

What's the mood out there?

Using data from the options market to understand market sentiment and help manage risk.



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Keys for today's session

- No option trading required!
- Focus on data that is readily, publicly available
 - [One exception]
- Limitations:
 - Option indicators tend to be short-term
- Indicators mentioned today should be used together with other indicators. Generally, the more indicators line up in the same direction the more confidence we can have.
- None of these indicators is infallible! They're simply useful supplemental information.

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Options

- Cboe Volatility Index (VIX) Options
- Equity Index (SPX-RUT-MSCI) Options
- Exchange Traded Product Options
- Single Stock Options
- WeeklysSM Options
- FLEX Options

Futures

- CBOE Volatility Index (VIX) Futures
- S&P 500 Variance
- Corporate Bond Indices
- AMERIBOR

Indices

- Cboe Volatility Index (VIX)
- Other Volatility Indices
- Strategy Benchmark Indices
- Social Media Indices

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The key option fundamentals we need to know

July 17 2020 **Calls** SPX @ 3,044.31 July 17 2020 **Puts**
48 Days to Exp

Strategy ▾ Trade Get Quote P&L Calc Clear Selections

Open Int	Vol	Change	Last	Bid	Ask	Strike	Bid	Ask	Last	Change	Vol	Open Int	
161	195	-20.12	107.48	125.60	127.00	3,015.00	88.80	89.90	98.44	0.39	48	55	-
840	119	-2.46	107.40	122.20	123.30	3,020.00	90.40	91.60	99.47	-5.83	117	532	-
5,098	1,308	9.81	116.47	118.90	119.90	3,025.00	92.10	93.30	118.60	15.80	18	12,031	-
153	53	3.29	110.32	115.60	116.60	3,030.00	93.80	94.90	98.02	-8.47	298	124	-
296	65	-20.62	99.70	112.30	113.40	3,035.00	95.50	96.70	100.75	0.00	0	24	-
6,745	51	-11.80	99.20	109.10	110.10	3,040.00	97.30	98.50	100.30	-7.19	158	163	-
355	20	1.10	101.00	105.90	106.90	3,045.00	99.10	100.30	111.80	-0.20	0	43	-
13,783	1,669	-4.72	93.55	102.70	103.80	3,050.00	100.90	102.10	119.22	0.34	48	10,088	-
90	3	-0.43	98.57	99.60	100.70	3,055.00	102.80	104.00	111.70	-0.30	107	32	-
9,845	150	8.61	95.57	96.60	97.60	3,060.00	104.80	105.90	121.97	5.97	11	129	-
167	1	-21.35	75.75	93.50	94.60	3,065.00	106.70	107.90	129.60	15.94	57	113	-
259	235	0.59	81.96	90.50	91.60	3,070.00	108.70	109.90	127.34	18.69	3	79	-

The key option fundamentals we need to know

- The price of an option is telling us something about how likely it is that the market will rise above or fall below \$x by a specific date
- (Or at least, it's telling us market perception regarding this)
- The options market is providing this perception for a wide range of different price targets, and a wide range of different future dates

The key option fundamentals we need to know

- You can be a buyer or seller of an option
- Buying a call is consistent with believing the price of the asset will rise above the strike price
- Buying a put is consistent with believing the price of the asset will fall below the strike price
- Selling a call is consistent with believing the price of the asset will not rise above the strike price
- Selling a put is consistent with believing the price of the asset will not fall below the strike price

The key option fundamentals we need to know

- A large percentage of the time the person on the “other side” of an options trade is a market maker
- Market makers are not trading based on a view of market direction
- Therefore, a typical trade is between an investor with a strong view that the price will/won't go above/below a certain level, and somebody with no view on the price.



VIX, Put-Call Ratio, SKEW, Net Gamma

- In each case:
 - What is it?
 - What is it telling us?
 - How can we use it?

Starting with the best known indicator: the “Fear Gauge”!





