CBOE Volatility Index and VIX Futures Trading

Russell Rhoads, CFA

Disclosure

In order to simplify the computations, commissions have not been included in the examples used in these materials. Commission costs will impact the outcome of all stock and options transactions and must be considered prior to entering into any transactions. Multiple-leg strategies involve multiple commission charges.

Any strategies discussed, including examples using actual securities and price data, are strictly for illustrative and educational purposes only and are not to be construed as an endorsement, recommendation, or solicitation to buy or sell securities.

Options involve risks and are not suitable for all investors. Prior to buying or selling an option, an investor must receive a copy of Characteristics and Risks of Standardized Options. Copies are available from your broker or from The Options Clearing Corporation, One North Wacker Drive, Suite 500, Chicago, Illinois 60606. Investors considering options should consult their tax advisor as to how taxes may affect the outcome of contemplated options transactions.

CBOE and Chicago Board Options Exchange are registered trademarks and The Options Institute is a servicemark of CBOE. All other trademarks and servicemarks are the property of their respective owners.

This presentation should not be construed as an endorsement or an indication by CBOE of the value of any non-CBOE product or service described in this presentation.

VIX and VIX Futures Trading

- Volatility Primer
- CBOE Volatility Index
- Volatility Risk Premium
- Performance by Strategy
- VIX Futures
- Trading the Curve
- Short Term Trading
- Links / Contact Info

Historical vs. Implied Volatility

Two Types of Volatility*

Historical Volatility – based on past stock price changes

Implied Volatility – expected volatility based on option market pricing

Historical vs. Implied Volatility

Six Option Pricing Factors

Price of Stock

Option Strike Price

Time Until Expiration

Interest Rates

Dividends

Implied Volatility

Historical vs. Implied Volatility

Option Pricing Calculator

Inputs		**Output**	**Call**	**Put**
Price	51.00	Theo Price	1.90	1.10
Strike	50.00			
Days to Exp.	30			
Dividends	1.95%			
Interest Rate	1.00%			
Volatility	25%			

Where does this number come from?

Historical vs. Implied Volatility

Option Pricing Calculator

Inputs		**Output**	
Price	51.00	Volatility	30%
Strike	50.00		
Days to Exp.	30		
Dividends	1.95%		
Interest Rate	1.00%		
Call Price	2.00		

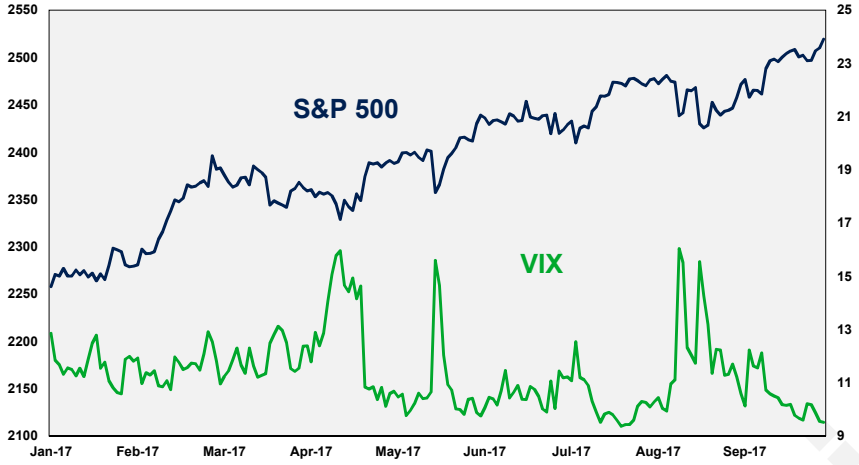
Implied Volatility comes from the Option Price

CBOE Volatility Index

- **The CBOE Volatility Index or VIX is a consistent 30 day measure of implied volatility as indicated by S&P 500 Index option prices**
- **The VIX Methodology is considered the industry standard for a consistent measure of implied volatility**
- **Historically VIX has displayed an inverse relationship with the S&P 500 which resulted in it being referred to as "the fear index"**

