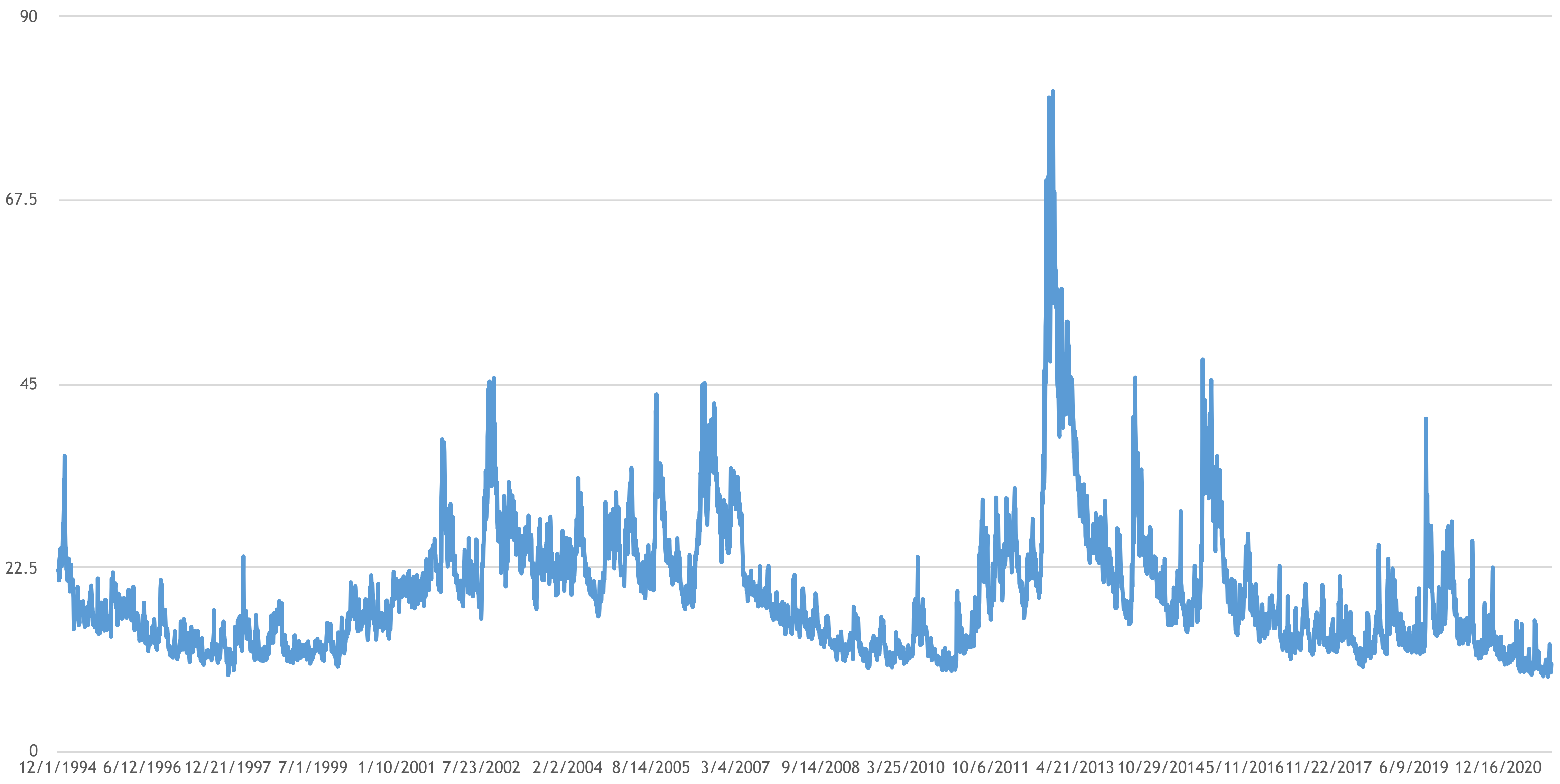
Think you know what volatility means….

