

Steve Meizinger

Learn About Volatility through Options Skew



For the sake of simplicity, the examples that follow do not take into consideration commissions and other transaction fees, tax considerations, or margin requirements, which are factors that may significantly affect the economic consequences of a given strategy. An investor should review transaction costs, margin requirements and tax considerations with a broker and tax advisor before entering into any options transaction.

Options involve risk and are not suitable for everyone. Prior to buying or selling an option, a person must receive a copy of CHARACTERISTICS AND RISKS OF STANDARDIZED OPTIONS. Copies have been provided for you today and may be obtained from your broker, one of the exchanges or The Options Clearing Corporation. A prospectus, which discusses the role of The Options Clearing Corporation, is also available, without charge, upon request at 1-888-OPTIONS or www.optionseducation.org.

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



Options Create Opportunities

Bearish	Moderately Bearish	Neutral	Moderately Bullish	Bullish
1) Buy put	1) Sell call 2) Buy put (bear) spread, sell call spread 3) Buy ratio put spread	1) Sell strangle 2) Sell straddle 3) Buy strangle 4) Buy straddle 5) Buy butterfly 6) Buy calendar spread 7) Sell calendar spread	1) Covered write (sell put) 2) Buy call (bull) spread, sell put spread 3) Buy ratio call spread	1) Buy call 2) Buy underlying purchase protective put

Market Strategies

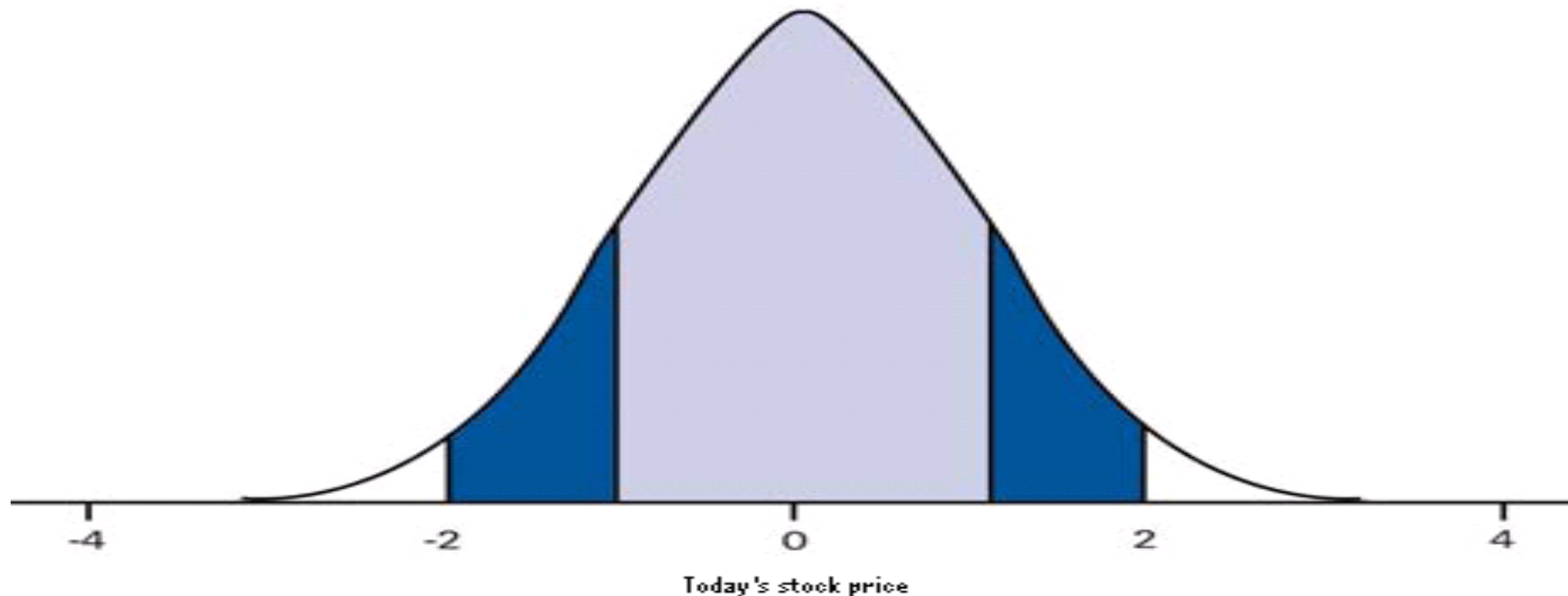
- Most market strategies are based on one of three characteristics
 - Yield based
 - Trend-following
 - Trend-reversion

Theory behind options

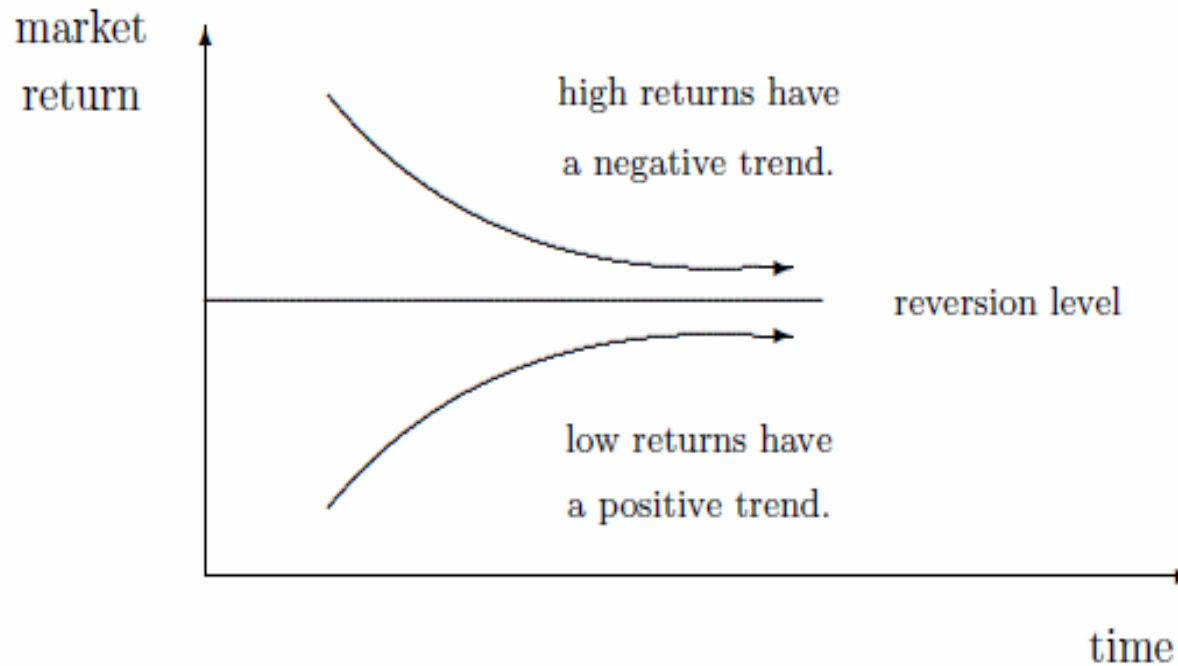
- Theoretical foundations laid by the German mathematician, Gauss, as “Gausschen normal distribution” works on the principle that coincidental values fluctuate around a middle value in the shape of a bell curve (log normal distribution). The economists, Markowitz, Black & Scholes and Sharpe expanded on this in their formulae of portfolio theory and option price calculation
- Fluctuating around the middle value is portrayed as a standard deviation/variance and, calculated on a yearly basis, is described as volatility

Option Prices are Based on Probabilities

Options pricing is based on risk neutrality, theory states that assets **will likely** revert back to a mean price



Theory of reversion to the mean



Models prefer simplicity

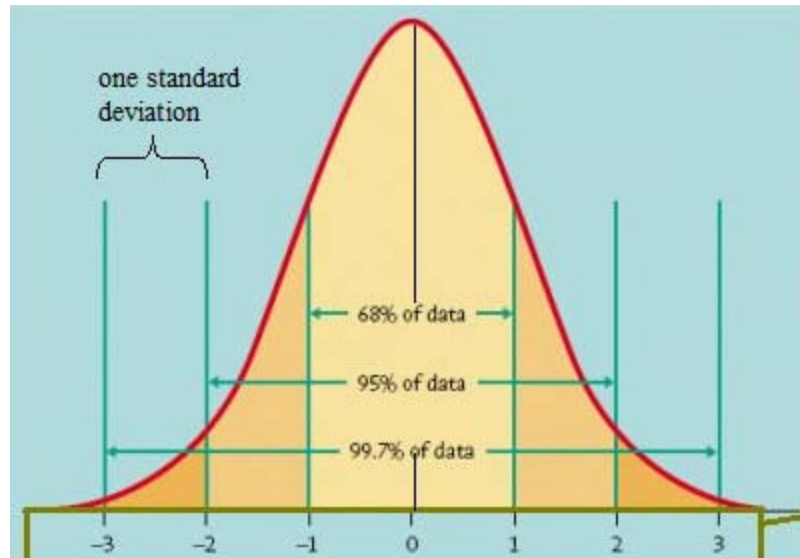
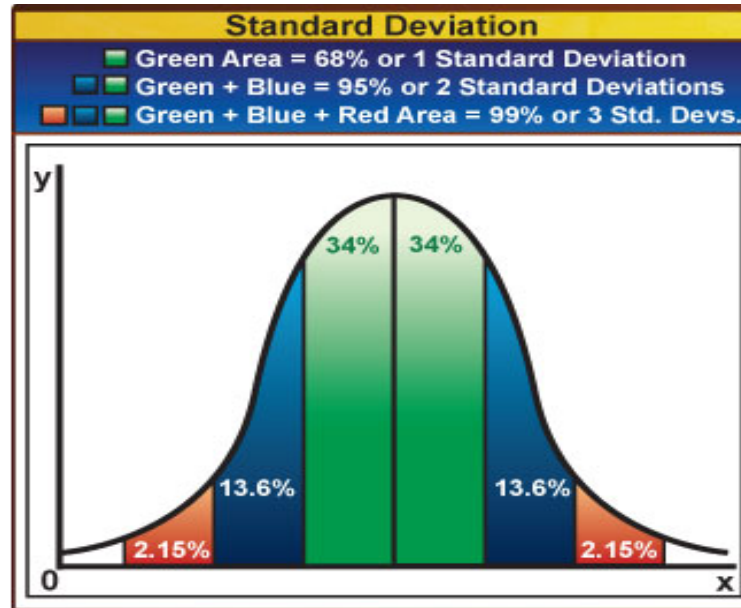
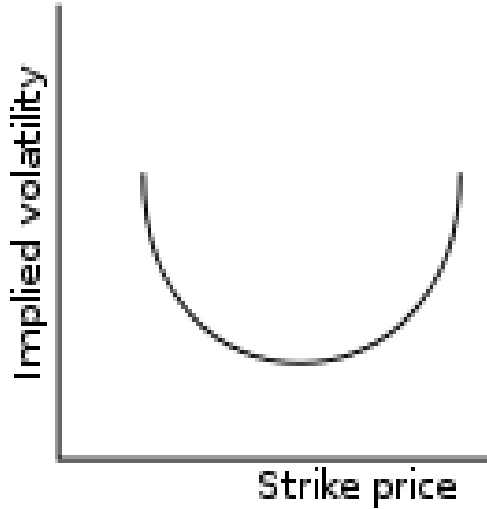
- The options theory assumes constant volatilities for different options
- Bell curve simply means that things revert to the mean in the long run. Also, as you deviate further and further away from the mean, the probability of that deviation will drop faster and faster. Therefore, by the definition of the Bell curve, extreme deviation from the mean is extremely unlikely.

Reality is different

- Assumptions that may not be true:
 - Markets are efficiently priced, no pricing gaps from one moment to the next
 - Returns are log-normally distributed
 - Borrow and lend at one risk-free rate
 - Dividends are fully predictable
 - No restrictions on short-selling
 - No arbitrage opportunities
 - No early exercise

- A flat smile or no skew gives you a log-normal return distribution which is exactly what is used in Black-Scholes.
- When the smile/skew is above the flat line there is more weight given to that outcome relative to the log-normal distribution

Options smile theory

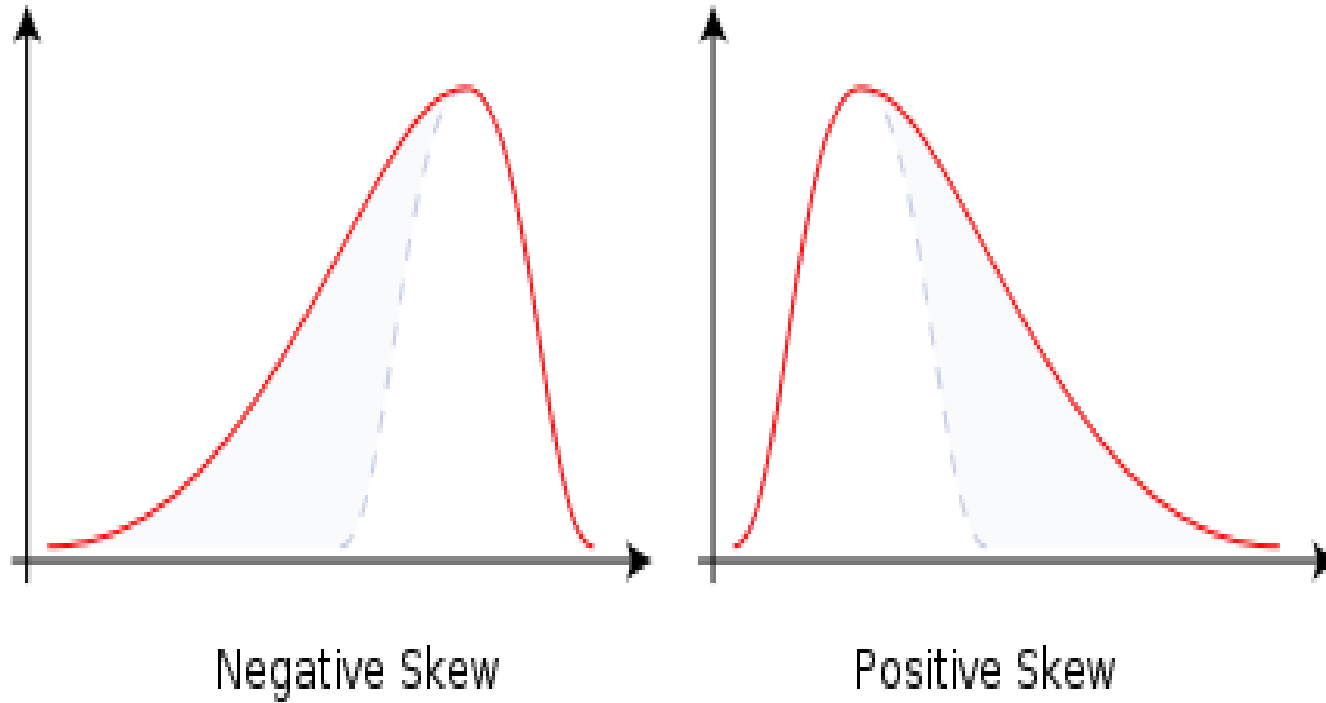


Skew

- The term options skew has various meanings, let's refer to skew as a variance from the normal implied volatility

- It can be extremely difficult to ascertain the true distribution of an extremely negatively (sometimes positively) skewed forecast from historical data
- When it is below less weight is given. Therefore the smile creates “Fat tails”

Equity options often exhibit skew



EUU

Report a bug / Feedback

Settings

10:07:15 PM

ISE FX Euro



^EUU 132.22 -0.57
After Hours 132.22 -0.4%

Sector	Currency	IV60	IV90	HV10	HV20	HV30	HV60
		12	12	8	10	12	13

IV30 11



Market Monitor Stats **Charts** Options Skew (beta) Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

Underlying Vol 3 mo 6 mo 1 yr 2 yr
 ■ HV10 ■ HV20 ■ HV30 ■ HV60 ■ HV90 ■ HV120 ■ HV180 ■ HV360
 ■ IV30 ■ IV60 ■ IV90 ■ IV120 ■ IV180 ■ IV360
 IV30 vs HV180



Unexpected events can occur though

- An example of extreme movement, EUR/USD using a June 7 implied volatility, the expected monthly move can be calculated as follows $17 \text{ vol} / \text{square root of } 12 (4.91)$
- Since May 7 the euro/usd has moved approximately \$8.21, about $1\frac{1}{2}$ standard deviations in one month's time

Why do equities exhibit skew?

- Leverage
 - As assets fall in price the price of insuring the fall increases, assets tend to fall faster than they rise
 - Financial leverage- Weakened balance sheets mean more equity risk and potential rewards
- Simply put, more demand relative to supply
 - Downside- More OTM put buyers and call sellers
 - The risk of “blowing up to the downside”
 - Upside- More OTM call buyers
 - The risk of “blowing up to the upside”

Vertical and horizontal skew

- Strike skew refers to the different volatilities for the various strike prices (smile)
- Time skew refers to the different volatilities for the various months
- Time skew normally occurs when the marketplace expects an extraordinary event to occur in a particular month

How can you use skew?

- Skew can be used in many ways when trading spreads
 - You can choose to trade against the skew, buying the “cheaper” option and selling the more “expensive”
 - OR, you can choose to trade with the skew, buying the “expensive” option and selling the “cheaper” option
- Cheap or expensive are terms that must be determined by each trader based on your view of the markets

Skew scenarios

- Options supply and demand considerations create the perception of “cheap” or “expensive”
- Ultimately each investor must decide if options are “cheap” or “expensive” based on their own risk/reward tolerances.

