

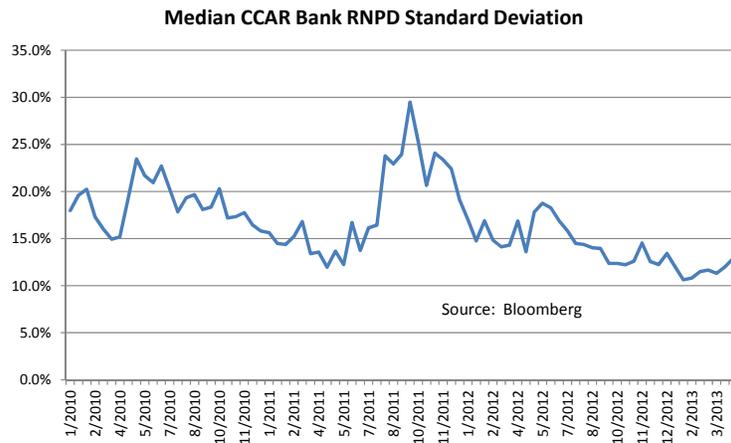
FEDERAL RESERVE BANK OF MINNEAPOLIS  
BANKING AND POLICY STUDIES

---

**Minneapolis Options Report – April 18<sup>th</sup>**

*Banks*

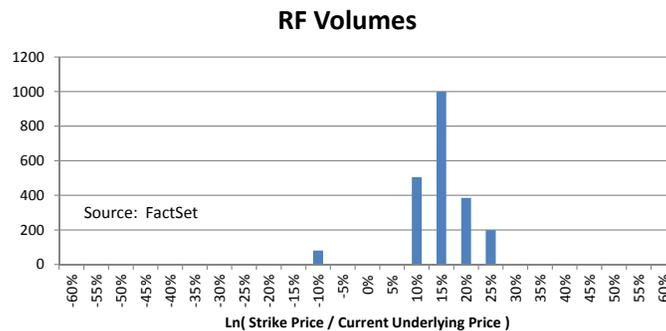
Trading in options on bank stocks was higher relative to last period for nearly every bank we follow. Volumes were relatively strong historically consistent with the markets reacting to earnings announcements. RNPD standard deviations clicked higher for the second straight period and RNPD skews are generally less negative than in our last two reports.



Within the CCAR universe, all but two of the firms have reported their fourth quarter earnings results. Though two thirds of the group reported earnings ahead of analyst estimates, 60% reported revenues below expectations. The market generally responded negatively to the news with the median firm share price falling -2.4% in the day surrounding the report. Since our last report, the median CCAR bank stock is down -3%.

Additional notes:

- Volatility smiles for BAC, COF, FITB, GS, JPM, STT each experienced shifts upward at every strike price. (*see top panel of individual reports*)
- Nearly all of the trading in RF was in call space (above the spot). (*see top panel of RF report*)



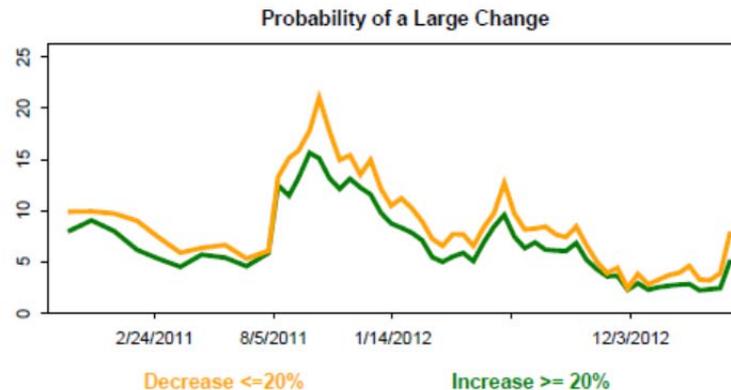
- C had the best spot performance over the period and strongest trading. Its RNPD remained stable.

### Other Commodity Markets

Trading was brisk across the other markets we follow. Volumes were robust in options on precious metals, oil, and exchange rate futures. Options on the S&P 500 index with 6 months to expiry also traded well above recent levels. RNPD standard deviations generally moved higher relative to last period. In some cases the increases were quite large.

- The WTI oil spot price dropped about -6% since our last report. The RNPD standard deviation increased 220 basis points for the WTI oil market and 180 basis points for the Brent market. Tail risks jumped as measured by increases in RN probabilities for price changes greater than 20% both up and down. (*See oil reports*)
- Similar action was seen in the precious metals markets. Since our last report the spot price for gold fell over -10% and the spot price for silver fell over -13%. Their RNPD standard deviations both increased over 300 basis points. (*See Gold and Silver reports*)

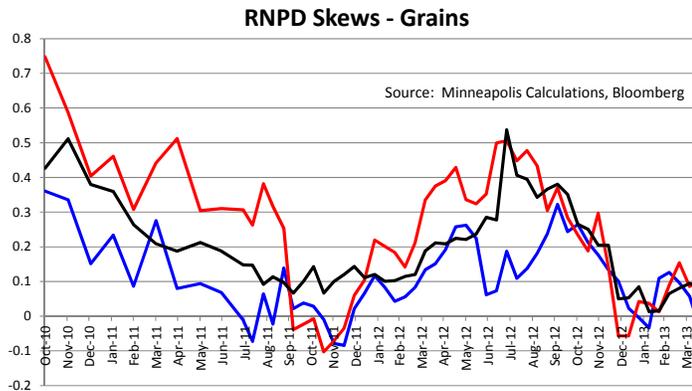
Risk Neutral Probabilities Derived from Options on Gold Futures



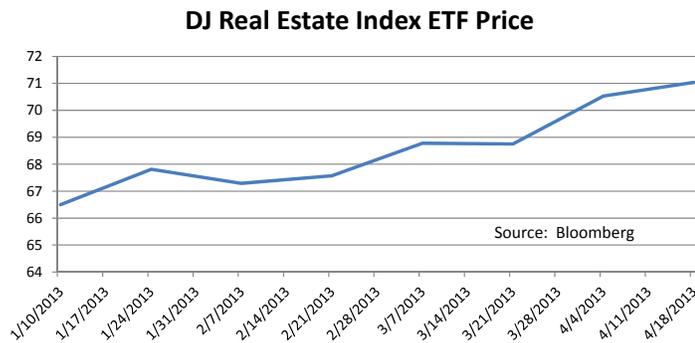
Source: Minneapolis Calculations, Bloomberg

- Tail risks edged higher in the Yen-Dollar exchange rate market. The dollar improved over 2% against the yen since our last report. The standard deviation of the RNPD derived from options on Yen-Dollar exchange rate futures rose 65 basis points since our last report. Notably, the RNPDs based on Dollar-Euro and Dollar-Pound exchange rate futures continue to show limited risk of volatility in those markets. (*See exchange rate reports*)

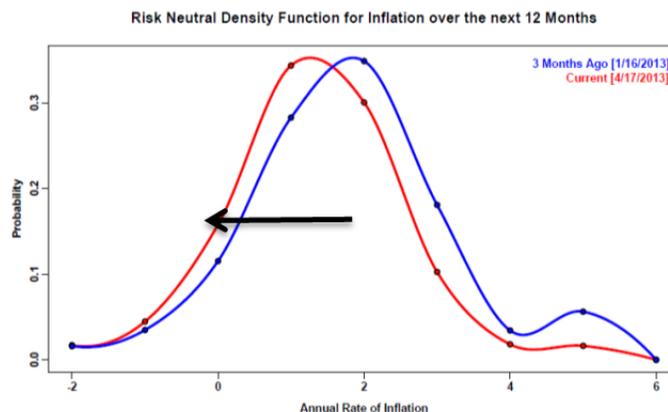
- RNPD standard deviations moved up in all three grain markets we follow. The value rose 160 basis points for the RNPD derived from options on corn futures. RNPD skews in these markets remain close to zero though are off their recent lows.



- Since the beginning of the year, the RNPD standard deviation derived from options on the DJ Real Estate ETF has risen by over 100 basis points. Relative to two weeks ago, we note a more negative skew in addition to a higher standard deviation. Trading was strong. We note that the ETF has gained over 10% since December 27<sup>th</sup>.



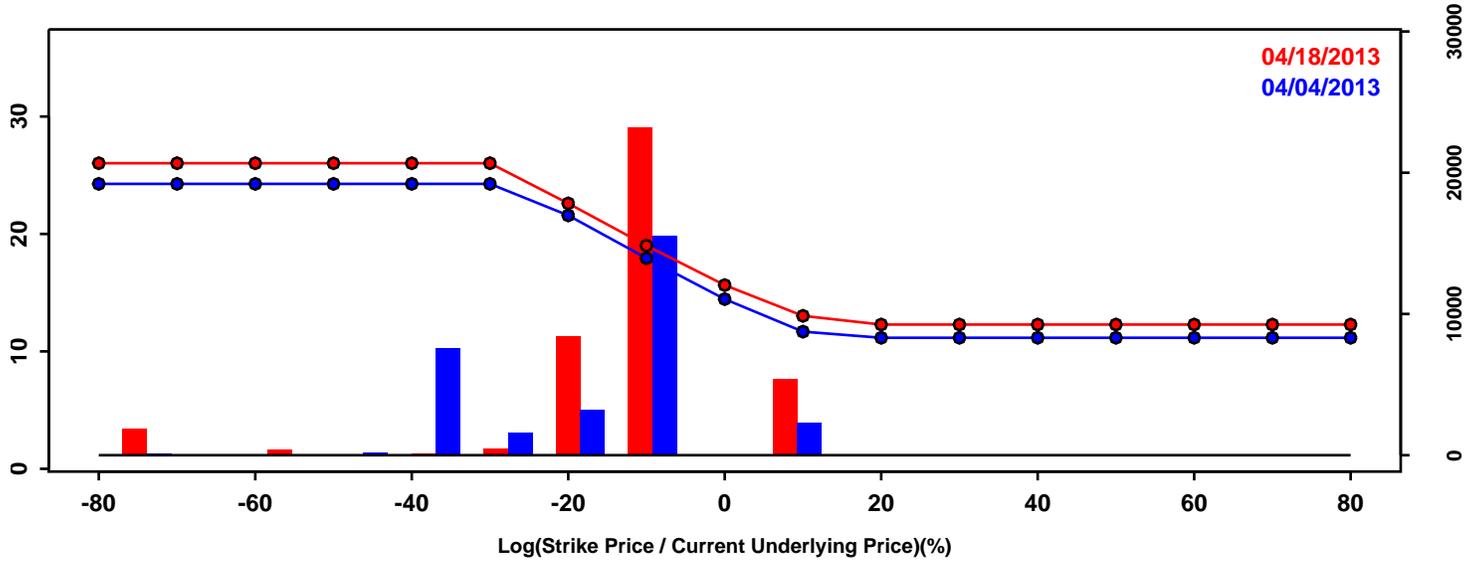
- Near-term inflation expectations have shifted lower:



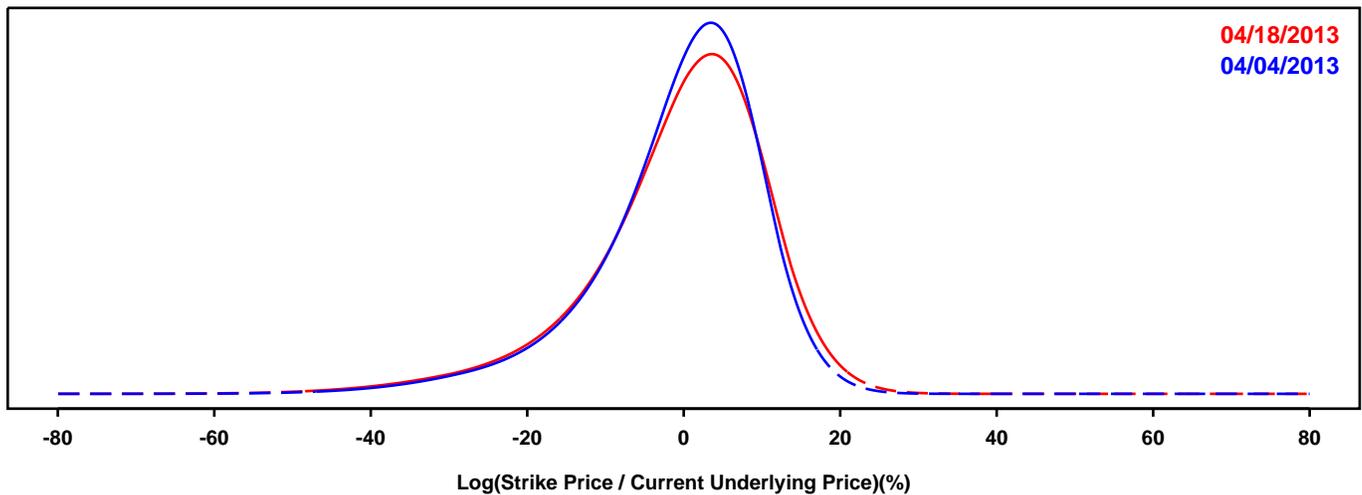
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

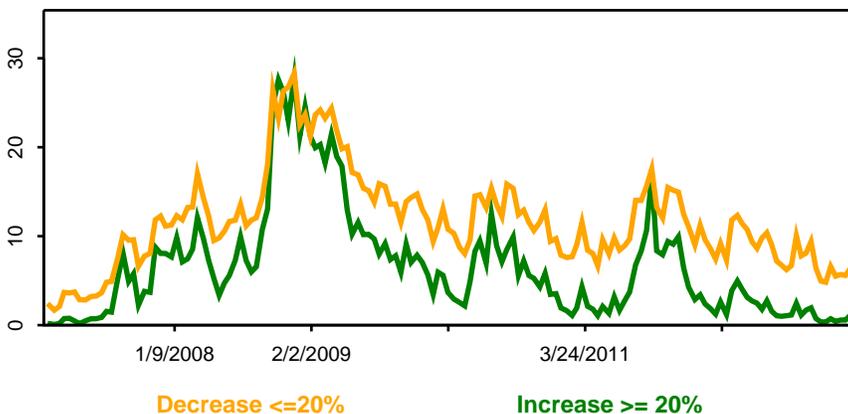
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

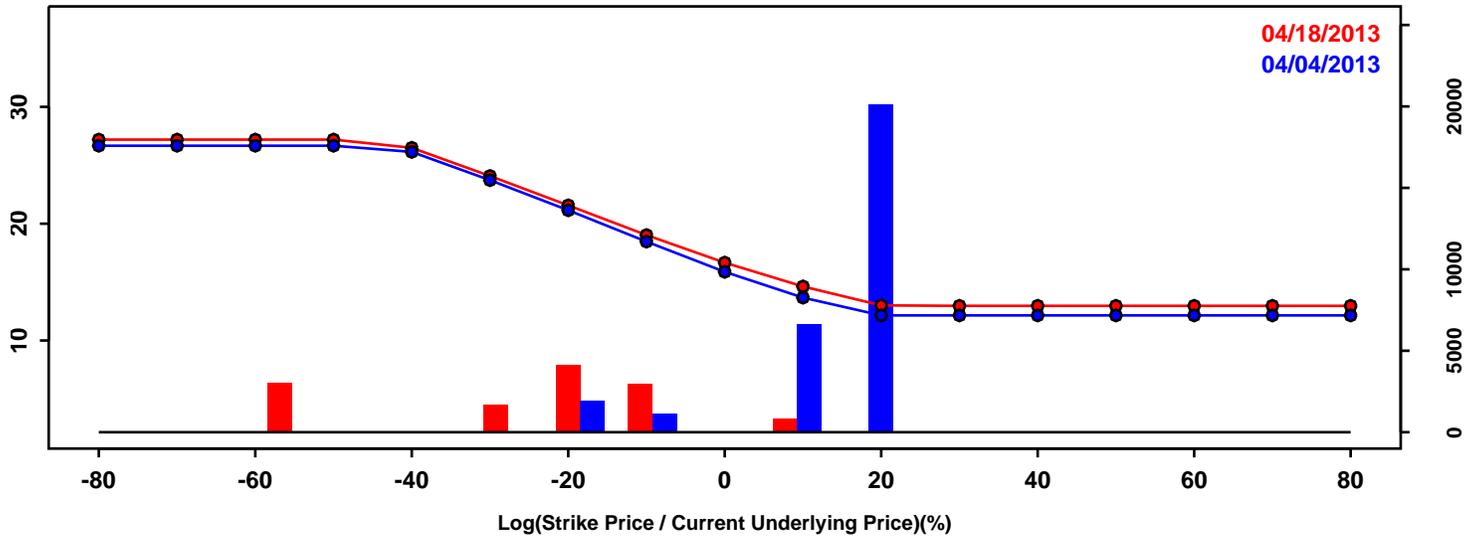


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-14.43%	-15.41%	-0.98%
50th Pct	1.11%	1.16%	0.05%
90th Pct	10.92%	11.94%	1.01%
Mean	-0.60%	-0.55%	0.05%
Std Dev	10.71%	11.52%	0.82%
Skew	-1.08	-1.04	0.04
Kurtosis	2.07	1.98	-0.09

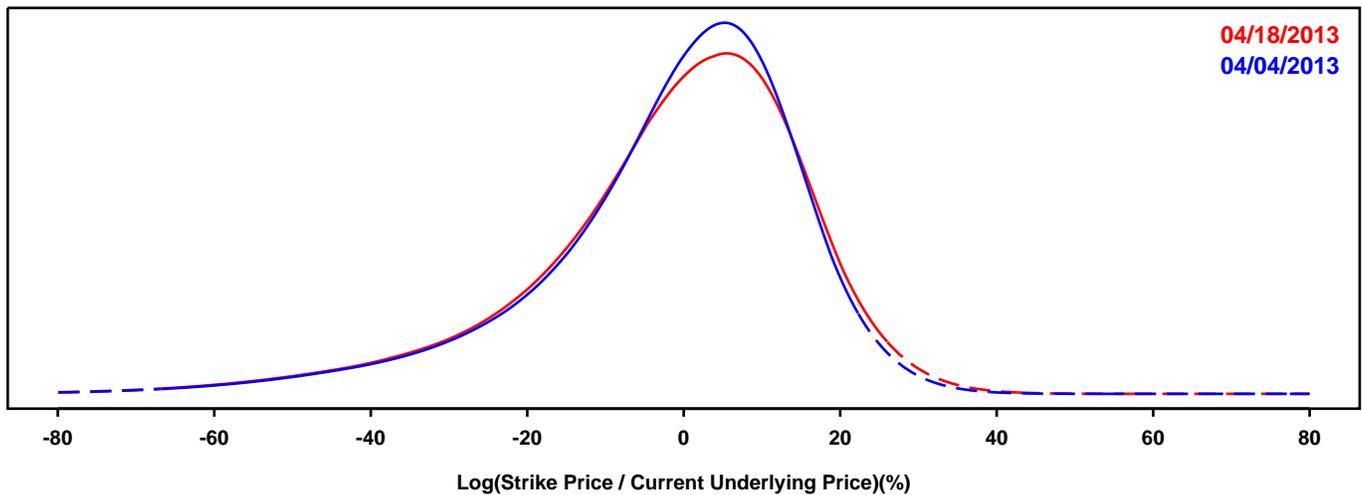
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 12 months.

