



# Introduction to Option Contracts

02/05/2020

---

Presented By:  
**Nikola Viazmenski (Head of Algorithmic Trading)**



**FORDHAM**  
FINTECH NETWORK



- 1 Basics of Option Contracts
- 2 Basic Option Strategies
- 3 Future Topics

## 1



## Basics of Option Contracts



An option is the *right*, but not the *obligation*, to buy or sell a certain amount of stock at a certain price on or before a certain date.

- Speculating
- Hedging
- Information

## Calls

- An option to **buy** a certain amount of stock
- Typically directly correlated with the performance of the underlying security
- Going **long** one **call** on AAPL gives you the right to buy **100 shares** of AAPL

## Puts

- An option to **sell** a certain amount of stock
- Typically inversely correlated with the performance of the underlying security
- Going **long** a **put** option contract on AAPL gives you the right to sell **100 shares** of AAPL

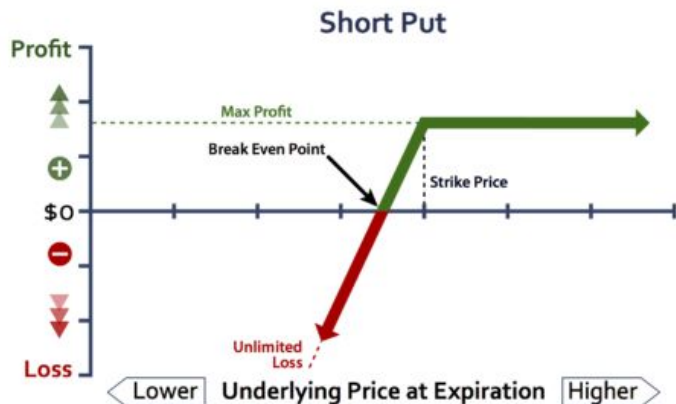
- **Strike Price** - Fixed price at which the owner of the option can buy/sell the underlying security.
- **Option premium** - The value of the option (Nothing is free: Commission fees + Option Premium).
- **Moneyness** - The relationship b/t the strike price of an option and the current trading price of the underlying asset.
  - In-The-Money (ITM) - Call/put strike price is much lower/much higher than the current price of the underlying
  - At-The-Money (ATM) - Option strike price is exactly or very close to the current price of the underlying
  - Out-of-The-Money(OTM) - Call/put strike price is much higher/much lower than the current price of the underlying
- **Intrinsic vs Extrinsic Value**
  - **Intrinsic value:** the value ascribed to an option by virtue of a difference between strike and underlying price
  - **Extrinsic value:** the value ascribed to an option by virtue of the time to expiry, in which time the value of the underlying can change

# Profit Diagrams: Short Call vs. Long Call





# Profit Diagrams: Short Put vs. Long Put



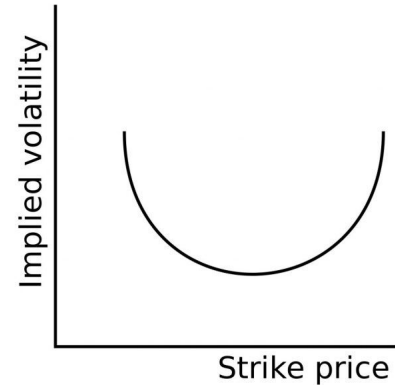
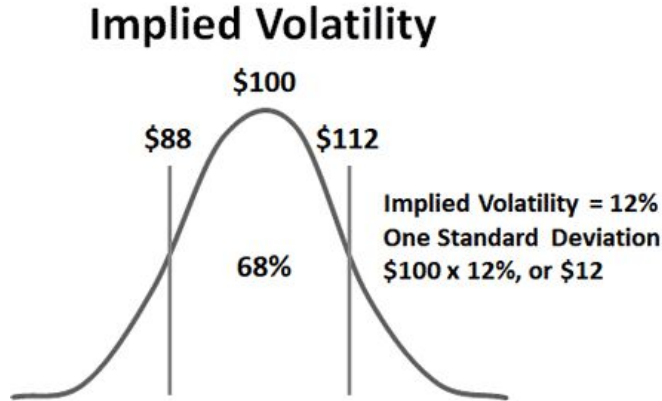
- Delta, Gamma, Vega, Theta, Rho
- Quantifiable factors that provide a way to measure the sensitivity of an option's price to various underlying factors.
- Delta - change in option price relative to change in the price of the underlying.
- Gamma - change in option price relative to change in delta.
- Vega - change in option price relative to change in implied volatility
- Theta - change in option price relative to change in the time to expiry
- Rho - change in option price relative to change in the national interest rate
- Black-Scholes formula