Skew

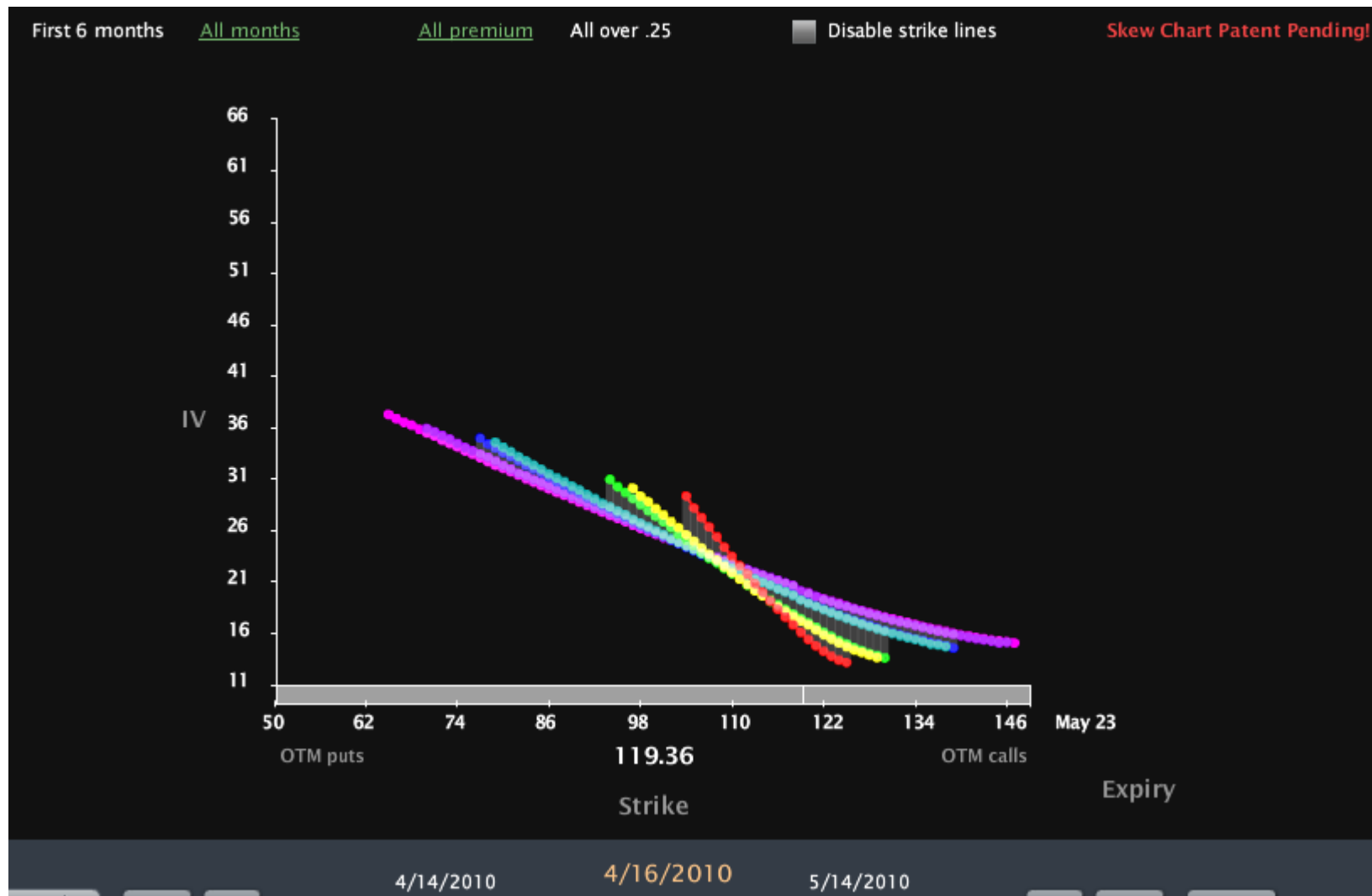
- Skew is typically most pronounced for OTM options, but ATM option can exhibit skew, especially during quiet market periods

Let's review some skew charts

- The live vol skew charts can help you understand how the marketplace reacts to changing news
- All skew charts made available by www.livevol.com



SPY and time and strike skew



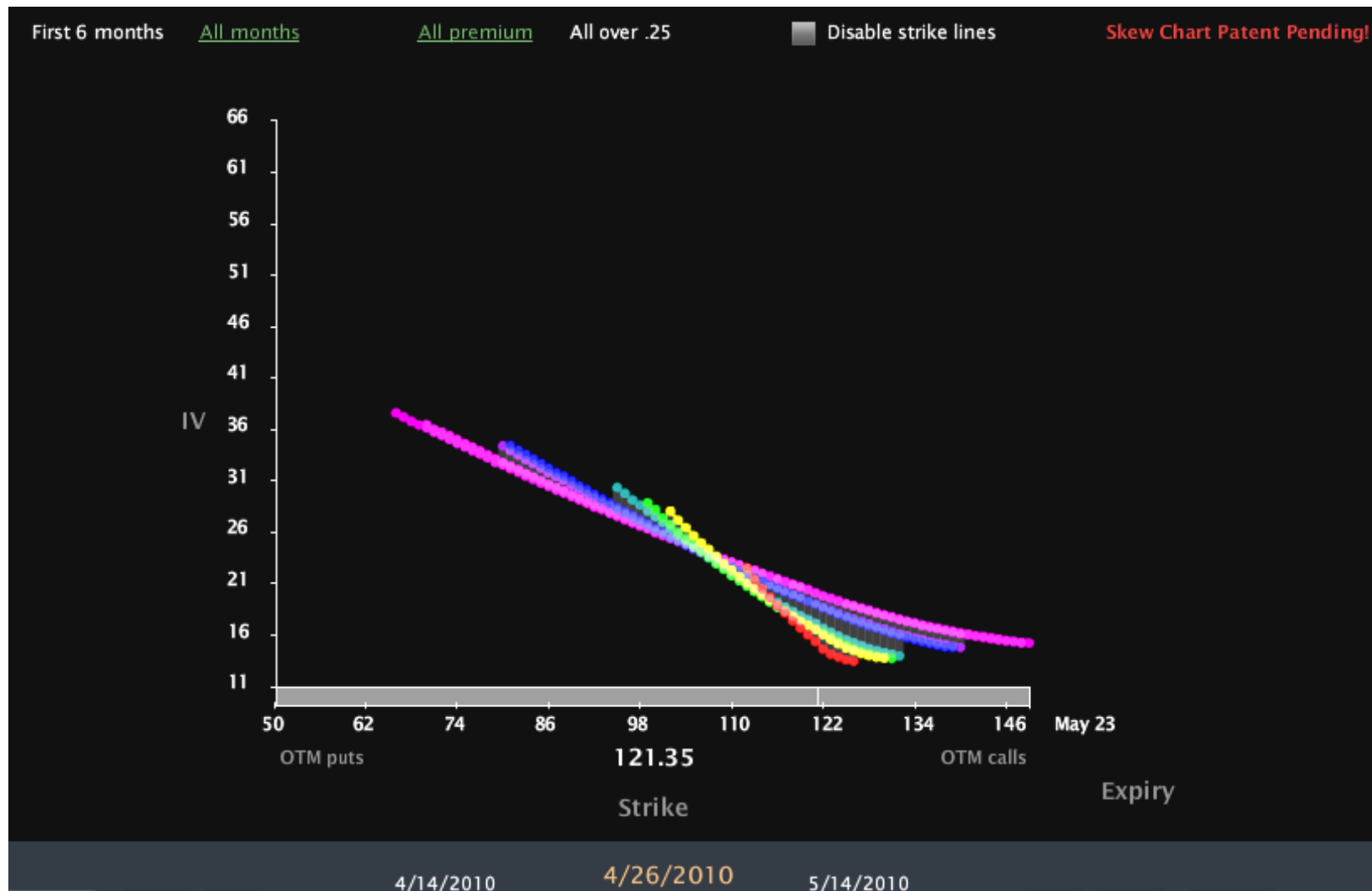
Monthly skew legend:

Red- 1st month
Yellow- 2nd month
Green- 3rd month

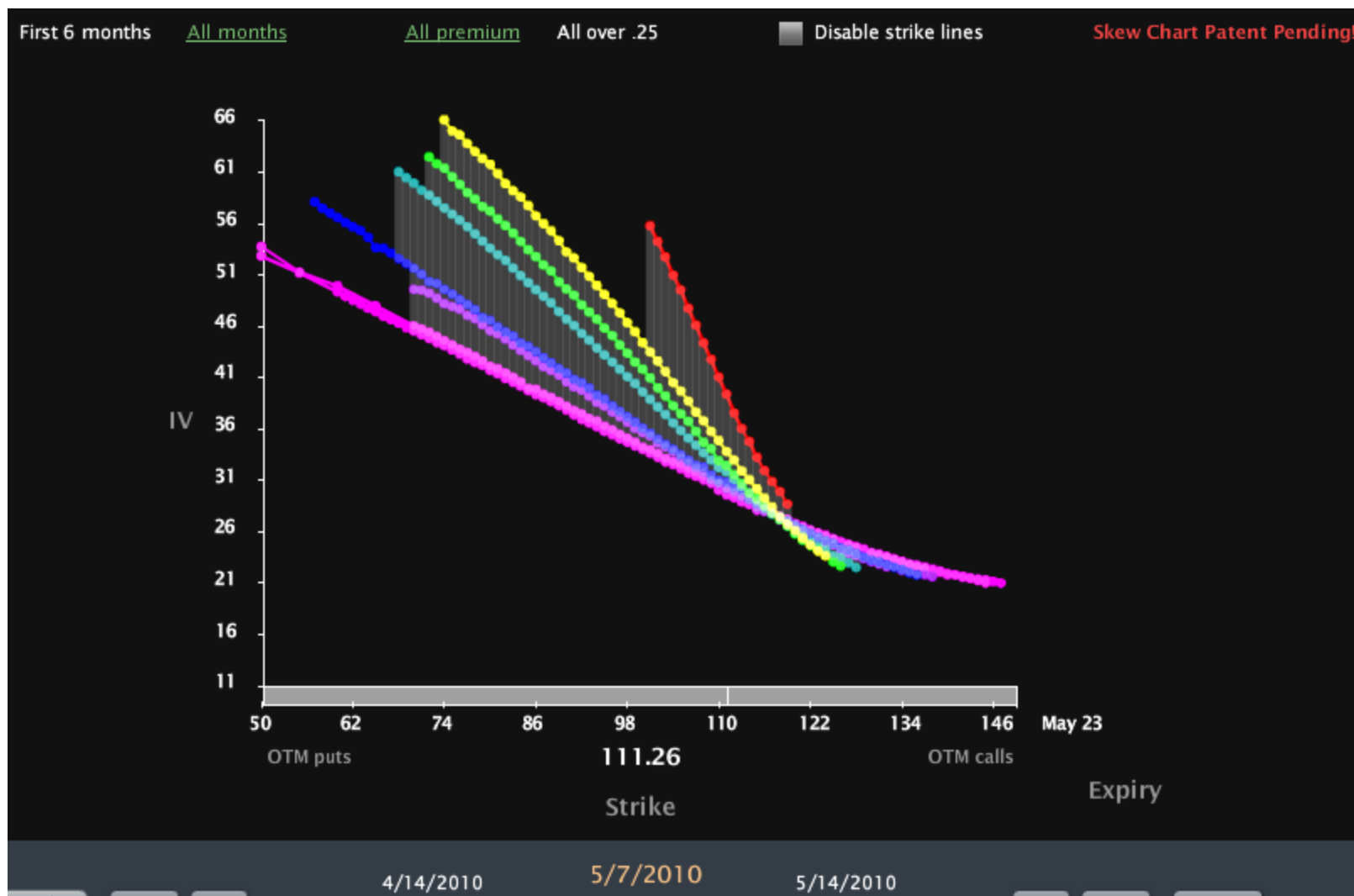
Light Blue- 4th month
Dark Blue- 5th month
Purple- 6th month



SPY and time and strike skew



SPY and time and strike skew



July skew

S&P Depository Receipts

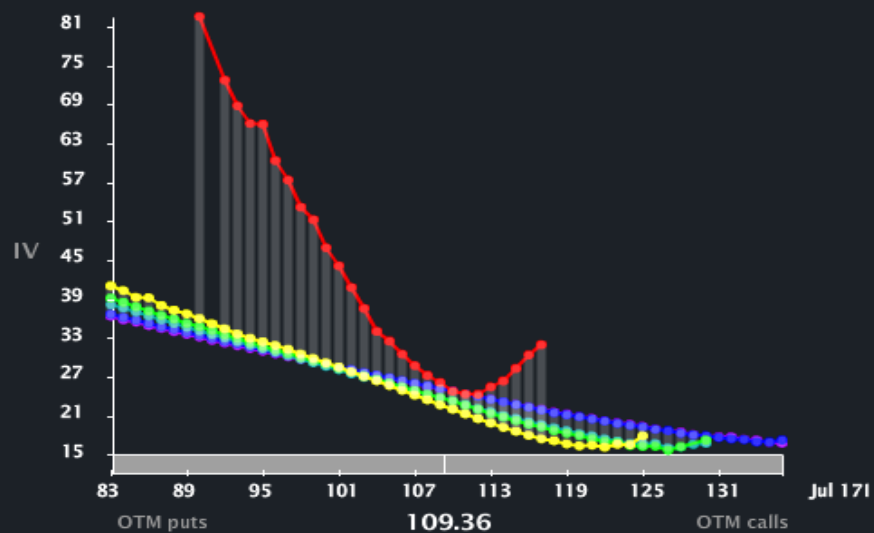
SPY	109.36	1.33 1.2%	Earnings	---
109.36 x 109.37	186 x 88		Dividend	---
IV30	22	-1 -5.4%	Sector	Finance
			IV60	24
			IV90	25
			HV10	25
			HV20	21
			HV30	25
			HV60	26



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

All strikes 10% 25% 50% First 6 months All months All premium All over .25 Disable lines

- Jul 17
- Aug 21
- Sep 18
- Sep 30
- Dec 18
- Dec 31
- Mar '11 19
- Mar '11 31
- Jun '11 18
- Jun '11 30
- Dec '11 17
- Dec '11 30
- Jan '12 21
- Dec '12 22



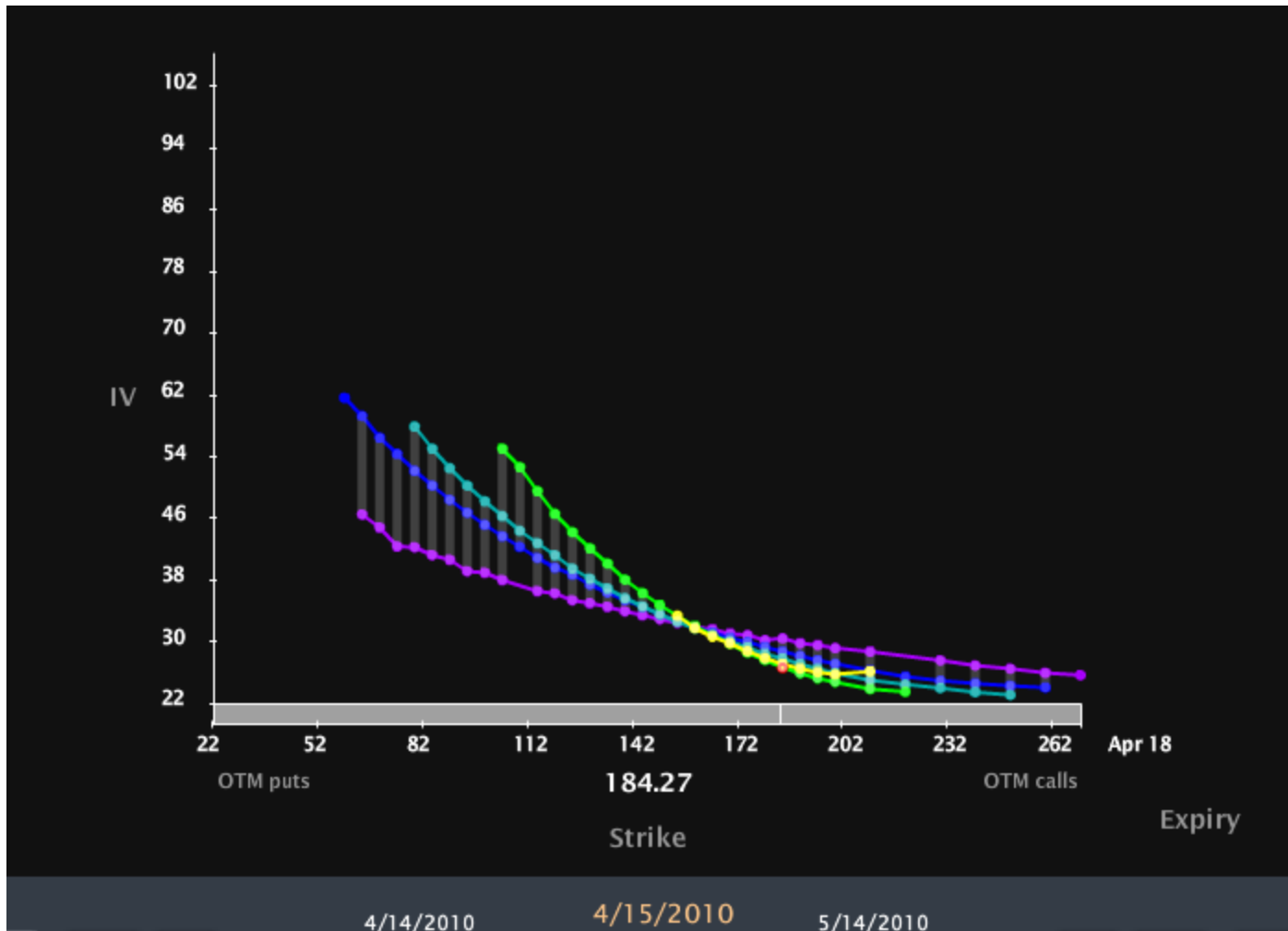
Expiry Skew Chart Patent Pending!