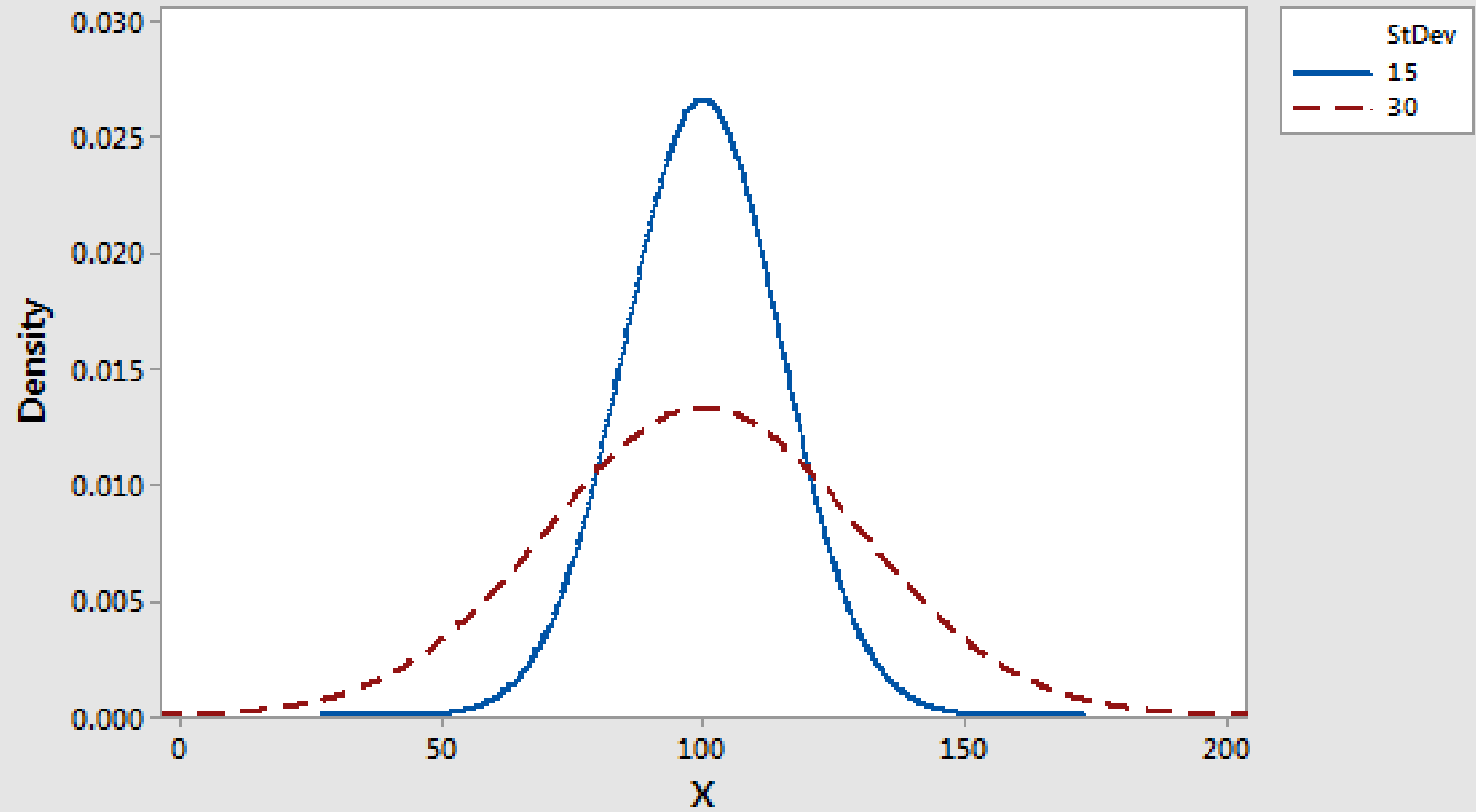
VIX

- ▶ What is it?
 - ▶ 30-day market forecast of volatility for the S&P 500 index
 - ▶ It's the level of short-term volatility that makes sense of the option prices we're seeing ("implied volatility")
 - ▶ Literally: standard deviation in returns
 - ▶ Read as a percentage: VIX of 30 means 30% standard deviation in returns (annual measure)

VIX

Normal Distribution: Same Means - Different Standard Deviations

Normal, Mean=100



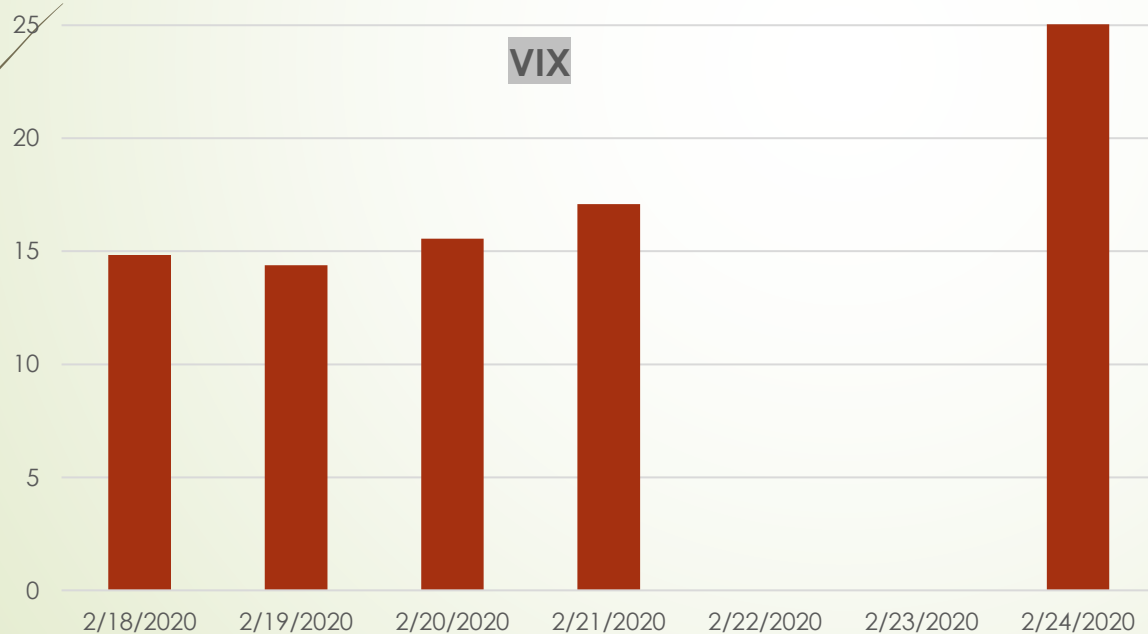


VIX

- ▶ What is it telling us?
 - ▶ How anxious investors are regarding the short-term market environment, hence “fear gauge”
 - ▶ Intuitively: range of future values of the S&P 500 is wide/narrow
 - ▶ Amount of uncertainty regarding short-term future
 - ▶ Spikes in VIX go together with downturns in the market
 - ▶ Many investors think volatility is symmetric ... you can get volatility to the upside as well as downside
 - ▶ Options market certainly thinks of volatility as asymmetric: always bad news!

VIX

- How can we use it?
 - Sadly, VIX is not great as a leading indicator, or advanced warning





VIX

- ▶ How can we use it?
 - ▶ Low VIX often coincides with strong bull markets
 - ▶ Best time to protect against a crash is BEFORE ONE HAPPENS!
 - ▶ High VIX: usually coincident with market downturns, so no advanced warning
 - ▶ However, volatility will persist for a while
 - ▶ VIX is a better leading indicator of recovery from a downturn (when it starts decreasing)

