

OPTION THEORY

Why Trade Options?

- Insurance/Hedge/Cap Risk
- Leverage
- **Speculate on volatility**
- Speculate on sideways price action

Only Trade Options If Necessary

- Before executing always ask yourself:
 - Why am I trading this option?
 - Can I replicate this bet more efficiently in the underlying?
- Underlying is usually cheaper to trade
 - Options have higher bid ask spreads and higher commission costs
- Underlying is also less complex
- **Do not introduce unnecessary complexity!**

Fancy Play Syndrome (FPS)

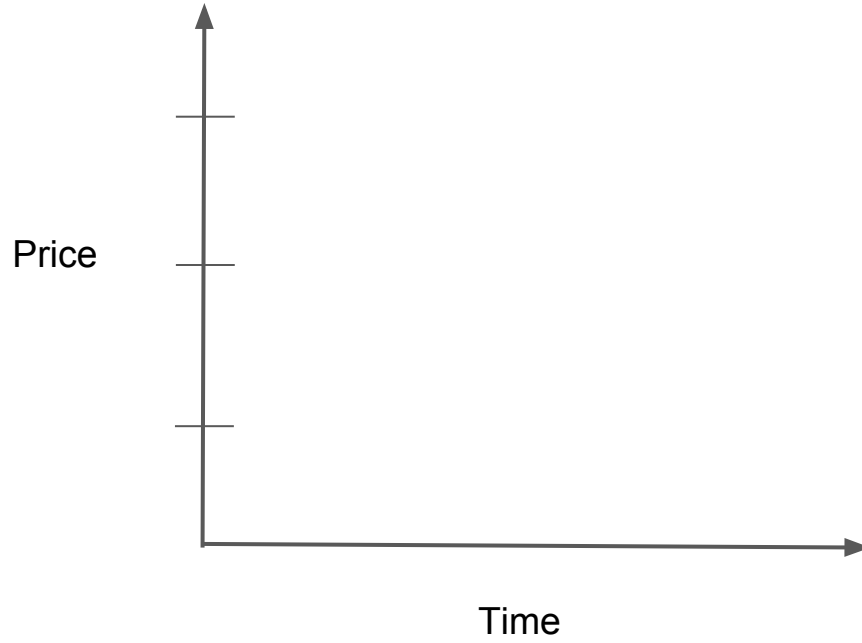
- In poker, fancy play syndrome is when someone plays unorthodox hands in bad position to acquire chips in an unconventional manner
- Most of the time this just costs the poker player money!
- Option trading is similar, many traders get into options for the intellectual stimulation but it ends up costing them money over time
- Avoid the siren song of complex options spreads and complex vol trading
- Relentlessly apply KISS to your options trading

Must-Know Option Jargon

- Volatility
 - Realized Volatility
 - Implied Volatility
- Term Structure
- Volatility Skew
- Delta
- Edge

Volatility

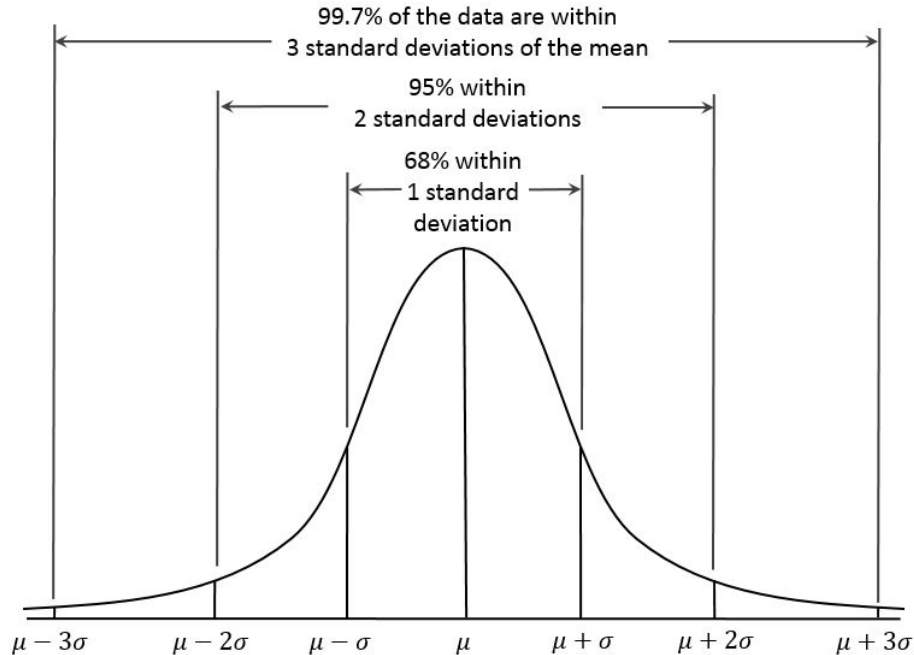
- In financial markets volatility = standard deviation of log returns quoted as an annual percentage
- Layman definition — how fast something moves around
- High volatility assets = Bitcoin, Crude Oil
- Low volatility assets = 2-year T-Note