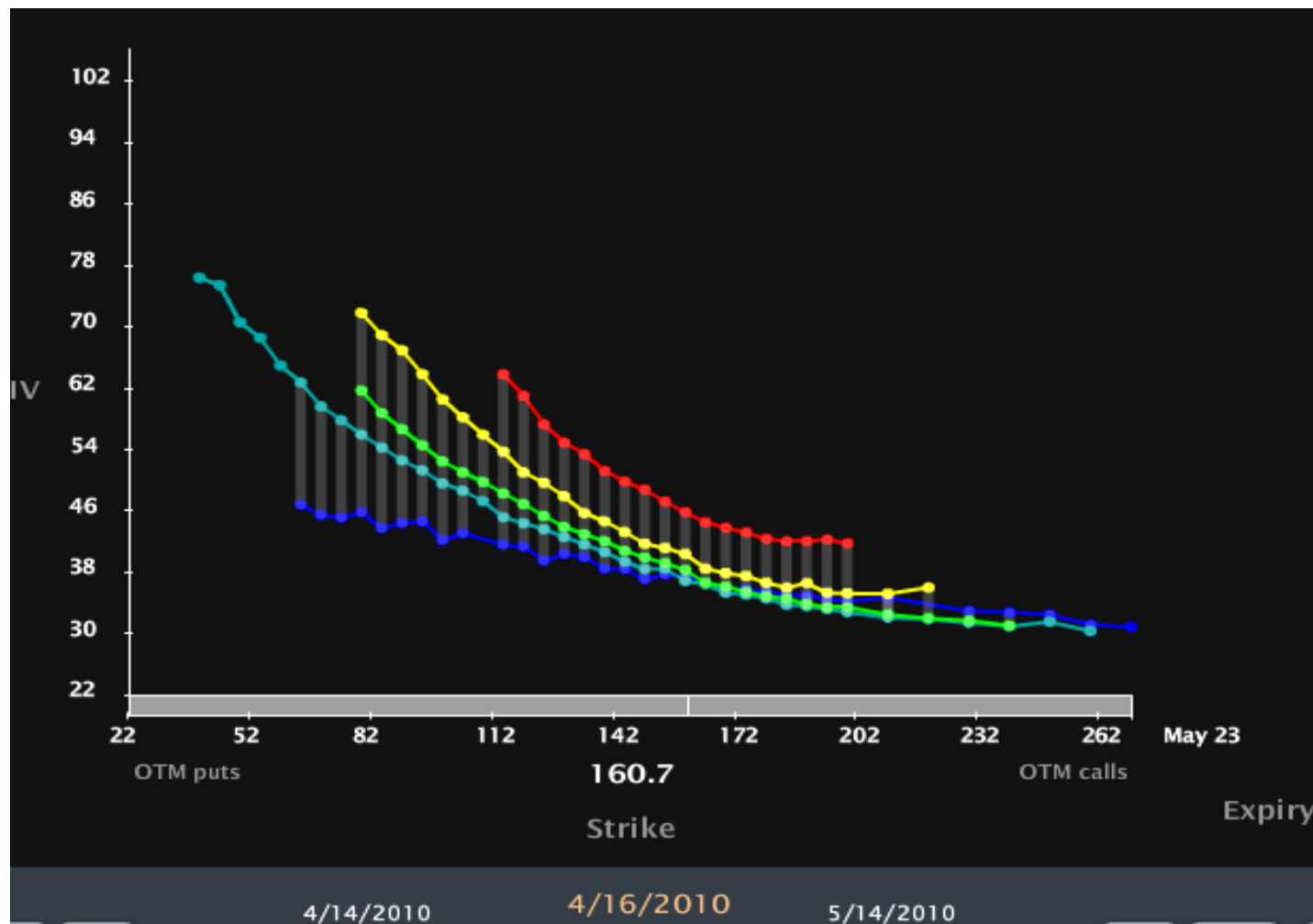
Current SPY skew

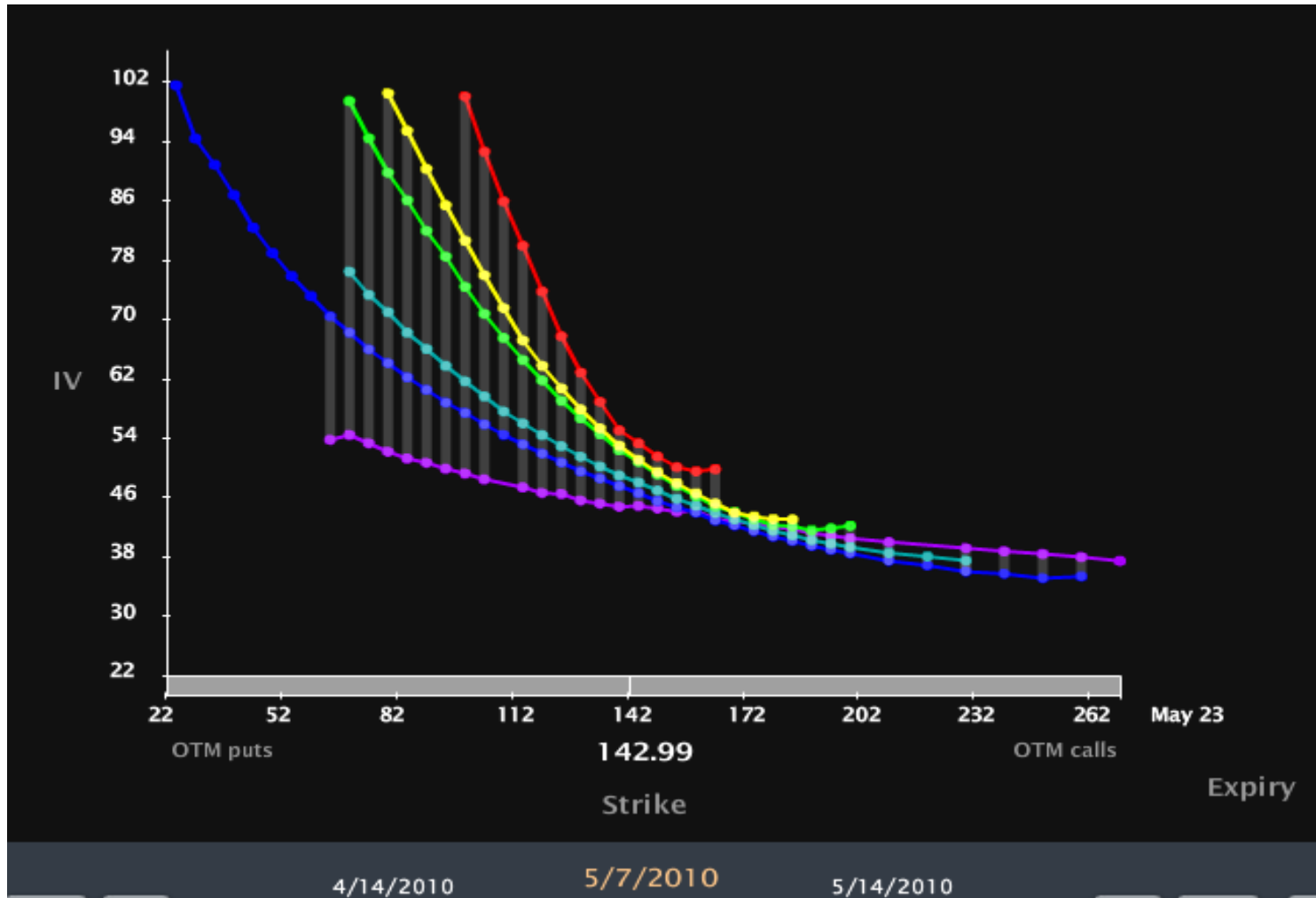


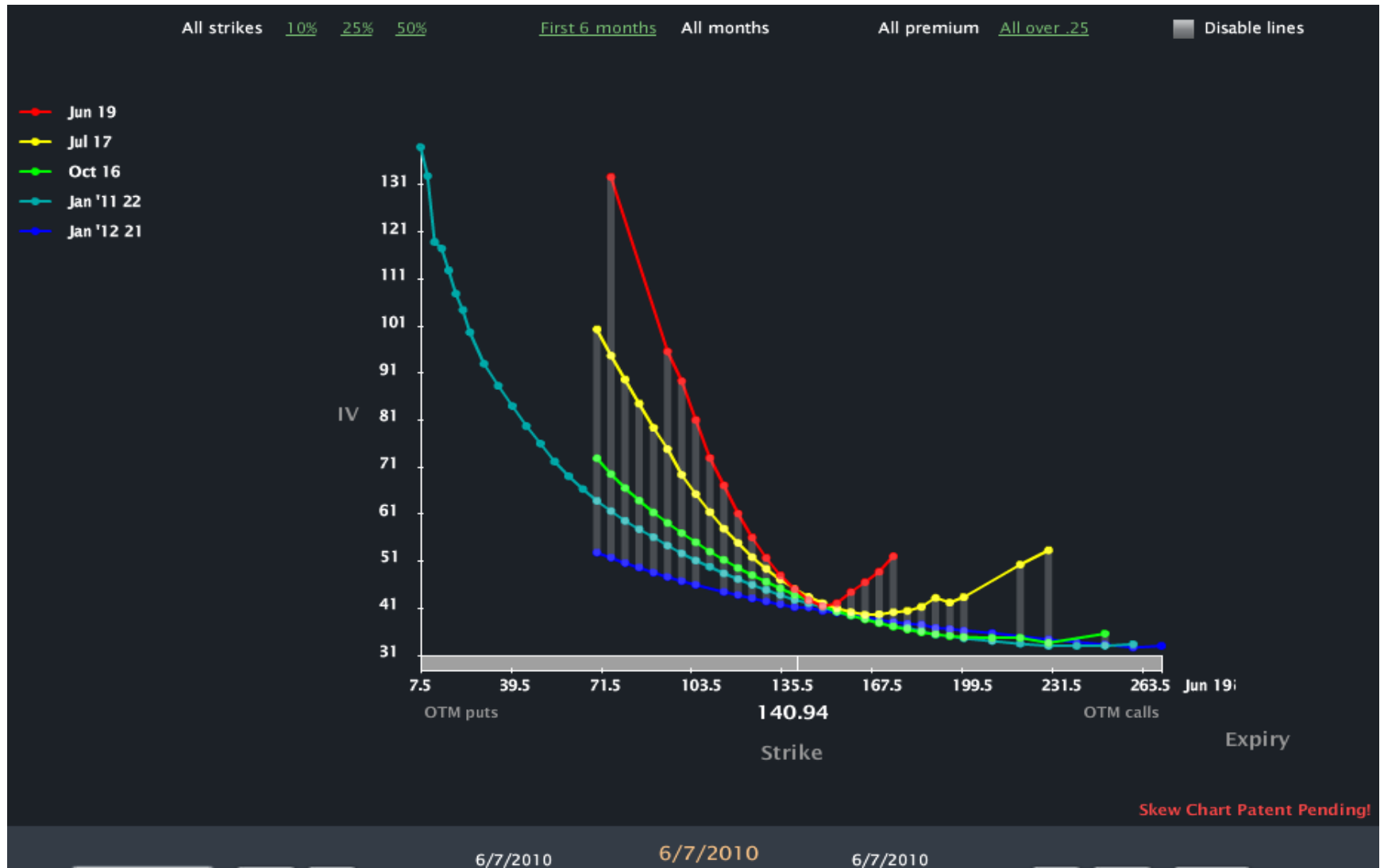
GS day prior to SEC announcement



GS day of SEC announcement







July GS

Goldman Sachs Group Inc.

GS 139.92 2.67
2.0%

139.91 x 139.92 16 x 3

IV30 34 -1
-2.3%

Earnings 7/20/2010 before (NOT confirmed)

Dividend 08/27/2010 0.350 (projected)

Sector Finance

IV60	IV90	HV10	HV20	HV30	HV60
35	36	26	26	25	46



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

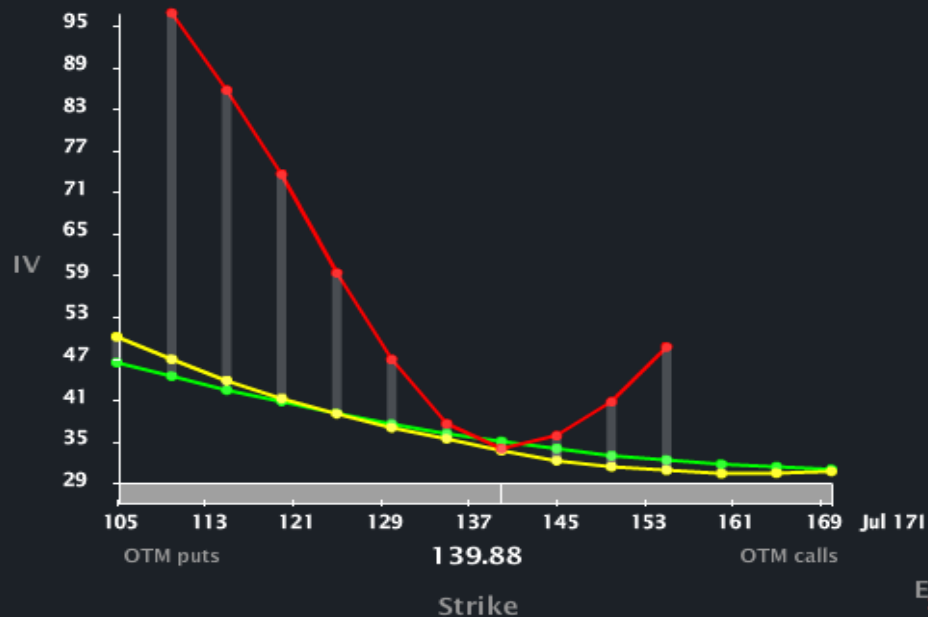
All strikes 10% 25% 50%

First 6 months All months

All premium All over .25

Disable lines

- Jul 17
- Aug 21
- Oct 16
- Jan '11 '22
- Jan '12 '21



Expiry Skew Chart Patent Pending!



INTERNATIONAL SECURITIES EXCHANGE.

Current GS

Goldman Sachs Group Inc.

GS 155.40 0.22
 After Hours 155.45 0.1%
 155.37 x 155.58 1 x 1

Earnings 10/14/2010 before (estimated)
Dividend 08/30/2010 0.350
Sector Finance

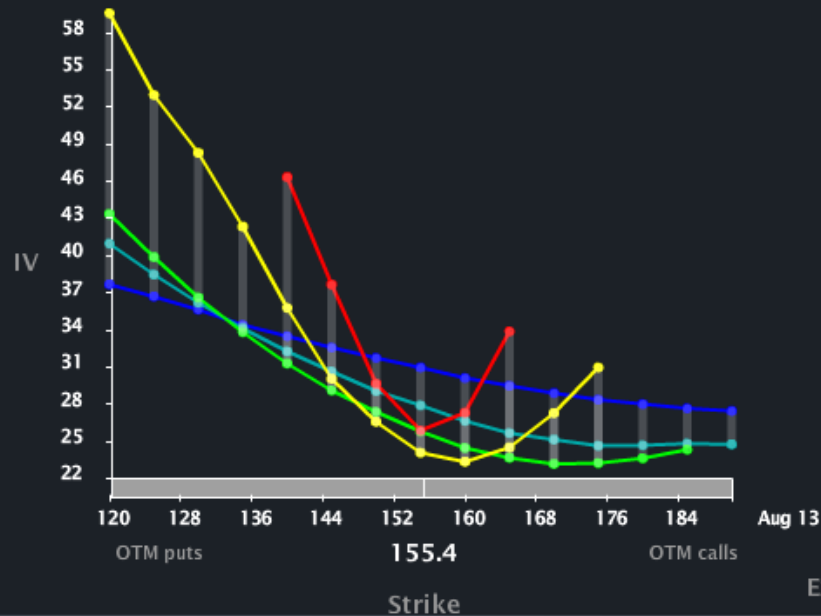
IV30 27
IV60 28 **IV90** 30 **HV10** 23 **HV20** 25 **HV30** 25 **HV60** 30



[Market](#) [Monitor](#) [Stats](#) [Charts](#) [Options](#) [Skew \(beta\)](#) [Fundamentals](#) [News](#) [Time & Sales](#) [Earnings & Divis](#) [Calendar](#) [Mapping \(beta\)](#) [Scanner](#) [Help](#)

[All strikes](#) [10%](#) [25%](#) [50%](#) [First 6 months](#) [All months](#) [All premium](#) [All over .25](#) Disable lines

- Aug 13
- Aug 21
- Sep 18
- Oct 16
- Jan '11 22
- Jan '12 21

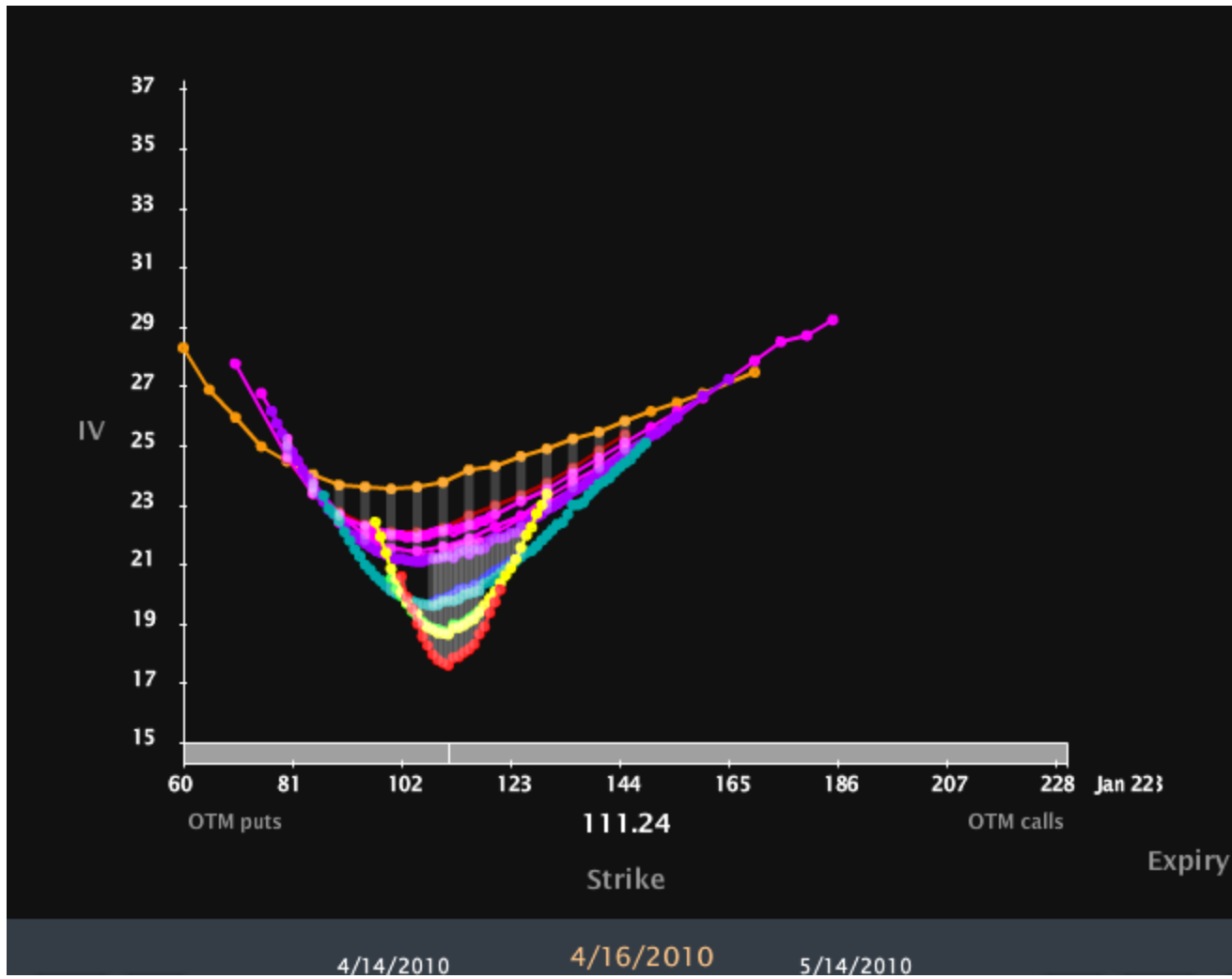


Expiry Skew Chart Patent Pending!

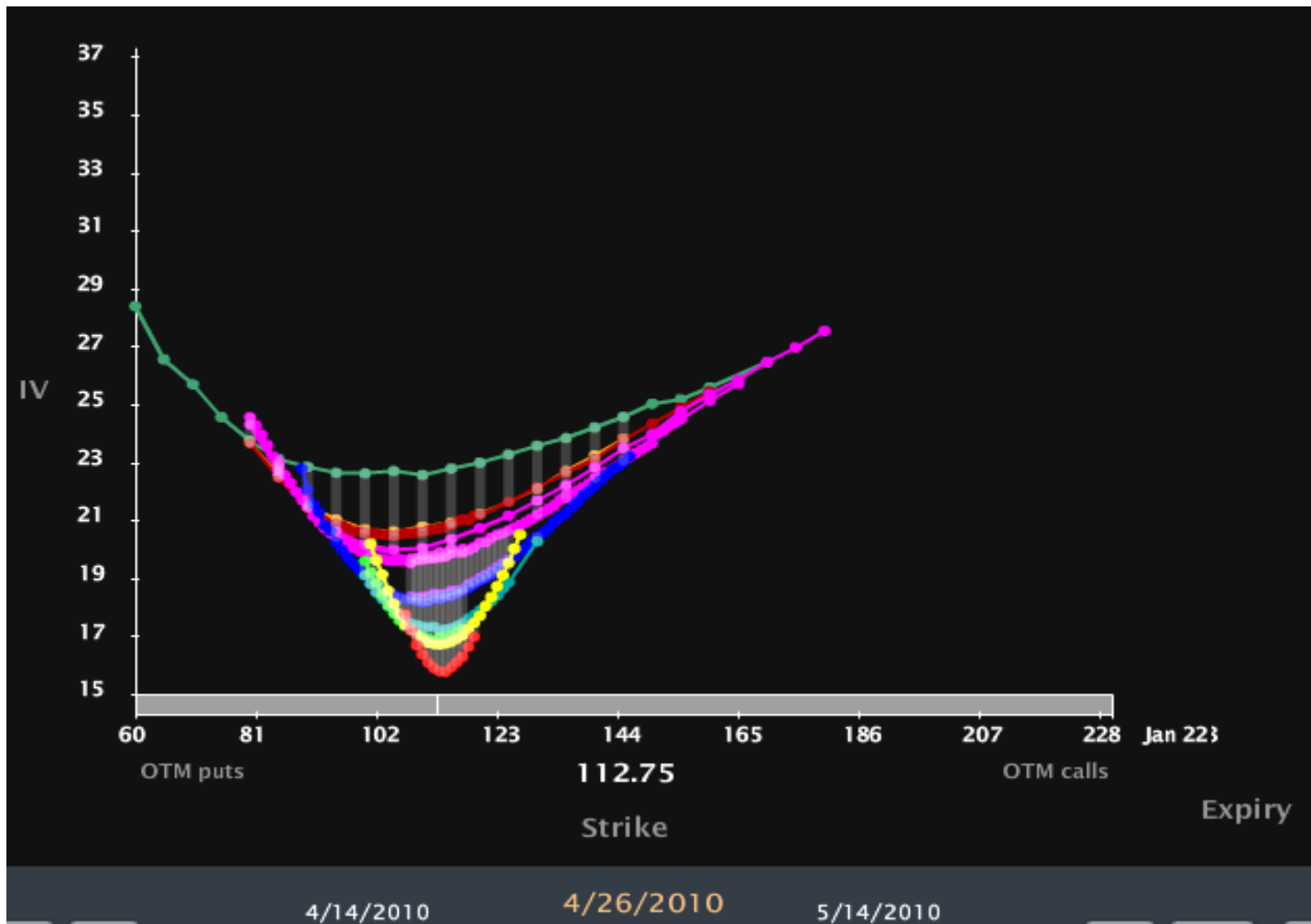


INTERNATIONAL SECURITIES EXCHANGE.

