

The background of the slide is an aerial photograph of a city skyline, likely Chicago, during sunset. The sky is a mix of orange, pink, and light blue. The city buildings are densely packed, with many windows glowing with lights. A large, white, semi-transparent arrow shape points from the left towards the right, partially overlapping the city view and the text.

# Trading Index Options

Options Institute at Cboe Global Markets

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May 10, 2019

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## ❖ Index Options Basics

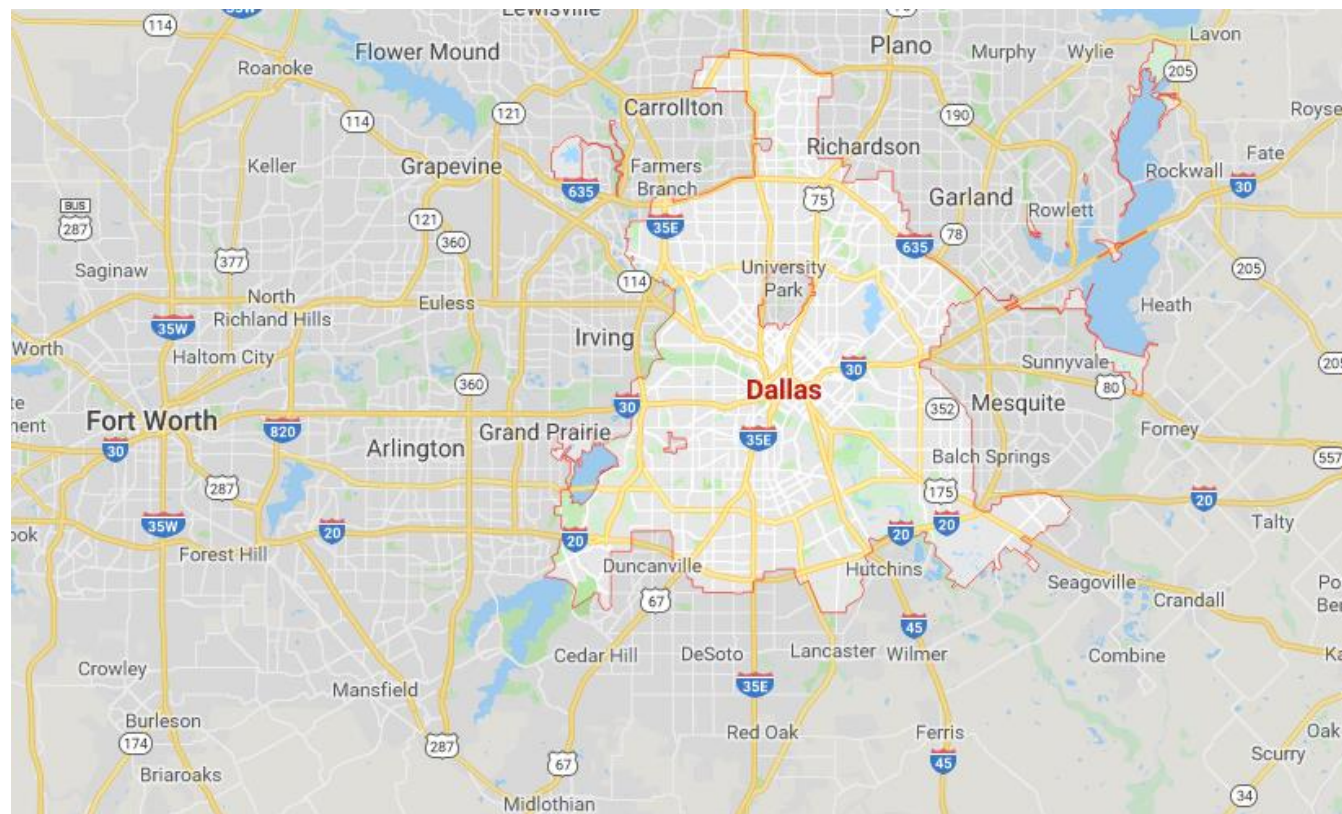
- Security Basics
- Trading & Settlement Characteristics
- Advantages
- How to Use Them

## ❖ Volatility for Beginners

- Historical and Implied Volatility
- The VIX
- The importance of Timeframes and timing

## ❖ Top Three Index Strategies

- Directional Trading: Buy a Call (market up)
- Directional Trading Buy a Put (market down)
- How to hedge your portfolio with the right Index



- ❖ Options to buy or sell the value of underlying index
- ❖ No actual stocks bought or sold
- ❖ CASH SETTLE
- ❖ Typically “European-style options”
- ❖ Can be used to diversify portfolio
- ❖ Multiple ways to hedge portfolio risks
- ❖ Contracts usually have a multiplier of 100
  - E.g. SPX May17 2800 Put @ \$26
  - Option price =  $\$26 \times 100 = \$2,600$

Index	Index Options	Related ETF
DJIA	DJX	DIA
S&P 500	SPX (XSP)	SPY
NASDAQ 100	NDX	QQQ
Russell 2000	RUT	IWM
VIX	VIX	-



- ❖ Underlying asset represents particular market
  - Cannot invest directly in index
  - Cash level of the Index adjusted by multiplier
    - E.g. SPX trading 2,800; notional value = \$280,000 (2,800 x 100)
- ❖ A.M. Settlement
  - Based on opening prices
  - Settlement calculated from Friday morning opening prices
  - E.g. SPX, RUT, VIX, XSP, DJX, NDX
- ❖ P.M. Settlement
  - Based on closing prices
  - Settlement calculated from Friday afternoon closing prices
  - E.g. SPXW, OEX



## European-style Options

- ❖ Most index options are European
- ❖ **May only be exercised at expiration**
- ❖ **CASH SETTLE** - No shares exchange hand
- ❖ Last day to trade Thursday before 3<sup>rd</sup> Friday
  - Non-standard trades until 3:00 p.m. CDT (e.g. SPXW)
- ❖ Settlement value determined Friday morning

