

# Volatility Jam Session

## Aligning Options Strategies with Volatility

Dave Lerman  
Sr. Director, Marketing/Education  
CME Group  
[David.lerman@cmegroup.com](mailto:David.lerman@cmegroup.com)  
312-648-3721

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# Volatility Jam Session—Agenda

- Volatility Basics: A quick review
- Different way of observing Volatility
- Determining Cheap vs. Expensive Volatility: Vol %tile rankings
- Reconciling Volatility and Strategies
- Reconciling Volatility and differing time horizons
- Volatility Skew Review
- Taming of the Skew—using skew to your advantage.

# Volatility Review—The Volatility Trifecta

## Historical Volatility

- Looks backwards
- Calculated using Standard deviation

## Implied Volatility

- Looks forward
- Calculated from options premiums
- Newton Search

## Realized Volatility

- The volatility that actually occurs going forward and what we all wish to know in advance

# Volatility Associated with a futures contract

Lets say for example the S&P 500 is trading at 2,000. And volatility is 10%.

A year from now :

68% chance we are trading between 1800 & 2200. ( $2000 \pm 10\%$  or  $\pm 200$ pts)

95% chance we are trading between 1600 & 2400. ( $2000 \pm 2 \times 10\%$  or  $\pm 400$ pts)

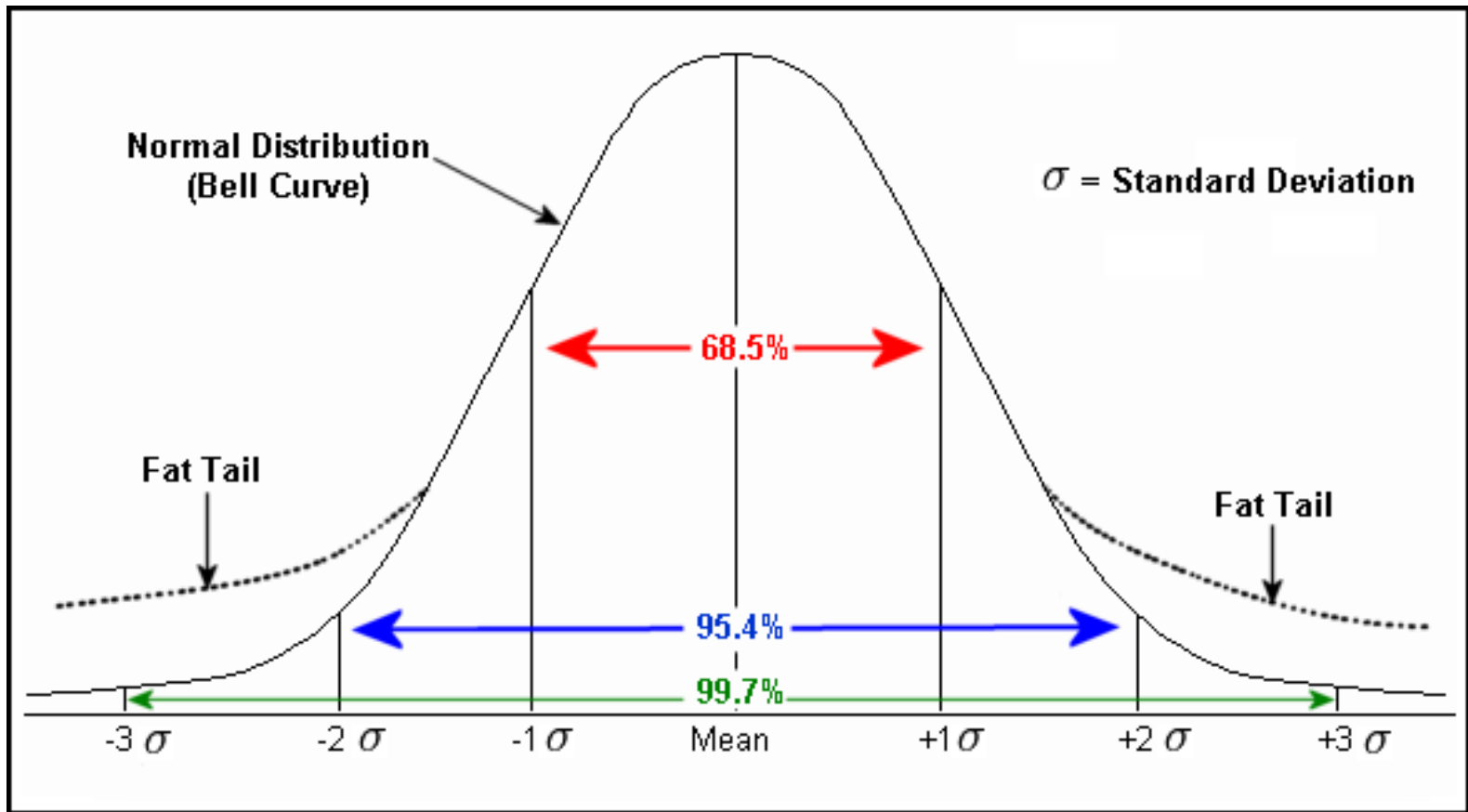
99.5% chance we are trading between 1400 & 2600 ( $2000 \pm 3 \times 10\%$  or  $\pm 600$ pts)

