

Introduction to Equity Options

By Maxwell Wang

Week 4

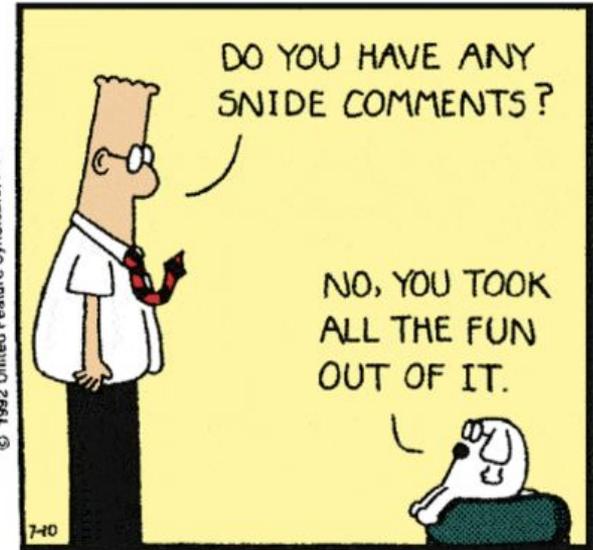
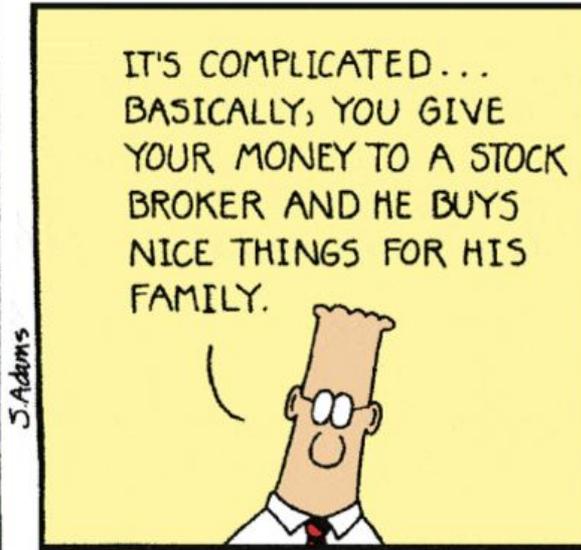


Agenda

- What are Options?
- Important Terms
- Graphical Interpretation
- Valuing Options
- Options Greek
- Options Strategies



What Are Options?



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What Are Options?

- A stock option is a contract between two parties
- Gives you the RIGHT, but NOT the obligation to purchase shares of a stock at a certain agreed upon price (the **strike price**) up until a certain expiration date
- 2 Types: A **call** option (call to **buy**) vs a **put** option (put to **sell**)

Complicated Because:

- When you invest in stock market, if stock goes up above your purchase price (**magnitude** of stock price change), you make money!
- However, you have TWO considerations when investing in options: The **magnitude** and the “**speed**” of the market (eg: if price goes up but not before expo, you LOSE money, even though you were right about price increase)

