY PUT @ 130 STRIKE

This will cost something (~\$1 for 5 day option)

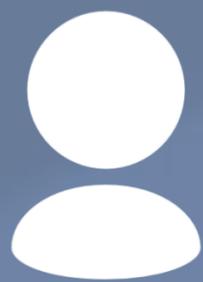
What happens when AAPL Stock goes to 120, 130, 140?

# ANOTHER EXAMPLE

IS BUYING A 130 STRIKE CALL THE SAME AS SELLING A 130 STRIKE PUT?

PREVIOUS CLOSE  
24.91  
TOTAL VOLUME  
823.149

24.91  
24.14  
25.88  
25.16  
24.66  
24.00



OPTIONS CHAIN



## Volatility

More on this later (quant guys use options for vol)

REASON 3

## LEVERAGE

Cheaper to buy calls/puts than stock

REASON 2

## PROTECTION AND HEDGING

Used to protect downside (think of payoff)

REASON 1

# USE OF AN OPTION

There are many reasons to buy an option instead of stock.

# EVAN THE OIL PRODUCER

## ▶ What should Evan do?

As an oil producer (who doesn't want to worry about uncertainty of oil prices), Evan wants to hedge its oil exposure through options. What should he do?

BUY CALL?

BUY PUT?

SELL CALL?

SELL PUT?



# ROHAN THE SPIV

## ▶ What should Rohan do?

Rohan put all his life savings to buy Yahoo stock (YHOO). If Verizon walks away from Yahoo merger, the stock is sure to go down a lot. How can Rohan protect himself on the downside?

BUY CALL?

BUY PUT?

SELL CALL?

SELL PUT?



# LEVERAGE

**Leveraging** is creating potential for bigger gains using a smaller amount of capital. For the investor, however, buying options provides inherent financial leverage. Without needing to use borrowed capital, by investing in options, you can control a **larger number of shares** for the same **initial investment**, than if you purchased the shares themselves.

# EUROPEAN VS. AMERICAN



## AMERICAN

- Can exercise the option at any time
- Nearly all exchange traded options are American

## EUROPEAN

- Can only exercise at expiry
- Most index option are European

Exercising means converting the option into the stock with an entry price at the strike price. Note: Don't mistake exercising an option with selling the position. You may not be able to exercise a European option, but you can sell your position by selling the option any time you want.

# MONEYNESS

## Out of the Money

**Out of the money** (OTM) is term used to describe a call option with a strike price that is higher than the market price of the underlying asset, or a put option with a strike price that is lower than the market price of the underlying asset.

## At the money

**At the money** (ATM) is a situation where an option's strike price is identical to the price of the underlying security. Both call and put options are simultaneously at the **money**. For example, if XYZ stock is trading at 75, then the XYZ 75 call option is at the money and so is the XYZ 75 put option.

## In the money

**In the money** (ITM) is term used to describe a call option with a strike price that is lower than the market price of the underlying asset, or a put option with a strike price that is higher than the market price of the underlying asset.

If AAPL is trading at 130 would an 80 Strike Call be ITM, OTM, or ATM. What if AAPL Traded at 60? 80?



Intrinsic Value: How much ITM the option is  
Extrinsic Value: The rest of option's value is attributed to extrinsic value (time value)

## Value of an Option

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There is something called the Black-Scholes options pricing model, but let's divide the value in a simpler manner: intrinsic and extrinsic.