- Delta, Gamma, Vega, Theta, Rho

SPY Jul17'20 322 CALL				
<b>13.04</b>				
<b>-3.91 -23.07%</b>				
Last Size 10				
Last Exch				
Bid/Ask 13.43 x 13.71				
Size 2,040 x 90				
Bid Exch				
Ask Exch				
Hi/Lo 13.92 - 13.04				
SPY <b>U</b>				
<b>321.85</b>				
Bid/Ask <b>◆ - x</b>				
	0.662	0.117	0.068	-0.509 321
	0.541	0.133	0.072	-0.522 322
	0.404	0.137	0.070	-0.481 323
				<b>▼ FEB 03 '20</b>
				<b>▼ FEB 05 '20</b>
				<b>▼ JUL 17 '20</b>
	0.541	0.012	0.847	-0.048 321
	0.528	0.012	0.854	-0.047 322
	0.516	0.012	0.857	-0.047 323

# Implied Volatility

- Implied volatility over a certain period of N days is defined as the percentage move in the value of the underlying in the forthcoming N days that represents a one-SD move from the current price of the underlying.
- TSLA vs KO options



# Options Chain

CALLS						DESCRIPTION	PUTS						
OPTN O...	VOLUME	BID	SIZE	BID	ASK	STRIKE	OPTN O...	VOLUME	BID	SIZE	BID	ASK	SIZE
						▼ FEB 05 '20 (3 DAYS)	IV: 20.2%						
173	110	5	◆	6.85	6.95	317	1.60K	7.10K	5	◆	1.56	1.59	5
106	245	5	◆	6.08	6.18	318	2.76K	4.01K	5	◆	1.78	1.82	6
149	580	152	◆	5.34	5.44	319	10.6K	23.3K	5	◆	2.04	2.08	5
366	2.23K	243	◆	4.64	4.72	320	8.69K	12.5K	5	◆	2.33	2.37	6
223	1.54K	395	◆	3.97	4.03	321	1.98K	38.7K	5	◆	2.65	2.71	5
284	2.58K	280	◆	3.34	3.39	322	3.28K	13.5K	5	◆	3.02	3.06	6
322	5.02K	498	◆	2.74	2.80	323	10.2K	7.75K	5	◆	3.40	3.48	5
897	7.20K	397	◆	2.20	2.25	324	7.95K	4.76K	5	◆	3.84	3.94	6
3.58K	7.55K	264	◆	1.71	1.74	325	4.04K	6.21K	5	◆	4.35	4.45	5
2.56K	8.09K	272	◆	1.28	1.31	326	5.37K	3.62K	5	◆	4.91	5.00	5
						▼ FEB 07 '20 (5 DAYS)	IV: 20.1%						
896	69	612	◆	6.98	7.09	317.5	2.33K	14.0K	194	◆	2.12	2.15	183
820	444	197	◆	6.62	6.68	318	4.18K	8.87K	5	◆	2.25	2.27	50
1.04K	664	5	◆	5.90	5.98	319	11.3K	6.25K	5	◆	2.53	2.55	40
980	2.10K	283	◆	5.21	5.26	320	32.4K	55.6K	5	◆	2.83	2.85	60
596	2.69K	348	◆	4.54	4.58	321	6.03K	10.5K	5	◆	3.16	3.18	50
4.05K	4.05K	451	◆	3.90	3.93	322	9.42K	23.2K	5	◆	3.51	3.56	239
1.47K	1.61K	688	◆	3.59	3.64	322.5	1.88K	2.66K	678	◆	3.68	3.73	60
1.98K	11.0K	778	◆	3.29	3.33	323	14.4K	14.3K	5	◆	3.90	3.94	25
4.70K	9.81K	351	◆	2.73	2.75	324	10.7K	11.1K	5	◆	4.32	4.38	158
5.87K	11.2K	1	◆	2.21	2.23	325	15.4K	11.9K	5	◆	4.80	4.86	193