## American-style Options

- ❖ All optionable equity stocks and ETFs
- ❖ **May be exercised at ANY time before expiration date**
- ❖ Settlement in delivery of underlying shares
- ❖ **Any option ITM by \$0.01 is subject to auto-exercise**
- ❖ Early Exercise reasons: Dividend (Call option), Bankruptcy (Put Option)
- ❖ Settlement price is official closing price for expiration

## Index Options

- ❖ Settles with cash
- ❖ Contract value = Index value x \$100 multiplier
- ❖ Some A.M. settle; Some P.M. settle
- ❖ Broad-based index options stop trading 3:15 p.m. CDT
- ❖ Mostly European-style exercise (OEX is American)
- ❖ Options may trade if components representing 80% of market cap trading in primary market
- ❖ Some special tax considerations – 1256 treatment



## Equity Options

- ❖ Settles with shares of stock
- ❖ Denominated in shares
- ❖ P.M. settlement
- ❖ Options stop trading 3:00 p.m. CDT
- ❖ American-style exercise
- ❖ Options may trade only if underlying trading in primary market
- ❖ Some special tax issues



# Index Option Basics - Advantages

- ❖ Ability to trade against diversified portfolio
  - Less volatility than individual stocks
  - Can protect index-correlated portfolio
- ❖ Large volume; Plenty of liquidity
- ❖ Large contract size tends to reduce cost (SPX/RUT)
  - SPX contract covers \$280,000\* of exposure
- ❖ No risk of disruption portfolio holdings at expiration
  - European exercise
  - No delivery of shares
- ❖ Receive Section 1256 Tax treatment<sup>1</sup>
  - Regardless of holding period
  - *Profits and losses: 60% long term and 40% short term*
  - Positions marked-to-market at EOY and taxed as if closed



\*Index value x 100 = 2800 x 100 = \$280,000

<sup>1</sup> Investors should consult with their tax advisors to determine how the profit and loss on any particular option strategy will be taxed. Tax laws and regulations change from time to time and may be subject to varying interpretations.



## Trading with Index Options

- ❖ Offer a diversified portfolio of stocks to trade risk
- ❖ Speculation on the index going up or going down in a certain time frame
  - **Buy Call** – bullish on index
  - **Buy Put** – bearish on index
- ❖ Hedge a long portfolio of stocks by purchasing insurance
  - Sell Calls
  - **Protective Put**



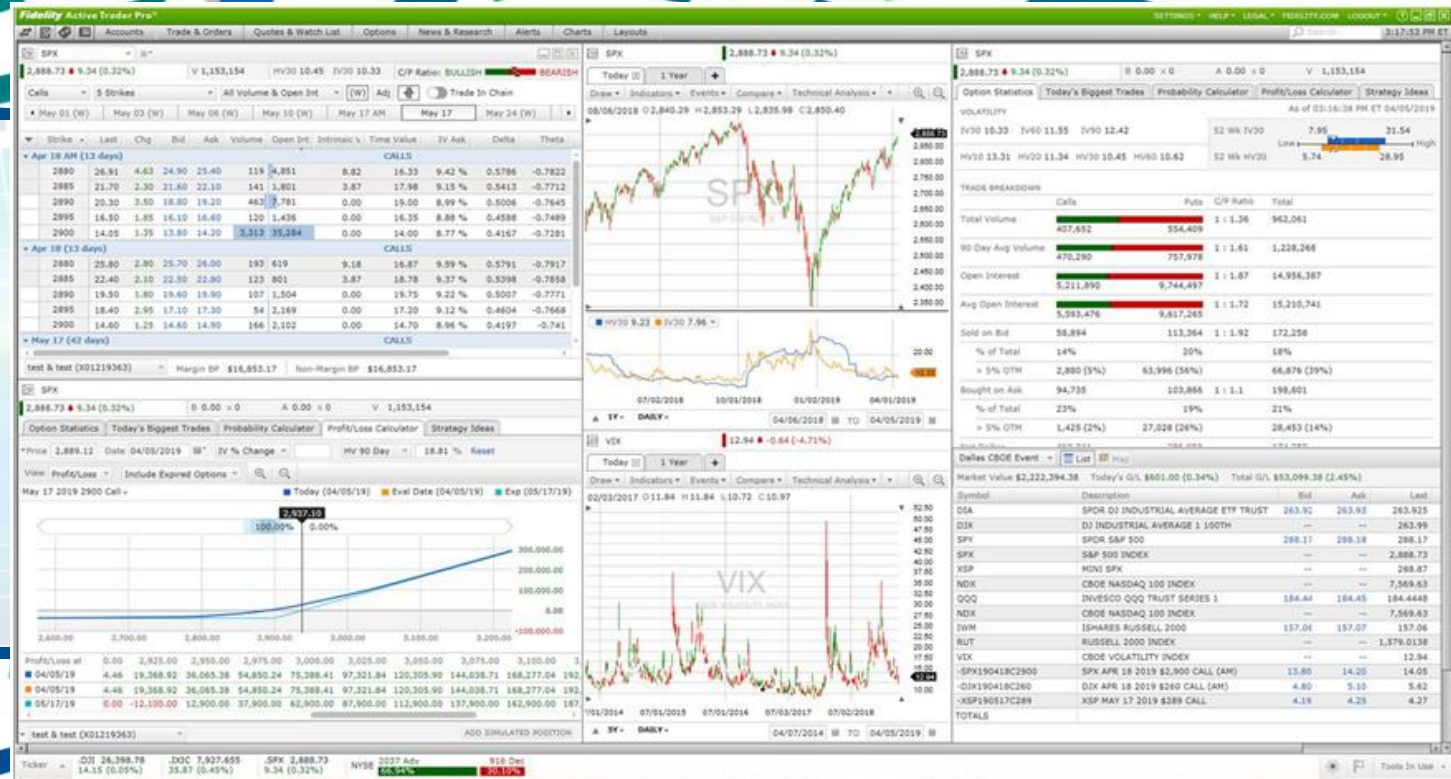
## What You Need to Know.....