These three illustrations represent a 1, 2 & 3 standard deviation move respectively.

How often do you see a 1-std Deviation move in the markets? 2-Std deviation? 3 SD?

If you are going to successfully trade options, you must understand volatility in all its forms....

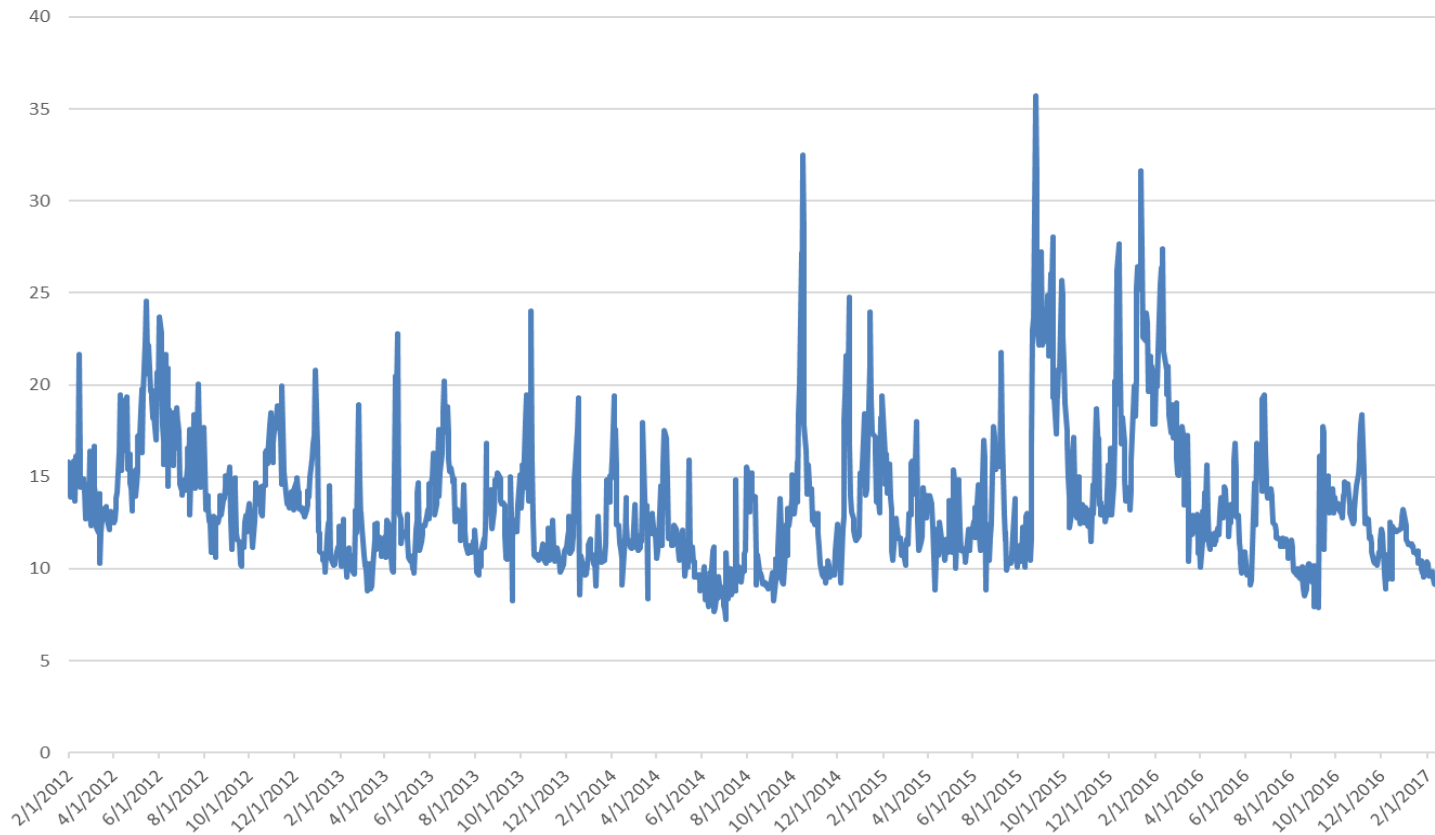
# Volatility Review



The Volatility associated with a futures contract is basically a 1 standard Deviation move, in percent over a year time period.

# The Traditional Way of looking at Volatility over Time

E-mini SP 500 Options ATM Implied Volatility  
5 yrs ending 2/24/17



# E-mini S&P 500 Volatility Percentile Rankings

## Impact on Strategies

3-years ending 2/14/2017

Percentile Ranking	ATM Impl. Vol Level	ATM Straddle* in premium terms	ATM straddle* in dollar terms
High	35.72%	167.00	\$8,350
90 <sup>th</sup> percentile	19.37%	97.00	\$4,850
75 <sup>th</sup> percentile	14.88%	80.00	\$4,000
50 <sup>th</sup> percentile	12.43%	68.75	\$3,437
25 <sup>th</sup> percentile	10.85%	62.00	\$3,100
10 <sup>th</sup> percentile	9.53%	58.00	\$2,900
Low	7.23%	45.00	\$2,250
* ATM straddle is S&P 500 2300 straddle Mar 17 exp.			



# Cheap vs. Expensive Premium

## Volatility Percentile Rankings

### Various CME Group Products

3-years ending 2/14/2017

