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Understanding Volatility, and How to Manage It

Dave Gilreath, CFP®
Co-Founder & Chief Investment Officer

CFP® CE credit available
Insurance credit available

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Today's Objectives

- **Market Volatility…**Gaining perspective
- **Measuring Volatility…**Historical and Implied
- **Option Overlay Concept**
- **Managing Volatility…** Harnessing Volatility through Equity Options
- **Case Study:** Income Generation Strategies
  - Put Selling
  - Covered Call Writing
- **Questions and Answers**

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This time is different?

“Look at market fluctuations as your friend rather than your enemy; profit from folly rather than participate in it.”

Warren Buffet

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How to Measure Volatility

ATR(Average True Range):

Measures the true range…the distance between the high and the low over a number of specified days. Offers a historical view of volatility.

VIX(Volatility Index):

Measures the implied volatility of the S&P 500 stock index as priced with S&P 500 options…creates a synthetic option expiring in 30 days. Measures the expected "future" volatility.

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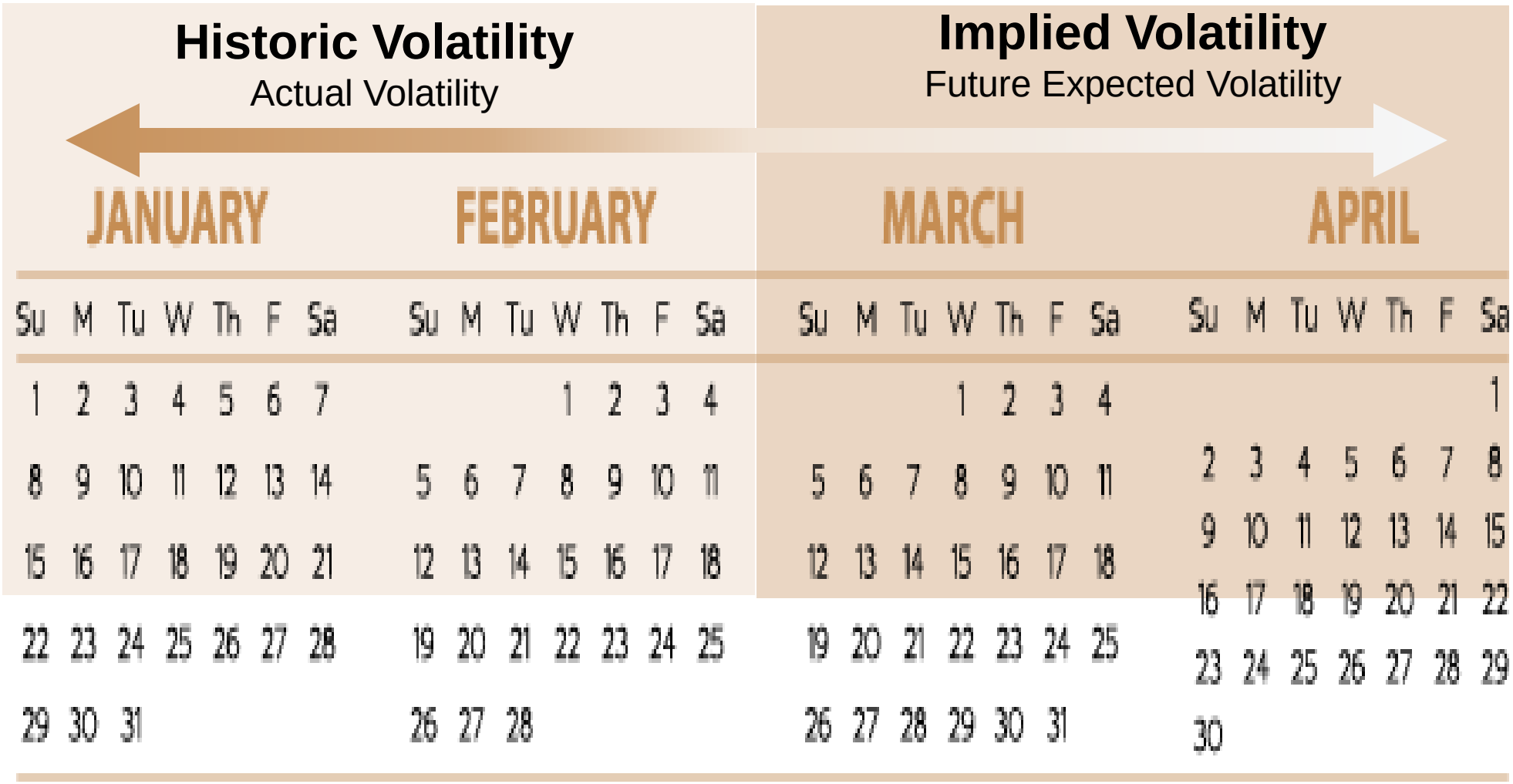
Two Types of Volatility



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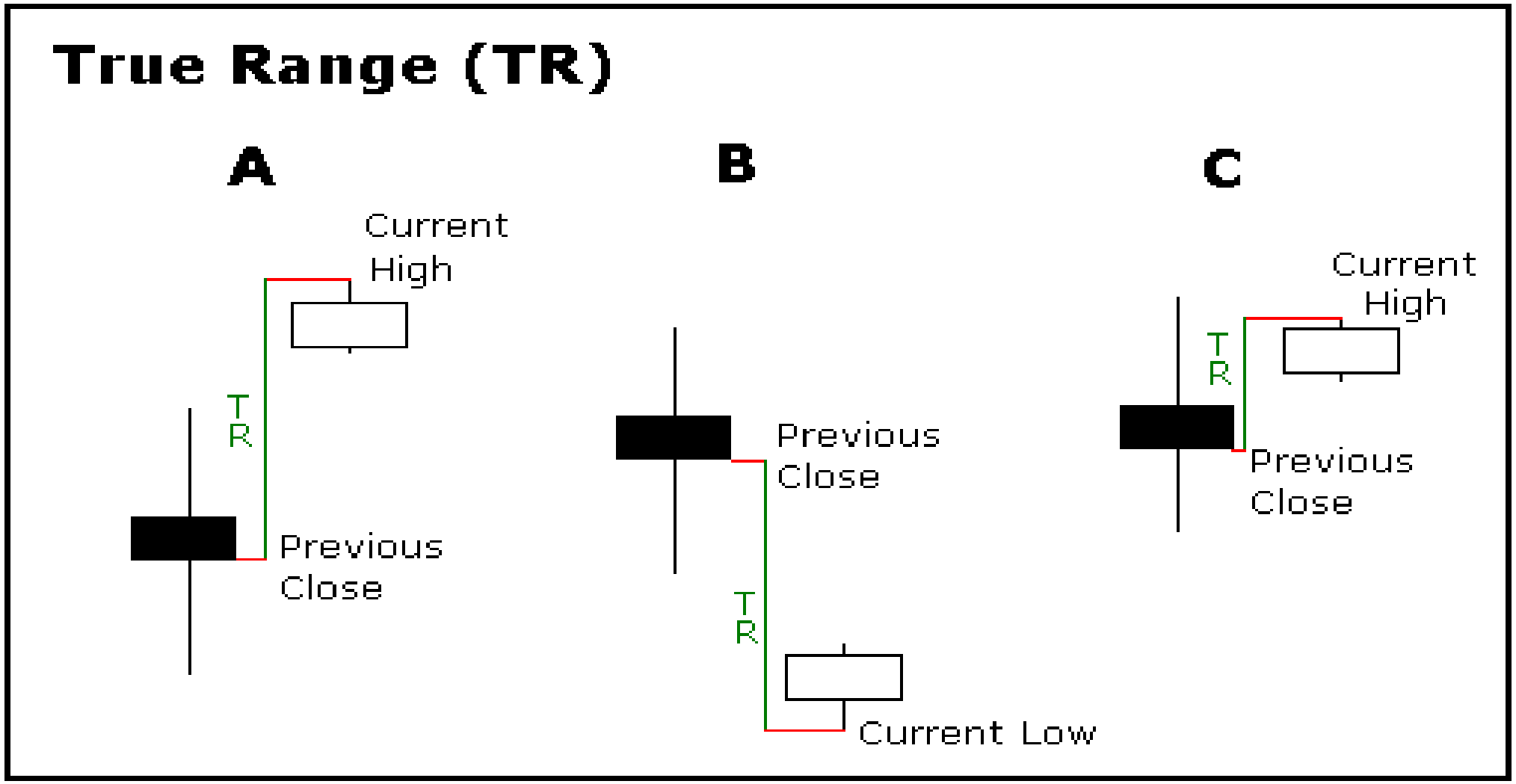
Average True Range…Historical Volatility



Source: StockCharts

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VIX: Fear and Greed Index

- Measures the implied volatility that is being priced into the S&P 500 index options.
- The VIX index (a synthetic option contract expiring in 30 days) offers an indication of the 30 day implied volatility.

