

Introduction to Options



Overview

- An overview of options
 - Calls
 - Puts
- Advantages options offer
- Potential risks to consider

- We will focus on examples rather than abstract concepts to explain options

Key terms and concepts

- Call
- Put
- Buyer
- Seller
- Exercise price
 - aka strike price
- Expiration date
- Exercise
- Assignment
- Expire worthless
- Premium
- In-the-money
- At-the-money
- Out-of-the-money

Options can be used to:

- Increase leverage to allow for gains of 100%, 200% or more with limited capital
- Benefit from uptrends
- Benefit from downtrends
- Predefine levels of potential risk in dollar terms

Options

- An option contract provides the buyer with the right to buy or sell or a stock or ETF at a predetermined price for a specific period of time
 - Option buyers have the right to buy or sell a stock but are under no obligation to do so
 - Each contract typically covers 100 shares
- Calls provide buyers with the right to buy stock
- Puts give buyers the right to sell stock
- Options sellers incur an obligation to buy or sell
 - Option selling is also known as writing options

Call

- A call option gives the buyer the right to buy a stock at a predetermined price before a predetermined date
 - Predetermined price is known as the strike price of the option or the option's exercise price
 - Predetermined date is known as the expiration date of the call

Intel (INTC) May \$35 call is a contract to buy 100 shares of INTC before May 19 at a price of \$35

INTC May \$35 call

- Call buyers can profit when the stock rises
- The buyer has the right to buy INTC at \$35
 - If INTC is trading above \$35 on the expiration date, this option will have a value equal to the amount above \$35
 - At \$40, this call will be worth \$5
 - One month before expiration, INTC is at \$36 and the call is trading at \$2 (the premium). If INTC moves up to \$40, the option will be worth at least \$5 and the call buyer earns a 150% profit on an 11% move in the stock
 - Below \$35 the option expires worthless
 - If the stock is at \$30 when the option expires, the call buyer would lose \$2 while the shareholder loses \$6

Put

- A put option gives the buyer the right to sell a stock at a predetermined price before a predetermined date
 - Predetermined price is known as the strike price of the option or the option's exercise price
 - Predetermined date is known as the expiration date of the call

INTC May \$35 put is a contract to sell 100 shares of INTC before May 19 at a price of \$35

INTC May \$35 put

- Assume INTC is at \$36 with a month to expiration
- The put buyer has the right to sell INTC at \$35
- This put is trading at about \$1.25
- Buyer profits if INTC falls below \$33.75 ($\$35 - \1.25)
 - At \$32 the put is worth at least \$3 with a gain of at least \$1.75 and the profit is 40% on an 11.1% decline in the stock
 - If INTC is above \$35 at expiration, the put is worthless
- Put buyer can profit if stock declines

Expiration dates

- There are monthly and weekly options
- Monthly options expire at the close on the third Friday of the month
 - Usually there are three or four contracts trading at any time
- Weekly options expire at the close on any Friday
 - Available for most active stocks. Usually available for each week through the next two months
- LEAPS are long-term options expiring in January up to two years in the future

After entering a trade, one of three things must happen

- Options
 1. Expire worthless
 2. Are exercised
 3. Or are closed
- Worthless options are out-of-the-money (calls with strike prices below the market price and puts with strikes above the market price)
- Buyers may exercise options and buy shares if they owned calls or sell shares if they own puts
 - Sellers are required to meet their obligations if the buyer exercises their right
 - Options will only be exercised if they are in-the-money
- Options can also be closed prior to expiration
 - Buyers sell to close the contract
 - Sellers buy to close the contract

Moneyness

- Moneyness describes the relationship between the stock's current market price and the option's strike price
- If the strike price of a call option is less than the current market price of the stock, the call is "in-the-money"
 - This means the holder of this call has the right to buy the stock at a price less than the price he would pay to buy the stock in the stock market and immediately realize a profit
 - A \$40 call is in-the-money with the stock at \$50
- For puts, an option is in-the-money when the strike price is greater than the current market price of the underlying security (a \$40 put is in-the-money with the stock at \$30)
- The opposite of in-the-money is out-of-the-money
- If the strike price equals the current market price, the option is said to be at-the-money

