Implied Volatility in Options Trading

The CBOE Volatility Index[®] (VIX[®] Index) is considered by many to be the world's premier barometer of equity market volatility. The VIX Index is based on real-time prices of options on the S&P 500[®] Index (SPX) and is designed to reflect investors' consensus view of future (30-day) expected stock market volatility. The VIX Index is often referred to as the market's "fear gauge".

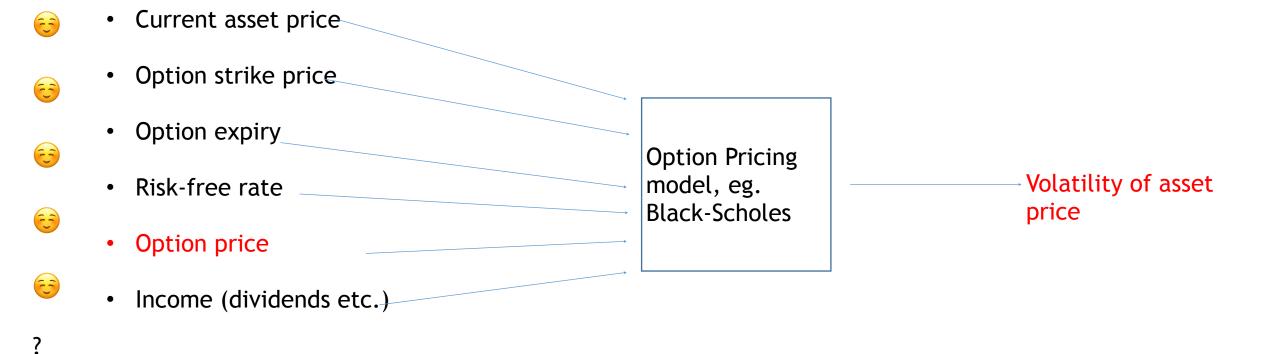
(CBOE.com)

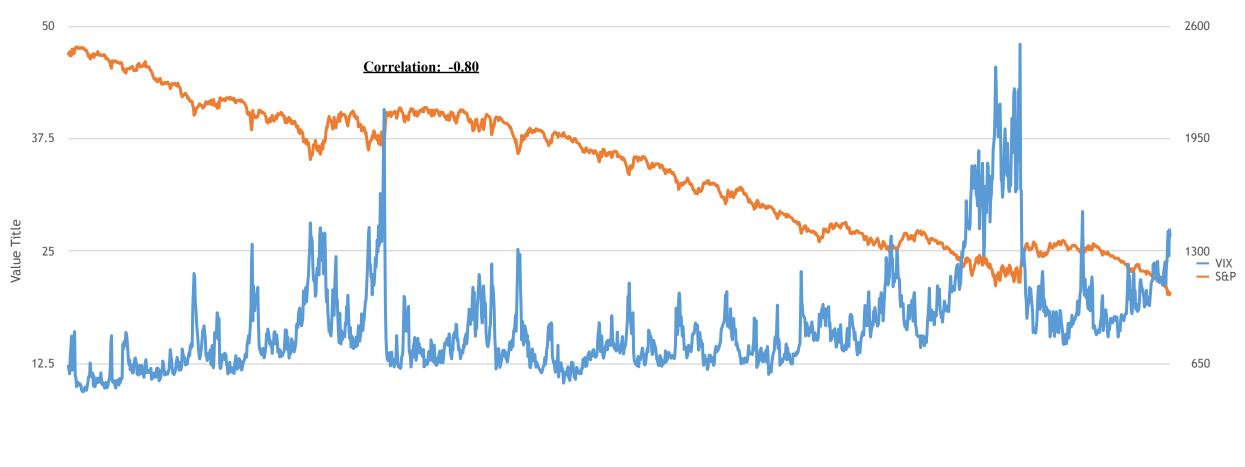
Current asset price
Option strike price
Option expiry
Risk-free rate
Volatility of asset price
Income (dividends etc.)