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Why it works: Volatility as an Asset Class

From 1990 to 2017, the average implied volatility, as measured by the CBOE Volatility Index® (VIX® Index) is 19.7%, while the average realized volatility is 15.4%, an average positive spread of 4.3%.

High volatility premium indicates that the index options are richly priced.

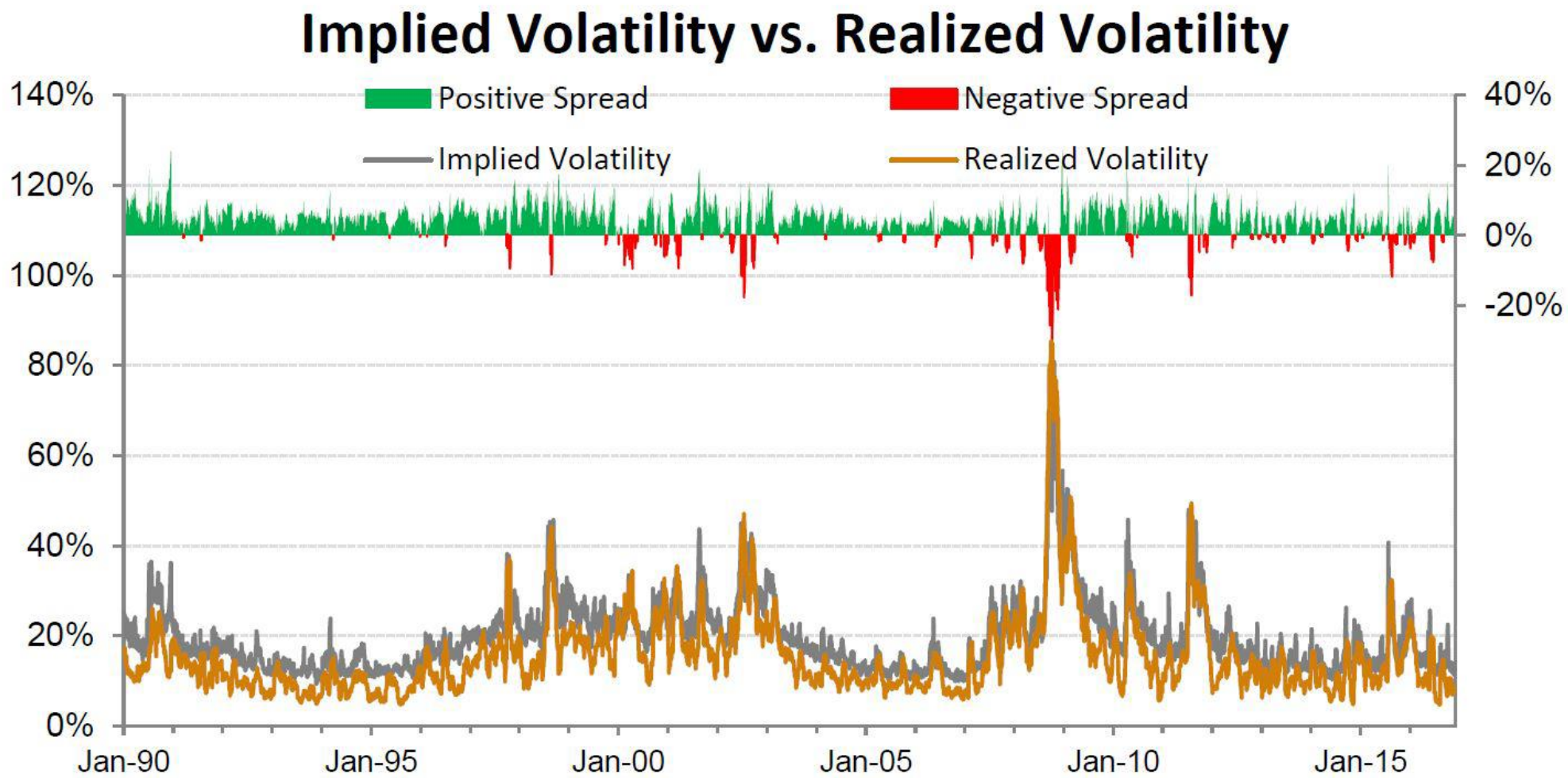

Chart source: *Swan Global Investments and the* Chicago Board Options Exchange® (CBOE®)

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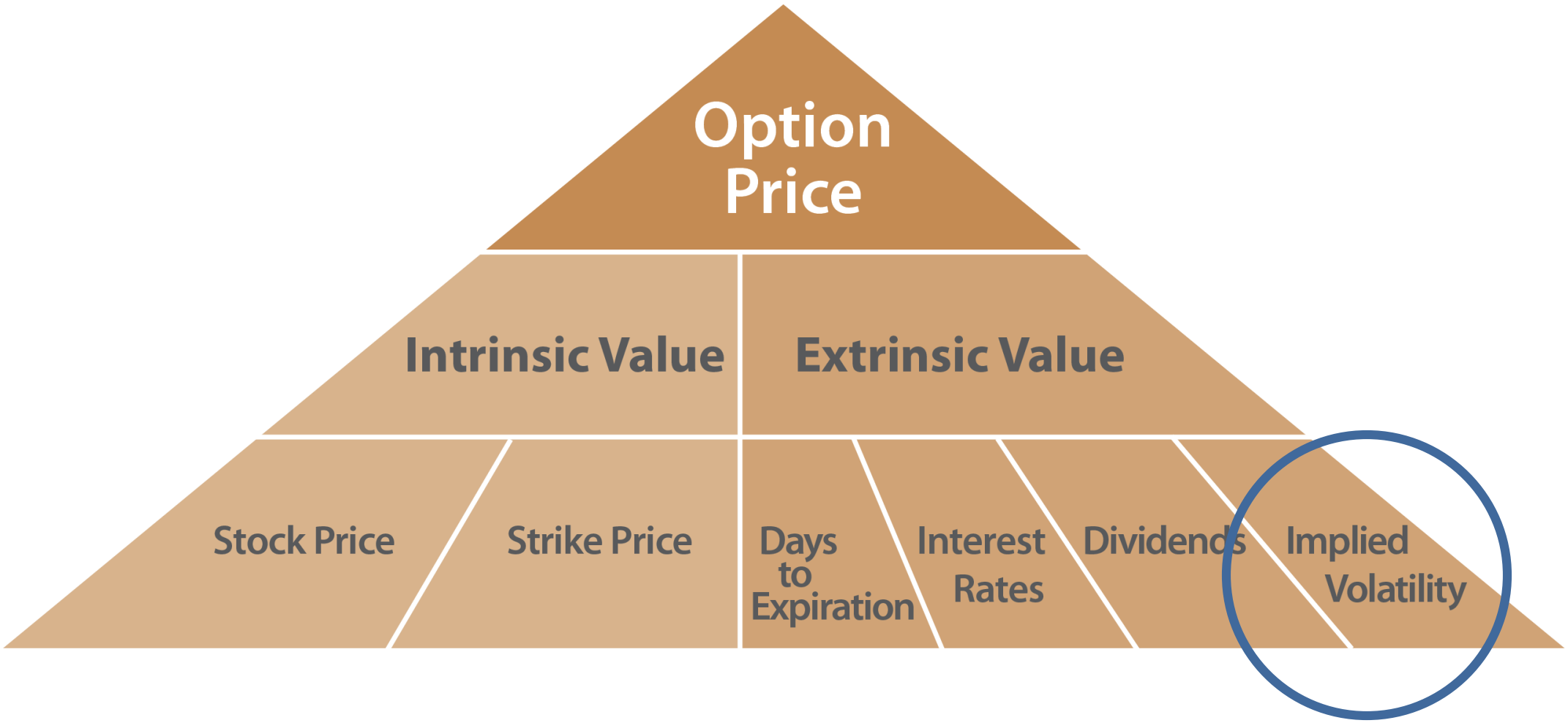
Option Pricing