- ❖ Options to buy/sell value of underlying index
- ❖ DJX, SPX, RUT and VIX are examples
- ❖ A.M./P.M. Settlements
- ❖ Most are European-style
- ❖ Cash settlement – no delivery of shares
- ❖ Some are very actively traded
- ❖ Ability to trade against diversified portfolio
- ❖ 1256 tax treatment<sup>1</sup>
- ❖ Can be used to hedge portfolio or speculate



<sup>1</sup> Investors should consult with their tax advisors to determine how the profit and loss on any particular option strategy will be taxed. Tax laws and regulations change from time to time and may be subject to varying interpretations.

# Applying What You Learned.....



- ❖ Index Options Basics
  - Security Basics
  - Trading & Settlement Characteristics
  - Advantages
  - How to Use Them
- ❖ Volatility for Beginners
  - Historical and Implied Volatility
  - The VIX
  - The importance of Timeframes and timing
- ❖ Top Three Index Strategies
  - Directional Trading: Buy a Call (market up)
  - Directional Trading Buy a Put (market down)
  - How to hedge your portfolio with the right Index

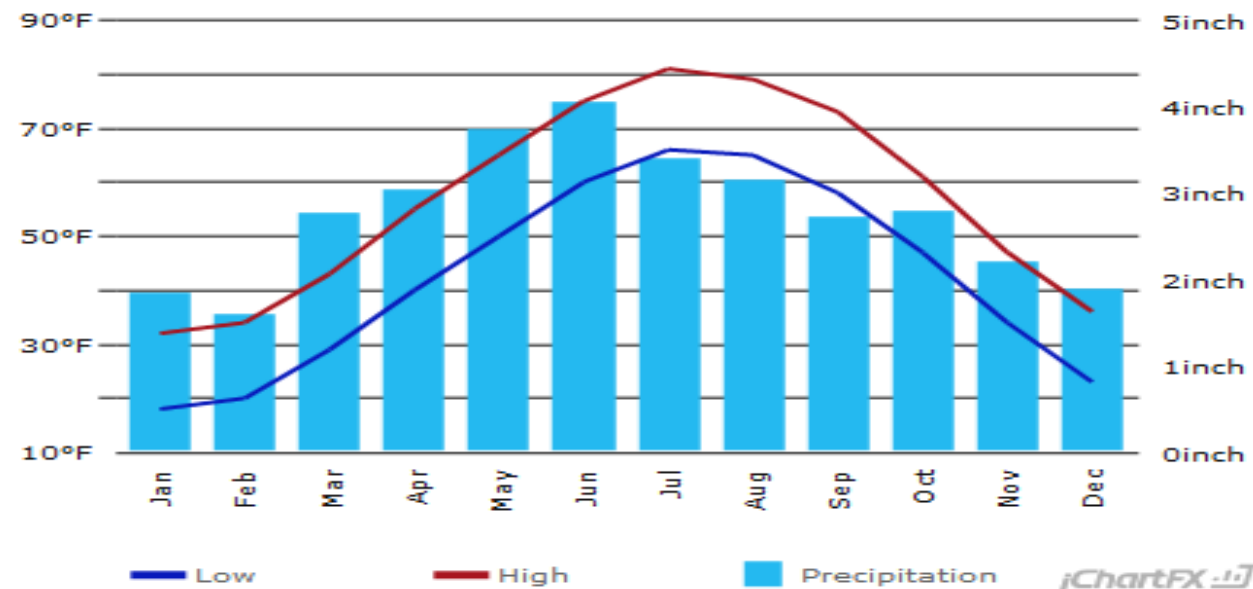


- ❖ Volatility = Measure of the relative degrees of change
- ❖ Periods of relatively high volatility and low volatility
- ❖ S&P 500<sup>®</sup> Index volatility – 1-yr versus 5-yr
  - 2018: 4.92% monthly; 17.05% annual
  - 2013-2018: 3.82% monthly; 13.23% annual
- ❖ Ebbs and flows over time due to many factors
- ❖ Volatility Drivers
  - Geopolitical
  - Corporate Earnings
  - Stock-specific news
  - Supply and Demand
- ❖ Volatility tends to be mean reverting



- ❖ Reflects changes in underlying BUT does not imply a price trend
  - Expectations change continually
- ❖ Weather example – Chicago in July
  - Average temperature: High - 81 degree, Low - 66 degree
  - Average precipitation: 3.25 inches (9 days of rain)

Chicago Climate Graph - Illinois Climate Chart



Source: USA climate data



## Historical Volatility (HV)

- ❖ Measure of changes in underlying from previous moves
- ❖ Factual data from past
- ❖ Measures how far traded prices move away from the mean
- ❖ Higher HV is indicative of a riskier asset – bullish and bearish
- ❖ No future guarantees

## Implied Volatility (IV)

- ❖ Estimate of volatility based on market's perception
- ❖ Represents the current market price for volatility
- ❖ Determined by prices of options of market forces
- ❖ Metric used to estimate future fluctuations in underlying price
- ❖ Proxy for market risk

*HV frequently compared with IV to determine if options prices are over- or undervalued*

# Changing Implied Volatility: Example #1

- ❖ You buy XYZ Sept 50 call for \$5.00
  - XYZ stock at \$50.00
  - Expiration in 120 days
- ❖ Next day XYZ stock fluctuates (up \$3/down \$3) and levels off at \$50
  - Sept 50 call *increases* in price to \$5.50
- ❖ What happened?
  - IV of Sept 50 call *increased*
  - IV was 35% when purchased – IV is 40% the next day
  - Unrealized *profit* based on volatility