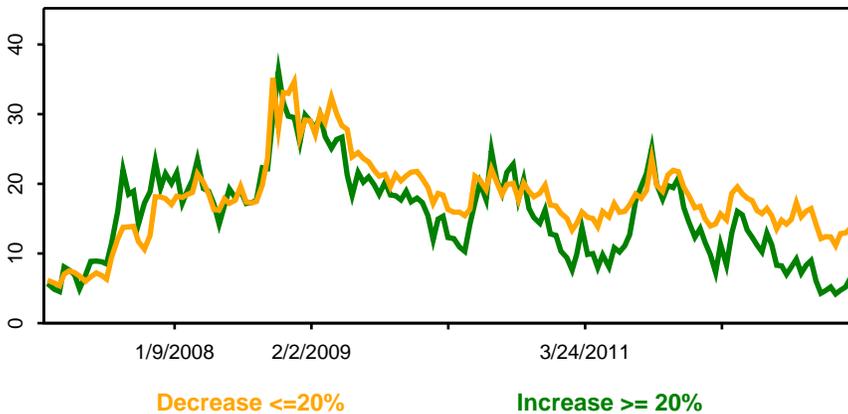
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

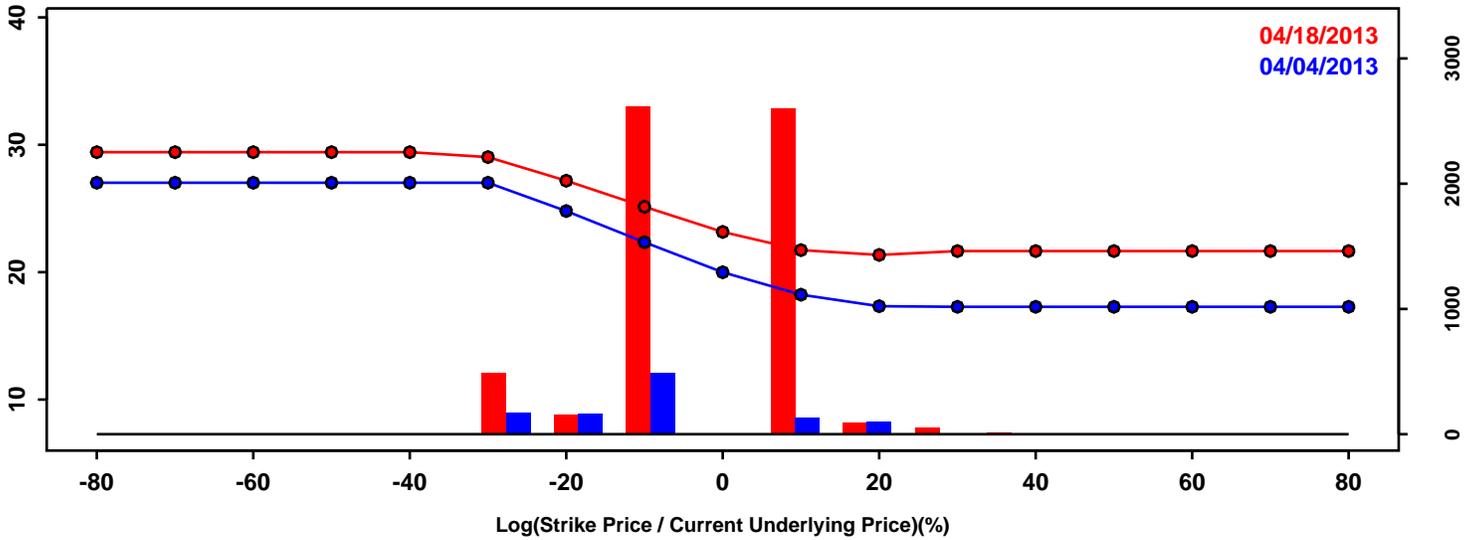


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-24.12%	-24.92%	-0.80%
50th Pct	1.18%	1.02%	-0.16%
90th Pct	16.20%	17.25%	1.05%
Mean	-1.80%	-1.81%	-0.02%
Std Dev	17.04%	17.70%	0.66%
Skew	-1.14	-1.05	0.09
Kurtosis	2.11	1.87	-0.24

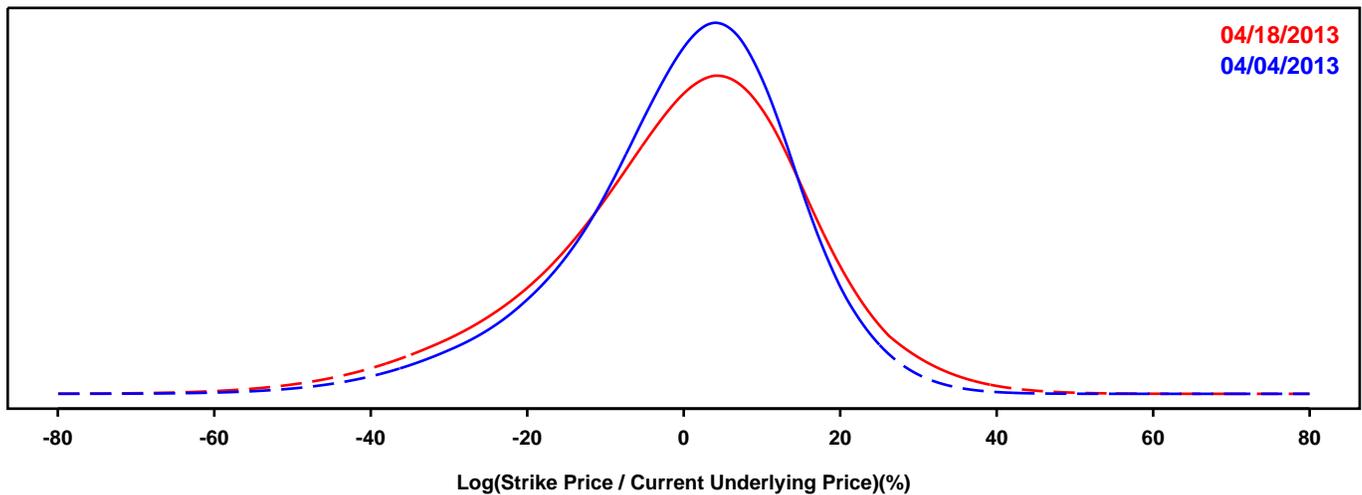
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (WTI)

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

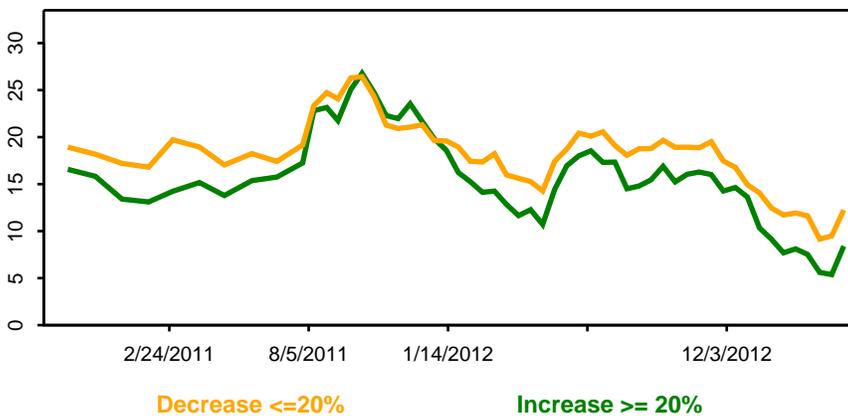
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

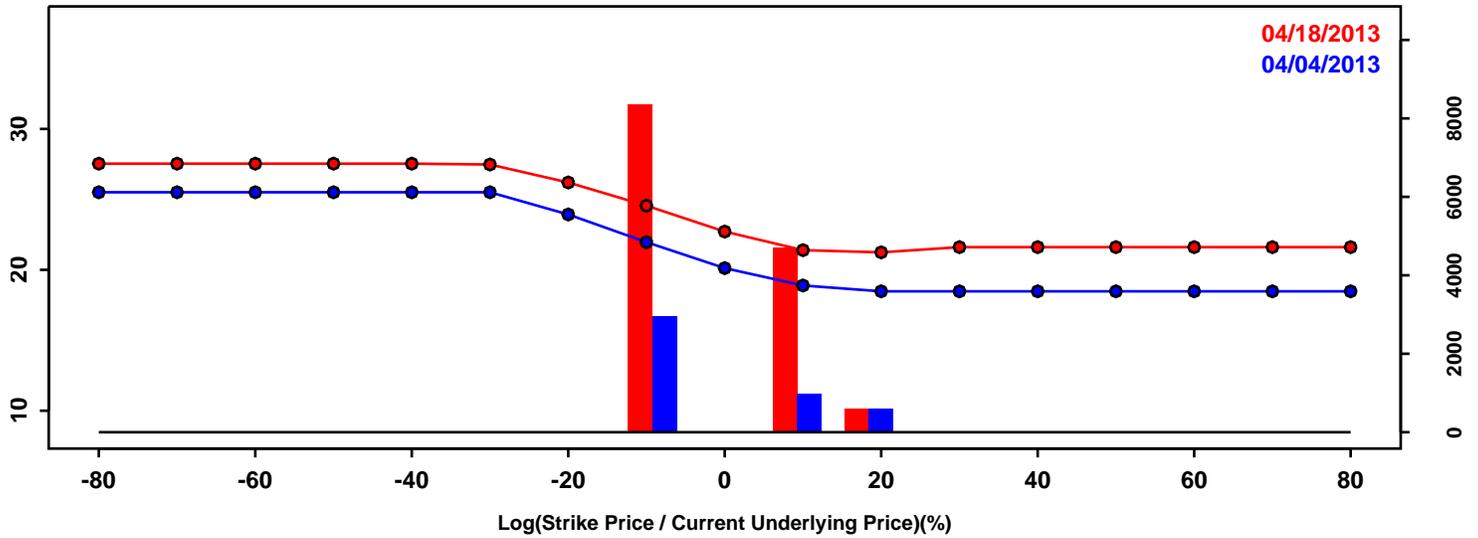


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-19.35%	-22.69%	-3.34%
50th Pct	1.45%	1.22%	-0.22%
90th Pct	16.22%	18.64%	2.42%
Mean	-0.23%	-0.48%	-0.26%
Std Dev	14.39%	16.59%	2.20%
Skew	-0.66	-0.53	0.13
Kurtosis	0.87	0.65	-0.22

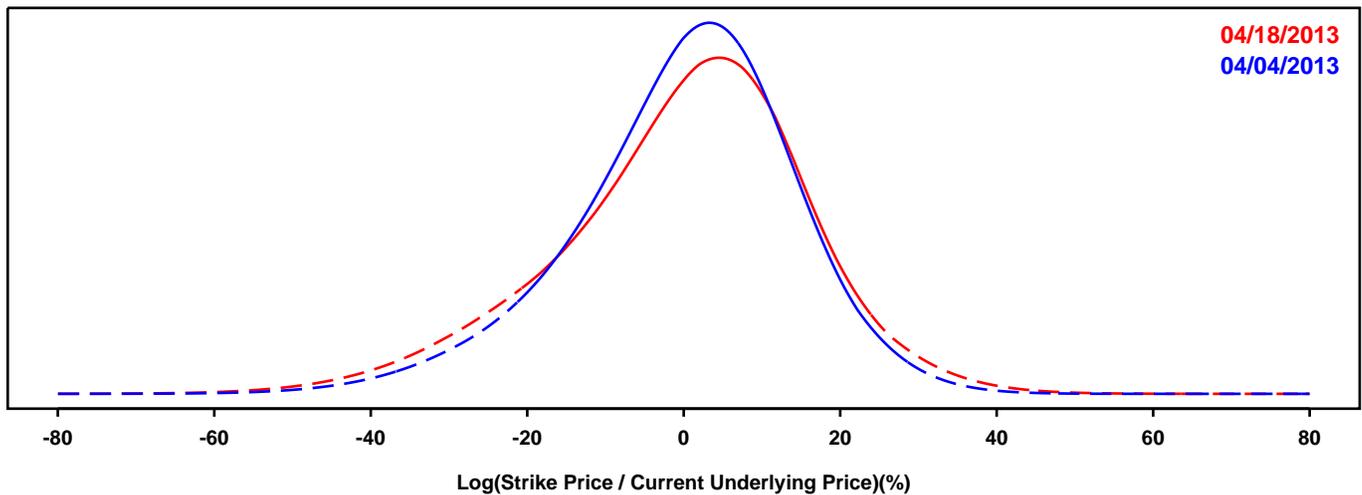
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (Brent)

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

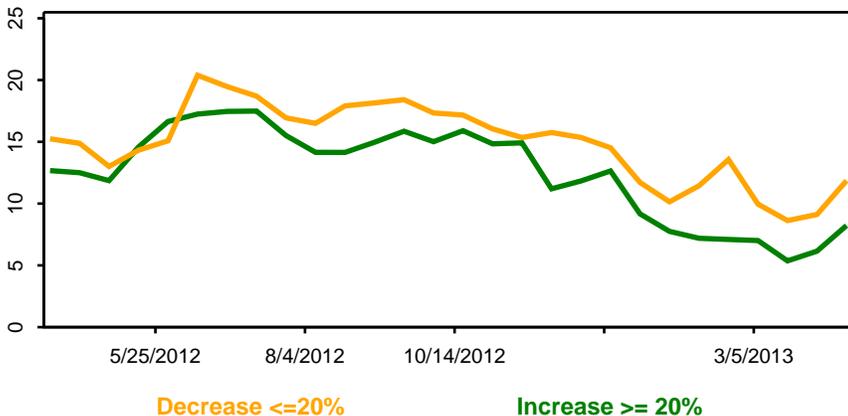
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

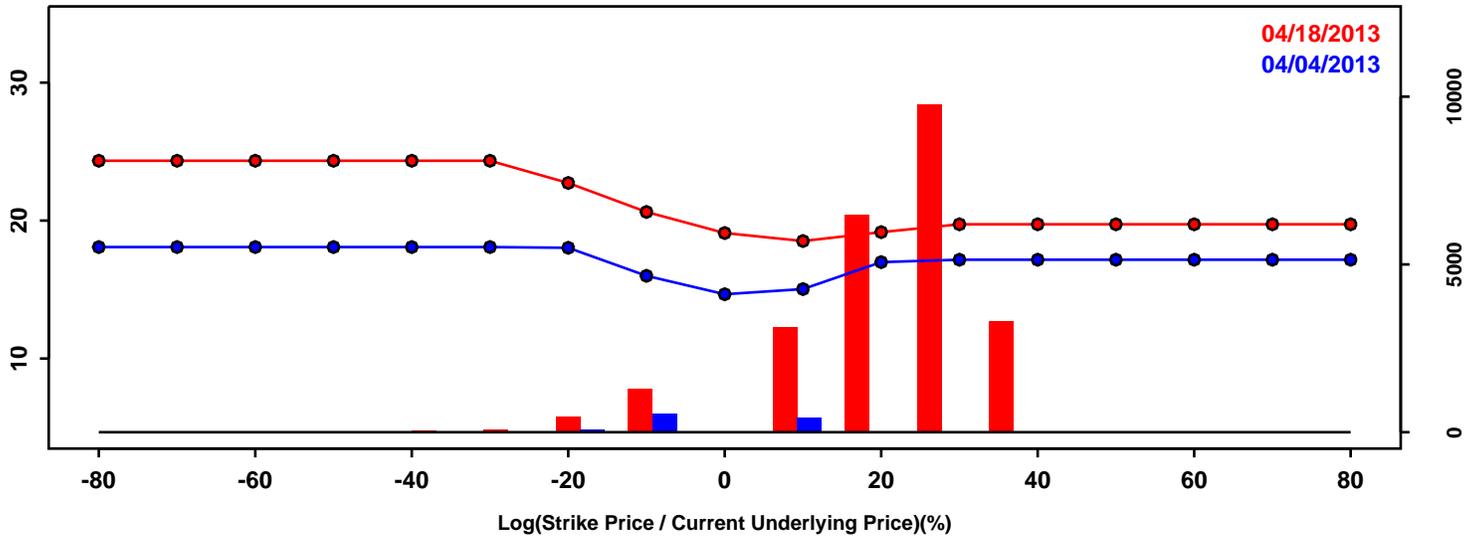


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-19.00%	-22.13%	-3.13%
50th Pct	1.16%	1.45%	0.29%
90th Pct	16.79%	18.52%	1.73%
Mean	-0.07%	-0.20%	-0.13%
Std Dev	14.35%	16.18%	1.83%
Skew	-0.48	-0.47	0.02
Kurtosis	0.61	0.51	-0.10

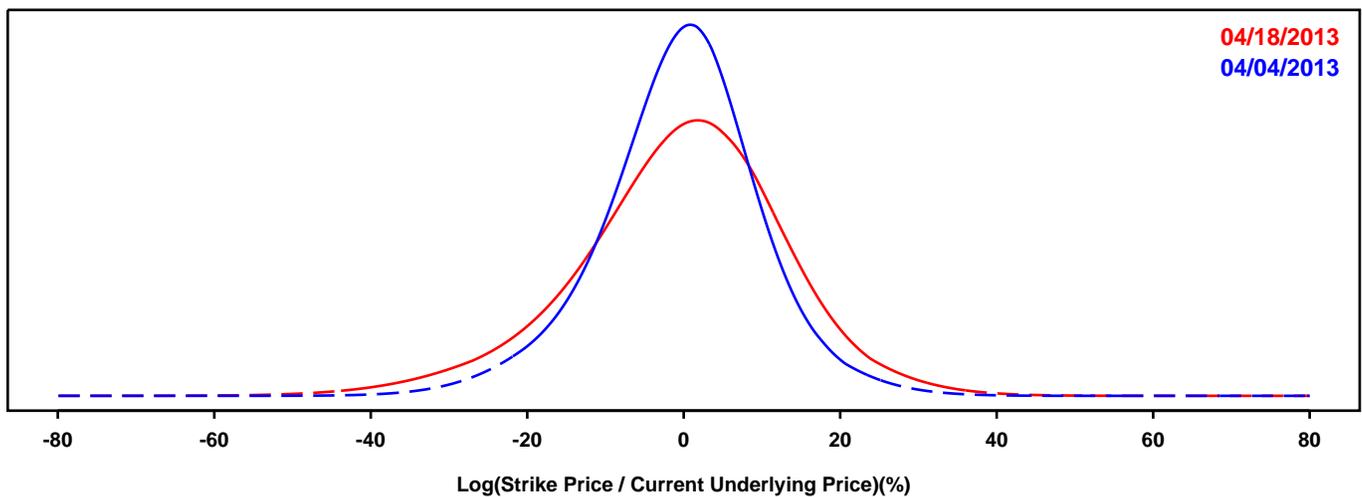
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLD FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

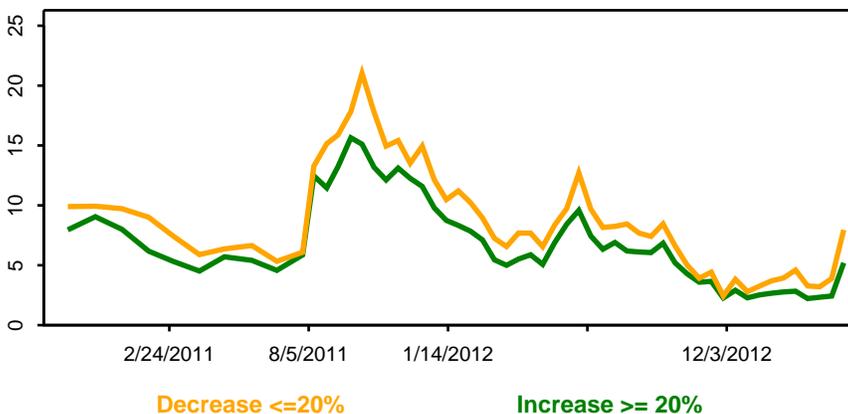
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

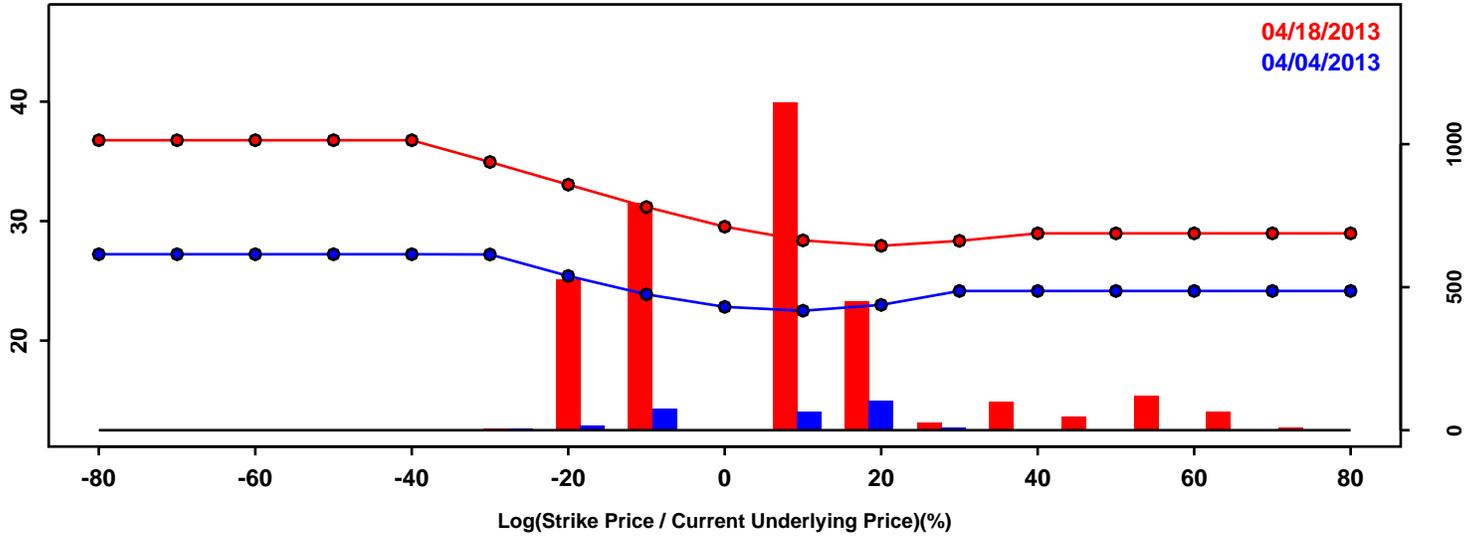


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-13.47%	-17.78%	-4.31%
50th Pct	0.00%	0.43%	0.43%
90th Pct	11.91%	15.58%	3.67%
Mean	-0.38%	-0.41%	-0.03%
Std Dev	10.37%	13.55%	3.18%
Skew	-0.20	-0.37	-0.17
Kurtosis	0.81	0.72	-0.10

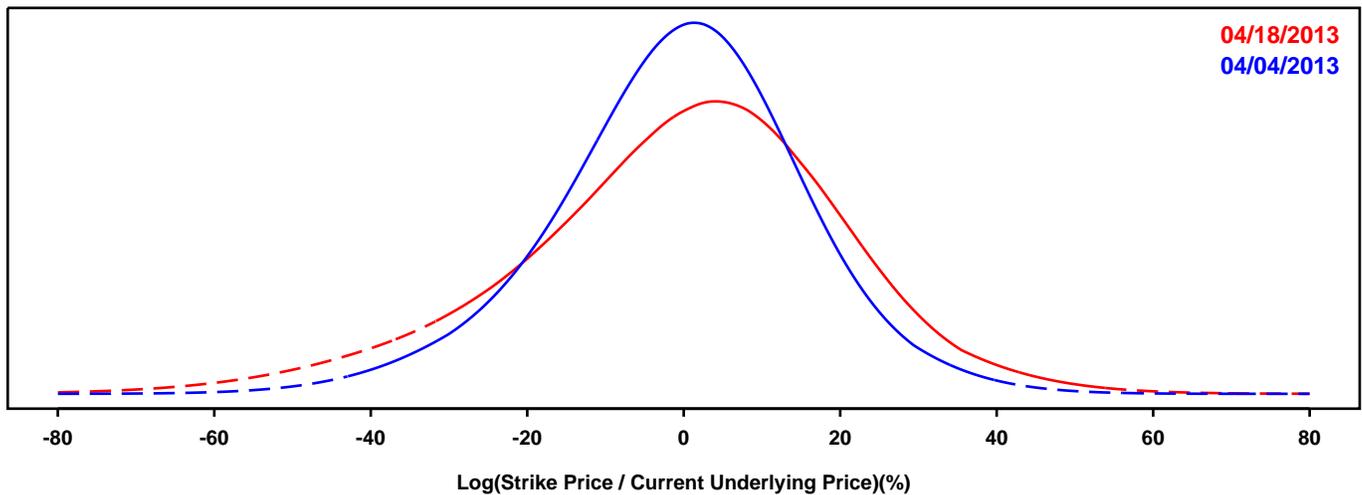
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SILVER FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