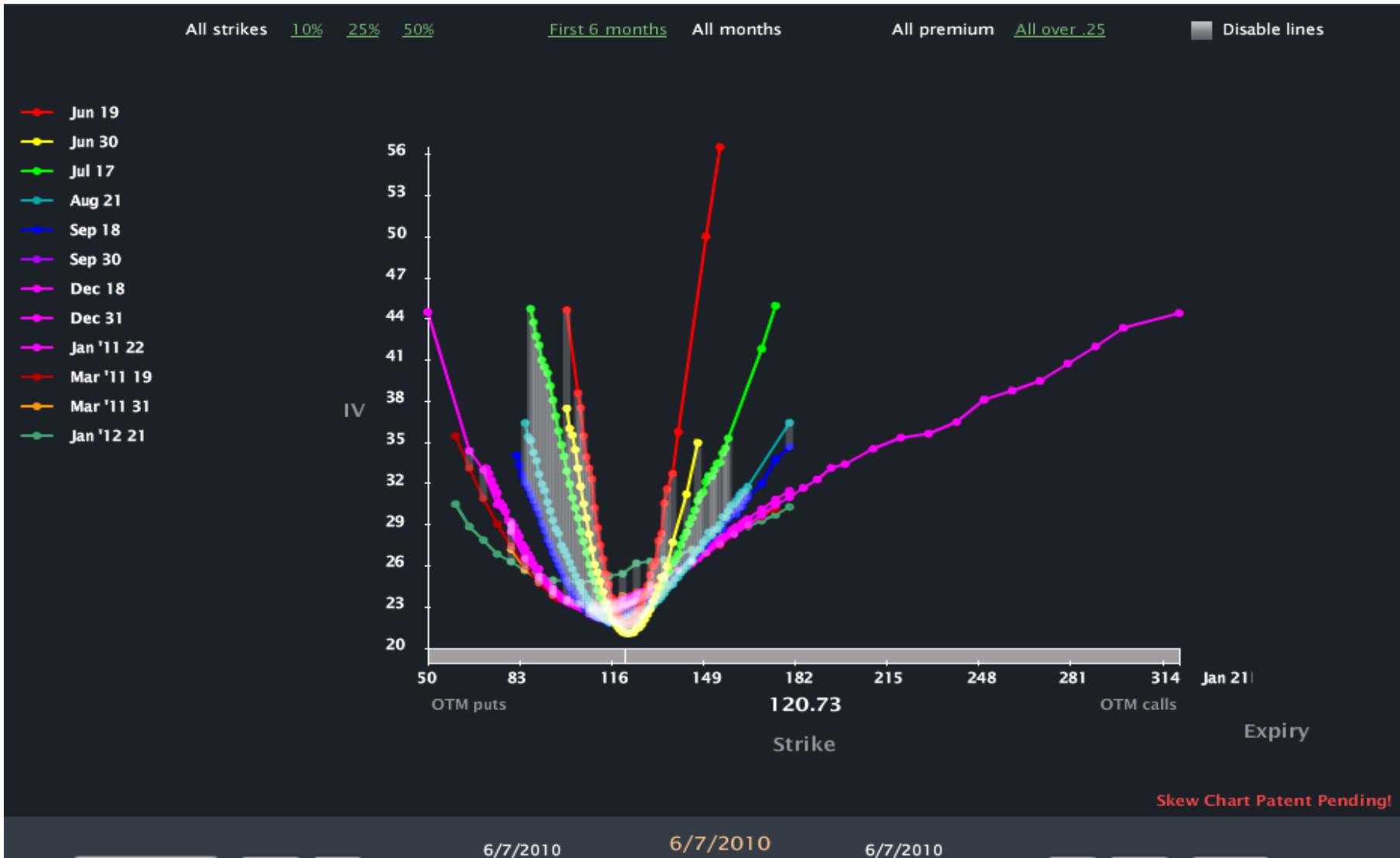
GLD



GLD



GLD



July GLD

SPDR Gold Shares

GLD 118.83 1.49
1.3%
 118.83 x 118.84 7 x 7

Earnings ---
 Dividend ---
 Sector Finance

IV30 19 1
2.8%

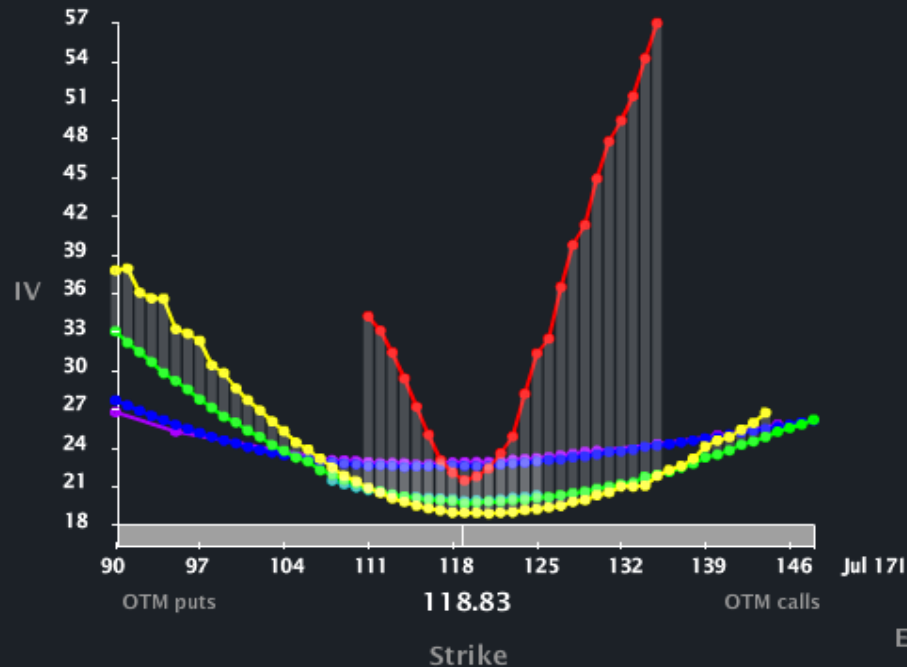
IV60	IV90	HV10	HV20	HV30	HV60
19	21	25	21	20	19



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

[All strikes](#) [10%](#) [25%](#) [50%](#) First 6 months [All months](#) All premium [All over .25](#) Disable lines

- Jul 17
- Aug 21
- Sep 18
- Sep 30
- Dec 18
- Dec 31
- Jan '11 22
- Mar '11 19
- Mar '11 31
- Jun '11 18
- Jun '11 30
- Jan '12 21



Expiry Skew Chart Patent Pending!



INTERNATIONAL SECURITIES EXCHANGE.

Current GLD

SPDR Gold Shares

GLD 117.40 -0.44
 After Hours 117.40 -0.4%
 106.64 x 117.52 1 x 2

Earnings ---
 Dividend ---
 Sector Finance

IV30 16

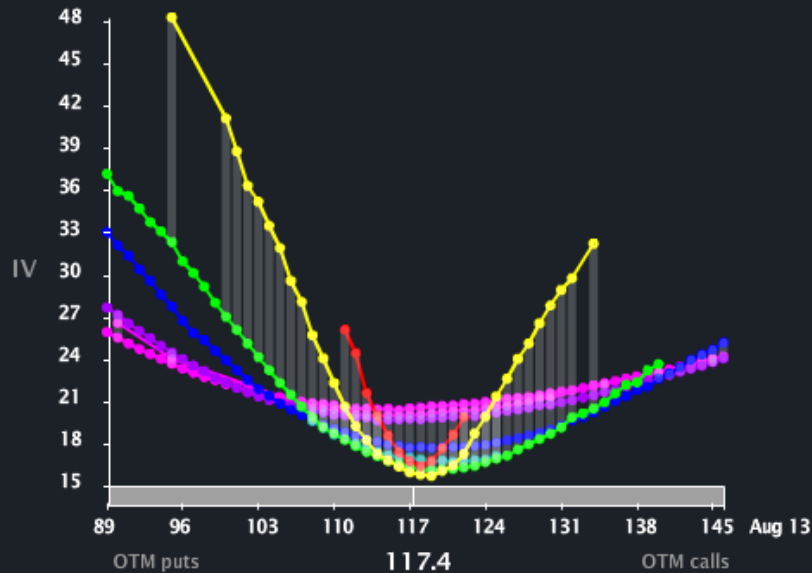
IV60 17 IV90 18 HV10 12 HV20 12 HV30 17 HV60 17



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

All strikes 10% 25% 50% First 6 months All months All premium All over .25 Disable lines

- Aug 13
- Aug 21
- Sep 18
- Sep 30
- Oct 16
- Dec 18
- Dec 31
- Jan '11 22
- Mar '11 19
- Mar '11 31
- Jun '11 18
- Jun '11 30
- Jan '12 21

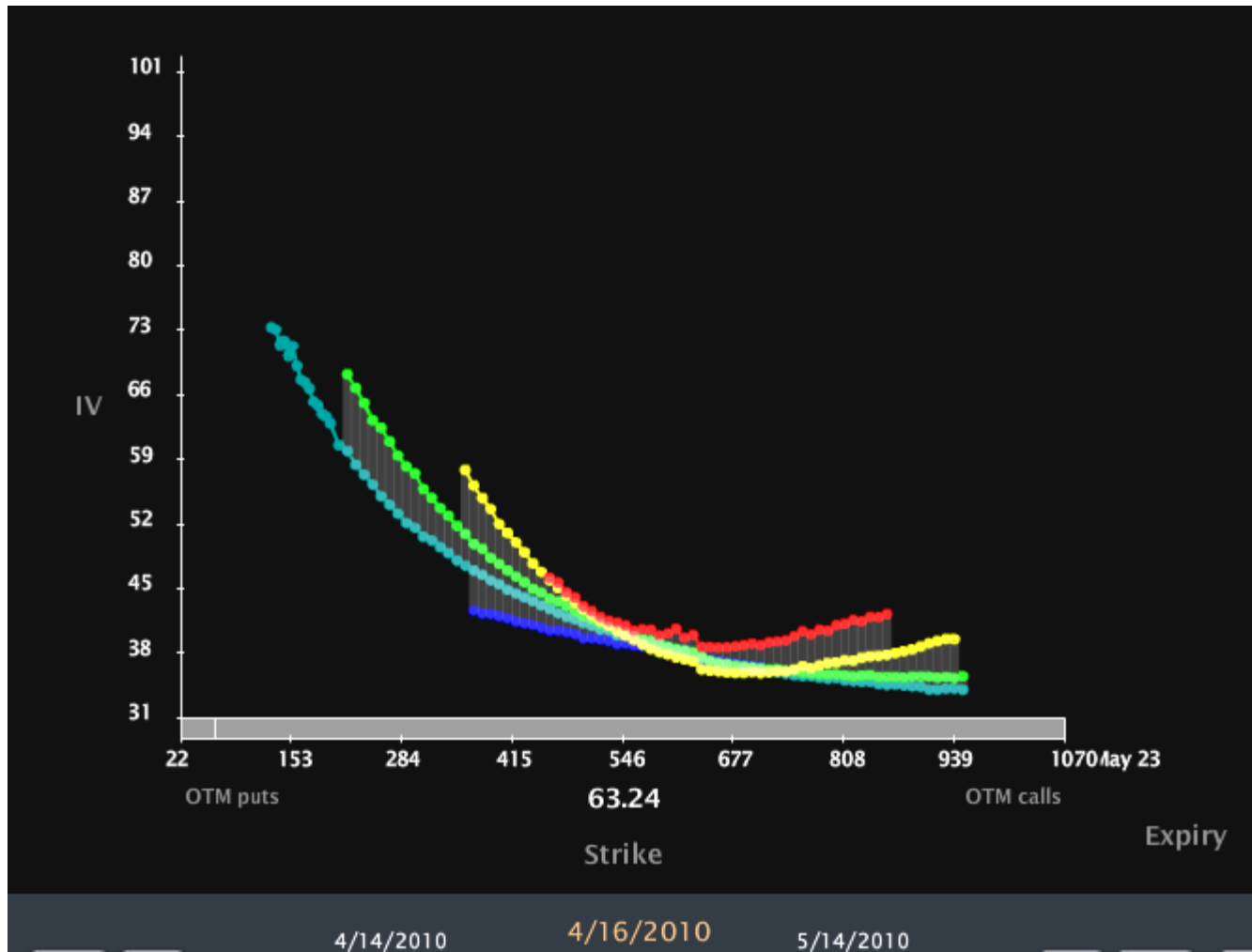


Expiry Skew Chart Patent Pending!

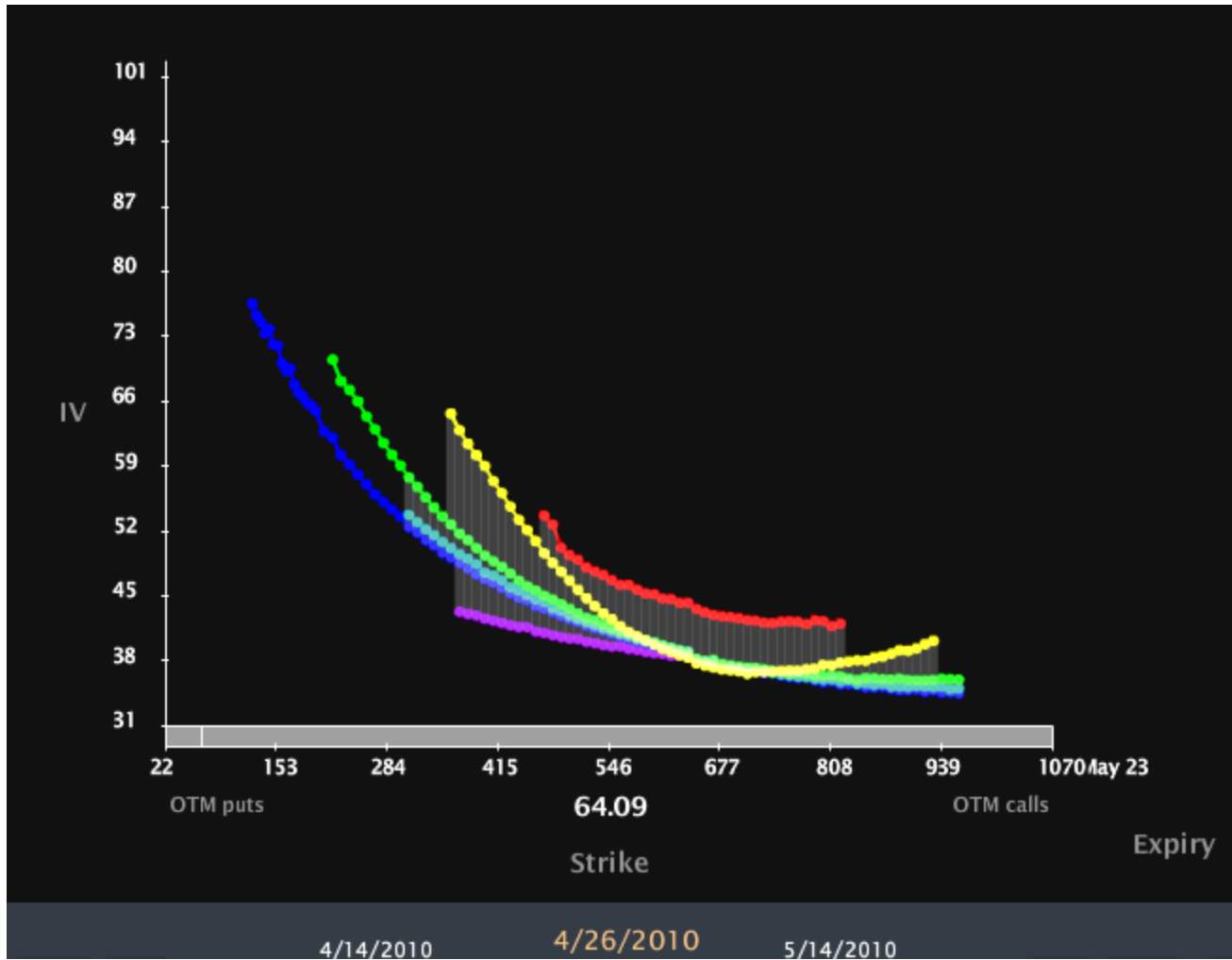


INTERNATIONAL SECURITIES EXCHANGE.

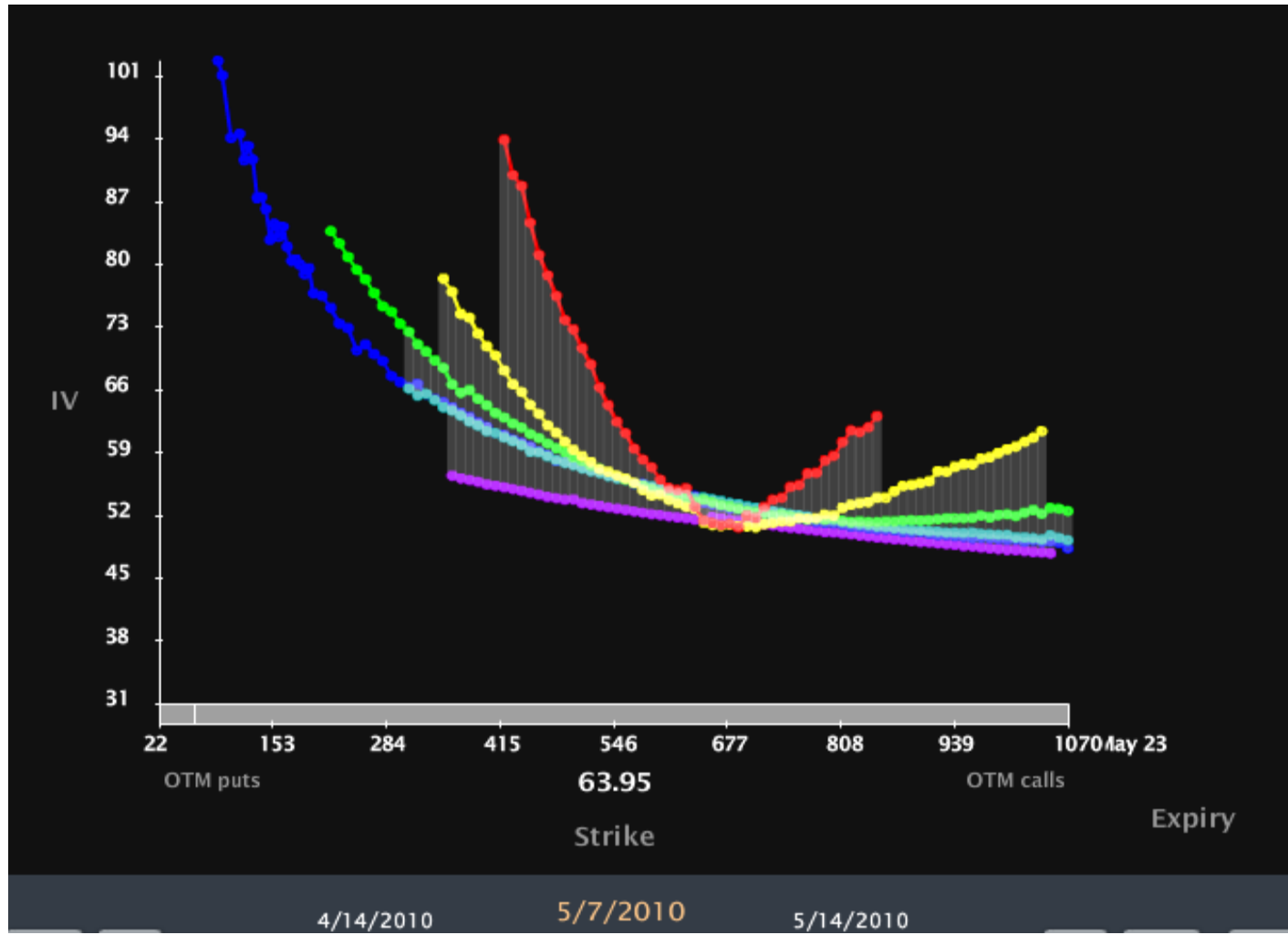
BIDU



BIDU



BIDU



July BIDU

Baidu Inc

BIDU

73.38

2.65
3.8%

Earnings 7/22/2010 after (NOT confirmed)