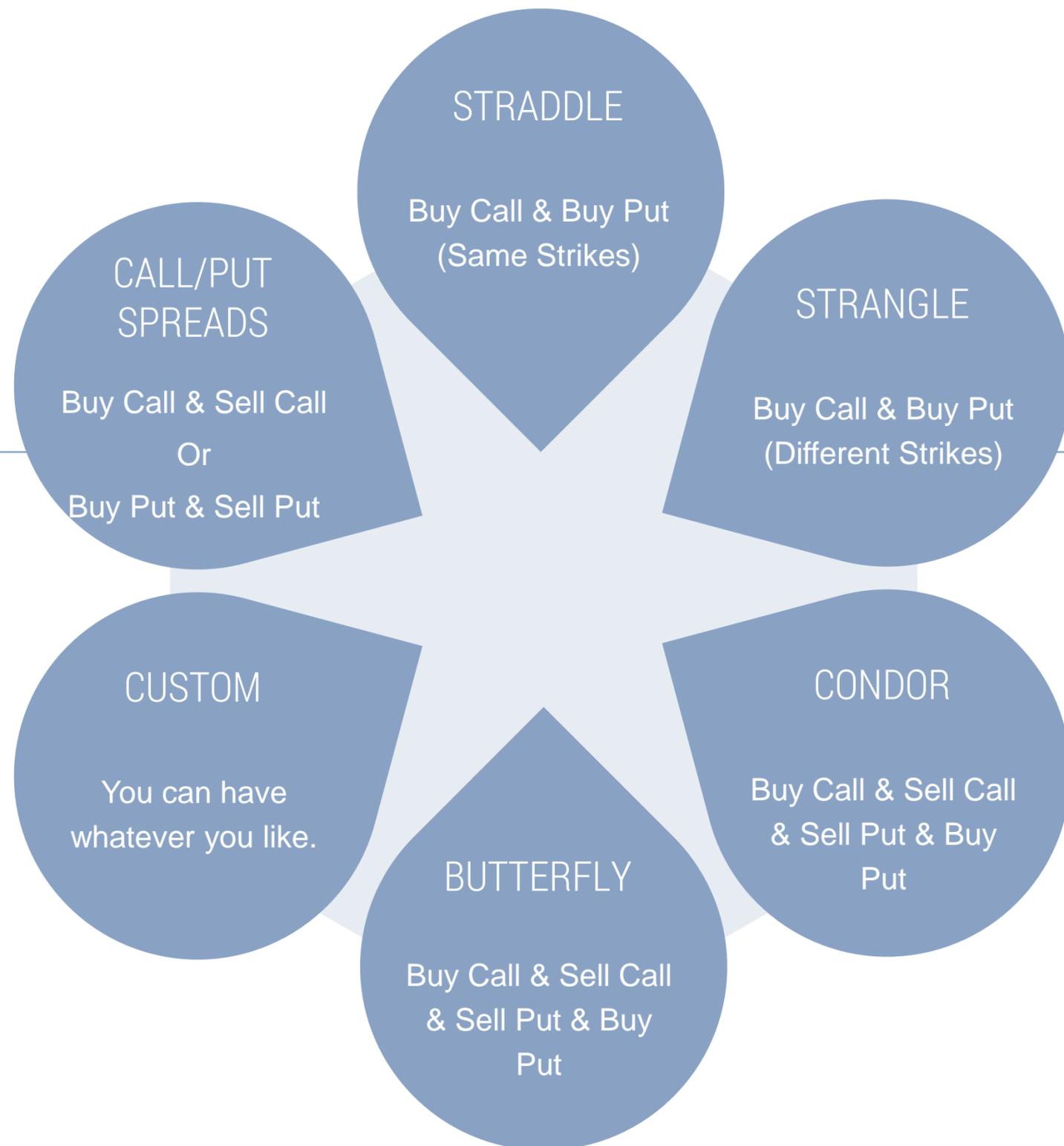
# PRACTICE QUESTIONS

Why does a call with strike 100 but underlying trade at 110 necessarily have to cost more than \$10?

What is the intrinsic value of an option with strike 110 and underlying trades at 100, with option price costing 3 dollars?

What is the extrinsic value of an option with strike 110 and underlying trades at 100, with option price costing 3 dollars.

# 6 OPTIONS STRATEGIES



## ► VARIETY OF EXPRESSIONS

Different strategies allow to customize trade expression to cater any investors needs

## ► WHAT RISKS DO YOU WANT?

Some strategies are riskier. We will go into risk sensitivities next lecture (1<sup>st</sup> Derivative and 2<sup>nd</sup> Derivative Greeks).