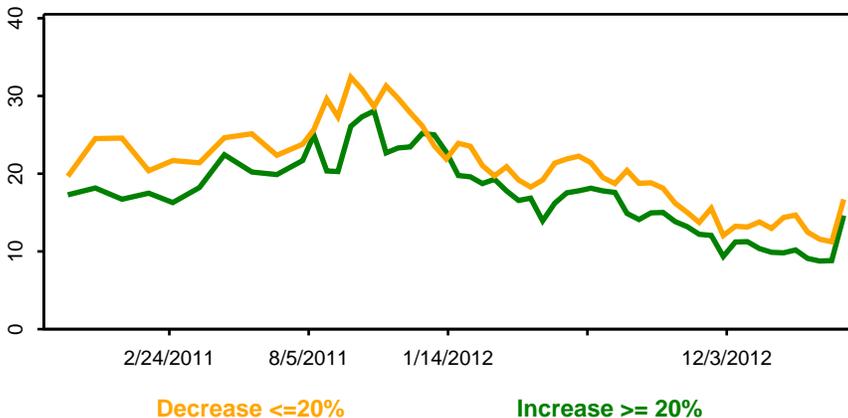
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

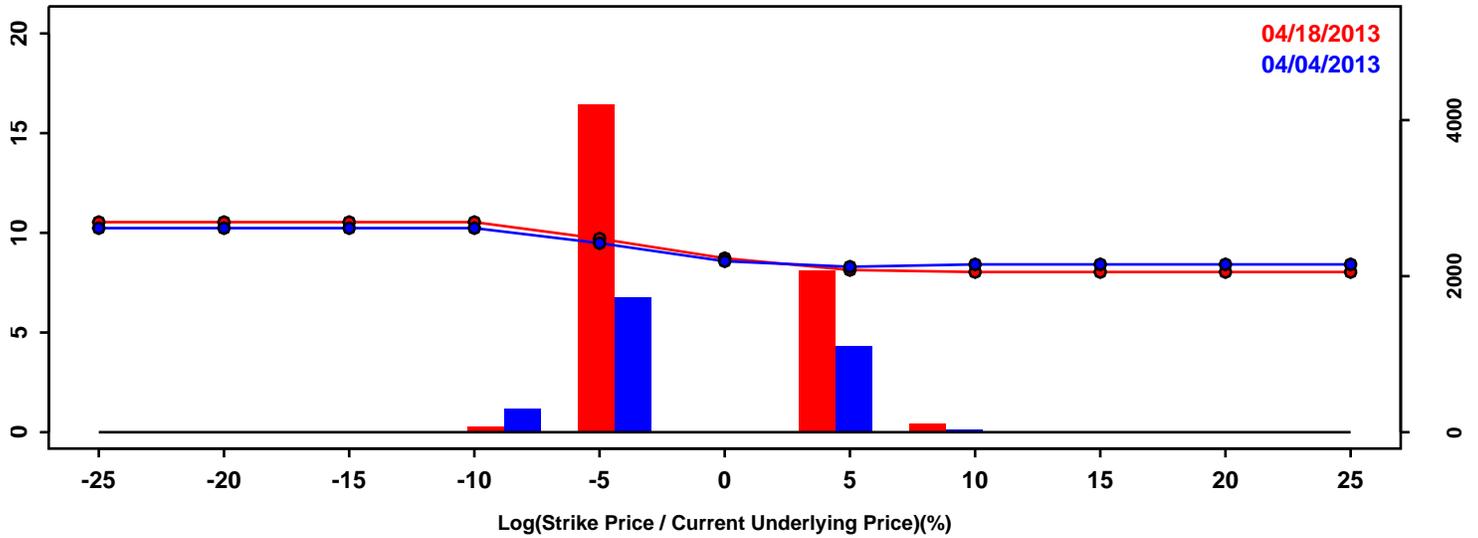


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-21.27%	-28.35%	-7.09%
50th Pct	0.05%	1.11%	1.05%
90th Pct	18.90%	24.02%	5.12%
Mean	-0.61%	-0.63%	-0.02%
Std Dev	16.16%	21.03%	4.87%
Skew	-0.23	-0.44	-0.21
Kurtosis	0.53	0.60	0.07

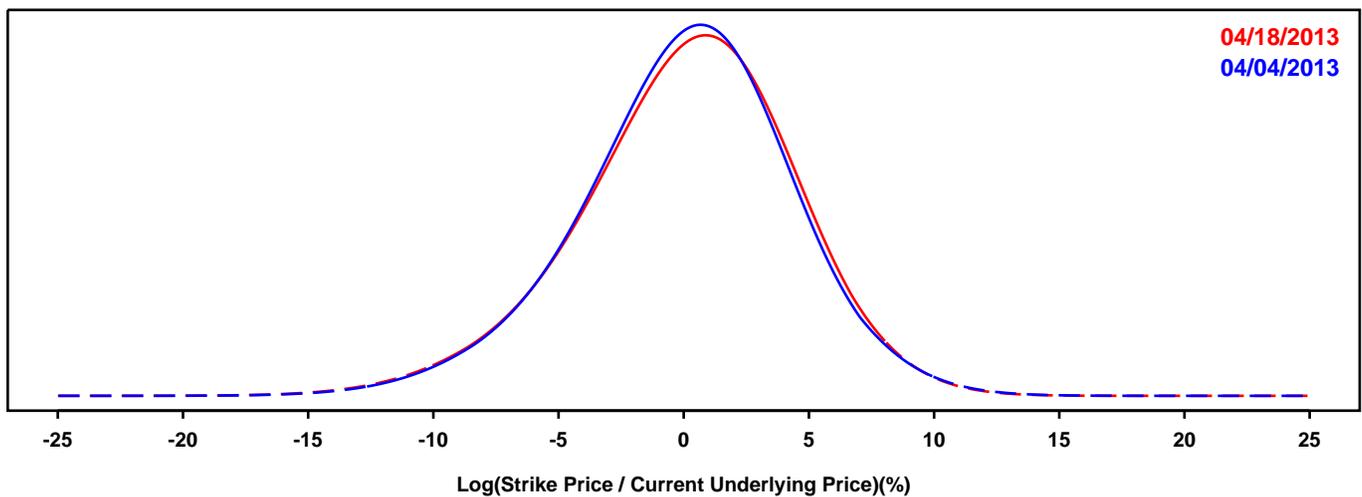
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-EURO EXCHANGE RATE FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

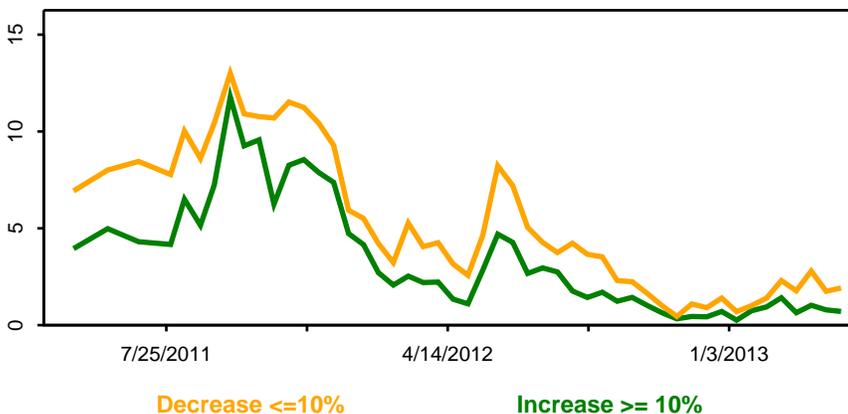
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

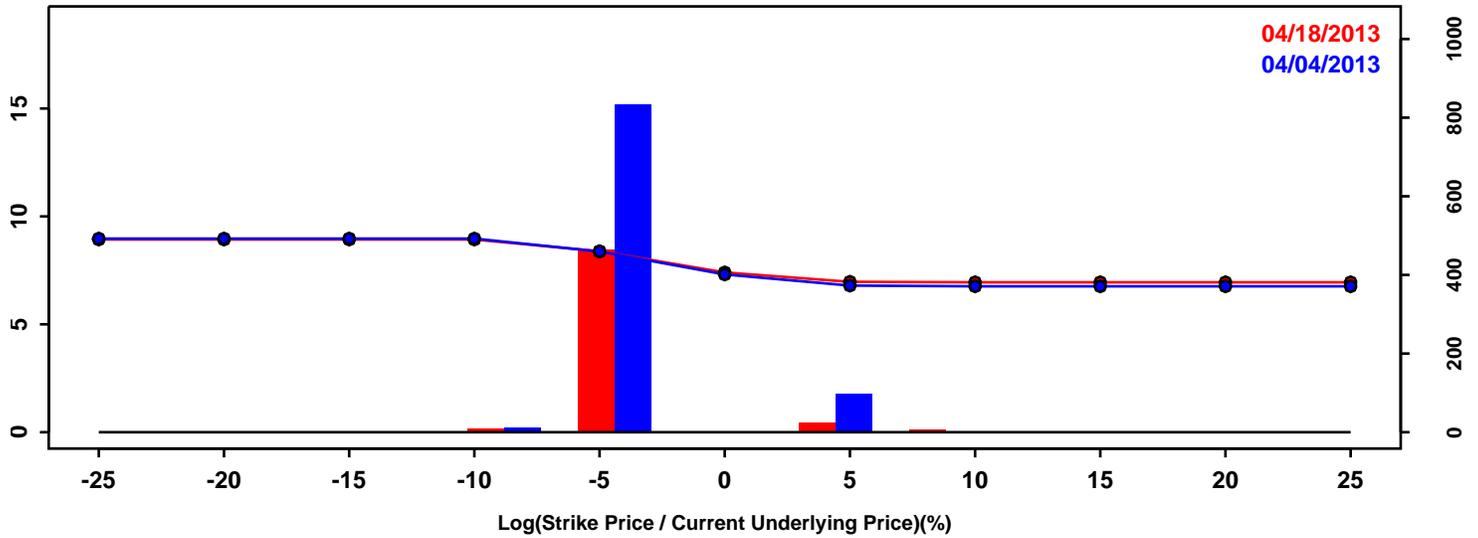


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-5.52%	-5.57%	-0.04%
50th Pct	0.27%	0.37%	0.10%
90th Pct	5.23%	5.41%	0.18%
Mean	0.07%	0.12%	0.06%
Std Dev	4.29%	4.36%	0.08%
Skew	-0.28	-0.35	-0.07
Kurtosis	0.42	0.38	-0.04

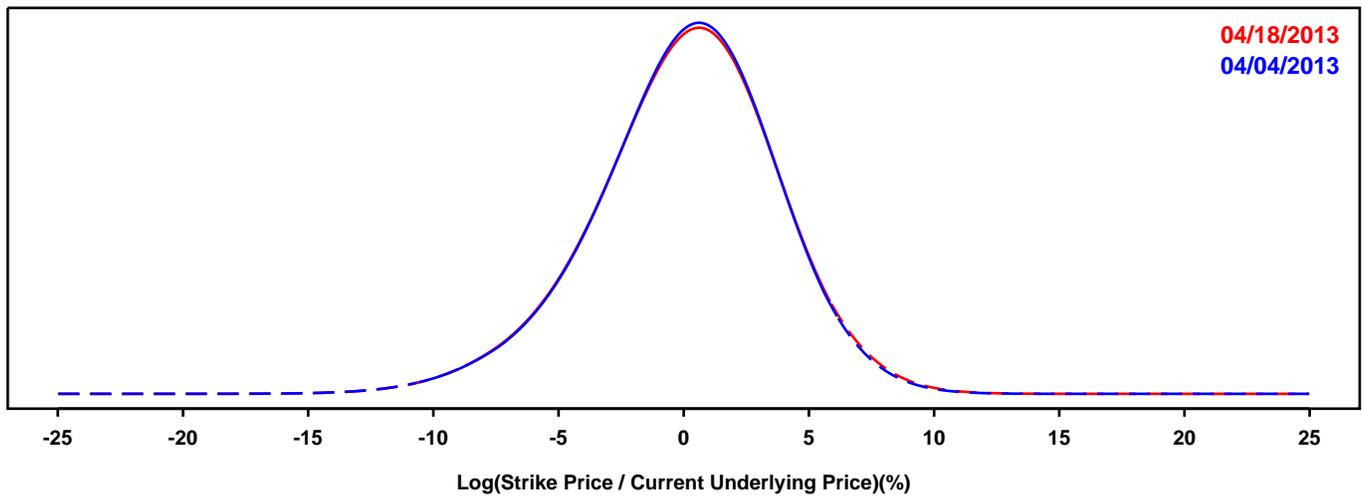
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-POUND EXCHANGE RATE FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

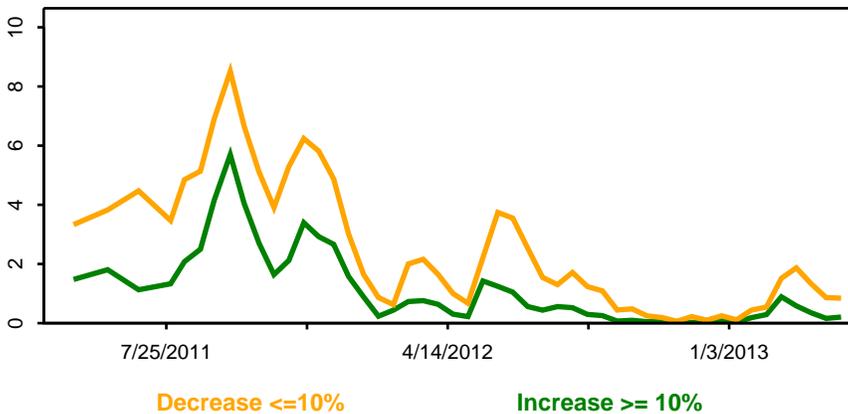
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

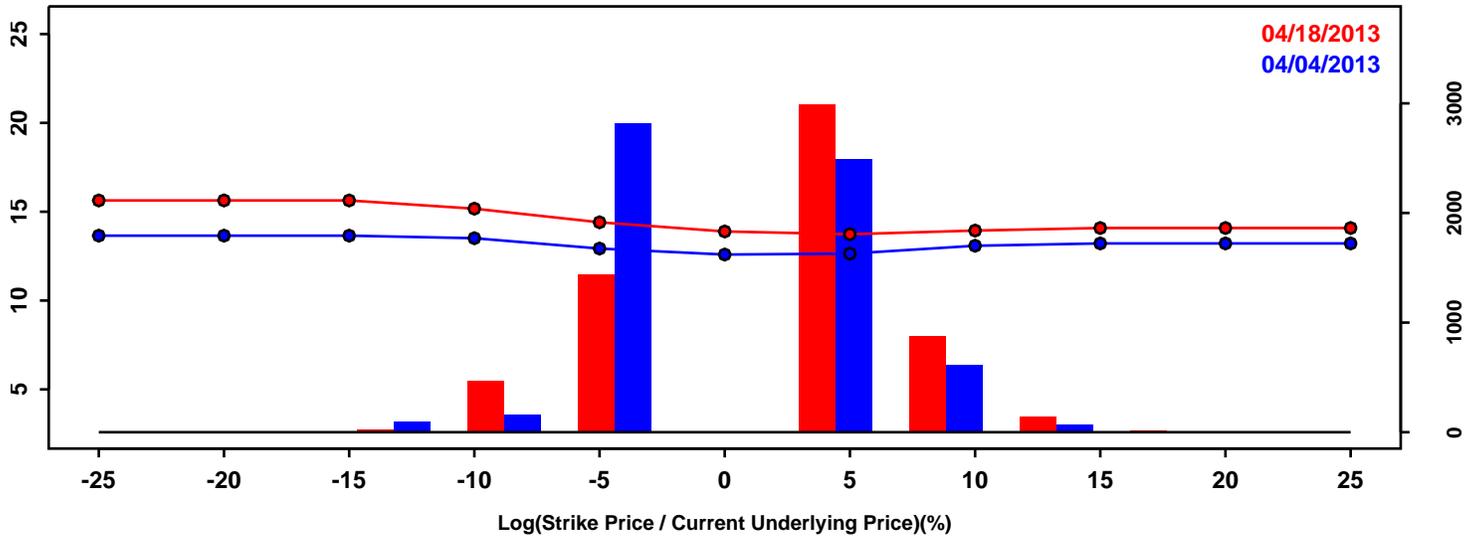


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-4.74%	-4.75%	-0.01%
50th Pct	0.27%	0.24%	-0.02%
90th Pct	4.46%	4.53%	0.07%
Mean	0.05%	0.08%	0.02%
Std Dev	3.66%	3.70%	0.04%
Skew	-0.36	-0.32	0.03
Kurtosis	0.43	0.40	-0.04

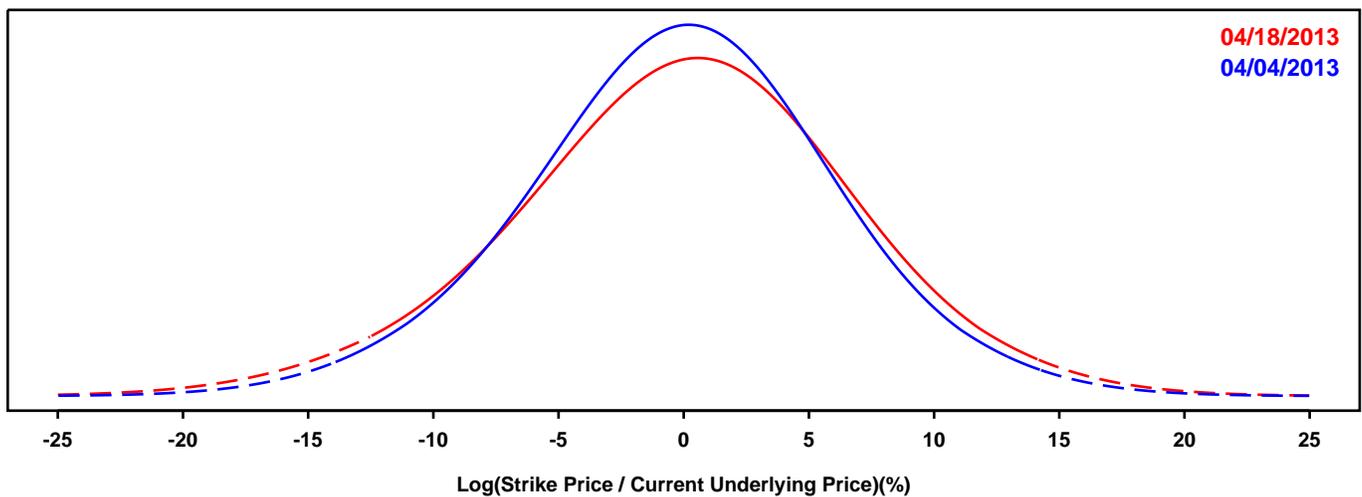
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- YEN-DOLLAR EXCHANGE RATE FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

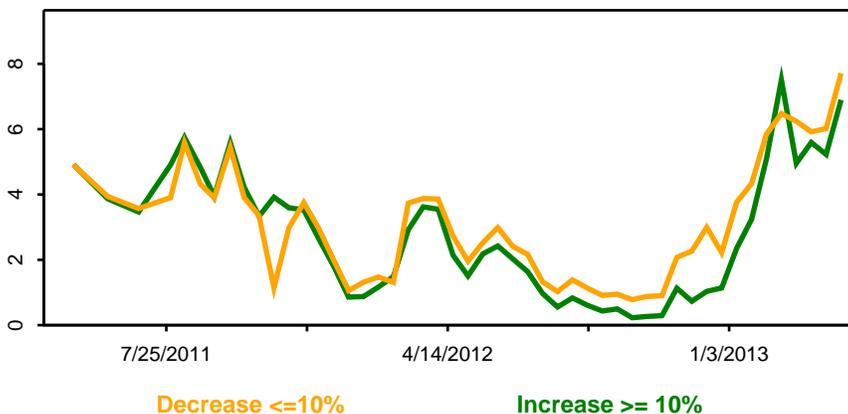
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

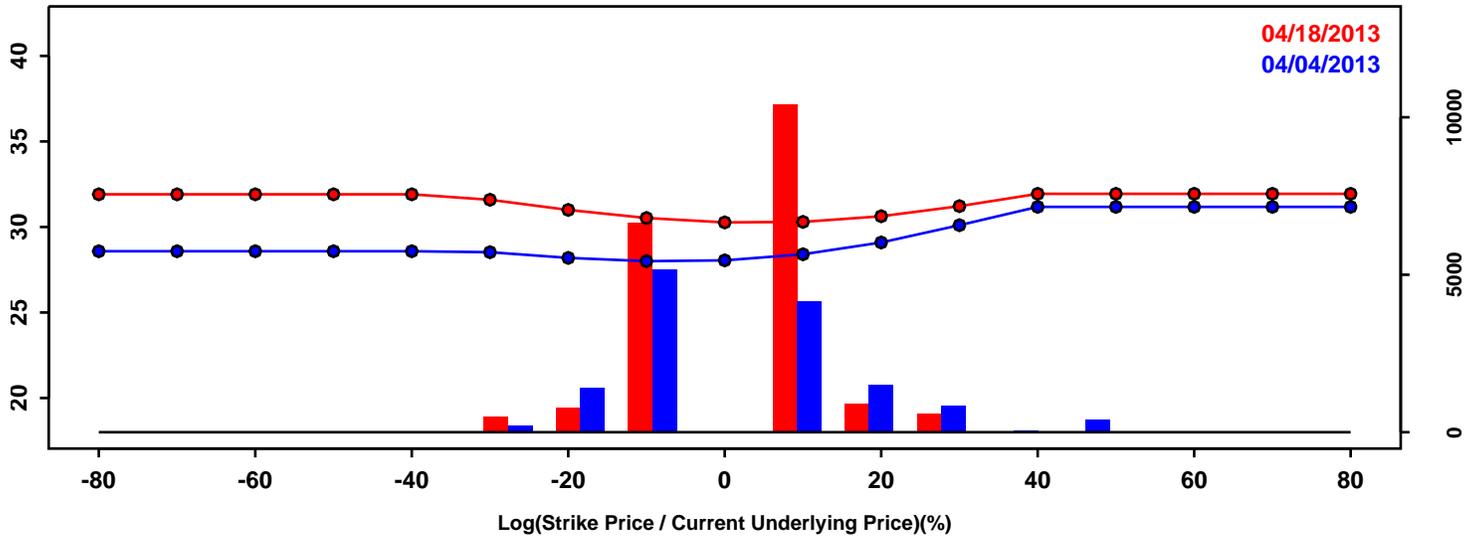


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-8.07%	-8.89%	-0.82%
50th Pct	0.00%	0.18%	0.18%
90th Pct	7.76%	8.58%	0.81%
Mean	-0.06%	0.04%	0.10%
Std Dev	6.28%	6.93%	0.65%
Skew	-0.06	-0.15	-0.08
Kurtosis	0.27	0.30	0.03