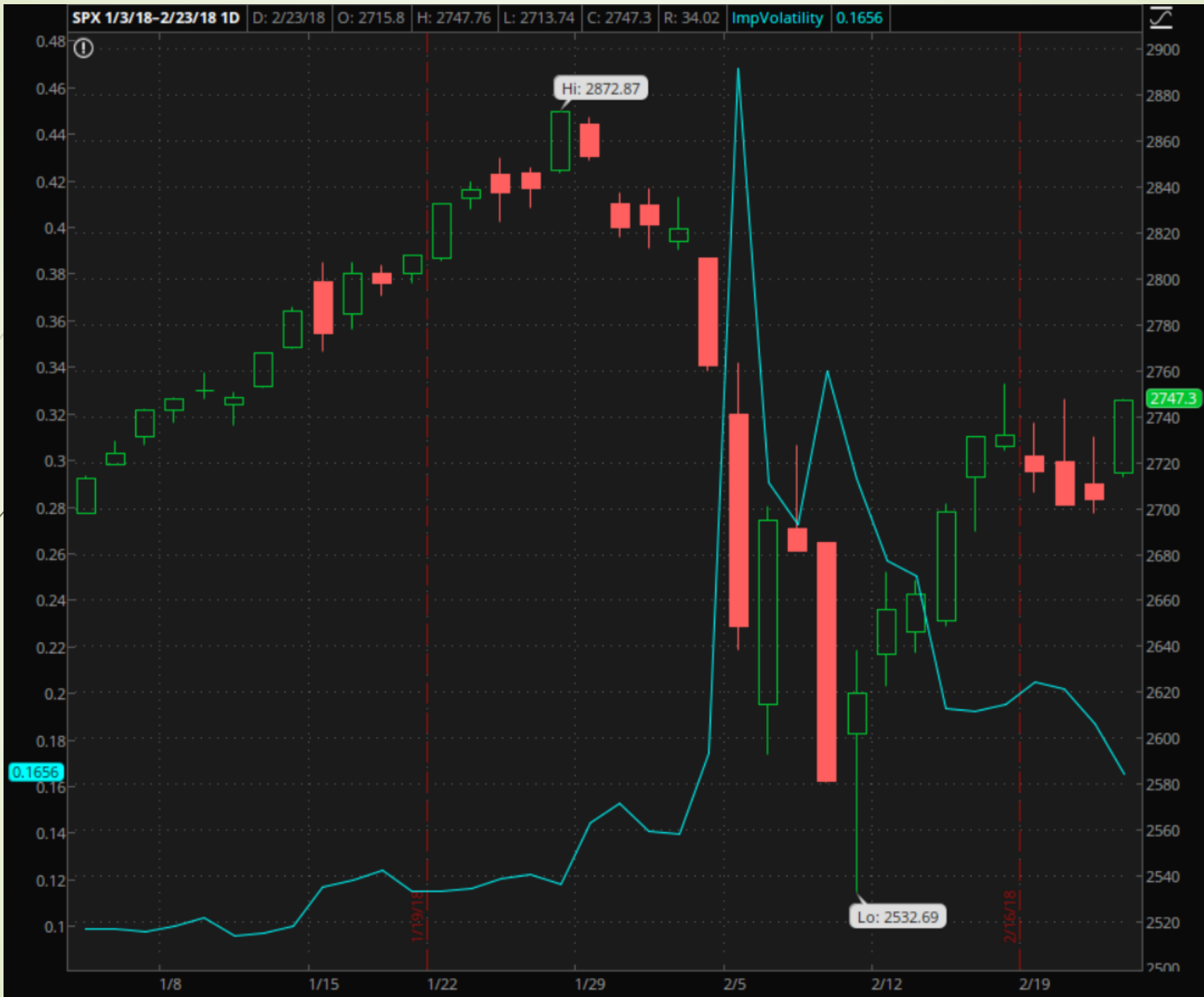


VIX

- ▶ How can we use it?
 - ▶ Typical: 13% to 15%
 - ▶ Low: 10% to 12%
 - ▶ High: 20% to 25%
 - ▶ Lookout!: > 30%
 - ▶ 2008 crisis: peak above 80%
 - ▶ Recent COVID-19 crash: peak above 100% (record high!)

SPX 1/1/20-6/5/20 1D D: 6/5/20 O: 3163.84 H: 3211.72 L: 3163.84 C: 3193.93 R: 47.88 ImpVolatility 0.2474





Early
February
2018

Note

- We can get these measures for individual stocks, or other indices
- CBOE includes data on some big names like AAPL and AMZN

[Cboe](#) ▶ [Indices](#) ▶ [Other Volatility Indices](#) ▶ Volatility on Individual Equities

Volatility on Individual Equities

Cboe Equity VIX[®] on Apple (VXAPL)

Cboe Equity VIX[®] on Amazon (VXAZN)

Cboe Equity VIX[®] on Google (VXGOG)

Cboe Equity VIX[®] on Goldman Sachs (VXGS)

Cboe Equity VIX[®] on IBM (VXIBM)

Cboe Equity VIX[®] on Amazon (VXAZN)

VXAZN



VIX	28.23	0.72
SPX	3055.73	11.42
VXAPL	30.99	-0.10
VXAZN	30.17	1.38
VXGOG	29.24	0.94

Delayed Quotes

Equity Volatility Indices

In a January 5, 2011, [Press Release](#) Cboe announced the creation of new Volatility Index[®] (VIX) methodology to options on five highly active individual equities designed to measure the expected volatility of the respective individual

Put-Call Ratio

- What is it?
- What is it telling us?
- How can we use it?



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For current market data please see [Cboe Daily Market Statistics](#)

Recent:

- [Cboe Total Exchange Volume and Put/Call Ratios \(11-01-2006 to 10-04-2019\)](#)



Put-Call Ratio

- ▶ What is it?
 - ▶ Volume of trading in puts relative to trading in calls
 - ▶ Ratio > 1 : more trading in puts than calls
 - ▶ Ratio < 1 : more trading in calls than puts



Put-Call Ratio

- ▶ What is it telling us?
 - ▶ $P/C > 1$: bearish
 - ▶ $P/C < 1$: bullish
- ▶ Most typically used as a contrarian indicator
- ▶ High: sentiment is peak negative, we're at the market bottom
- ▶ Low: sentiment is peak positive, we're at the market top



Put-Call Ratio

- ▶ How can we use it?
 - ▶ Honestly ...
 - ▶ ...not sure!
 - ▶ Doesn't seem to have strong evidence in support of it.
 - ▶ I've seen efforts to refine it ... weekly averages, moving averages etc. ... but evidence is weak (and this is a whole lot more work than we signed up for this morning!)
 - ▶ Main issue is that just looking at volume doesn't tell you which side of the market the stronger sentiment is on

SKEW

- ➔ What is it?
- ➔ What is it telling us?
- ➔ How can we use it?