Dividend ---

Sector Computer and Technology

IV30

58

-0.6%

IV60 **IV90** **HV10** **HV20** **HV30** **HV60**

55 55 65 53 55 63



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

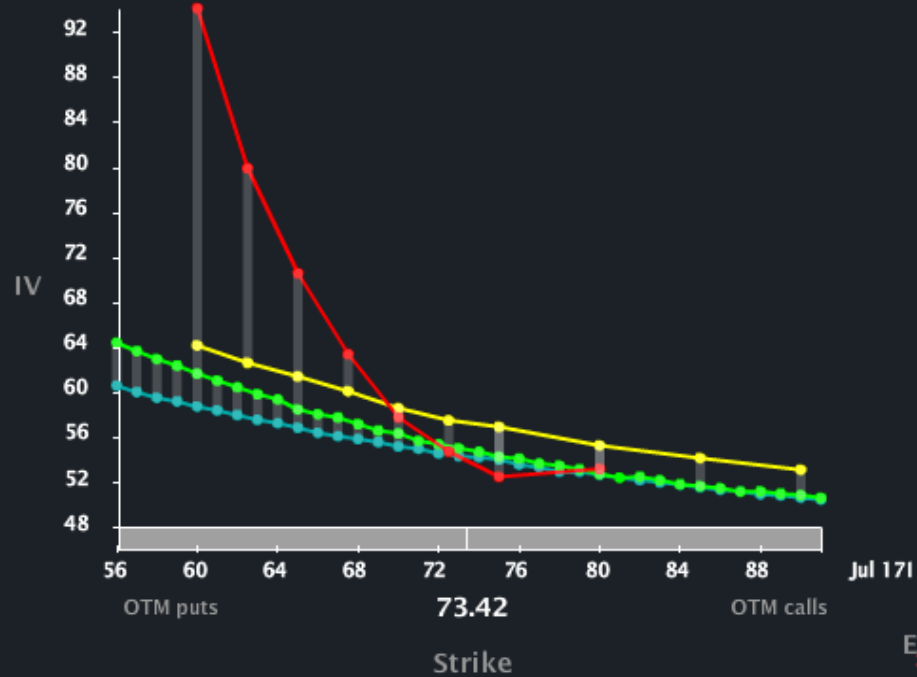
All strikes 10% 25% 50%

First 6 months All months

All premium All over .25

Disable lines

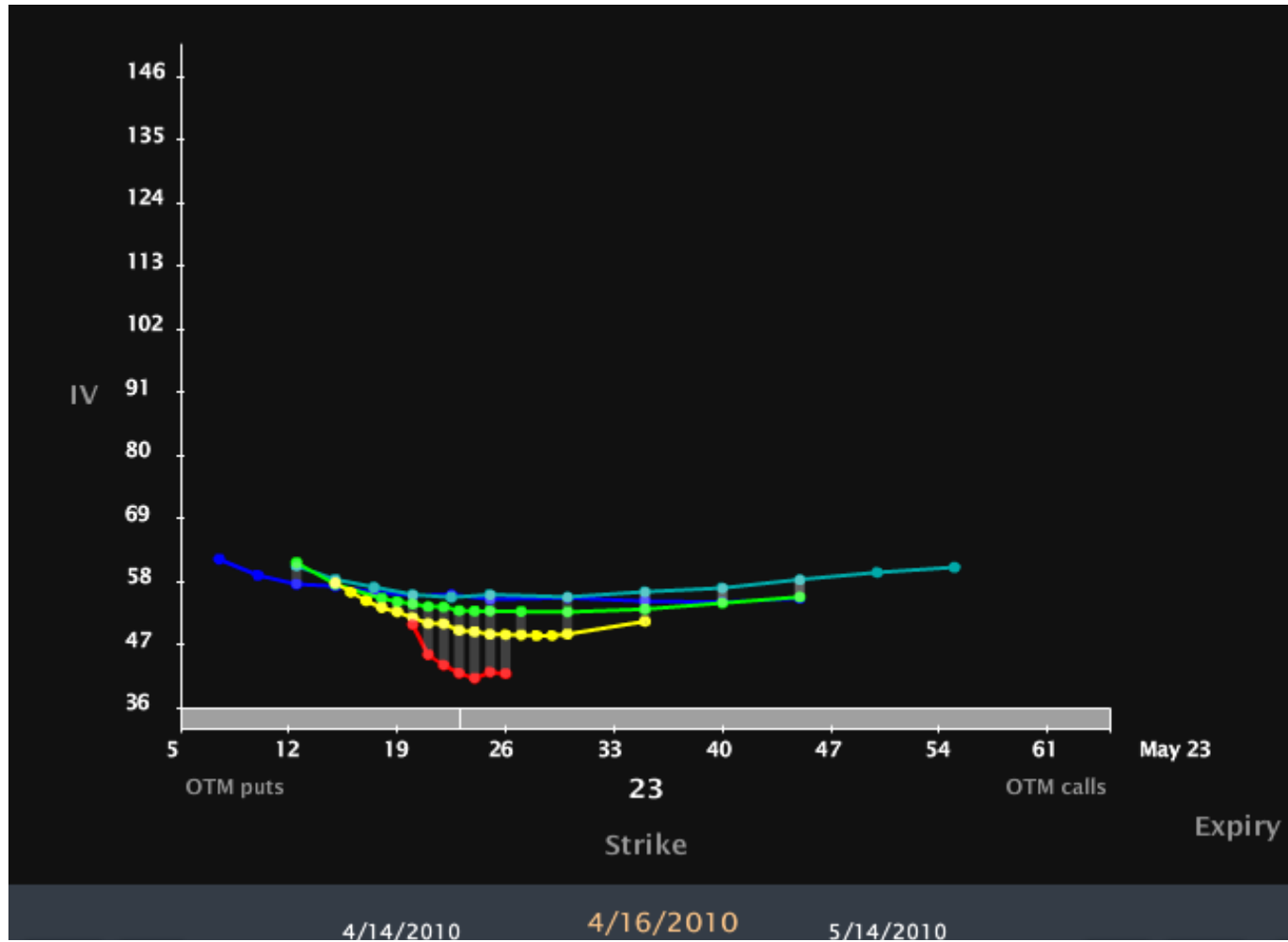
- Jul 17
- Aug 21
- Sep 18
- Dec 18
- Jan '11 22
- Jan '12 21



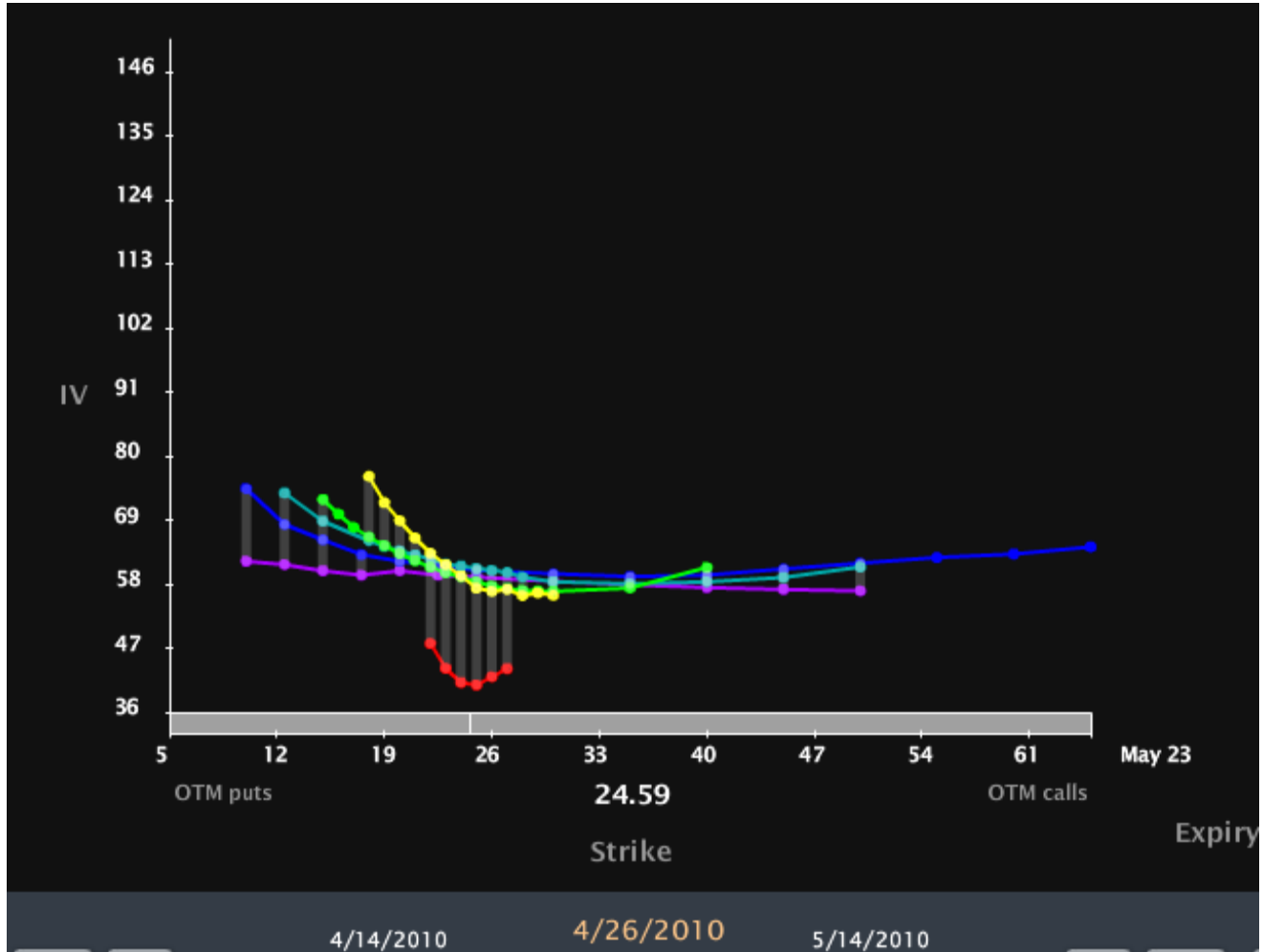
Current BIDU



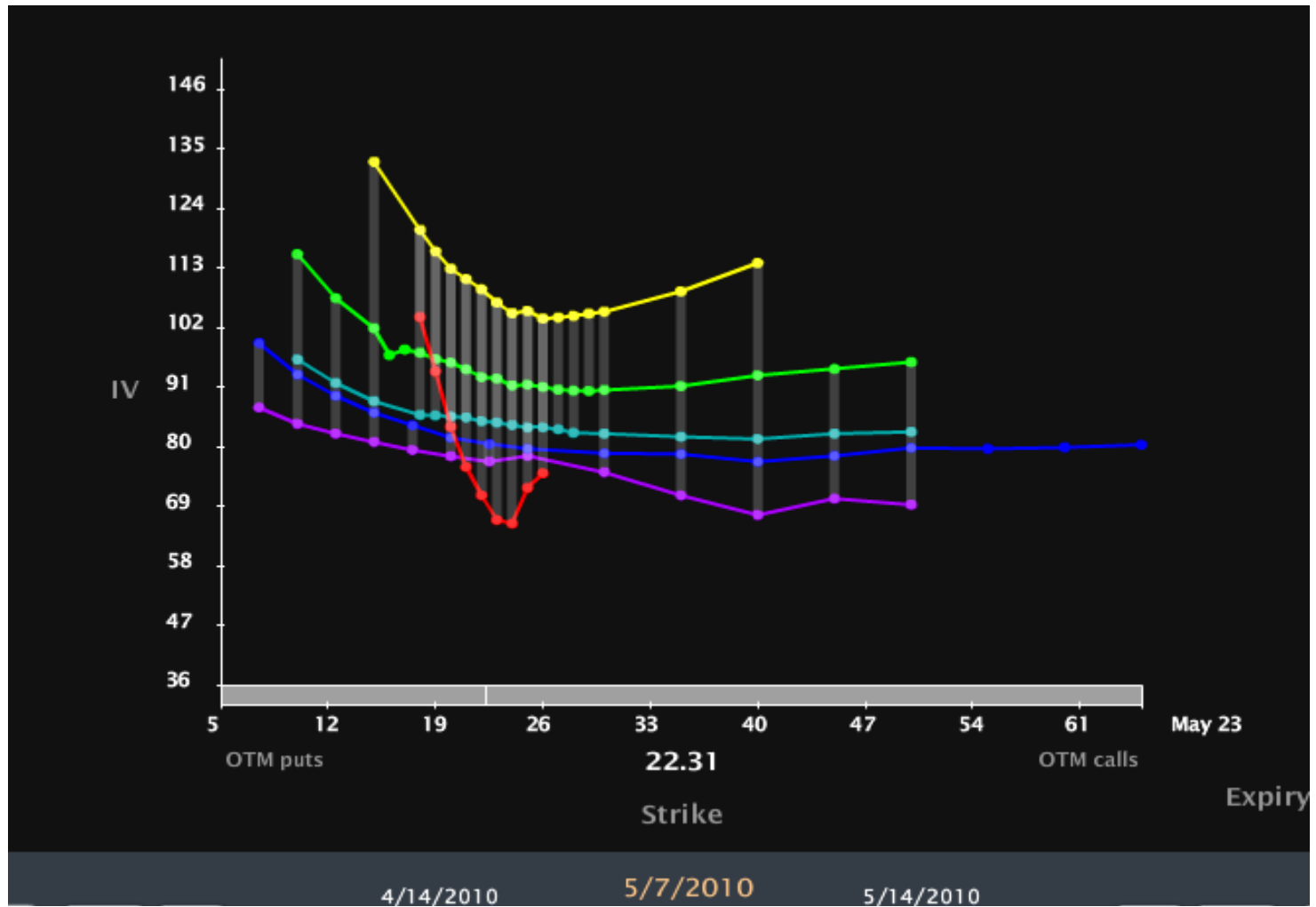
RMBS



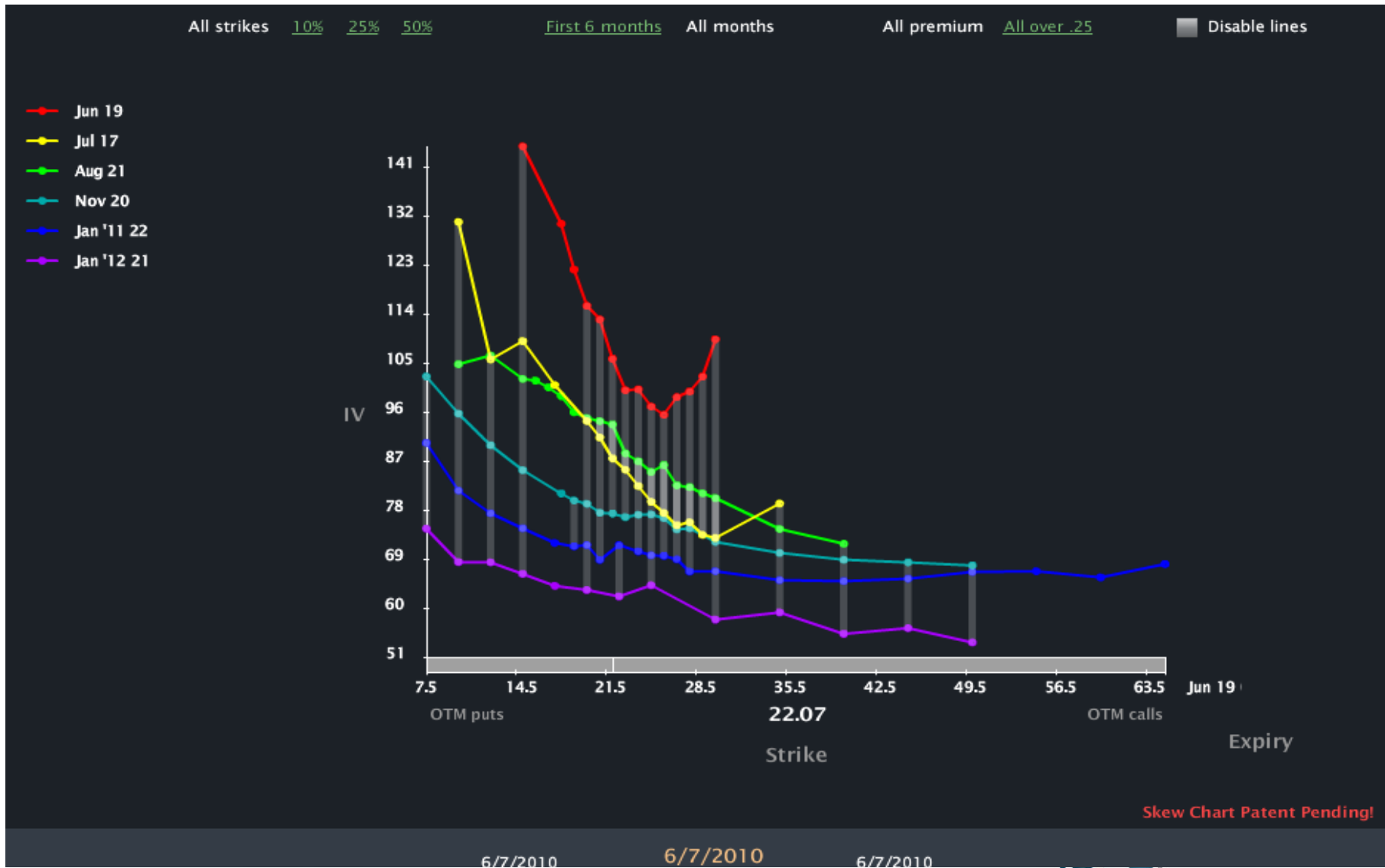
RMBS



RMBS



RMBS



July RMBS

Rambus Inc.

RMBS

18.68

0.38
2.1%

18.67 x 18.69

19 x 64

Earnings 7/22/2010 after (NOT confirmed)

Dividend ---

Sector Computer and Technology

IV30

56

2
3.0%

IV60

55

IV90

55

HV10

32

HV20

27

HV30

63

HV60

55



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

All strikes 10% 25% 50% First 6 months All months All premium All over .25 Disable lines

- Jul 17
- Aug 21
- Nov 20
- Jan '11 22
- Feb '11 19
- Jan '12 21



Current RMBS

Rambus Inc.

RMBS

19.27

0.10

After Hours

19.00

0.5%

18.53 x 19.62

2 x 2

Earnings 10/21/2010 after (estimated)