CBOE Volatility Index

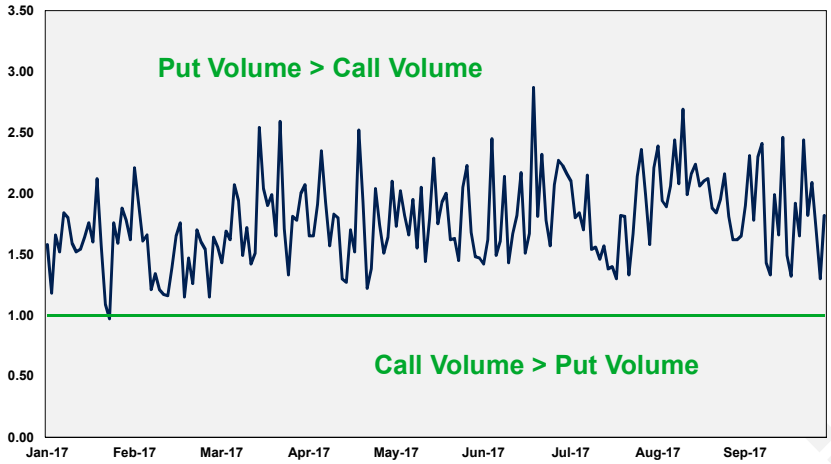
VIX vs. S&P 500



Data Source: Bloomberg

CBOE Volatility Index

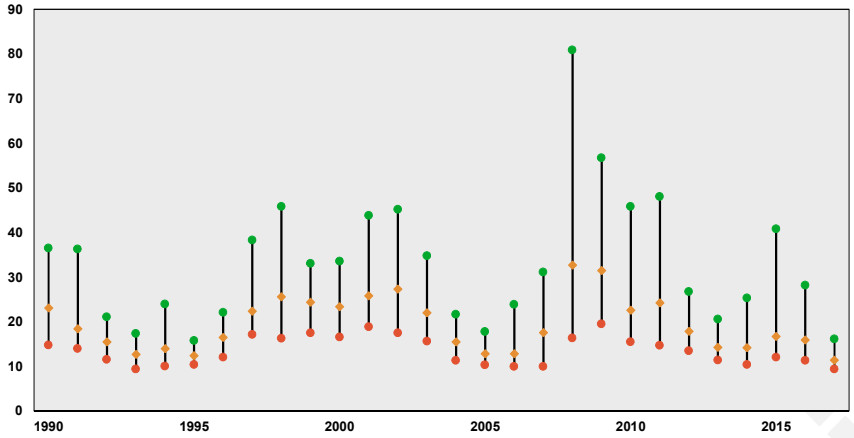
S&P 500 Put / Call Ratio



Data Source: www.cboe.com

CBOE Volatility Index

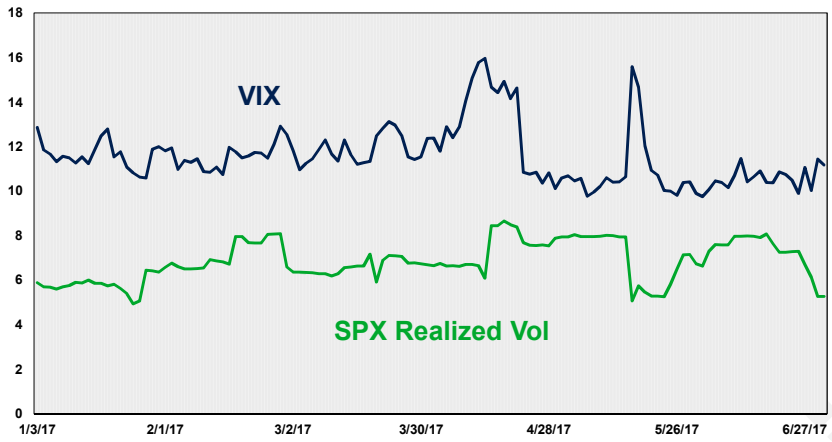
VIX High Low Average by Year



Data Source: www.cboe.com

Volatility Risk Premium

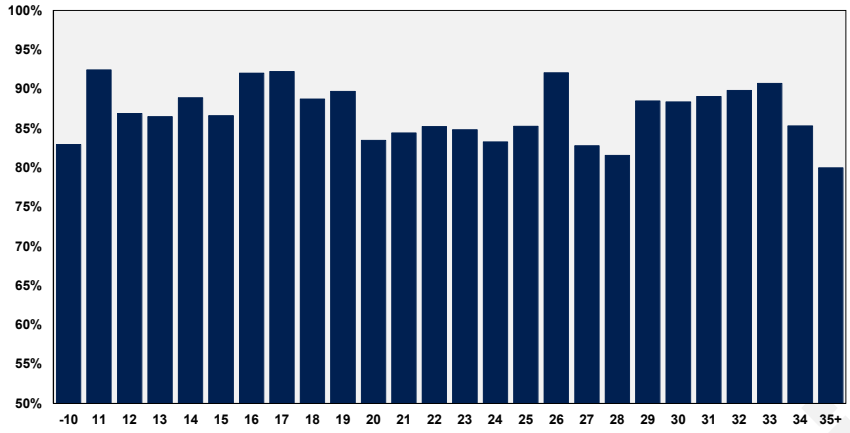
VIX vs. SPX Realized Volatility



Data Source: Bloomberg and www.cboe.com

Volatility Risk Premium

VIX vs. SPX Realized Volatility



Data Source: Bloomberg

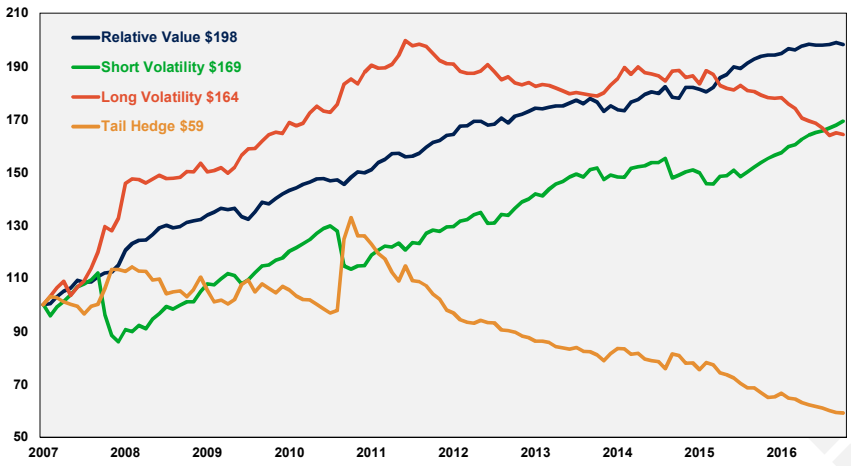
Volatility Strategy Performance

Volatility Strategy Indexes

- **CBOE Eurekahedge Short Volatility Index**
- **CBOE Eurekahedge Long Volatility Index**
- **CBOE Eurekahedge Relative Value Volatility Index**
- **CBOE Eurekahedge Tail Risk Index**

Volatility Strategy Performance

Eurekahedge Indexes – Return of $100 Jan 2008 – Sep 2017



Data Source: Bloomberg

VIX Futures

Contract Specifications

- The value of a VIX futures contracts is $1000 times the quoted value
- Minimum ticks are 0.05 ($50) for single contract trades and 0.01 ($10) for calendar spreads
- There are both standard and weekly contracts available for trading – currently the majority of volume is concentrated in the standard expirations
- Trading is available almost 24 / 5 with small breaks after the end of regular US trading hours
- Expirations typically occur on Wednesdays and the futures are AM settled