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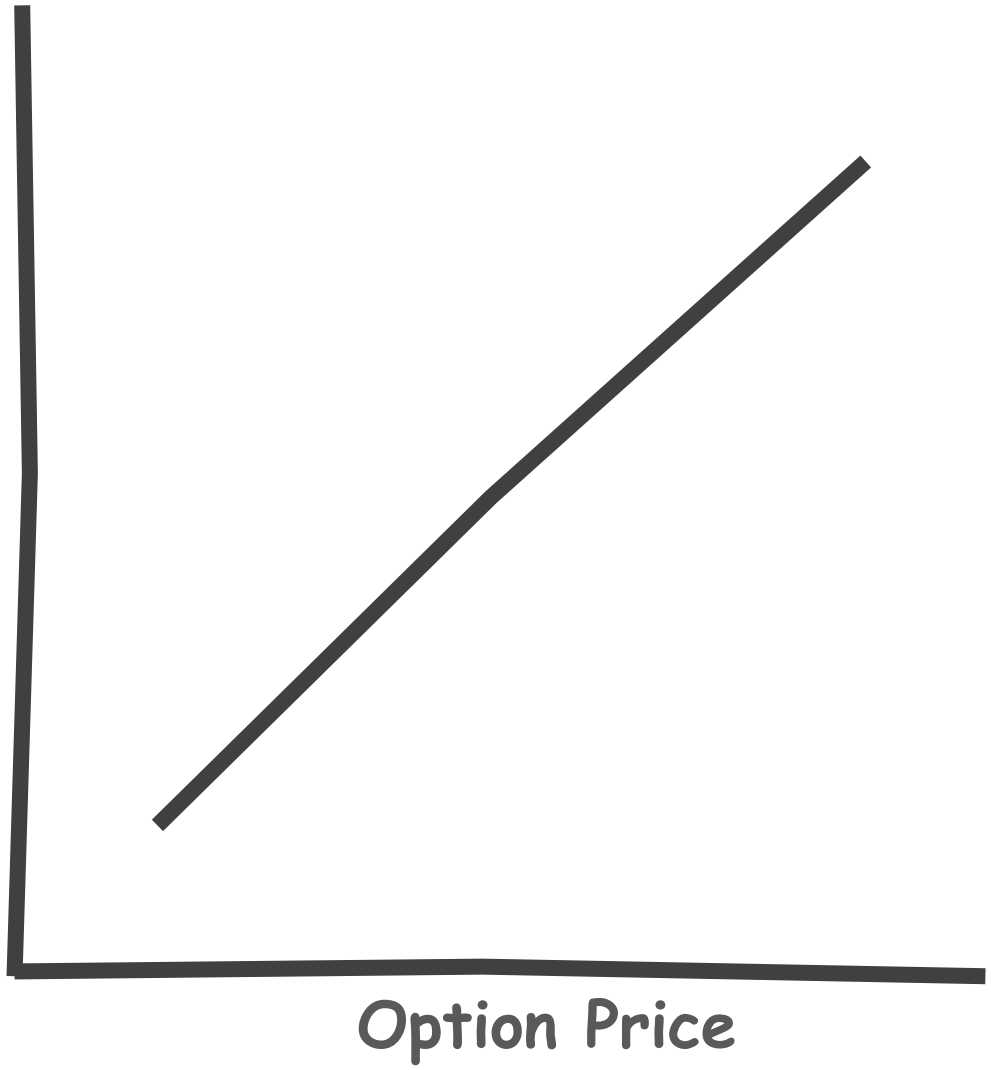
Option Price Determinant-Implied Volatility (Vol)

Implied Volatility

It is important to remember that implied volatility is theoretical probability.

It is an estimate of future prices.



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Example of the VIX Index

	SPX =	2732.00	
	30-Day	Option	
SPX Strike Price	Call Price	Put Price	Implied Volatility
2900	0.53	185.55	10.00%
2870	0.83	156.00	9.75%
2800	4.55	89.80	8.75%
2735	24.50	45.00	9.95%
2670	66.90	22.40	13.00%
2600	125.70	11.40	15.50%
2570	153.00	8.80	17.00%

Table above displays an SPX 30-day (reference: 2732) option chain. Notice:

- Each strike price displays a unique implied volatility.
- Equidistant strikes from the at-the-money option (2735) are not necessarily equal in price or in published implied volatility.

* Data from Matrix EX, *"Does the VIX predict? Resolving the Misnomers and Erroneous Interpretations on the Stock Markets Fear Gauge!"*

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VIX Measures Movement, not Price Path

To truly understand VIX, it is critical to stress that VIX is an attempt—a mere snapshot of looking ahead—assessing volatility that we look forward to seeing. It is not in any way backward-facing, looking at volatility that has been recently observed as some of us are taught.

* From Matrix EX, *"Does the VIX predict? Resolving the Misnomers and Erroneous Interpretations on the Stock Markets Fear Gauge!"*

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How the VIX Works in Practice

To break that down to a shorter time period, simply multiply the annualized number by the square root of time. In this case, that means we would multiply 20% by the square root of (30/365) and come up with 5.77%.

VIX Reading	Divided by Standard Deviation of 12	Magnitude of the S&P 500's 30-Day Return Will Be Less Than
10	3.464	2.89%
15	3.464	4.33%
20	3.464	5.77%
25	3.464	7.22%
30	3.464	8.66%
35	3.464	10.10%
40	3.464	11.54%

Table above shows various VIX prices and what that implies about market consensus.

* Data from Matrix EX, *"Does the VIX predict? Resolving the Misnomers and Erroneous Interpretations on the Stock Markets Fear Gauge!"*

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Example: Implied Volatility

Two technology stocks

At-the-money put options

86 days until expiration

7/25/18 2:50PM

Quote source: TD Ameritrade thinkpipes

	Stock Price	Strike Price	Option Bid	Actual Yield	Vol
twitter	$44	$44	$4.00	9.1%	49%
CISCO	$43	$43	$1.74	4.0%	19%

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Smile Skew

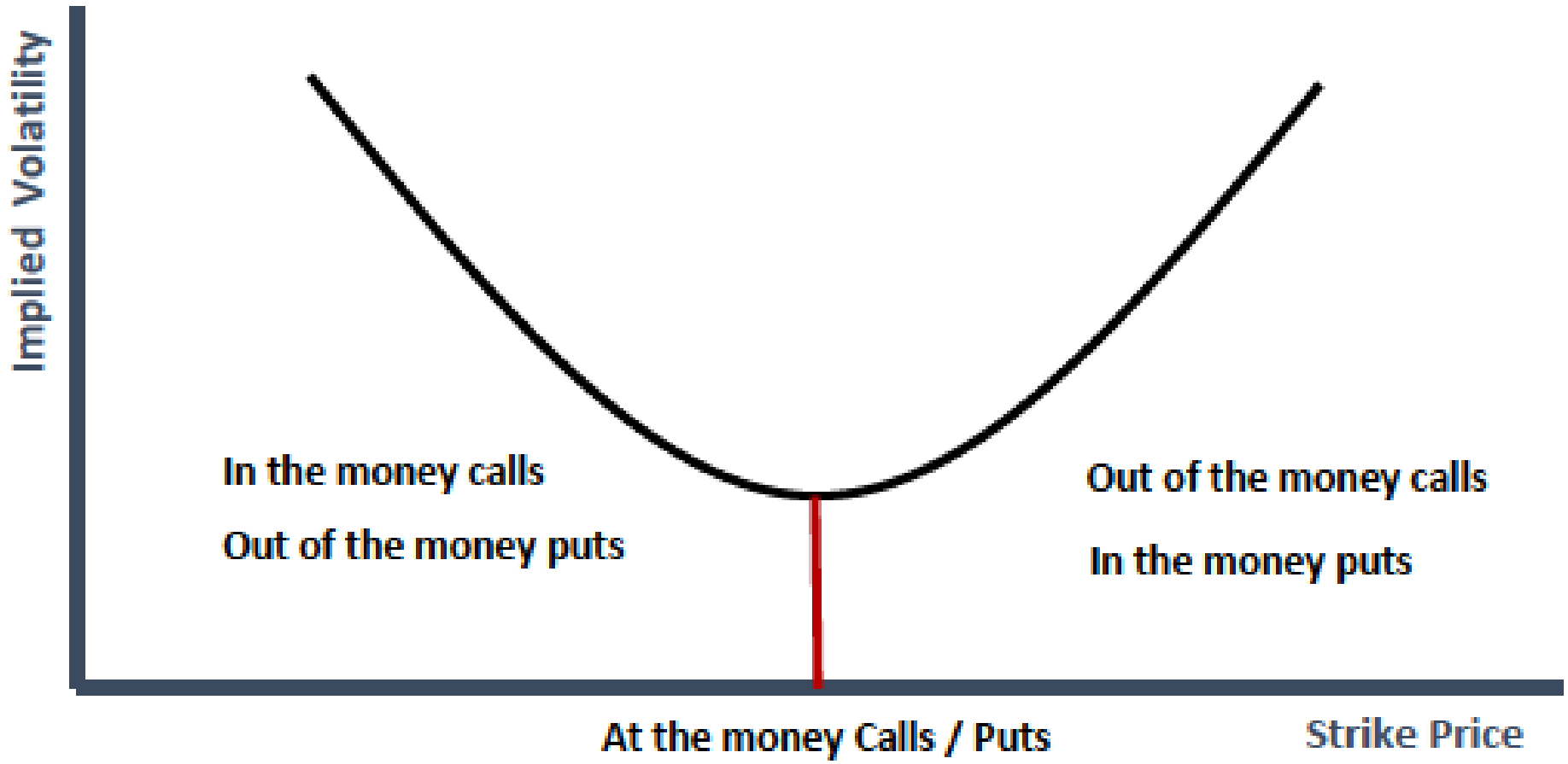

Exhibit above shows a typical S&P 500 implied volatility option skew plot.