Moneyness defines intrinsic value

- The amount that an option is in-the-money at any time is called intrinsic value
- An at-the-money or out-of-the-money option has no intrinsic value
- The amount that an option's total premium exceeds intrinsic value is known as the time value
 - Premiums are determined by moneyness, volatility, interest rates, dividend amounts and the amount of time to expiration
- \$50 call trading at \$5.50 on a \$55 stock has an intrinsic value of \$5 and a time premium of \$0.50
- \$50 put trading at \$5.50 on a \$45 stock has an intrinsic value of \$5 and a time premium of \$0.50

Moneyness (with examples)

- **Calls**

- In-the-money = strike price (\$45) less than stock price (\$50)
- At-the-money = strike price same as stock price
- Out-of-the-money = strike price (\$45) greater than stock price (\$40)

- **Puts**

- In-the-money = strike price (\$45) greater than stock price (\$40)
- At-the-money = strike price same as stock price
- Out-of-the-money = strike price (\$45) less than stock price (\$40)

Example: a gain on buying a call

- Buy INTC May \$35 call at \$2
- INTC moves to \$37 and the call is now worth \$3
 - Pricing of options is detailed later in this video
 - Profit is \$1 (50%)
- Call buyer can exercise their call and take delivery of the shares by paying \$3,500 ($\$35 * 100$)
 - They could then resell the shares for \$3,700 (5.7% profit)
- Call buyer can sell the call at the market price to capture the \$1 profit and this position is then closed

- If INTC is below \$35 at expiration, the call is worthless and no action is required
- If INTC is above \$35 at expiration and the contract is open, shares will be delivered to your account (this is easy to avoid by selling to close the option)

Orders for call trades

- To open a position, you can place a “buy to open” order with your broker using a market or limit order
- To close the position, you would then place a “sell to close”

- To open a position by selling an option, you use a “sell to open” order
- Closing this trade would require a “buy to close” order

- At expiration, worthless options are dropped from your account, no action is required
- At expiration, options with value will be exercised and cash withdrawn to pay for the shares (easy to avoid)

Example: a gain on buying a put

- Buy INTC May \$35 put at \$1.25
- INTC moves to \$40 at expiration and the put is now worthless
 - The put is worthless at expiration for any market price above \$35
- INTC falls to \$33 and the put is worth \$2.50 for a 100% gain
- Put buyers can exercise their options and deliver shares if they own them and the stock is trading below the put strike price
 - If you buy a \$35 put and the stock falls to \$30, you can “put” your shares to the seller and collect \$3,500 ($\$35 * 100$)

Order types for put trades are the same as for calls

- To open a position, you can place a “buy to open” order with your broker using a market or limit order
- To close the position, you would then place a “sell to close”

- To sell a call, you use a “sell to open” order
- Closing this trade requires a “buy to close” order

- At expiration, worthless options are dropped from your account, no action is required
- At expiration, options with value will be exercised and cash withdrawn to pay for the shares (easy to avoid)

Reasons to trade options

- Leverage
 - A small investment in one contract can benefit from the ownership of 100 shares. Example: a \$2 call costs \$200 and could be equivalent to owning \$5,000 or more in stock
- Limited risk when buying options
- Income
 - Some option strategies generate income from stocks you own
 - Other option strategies generate income from high probability trades

Risks to consider

- Option sellers face unlimited risk in theory
 - In practice, the risks are very large and risk management is an important consideration
 - It is possible to lose more than you have in your account if you don't manage risk properly
 - Options can be exercised early so there is some degree of risk the entire time the contract is open
 - Precision Profits does not sell options and avoids this risk
- Option buyers can lose 100% of their investment
 - Usually small in dollar terms; often less than \$3 or \$300 per contract and frequently less than \$1 or \$100 per contract

Options for bulls and bears

	Bull	Bear
Calls	Buy to open	
Puts		Buy to open

	Rewards	Risks
Call buyers	Unlimited upside	Limited to amount invested
Put buyers	Maximum gain is limited to the strike price minus the premium paid	Limited to amount invested