Percentile Ranking	E-mini S&P 500	Crude oil	Japanese Yen	US Treasury notes	US Treasury Bond	Gold
High	35.72	78.94	18.02	14.69	14.75	25.92
90 <sup>th</sup> percentile	19.37	50.90	13.06	6.37	12.65	18.46
75 <sup>th</sup> percentile	14.88	43.68	11.93	5.68	11.47	16.33
50 <sup>th</sup> percentile	12.43	37.06	9.93	5.05	10.22	14.50
25 <sup>th</sup> percentile	10.85	26.92	8.21	4.59	8.25	13.17
10 <sup>th</sup> percentile	9.53	16.18	6.32	4.21	7.39	12.28
Low	7.23	12.49	4.82	2.73	6.09	9.48
<b>Current Volatility</b>	<b>9.11</b>	<b>24.92</b>	<b>10.96</b>	<b>4.66</b>	<b>8.92</b>	<b>11.07</b>
<b>Current %tile Rank</b>	<b>5%tile</b>	<b>21%tile</b>	<b>62%tile</b>	<b>26%tile</b>	<b>29%tile</b>	<b>3%tile</b>
<b>Cheap/expensive</b>	<b>Very cheap</b>	<b>cheap</b>	<b>Slightly expensive</b>	<b>cheap</b>	<b>cheap</b>	<b>Very cheap</b>

# Converting Annualized Volatility to other Time Periods

- Most Volatilities are annualized values
- Most options have expirations of less than a year.
- How can a trader convert annualized vol. to other time frames?
  - Monthly
  - Weekly
  - Daily
- How can you align these converted volatilities to optimize your options strategy?