* Data from Matrix EX, *"Does the VIX predict? Resolving the Misnomers and Erroneous Interpretations on the Stock Markets Fear Gauge!"*

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Supply, Demand, & Smile Skews

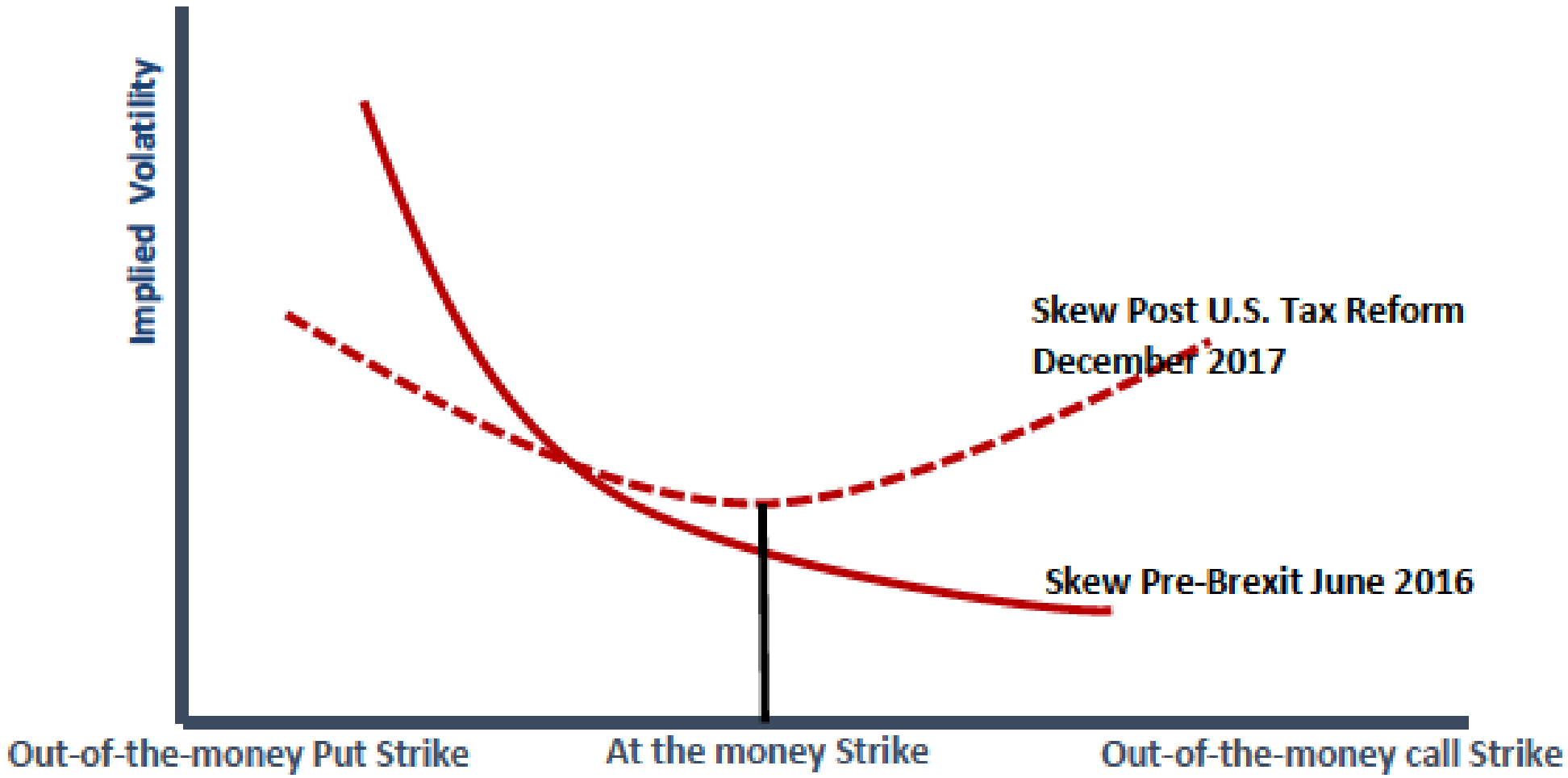

Exhibit above shows varying S&P 500 option “skews” or “smiles.”

* Data from Matrix EX, *“Does the VIX predict? Resolving the Misnomers and Erroneous Interpretations on the Stock Markets Fear Gauge!”*

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How To Manage Volatility

- **Know yourself as an investor**
  - Risk Tolerance
  - Time Frame, objectives, goals
- **Diversification**
  - Strategic Asset Allocation
  - Rebalance
  - Do not try to time the market
- **Specific Strategies**
  - Portfolio/Position Hedge
  - Income Generation: Options Premium

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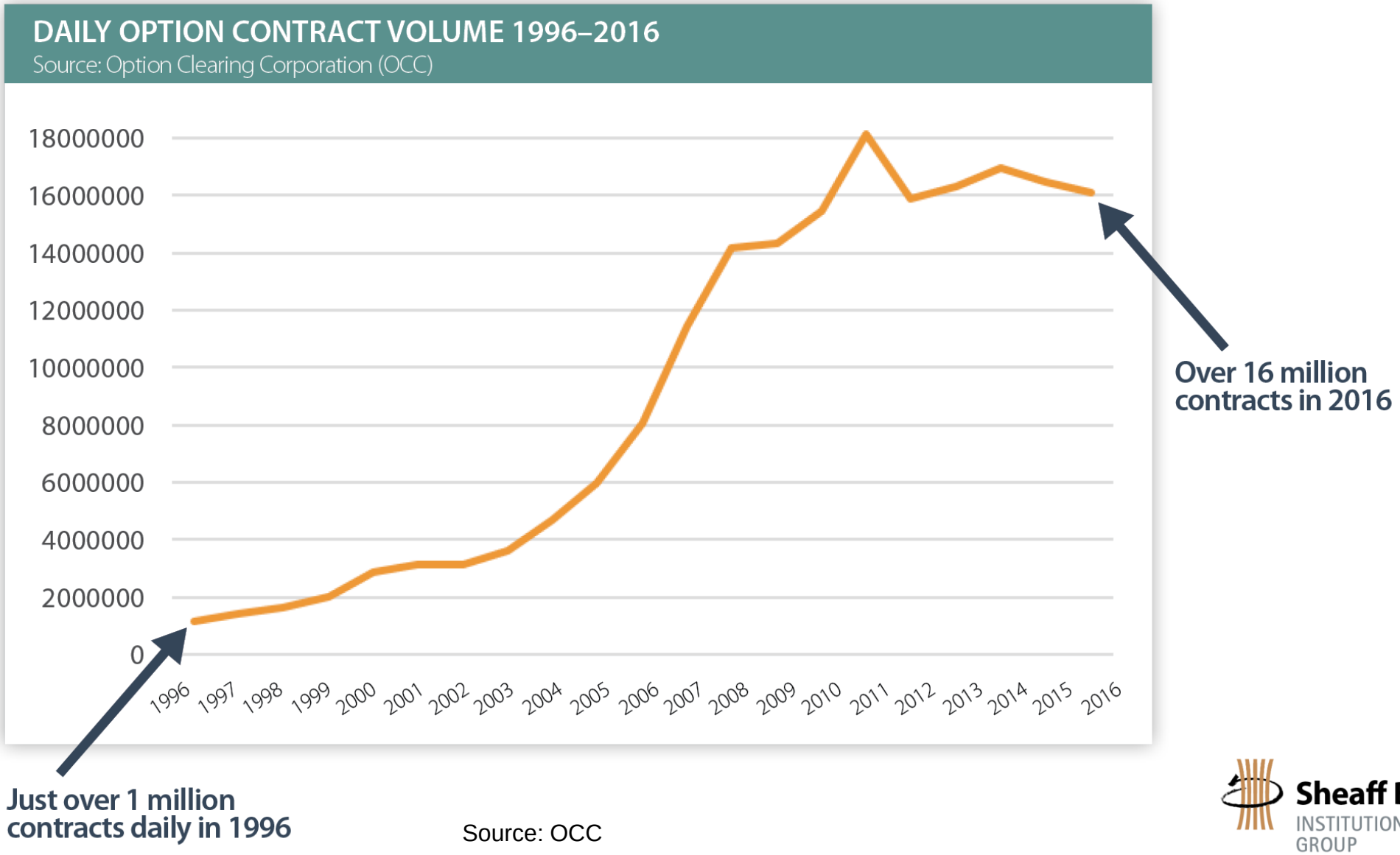
Annual Options Growth