Realized Volatility

- Realized volatility is a backward looking measure of an asset's volatility
- $RV(20)$ = volatility measurement based on the last 20 trading days
- Example $RV(20) = 25\%$
 - “Based on the last 20 trading days of data this asset will end up or down 25% after a year 68% of the time”

Returns are assumed to be normally distributed

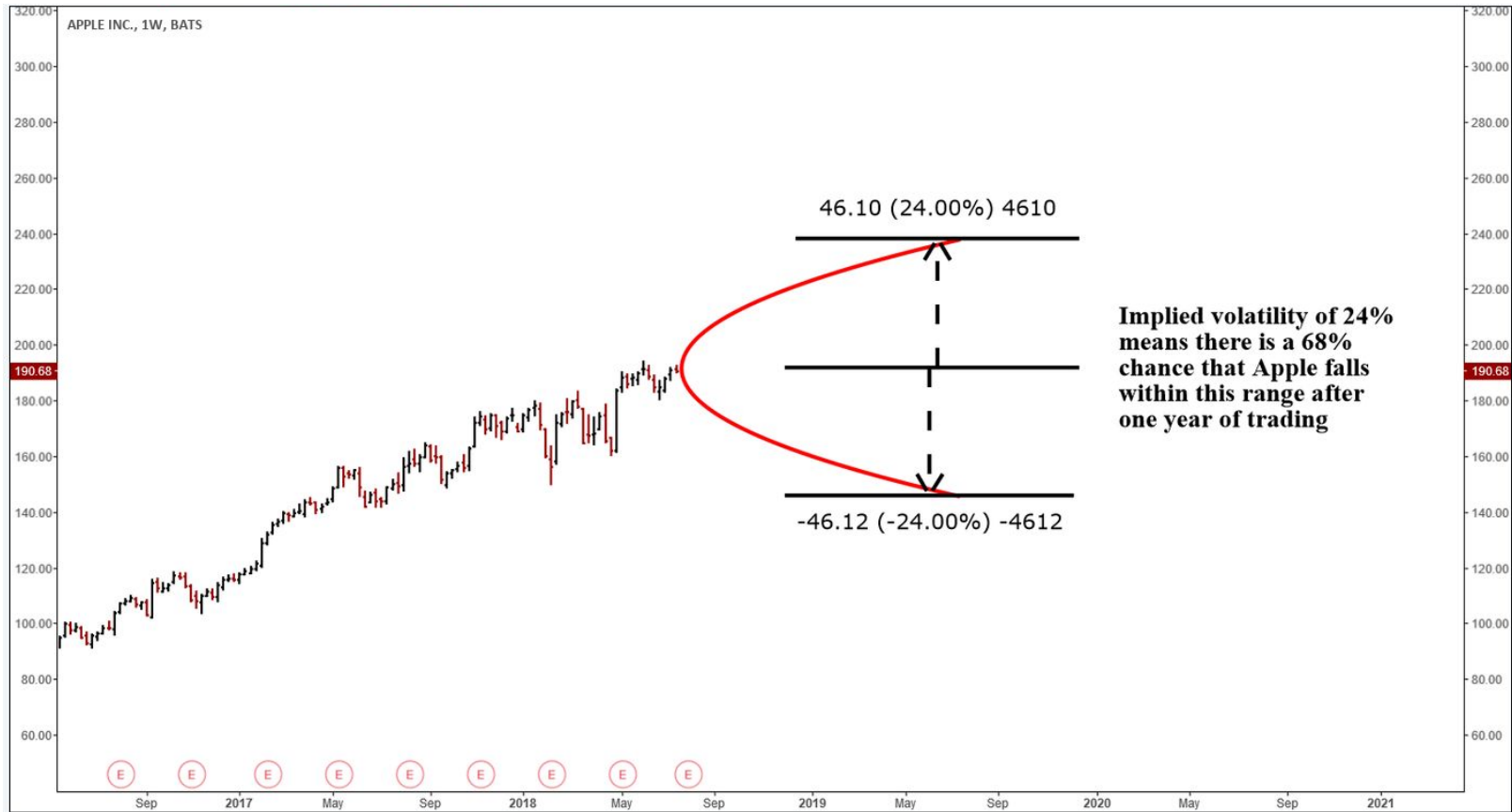


Implied Vol

- Implied volatility = the option market's best guess of what future volatility will be
- This is the most important input to an option's price, all other variables are known (strike, days to expiration, interest rates, dividends)
- Option trading can be thought of as volatility trading, we are making bets on whether or not implied vol is too high or too low

Implied Vol Intuition

- Example: An option on Apple has an implied volatility of 24%
- This means the option market is predicting that AAPL stock will end in the range of +24% and -24% with 68% probability after one year of trading



Converting Implied Vol Quotes

- The IV number can be confusing or non-intuitive because of the annual quotation
- But we can convert the IV to smaller time frames that are more relevant to our trading time horizon
- Annual to daily — Divide by $\sqrt{252}$
- Annual to weekly — Divide by $\sqrt{50}$
- Annual to monthly — Divide by $\sqrt{12}$
- Annual to quarterly — Divide by $\sqrt{4}$