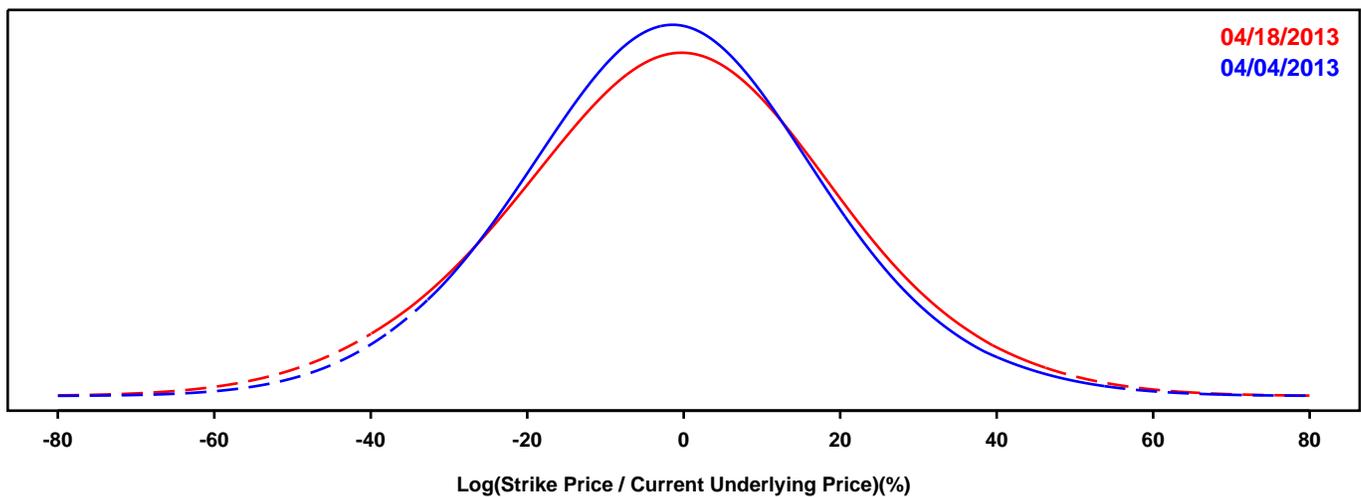
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CORN FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

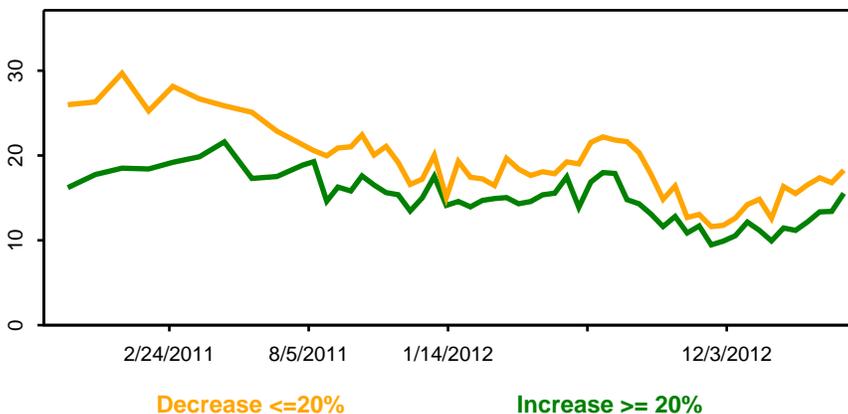
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

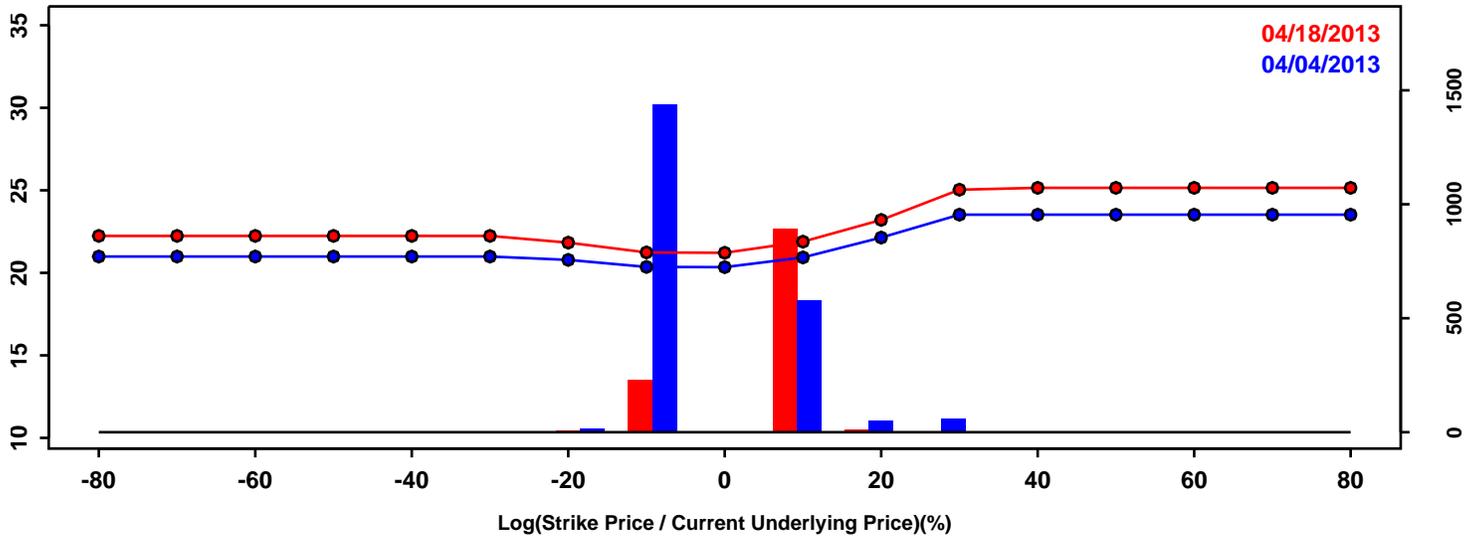


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-26.35%	-28.46%	-2.11%
50th Pct	-1.48%	-0.86%	0.62%
90th Pct	23.55%	25.75%	2.20%
Mean	-1.36%	-1.07%	0.28%
Std Dev	19.76%	21.39%	1.64%
Skew	0.06	-0.03	-0.09
Kurtosis	0.24	0.21	-0.03

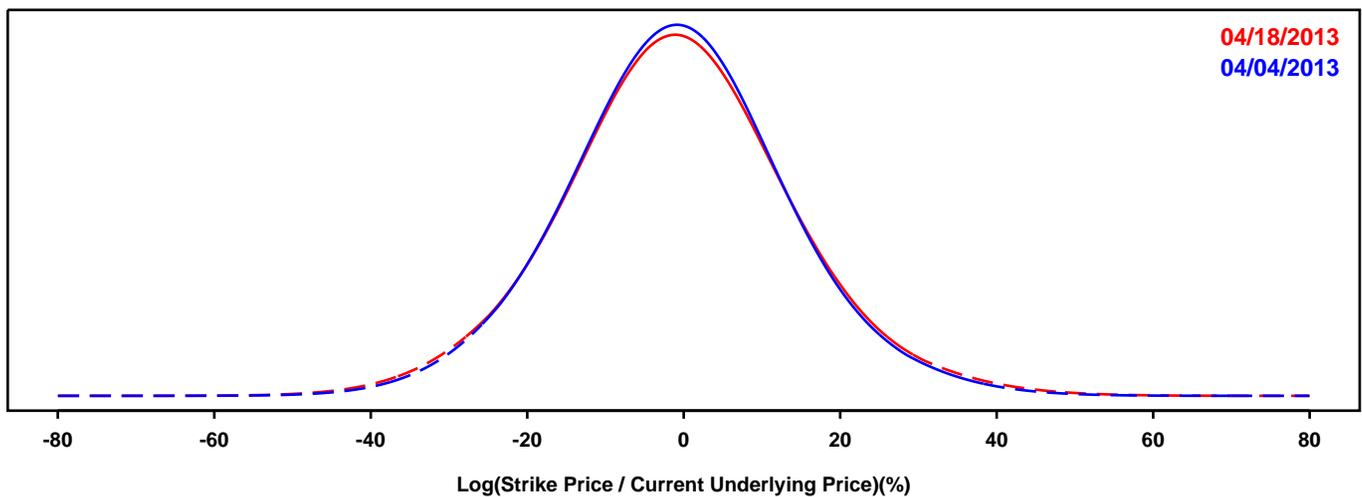
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SOYBEAN FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

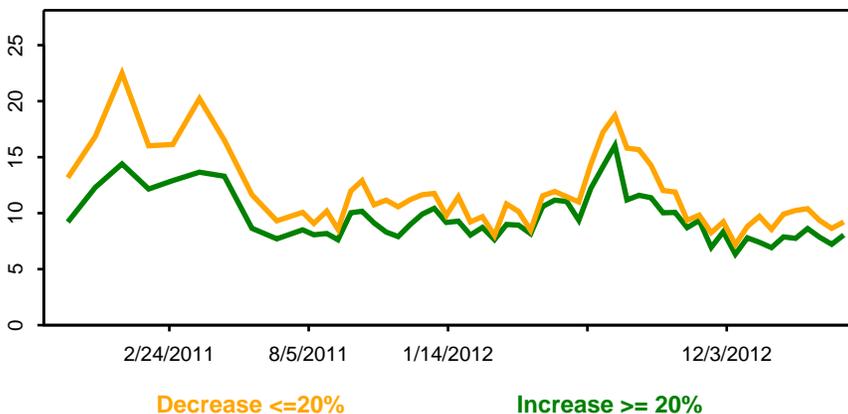
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

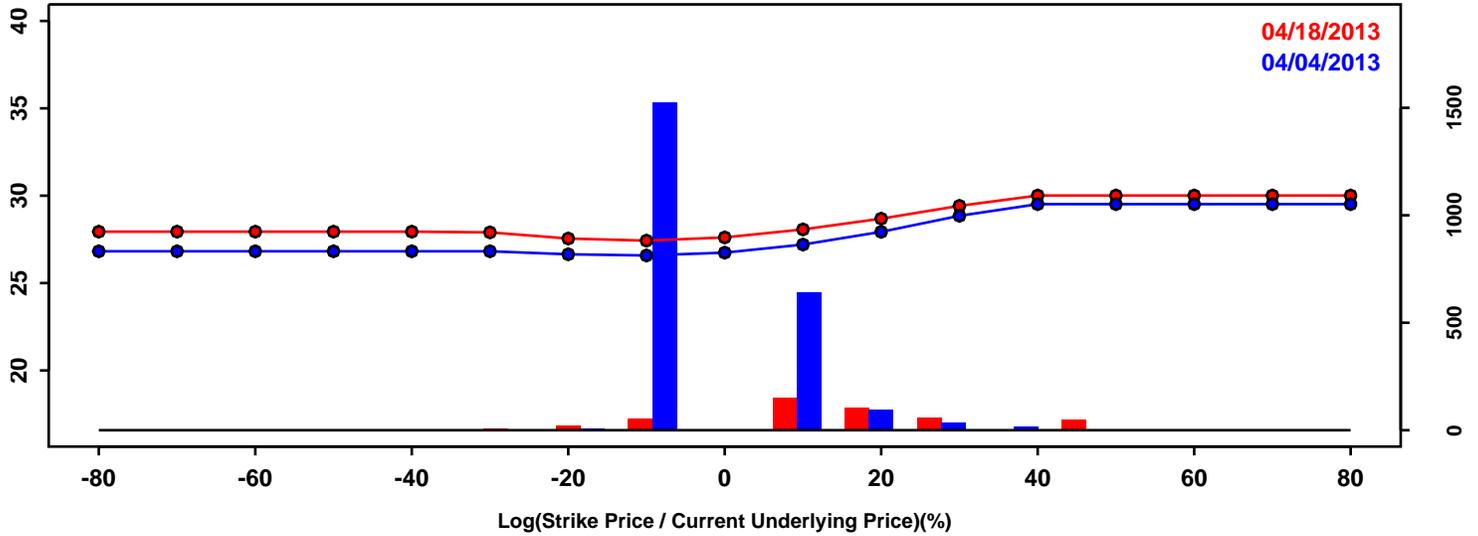


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-18.78%	-19.29%	-0.52%
50th Pct	-0.92%	-0.86%	0.06%
90th Pct	17.17%	18.01%	0.84%
Mean	-0.77%	-0.65%	0.12%
Std Dev	14.32%	14.93%	0.61%
Skew	0.09	0.10	0.01
Kurtosis	0.37	0.46	0.09

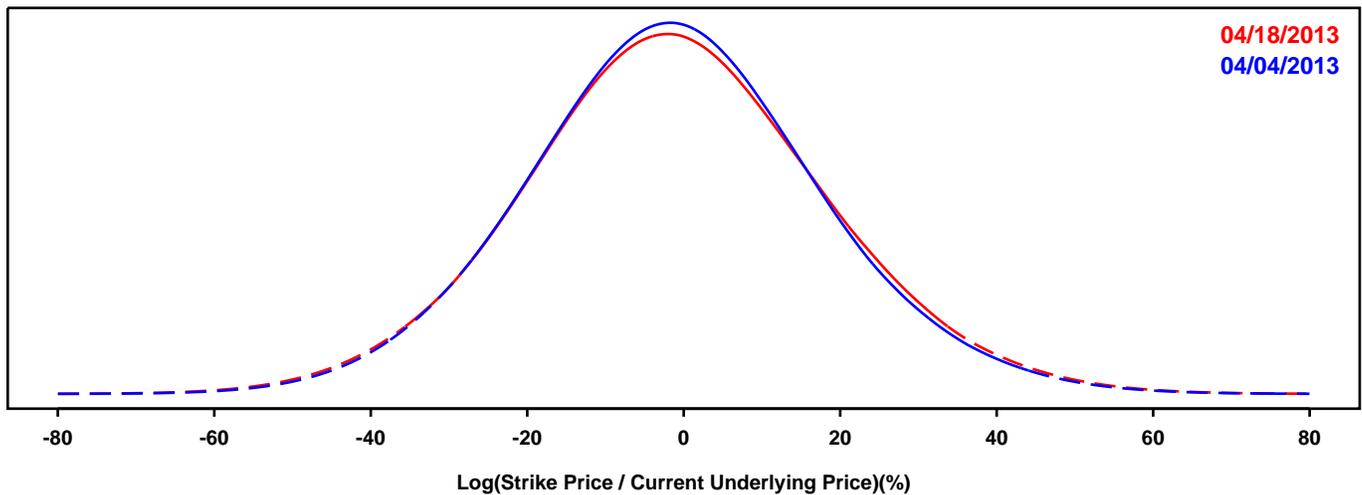
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WHEAT FUTURES

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 6 months.

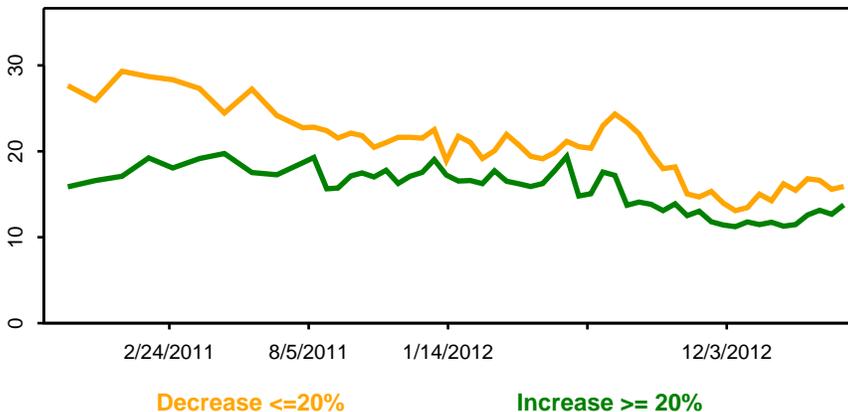
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

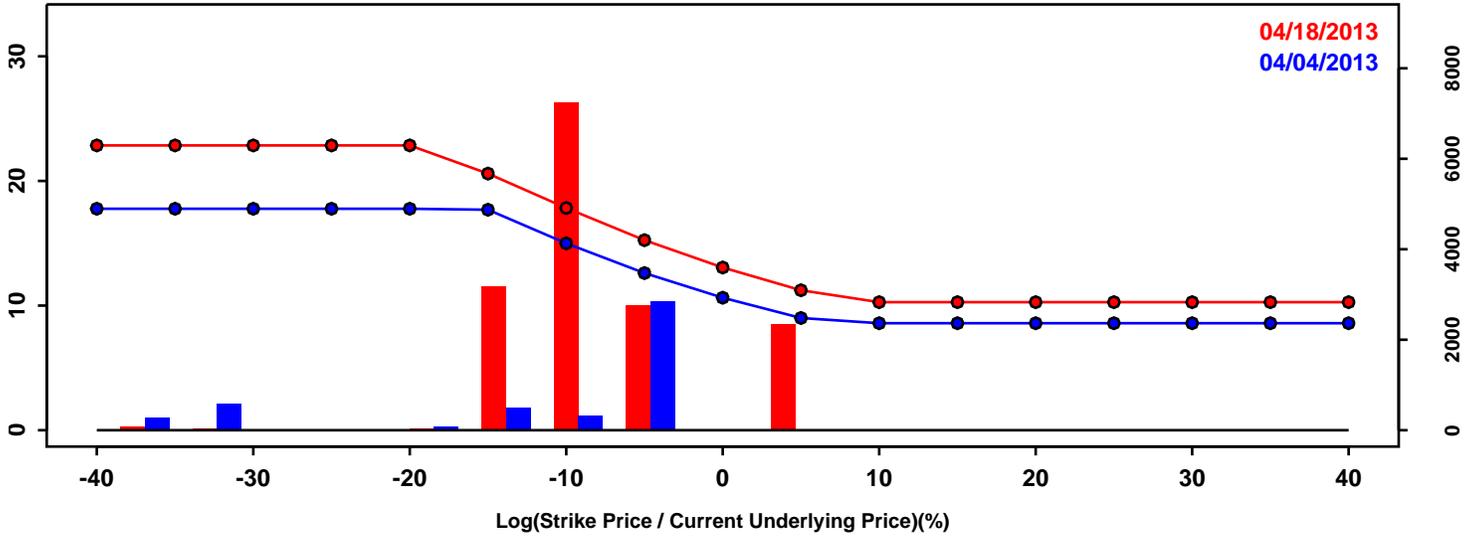


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-25.07%	-25.44%	-0.37%
50th Pct	-1.48%	-1.35%	0.14%
90th Pct	22.81%	23.96%	1.16%
Mean	-1.23%	-1.00%	0.22%
Std Dev	18.89%	19.48%	0.59%
Skew	0.09	0.09	-0.01
Kurtosis	0.22	0.20	-0.01

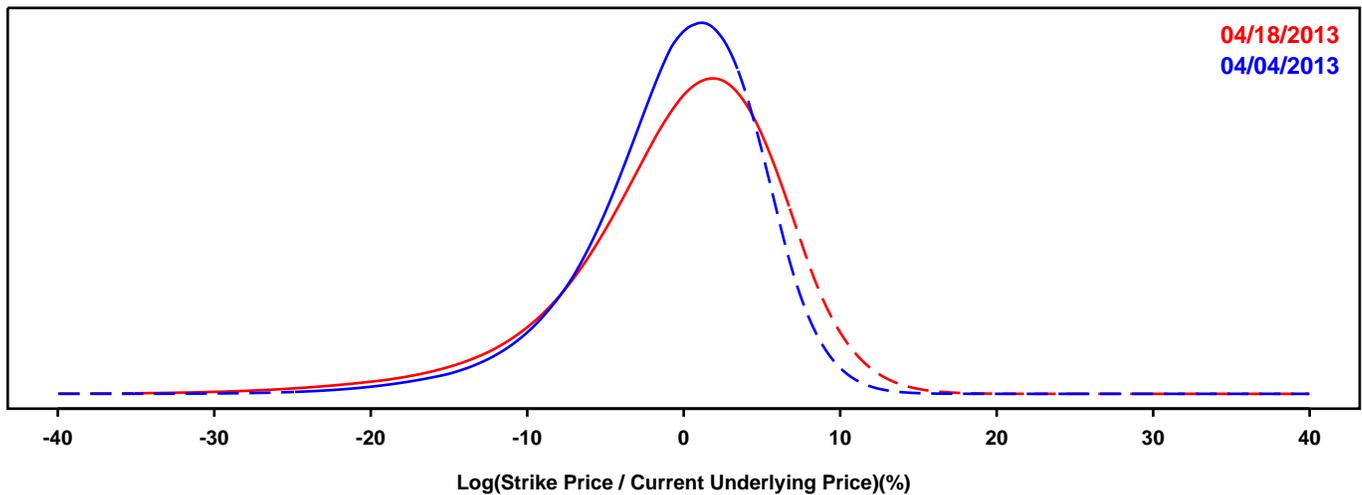
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- iSHARES DOW JONES US REAL ESTATE