Dividend ---

Sector Computer and Technology

IV30

47

IV60

50

IV90

52

HV10

26

HV20

32

HV30

32

HV60

51



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

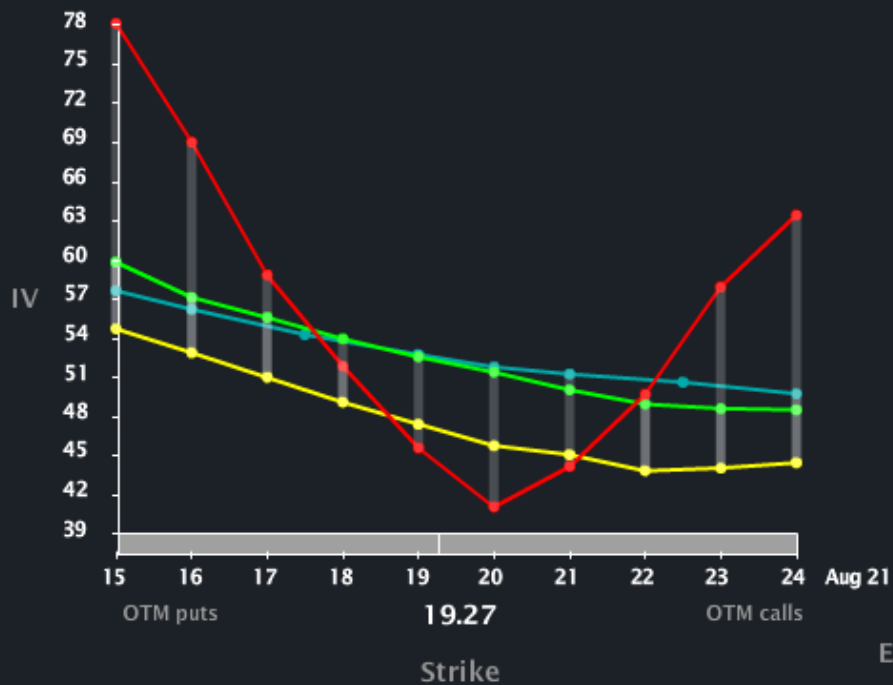
All strikes 10% 25% 50%

First 6 months All months

All premium All over .25

Disable lines

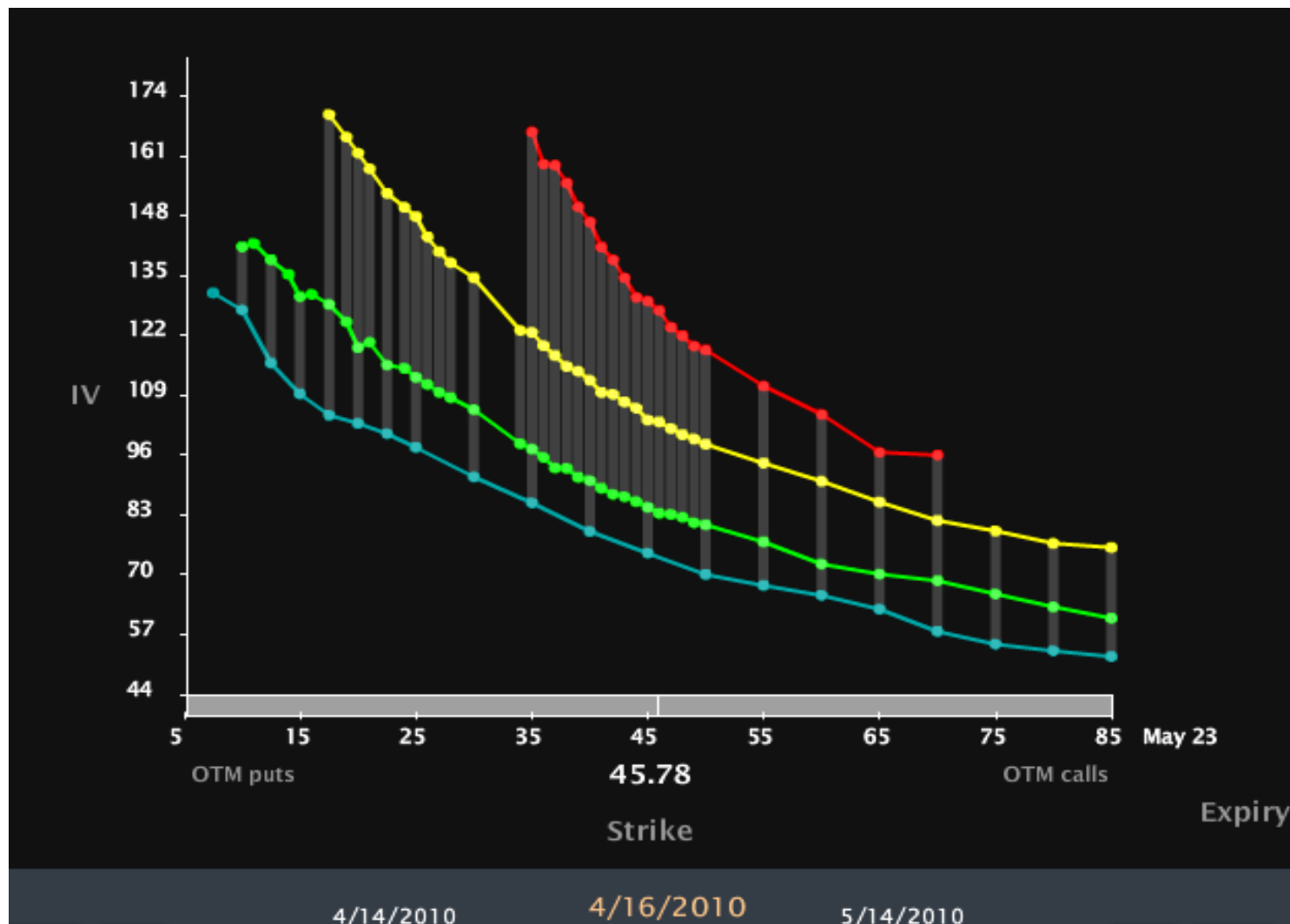
- Aug 21
- Sep 18
- Nov 20
- Jan '11 22
- Feb '11 19
- Jan '12 21

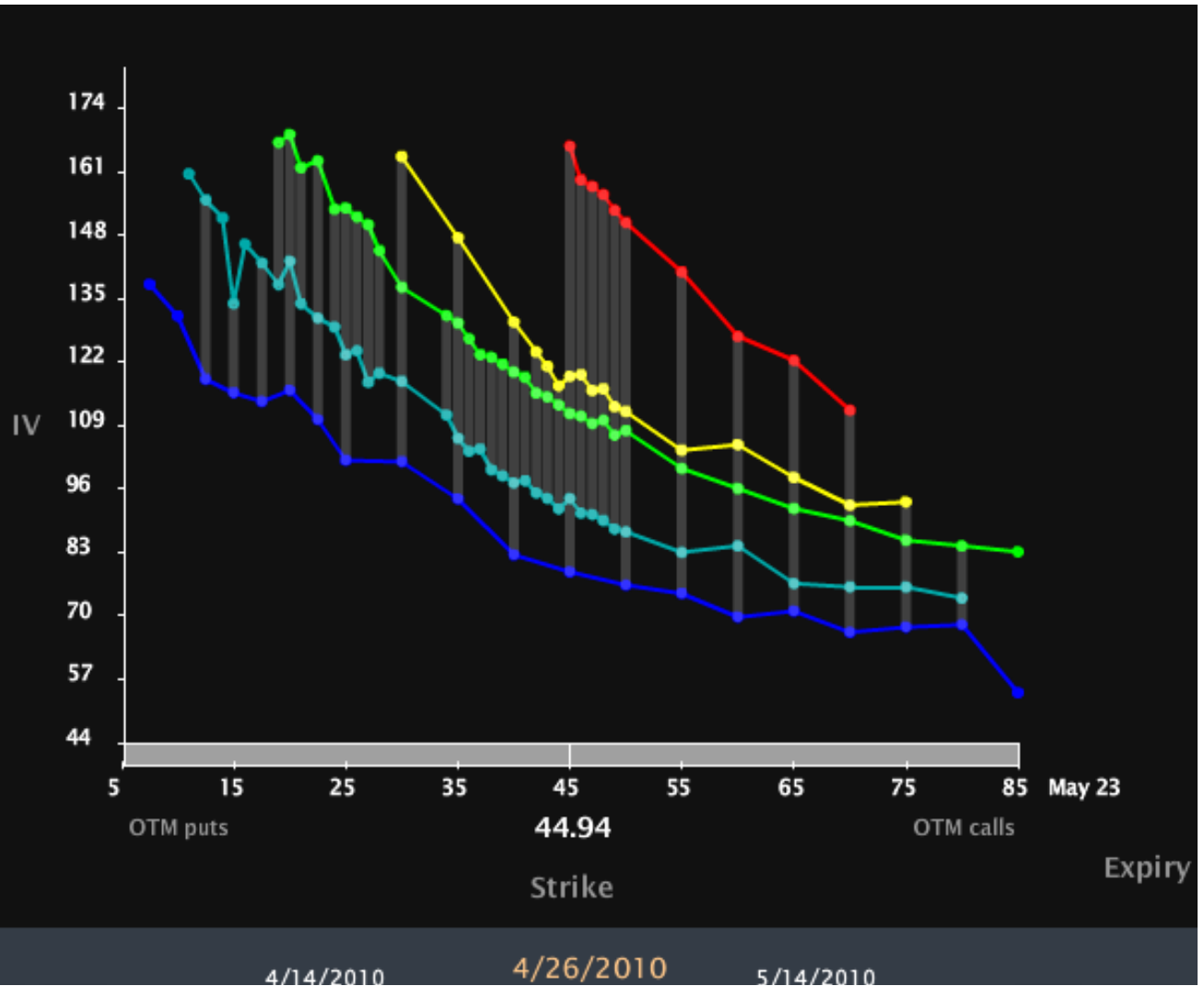


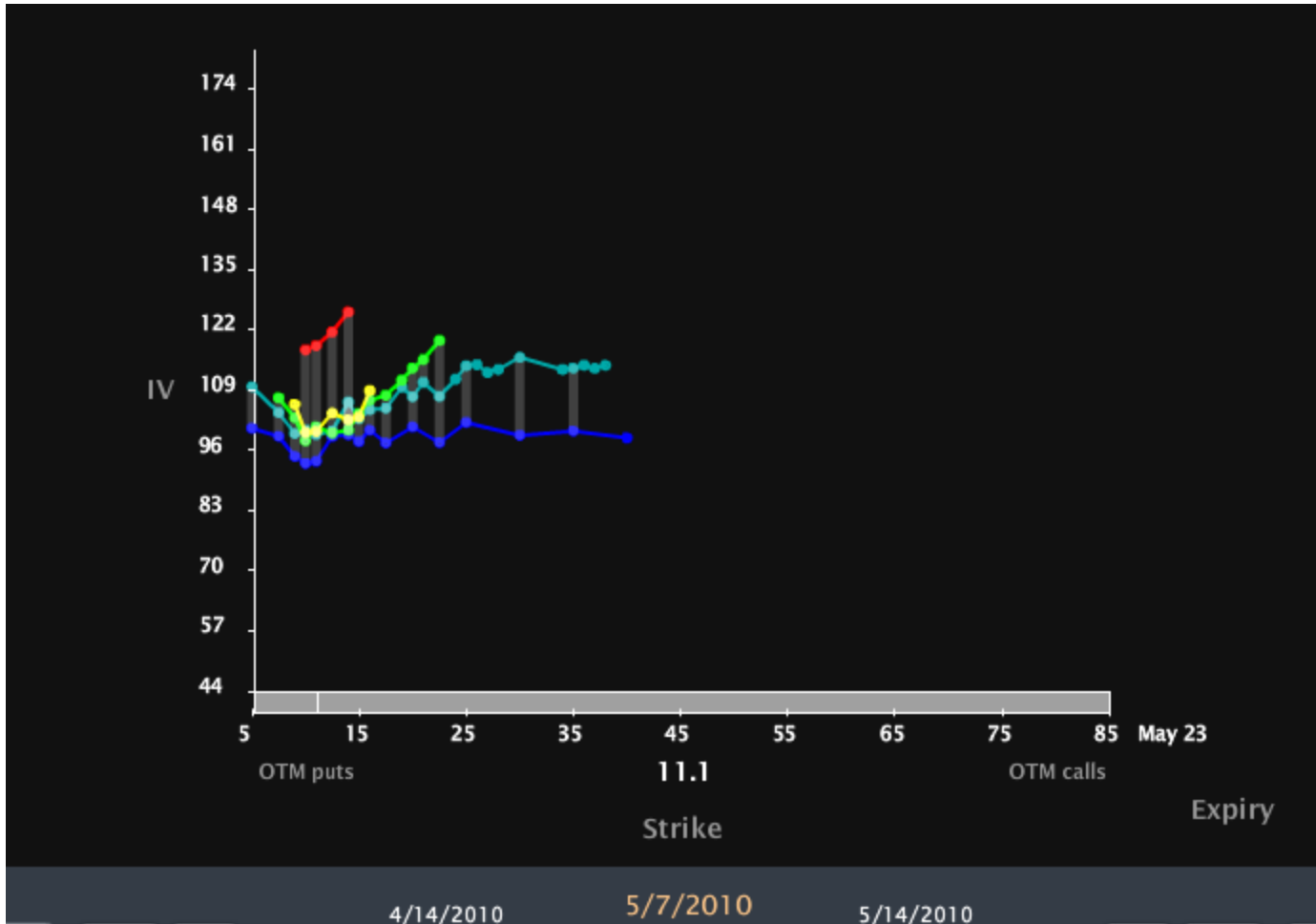
Expiry Skew Chart Patent Pending!



INTERNATIONAL SECURITIES EXCHANGE.







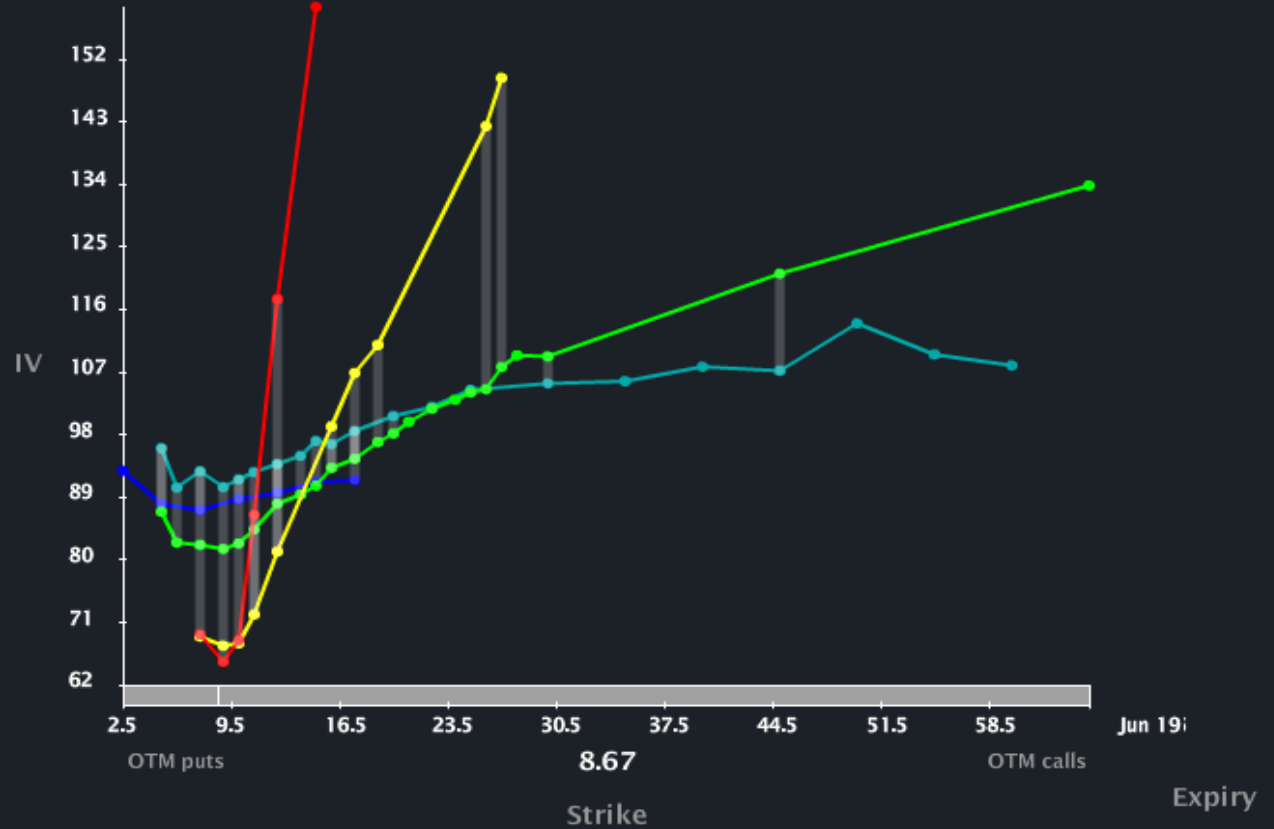
All strikes 10% 25% 50%

First 6 months All months

All premium All over .25

Disable lines

- Jun 19
- Jul 17
- Oct 16
- Jan '11 22
- Jan '12 21



Skew Chart Patent Pending!

6/7/2010

6/7/2010

6/7/2010



July ITMN

InterMune Inc.

ITMN

9.33

0.27
3.0%

9.34 x 9.35

5 x 5

Earnings

8/5/2010 after (NOT confirmed)

Dividend

Sector

Medical

IV30

104

1
0.7%

IV60

105

IV90

106

HV10

62

HV20

59

HV30

57

HV60

290



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Hel

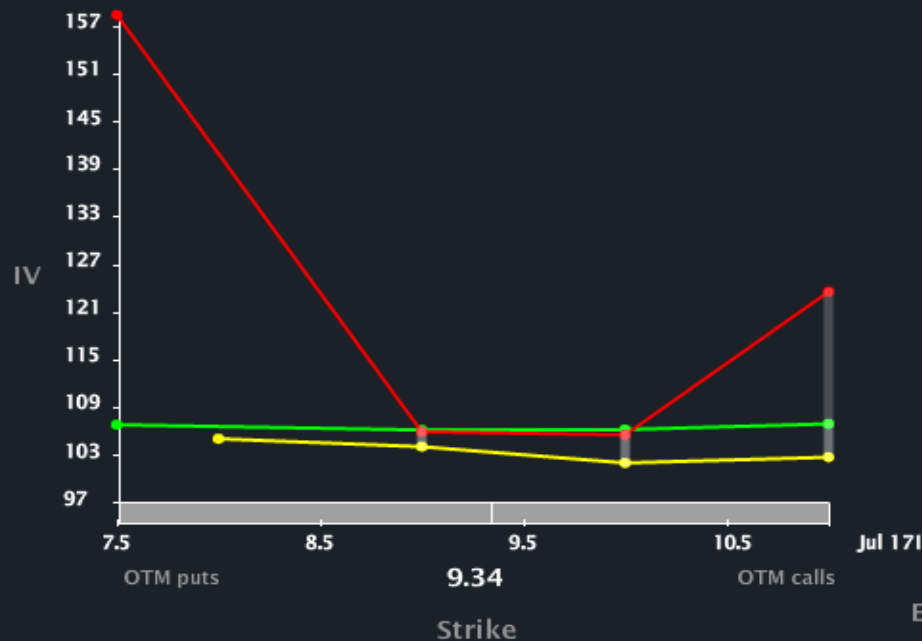
All strikes 10% 25% 50%

First 6 months All months

All premium All over .25

Disable lines

- Jul 17
- Aug 21
- Oct 16
- Jan '11 22
- Jan '12 21



Expiry Skew Chart Patent Pending!



Current ITMN

InterMune Inc.

ITMN 10.32 0.12
 After Hours 10.32 1.2%
 8.36 x 11.70 3 x 3

Earnings 11/4/2010 after (estimated)