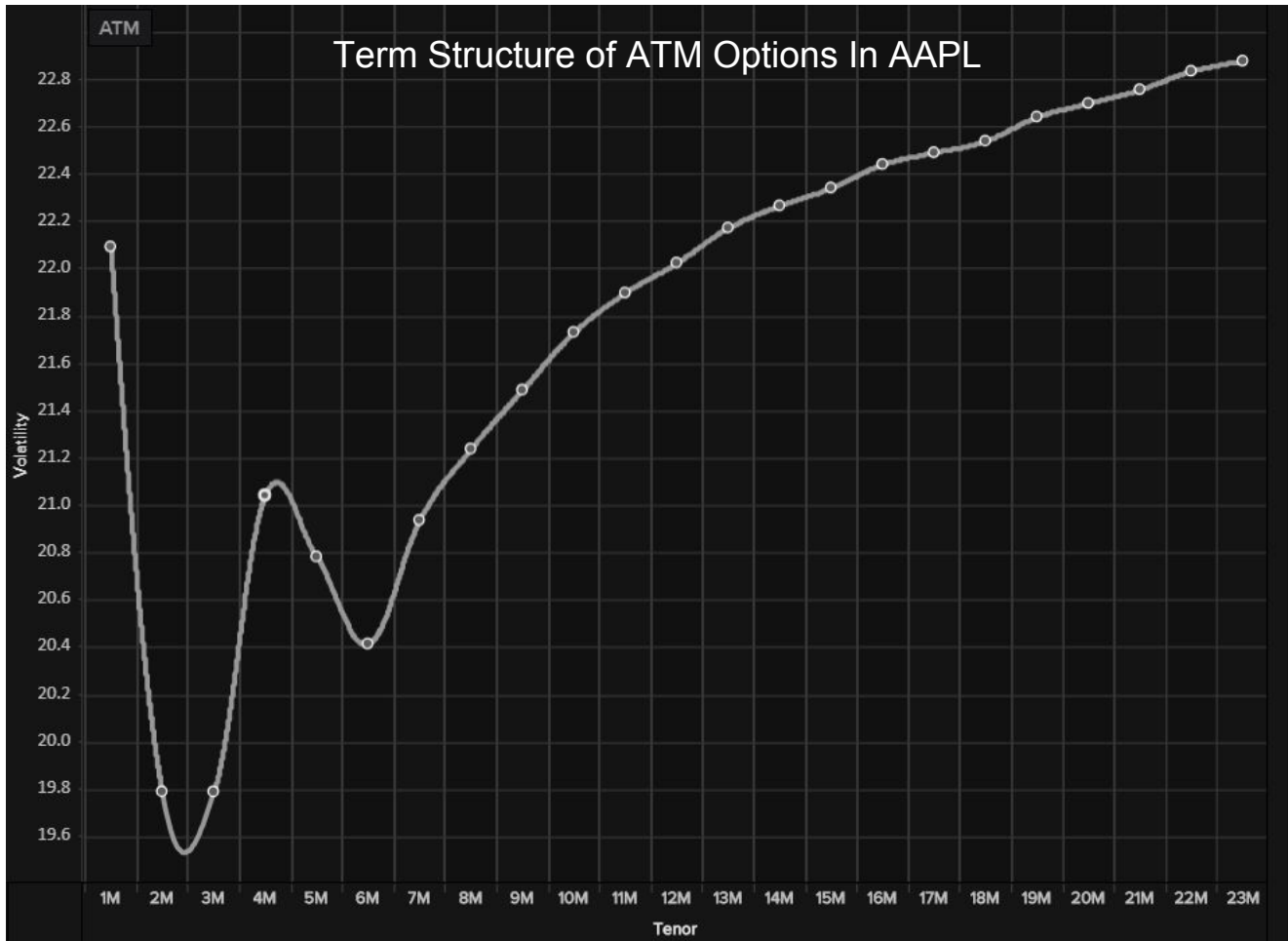
Converting Implied Vol Quotes

- Stock is at \$100 and the ATM call has a 20% IV value
 - The option is implying a 20% move up or down as the expected move over a year
- Expected daily move = $20/\sqrt{252} = 1.26\%$
 - The option is implying a 1.26% move up or down as the expected move over one day