# STRADDLE

## BUY ATM CALL & ATM PUT

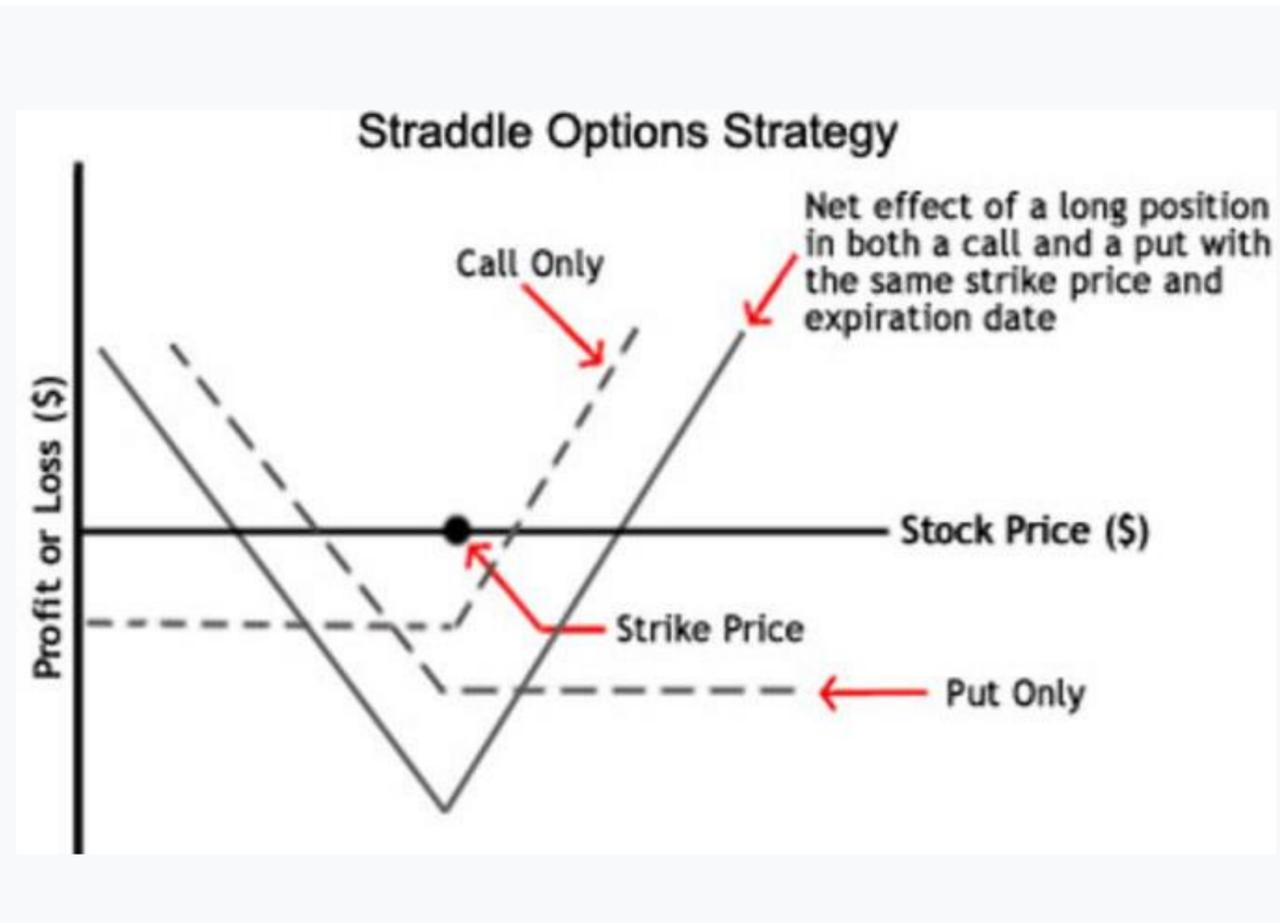
The result of buying the two leads to a V-Shape

## NON-DIRECTIONAL VIEW

You can make money if the underlying moves in either direction

## LONG VOLATILITY VIEW

You want higher volatility (greater movements up or down)