Stock Price	\$50.00
Exp/Strike	Sept 50 call
Opt. Price	\$5.00
Vol	35%
DTE	120

Stock Price	\$50.00
Exp/Strike	Sept 50 call
Opt. Price	\$5.50
Vol	40%
DTE	119



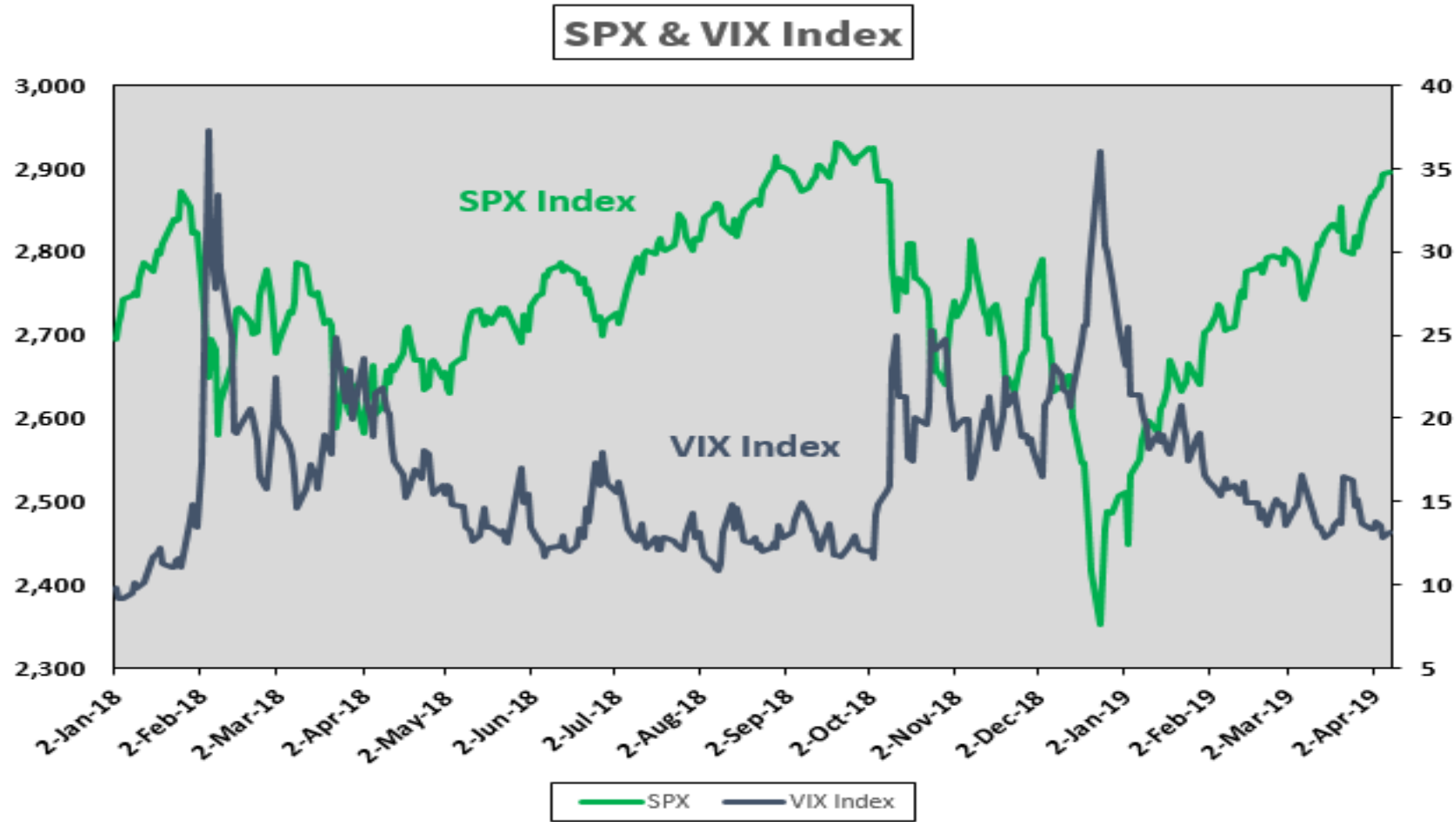
## Changing Implied Volatility: Example #2

- ❖ You buy XYZ Jun 55 call for \$3.00
  - XYZ stock at \$50.00
  - Expiration in 30 days
- ❖ After 5 days XYZ stock *rises* to \$51.50
  - June 55 call *drops* in price to \$2.50
- ❖ What happened?
  - IV of Jun 55 call *decreased*
  - IV was 35% when purchased – IV is 30% after 5 days
  - Unrealized *loss* based on volatility

Stock Price	\$50.00
Exp/Strike	Jun 55 call
Opt. Price	\$3.00
Vol	35%
DTE	30

Stock Price	\$51.50
Exp/Strike	Jun 55 call
Opt. Price	\$2.50
Vol	30%
DTE	25

Inverse Relationship



Average VIX in 2017: 11.09  
Average VIX in 2018: 16.64  
Average VIX in 2019: 15.51\*

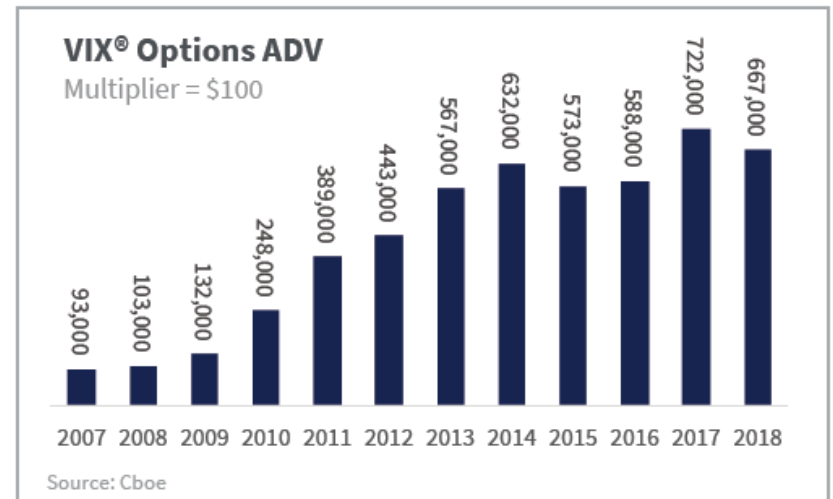
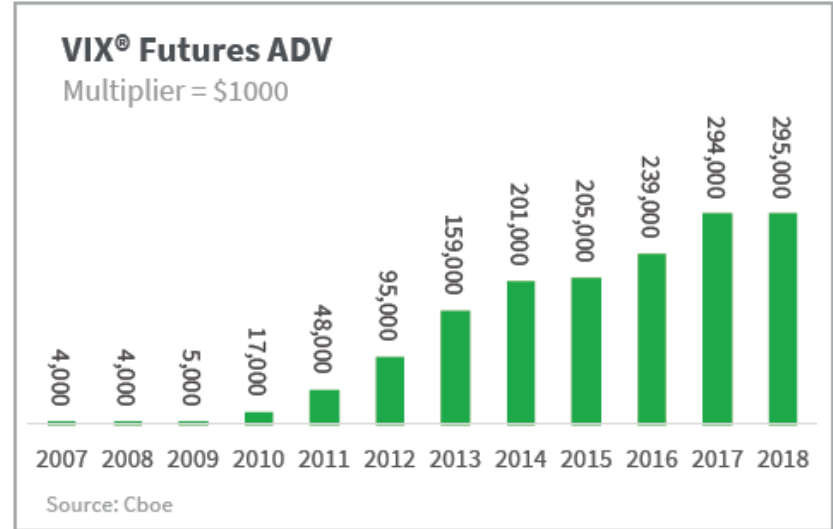
Data: Cboe Global Markets