- Keep in mind the “expected move” is the range the stock will fall into 68% of the time

Term Structure

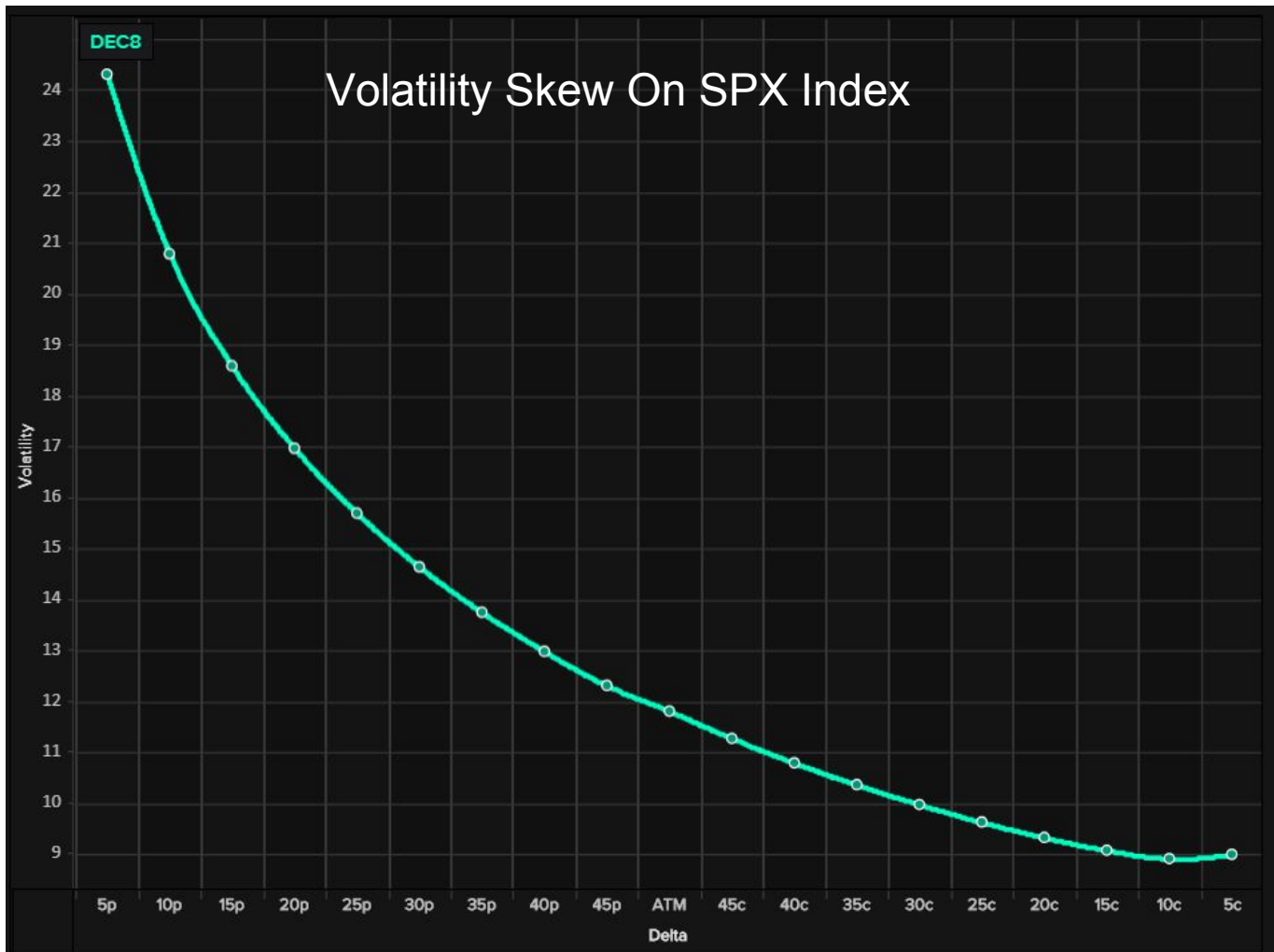
- Each underlying will have options expiring at different points in time
- But implied vol for each expiration will be different
 - Perceived risk tomorrow is different than perceived risk weeks from now
- This difference in volatilities at each expiry forms a **term structure**