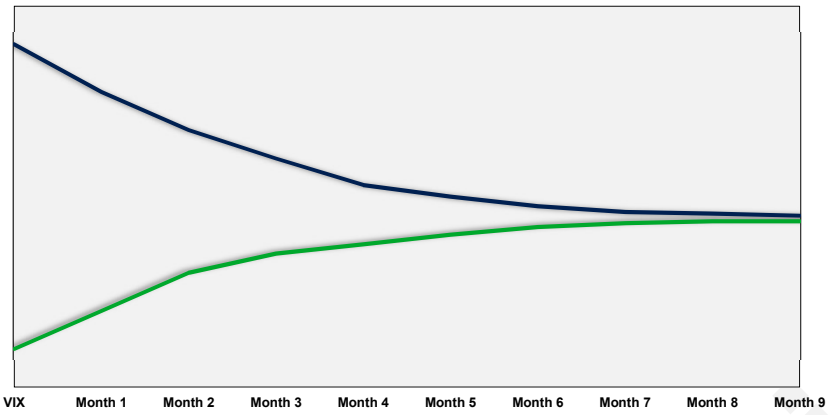
VIX Futures

Pricing

- Unlike many financial futures markets there is not a ‘fair value’ relationship between VIX and the associated futures contracts
- At times VIX futures are priced at a premium to spot VIX and at times VIX futures will be priced at a discount
- The pricing relationship is often referred to as being in contango or backwardation

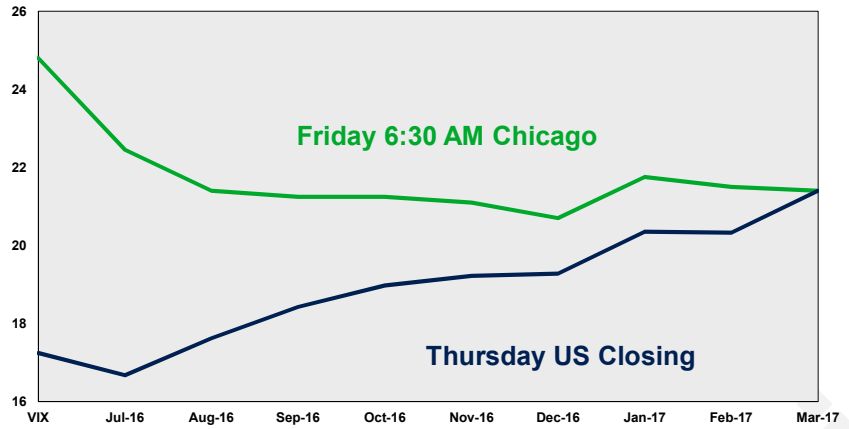
VIX Futures

Contango / Backwardation



VIX Futures

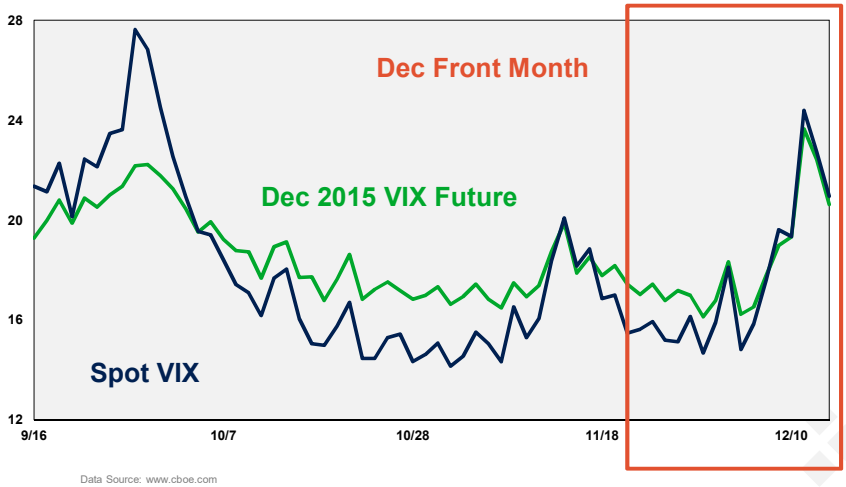
Backwardation – Impact of Brexit Referendum