To get started in options

- You will need approval from your broker
 - Usually requires you to complete a form detailing your assets and investing experience
 - Each broker sets their own requirements for approving accounts at different levels
- Based on experience and assets, you can be approved for trading at one of five levels (levels vary by broker)
 - Level 1: Covered call selling is allowed
 - Level 2: Buying calls and puts is allowed
 - Level 3: Spread trading is allowed
 - Level 4: Selling naked equity options is allowed
 - Level 5: Selling naked index options is allowed

Select a broker

- Commissions and fees can vary considerably
 - From \$1 a contract to \$15 or more per contract
- Customer service also varies considerably
 - Low-cost brokers tend to have less service, including no phone reps to assist you
 - If you need more help, expect to pay more at a high service broker
- You can always switch later so you could start at a broker who offers fewer services switch to a lower cost broker after gaining experience



Why use options?



Double, triple or even quadruple the
return of your portfolio

Overview

- Options provide a trading strategy that uses options to leverage your portfolio and limits risk to precise levels
 - We will look at the alternatives in this video

Leverage

- Leverage involves increasing your exposure to the market
- Example: a margin account offers 100% leverage
 - In a margin account you borrow money from your broker
 - If you own \$10,000 worth of stock, you can buy another \$10,000 worth of stock
 - If stocks go up 10%, you make \$2,000, a 20% gain on your \$10,000
 - A 10% decline means there is 20% loss on your \$10,000 and you still owe your broker the full \$10,000 you borrowed (plus interest)

Margin accounts carry costs

- You pay interest on the money borrowed
 - Can be low at deep discount brokers but larger discount brokers charge a relatively high rate
- This interest compounds and lowers the benefits of margin
- Margin is useful but is not free

Call options are an alternative

- Call options are equivalent to owning the stock for a period of time
 - All options expire but this can be handled with a trade plan
- Call options cost less than owning the stock
- Call options offer more leverage than a margin account
- Call options do not require you to pay interest to your broker
- Call options provide a strictly defined risk in dollar terms

Example: calls as a short-term strategy

- Scenario: Travelzoo (TZOO) is reporting earnings in one week. On average, the stock gains 6.1% in the week after this announcement. The largest gain and loss have both been more than 25%.
 - We want to find the best trading strategy assuming we can see an average return, a gain of 25% or a loss of 25%

Alternative 1: Long stock

- Buy 100 shares TZOO @ \$8 for \$800
 - Gain of 6.1% results in a gain of \$48.80
 - Gain of 25% results in a gain of \$200
 - Loss of 25% results in a loss of \$200
- Risk is high

Alternative 2: Long on margin

- Buy 200 shares TZOO @ \$8 for \$800 using margin
 - Gain of 6.1% results in a gain of \$97.60
 - Gain of 25% results in a gain of \$400 (50%)
 - Loss of 25% results in a loss of \$400 (50%)
- Risk is even higher

Alternative 3: use calls options

- Option expiring in one month with a strike price of \$8 is trading for \$0.35. Ignore commissions in example
- Buy 1 \$8 call for \$35
 - Gain of 6.1% moves TZOO to \$8.49. Call is worth at least \$0.49 with a \$0.14 profit, results in a gain of \$14 (40%)
 - Gain of 25% moves TZOO to \$10. Call is worth at least \$2.00 with a \$1.65 profit, results in a gain of \$165 (371%), nearly quadrupling the rewards
 - Loss of 25% moves TZOO to \$6. Call is worth at nothing, results in a loss of \$35 (100%)
- You could trade multiple contracts to boost potential returns
 - 5 contracts cost \$175 and offer gains up to \$825
- Risk is low and fixed in dollar terms

Example: Calls as a long-term strategy

- Scenario: AAPL is trading at \$130 and you believe the stock should increase to at least \$145 in one year
 - We want to find the results for different trading strategies assuming AAPL is unchanged, gains 35% or loses 10%.