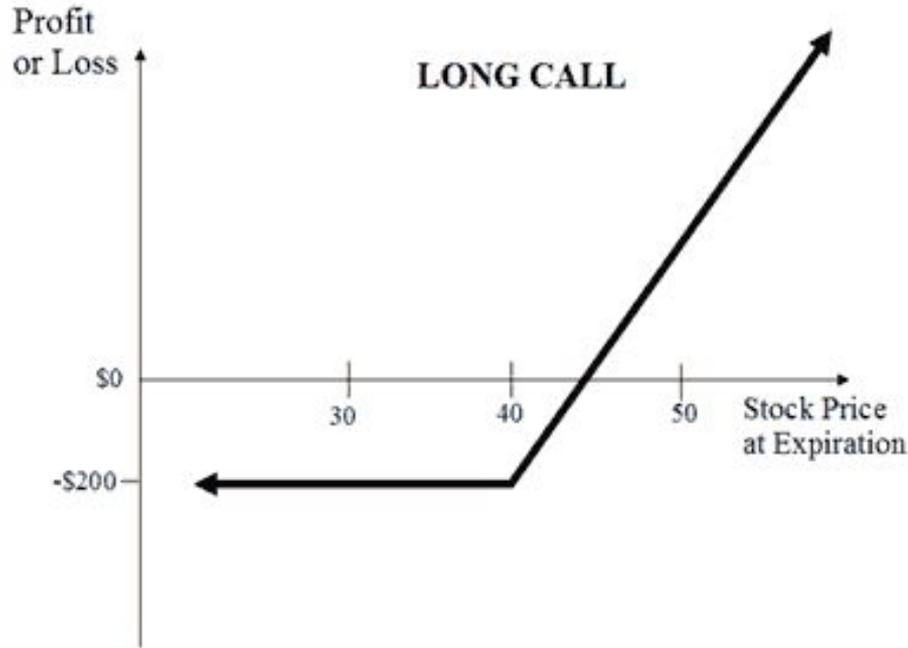


Important Terms

- Strike Price
- Expiration Date
- In the Money (ITM)
- Out the Money (OTM)
- At the Money (ATM)
- Call vs. Put Option
- Shorting/Writing/Selling an option
- Buying an option/"Long" an option (eg: Long call position)
- European Options (can only exercise at expiration)
- American Options (can exercise any time up until expiration)



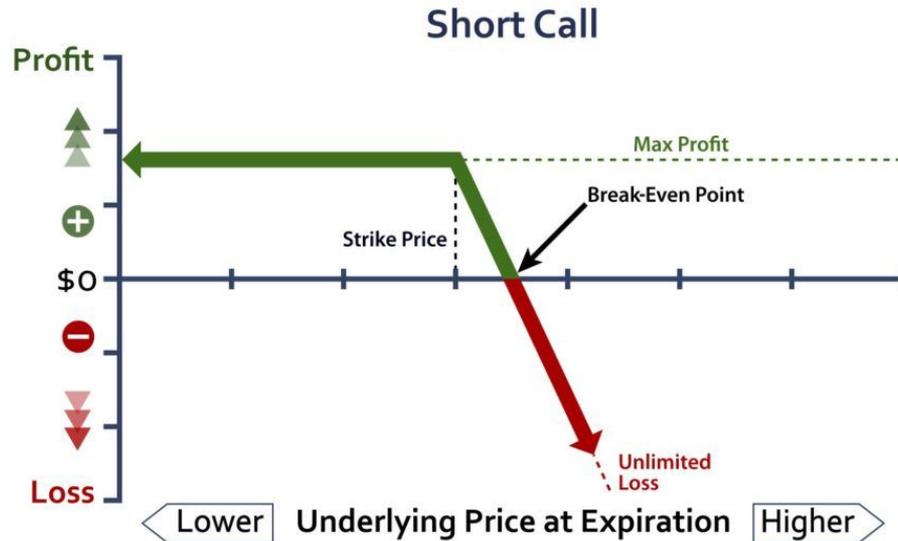
Graphical Interpretation: Buying a Call Option/ Long Call



- What is the strike price?
- What is the breakeven price?
- Why is the loss limited at -\$200? What if stock price keeps falling? Note: NOT THE CASE for written calls