# Converting Annualized Volatility to other Time Periods

How can a trader convert annualized vol. to other time frames?

$$\text{Volatility}_t = \text{Volatility}_{\text{annualized}} * \sqrt{t}$$

There are about 256 days in a trading year. So $t = 1/256$	
	$\text{Vol}_{\text{daily}} = \text{Volatility}_{\text{annualized}} * \sqrt{1/256} = 1/16$
Daily:	$\text{Vol}_{(\text{daily})} = \text{Volatility}_{(\text{annualized})}/16$
There are 52 weeks in a trading year. So $t = 1/52$	
	$\text{Vol}_{\text{weekly}} = \text{Volatility}_{\text{annualized}} * \sqrt{1/52} = 1/7.2$
Weekly	$\text{Vol}_{(\text{weekly})} = \text{Volatility}_{(\text{annualized})}/7.2$
There are 12 months in a trading year. So $t = 1/12$	
	$\text{Vol}_{\text{monthly}} = \text{Volatility}_{\text{annualized}} * \sqrt{1/12} = 1/3.5$
Monthly	$\text{Vol}_{\text{monthly}} = \text{Volatility}_{\text{annualized}}/3.5$

# Converting Annualized Volatility to other Time Periods

- How can a trader convert annualized vol. to other time frames?

- Monthly       $Vol_{(monthly)} = Volatility_{(annualized)}/3.5$

- Weekly       $Vol_{(weekly)} = Volatility_{(annualized)}/7.2$

- Daily       $Vol_{(daily)} = Volatility_{(annualized)}/16$

So, if current annualized implied Volatility in the S&P 500 is 12.00% and the S&P 500 futures are trading at 2,300.00. What are the expected monthly, weekly and daily moves in the futures?

Converting to monthly       $= 12.00/3.5 = 3.43\%$

Converting to weekly       $= 12.00/7.2 = 1.66\%$

Converting to daily       $= 12.00/16 = 0.75\%$

# Converting Annualized Volatility to other Time Periods

So, if current annualized implied Volatility in the S&P 500 is 12.00% and the S&P 500 futures are trading at 2,300.00. What are the expected monthly, weekly and daily moves in the futures?

Converting to monthly volatility or standard deviation	= 12.00/3.5 = 3.43%
Converting to weekly volatility or standard deviation	= 12.00/7.2 = 1.66%
Converting to daily volatility or standard deviation	= 12.00/16 = 0.75%

S&P 500 futures at 2,300.00

Monthly Std. Deviation	= 2,300 X .0343 ±78.9
Weekly Std. Deviation	= 2,300 X .0166 ±38.2
Daily Std. Deviation	= 2,300 X .0075 ±17.3

# Aligning Options Strategies with Volatility

E-mini June S&P 500 futures at 2,300.00

		1 STD	2 STD	3 STD
Monthly Std. Deviation	= 2,300 X .0343=	±78.9	±157.8	±236.7
Weekly Std. Deviation	= 2,300 X .0166=	±38.2	±76.4	±114.6
Daily Std. Deviation	= 2,300 X .0075=	±17.3	±34.6	±51.9

Case 1: Reconciling volatility with our choice of strategy. A trader thinks the market is going to have a large move into next week's unemployment number and decides to put on a strangle.

## Theoretical premiums:

2400 call = 0.07 pts

2375 call = 0.41 pts

2350 call = 1.81 pts

2325 call = 6.01 pts

2325c/2275p strangle premium = 11.89

2350c/2350p strangle premium = 3.47

2375c/2225p strangle premium = 0.74

2400c/2200p strangle premium = 0.11

2275 put = 5.88 pts

2250 put = 1.66 pts

2225 put = 0.33 pts

2200 put = 0.04 pts

Pros/cons to each choice:

# Volatility Across Strike Price--Taming of the Skew.

Theoretical premiums:

2400 call = 0.07 pts

2375 call = 0.41 pts

2350 call = 1.81 pts

2325 call = 6.01 pts

2275 put = 5.88 pts

2250 put = 1.66 pts

2225 put = 0.33 pts

2200 put = 0.04 pts

2375c/2400c spread = 0.34

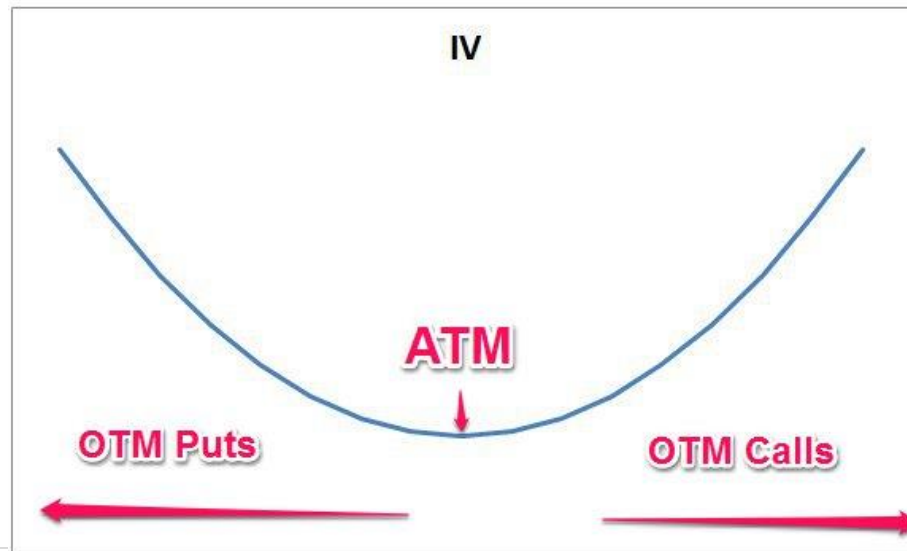
2225p/2200p spread = 0.29

# Volatility Skew Basics

Volatility skew describes the changes in Implied Volatility across put and call Options.

As you transition from at-the-money to out-of-the-money on the call side and put side, you see changes in implied volatility. This is called skew. While some skews are in the shape of a smile, others have different shapes.

Why?





# Volatility Skew Basics

GRAB  
Click a volatility point for details

ESA Index 90) Asset - 91) Actions - 92) Views - 93) Settings - Volatility Surface