\*As of 5/3/2019

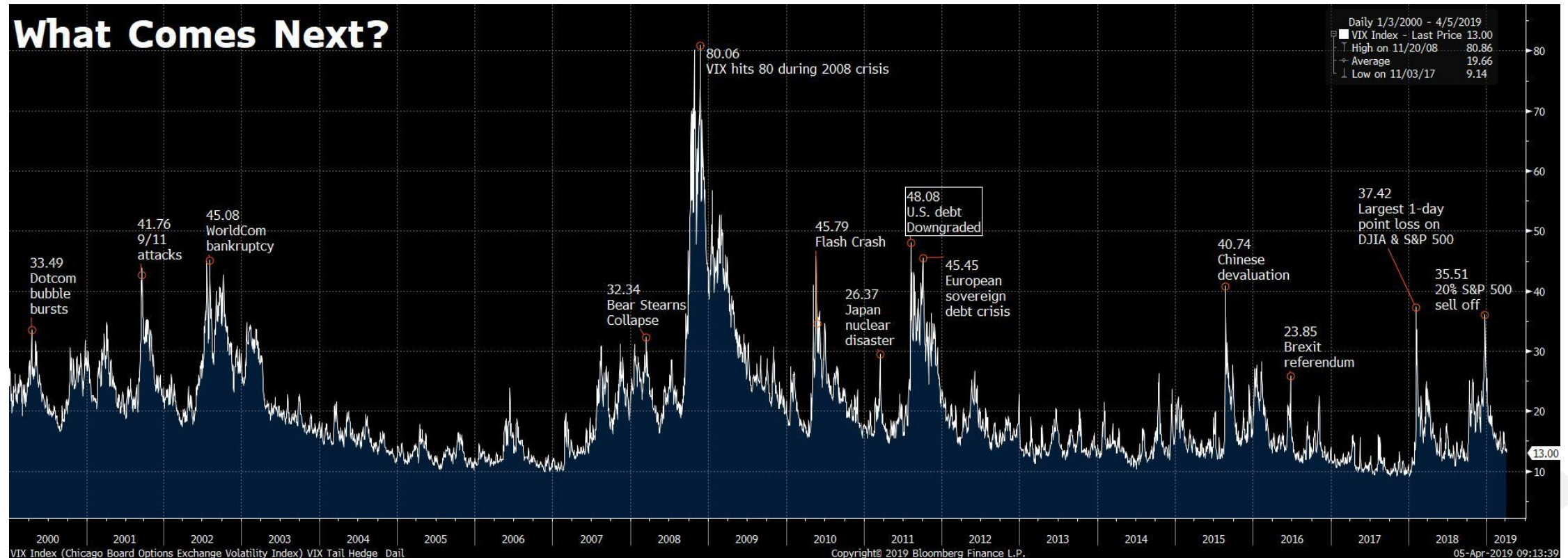


## What is the VIX® Index?

- ❖ Index represents market's expectation of 30-day forward looking volatility
- ❖ Derived from price inputs of S&P 500 index options
- ❖ Barometer of investor sentiment and market volatility
- ❖ VIX has paved the way for volatility as a tradeable asset
- ❖ Historically has inverse relationship with SPX
- ❖ Index is NOT an investable index
- ❖ VIX futures and options are tradeable vehicles



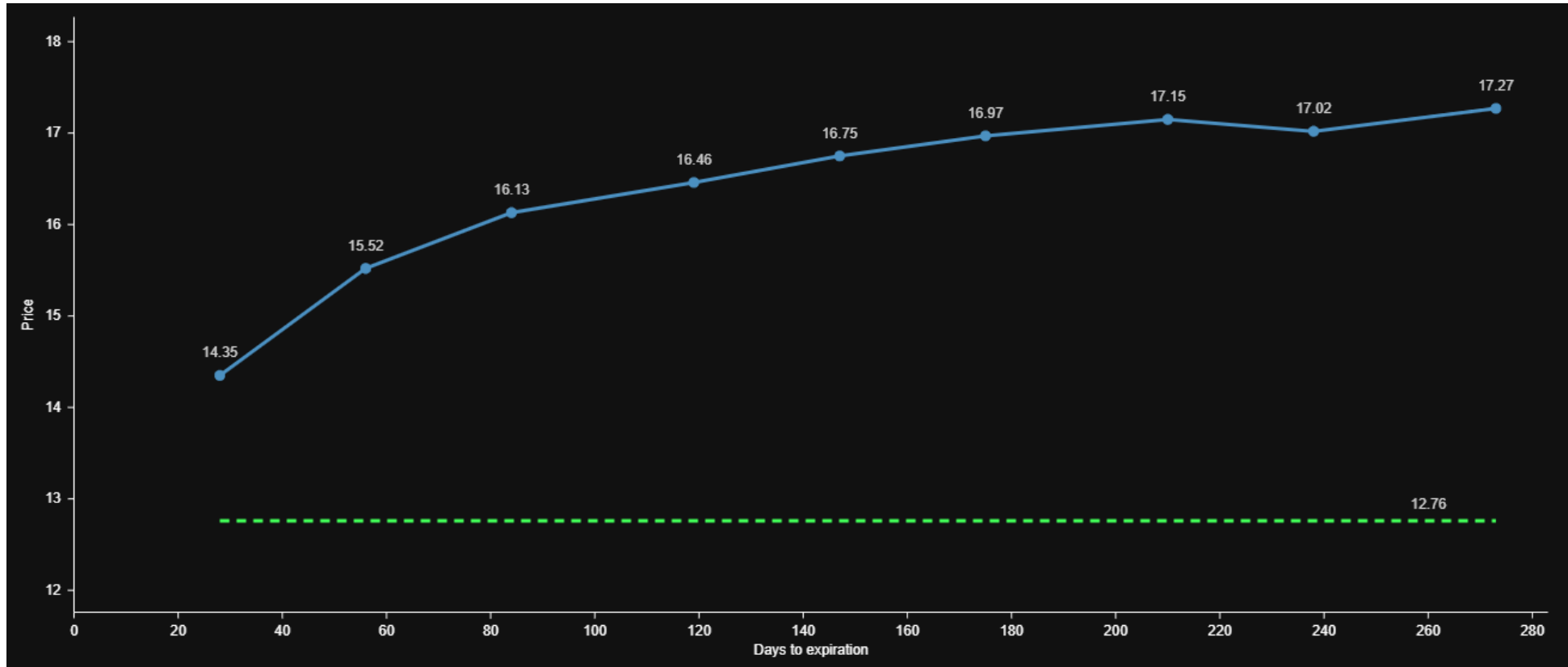
- ❖ Different perspective (Volatility is ever-changing)
  - Intraday all-time high (Index): 89.53 (Oct 24, 2008)
  - Closing all-time high (Index): 80.06 (Nov 20 2008)
  - Closing high ex 2008/2009: 48.00 (Aug 8, 2011)