# STRANGLE

## BUY OTM CALL & OTM PUT

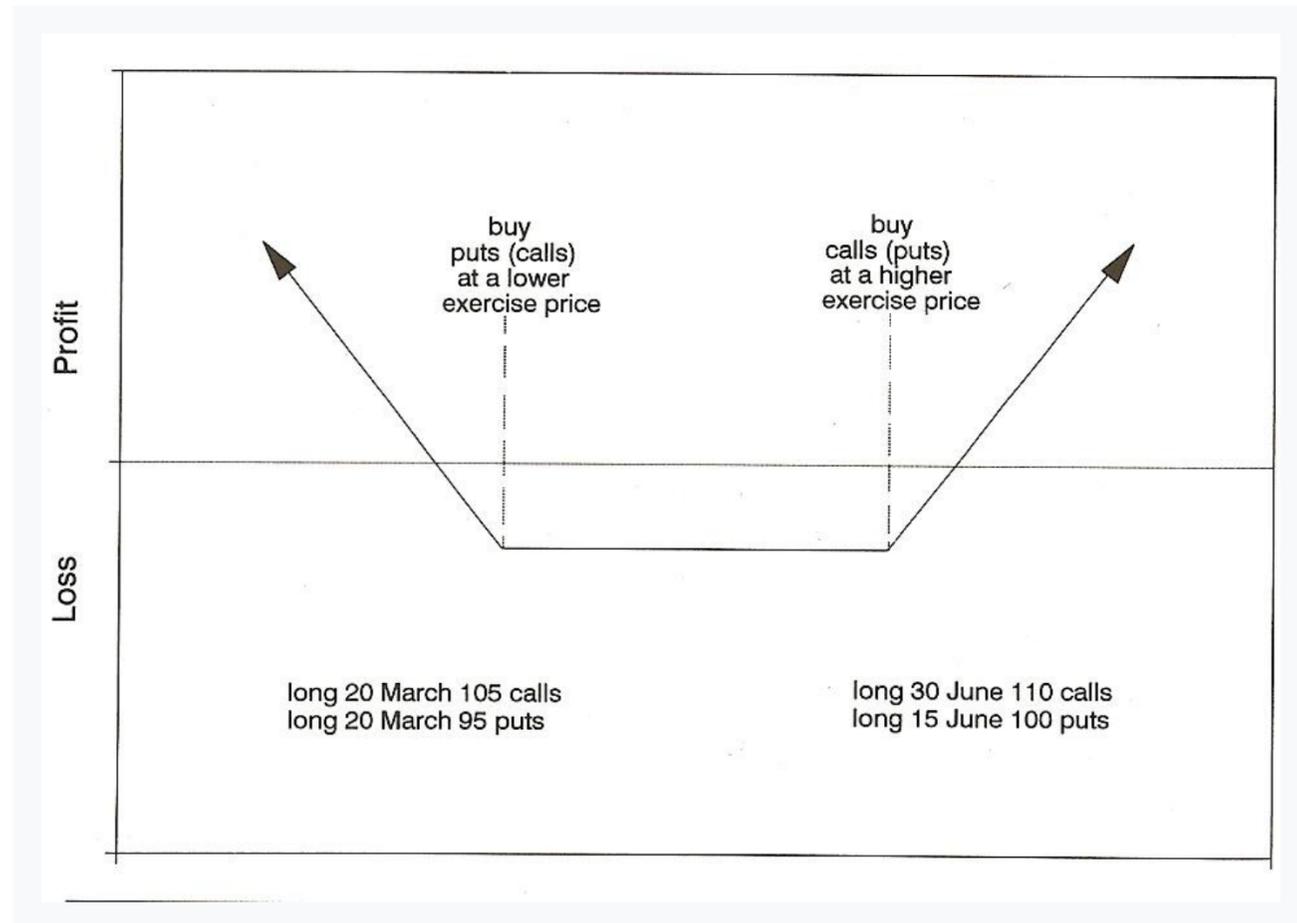
The result of buying the two leads to a U-Shape