Data Source: www.cboe.com

VIX Futures

Standard Futures Daily Pricing



Data Source: www.cboe.com

VIX Futures

Contango / Backwardation by Year

Year	VIX Index Higher than Month 1	Month 1 Future Higher than Month 2	VIX - Month 1 - Month 2 Backwardation	SPX Performance
2007	39.04%	29.48%	21.12%	3.53%
2008	45.45%	48.62%	35.18%	-38.49%
2009	23.81%	26.98%	9.92%	23.45%
2010	20.24%	6.35%	6.35%	12.78%
2011	27.78%	30.95%	14.68%	0.00%
2012	9.20%	0.80%	0.00%	13.41%
2013	13.10%	3.57%	3.17%	29.60%
2014	17.86%	10.32%	9.13%	11.39%
2015	17.46%	19.05%	12.70%	-0.73%
2016	13.10%	14.29%	8.73%	9.54%

Data Source: www.cboe.com

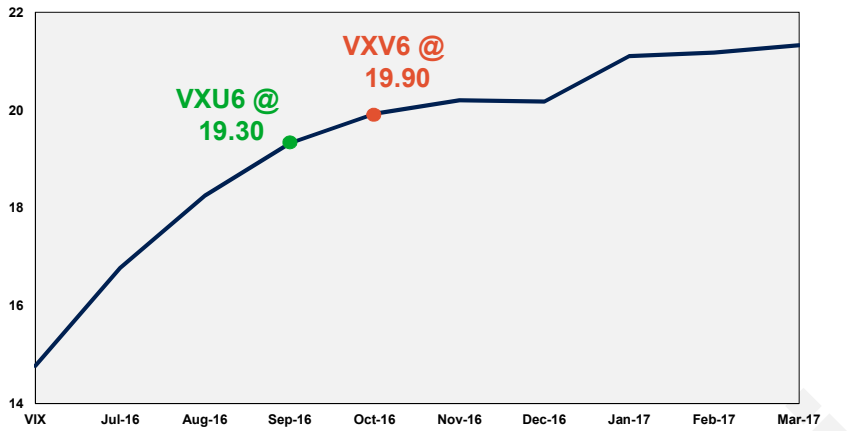
Calendar Spreads

Strategy Overview

- VIX Futures contracts are often spread against each other with the near month typically being sold
- Two common instances of selling VIX futures stem from an expectation for VIX to move lower or for futures to drift lower along the curve

Calendar Spreads

Trading the Curve – Term Structure on Friday July 1



Data Source: www.cboe.com

Calendar Spreads

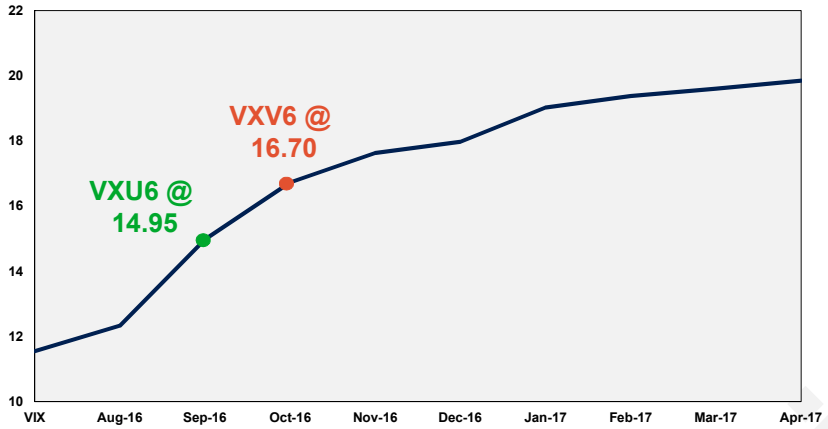
Trading the Curve – Term Structure on Friday July 1