Dividend ---

Sector Medical

IV30 87

IV60	IV90	HV10	HV20	HV30	HV60
102	112	66	64	63	60



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner

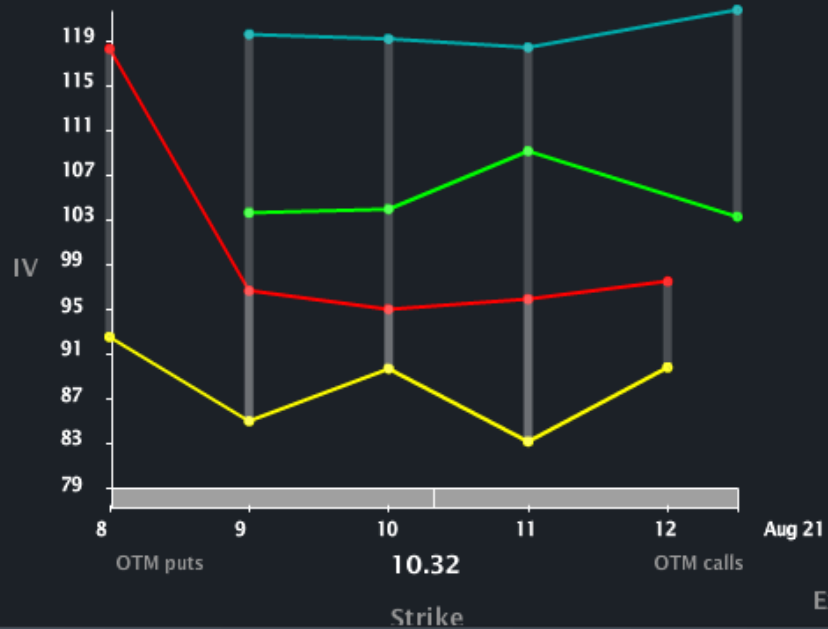
All strikes 10% 25% 50%

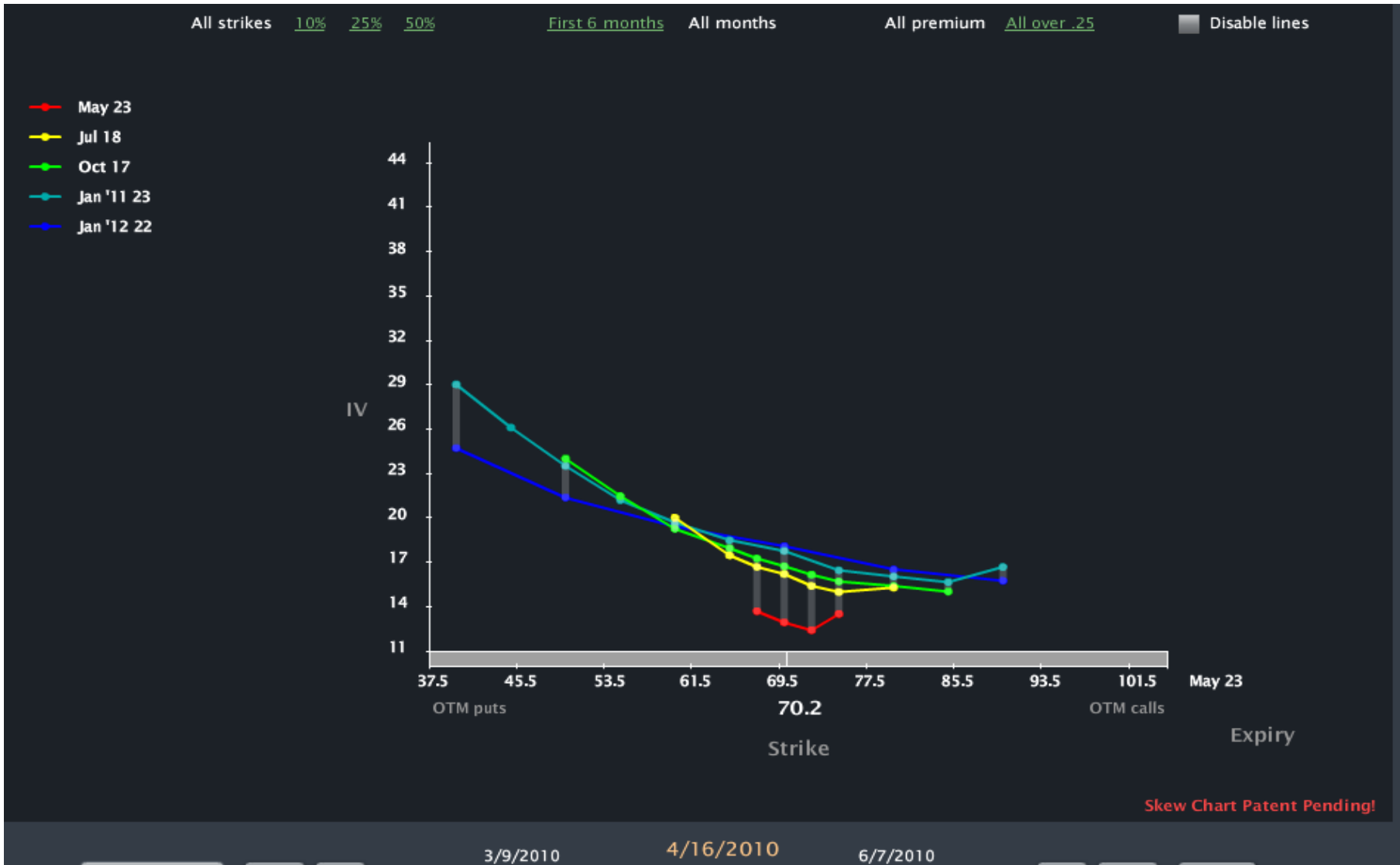
First 6 months All months

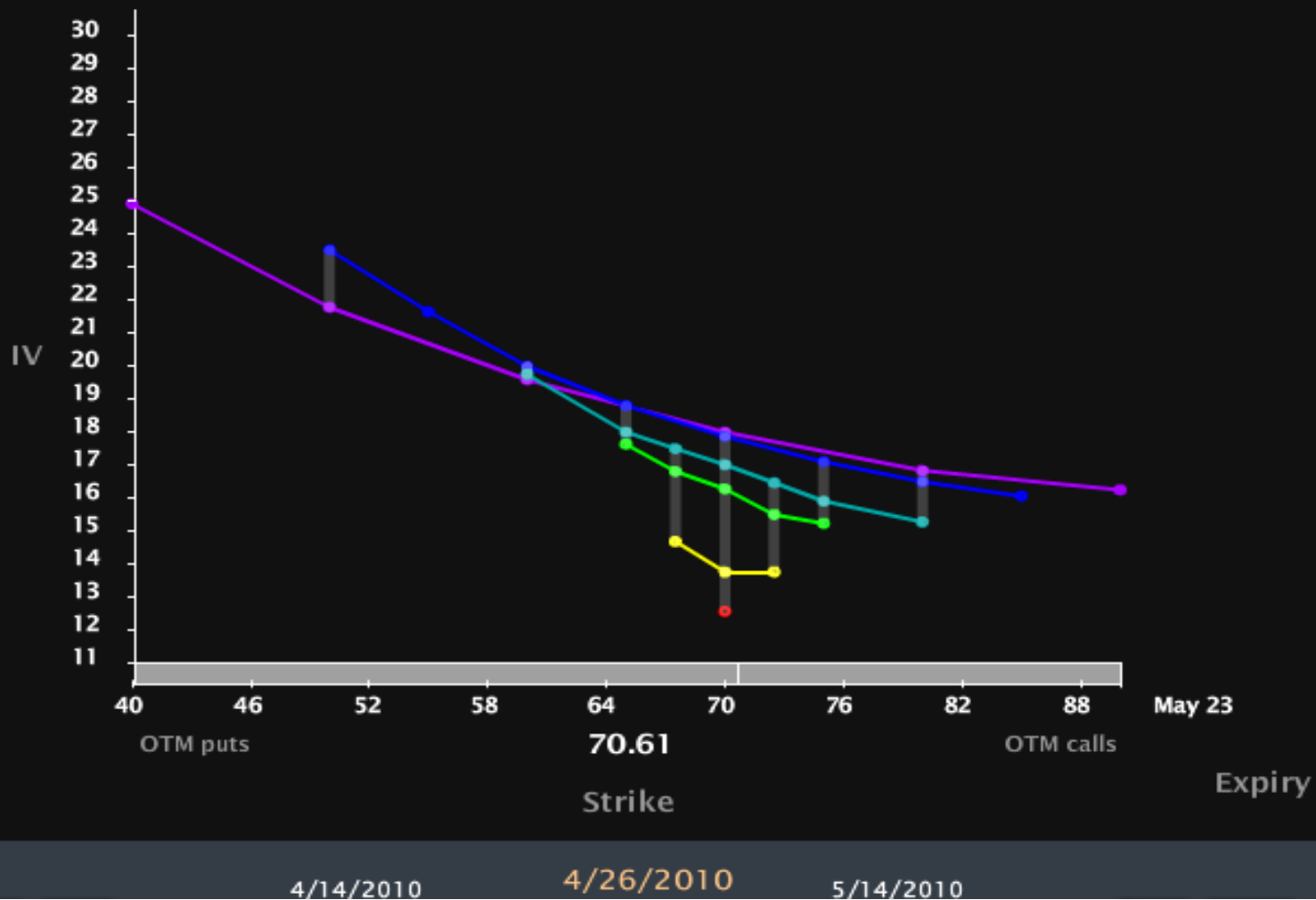
All premium All over .25

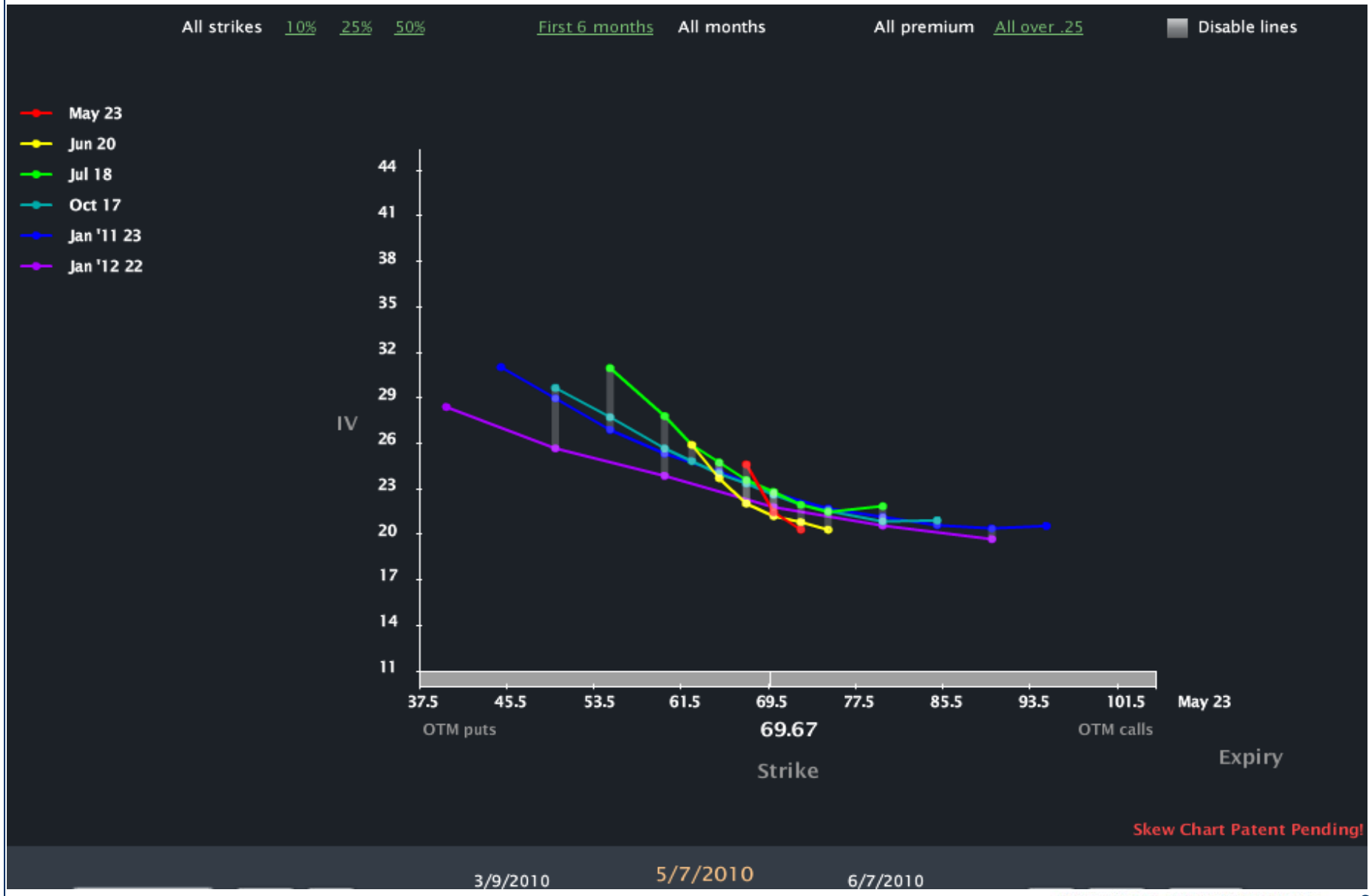
Disable lines

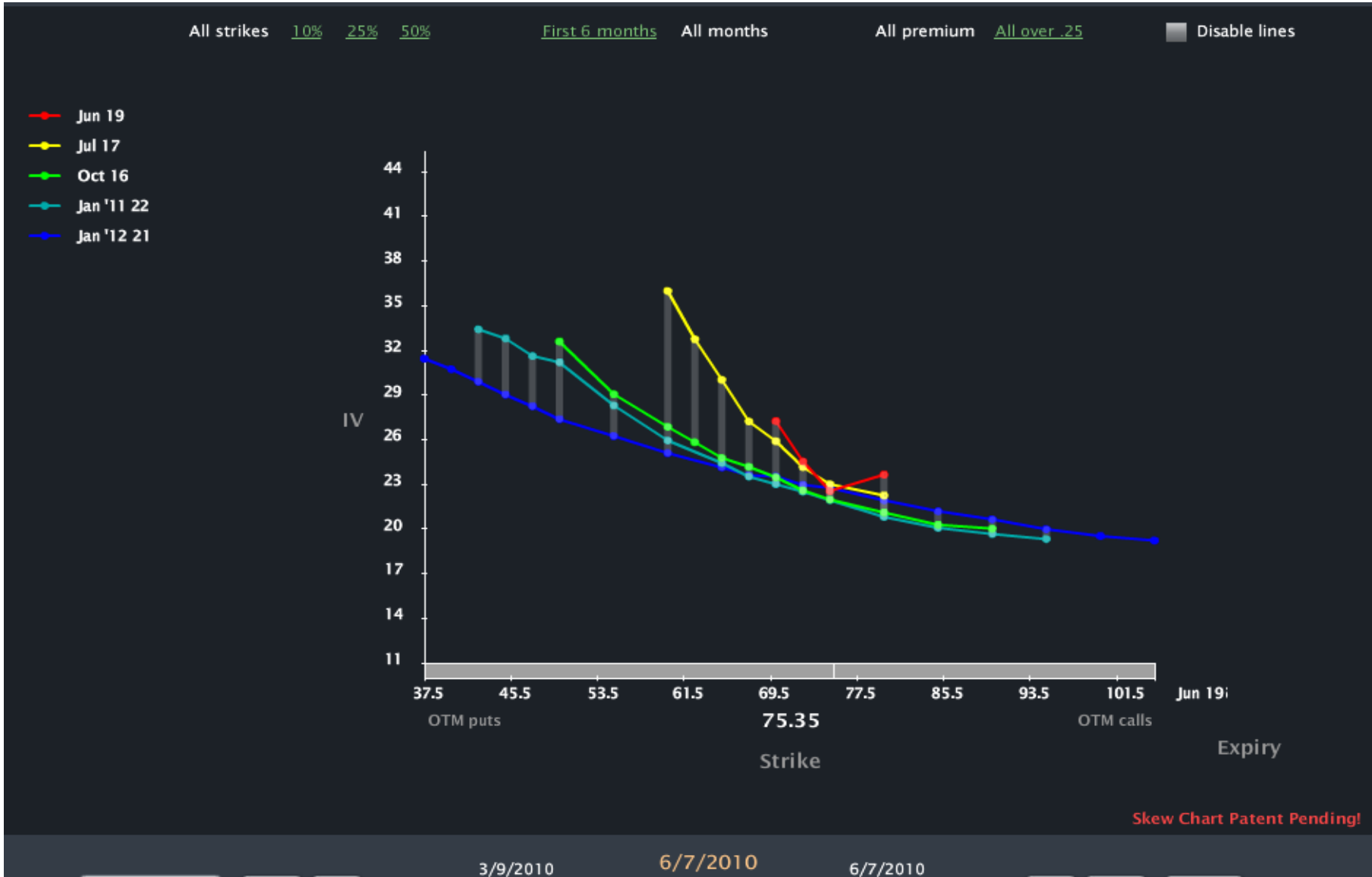
- Aug 21
- Sep 18
- Oct 16
- Jan '11 22
- Jan '12 21











July GIS

General Mills Inc.

GIS 36.39 0.17
0.5%

36.38 x 36.39 16 x 9

IV30 20 -1
-2.6%

Earnings ---
Dividend ---
Sector Consumer Staples

IV60	IV90	HV10	HV20	HV30	HV60
21	22	25	21	21	20



Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

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- Jul 17
- Aug 21
- Oct 16
- Jan '11 22
- Jan '12 21



Expiry Skew Chart Patent Pending!

Current GIS

General Mills Inc.

GIS 33.70 0.13
 After Hours 33.72 0.4%
 33.55 x 33.86 6 x 4

Earnings 9/21/2010 before (NOT confirmed)
Dividend 10/08/2010 0.280 (projected)
Sector Consumer Staples

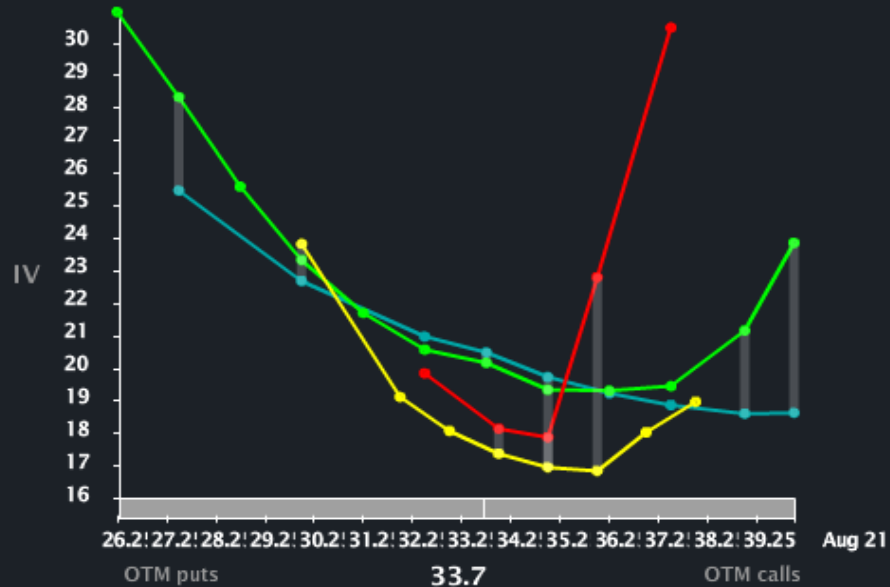
IV30 18 **IV60** 21 **IV90** 21 **HV10** 27 **HV20** 20 **HV30** 22 **HV60** 21



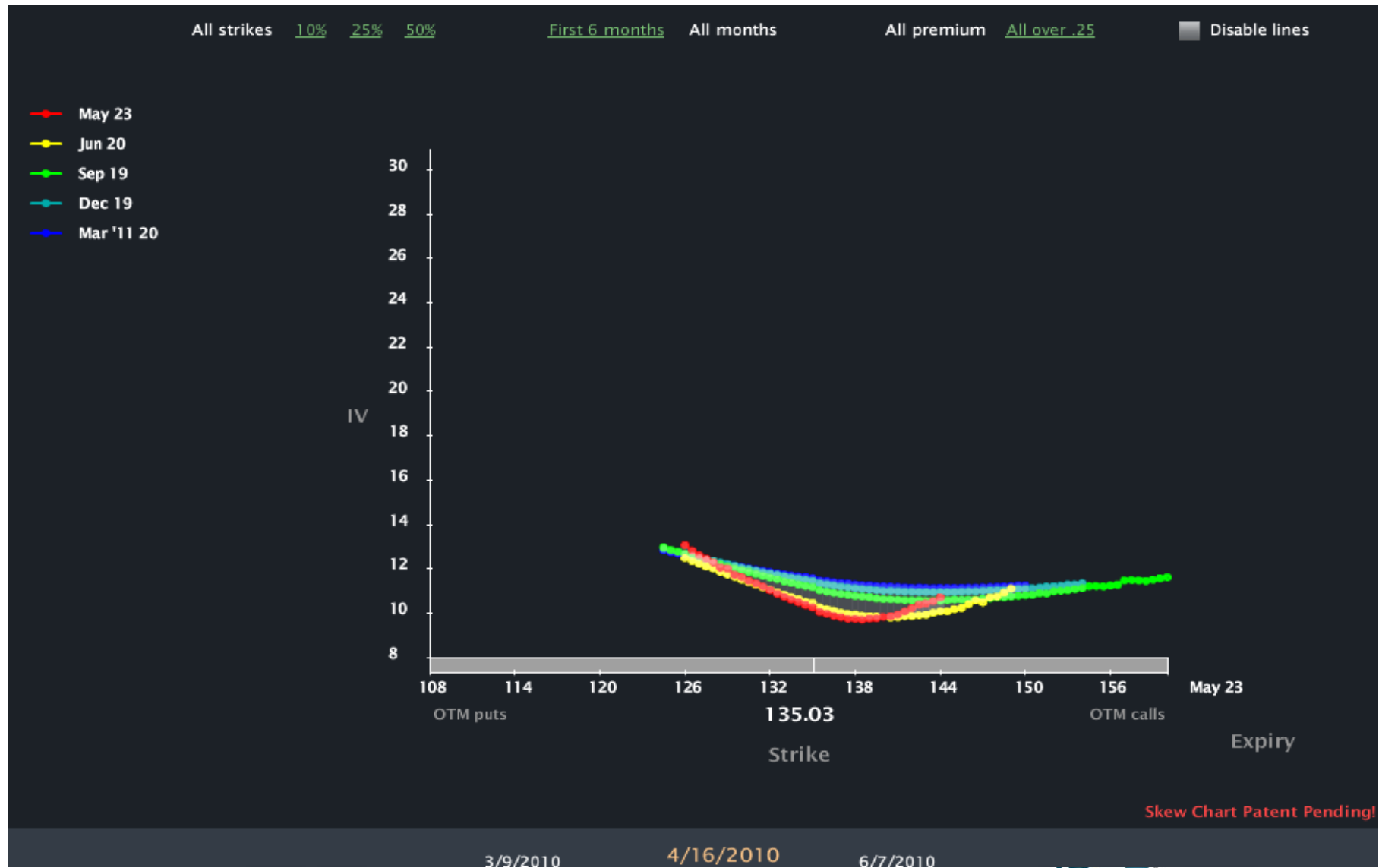
Market Monitor Stats Charts Options **Skew (beta)** Fundamentals News Time & Sales Earnings & Divis Calendar Mapping (beta) Scanner Help