Cboe ▶ [Indices](#) ▶ Other Volatility Indices

Other Volatility Indices

- Volatility on Stock Indices
- Volatility on Individual Equities
- VIX-Related Strategy Benchmarks
- SKEW**
- Correlation Indicators
- Other Cboe Volatility Indicators

Cboe SKEW Index (SKEW) www.cboe.com/SKEW

SKEW	129.87	-0.90
SPX	3193.93	81.58
BXM	1294.81	2.22
PUT	1731.71	1.97
VIX	24.52	-1.29

[Delayed Quotes](#)

Cboe SKEW Index

Introduction to Cboe SKEW Index ("SKEW")

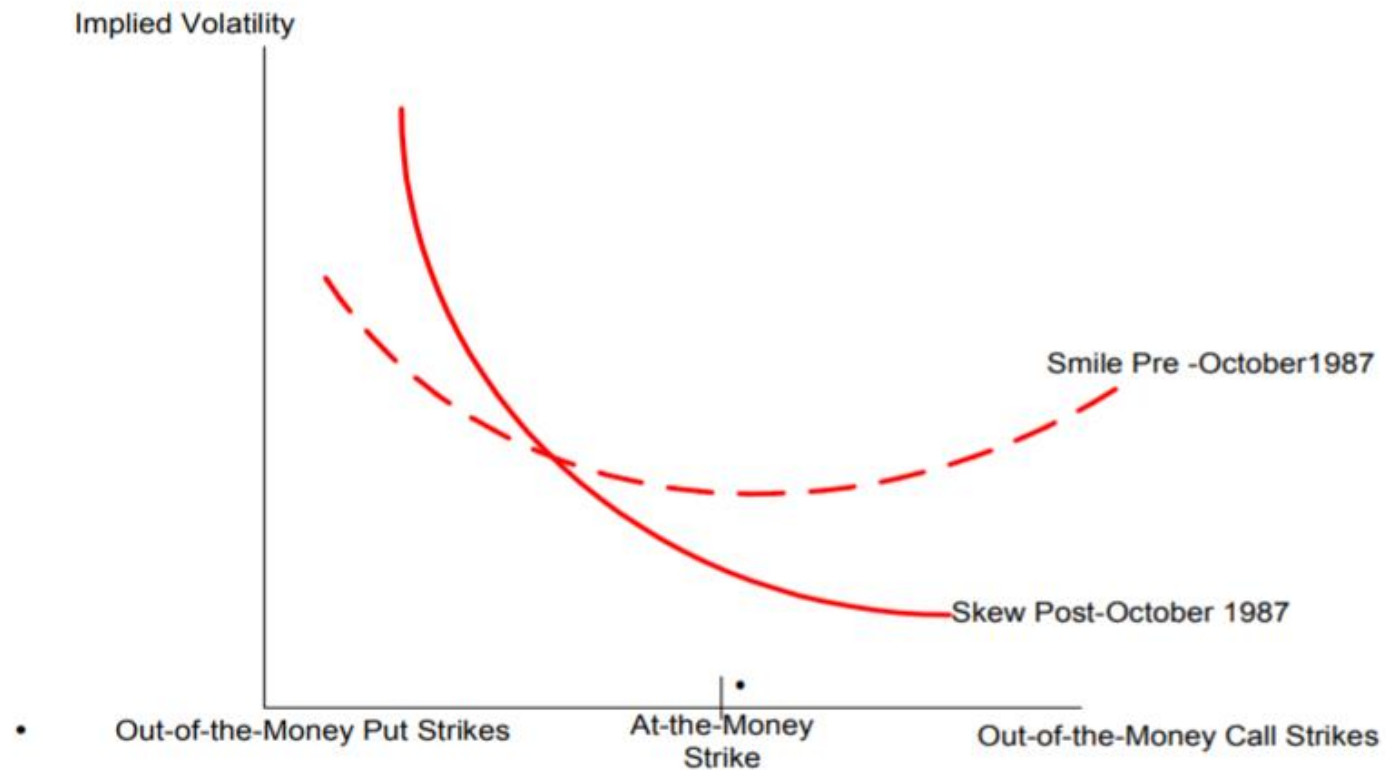
The crash of October 1987 sensitized investors to the potential for stock market crash

SKEW

► What is it?

- Imbalance” between OTM call prices and put prices

Chart 1. The S&P 500 Implied Volatility Curve Pre-and Post- 1987



Source: CBOE



SKEW

- What is it telling us?
 - The difference between the strength of the upside versus the downside
 - A skew index of 100 indicates an expectation of normal (symmetric) returns in the index
 - A skew index > 100 indicates downside is considered stronger than upside (the more > 100 , the greater the “crash” or “tail” risk)
 - A skew index < 100 indicates upside is considered stronger than downside. The skew index is NEVER below 100! ☹

SKEW

➤ What is it telling us?