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

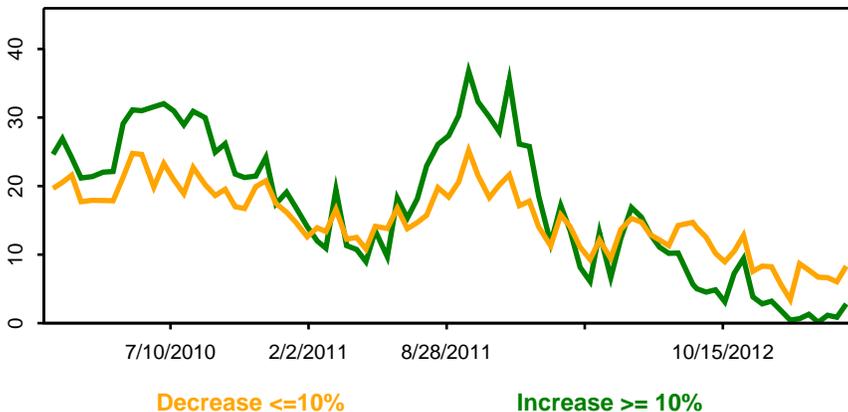
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



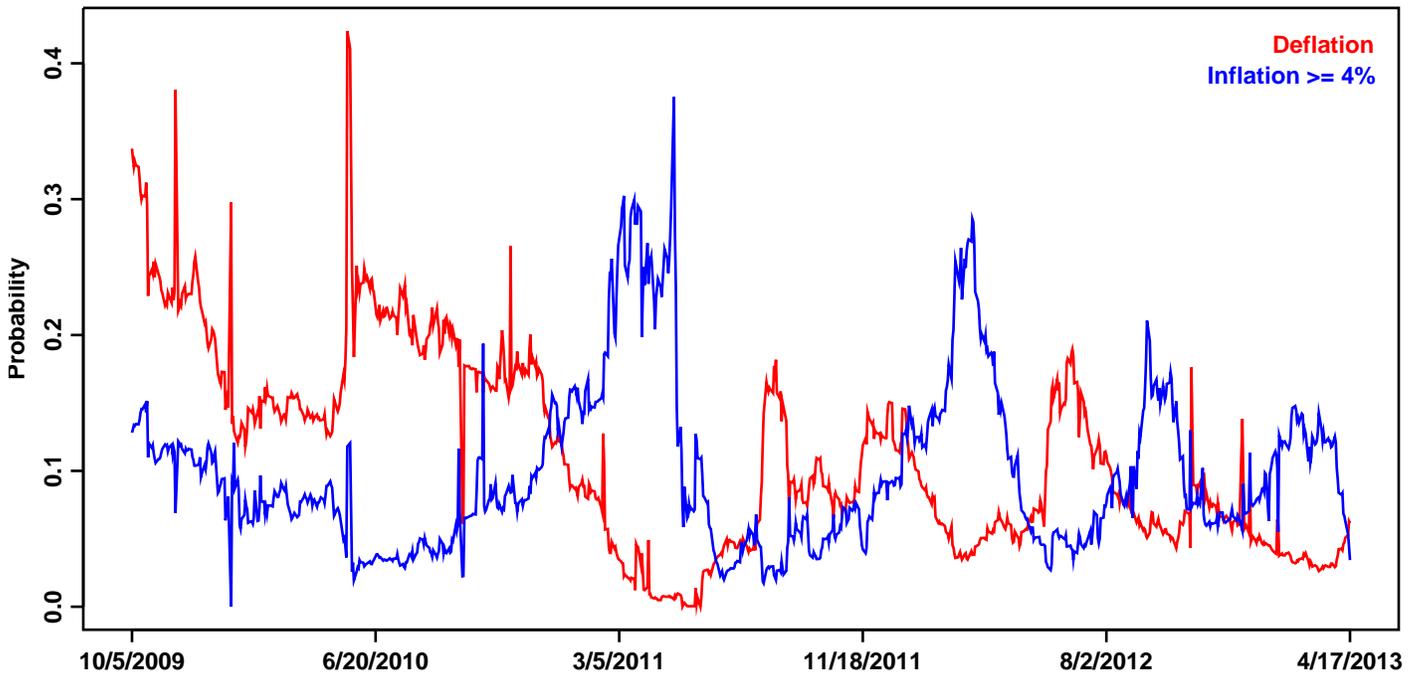
Probability of a Large Change



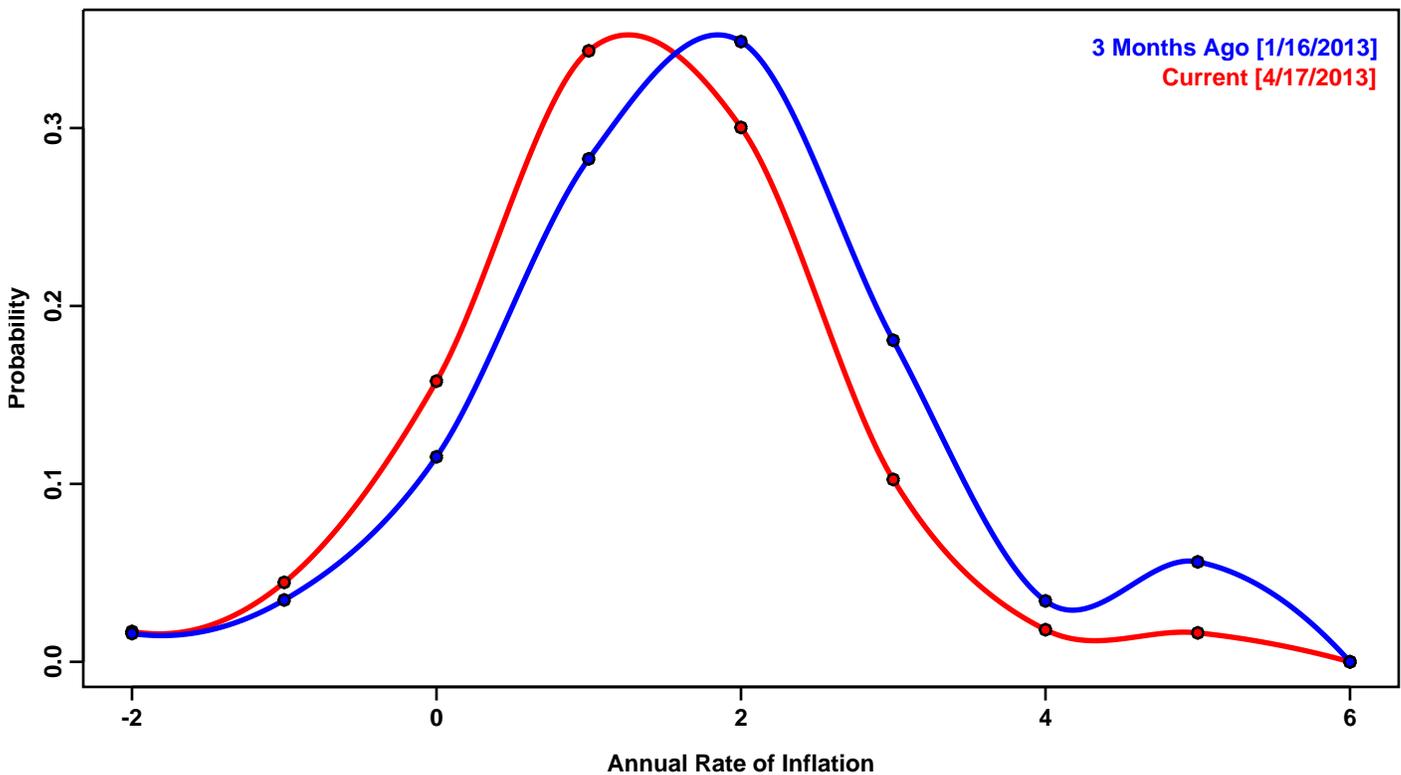
Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-7.77%	-8.98%	-1.21%
50th Pct	0.05%	0.53%	0.48%
90th Pct	5.62%	7.06%	1.44%
Mean	-0.61%	-0.38%	0.23%
Std Dev	5.56%	6.78%	1.22%
Skew	-0.89	-1.02	-0.12
Kurtosis	1.63	2.08	0.46

# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- Inflation Caps & Floors

## Probability of Deflation and High Inflation over the next 12 Months

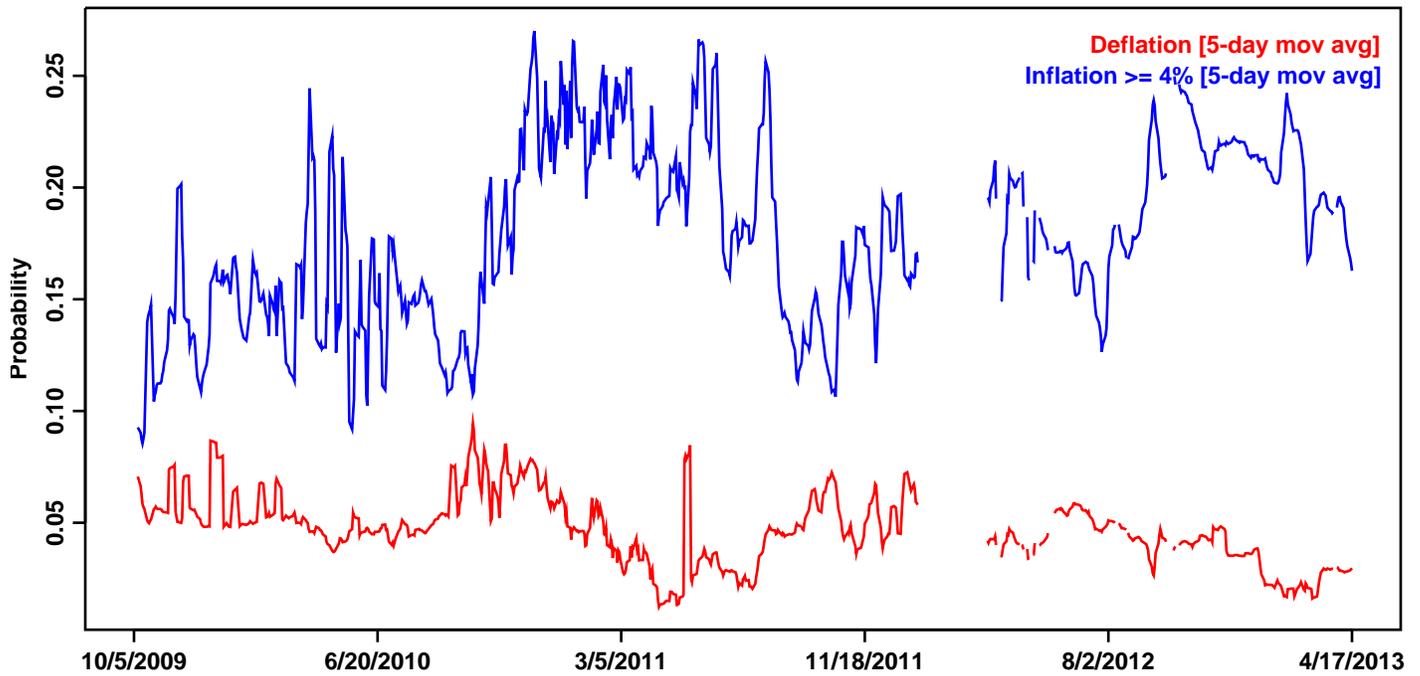


## Risk Neutral Density Function for Inflation over the next 12 Months

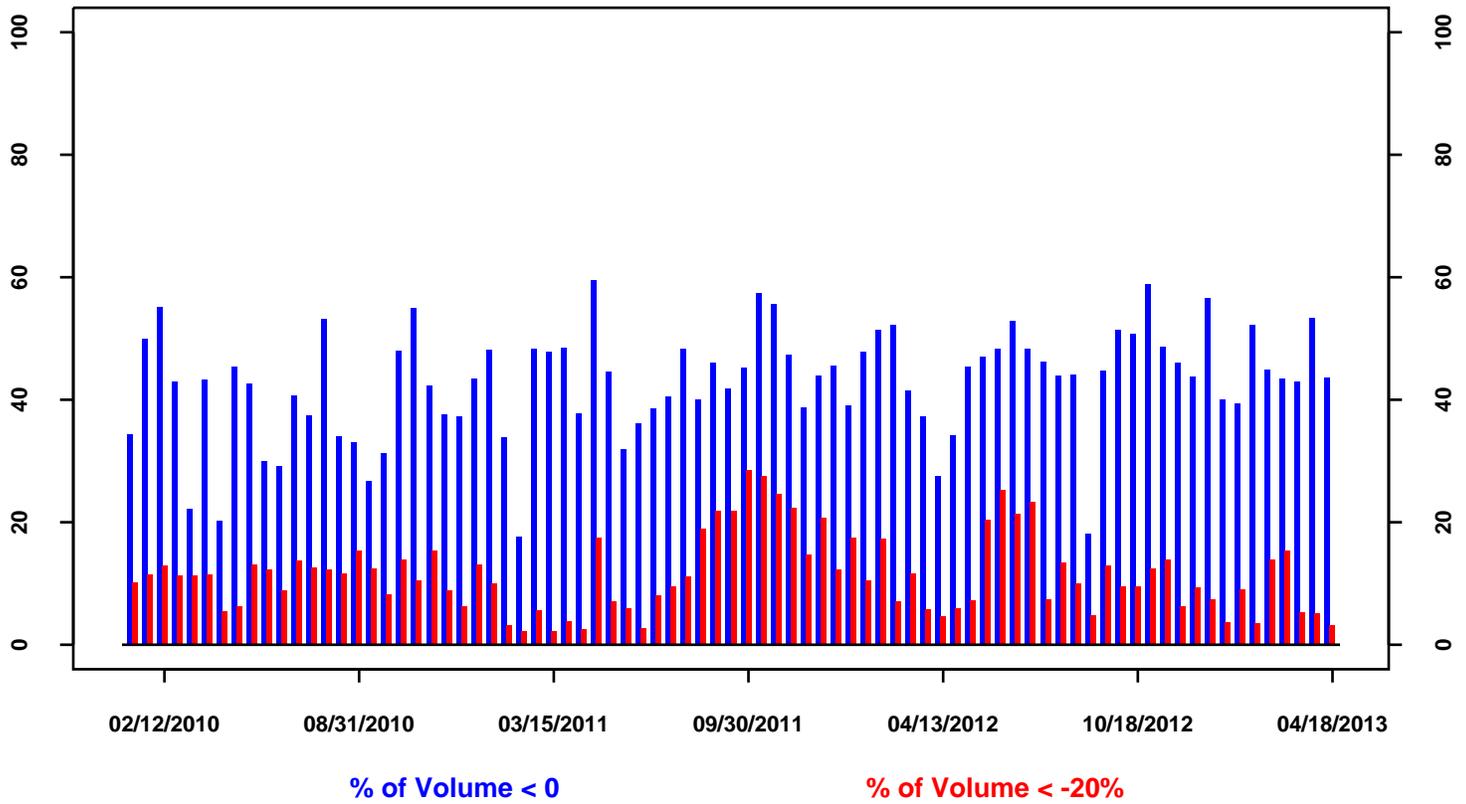


# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- Inflation Caps & Floors

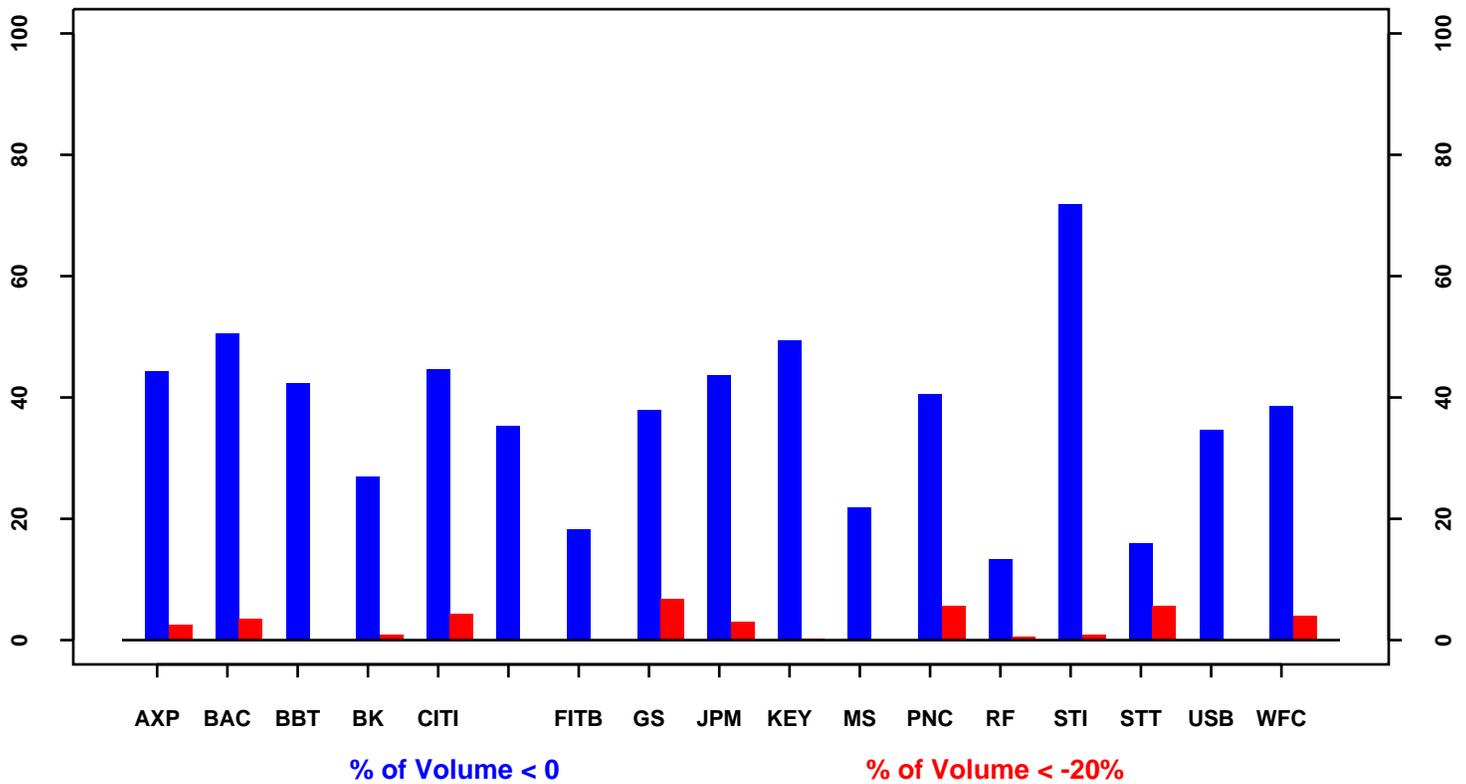
## Probability of Deflation and High Inflation over the next 5 Years