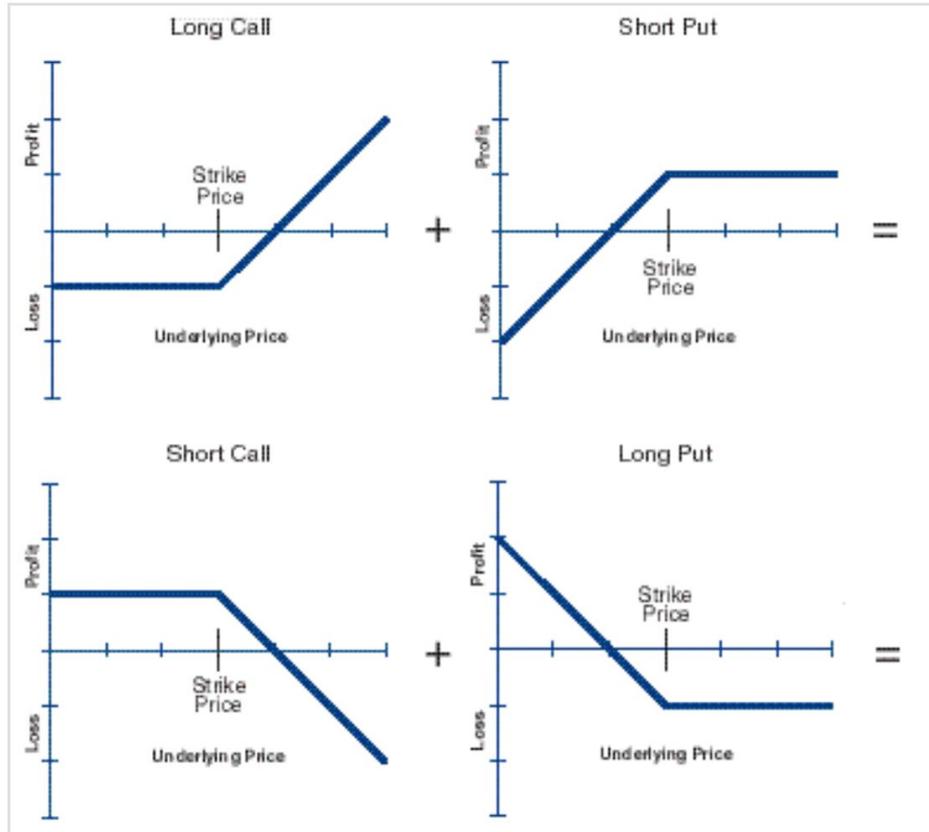
Graphical Interpretation: Written Call/Selling a Call



- We just looked at the buyer of the call option, now we look at it from the seller's perspective...
- Note, same graph but flipped upside down. Think about it from seller's perspective
- UNLIMITED DOWNSIDE, so why would you do it?



Graphical Interpretation: Puts



Valuing Options: Black Scholes Model

- A mathematical model for pricing an options contract. In particular, the model estimates the variation over time of financial instruments.
- Black Scholes model requires **six** input variables: the strike price of an option, the current stock price, the time to expiration, the risk-free rate, dividend yield, and the volatility

$$C = N(d_1)S_t - N(d_2)Ke^{-rt}$$

$$\text{where } d_1 = \frac{\ln \frac{S_t}{K} + (r + \frac{\sigma^2}{2})t}{\sigma\sqrt{t}}$$

$$\text{and } d_2 = d_1 - \sigma\sqrt{t}$$



Options Greek

The Five Main Greeks



Delta (Δ)

Represents the sensitivity of an option's price to changes in the value of the underlying security.



Theta (Θ)

Represents the rate of time decay of an option.



Gamma (Γ)

Represents the rate of change of Delta relative to the change of the price of the underlying security.



Vega (V)

Represents an option's sensitivity to volatility.



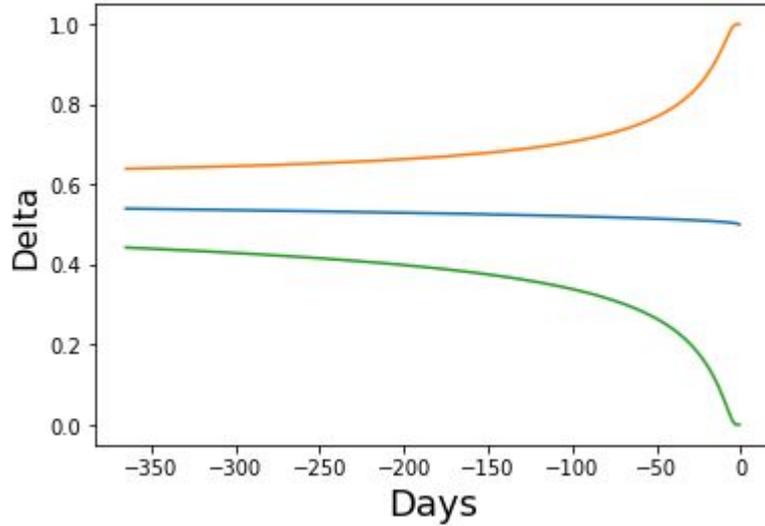
Rho (ρ)

Represents how sensitive the price of an option is relative to interest rates.