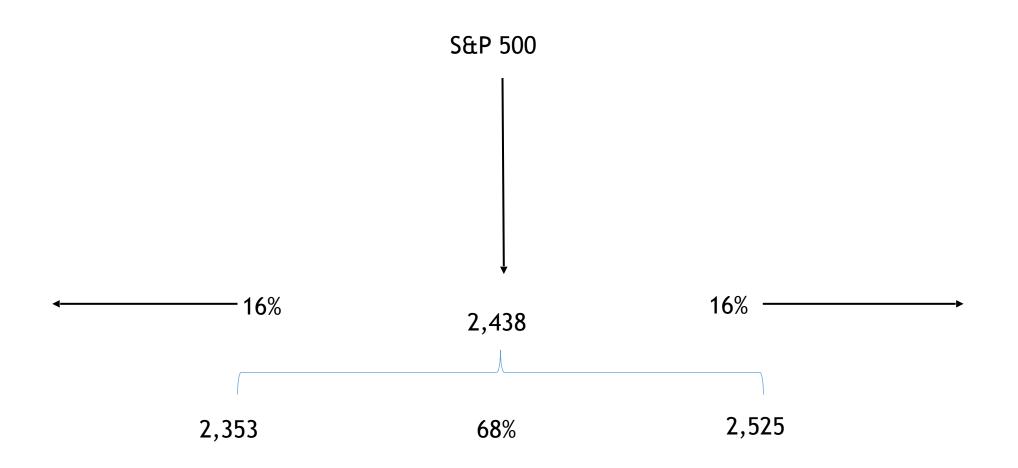
• Current asset price • Option strike price 6 Option expiry • 3 **Option Pricing** model, eg. **Option price** Risk-free rate • Black-Scholes . • Volatility of asset price ... • Income (dividends etc.)

65

?







<u>Actions</u>

- Buy options when they're "cheap"
- Sell options when they're "expensive"
- How do we know what "cheap" or "expensive" looks like?
 - ...implied volatility!

<u>Actions</u>

- Buy options when they're "cheap"
- Buying put options to protect the downside
 - Limits losses when there's a downturn
 - Gives you confidence to stay in a position, which can be useful even if there's no downturn
 - Can close out put for a profit following a temporary downturn and profit on the market swings
- Buying puts when implied volatility is low
 - Puts are "cheap" at this time
 - There's often a calm before the storm, so low IV <u>could be</u> a signal of impending downturn

<u>Actions</u>

- Sell options when they're "expensive"
- Put writing and covered call writing



- Volatility is a unique feature of an investment
- Get to know the typical levels of implied volatility for a specific asset
- Look out for deviations from norm
- Look out for deviations across different option contracts