### Aggregate Volumes for Options on CCAR Banks

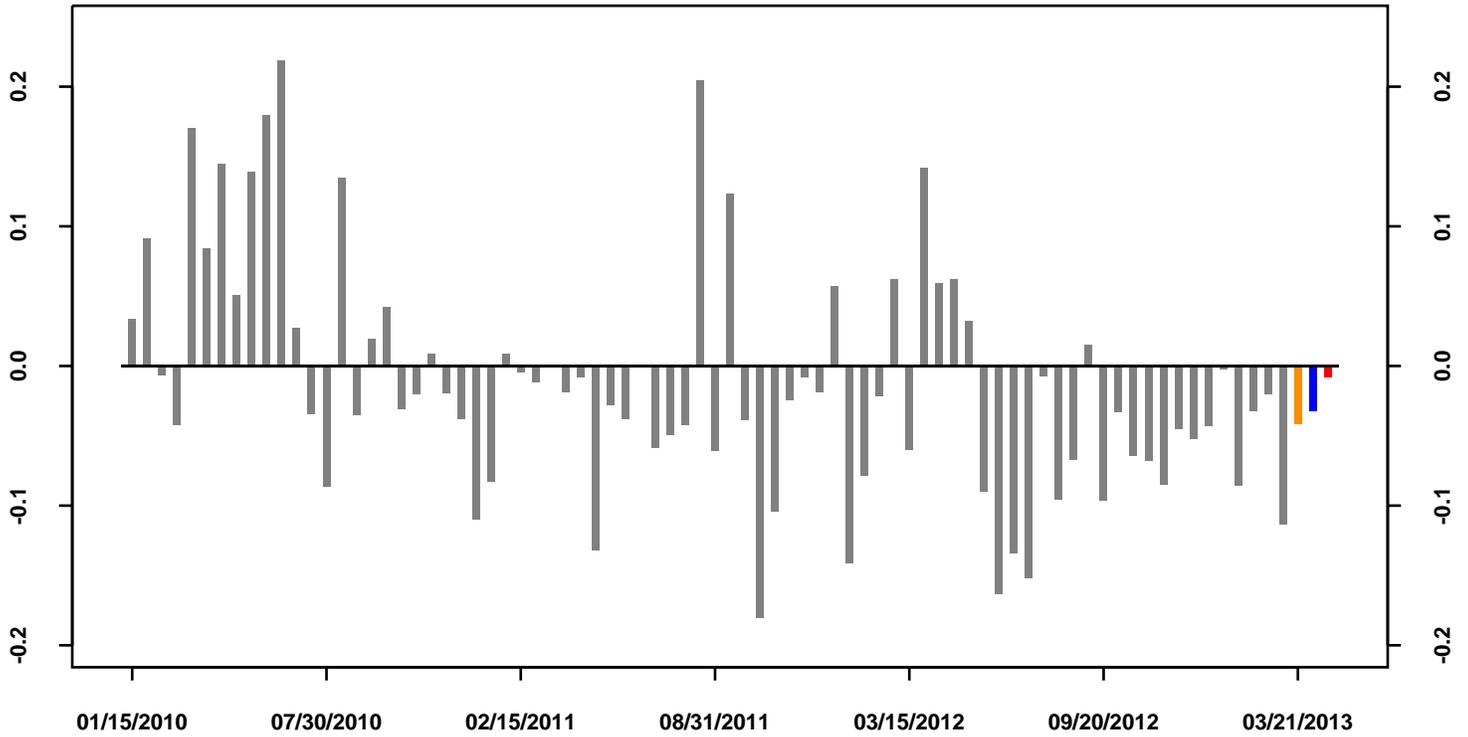


### Volumes for Options on CCAR Banks

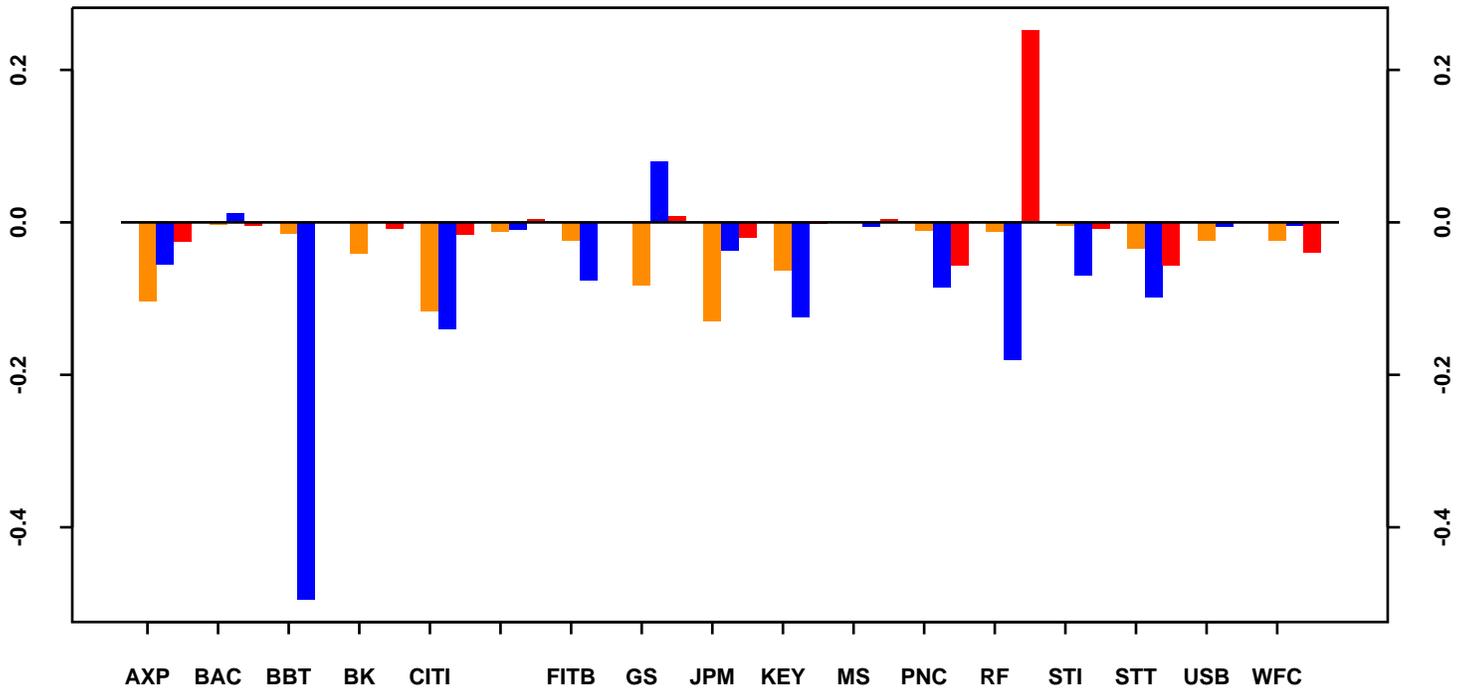


### Aggregate Volume Skew--CCAR Banks

(% of volume traded in deep out-of-the-money calls LESS % of volume traded in deep out-of-the-money puts)



### CCAR Bank Volume Skew -- Last Three Periods



03/21/2013

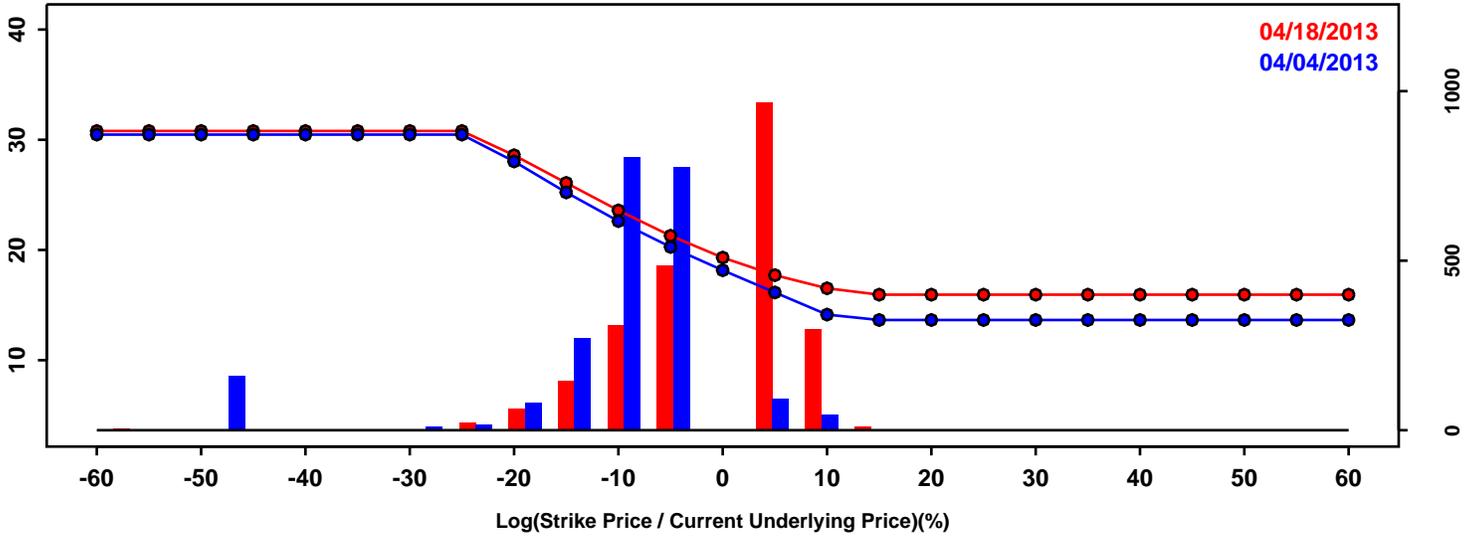
04/04/2013

04/18/2013

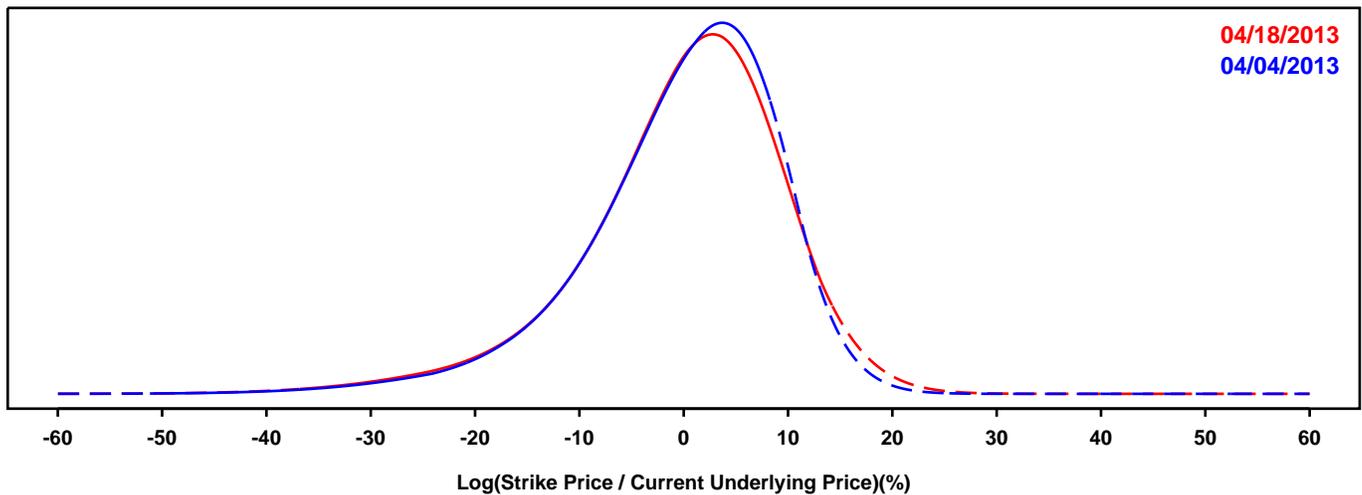
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AMERICAN EXPRESS

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

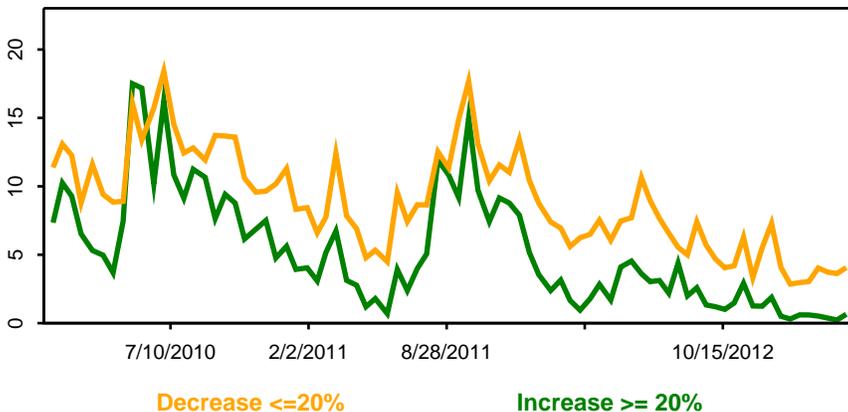
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

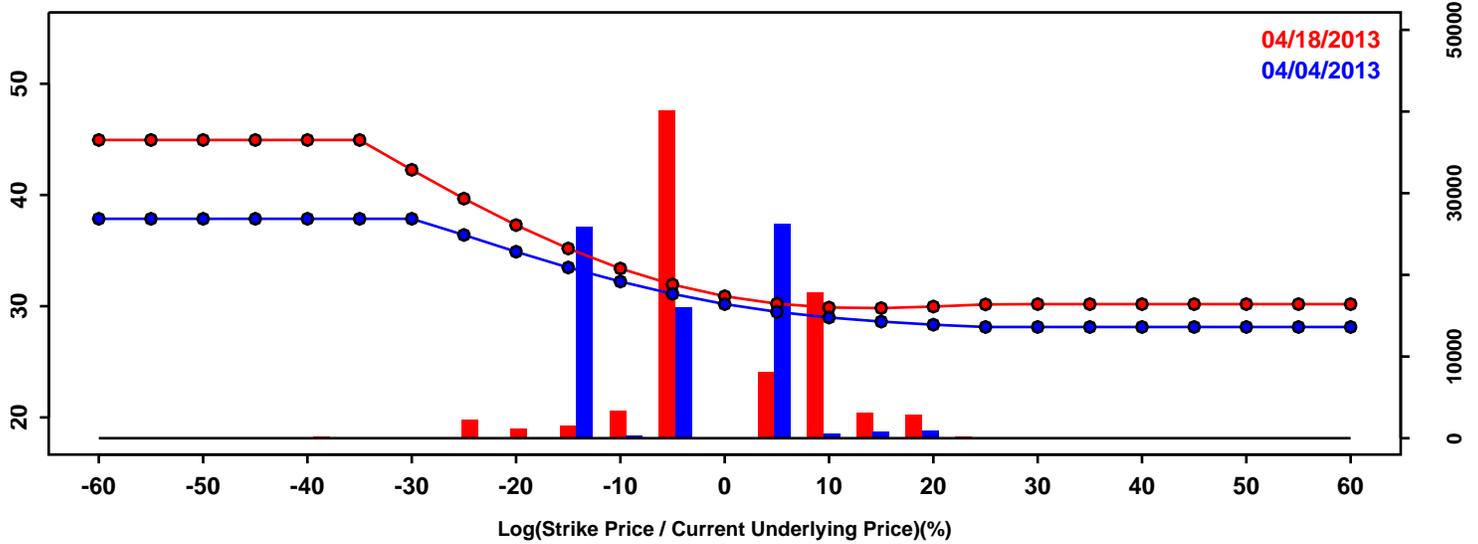


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-12.19%	-12.63%	-0.44%
50th Pct	1.23%	1.06%	-0.17%
90th Pct	10.25%	10.88%	0.63%
Mean	-0.10%	-0.11%	-0.01%
Std Dev	9.39%	9.84%	0.45%
Skew	-0.99	-0.88	0.11
Kurtosis	1.82	1.69	-0.13

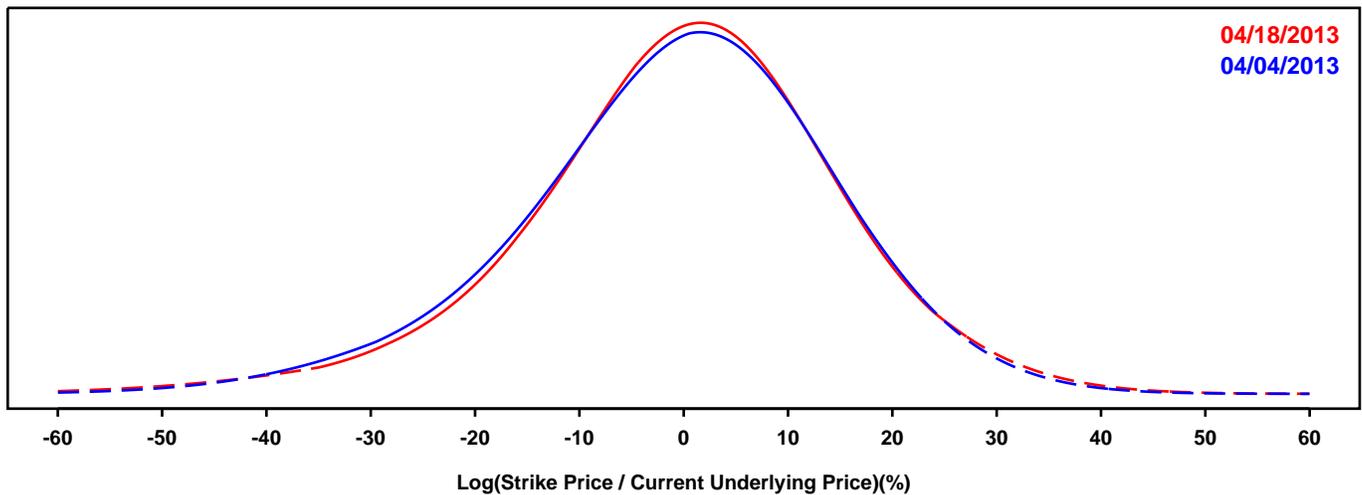
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF AMERICA

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

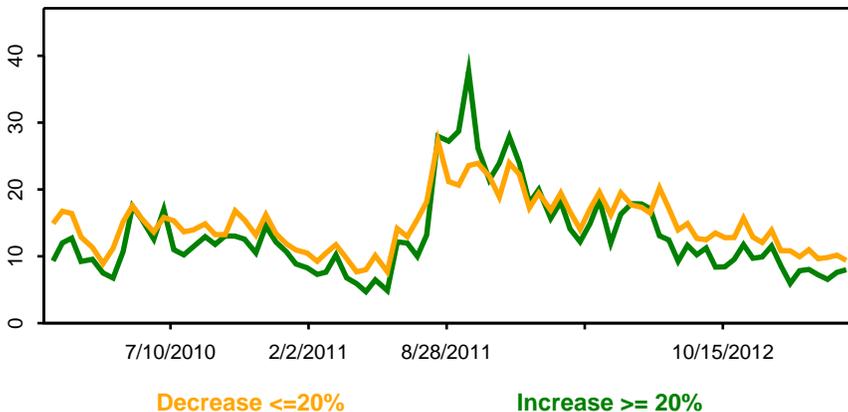
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

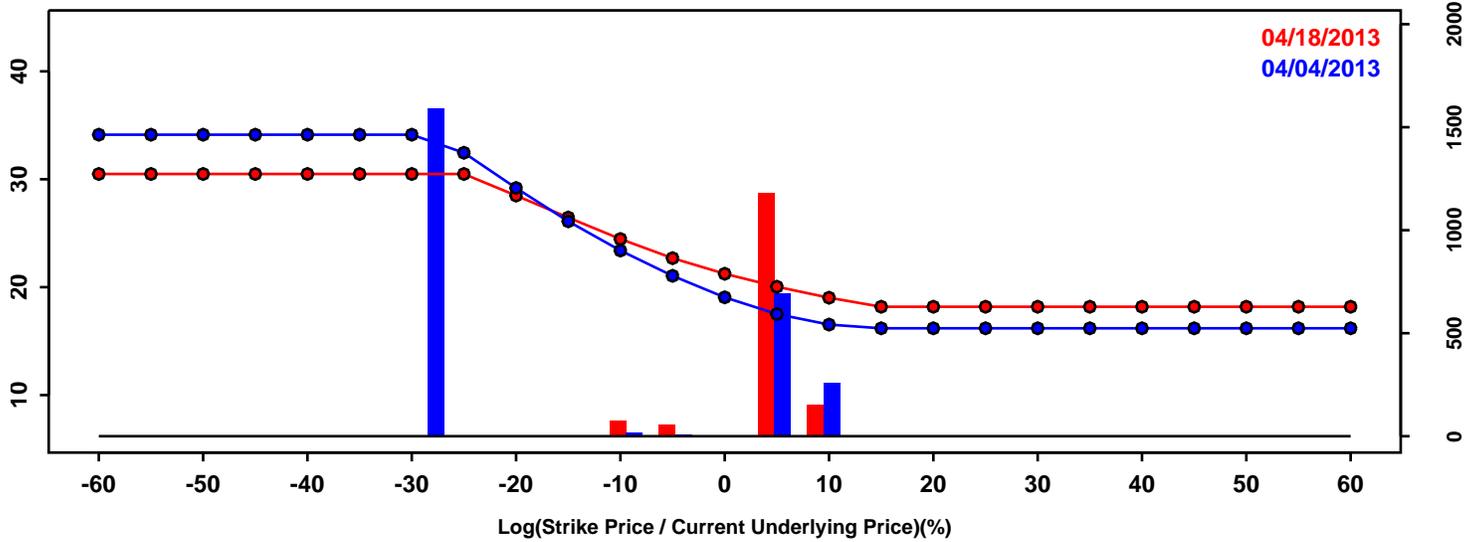


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-20.19%	-19.32%	0.87%
50th Pct	0.39%	0.64%	0.25%
90th Pct	17.89%	18.21%	0.32%
Mean	-0.50%	-0.15%	0.35%
Std Dev	15.23%	15.45%	0.22%
Skew	-0.38	-0.46	-0.08
Kurtosis	0.52	1.10	0.58

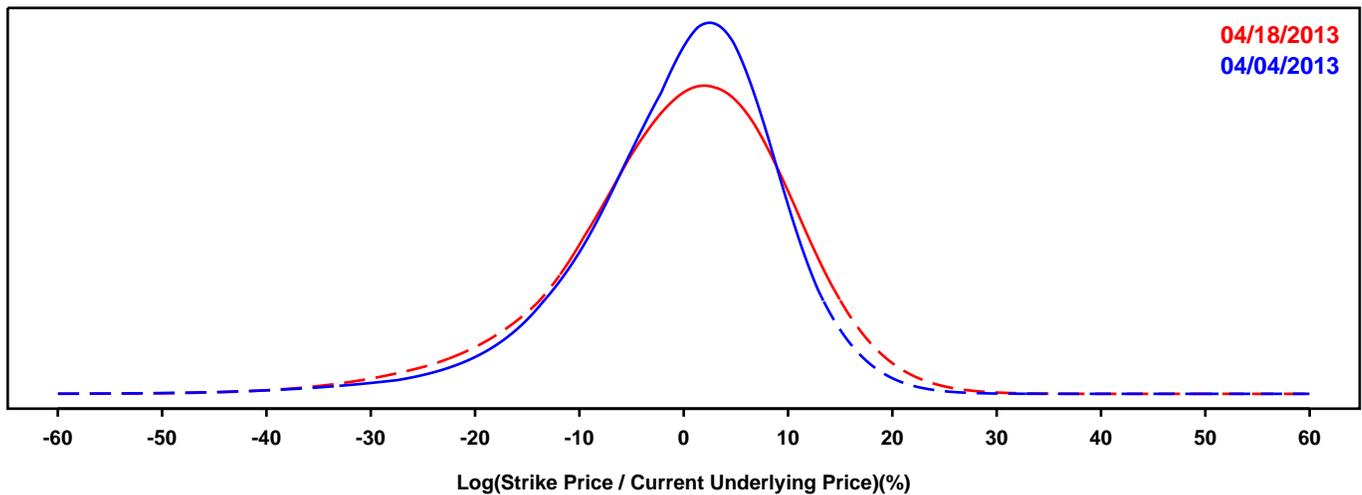
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BB&T