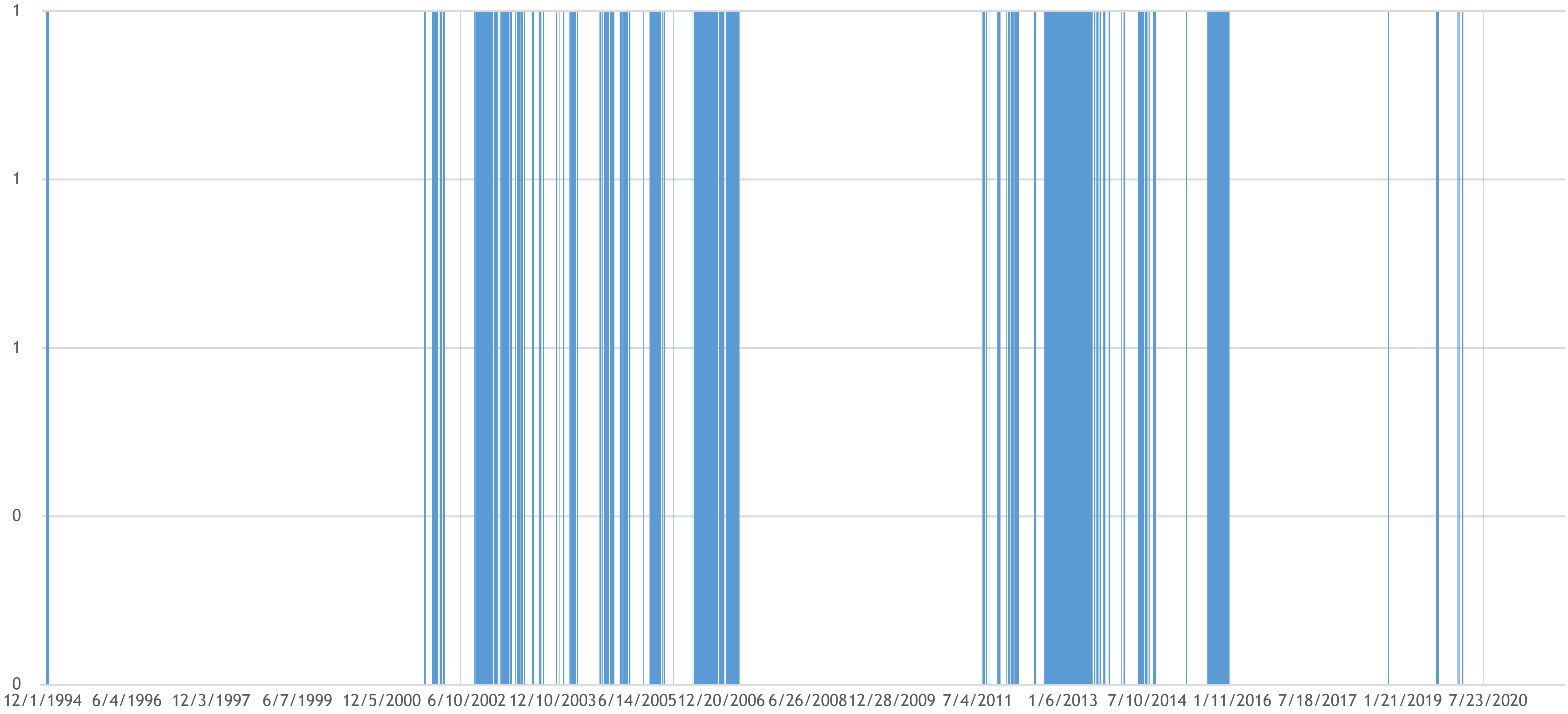
NEW YORK (Reuters) - Nasdaq Inc plans to launch a futures contract based on bitcoin in 2018, making it the third exchange operator to plan U.S. derivatives contracts linked to the digital currency, a source with knowledge of the matter said on Wednesday.


Cboe



90
67.5
45
22.5
0
12/1/1994
6/12/1996
12/21/1997
7/1/1999
1/10/2001
7/23/2002
2/2/2004
8/14/2005
3/4/2007
9/14/2008
3/25/2010
10/6/2011
4/21/2013
10/29/2014
5/11/2016
11/22/2017
6/9/2019
12/16/2020

VIX above 25%


1
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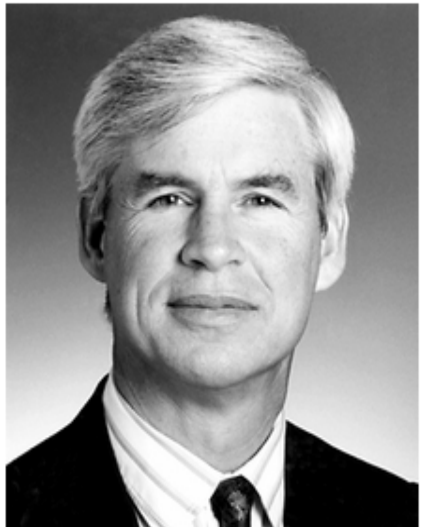
6/26/2008
12/28/2009
7/4/2011
1/6/2013
7/10/2014
1/11/2016
7/18/2017
1/21/2019
7/23/2020

Can we predict volatility?