AAPL		APPLE INC COM		190.80	-53 -0.28%	B: 190.80 A: 190.81	ETB	NASDAQ	±1.007	Company Profile			
Underlying													
Last X	Net Chng	Bid X	Ask X	Size	Volume	Open	High	Low					
190.80	-53	190.80	190.81	2 x 9	12,171,371	191.52	192.65	190.415					
Trade Grid													
Option Chain		Filter: Off	Spread: Single	Layout: Impl Vol, Probability OTM, Delta									
20 JUL 18	(4)	100											18.27% (±3.168)
27 JUL 18	(11)	100 (Weeklys)											17.71% (±4.835)
3 AUG 18	(18)	100 (Weeklys)											26.81% (±9.258)
10 AUG 18	(25)	100 (Weeklys)											25.40% (±10.283)
17 AUG 18	(32)	100											24.50% (±11.189)
24 AUG 18	(39)	100 (Weeklys)											23.07% (±11.61)
31 AUG 18	(46)	100 (Weeklys)											22.40% (±12.228)
21 SEP 18	(67)	100											22.43% (±14.755)
19 OCT 18	(95)	100											21.85% (±17.107)
16 NOV 18	(123)	100											23.29% (±20.774)
21 DEC 18	(158)	100											22.69% (±22.953)
18 JAN 19	(186)	100											22.68% (±24.917)
21 JUN 19	(340)	100											23.58% (±35.29)
17 JAN 20	(550)	100											24.37% (±46.96)
19 JUN 20	(704)	100											24.00% (±52.693)