.//investor.t	adekin	g.com/N	/lodules/R	esearch/Opt	ionChain/o	ptionChain	.php									C C	Q Searc	:h	1	Ê	÷
	3		- inuiviuuai	Account V						As of: 08	3/25/17 11	:57 AM E	T Video	Demo Detac	h Chain⊡' (Customize Pri	nt Export t	o Excel He	lp		
																U	.S. Markets	close in 4:00	:56		
		Show: A	APL		More	•	Calls	And Puts		•	Sep	15 2017	•	Go				Refresh			
		APPLE IN	NC (AAPL)	Last 159.7	72 Chang	e 0.45 Bi	d 159.72	Ask 159.	73 Va	olume 14,817	7,315	Trade N	lews Ch	art							
			Sep	tember 1	5 2017 Ca	alls				PL @ 159				S	eptembe	r 15 2017	Puts				
		Choose	a Strategy	y 🔻 Trade	Get Qu	ote P&	L Calc	Clear Sele		,	-										
		IV	Delta	Open Int	Vol	Change	Last	Bid	Ask	Strike	Bid	Ask	Last	Change	Vol	Open Int	Delta	IV			
		26.55	0.910	33	40	0.00	13.15	13.25	13.30	147.00	0.41	0.43	0.43	-0.15	88	512	-0.088	26.22			
		26.04	0.896	27	71	0.95	12.85	12.30	12.40	148.00	0.48	0.50	0.49	-0.18	49	1,168	-0.102	25.68			
		25.69	0.878	88	0	0.00	11.25	11.40	11.50	149.00	0.57	0.59	0.58	-0.19	56	490	-0.118	25.24			
		25.13	0.860	17,612	53,446	0.22	10.59	10.50	10.60	150.00	0.68	0.69	0.70	-0.19	55,159	43,859	-0.138	24.80			
		23.98	0.800	197	91	0.17	8.47	8.35	8.45	152.50	1.04	1.06	1.03	-0.33	300	1,423	-0.199	23.86			
		23.19	0.718	35,498	867	0.06	6.43	6.40	6.50	155.00	1.58	1.61	1.62	-0.30	2,754	31,269	-0.281	23.06			
		22.46	0.618	2,340	4,684	0.05	4.80	4.70	4.75	157.50	2.36	2.38	2.39	-0.32	613	1,496	-0.383	22.34			
		21.96	0.503	126,893	4,274	0.00	3.30	3.25	3.35	160.00	3.40	3.45	3.45	-0.35	1,475	26,757	-0.498	21.71			
		21.58	0.386	6,699	1,848	-0.05	2.19	2.17	2.20	162.50	4.80	4.85	4.85	-0.34	122	237	-0.617	21.41			
		21.33	0.277	68,112	1,629	-0.09	1.36	1.36	1.38	165.00	6.50	6.55	6.69	-0.36	44	2,361	-0.726	21.22			
		21.27	0.188	1,710	326	-0.07	0.84	0.81	0.84	167.50	8.45	8.55	8.53	-0.27	36	469	-0.815	21.27			
		21.35	0.121	61,985	340	-0.07	0.46	0.47	0.49	170.00	10.55	10.70	10.05	-1.05	24	2,677	-0.889	20.84			
		Choose	a Stratem	y 🔻 Trade	Get Qu	ioto D8	L Calc	Clear Sele	ctions												

•

⁰⊻ 🧷

x∎

0

w

٩

Q

▲ 🍡 🐯 🛱 ♠) 8:58 AM 8/25/2017

🕥 Ally Invest - Option Chains 🛛 🗙 🕇 🕂

4

Q

Go

e

0

🛈 🔒 | https://investor.tradeking.com/Modules/Research/OptionChain/optionChain.php

俞

-

-

+

☆ 自 ♥

U.S. Markets close in 4:00:20

Q Search

E)