Table 2. Estimated Risk-Adjusted Probabilities of S&P 500 Log Returns Two and Three Standard Deviations below the Mean

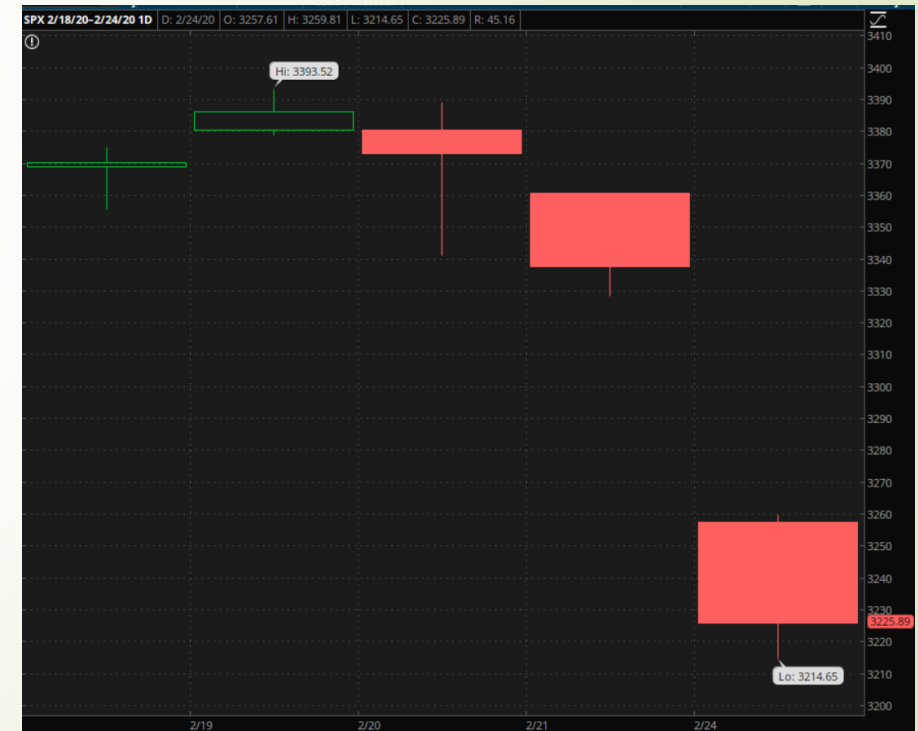
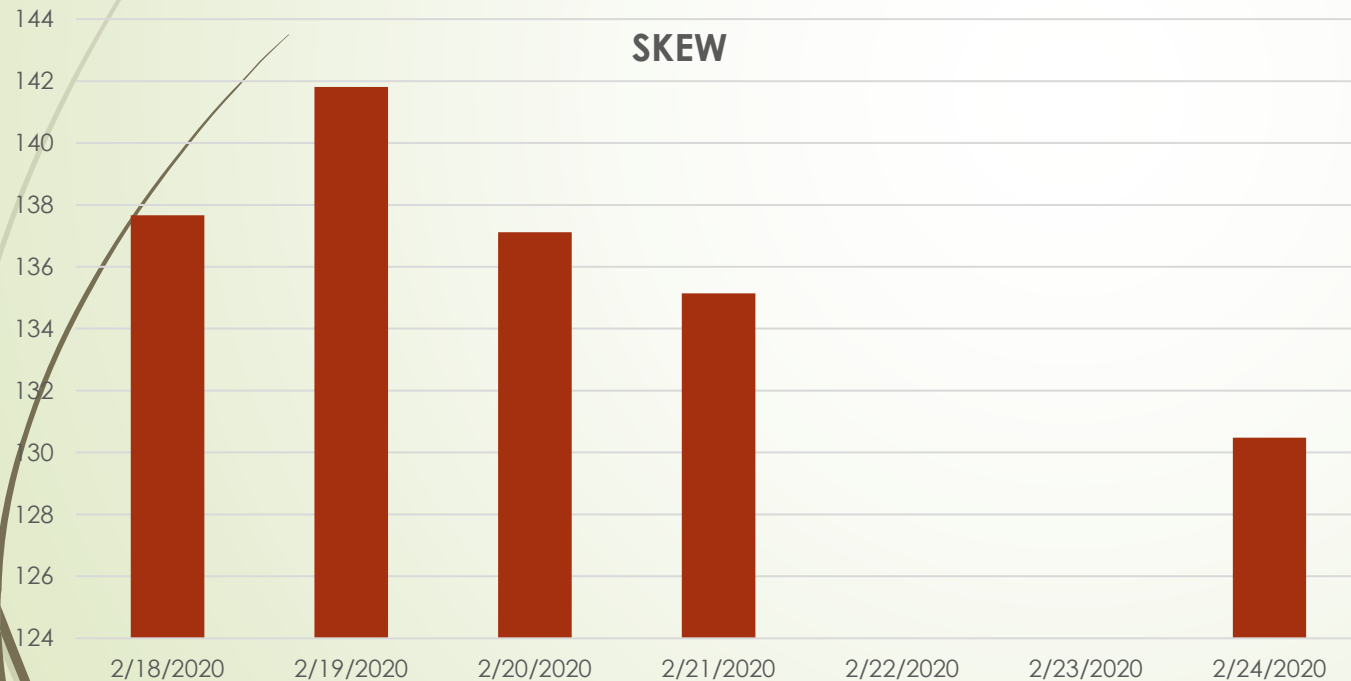
Estimated Risk Adjusted Probability		
SKEW	S&P 500 30-Day Log Return	
	2 Std. Dev	3 Std. Dev.
100	2.30%	0.15%
105	3.65%	0.45%
110	5.00%	0.74%
115	6.35%	1.04%
120	7.70%	1.33%
125	9.05%	1.63%
130	10.40%	1.92%
135	11.75%	2.22%
140	13.10%	2.51%
145	14.45%	2.81%

Source: CBOE

- SKEW > 130 means “crash” risk is elevated
- However, ‘elevated’ is still way below 100%, so we will get some false warnings.

SKEW

- How can we use it?
 - Better leading indicator of a crash than VIX, but with some false positives





Net gamma

- ▶ What is it?
- ▶ What is it telling us?
- ▶ How can we use it?

- ▶ **NOTE:** *data for this not very easily accessible ... requires a little work on our part, and an account that has options data*



Net gamma

➤ What is it?

- Identifies likely hedging demand by market makers
- When market makers trade, they hedge their option positions by trading the underlying market
- This hedged setup is unstable over time (because asset moves one-for-one with the market, while option prices have a curved relationship ... gamma!)
- Provides a clue to what market makers in the options market will do in the future when the market moves



Net gamma

- What is it telling us?