Alternative 1: long stock

- 100 shares @ \$130 costs \$13,000
- If AAPL is unchanged, you collect \$2.28 in dividends for a return of \$228 (1.8%)
- If AAPL gains 35%, the stock price goes to \$175.50 and you earn \$4,778 (36.8%) including dividends
- If AAPL loses 10%, the stock falls to \$117 and you have a loss of 8.2% after dividends

Alternative 2: Long on margin

- Buy 200 shares AAPL @ \$130 for \$13,000 using margin at a 2% interest rate
- If AAPL is unchanged, you collect \$5.56 in dividends for a return of \$556 and pay \$260 in interest, a total return of 2.3%
- If AAPL gains 35%, the stock price goes to \$175.50. Your 200 shares are worth \$35,100 or \$35,396 after dividends and interest. You owe \$13,000 so your gain is 72.3%
- If AAPL loses 10%, the stock falls to \$117 and you have a loss of 17.7% after dividends and interest

Alternative 3: long-term options

- You believe the stock will gain more than 35% in the next year. There is an option expiring in twelve months that allows you to trade this idea
- The \$130 call is trading at \$11.75 and will cost \$1,175
 - If AAPL is unchanged or trading below \$118.25, you lose \$1,175
 - If AAPL gains 35%, with the stock at \$175.50 the call is worth at least \$45.50, a gain of \$3,375 (287%) and your rewards are tripled relative to the margin strategy and 6.7x larger than the shareholder earns

Selecting options

- There will always be different expiration dates and different strike prices
 - The decision of which one is best truly depends on your risk tolerance and market opinions but we can provide a general framework
- Expiration dates: if you have a short-term opinion, use short-term options to minimize time premium. Long-term opinions should use long-term options if they provide adequate potential returns
 - If the potential gains are not high enough, find another trade

Selecting strike prices: one common technique is to consider the reward/risk ratio

- Set a target price for the stock
 - Subtract strike price from target to find minimum value of option at target price
- Subtract current price of option from minimum value to determine potential reward
 - Use midpoint of bid and ask to find current price
- Divide potential reward by price of call (risk)
- Highest ratio shows highest potential reward per unit of risk

This approach is popular, but flawed

- Potential rewards rise as we move out-of-the money
 - We know out-of-the-money options costs less than in-the-money options
- Finding the probability of success might be the best way to find the best option for you to trade
 - Define your comfort level and trade at that risk level

Probability of success

- Options pricing models allow us to determine the probability an option will be in-the-money at expiration
 - Expressed as a percentage
- Balance the potential rewards with the probability of success to find your personal comfort zone
 - For example, require an 80% probability of success or maximize trading opportunities with a 50% probability

Finding the probability of success

- This is based on a floor trader method
- Use the delta of the option to find the likelihood of success
- Delta is calculated in the options calculator
<http://goo.gl/0WThht>
- Delta of a call will be between 0.00 and 1.00; puts are between -1.00 and 0.00
- The probability a call will be in-the-money at expiration is equal to the delta as a percentage
- The probability of a put being in-the-money at expiration is equal to the absolute value of the delta of the put

Bottom line

- Options are a flexible and powerful tool
- Risks can be managed
- Profits can be significant
- These are not “buy and forget” investments, you need to follow open option trades at least weekly and ideally daily
- You can use a call option instead of owning a stock or a put option to benefit from a selloff
 - This could double, triple or even quadruple the return of your portfolio



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Option prices



Overview

- Understanding option quotes
- Valuing options
- Using pricing models to trade options

Options: a quick summary

- An option contract provides the buyer with the right to buy or sell or a stock or ETF at a predetermined price for a specific period of time
 - Option buyers buy a right but incur no obligations
 - Option buyers always have a predetermined amount of risk in dollar terms
- Calls provide buyers with the right to buy stock
- Puts are the right to sell stock

Options quote: AAPL170421C001450000

AAPL170421C00145000

OPR - OPR Delayed Price. Currency in USD

[★ Add to watchlist](#)

1.26 +0.43 (+51.81%)

As of 11:21AM EST. Market open.