OCC Daily Option Contract Volume (1996–2016)



Source: OCC

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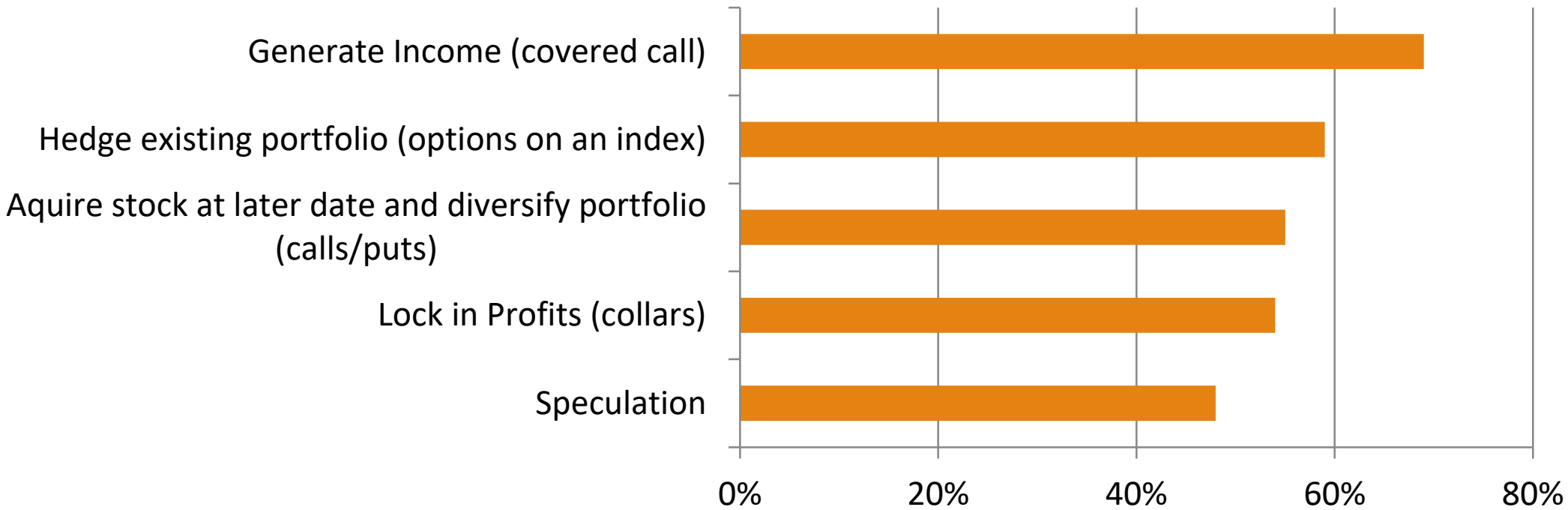
Why Options?



Source: Options Industry Council Bellamy Advisor Study 2012

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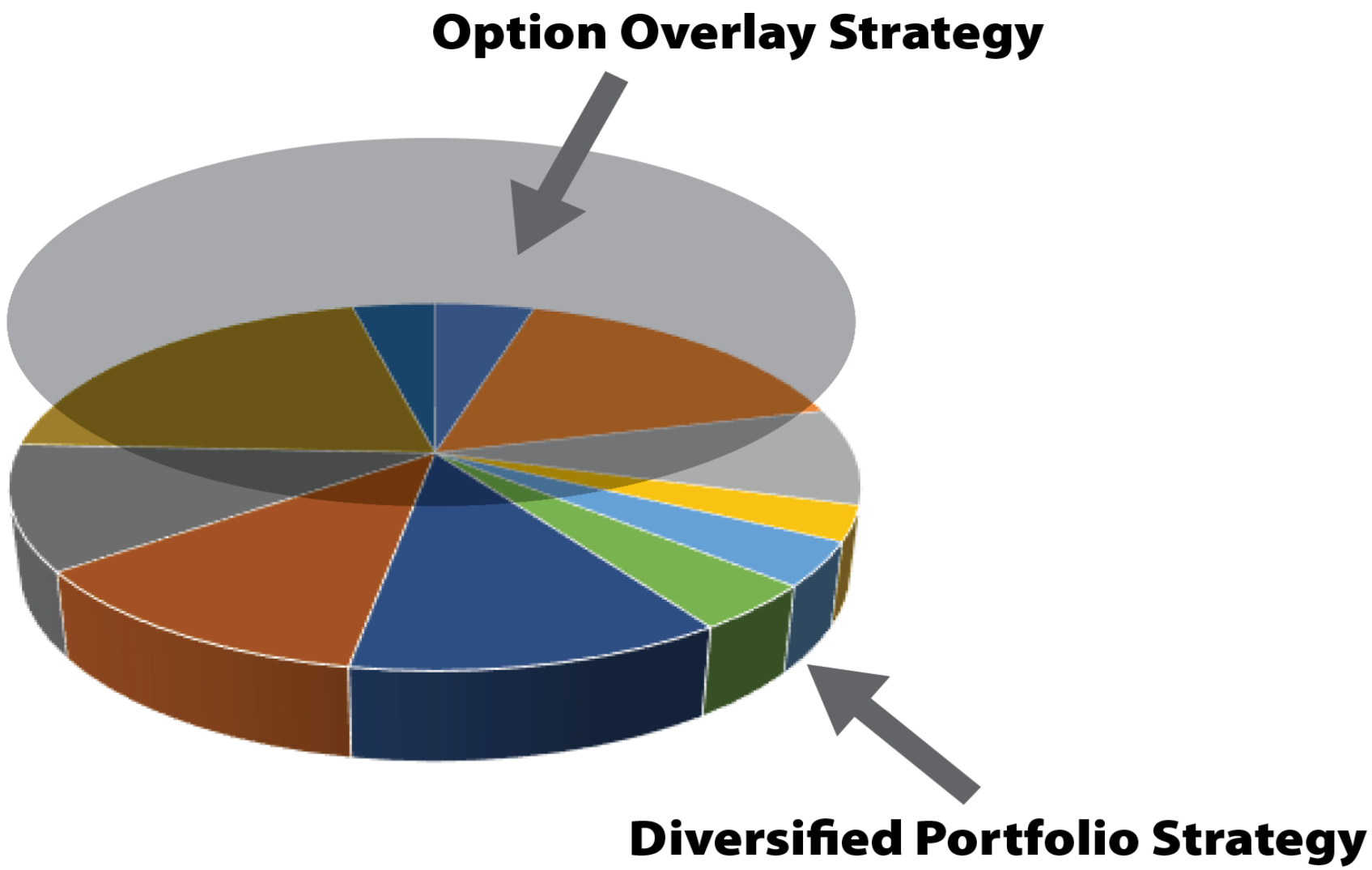
Option Overlay Concept



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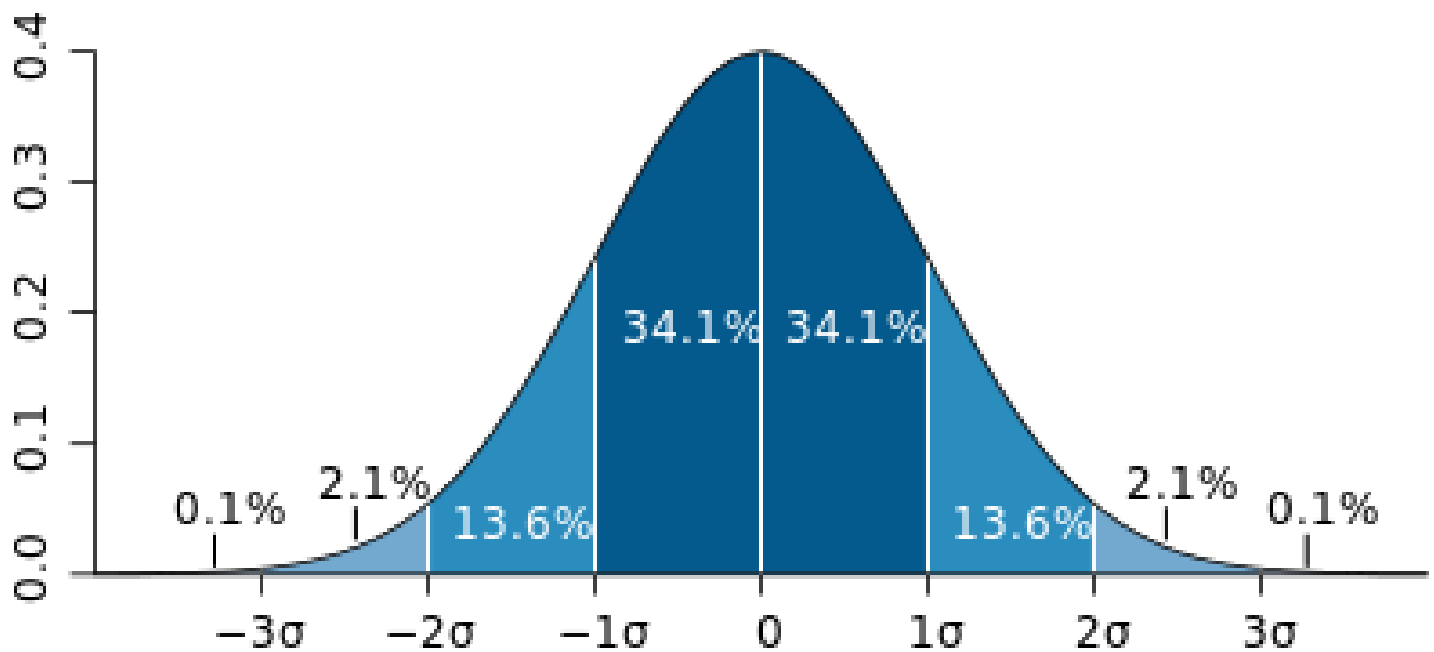
Probability of Expiration Cone