## NON-DIRECTIONAL VIEW

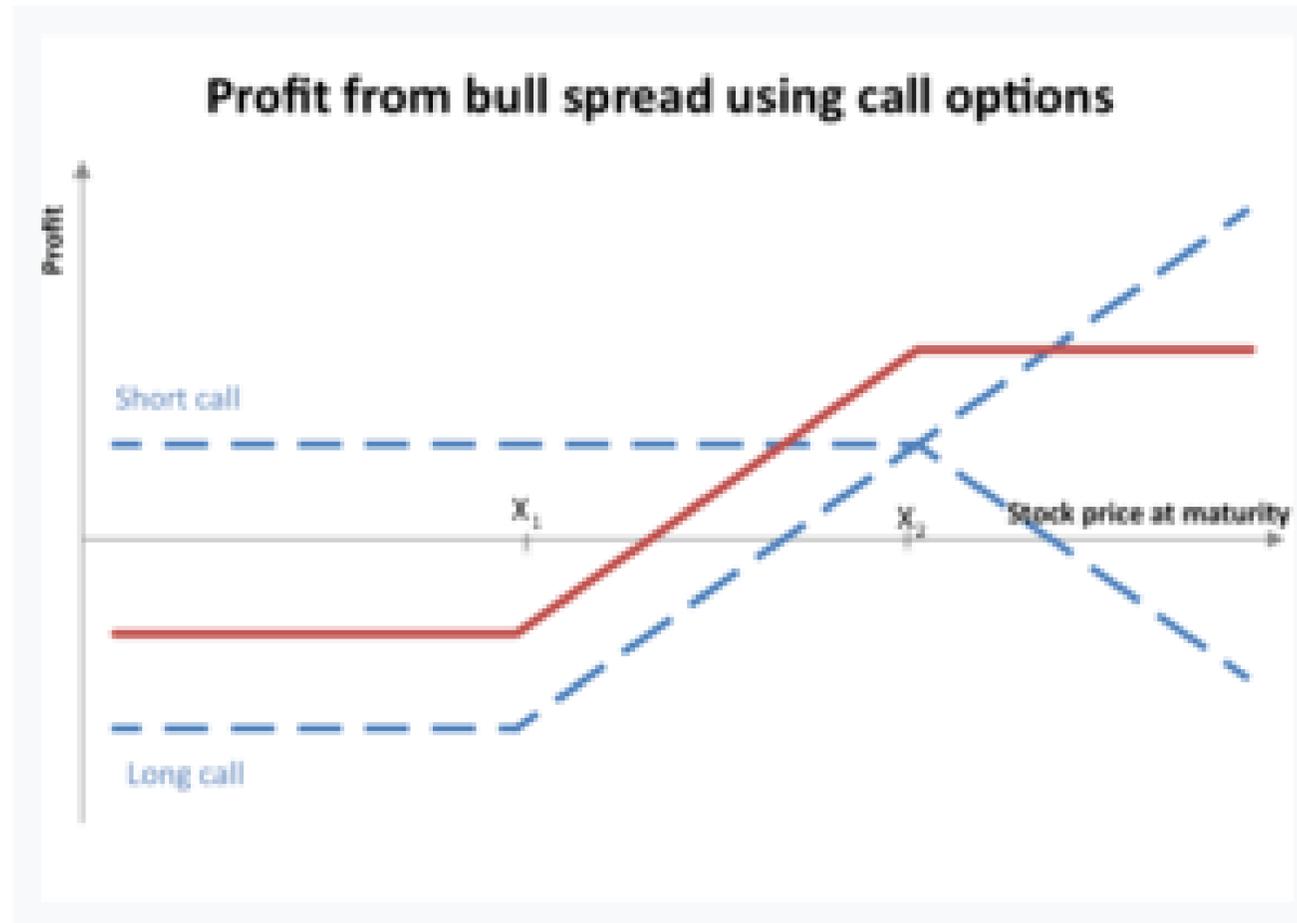
You can make money if the underlying moves in either direction

## LONG VOLATILITY VIEW

You want higher volatility (greater movements up or down)