Summary

Previous Close	0.83	Expire Date	2017-04-21
Open	0.98	Day's Range	0.92 - 1.27
Bid	1.26	Contract Range	N/A
Ask	1.28	Volume	3,742
Strike	145.00	Open Interest	11.36k

Symbol: AAPL170421C001450000

Underlying symbol: AAPL

Expiration date: 170421 (April 21, 2017 in YYMMDD format)

C = Call, this would be P for a put

001450000 is the strike price of \$145 the format is \$XXXXX.XXX which provides for strike prices as high as \$99,999.999 with three decimal place

AAPL170421C00145000

OPR - OPR Delayed Price. Currency in USD

[★ Add to watchlist](#)

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Quotes

- Include the price of the last trade (\$1.26) and the change from the previous close (+\$0.43)
- Bid prices are what you can sell at (\$1.26)
- Ask prices are what you can buy at (\$1.28)
- Volume (3,742) shows today's trading activity
- Open interest (11,360) shows total number of contracts open in that specific option

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Bid and ask prices are important

- These are the prices a market order should be executed at
- You could set a limit price using the bid and ask to ensure you get a fair price on your trade
- The spread is the difference between the bid and ask
 - You could set a limit order between the bid and ask to get a better price
- Bid \$1.26/Ask \$1.28: expect to sell at \$1.26, buy at \$1.28 or use a limit order of \$1.27

Volume and open interest

- Volume shows the trading activity for that day
- Open interest (OI) shows the trading activity over the life of the contract

- Due to high frequency trading, these are no longer as important as they once were – you can trade any option in any liquid stock no matter what the volume and OI are

Option liquidity exists because of put-call parity

$$P + S = C + PV(A)$$

with

P = price of put with strike price A

S = price of stock

C = price of call with strike price A

PV(A) = net present value of the option's strike price

Simplified version: a put and the stock = a call and cash

So what?

- This means an option with low open interest (OI) will be tradable if the stock is liquid
- In this case, the model depends on:
 - Are the assumptions behind the model generally true?
 - Do market participants follow the model?
- You don't need to know why put-call parity holds to benefit from it but this section shows the why so you'll be able to trade with confidence

Where do the options prices come from?

- Pricing models have been developed by traders and researchers
 - Models are a way to express the real world with math and are widely used in the markets
 - For example, find a stock's estimated fair value with a model based on the P/E ratio by using the average P/E ratio for the past five years
- The most popular options pricing model is the Black-Scholes pricing model
 - Developers were awarded a Nobel Prize in Economics
- Models include a number of factors
 - Additional factors not included in the models are also at work

Factors determining options pricing

1. Stock price

- Important because the pricing models assume the stock is actually bought. Therefore, high-priced stocks have high carrying costs and will have higher premiums than low-priced stocks
 - All things being equal, a call or put option on a \$100 stock will be more expensive than a \$10 stock

2. Interest rates

- Important because models assume traders borrow money to fund their stock purchase

Factors determining options pricing

3. Dividends (if any)

- Important because models assume the stock is bought so dividends would be received and add to the total return of the trade

4. Time to expiration

- Important because (1) it costs more to borrow money for a longer period of time and models assume you borrow to fund the purchase and (2) there is a greater probability the option will have value when the timeframe is longer

Factors determining options pricing

5. Volatility

- Important because greater volatility means there is a greater likelihood of profitability on the trade
- Volatility cannot be directly measured
- It is found by inserting known values into the model and solving for the variable that represents volatility

Factors interact with each other

- Each factor changes frequently
 - Time changes daily
 - Interest rates usually change slightly each day
 - Prices change throughout the day
 - Volatility changes with each market tick
- To see the current value of an option, based on the Black-Scholes model use a calculator such as the one at the CBOE web site

<http://goo.gl/0WThht>

CBOE Options Calculator

Options Calculator



The IVolatility.com Options Calculator is an educational tool intended to assist individuals in learning how options work. It is not intended to provide investment advice, and users of the Options Calculator should not make investment decisions based upon values generated by it.