- **Scenario:** According to our research, we believe that TSLA's stock price will significantly increase within the next two weeks due to a vast increase in inventory builds.
- **Options Contract Contents:**
  - 62% IV (vs. 20% IV Annual Average)
- What type of Trade Can we put on?
  - Long calls
  - Short puts
- What risks are we opening ourselves to?
  - Volatility Risks
  - Liquidity Risks

Order Entry Tools

Order Entry and Saved Orders

Order Entry Saved Orders PM This is a simulation, not a real trade

Spread	Side	Qty	Pos	Effect	Symbol	Exp	Strike	Type	Link	Price	Order	TIF	Exchange
SINGLE	BUY	+1		AUTO	TSLA	14 FEB 20 (Weeklys)	645	CALL		33.00	LMT	DAY	BEST

Order Confirmation Dialog

PM This is a simulation, not a real trade Auto send with shift click

Order Description BUY +1 TSLA 100 (Weeklys) 14 FEB 20 645 CALL @33.00 LMT [TO OPEN]

Break Even Stock Prices 678.00

Max Profit Infinite

Max Loss \$3,300.00 (net including possible dividend risk)

Cost of Trade including commissions \$3,300.00 + \$0.65 = \$3,300.65

Buying Power Effect (\$3,300.00)

Resulting Buying Power for Stock \$193,400.00

Resulting Buying Power for Options \$96,700.00

Single Account Account: D-17038327 (margin)  Save last used mode

Note for this order

Please note that you have selected a weekly option series with a "non-standard" expiration date.

Delete Edit Save Send

- Long Call TSLA at 645 Strike, which expires on Feb. 14th.
- Math:  $33.00/\text{Share} * 100 \text{ Shares} = \$3,300 + .65 \text{ (Commission)} = \$3,300.65$

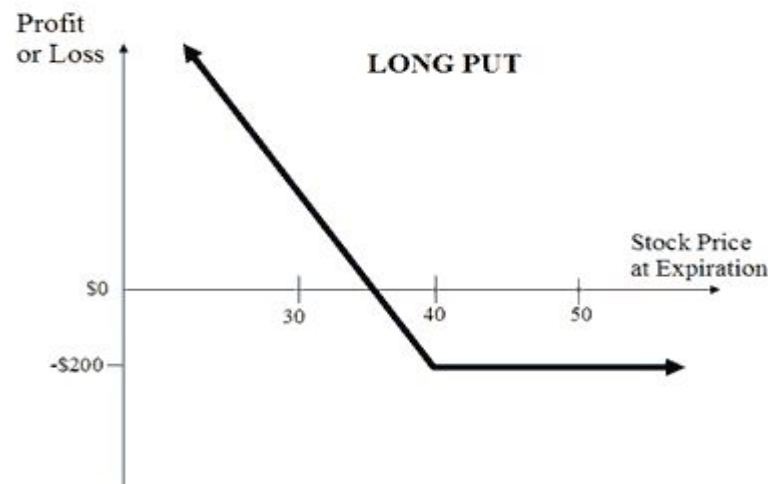
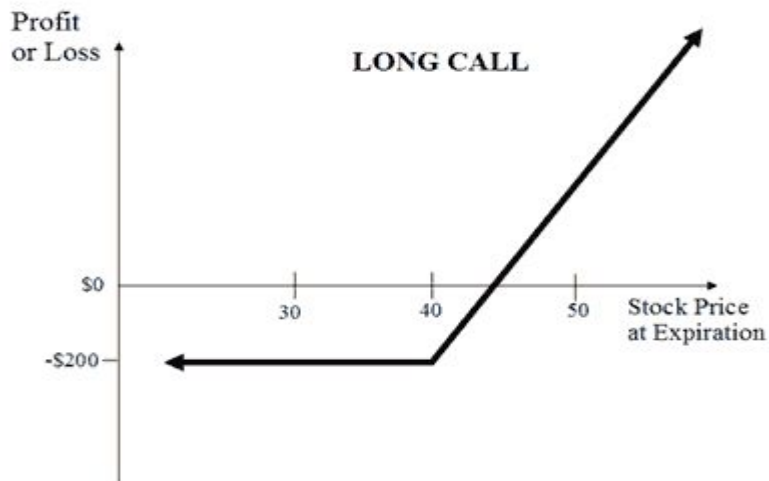
## 2