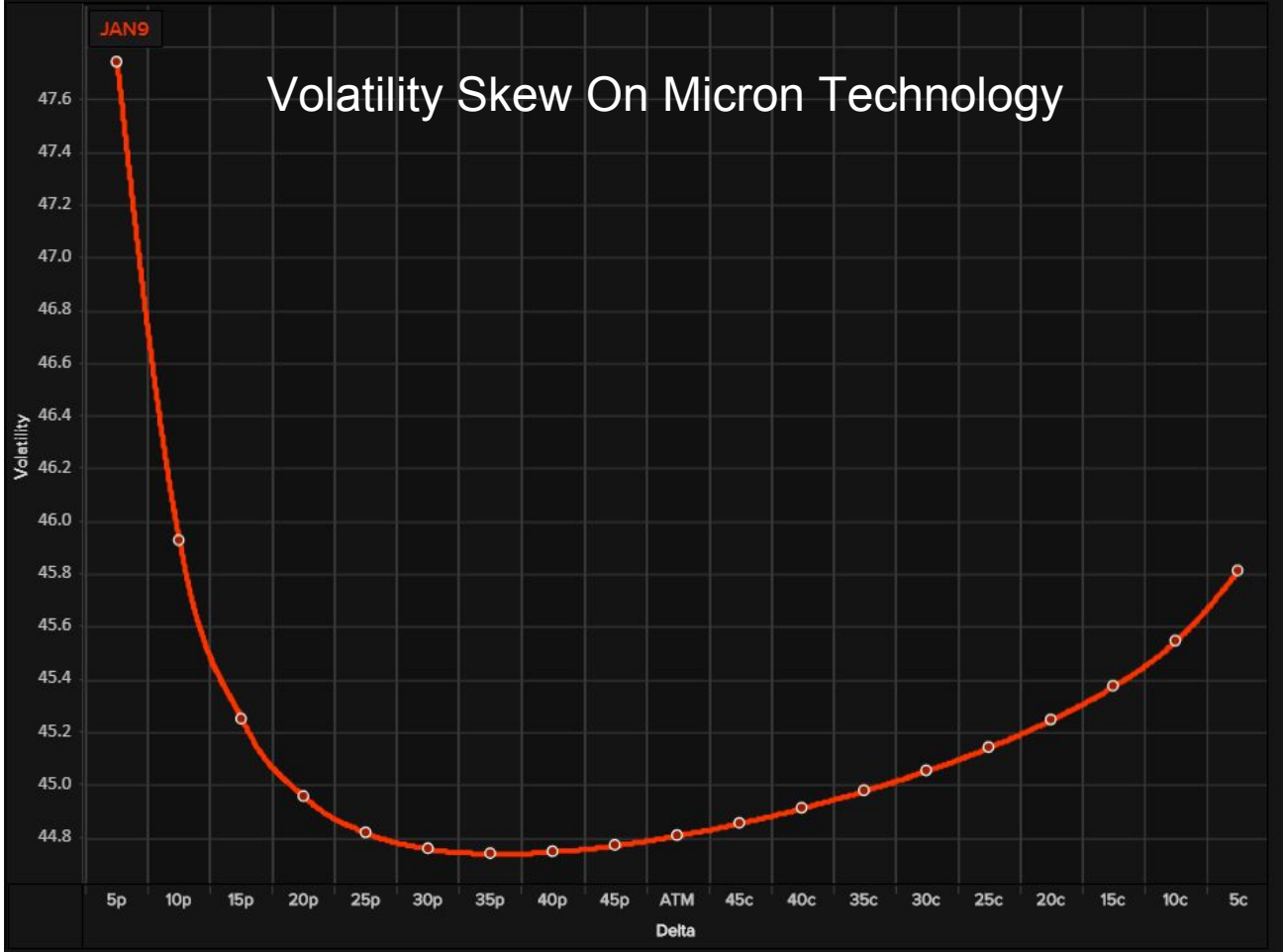


Volatility Skew

- Just how implied volatility changes across time it also changes across strikes
- This is called skew
- Generally options further OTM have a higher implied vol than those close to the money
- The market knows that the wings of the distribution are harder to price so option market makers compensate by charging higher for OTM options



Volatility Skew On Micron Technology

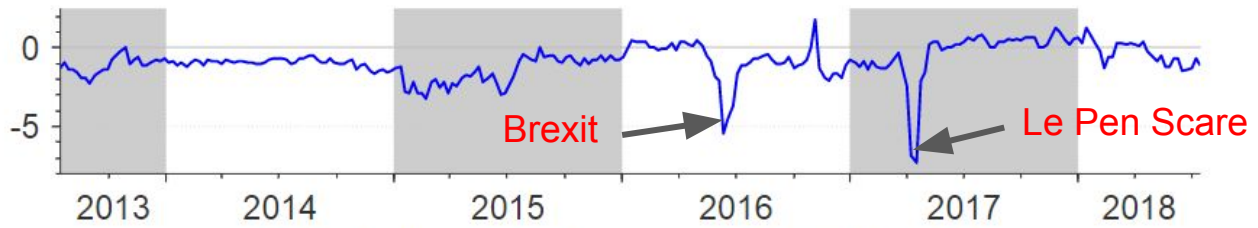


Relevance of Volatility Skew

- The skew shows us demand of puts vs calls and can be used as a positioning tool
- When puts are more expensive than calls that tells you that market participants are overly bearish or scared
- When calls are more expensive than puts that tells you that market participants are overly bullish or greedy
- Risk reversals measure the put/call relationship
 - A risk reversal is defined as the difference between the implied volatility of an out-of-the money call option versus an out-of-the-money put option struck at a price with a similar delta