Sell September VIX at 19.30

Buy October VIX at 19.90

Calendar Spreads

Trading the Curve – Term Structure on Friday August 12



Data Source: www.cboe.com

Calendar Spreads

Trading the Curve – Term Structure on Friday August 12

Short September VIX at 19.30 down 4.35 to 14.95

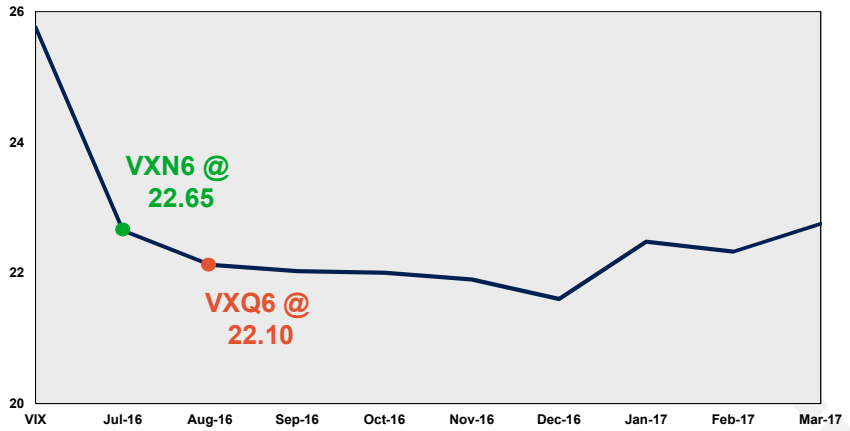
Long October VIX at 19.90 down 3.20 to 16.70

Net Profit = +1.15

Data Source: www.cboe.com

Calendar Spreads

Fading a Spike – Friday June 24 – VIX up 30% to 25.76



Data Source: www.cboe.com

Calendar Spreads

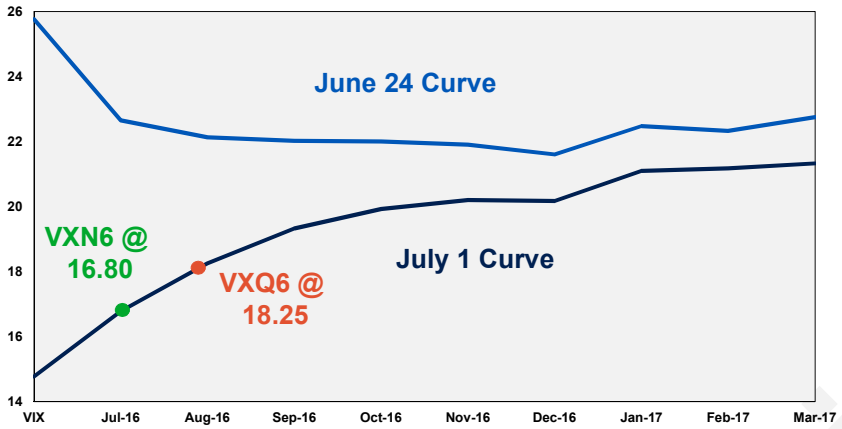
Fading a Spike – Friday June 24 – VIX up 30% to 25.76

Sell July VIX at 22.65

Buy August VIX at 22.10

Calendar Spreads

Friday July 1 – VIX Curve Back in Contango



Data Source: www.cboe.com

Calendar Spreads

Friday July 1 – VIX Curve Back in Contango

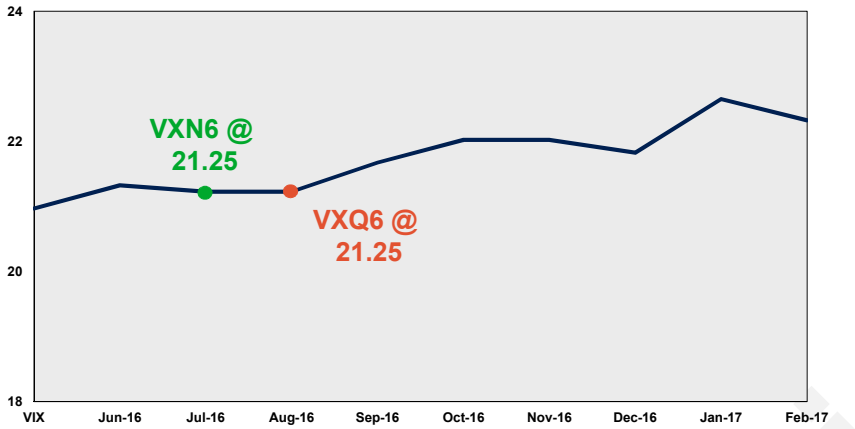
Buy July VIX at 16.80 (+5.85)