- Periods of high volatility do tend to subside gradually over time
- …but, it's really difficult to predict when the spikes will interrupt the periods of calm.
- Formal models of volatility are very complicated!! (Nobel Prize – winning ARCH model of Rob Engle)

Robert F. Engle III - Facts



Robert F. Engle III

Born: 10 November 1942, Syracuse, NY, USA

Affiliation at the time of the award: New York University, New York, NY, USA

Prize motivation: "for methods of analyzing economic time series with time-varying volatility (ARCH)"

Field: econometrics

Buying put options for protection

S&P 500 January Put option @ 2,640 trading at $32.80

Matches up neatly with portfolio of 2,640 x $100 = $264,000

(Perfectly protects against any decline below 2,640)

Portfolio cost = $3,280 / $264,000 = 1.24% (for +- 50 days)

- Large cost if we did this repeatedly (even when puts are “cheap”)
- We want to be selective about when we use this protection

Buying put options for protection

EXPIRATION DATE: Jan 19, 2018

CALLS			PUTS	
Bid	Ask	Strike Price	Bid	Ask
39.90	41.00	2,640.00	32.10	32.80
36.30	37.60	2,645.00	33.00	34.30
37.00	37.70	2,645.00	33.60	34.60
33.20	34.50	2,650.00	34.80	36.20
33.90	34.60	2,650.00	35.50	36.50
30.30	31.50	2,655.00	36.80	38.20

SPX JAN 19 2018 2,650.00 CALL

Buy Sell

LAST	TODAY'S CHANGE	BID (SIZE)	ASK (SIZE)
32.92	+1.02 (3.20%)	33.20 (x160)	34.50 (x140)
Volume	3,526	IV	9.29%
Open Interest	29,314	Delta	0.488
Open	0	Gamma	0.0044
Previous Close	31.9	Vega	3.8602
Today's High	37.5	Theta	-0.3999
Today's Low	34	Rho	1.6856

Closing Price - Last Trade as of 4:15PM ET 12/01/17

2,650 + $34.50 = 2,684.50
Return of 1.30% to breakeven

Buying call options

EXPIRATION DATE: < Jan 19, 2018 >

CALLS		^	PUTS	
Bid	Ask	Strike Price	Bid	Ask
39.90	41.00	2,640.00	32.10	32.80
36.30	37.60	2,645.00	33.00	34.30
37.00	37.70	2,645.00	33.60	34.60
33.20	34.50	2,650.00	34.80	36.20
33.90	34.60	2,650.00	35.50	36.50
30.30	31.50	2,655.00	36.80	38.20

Delayed Quotes - Data delayed 15 minutes

SPX JAN 19 2018 2,650.00 CALL

Buy Sell

LAST	TODAY'S CHANGE	BID (SIZE)	ASK (SIZE)
32.92	+1.02 (3.20%)	33.20 (x160)	34.50 (x140)
Volume	3,826	IV	9.29%
Open Interest	29,314	Delta	0.488
Open	0	Gamma	0.0044
Previous Close	31.9	Vega	3.8602
Today's High	37.5	Theta	-0.3999
Today's Low	23.3	Rho	1.6856

Closing Price - Last Trade as of 4:15PM ET 12/01/17

Buying straddles

$37.60 + $34.30 =
$71.90
Profit: < 2,570 (-2.72%)
> 2,714
(2.72%)

January 19 2018 Calls | **SPX @ 2,642.22** 49 Days to Exp | **January 19 2018 Puts**

Choose a Strategy | Trade | Get Quote | P&L Calc | Clear Selections

IV	Delta	Open Int	Vol	Change	Last	Bid	Ask	Strike	Bid	Ask	Last	Change	Vol	Open Int	Delta	IV
9.76	0.582	9,498	79	-3.77	45.08	46.30	47.70	2,630.00	28.10	29.30	34.85	5.65	177	1,833	-0.417	9.60
9.57	0.562	773	136	-3.15	42.45	42.80	44.20	2,635.00	29.60	30.90	32.00	0.75	98	739	-0.438	9.43
9.41	0.541	3,278	91	-5.69	38.19	39.50	40.90	2,640.00	31.20	32.50	36.84	7.64	115	1,648	-0.459	9.25
9.23	0.519	345	47	-2.95	35.95	36.30	37.60	2,645.00	33.00	34.30	43.00	7.90	10	170	-0.481	9.09
9.07	0.496	29,314	3,811	1.02	32.92	33.20	34.50	2,650.00	34.80	36.20	36.93	0.13	2,120	3,658	-0.504	8.91
8.91	0.473	1,679	27	-4.15	29.60	30.30	31.50	2,655.00	36.80	38.20	53.00	17.15	2	675	-0.528	8.75