Using Standard Deviation When Selling Options



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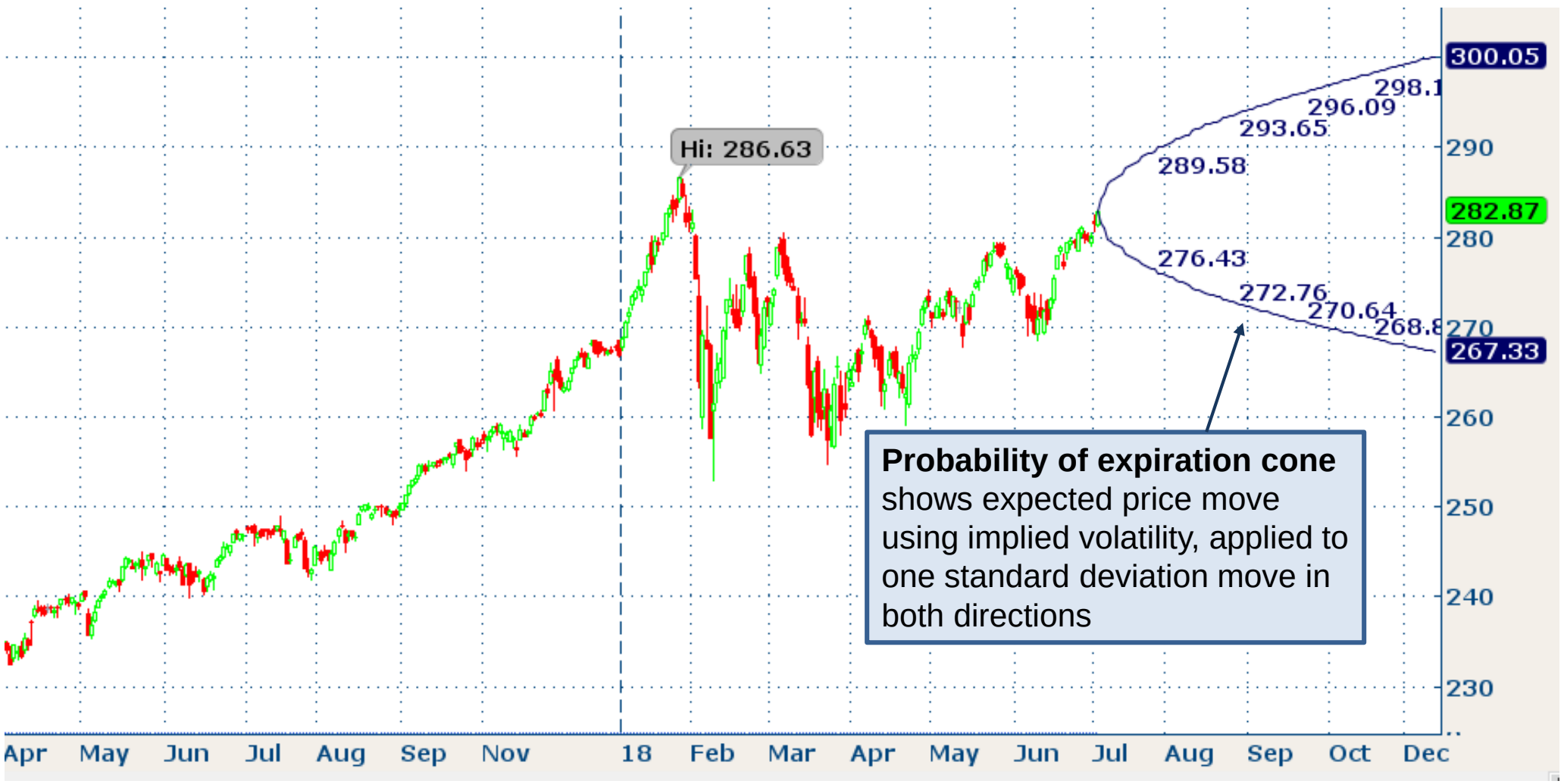
Probability of Expiration Cone



Source:
TD Ameritrade thinkpipes 07/25/18 3:00PM

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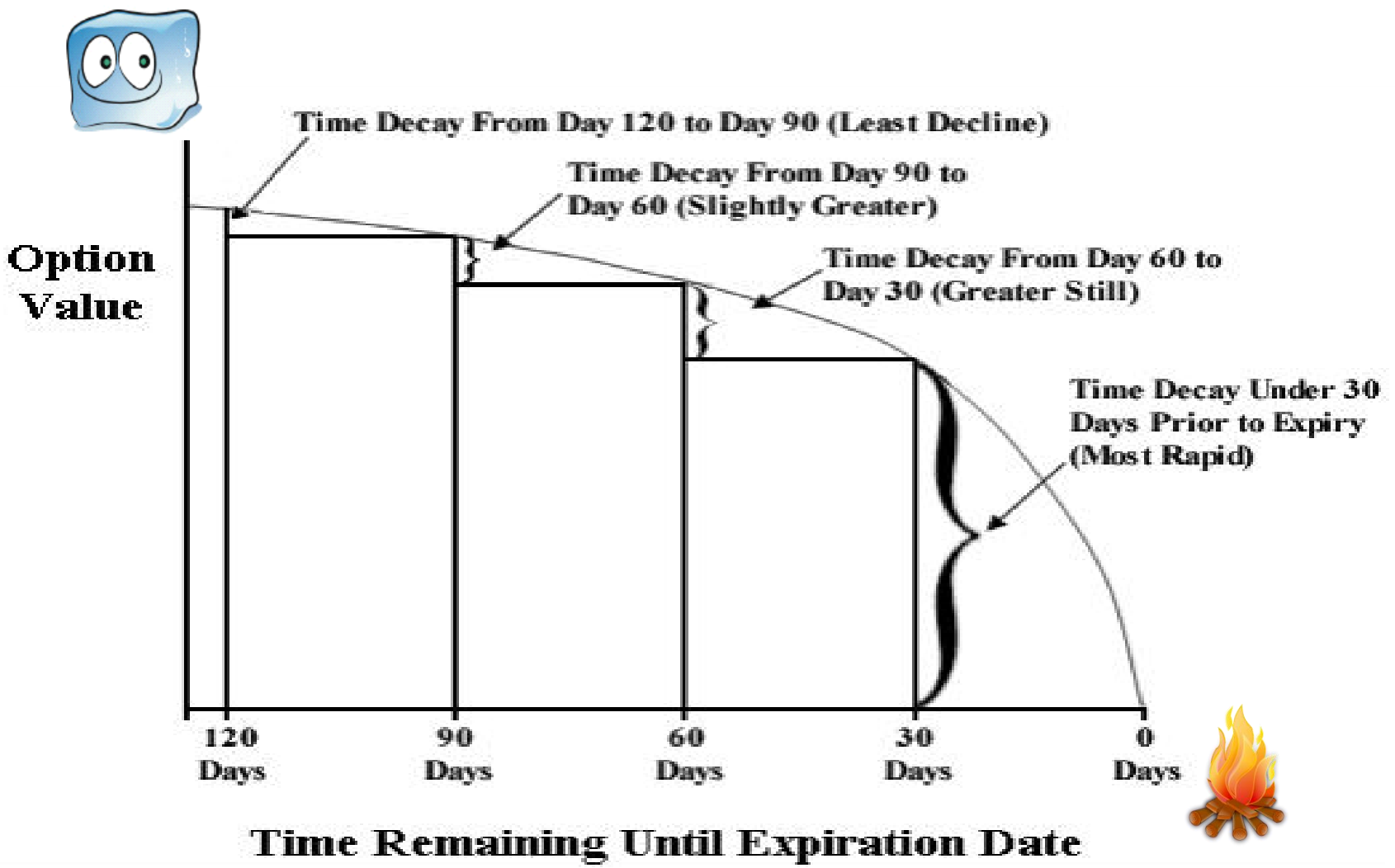
Option Price Determinant: Time Decay (Theta)