S&P500 EMINI FUT Bloomberg As of < 07-Mar-2017 > 13:00

1) Vol Table 2) 3D Surface 3) Term 4) Skew 6) Prices

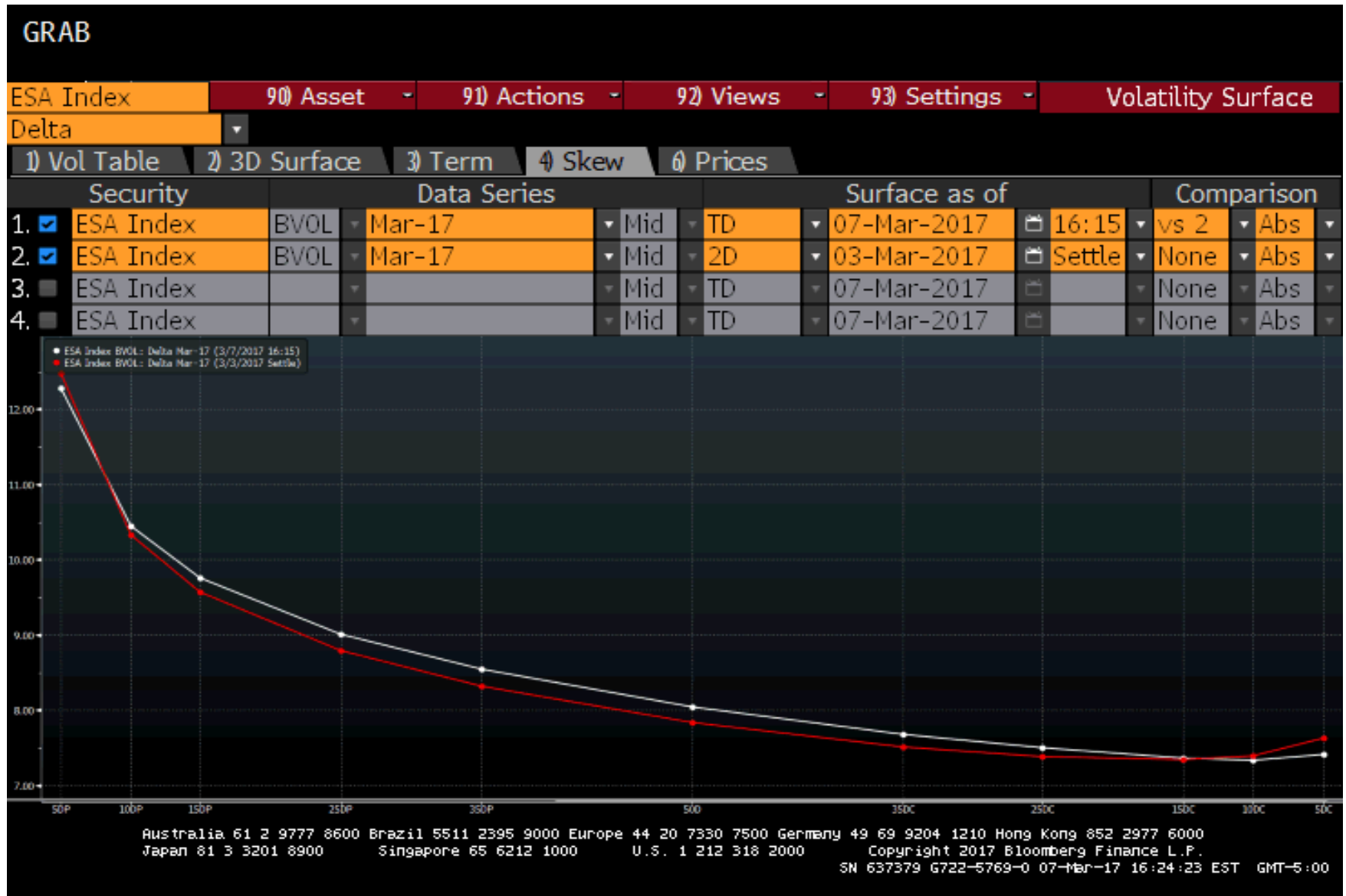
Delta Listed Edit  FUT  Dates  Strikes  Spread

Contract	Futures	10DP	15DP	25DP	35DP	50D	35DC	25DC	15DC	10DC
Mar-17	2370.50	11.14	10.17	9.23	8.74	8.30	8.01	7.84	7.70	7.66
Jun-17	2367.25	18.60	16.96	14.94	13.51	11.96	10.82	10.15	9.54	9.26
Sep-17	2364.25	20.64	18.81	16.65	15.04	13.20	11.84	11.04	10.25	9.88
Dec-17	2365.25	21.58	19.82	17.69	15.97	13.82	12.30	11.47	10.69	10.30

98) Legend Zoom 100%

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Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000  
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# Volatility Skew Basics



# Key Points in Volatility Trading

- Anyone can trade a straddle or any other options strategy from the long or short side. But doing the trade in the correct volatility environment will be a key determinant in your success rate. You want probability working for you not against you. Buy low, sell high pertains to volatility levels too.

Use Volatility Percentile Rankings as a tool to weed out certain trades.

- If you want to “short” premium, consider doing so when volatility is high.... above the 75%TILE
- Remember, percentile rankings are only one tool. Just because volatility is in a low percentile, doesn't mean that it can't go lower. And if its high, it can also go higher
- And also remember, even if you are fortunate enough to buy volatility with low percentile rankings, you still have to deal with time decay issues and choosing appropriate strikes. Options are four dimensional instruments—it's not only up and down movement in the underlying that matters, but time to expiration as well as volatility
- Use Volatility skew in your favor. Consider put spreads and call spreads to take advantage of premium distortions due to skew.

# Thank you