- If positive:

- Market makers will be **selling** into a **rising** market, and **buying** into a **falling** market

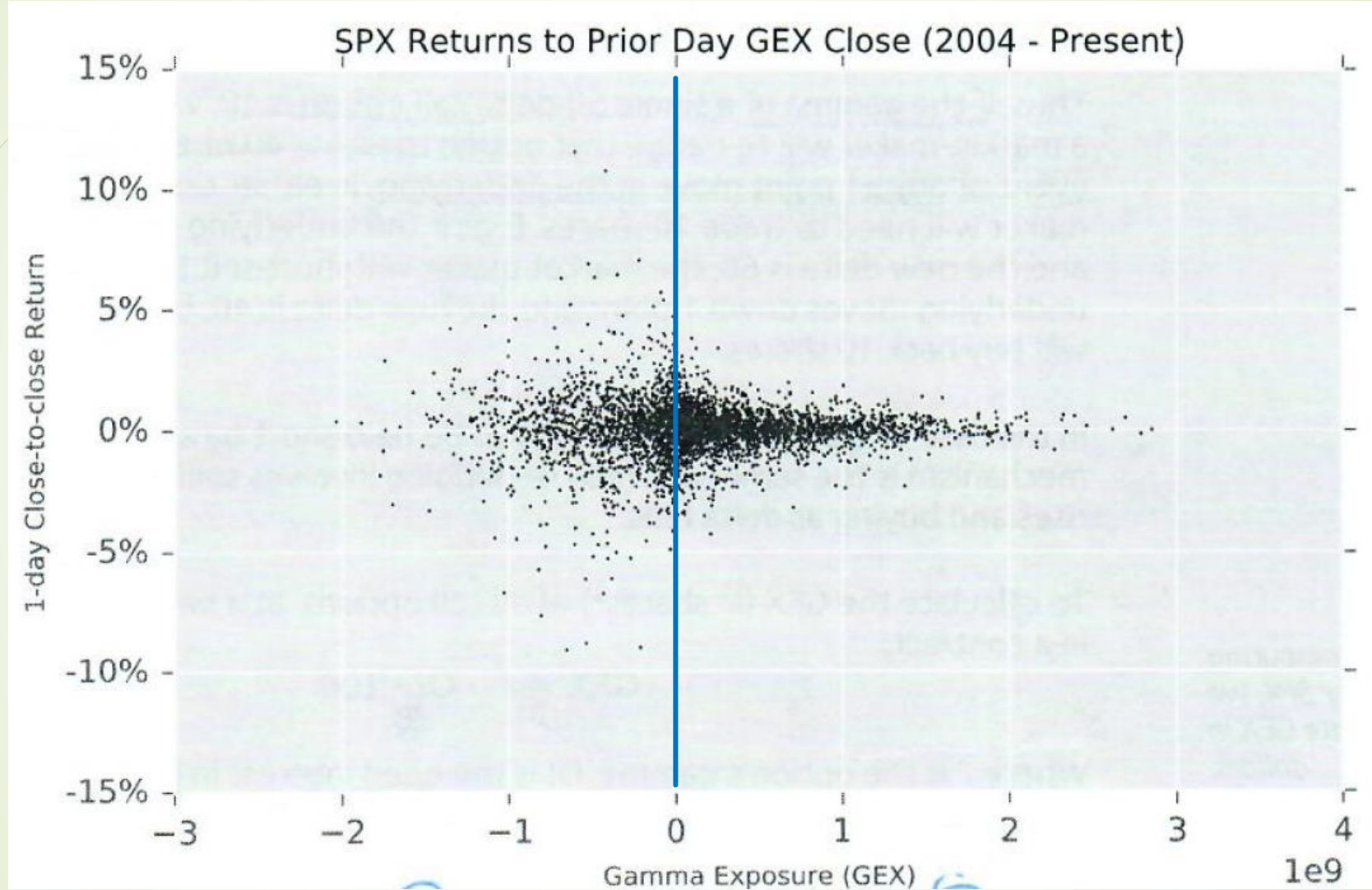
- Market maker activity will have a **stabilizing** effect on the market

- If negative:

- Market makers will be **buying** into a **rising** market, and **selling** into a **falling** market