Example: Time Decay

SPDR S&P 500

Symbol	Bid	Ask	Last	Change	Change %
SPY	275.38	275.39	275.39	-1.17	-0.42

SPY(Weekly) Jun 20 2018 — 1 days to expiration

Strike	Puts	Bid	Ask	Last	High	Low	Change	
275.00	275.00	0.58	0.60	0.59	1.82	0.43	0.31	15

SPY Jul 20 2018 — 31 days to expiration

Strike	Puts	Bid	Ask	Last	High	Low	Change	
275.00	275.00	2.91	2.95	2.95	3.94	2.79	0.63	13

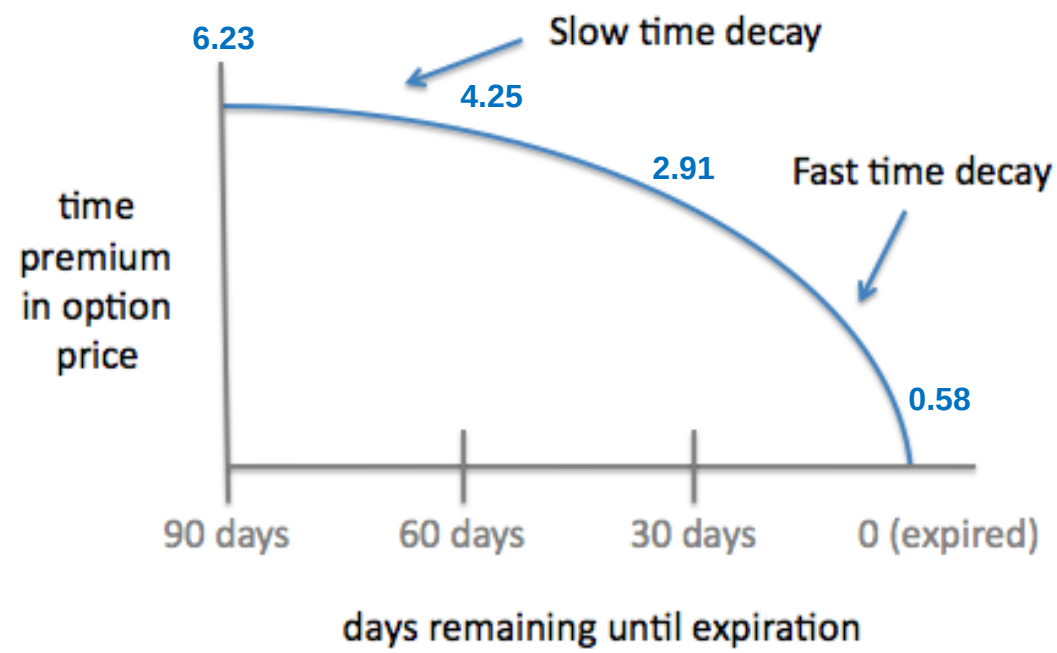
SPY Aug 17 2018 — 59 days to expiration

Strike	Puts	Bid	Ask	Last	High	Low	Change	
275.00	275.00	4.25	4.30	4.27	5.24	4.15	0.66	3,

SPY Sep 21 2018 — 94 days to expiration

Strike	Puts	Bid	Ask	Last	High	Low	Change	V
275.00	275.00	6.23	6.26	6.16	7.12	6.16	0.63	83

Source: TD Ameritrade thinkpipes 06/19/18 3:00PM



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Selling Puts

- Cash secured put has same risk profile as a covered call
- Generate income through premiums, that's all, income. Premium received is maximum you will earn
- Bullish position
- Cash premium comes in up front, taxation of premium is realized later
- Obligations out in time
- Positive theta = Time is on your side (Yes it is!)
- Can be used to initiate stock ownership at a lower price

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Risk Profile of Selling Puts

- **Worst case — Stock goes to zero** (why many people sell puts on an index)
- **Premium is received up front and a future obligation (a negative "short" position) is created**
- **Risk of being assigned (put the stock) if the put buyer would rather receive the stock and exercise**
- **The closer to the money a put is sold the higher the premium, but also higher the risk of a potential loss**
- **Investor Profile - Income seeking, long term investment mentality vs. "trading" mentality**
- **Analogous to property insurance company**

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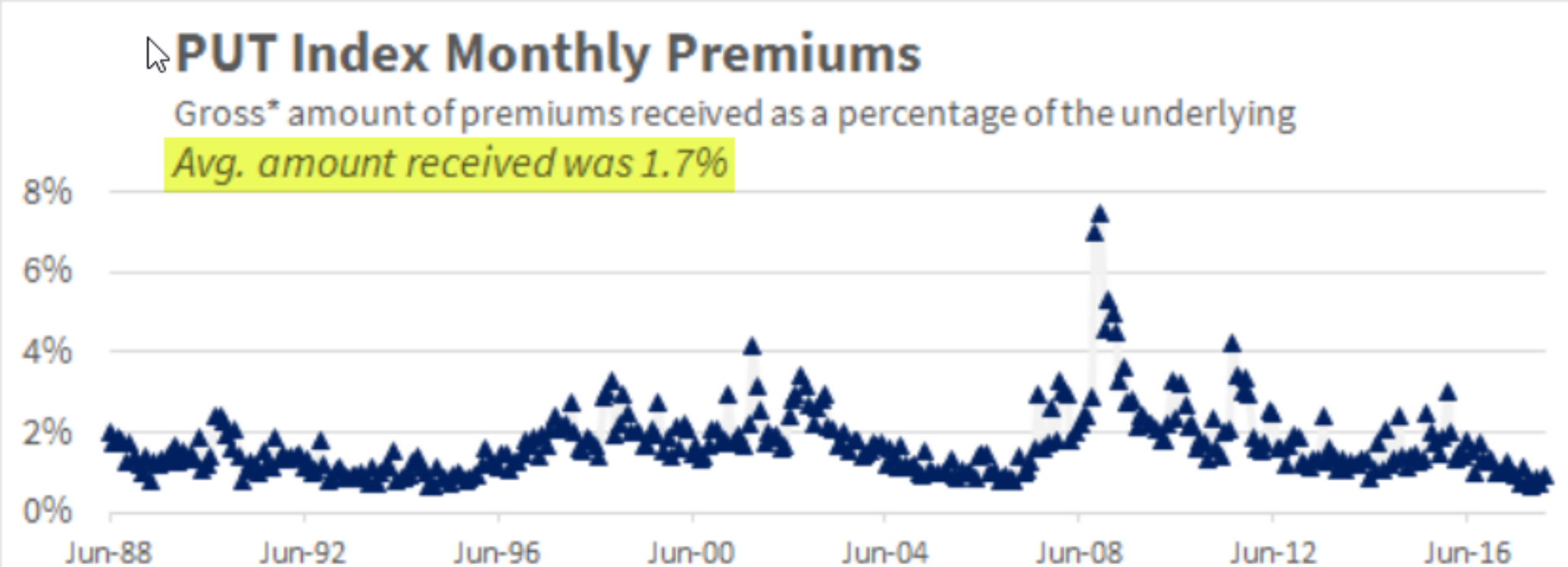
PUT Index: Return



(June 1988 - January 2018) * Please note that the amounts shown are for the gross premiums received, and the net returns for the strategy can be less or negative.
Source: Cboe. www.cboe.com/benchmarks