All strikes 10% 25% 50% First 6 months All months All premium All over .25 Disable lines

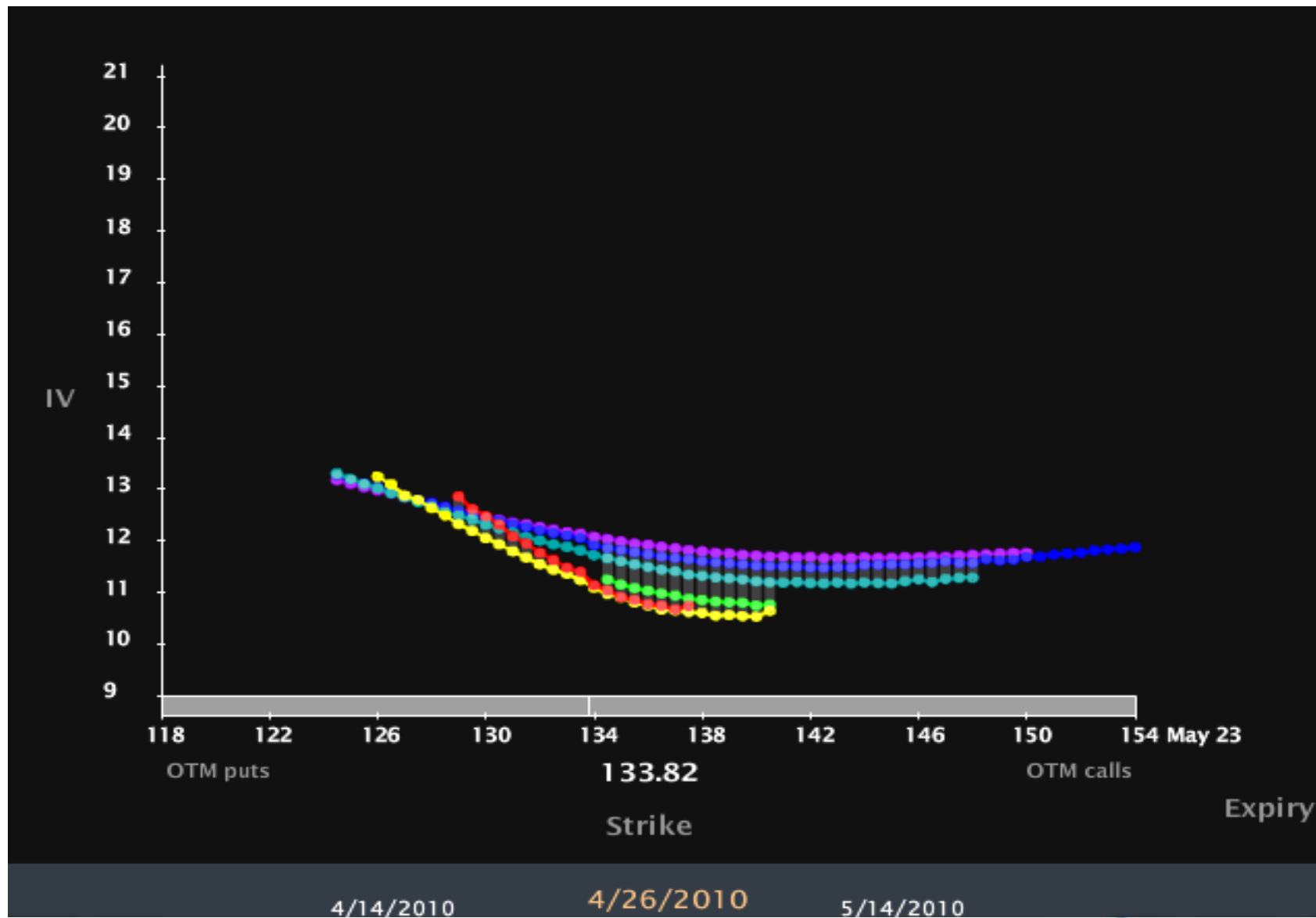
- Aug 21
- Sep 18
- Oct 16
- Jan '11 22
- Jan '12 21



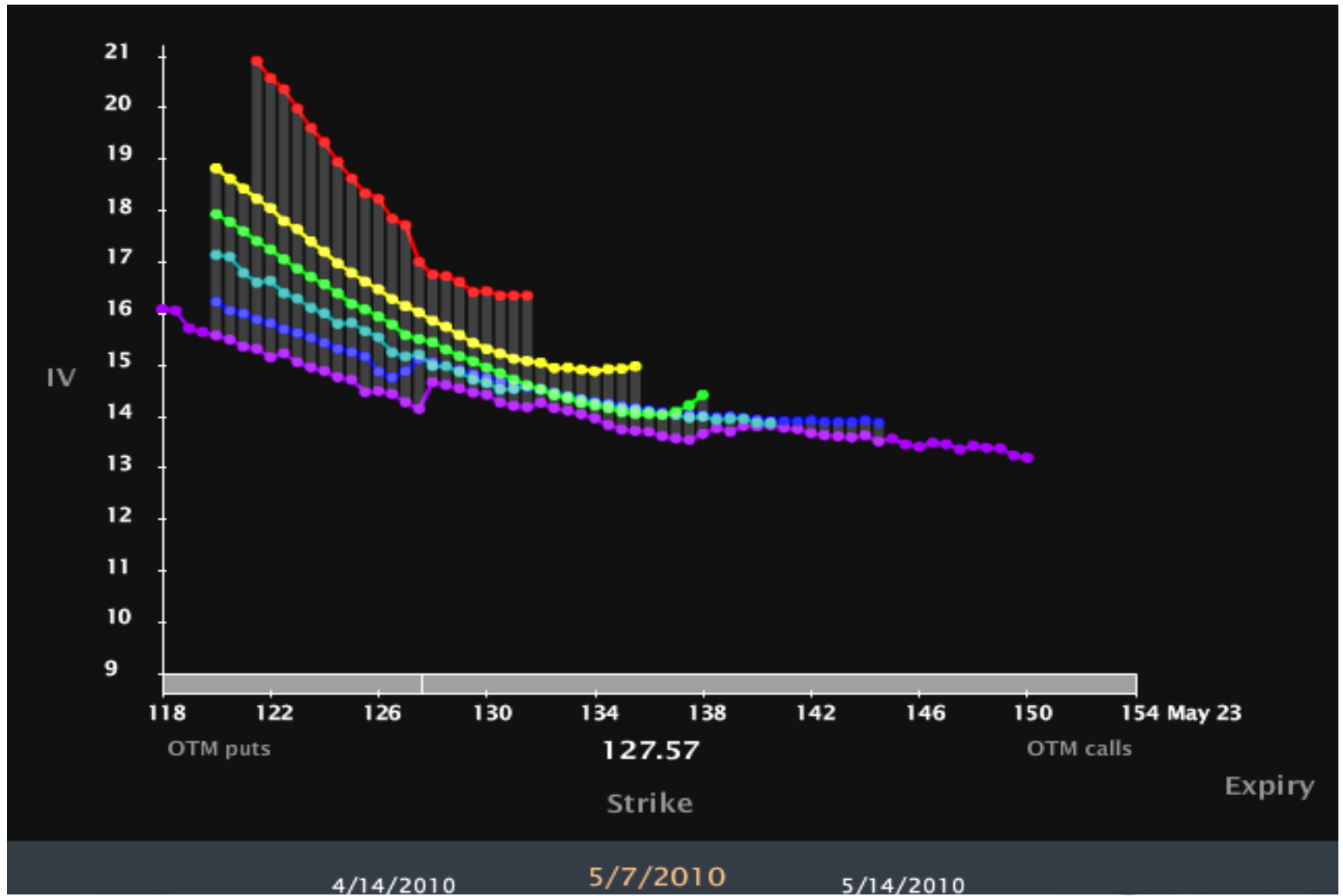
EUU



EUU



EUU



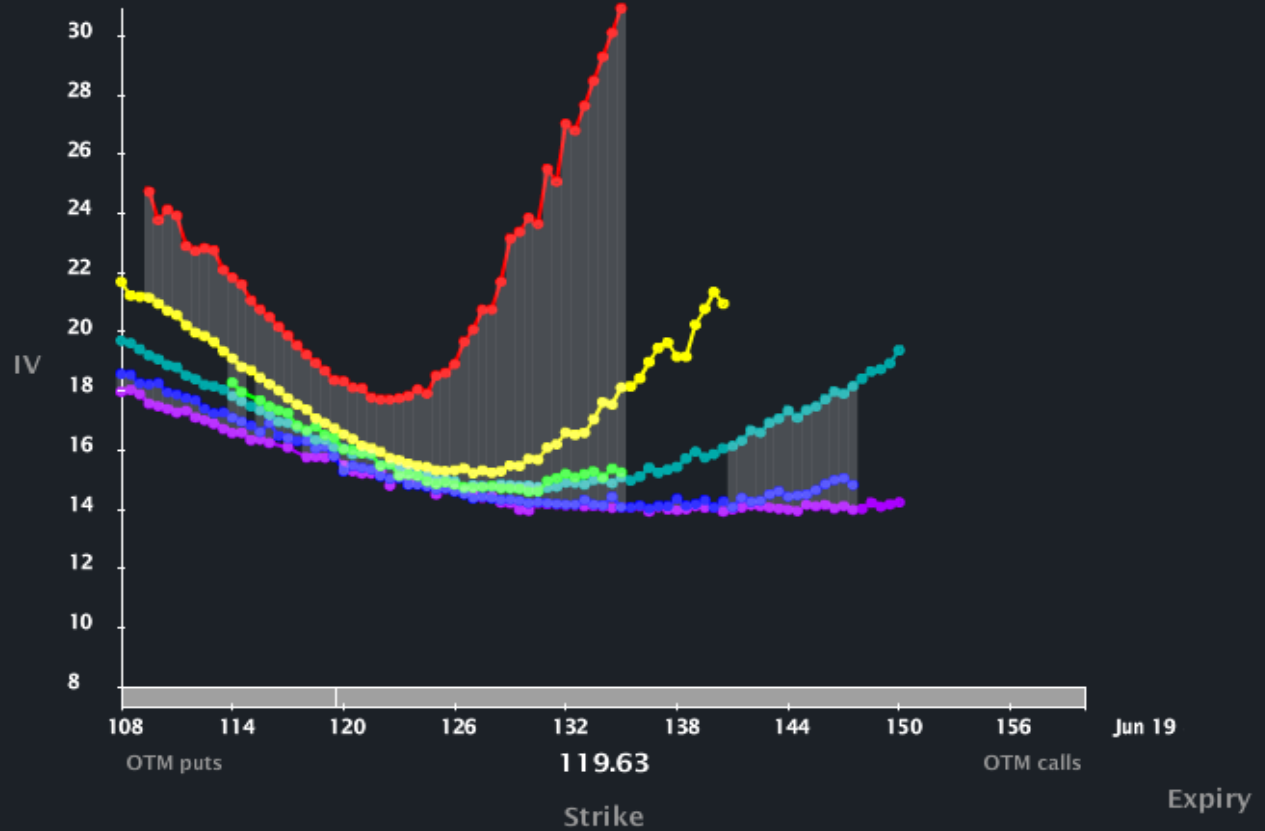
All strikes 10% 25% 50%

First 6 months All months

All premium All over .25

Disable lines

- Jun 19
- Jul 17
- Aug 21
- Sep 18
- Dec 18
- Mar '11 19



Skew Chart Patent Pending!

3/9/2010

6/7/2010

6/7/2010

July EEUU

ISE FX Euro



^EUU 126.60 0.64
0.5%

Sector	Currency	IV60	IV90	HV10	HV20	HV30	HV60
		12	13	14	11	12	14

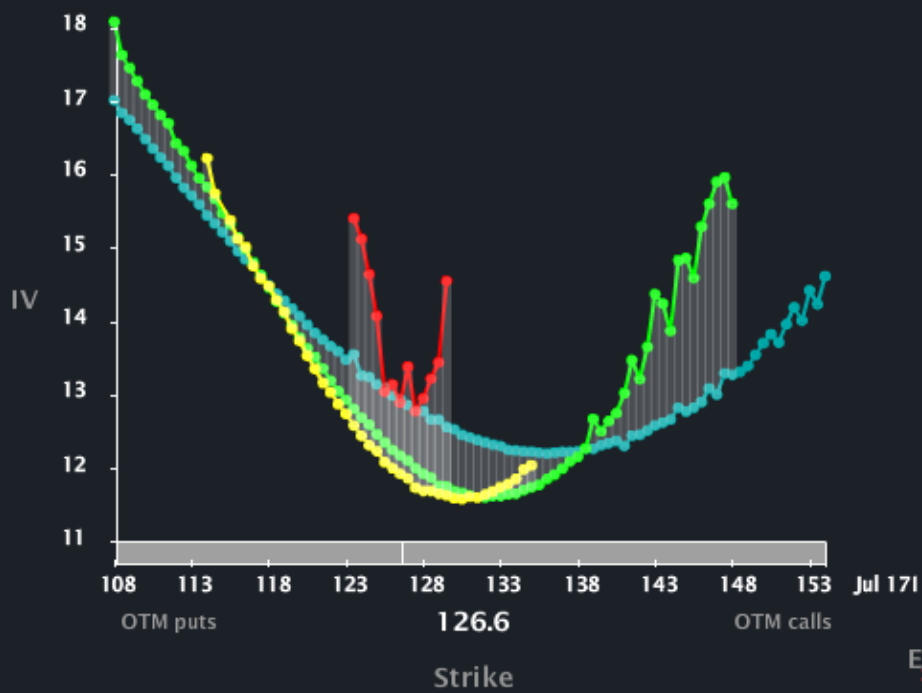
IV30 12



- Market
- Monitor
- Stats
- Charts
- Options
- Skew (beta)**
- Fundamentals
- News
- Time & Sales
- Earnings & Divis
- Calendar
- Mapping (beta)
- Scanner
- Help

[All strikes](#) [10%](#) [25%](#) [50%](#) [First 6 months](#) [All months](#) [All premium](#) [All over .25](#) Disable lines

- Jul 17
- Aug 21
- Sep 18
- Dec 18
- Mar '11 19
- Jun '11 18



Expiry Skew Chart Patent Pending!

Current EUU

ISE FX Euro



^EUU 132.22 -0.57
After Hours 132.22 -0.4%

Sector	Currency	IV60	IV90	HV10	HV20	HV30	HV60
		12	12	8	10	12	13

IV30 11



- Market
- Monitor
- Stats
- Charts
- Options
- Skew (beta)**
- Fundamentals
- News
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- Earnings & Divis
- Calendar
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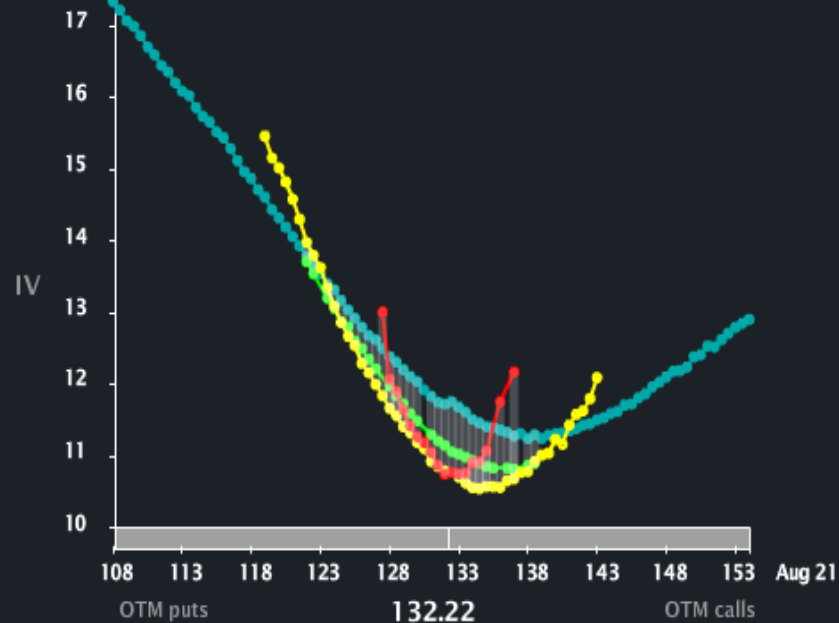
[All strikes](#) [10%](#) [25%](#) [50%](#)

[First 6 months](#) [All months](#)

[All premium](#) [All over .25](#)

Disable lines

- Aug 21
- Sep 18
- Oct 16
- Dec 18
- [Mar '11 19](#)
- [Jun '11 18](#)



Examples using USD/EUR implied volatilities (June)

	1 st leg	2 nd leg	Components	Explanation
1-2 mo call calendar	19 volatility	17 volatility	Long 2 nd short 1 st calendar	Against the skew
1-2 mo put calendar	19 volatility	17 volatility	Long 2 nd short 1 st calendar	Against the skew
1 mo 117/121 c vertical	20 volatility	18 volatility	Long lower short higher vertical	With the skew
1 mo 117/121p vertical	20 volatility	18 volatility	Long lower short higher vertical	Against the skew

Current Aug 2010 EEU skews

	1 st leg	2 nd leg	Components	Explanation
1-2 mo call calendar	11 volatility	11 volatility	Long 2 nd short 1 st calendar	No skew
1-2 mo put calendar	11 volatility	11 volatility	Long 2 nd short 1 st calendar	No skew
1 mo 131/134c	11 volatility	11 volatility	Long lower short higher vertical	No skew
1 mo 134/131p	11 volatility	11 volatility	Long lower short higher vertical	No skew

Calendars, verticals and skew

	Negative Strike skew	Positive Strike skew	Negative time skew	Positive time skew
	Higher volatility as prices drop	Higher volatility as prices rise	Higher volatility in shorter-term	Higher volatility in the longer-term
Long calendar			Against skew	With skew
Short calendar			With skew	Against skew
Long vertical call spread	With the skew	Against the skew		
Long vertical put spread	Against skew	With skew		
Short vertical call spread	Against skew	With skew		
Short vertical put spread	With skew	Against skew		

Flexibility is key

- Adjusting to the various market conditions and finding investment strategies that meet your own financial goals and risk tolerances are very important for all investors

Summary

- Option volatility is measured in many ways
- Implied volatility measures the inferred volatility that comes from the actual market price using a standard option pricing model
- Each strike price will trade at various implied volatilities based on supply and demand
- Occasionally the implied volatilities might differ greatly based on differing expectations by the marketplace

Summary

- The term “skew” defines the difference between an expected normal options price value and the market price
- Skew is most pronounced when most participants are predicting the potential for large asymmetric move
- Traders should consider the skew implications, time or strike skew, prior to entering any options transaction
- If the risk/reward does not seem rewarding, consider an alternative trading situation



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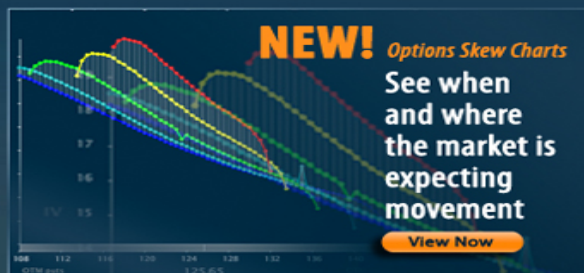
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Symbol	Convention	Per US \$	In US \$	Change	Implied Vol
		Last Price	Last Price		
AUX	USD / AUD	122.11	▲ 0.65 (0.54%)	20.38%	
BRB	USD / BRL	186.20	▼ -0.37 (-0.20%)	18.17%	
CDD	USD / CAD	105.30	▼ -0.99 (-0.93%)	14.16%	
SFC	USD / CHF	116.08	▼ -0.21 (-0.18%)	12.99%	
EUI	USD / EUR	83.63	▲ 0.09 (0.11%)	16.67%	
BPX	USD / GBP	69.00	▼ -0.19 (-0.27%)	15.07%	
YUK	USD / JPY	91.95	▲ 0.03 (0.03%)	13.64%	
PZO	USD / MXN	128.71	▼ -0.85 (-0.66%)	19.06%	
NZD	USD / NZD	150.43	▲ 1.32 (0.89%)	19.59%	
SKA	USD / SEK	80.72	▲ 0.53 (0.66%)	18.30%	

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