Symbol: Stock or Index Symbol Option symbol

SPY: NYSEArca - SPDR S&P 500 ETF Trust Closing prices as of: 02/28/2017 Today's date: 03/01/2017

[Calculators Help](#) [FAQ](#)

Style:	<input type="text" value="American"/>		
Price:	<input type="text" value="236.47"/>	<input type="button" value="↑"/>	<input type="button" value="↓"/>
Strike:	<input type="text" value="229"/>	<input type="button" value="↑"/>	<input type="button" value="↓"/>
Expiration Date:	<input type="text" value="Mar 24, 2017"/>		
Days to Expiration:	<input type="text" value="23"/>		
Volatility %:	<input type="text" value="14.64"/>		
Interest Rate%:	<input type="text" value="0.7889"/>		
Dividends Date (mm/dd/yy):	<input type="text" value="12/16/16"/>		
Dividends Amount:	<input type="text" value="1.33"/>		
Dividends Frequency:	<input type="text" value="Quarterly"/>		
	<input type="button" value="Calculate"/>		

	Call	Put
Symbol:	SPY 170324C	SPY 170324P
Option Value:	8.1838	1.1522
Delta:	0.8452	-0.2261
Gamma:	0.0326	0.0350
Theta:	-0.0572	-0.0556
Vega:	0.1424	0.1823
Rho:	0.0833	-0.0318
Implied Volatility		
	Option Price	Vola %
Call	<input type="text"/>	0.00
	<input type="button" value="Calculate"/>	

Why use a calculator?

- Can find updated data through the day
 - Allows you to trade at the best price
- Limits trading costs
 - Knowing the fair value helps you place limit orders that are likely to be filled
 - Spreads on options (the difference between the bid and ask) can reduce profits on a trade by 20% or more

Trading example

- SPY \$240 call with 20 days to expiration is worth \$0.70
 - Bid = \$0.65
 - Ask = \$0.75
- A buy order at \$0.70 is likely to be filled
 - Lower trading costs are achieved by using orders inside the spread and paying \$0.70 to buy with a limit order instead of \$0.75 with a market order
 - Lowers trading cost by 6.7%, or almost 14% on a round turn compared to market orders

Calculator also provides the Greeks

- The Greeks are values of the risk factors that affect an options contract
 - They are calculated from models
- There are five Greeks - delta, gamma, theta, rho and vega
 - Each defines the amount an option price should move if only one factor changes and everything else remains unchanged
- Delta is the most important one for traders to follow
 - You can trade options profitably using the strategies in this course without knowing the Greeks but delta can help you increase your profits

Delta

- Delta measures how much an option's price should change if the value of the underlying security changes by \$1.00
- The values of delta range from 0 to 1 for calls and 0 to -1 for puts
- As an example, if a trader holds an out-of-the-money call option on GOOGL with a delta of 0.25, they should to see the price of the option increase by \$0.25 if GOOGL goes up by \$1
- The call should gain about \$0.125 if GOOGL increases in value by \$0.50.
- If GOOGL falls by \$1, the value of the option should fall by \$0.25

- For puts, the delta might be -0.25 and the put option would be expected to fall by \$0.25 if GOOGL rose by \$1
- If GOOGL fell by \$1, the put option should increase by \$0.25
- If GOOGL rises \$1, the put option should decrease by \$0.25

Delta's usefulness for traders

- Delta can be used to find the probability an option will be in-the-money at expiration
 - The formula for a call is
 $\text{delta} * 100$
 - The formula for a put is
 $(1 - |\text{delta}|) * 100$
- Delta can help you determine if a trade has too much risk

Other Greeks are not as useful for us

- Gamma is used to estimate how much delta will change when the underlying security moves by \$1.00
- Theta describes the time decay of an option
- Vega measures how much the price of the option should change for every 1% change in the volatility of the underlying security
- Rho measures the sensitivity of an option's price to moves in interest rates. Rho is the estimated change in the value of an option when interest rates change by 1%. It is usually fairly low, often under 0.05

Options are not complex to trade

- The math behind options can be complex
- Modern markets with HFT and other changes allow anyone to obtain fair prices when trading options