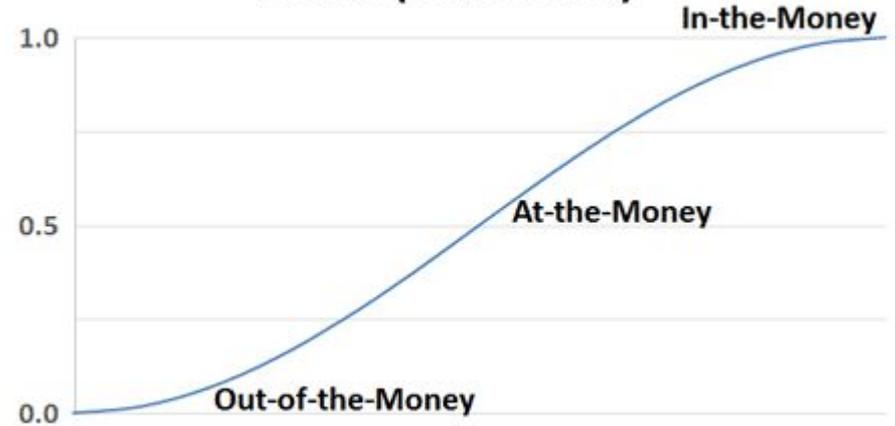


In Depth Look at Delta

Delta vs. Time

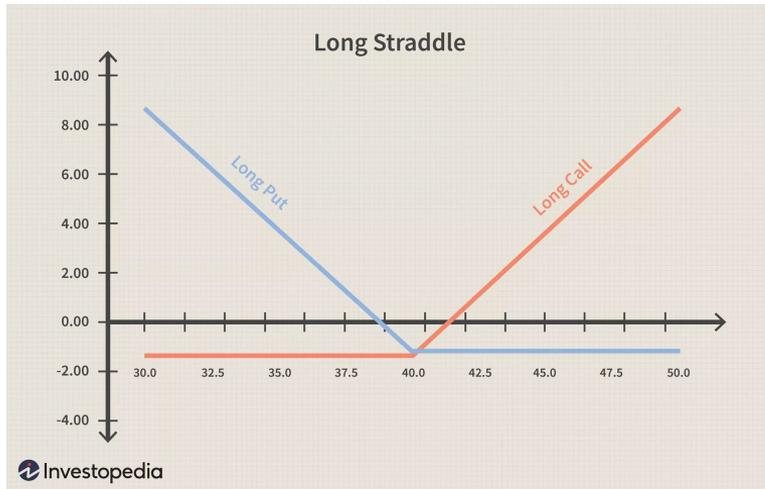


Delta (Call Delta)

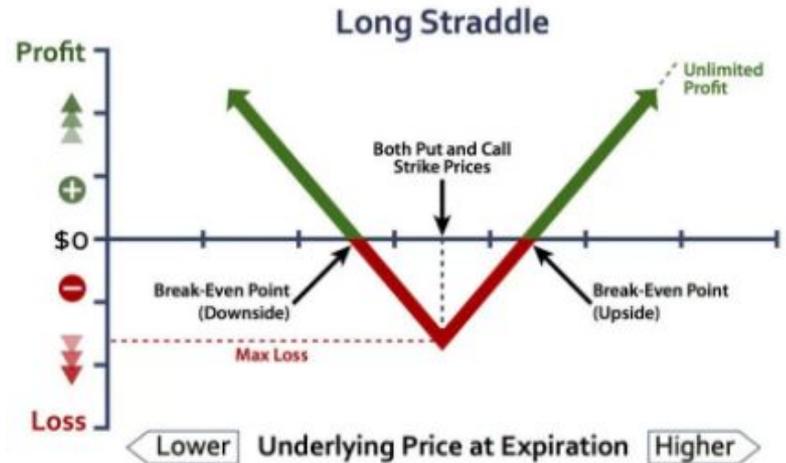


What Strategies Can You Do With Options?

- Options are unique because you can create specifically tailored strategies to best suit unique investment theses
- Can range from simple strategies like this...