# OPTION SPREADS



## BUY LOWER STRIKE / SELL HIGHER STRIKE CALL

The result is limited downside, but you also sold your upside

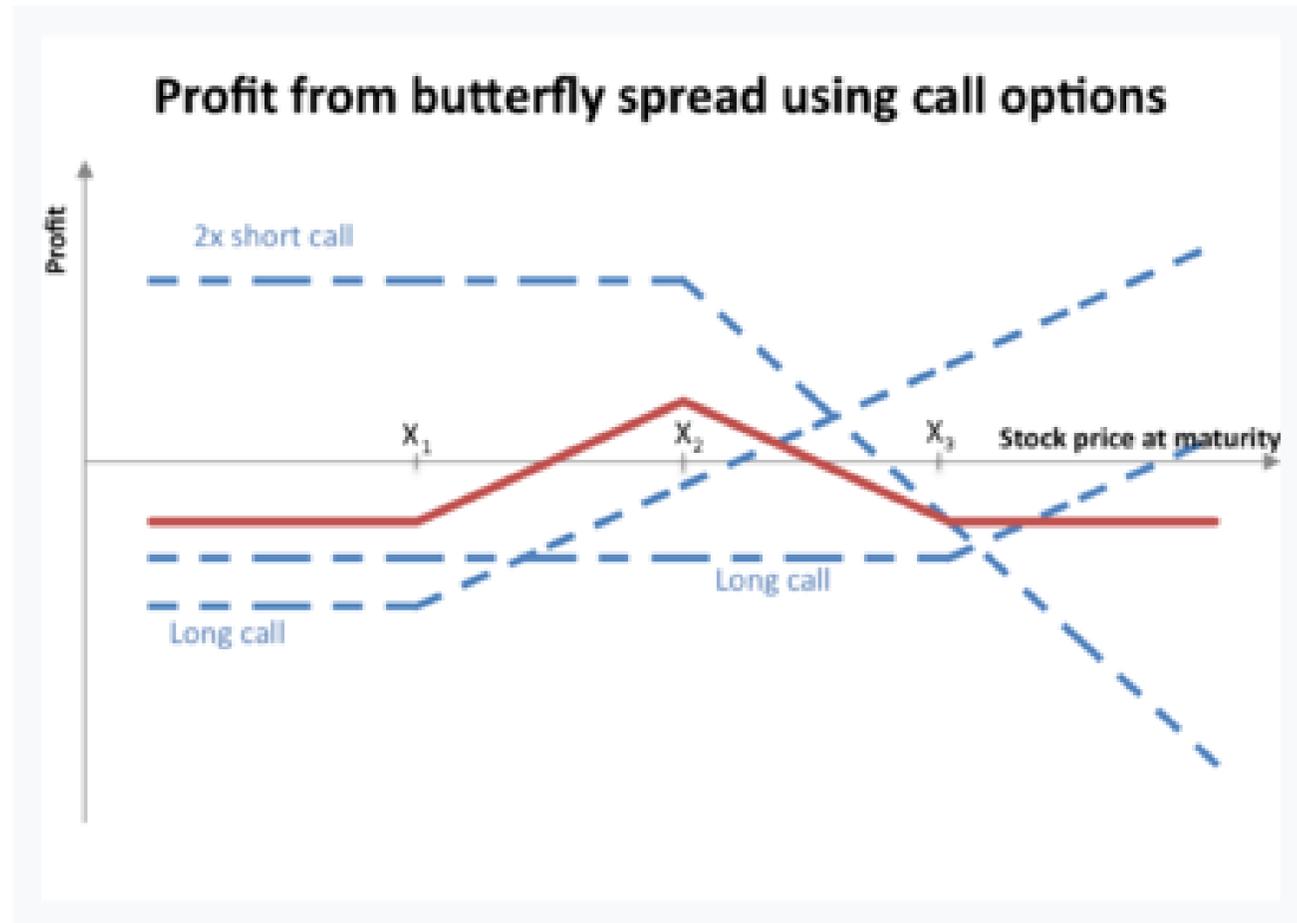
## DIRECTIONAL VIEW

For this particular option spread, you are bullish on underlying but think there won't be a large movement up though

## VOLATILITY VIEW

Not really a view on volatility – but benefit as volatility decreases as you are more correct.