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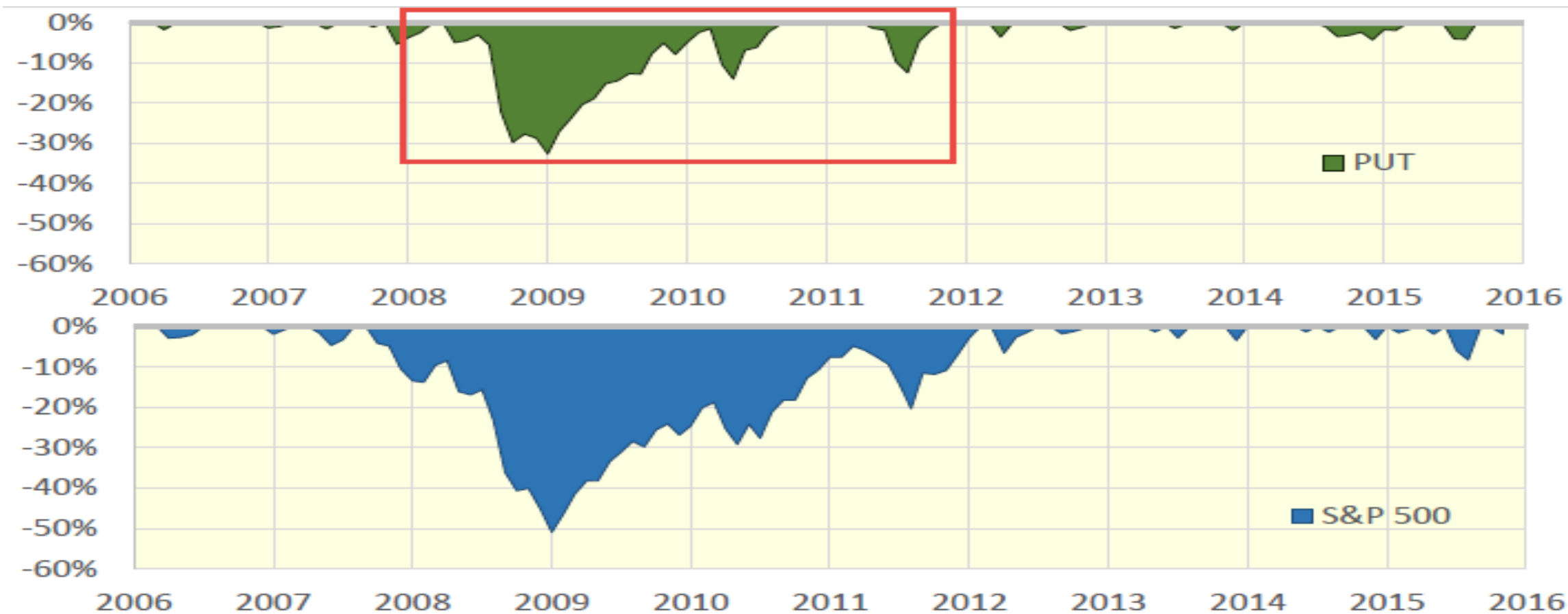
PUT: Risk

EXHIBIT 10 – MONTHLY DRAWDOWN FOR PUT, WPUT, AND S&P 500 (2006 TO 2015



Monthly Drawdown for PUT, WPUT, and S&P 500 TR Indices. The period is from Jan 2006 to Dec 2015.

Chart source: *Analysis of Index Option Writing with Monthly and Weekly Rollover*, Oleg Bondarenko, 2016, University of Chicago and Chicago Board Options Exchange® (CBOE®)

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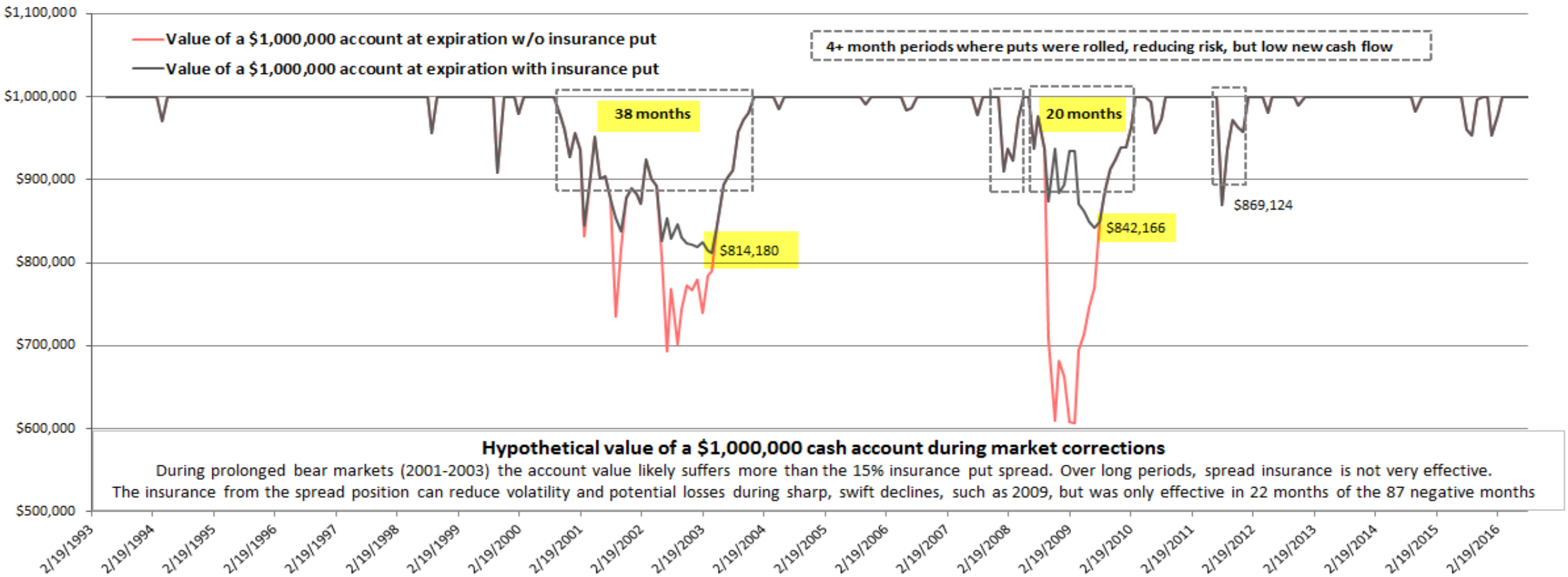
Spreads on an Index – PATIENCE may be required



Hypothetical value of a $1,000,000 cash account during market corrections

During prolonged bear markets (2001-2003) the account value likely suffers more than the 15% insurance put spread. Over long periods, spread insurance is not very effective. The insurance from the spread position can reduce volatility and potential losses during sharp, swift declines, such as 2009, but was only effective in 22 months of the 87 negative months

This is intended to illustrate the history of using the S&P 500 ETF (SPY) for an option overlay strategy. Results assume that an investor would be able to roll down one-point in strike price each month an option is rolled forward, but there is no guarantee or assurance this could be done in actual practice. Results do not show any return because the intent is to show how long a period may have been required to experience capital gains. Any gains and/or cash-flow would have been reduced by trading commissions and the deduction of a annual management fee. The illustration is designed to show price movement from an option overlay ONLY, and does not include any income or appreciation from the underlying collateral or the option spread credits. This is a hypothetical based on actual closing prices obtained from State Street Global Advisors and Yahoo Finance. **Past performance does not guarantee or indicate future performance.**

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Wide Spread = High Deductible Insurance

Case Study: Examination of Put Selling

Sell 1 Jan 15th 205 put at $3.81. Investor obligates to buy 100 SPY at $205, and in return the premium from the put is $381

Capital at risk is $20,500

Cumulative cash-flow $381

S&P 500 drops 9%. The January put is deep in the money and to prevent exercise must be rolled out to February.

Buy Jan put at $17.25 or ($1725) and sell Feb put for $18.30 or $1830. Additional cash-flow is $105.

Cumulative cash-flow $486

S&P 500 recovers a little. The February put is deep in the money and must be rolled to March.

Buy Feb put at $12.99 or ($1299) and sell March put for $14.11 or $1411. Additional cash-flow is $112.

Cumulative cash-flow $598

SPY almost makes it back to 205 but is at 204.52. The March put must be rolled out to April.

Buy March put at $0.50 or ($50) and sell April put for $2.97 or $297. Additional cash-flow is $247.

Cumulative cash-flow $845

SPY closes above 205 and the April put expires. The obligation and capital at risk is released. All accumulated cash-flow becomes profit.

Cumulative realized profit $845

Case Study…Examination of Covered Call Writing

Buy 100 shares SPY at $205.81, sell 1 Jan 15th 206 call at $2.93

Stock cost $20,581, premium from call is $293

Capital at risk is $20,581

Cumulative cash-flow $293.00

S&P 500 drops 9%. The January call expires and a February call is sold.

Sell 1 Feb 19th 206 call at $0.12, premium from call is $12

SPY pays a dividend of $121.20

Cumulative cash-flow $426.20

S&P 500 recovers a little. The February call expires and a March call is sold.

Sell 1 Mar 18th 206 call at $0.08, premium from call is $8

Cumulative cash-flow $434.20

S&P 500 almost makes it back to 206. The March call expires and an April call is sold.

Sell 1 Apr 15th 206 call at $1.94, premium from call is $194

Cumulative cash-flow $628.20

SPY closes above 206 and the April call is exercised.

SPY shares sell at $206

Gain from stock sale $19, SPY pays another dividend in April of $105

Cumulative realized profit $752.20

Summary

- Reviewed ways to measure market volatility
- Differentiated between implied and historical volatility
- Discussed Volatility as an asset class
- Demonstrated how the VIX is measured and applied
- Analyzed the pricing of options
- Reviewed the Put Selling and Credit Spreads
- Completed an examination of Covered Calls and Put Selling

Questions & Answers

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Thank you!

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Christy Jordan, Senior Vice President, Investments
317.705.5700

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