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

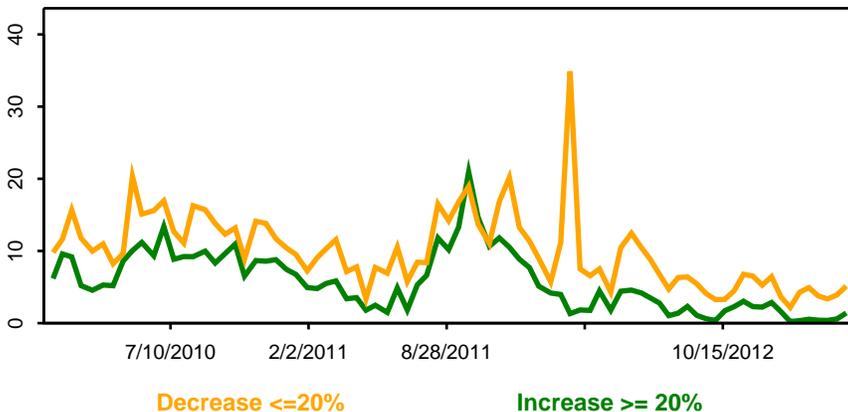
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

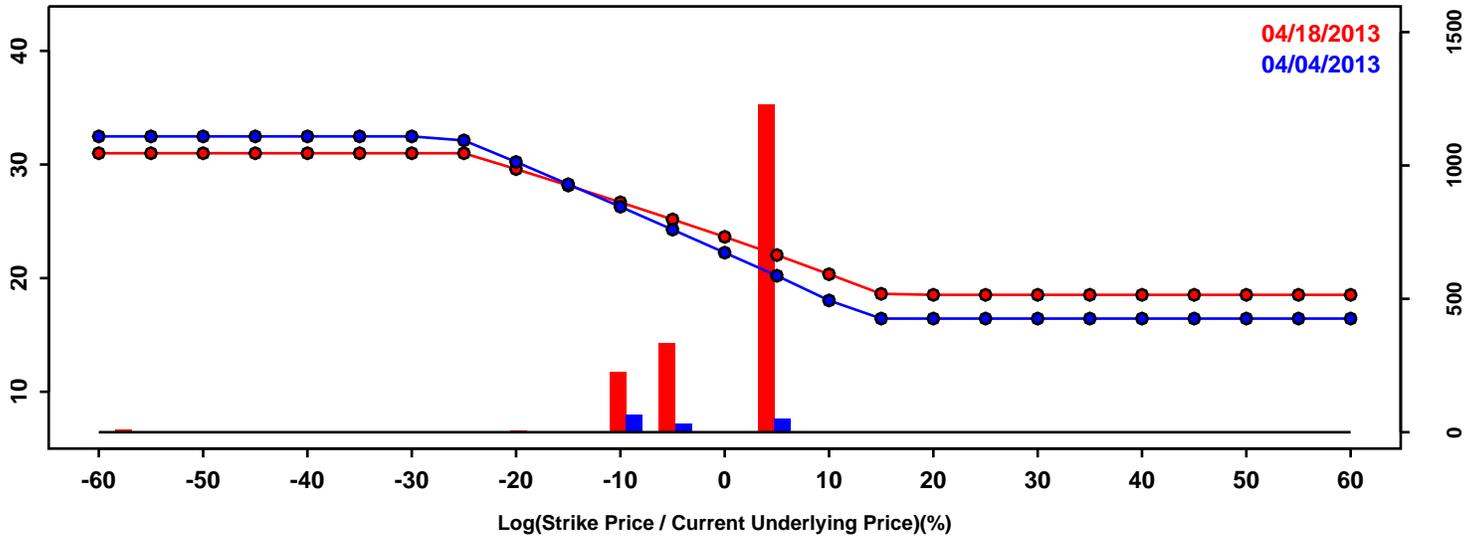


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-12.79%	-14.36%	-1.57%
50th Pct	0.67%	0.53%	-0.14%
90th Pct	10.30%	12.10%	1.79%
Mean	-0.53%	-0.48%	0.05%
Std Dev	9.77%	10.81%	1.04%
Skew	-0.93	-0.66	0.27
Kurtosis	2.11	1.03	-1.08

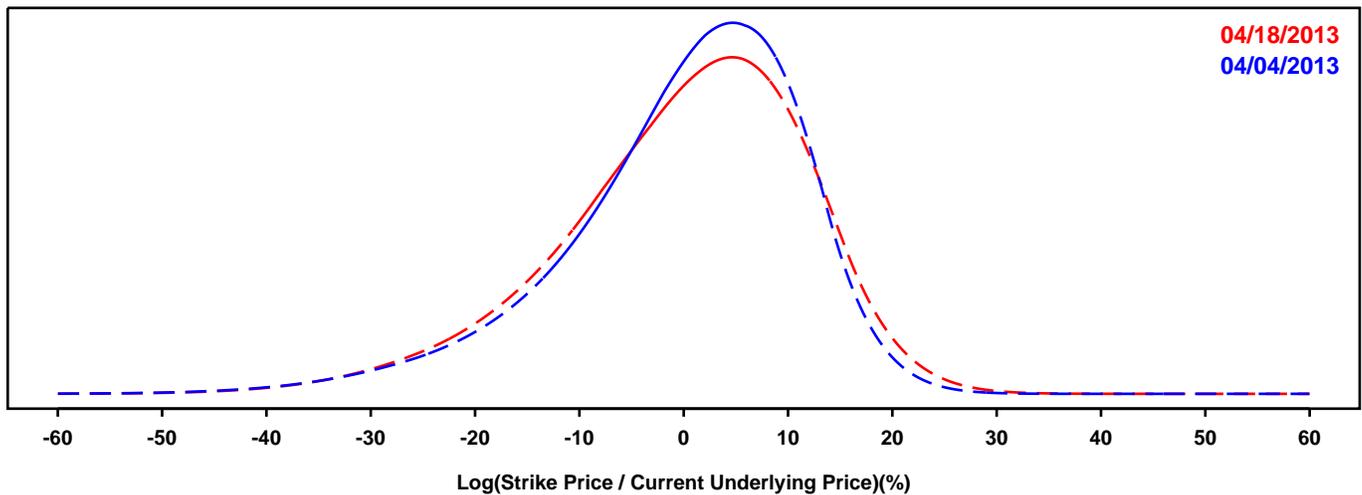
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF NEW YORK MELLON

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

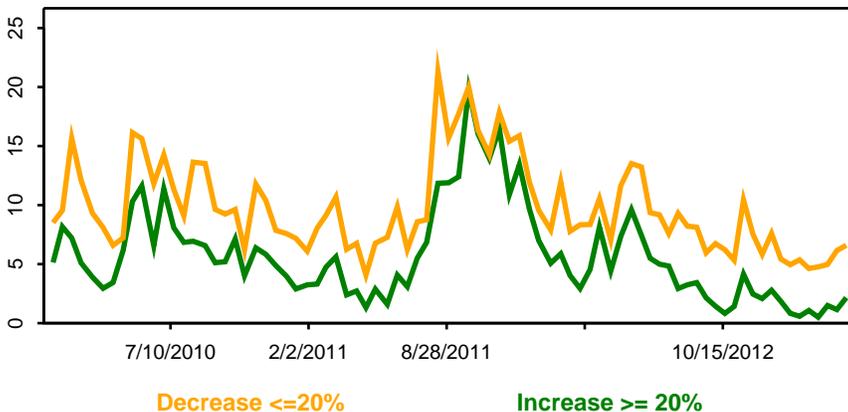
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

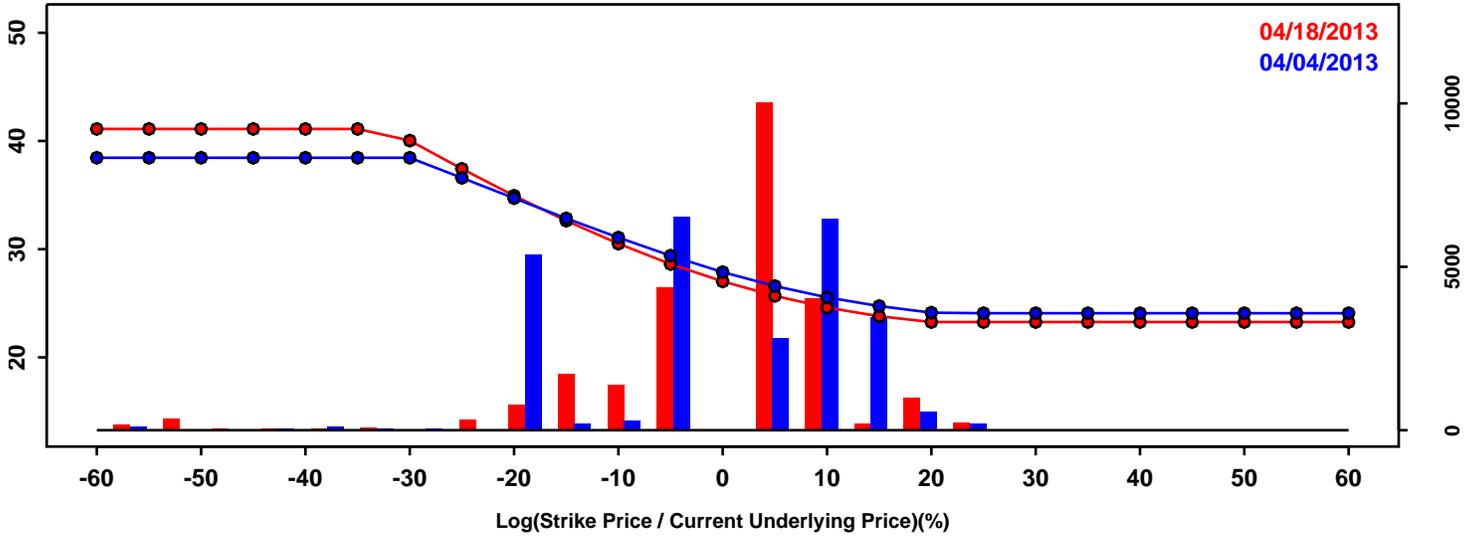


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-15.42%	-16.29%	-0.87%
50th Pct	1.67%	1.37%	-0.30%
90th Pct	12.68%	13.76%	1.08%
Mean	-0.06%	-0.09%	-0.04%
Std Dev	11.46%	12.00%	0.54%
Skew	-0.88	-0.66	0.22
Kurtosis	1.16	0.61	-0.55

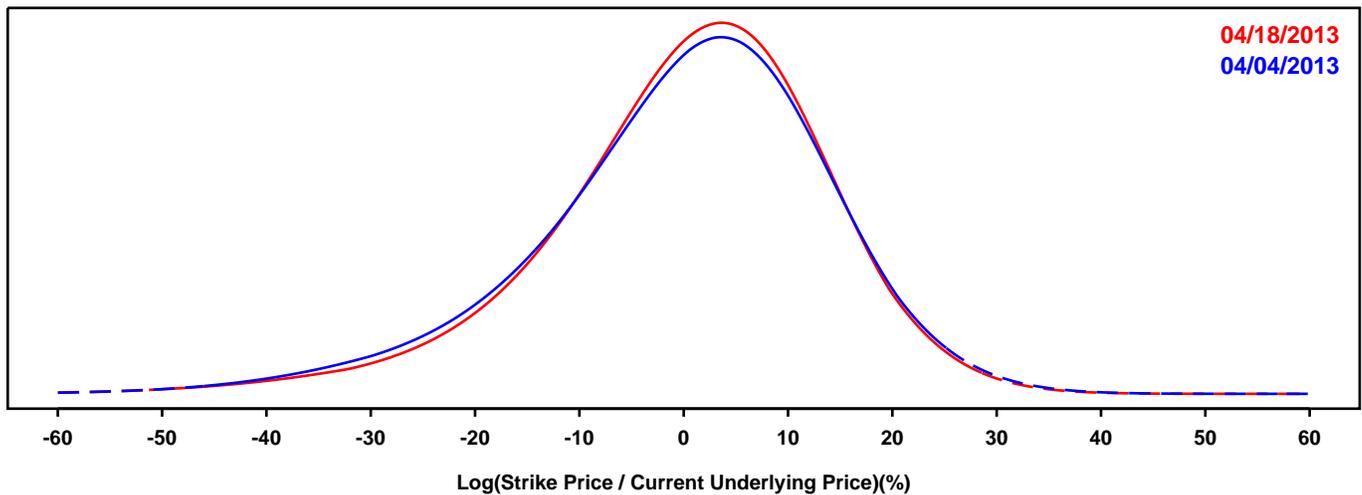
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CITIGROUP

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

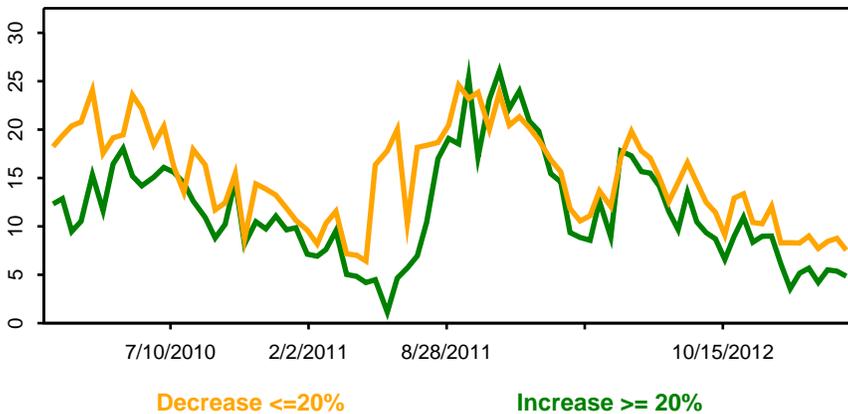
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

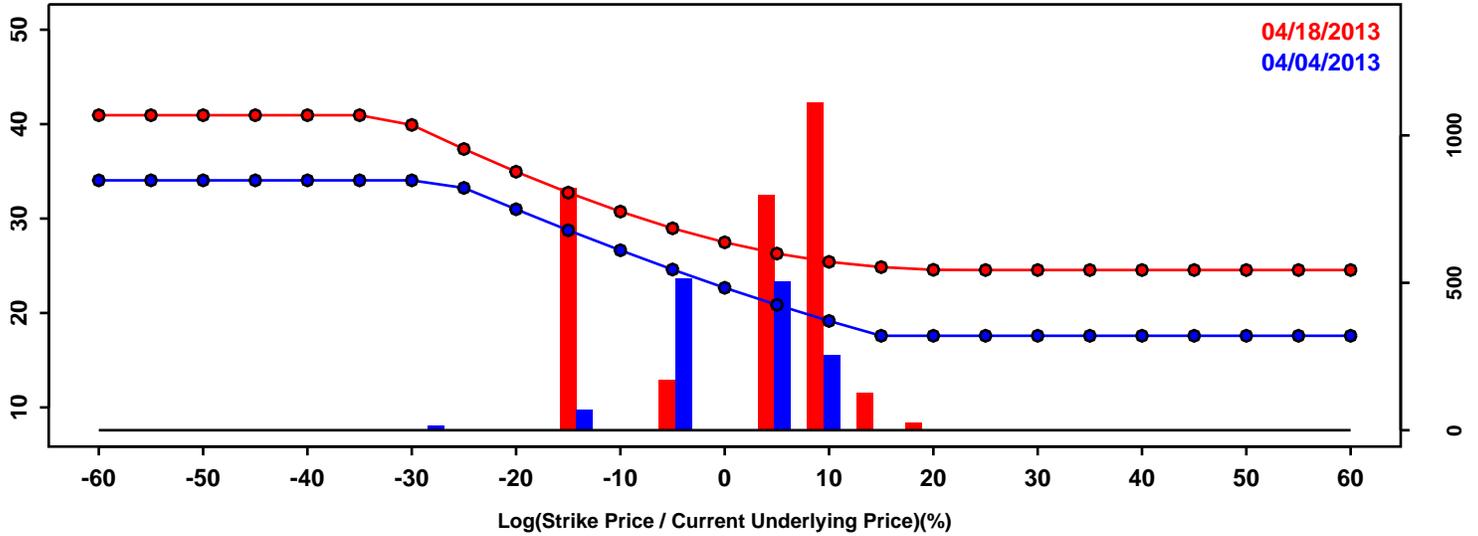


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-18.58%	-17.09%	1.49%
50th Pct	1.34%	1.58%	0.24%
90th Pct	16.25%	15.87%	-0.38%
Mean	-0.10%	0.24%	0.34%
Std Dev	14.13%	13.61%	-0.53%
Skew	-0.64	-0.72	-0.08
Kurtosis	0.91	1.31	0.40

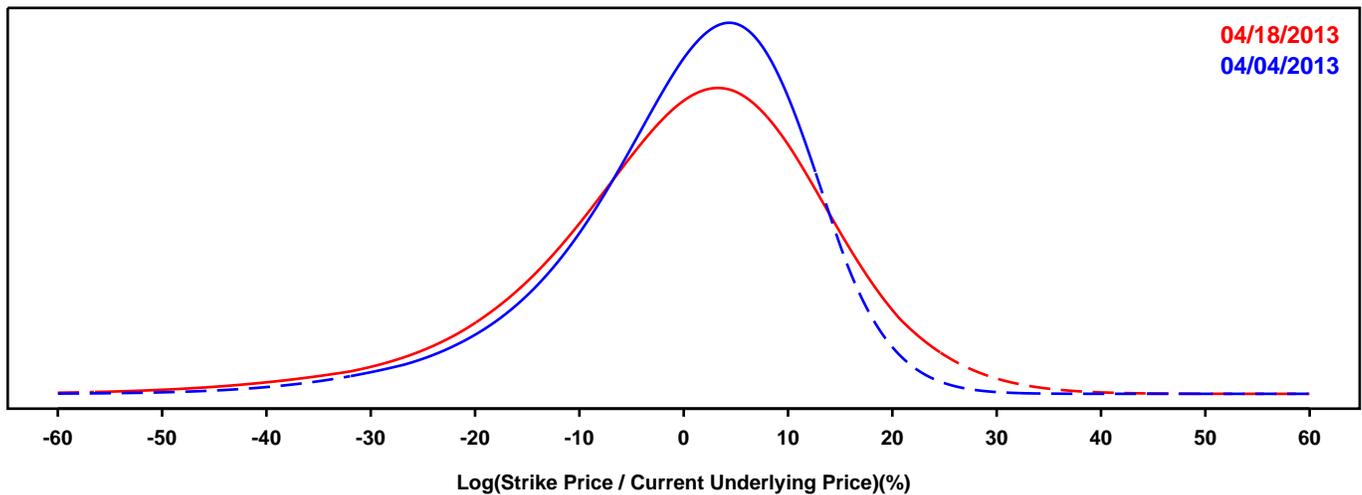
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CAPITAL ONE

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

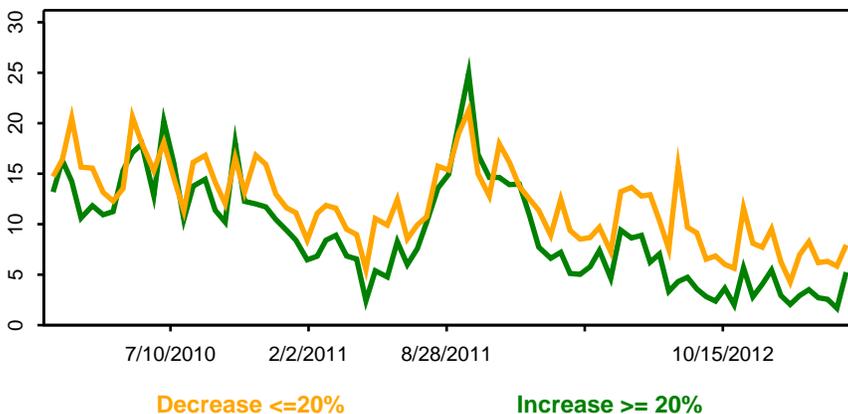
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

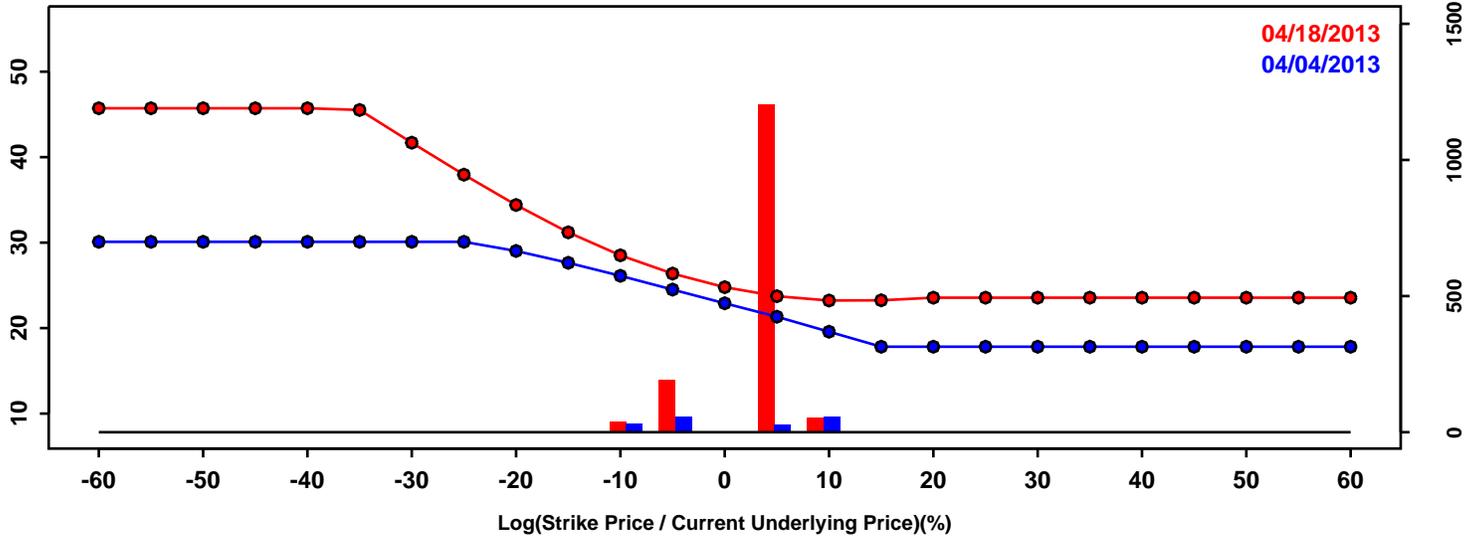


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-15.04%	-17.58%	-2.54%
50th Pct	1.72%	1.32%	-0.40%
90th Pct	13.19%	16.05%	2.86%
Mean	0.18%	0.05%	-0.14%
Std Dev	11.57%	13.87%	2.30%
Skew	-0.85	-0.66	0.19
Kurtosis	1.29	1.21	-0.08