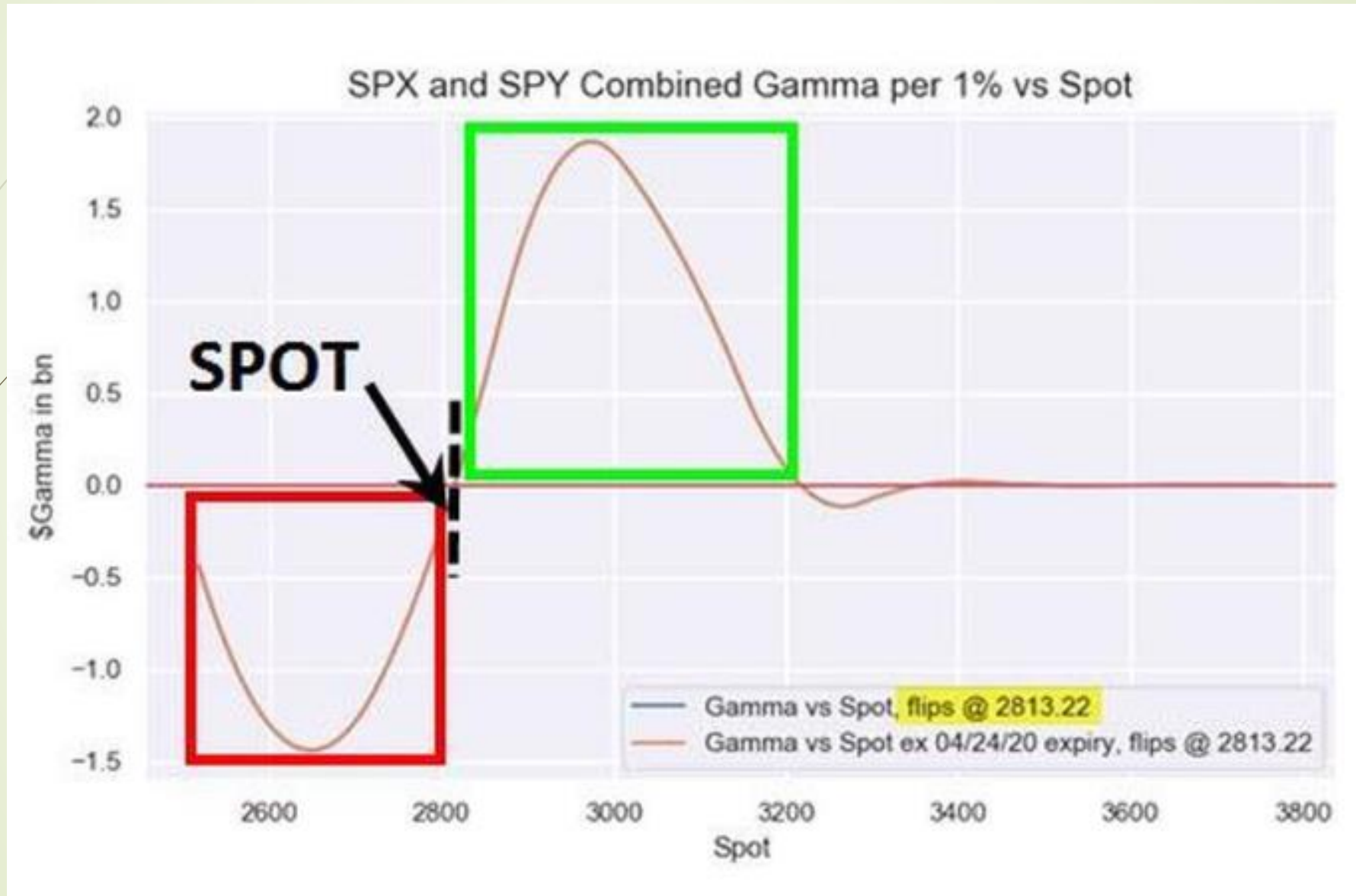
- Market maker activity will have a **destabilizing** effect on the market