G

F	MAZON.	COM INC ()	AMZN) Las	949.88	Change	-2.58 Bi	d 949.70	Ask 950.	.20 Volum	ne 1,694,6	07 Tra	de News	Chart								
		Sept	ember 15 2	2017 (Calls				ZN @ 949			Sej	September 15 2017 Puts								
C	choose a	a Strategy	▼ Trade	Get	Quote F	%L Calc	<u>Clear Se</u>	lections													
	IV	Delta	Open Int	Vol	Change	Last	Bid	Ask	Strike	Bid	Ask	Last	Change	Vol	Open Int	Delta	IV				
	20.97	0.638	199	1	-0.21	30.77	27.40	28.25	935.00	11.85	12.30	12.05	0.55	89	1,105	-0.362	20.77	[
]	20.82	0.598	337	11	-2.75	24.25	24.30	25.10	940.00	13.65	14.10	13.78	0.48	157	1,735	-0.402	20.53				
]	20.47	0.558	251	72	-2.03	22.30	21.10	22.10	9 45.00	15.60	16.10	15.35	0.35	42	761	-0.443	20.27	-			
]	20.43	0.536	42	8	-2.23	20.61	19.75	20.75	947.50	16.55	17.20	17.50	2.65	32	83	-0.465	20.10	-			
ו	20.37	0.515	831	602	-2.13	18.87	18.55	19.30	950.00	17.80	18.30	17.80	1.00	134	3,501	-0.486	20.03	ſ			
]	20.24	0.494	52	336	-4.32	17.38	17.25	17.95	952.50	18.85	19.65	19.20	1.11	8	68	-0.508	19.94	ſ			
	20.17	0.472	424	78	-1.46	16.35	16.05	16.70	955.00	20.25	20.80	20.40	1.00	105	768	-0.530	19.86	ſ			
]	20.09	0.450	71	21	-1.00	15.75	14.85	15.55	957.50	21.45	22.25	22.20	2.20	11	83	-0.552	19.78	ſ			
	20.04	0.429	1,367	100	-0.88	14.57	13.90	14.30	960.00	22.90	23.50	23.20	1.40	35	1,749	-0.575	19.66	ſ			
	19.89	0.407	68	13	-1.30	13.50	12.65	13.30	962.50	24.10	25.00	23.90	1.00	10	57	-0.597	19.48	ſ			
	19.86	0.386	569	19	-3.15	12.10	11.70	12.30	965.00	25.65	26.50	26.10	1.85	22	759	-0.619	19.44				
]	19.82	0.365	74	3	-1.63	11.67	10.80	11.35	967.50	27.15	28.10	24.20	-1.95	3	108	-0.640	19.36				

Highlighted options are in-the-money.