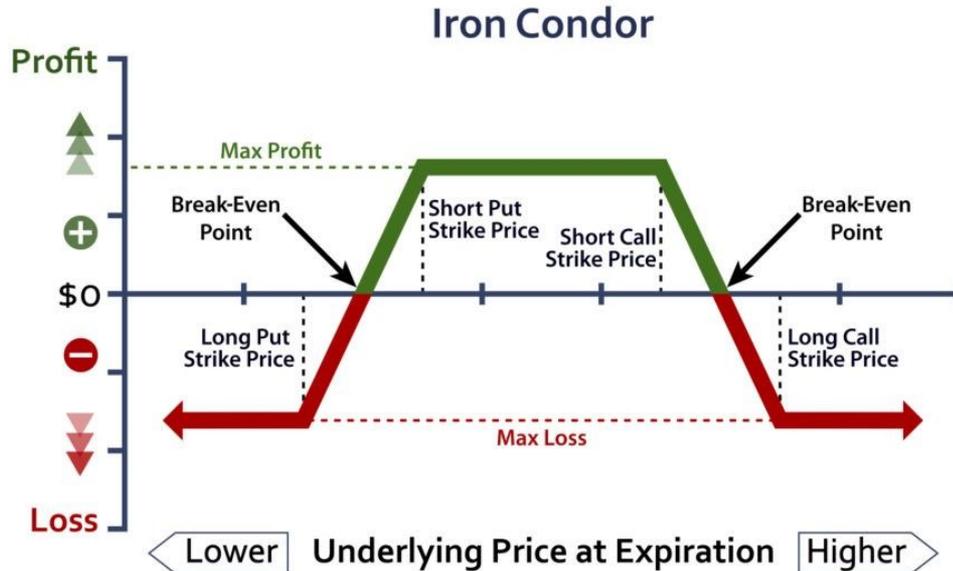


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What Strategies Can You Do With Options?

...To this!

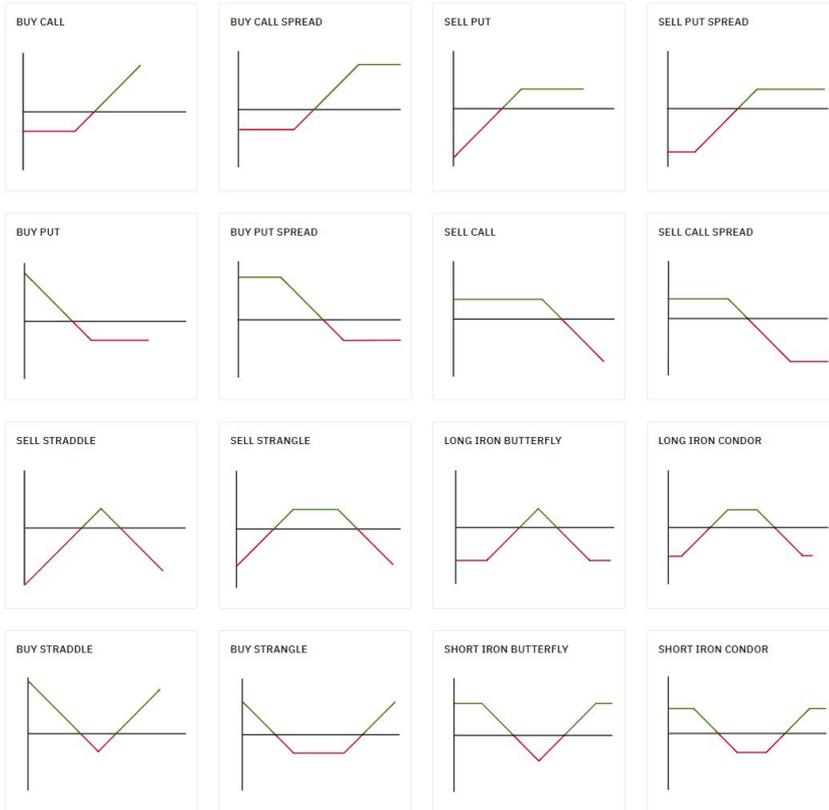


What Strategies Can You Do With Options?

Can also create synthetic stocks using options to capitalize on arbitrage opportunity



Options Strategies are Varied and Complex



If you're able to do these on your robinhood account and know what you're doing, good job!

There are Strategies for:

- Betting on huge volatility swings
- Betting that stock will stay at around the same price
- Betting on time decay
- Losing money very quickly! **Be careful with options**



Thank you!

(Make sure you signed in)