Sell August VIX at 18.25 (-3.85)

Net Gain = +2.00

Calendar Spreads

June 13 – VIX Term Structure Flat



Data Source: www.cboe.com

Calendar Spreads

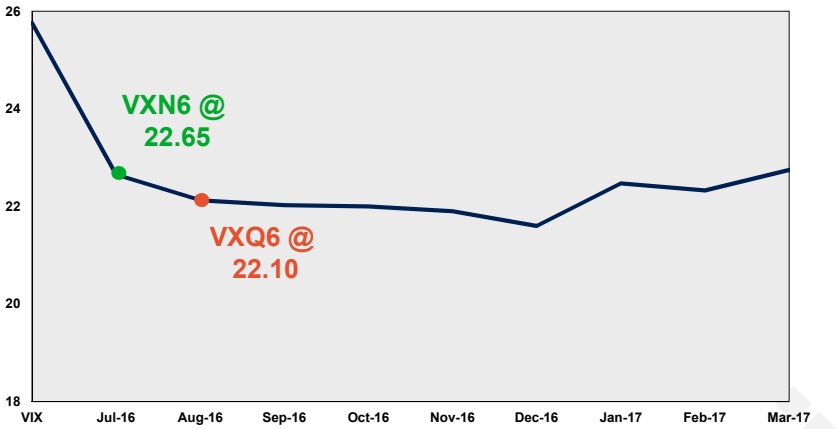
June 13 – VIX Term Structure Flat

Sell July VIX at 21.25

Buy August VIX at 21.25

Calendar Spreads

Friday June 24 – VIX up 30% to 25.76



Data Source: www.cboe.com

Calendar Spreads

Friday June 24 – VIX up 30% to 25.76

Short July VIX at 21.25 now up 1.40 to 22.65

Buy August VIX at 21.25 now up 0.85 to 22.10

Current P/L = -0.65

Short July Leg = -1.40

Calendar Spreads

Friday June 24 – VIX up 30% to 25.76

July VIX Intraday High = 27.65

August VIX Intraday High = 25.65

Short July VIX Intraday Max Loss = 6.40

Calendar Spread Intraday Max Loss = 2.00

Short Term VIX Spreads

Common Day Trade Structures

Calendar Spread

Usually short near month / long farther month

Butterfly Spread

Usually short near month and farther month

Long expiration between short months

Short Term VIX Spreads

Calendar Spread – October 21, 2016

Market Open
Short Nov VIX at 16.00
Buy Dec VIX at 16.80

Market Close
Cover Nov VIX at 15.50 (+0.50)
Sell Dec VIX at 16.50 (-0.30)

Net Result +0.20

Short Term VIX Spreads

Butterfly Spread – November 11, 2016

Market Open
Short 1 Nov VIX at 16.05
Buy 2 Dec VIX at 16.70
Short 1 Jan VIX at 17.70

Market Close
Cover 1 Nov VIX at 15.00 (+1.05)
Sell 2 Dec VIX at 16.10 (-1.20)
Cover 1 Jan VIX at 17.30 (+0.40)

Net Result +0.25

VIX Futures Trading

Summary

- **VIX and the S&P 500 have historically had an inverse relationship**
- **VIX futures do not have a fair value relationship between the spot index like most other financial futures contracts**
- **Due to the narrow tick size for calendar spreads these types of trades are popular with short term traders**

Useful Links / Contact Information

Links

www.cboe.com/vix

www.cfe.cboe.com

www.cboe.com/blogs

Contact Information

Russell Rhoads, CFA

rhoads@cboe.com

Twitter - @RussellRhoads