EURUSD Skew / Risk Reversal

EURO 1M 10D Reversal



— Inverse of EURO TO US \$ (WMR&DS) (RH Scale) — EURO 1M 10D REVERSAL

Source: Thomson Reuters Datastream / Macro Ops

www.macro-ops.com



Delta

- There's multiple option greeks but Delta is the most important one to understand
 - The rest of the greeks only relevant to traders running a pure options/vol portfolio
- Delta tracks the theoretical rate of change of an option's price given a \$1.00 increase in the underlying's price
- Example:
 - Stock at \$100, 10 delta option at \$1.00
 - If stock rallies to \$101 all else equal option price will increase to \$1.10

Delta As A Proxy For Probability

- Option delta can also be used to estimate the probability of an option expiring in-the-money
- An option with a delta of 10 has roughly a 10% chance of expiring in-the-money

Strike	PUTS					Delta
	Bid X	Ask X	Impl Vol	Prob.ITM	12.13% (±78,745)	
2675	6.20 C	6.50 C	14.43%	11.76%	-11	
2680	6.40 C	6.70 C	14.17%	12.22%	-11	
2685	6.70 C	7.00 C	13.97%	12.80%	-12	
2690	7.00 C	7.30 C	13.75%	13.40%	-13	
2695	7.30 C	7.60 C	13.53%	14.02%	-13	
2700	7.60 C	8.00 C	13.32%	14.71%	-14	
2705	8.00 C	8.40 C	13.13%	15.47%	-15	
2710	8.40 C	8.80 C	12.93%	16.25%	-15	
2715	8.80 C	9.20 C	12.71%	17.05%	-16	
2720	9.30 C	9.70 C	12.52%	17.98%	-17	
2725	9.70 C	10.20 C	12.30%	18.89%	-18	
2730	10.20 C	10.70 C	12.09%	19.87%	-19	
2735	10.80 C	11.20 C	11.88%	20.93%	-20	
2740	11.40 C	11.90 C	11.70%	22.11%	-21	
2745	12.00 C	12.50 C	11.47%	23.29%	-22	
2750	12.80 C	13.30 C	11.31%	24.67%	-24	
2755	13.50 C	14.00 C	11.09%	26.01%	-25	
2760	14.40 C	14.80 C	10.91%	27.52%	-26	
2765	15.20 C	15.70 C	10.70%	29.07%	-28	
2770	16.10 C	16.70 C	10.51%	30.74%	-30	
2775	17.20 C	17.80 C	10.34%	32.57%	-31	
2780	18.30 C	18.90 C	10.15%	34.45%	-33	
2785	19.50 C	20.20 C	9.98%	36.47%	-35	
2790	20.90 C	21.60 C	9.82%	38.63%	-38	
2795	22.30 C	23.10 C	9.65%	40.87%	-40	
2800	24.00 C	24.70 C	9.51%	43.24%	-42	
2805	25.70 C	26.50 C	9.36%	45.70%	-45	
2810	27.60 C	28.40 C	9.23%	48.26%	-47	

You Need An Edge To Win

- It's extremely important to define the reason for trading options
- Is it a profit center for your trading business or is it a cost center used to reinsure and hedge out risks?
- **If it's a profit center make sure you have an edge!**
- Edge is your ability to detect mispricings in implied volatility
- Lots of different edges
 - Earnings related edges
 - VRP edges
 - DOTM
 - Term structure trades

What's Possible For Individual Investors

- **Large cap stocks** have a lot of liquidity, easy to trade, small contract sizes and good for small accounts
- **Equity index options** have a lot of liquidity and volume, easy to trade, contract risk size high
- **Commodity futures** options have decent liquidity, easy to trade, contract risk size high
- **Forex** does not have a liquid option market for individual investors, some ETFs, but in general low liquidity

A Note On Position Sizing

- No set rules and varies widely based upon what strategy is getting implemented
- If hedging then you need to size so that the exposure in the book is covered
 - Example: If you have 200k of open risk in equities you need to make sure position size is large enough to cover that
- If you are selling options the most important thing is max loss — always calculate what your max loss is in a crisis scenario, size from there
- When going long options size with how much you are willing to lose if the option expires worthless

Continuous Evolution

- Best Books Out There
 - [Volatility Trading by Euan Sinclair](#)
 - [How To Price and Trade Options by Al Sherbin](#)
 - [The 2nd Leg Down by Hari Krishnan](#)
 - [FX Option Performance by Jessica James, Jonathan Fullwood, and Peter Billington](#)