0

w

0

x∎

Show: TSLA More Calls And Puts Sep 15 2017 Go Refresh View: Standard Non-Standard Non-Standard Refresh Refresh <th>si.tradeking.com</th> <th>/ Modul</th> <th>es/Research/Op</th> <th>tionChain</th> <th>/optionCh</th> <th>iain.php</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>C C</th> <th>Q Sear</th> <th>ch</th> <th>5</th> <th><u>۲</u></th> <th>*</th> <th>î</th>	si.tradeking.com	/ Modul	es/Research/Op	tionChain	/optionCh	iain.php									C C	Q Sear	ch	5	<u>۲</u>	*	î
V Delta Open Int Vol Change 1.80 3.80 3.90 0.90 6.90 6.10 5.90 0.60 6.70 6.90 6.70 6.90 6.70 6.90 6.70 6.90 6.70 7.80 9.00 9.80 8.90 8.90 8.90 8.90 8.90 8.90 8.90 8.90 8.90 9.90	Show:	TSLA		More			s And Pu	ts	•	Sep 1	5 2017	•	Go				Refres	h			
TelA 330.97 21 Days to Exp September 15 2017 Calls TelA 330.97 21 Days to Exp September 15 2017 Calls Trade Get Quote P&L Calc Clear Selection IV Delta Open Int Vo Change Last Bid Ask Strike Bid Ask Last Change Vol Open Int Delta IV 33.98 0.701 130 1 -0.39 21.61 19.25 19.60 337.50 5.90 6.10 5.95 0.28 9 208 -0.304 35.00 0 33.78 0.670 1.905 235 -2.46 17.34 17.45 18.00 340.00 6.70 6.90 6.73 0.33 141 2.774 -0.344 34.76 0 33.55 0.603 1,321 67 -4.05 14.20 14.45 14.80 345.00 6.52 197 1.465 -0.399 34.17 0 33.05 0.569 186 13	View:	Standa	rd Non-Star	dard																	
Bepermer for corr cons Bepermer for corr cons Choose a Strategy Trade Get Quote P&L colspan="12">Chare Selection IV Delta Open Int Vol Change Last Bid Ask Strike Bid Ask Last Change Vol Open Int Delta IV 3388 0.701 130 1 -0.39 21.61 19.25 19.60 337.60 5.90 6.10 5.95 0.28 9 208 -0.304 35.00 - 3378 0.670 1,905 235 -2.46 17.44 18.00 340.00 6.70 6.90 6.73 0.33 141 2.774 -0.34 34.76 - 33.56 0.603 1,321 67 -4.05 14.20 14.80 345.00 8.50 8.60 0.52 197 1,465 -0.399 34.17 33.65 0.603 1,321 67 -4.05 14.55	TESLA	INC (T	SLA) Last 350	.97 Cha	inge -1.96	Bid 350.80) Ask 3	51.02 \	/olume 1,749	,040 T	ade Ne	ws Chart									
IV Delta Open Int Vol Change Last Bid Ask Last Change Vol Open Int Delta IV 33.98 0.701 130 1 -0.39 21.61 19.25 19.60 337.50 5.90 6.10 5.95 0.28 9 208 -0.304 35.00 - 33.78 0.670 1,905 235 -2.46 17.34 17.45 18.00 340.00 6.70 6.90 6.73 0.33 141 2,774 -0.334 34.76 33.75 0.603 11,22 2 -2.83 16.27 15.85 14.20 7.55 7.75 7.83 1.11 12 391 -0.366 34.43 - 33.05 0.603 1,321 67 -4.05 14.20 14.45 14.80 346.00 8.50 8.70 8.60 0.52 197 1,465 -0.399 34.17<- 33.05 0.509 186 13 <th></th> <th>5</th> <th>eptember 1</th> <th>5 2017 (</th> <th>Calls</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Se</th> <th>ptemb</th> <th>er 15 2017</th> <th>' Puts</th> <th></th> <th></th> <th></th> <th></th> <th></th>		5	eptember 1	5 2017 (Calls								Se	ptemb	er 15 2017	' Puts					
33.98 0.701 130 1 -0.39 21.61 19.25 19.60 337.50 5.90 6.10 5.95 0.28 9 208 -0.304 35.00 - 33.78 0.670 1,905 235 -2.46 17.34 17.45 18.00 340.00 6.70 6.90 6.73 0.33 141 2.774 -0.334 34.76 - 33.56 0.638 112 2 -2.83 16.27 15.85 16.35 342.50 7.55 7.75 7.83 1.11 12 391 -0.366 34.43 - 33.56 0.633 1,321 67 -4.05 14.45 14.80 345.00 8.50 8.70 8.60 0.52 197 1,465 -0.399 34.17 - 33.05 0.569 186 13 -3.60 12.90 12.85 13.30 347.50 9.55 9.75 9.80 1.00 29 333 -0.432 33.80 - 32.83 0.534 2,588 374 -1.40 11.79 <td< th=""><th>Choos</th><th>e a Stra</th><th>ategy 🔻 Trad</th><th>e Get</th><th>Quote</th><th>P&L Calc</th><th>Clear Se</th><th>lections</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>	Choos	e a Stra	ategy 🔻 Trad	e Get	Quote	P&L Calc	Clear Se	lections													