- ❖ VIX futures & options afford market participants tremendous flexibility
  - Pure play on expected volatility (higher/lower/neutral)
  - Future price reflects market opinion of future VIX Index direction
- ❖ VIX futures can trade at a premium (contango) or discount (backwardation) to the VIX Index
- ❖ Typical futures trading strategies
  - Outright Long VIX futures (market vol *up* directional play)
  - Outright Short VIX futures (market vol *down* directional play)
  - Calendar spreading (term structure play)
- ❖ Futures are cash settled; typically expire on a Wednesday morning (A.M. settlement)
  - Based on special settlement process for SPX options that expire 30 days out (from expiration)

***VIX futures contract has \$1,000 multiplier***

## VIX Futures Term Structure Matters – Understand It



- ❖ VIX options price off of indicative future
- ❖ **Backwardation/Inversion** – Fear driven market (Dec 2018 – January 2019)
- ❖ **Contango** – During periods of market stability (since February 2019)

Source: Cboe LiveVol



- ❖ **CASH SETTLED** contracts that share an expiration date with a VIX future
- ❖ Priced off of corresponding futures contract with shared expiry – **VERY IMPORTANT**
  - Trading June VIX options; June VIX future determines
- ❖ VIX option strategies? Same as equity, ETF, and Index options strategies
  - Directional - Long calls or puts (spreads)
  - Structured spreads – Ratio spreads, Calendar spreads
  - VIX options widely used hedging vehicle for Institutional portfolios
- ❖ VIX options priced off futures contract, but settle into the VIX Index
- ❖ VIX options cease trading (typically) Tuesday P.M. before Wednesday A.M settle along with corresponding future

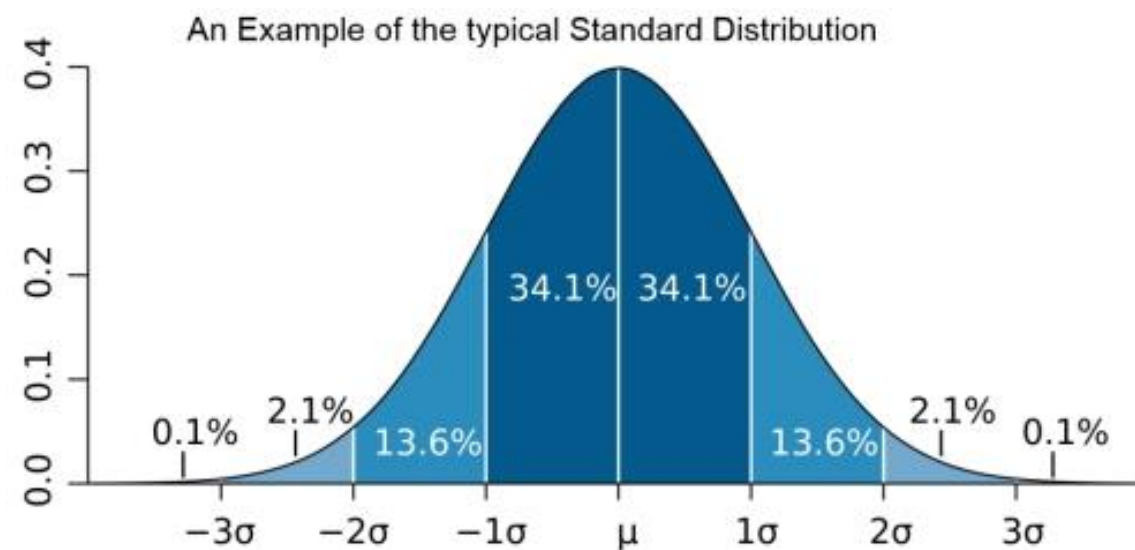
*VIX Options have a \$100 contract multiplier*

- ❖ Volatility exists for different timeframes
  - 1-mo vol → 3-mo vol → 1-yr vol → 3-yr vol
  - Be aware of current IV compared to past IV level
  - Also know relevant IV compared to relevant HV (i.e. 3-mo IV vs. 3-mo HV)
- ❖ Time-varied volatility measures can influence the expectations of investments
  - Expectations are constantly in flux
- ❖ Analyzing volatility by specified timeframes can be helpful
  - Can reveal how a security has behaved in cycles or other events
- ❖ Trying to time pivot points in the market (equity or volatility) is difficult
  - Volatility tools (IV/HV timeframes) to help approximate potential pivot points