## Basic Option Strategies



# One-Leg Strategies

- Simplest of the bunch
- Buying calls/puts
- Selling “naked” calls/puts (*extremely* risky)



# Two-leg Strategies

---

- Covered calls
- Cash-secured puts
- Debit spreads
- Credit spreads
- Straddles
- Strangles

- Typically used as a way to generate income from stock held
- Sell an OTM call, with the stock you hold as collateral in case the call goes ITM

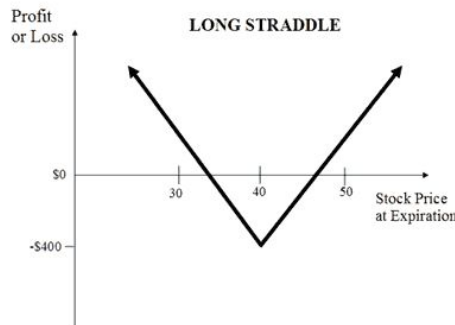


- Typically used as a method of “safely” selling puts (i.e. preventing margin call)
- Sell an OTM put, with the cash you hold as collateral in case the put goes ITM

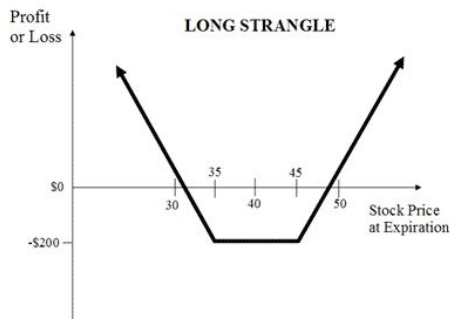
- Typically used as a way to go long calls or puts, limiting downside risk in exchange for limiting upside potential
- Sell a more OTM option (option 1) to partially fund the purchase of a more ITM option (option 2)
- Net purchase of options (debit to the account)
- Gain is capped at (strike of option 2) - (strike of option 1)
- Loss is capped at the debit to the account (the worst case for a long position is that everything goes to zero)

- Typically used as a way to go short calls or puts while limiting losses and gains.
- Buy a more OTM option to offset some of the risk of selling a more ITM option
- Net sale of options (credit to the account)
- Gain is capped at the credit gained
- Loss is capped at the difference between the strike prices less the credit gained

- Typically used as a non-directional bet on volatility.
- Purchase call and put options at the same strike price and same expiration date.



- Typically used in the same manner as a straddle, but is usually cheaper due to the call and put being OTM.
- Hold positions in both a call and put option at different strike prices, but the same underlying asset and expiration date.





## 3



## Future Topics



# Methods for pricing options

---

- Black-Scholes formula
- Binomial tree valuation
- Heston model

## More complex strategies

---

- Continuous delta hedging
- Higher-leg strategies (iron condors, etc.)
- Other types of spreads (calendar spread, diagonal spread)
- Algorithmic implementations of options strategies

# Questions?

---