33.78 0.670 1,905 235 -2.46 17.34 17.45 18.00 6.70 6.90 6.73 0.33 141 2,774 -0.334 34.76 33.56 0.638 112 2 -2.83 16.27 15.85 16.35 342.50 7.55 7.75 7.83 1.11 12 391 -0.366 34.43 33.55 0.603 1,321 67 -4.05 14.20 14.45 14.80 345.00 8.50 8.70 8.60 0.52 197 1,465 -0.399 34.17 33.05 0.569 186 13 -3.60 12.90 12.85 13.30 347.50 9.55 9.75 9.80 1.00 29 333 -0.432 33.80 32.83 0.534 2,588 374 -1.40 11.79 11.50 11.85 12.25 12.05 1.45 38 89 -0.502 33.67 32.69 0.462 1,340 170 -1.44 9.42 9.20 9.45 </td <td>IV</td> <td>De</td> <td>Ita Open In</td> <td>Vol</td> <td>Change</td> <td>Last</td> <td>Bid</td> <td>Ask</td> <td>Strike</td> <td>Bid</td> <td>Ask</td> <td>Last</td> <td>Change</td> <td>Vol</td> <td>Open Int</td> <td>Delta</td> <td>IV</td> <td></td> <td></td> <td></td> <td></td>	IV	De	Ita Open In	Vol	Change	Last	Bid	Ask	Strike	Bid	Ask	Last	Change	Vol	Open Int	Delta	IV				
33.66 0.638 112 2 -2.83 16.27 15.85 16.35 342.50 7.55 7.75 7.83 1.11 12 391 -0.366 34.43	33.9	8 0.	701 130	1	-0.39	21.61	19.25	19.60	337.50	5.90	6.10	5.95	0.28	9	208	-0.304	35.00				
33.55 0.603 1,321 67 -4.05 14.20 14.45 14.80 345.00 8.50 8.70 8.60 0.52 197 1,465 -0.399 34.17 - 33.05 0.569 186 13 -3.60 12.90 12.85 13.30 347.50 9.55 9.75 9.80 1.00 29 333 -0.432 33.96 - 32.83 0.534 2,588 374 -1.40 11.79 11.50 11.90 350.00 10.70 10.90 10.80 0.68 107 2,596 -0.467 33.80 - 32.78 0.498 545 27 -2.80 10.49 10.35 10.60 352.50 11.85 12.25 14.55 38 89 -0.502 33.67 - 32.69 0.462 1,340 170 -1.44 9.42 9.20 9.45 355.00 13.25 13.50 13.35 0.85 27 714 -0.537 33.52 - 32.64 0.427 169 11 -1.44 8.16	33.7	8 0.	370 1,905	235	-2.46	17.34	17.45	18.00	340.00	6.70	6.90	6.73	0.33	141	2,774	-0.334	34.76				
33.05 0.569 186 13 -3.60 12.90 12.85 13.30 347.50 9.55 9.75 9.80 1.00 29 333 -0.432 33.96	33.5	6 0.	538 112	2	-2.83	16.27	15.85	16.35	342.50	7.55	7.75	7.83	1.11	12	391	-0.366	34.43				
32.83 0.534 2,588 374 -1.40 11.79 11.50 11.90 10.70 10.90 10.80 0.68 107 2,596 -0.467 33.80	33.5	5 0.	503 1,321	67	-4.05	14.20	14.45	14.80	345.00	8.50	8.70	8.60	0.52	197	1,465	-0.399	34.17				
32.78 0.498 545 27 -2.80 10.49 10.35 10.60 352.50 11.85 12.25 12.05 1.45 38 89 -0.502 33.67	33.0	5 0.	69 186	13	-3.60	12.90	12.85	13.30	347.50	9.55	9.75	9.80	1.00	29	333	-0.432	33.96				
32.69 0.462 1,340 170 -1.44 9.42 9.20 9.45 355.00 13.25 13.35 0.85 27 714 -0.537 33.52	32.8	3 0.	34 2,588	374	-1.40	11.79	11.50	11.90		10.70	10.90	10.80	0.68	107	2,596	-0.467					
32.64 0.427 169 11 -1.44 8.16 8.15 8.40 357.50 14.65 15.10 15.20 2.55 5 20 -0.571 33.62																					
32.71 0.393 3,326 80 -1.18 7.37 7.25 7.45 360.00 16.65 16.28 1.28 14 1,674 -0.605 33.63																					
32.60 0.359 153 2 -0.90 7.10 6.30 6.60 362.50 17.75 18.25 19.80 0.00 0 26 -0.638 33.46																					
	32.5	5 0.	326 2,735	62	-0.98	5.55	5.50	5.80	365.00	19.50	20.00	17.90	-2.40	3	1,340	-0.669	33.60				

w

۲

Q

0

-

8:59 AM 8/25/2017

- 🍡 🐯 📴 🐠

Q

?

Go

e

0