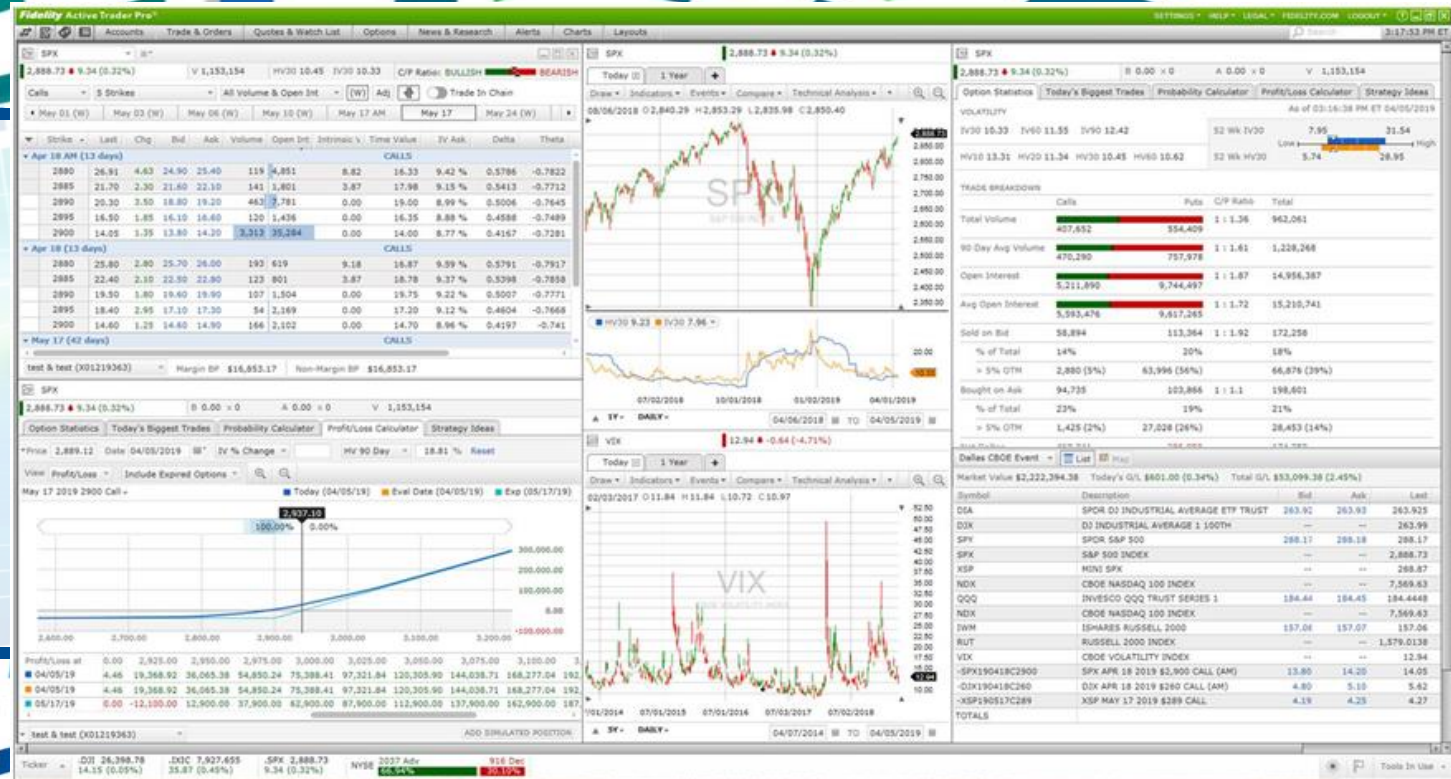


## What You Need to Know.....

- ❖ Volatility measures degree of changes in underlying
- ❖ HV measure of past underlying changes
- ❖ IV is market's forecast underlying changes
- ❖ Affect of IV on options pricing
- ❖ VIX Index – VIX Futures – VIX Options
- ❖ Understand VIX Term Structure
- ❖ VIX options prices determined by corresponding VIX future
- ❖ Time-varied volatility measures can influence expectations



# Applying What You Learned.....



## ❖ Index Options Basics

- Security Basics
- Trading & Settlement Characteristics
- Advantages
- How to Use Them

## ❖ Volatility for Beginners

- Historical and Implied Volatility
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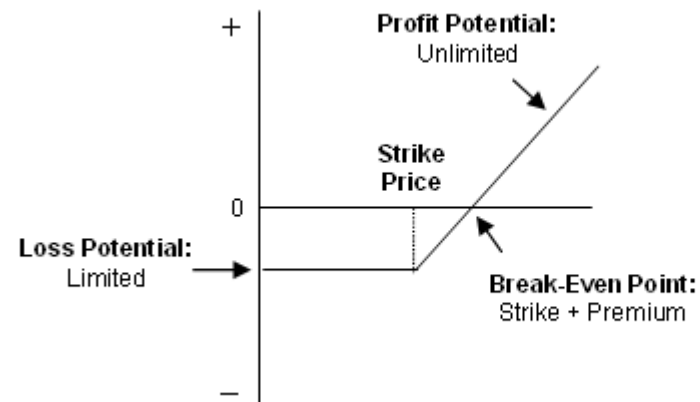
## ❖ Top Three Index Strategies

- **Directional Trading: Buy a Call (market up)**
- **Directional Trading Buy a Put (market down)**
- **How to hedge your portfolio with the right Index**



# Directional Trading – Buy a Call (market up)

- ❖ Investor that is bullish on S&P 500 index
  - Buy Call to potentially profit from rise in level
- ❖ Investor who wants to diversify short delta portfolio
  - Buy Call for upside exposure of S&P 500 index
- ❖ Investor that understands the advantage of options
  - Limited dollar risk
  - Leverage