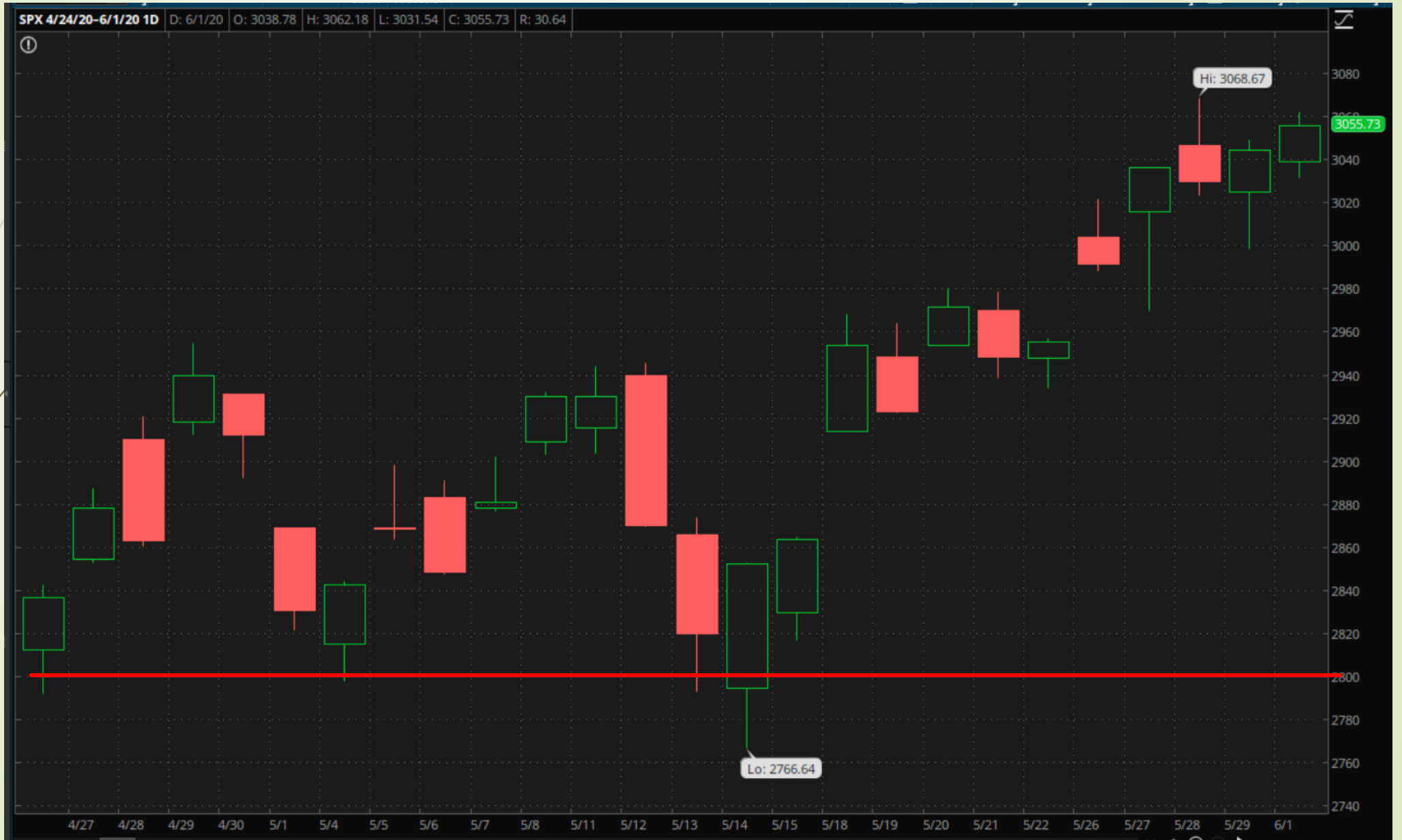
Net gamma



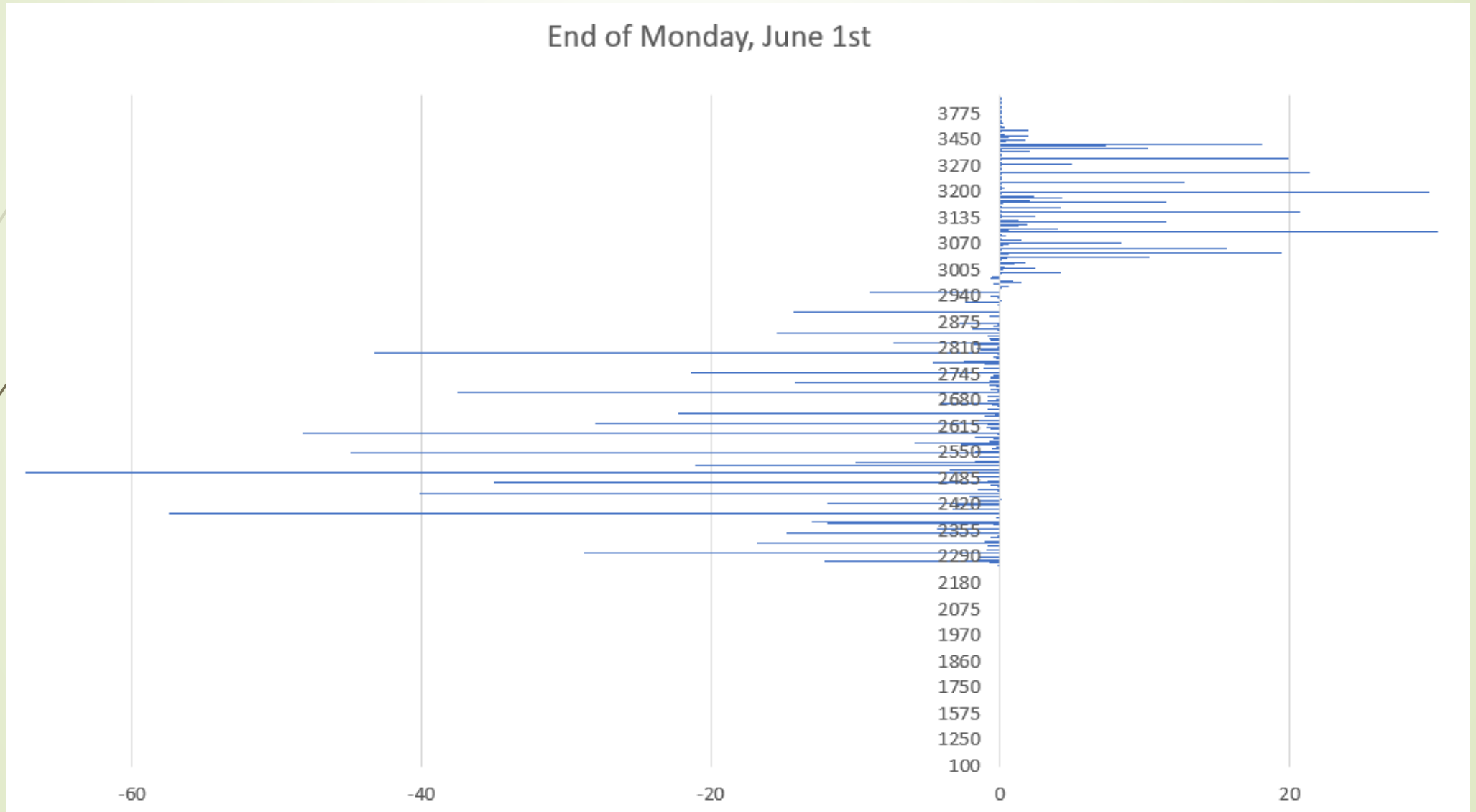
From SqueezeMetrics Research

From Zerohedge, April 24th 2020





S&P 500, last Monday



S&P 500, last Monday



Appendix: Calculation of net gamma

- For a specific strike price and expiry date, net gamma is:
 - $[\text{call gamma}] \times [\text{call open interest}] - [\text{put gamma}] \times [\text{put open interest}]$
 - The net gamma chart is produced by exporting the data into Excel and copying and pasting the above equation for each strike price

AMZN @ 2,483.00 July 17 2020 **Calls**

Choose a Strategy

Strike	Bid	Ask	Last	Change	Volume	Open Int	Day High	Day Low	Delta	Gamma
2,460.00	93.35	95.30	95.00	8.30	80	256	97.80	76.98	0.563	0.002
2,470.00	87.90	89.75	88.00	5.17	99	118	91.50	74.95	0.543	0.002
2,480.00	82.65	84.00	83.00	5.65	84	597	86.38	66.90	0.524	0.002
2,490.00	77.50	79.30	77.82	5.32	26	82	78.97	62.48	0.504	0.002
2,500.00	72.70	74.50	73.20	4.20	301	3,143	76.49	59.25	0.485	0.002
2,510.00	67.90	69.65	66.92	1.92	1,103	2,207	71.25	54.30	0.465	0.002

AMZN @ 2,483.00 July 17 2020 **Puts**

Choose a Strategy

Strike	Bid	Ask	Last	Change	Volume	Open Int	Day High	Day Low	Delta	Gamma
2,460.00	69.80	72.40	71.50	-18.14	52	130	85.62	71.50	-0.438	0.002
2,470.00	74.25	76.90	73.65	-20.92	30	130	98.00	73.65	-0.457	0.002
2,480.00	78.90	81.60	81.00	-14.80	39	67	95.55	81.00	-0.476	0.002
2,490.00	83.55	86.50	87.10	-7.07	15	171	97.65	86.90	-0.496	0.002
2,500.00	88.55	91.55	92.27	-18.19	26	1,625	103.08	89.93	-0.515	0.002
2,510.00	93.75	96.95	95.10	-19.35	1,003	2,021	108.25	95.10	-0.535	0.002