# BUTTERFLY



- ▶ **LONG 1x ITM CALL, SHORT 2x ATM CALL, LONG 1x OTM CALL**  
You can also build it through puts or a combination of puts and calls as well
- ▶ **NON-DIRECTIONAL VIEW**  
You don't really care if it goes up or down – you can still make money
- ▶ **SHORT VOLATILITY VIEW**  
So long as the underlying doesn't move up or down a lot, you stand to make money on the strategy

# CONDOR

## ► SIMILAR TO BUTTERFLY

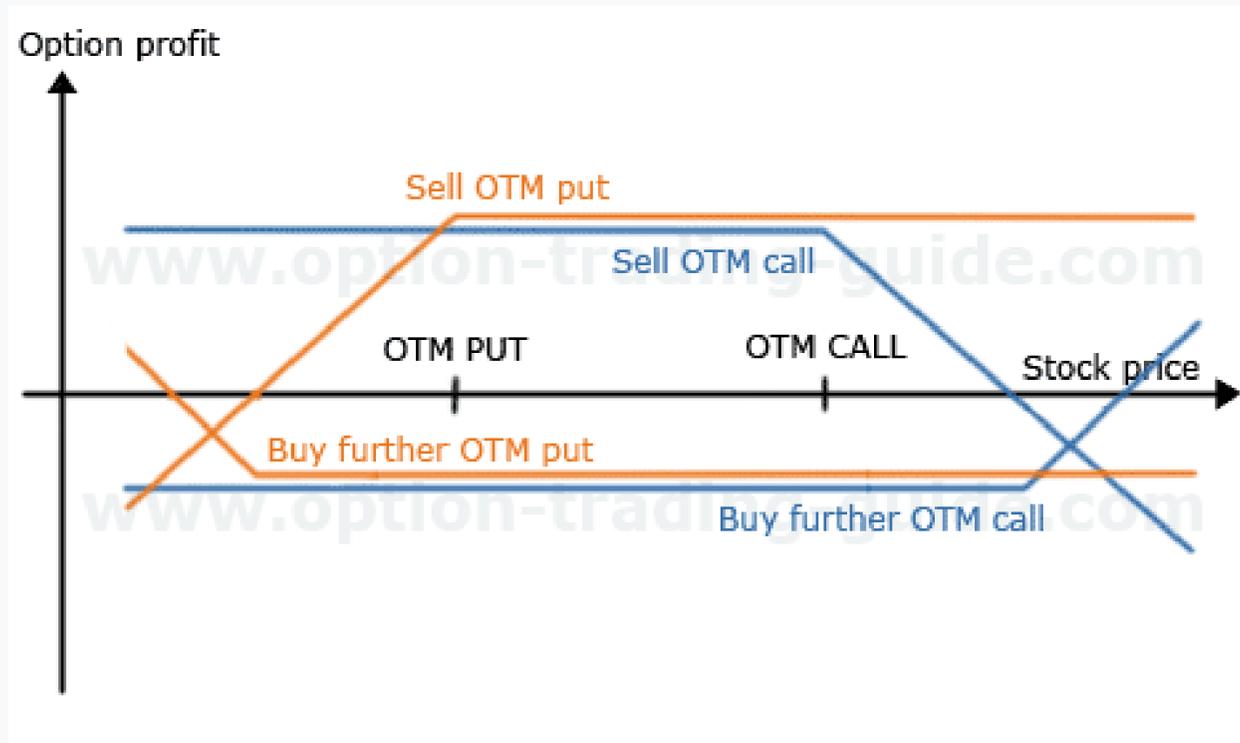
You can also build with just puts or just calls as well

## ► NON-DIRECTIONAL VIEW

Doesn't matter which direction the underlying moves

## ► VOLATILITY VIEW

Like butterflies, we are also short butterflies



# NEXT WEEK

BLACK SCHOLES



ASSUMPTIONS  
OF B/S MODEL



OPTION GREEKS



SKEW



PUT / CALL  
PARITY



OPTIONS PITCH