Sell Puts on VIX

Find Options

Options Chain

EXPIRATION DATE: Jan 17, 2018

CALLS			PUTS	
Bid	Ask	Strike Price	Bid	Ask
3.20	3.50	10.00	0.05	0.10
2.85	3.10	10.50	0.15	0.20
2.50	2.70	11.00	0.30	0.35
2.20	2.35	11.50	0.50	0.55
1.95	2.10	12.00	0.75	0.80
1.75	1.90	12.50	1.05	1.10

Delayed Quotes - Data delayed 15 minutes

Option Detail

VIX JAN 17 2018 11.50 CALL

Buy | Sell

LAST	TODAY'S CHANGE	BID (SIZE)	ASK (SIZE)
2.35	+0.35 (17.50%)	2.20 (x3,505)	2.35 (x1,104)

Volume	279	IV	141.94%
Open Interest	10,591	Delta	0.5968
Open	0	Gamma	0.0665
Previous Close	2	Vega	0.0159
Today's High	2.15	Theta	-0.0241
Today's Low	2.15	Rho	0.0059

Closing Price - Last Trade as of 4:15PM ET 12/01/17

Sell Puts on VIX

Find Options | Options Chain

EXPIRATION DATE: Mar 21, 2018

CALLS			PUTS	
Bid	Ask	Strike Price	Bid	Ask
5.70	6.00	9.00	0.00	0.05
4.80	5.10	10.00	0.05	0.15
4.00	4.30	11.00	0.25	0.35
3.50	3.70	12.00	0.65	0.75
3.00	3.20	13.00	1.15	1.25
2.65	2.80	14.00	1.75	1.90

Option Detail

VIX MAR 21 2018 12.00 CALL

Buy | Sell

LAST	TODAY'S CHANGE	BID (SIZE)	ASK (SIZE)
3.60	+0.20 (5.88%)	3.50 (x190)	3.70 (x6,058)
Volume	132	IV	155.36%
Open Interest	1,785	Delta	0.6453
Open	0	Gamma	0.0382
Previous Close	3.4	Vega	0.0233
Today's High	3.4	Theta	-0.0166
Today's Low	3.6	Rho	0.0114

Closing Price - Last Trade as of 4:15PM ET 12/01/17

Buy Calls on VIX

EXPIRATION DATE: Jan 17, 2018

CALLS			PUTS	
Bid	Ask	Strike Price	Bid	Ask
2.50	2.70	11.00	0.30	0.35
2.20	2.35	11.50	0.50	0.55
1.95	2.10	12.00	0.75	0.80
1.75	1.90	12.50	1.05	1.10
1.60	1.70	13.00	1.35	1.45
1.45	1.55	13.50	1.70	1.80

VIX JAN 17 2018 11.50 CALL

Buy Sell

LAST	TODAY'S CHANGE	BID (SIZE)	ASK (SIZE)
2.35	+0.35 (17.50%)	2.20 (x3,505)	2.35 (x1,104)
Volume	279	IV	141.94%
Open Interest	10,591	Delta	0.5968
Open	0	Gamma	0.0665
Previous Close	2	Vega	0.0159
Today's High	2.15	Theta	-0.0241
Today's Low	2.15	Rho	0.0059

Closing Price - Last Trade as of 4:15PM ET 12/01/17

Buy Calls on VIX

EXPIRATION DATE: Mar 21, 2018

CALLS			PUTS	
Bid	Ask	Strike Price	Bid	Ask
4.00	4.30	11.00	0.25	0.35
3.50	3.70	12.00	0.65	0.75
3.00	3.20	13.00	1.15	1.25
2.65	2.80	14.00	1.75	1.90
2.35	2.45	15.00	2.45	2.55
2.05	2.20	16.00	3.20	3.30

VIX MAR 21 2018 12.00 CALL

Buy Sell

LAST	TODAY'S CHANGE	BID (SIZE)	ASK (SIZE)
3.60	+0.20 (5.88%)	3.50 (x190)	3.70 (x6,058)
Volume	132	IV	155.36%
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