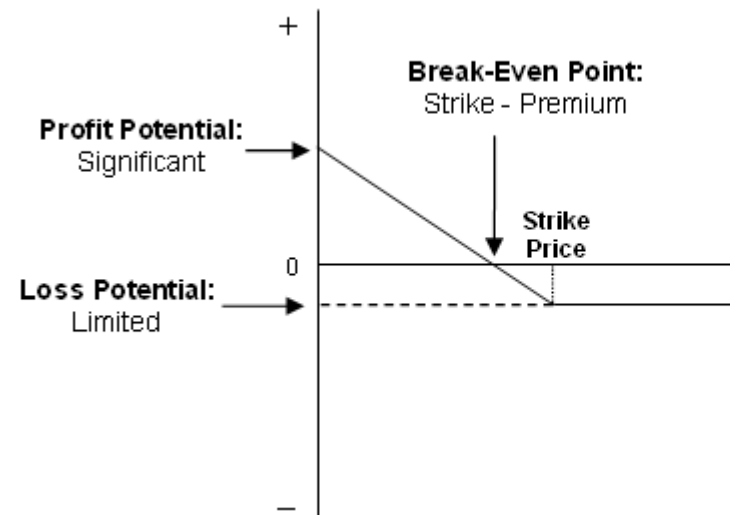
**Volatility:**  
Increase = Positive Effect  
Decrease = Negative Effect

**Time Decay:**  
Negative Effect



# Directional Trading – Buy a Put (market down)

- ❖ Investor who is bearish on S&P 500 index
  - Buy Put to potentially profit on decline in level
- ❖ Investor wants to speculate on market drop
  - Buy Put for downside exposure to S&P 500
- ❖ Investor that understands the advantage of options
  - Limited dollar risk
  - Leverage



**Volatility:**  
Increase = Positive Effect  
Decrease = Negative Effect

**Time Decay:**  
Negative Effect



# How to Hedge your Portfolio with the right Index

Determine # of SPX contracts:

$$\frac{\text{Portfolio \$Value to be Hedged}}{\text{Notional Value of Index Contract (Strike x \$100)}}$$

$$\frac{\$500,000}{2800 \times \$100} = 2 \text{ SPX Puts}$$

Buy 2 SPX January 2800 Puts @ \$100 (Total \$20,000 – 4% of portfolio)



# How to Hedge your Portfolio with the right Index

\$500,000

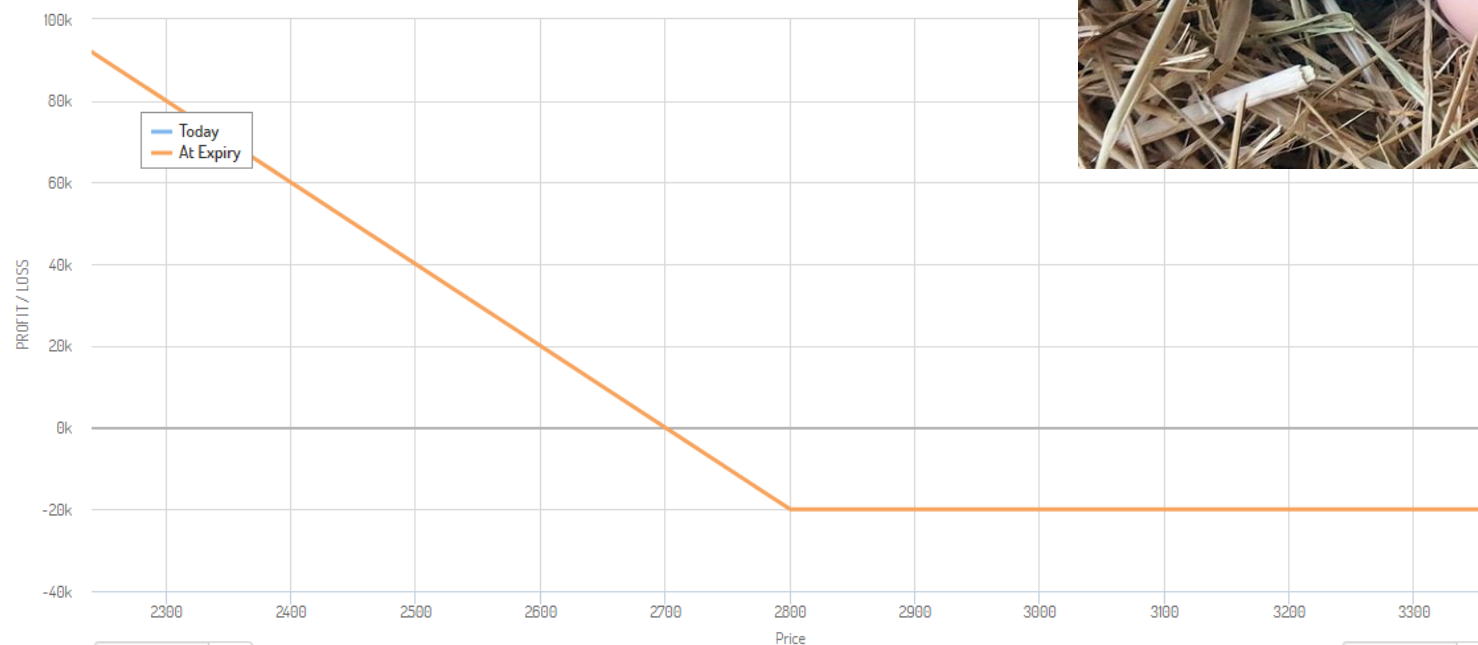
SPX @ 2,800

Buy 2 SPX January 2800 Puts \$100

Cost =  $2 \times 100 \times \$100 = \$20,000$

1 SPX Put protects \$280,000

Strike price is at-the-money



# How to Hedge your Portfolio with the right Index

Assume SPX at 2,240

Market is down 20% so Portfolio is down 20%

\$480,000 stock portfolio is now \$384,000

But since we hedged:

SPX 2,240 → 2,800 puts \$560

Value of Puts:  $\$560 \times 2 \times 100 = \$112,000$

Portfolio: Value of Equities + Value of 2800 strike puts

Total Portfolio Value:  $\$384,000 + \$112,000 = \$496,000$

Due to hedging:

Market down 20% but Portfolio ONLY down 0.8%





Any Questions?!?!



*The End*