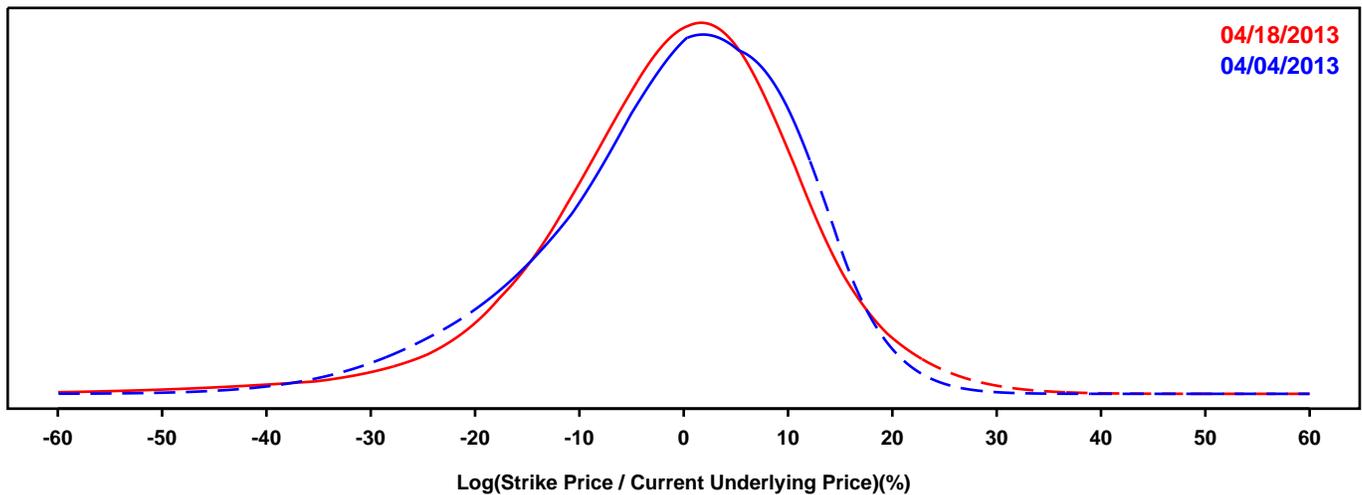
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- FIFTH THIRD

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

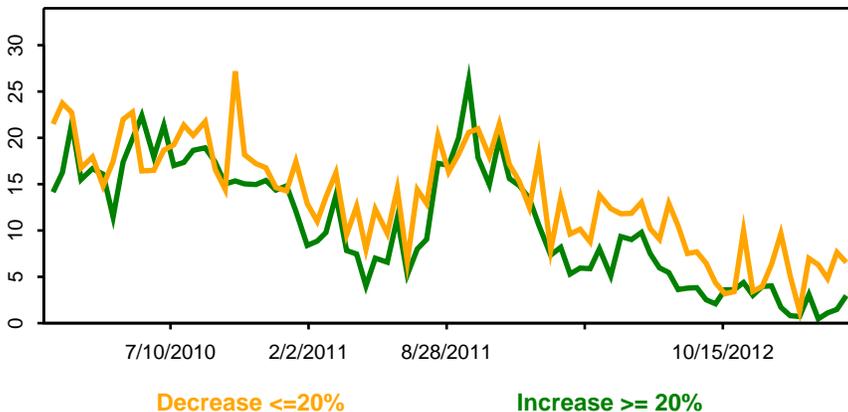
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

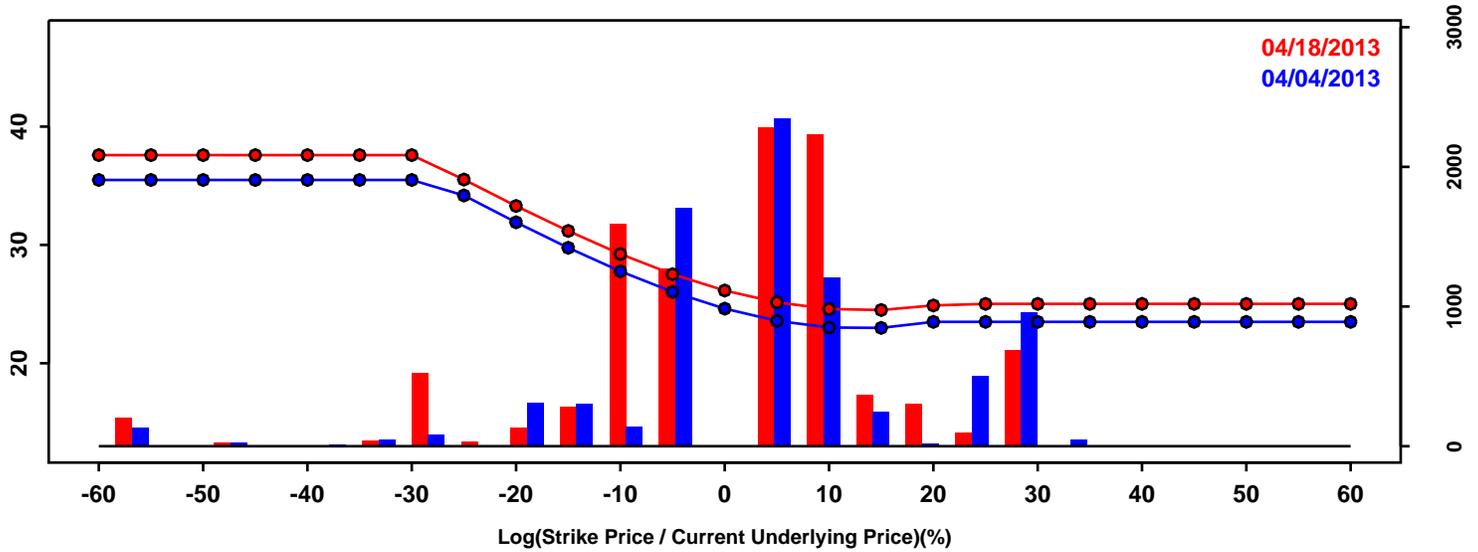


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-17.48%	-16.20%	1.28%
50th Pct	0.33%	0.00%	-0.33%
90th Pct	12.76%	13.16%	0.40%
Mean	-1.13%	-1.06%	0.07%
Std Dev	11.99%	12.58%	0.58%
Skew	-0.67	-0.82	-0.15
Kurtosis	0.56	2.36	1.80

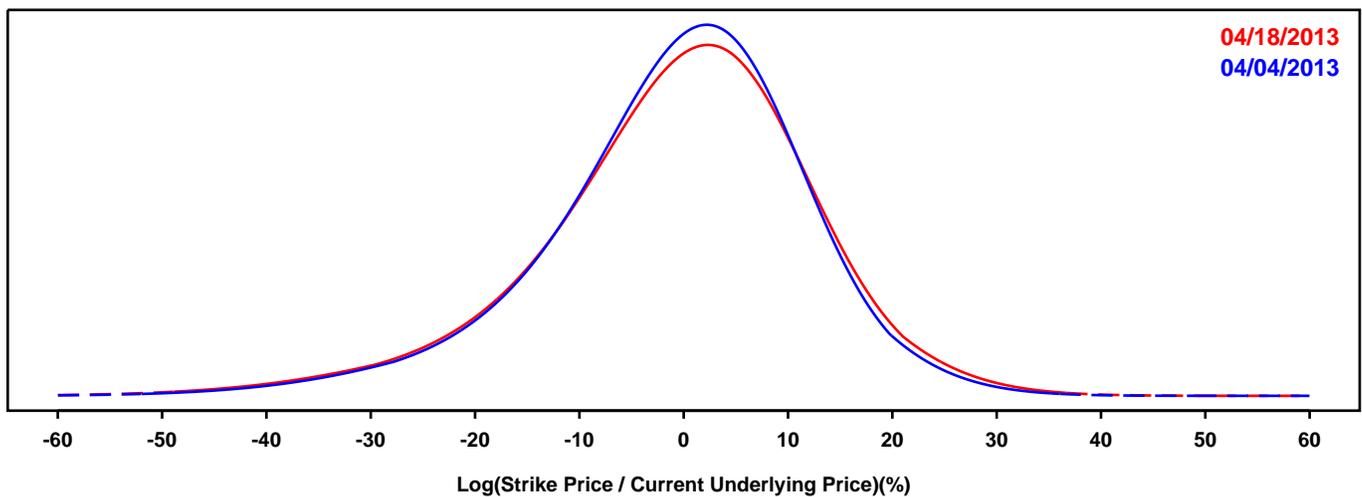
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLDMAN SACHS

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

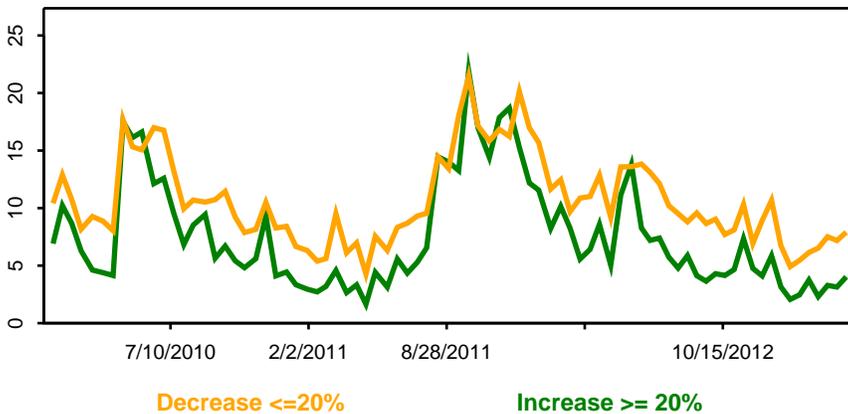
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

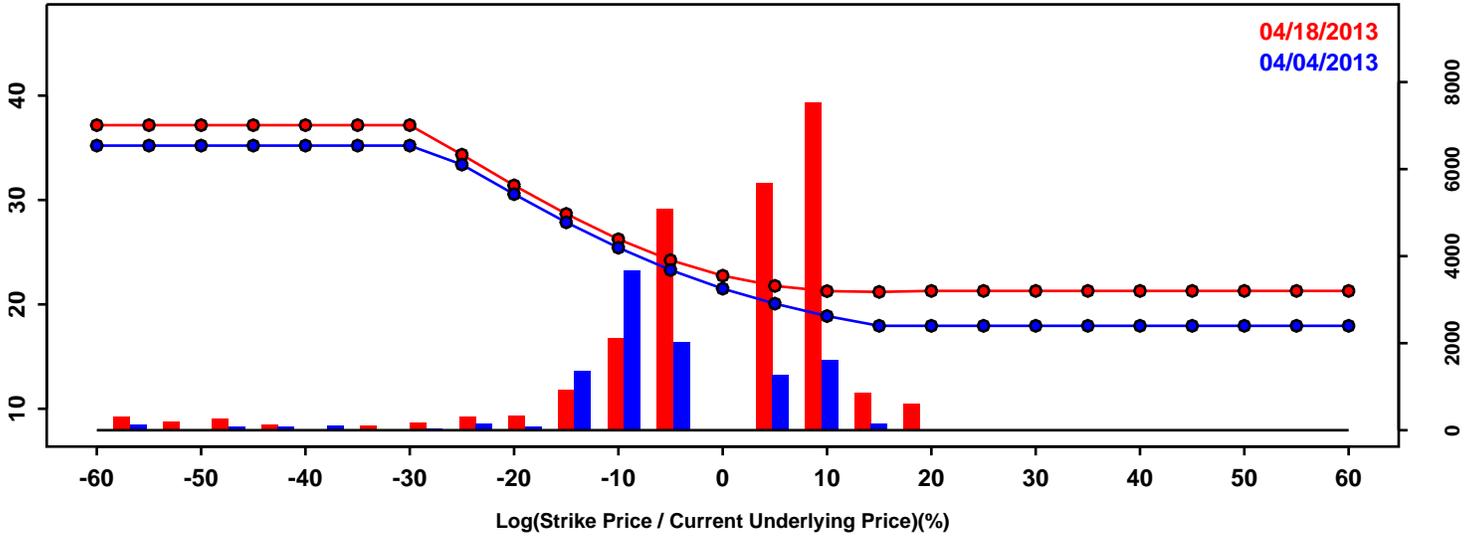


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-16.82%	-17.58%	-0.76%
50th Pct	0.37%	0.49%	0.12%
90th Pct	13.62%	14.58%	0.96%
Mean	-0.78%	-0.69%	0.08%
Std Dev	12.54%	13.27%	0.72%
Skew	-0.62	-0.61	0.02
Kurtosis	1.14	1.14	-0.00

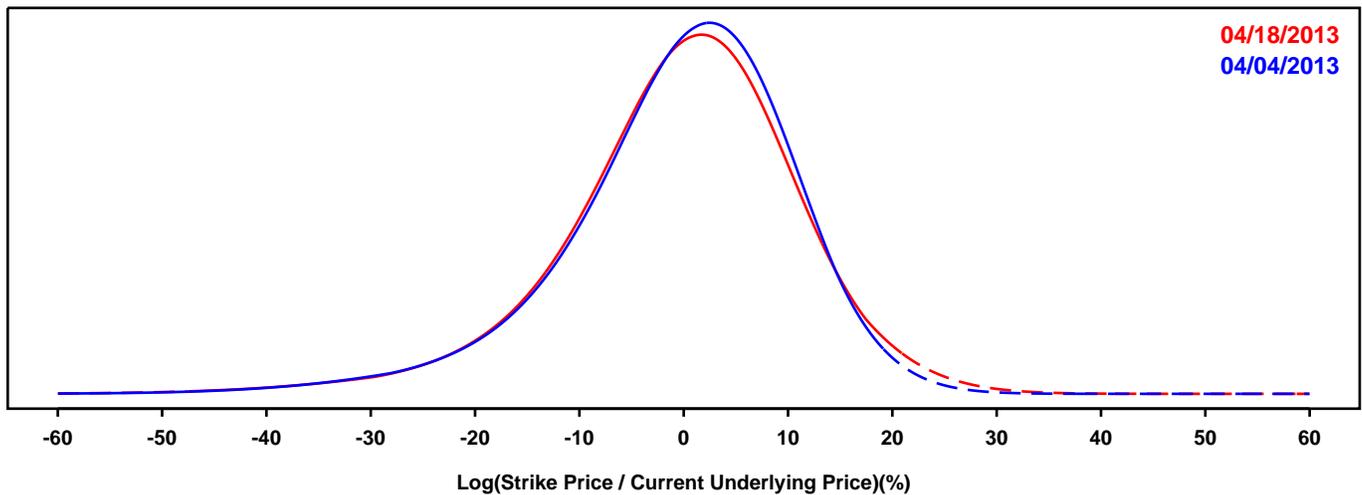
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- JP MORGAN

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

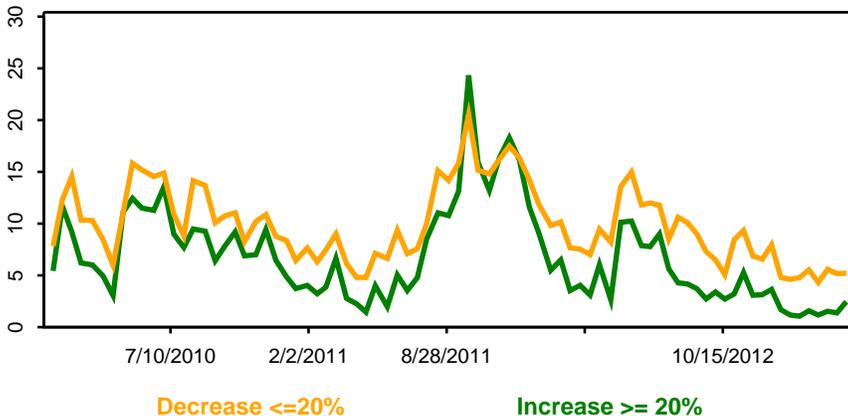
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

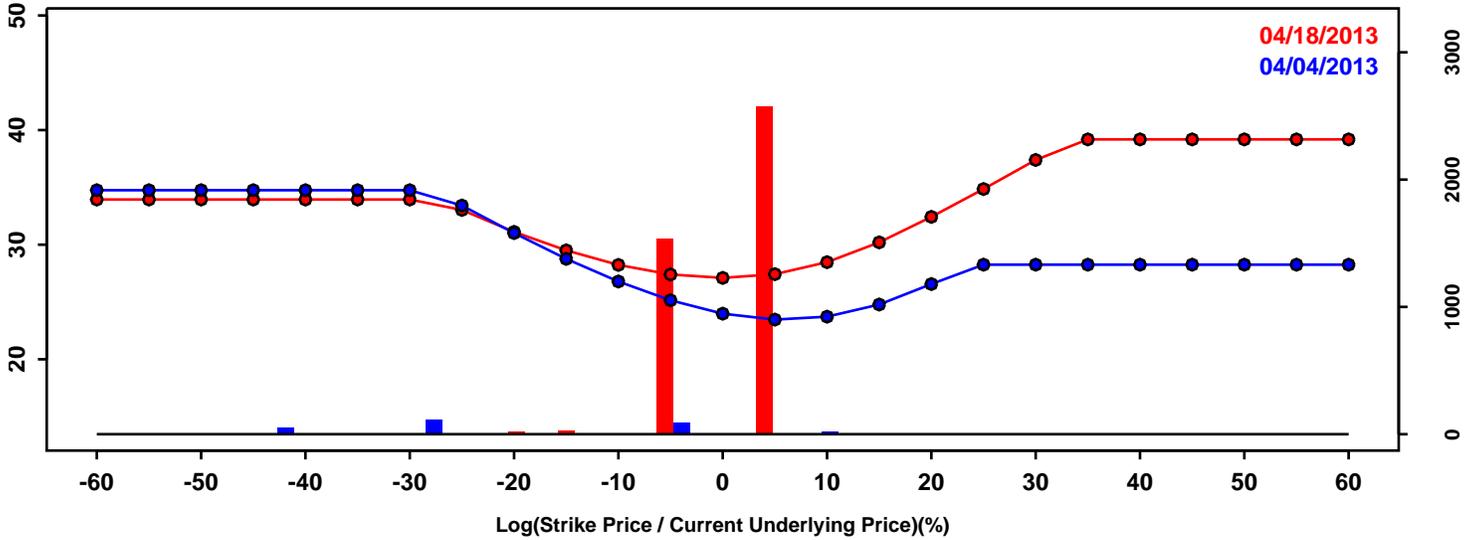


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-14.27%	-14.42%	-0.16%
50th Pct	0.82%	0.58%	-0.23%
90th Pct	12.16%	12.91%	0.74%
Mean	-0.36%	-0.30%	0.06%
Std Dev	11.02%	11.45%	0.43%
Skew	-0.83	-0.68	0.16
Kurtosis	1.65	1.62	-0.02

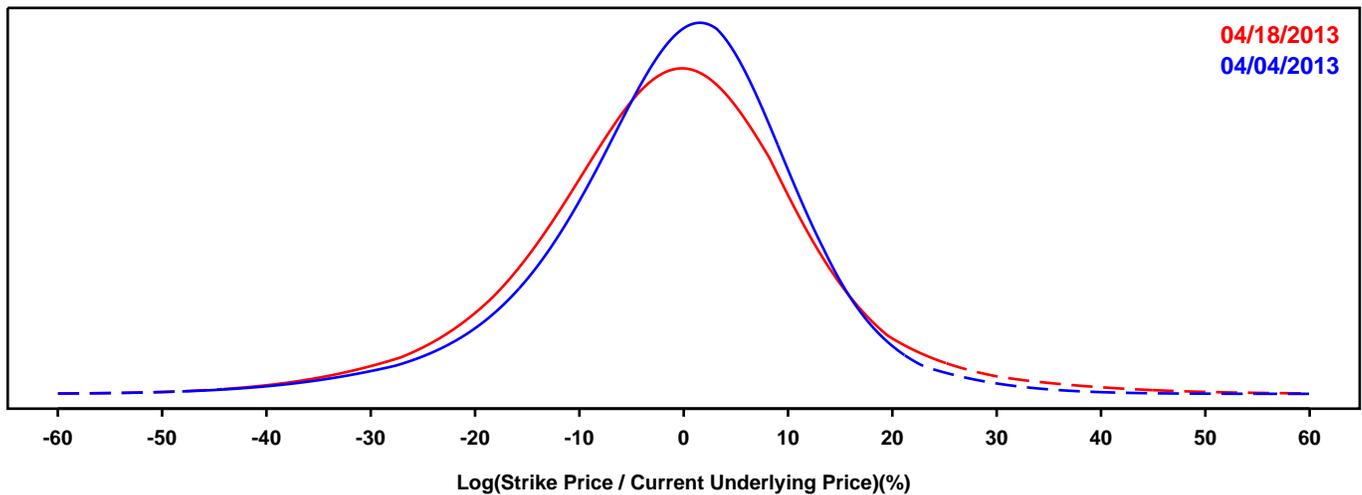
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- KEYCORP

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

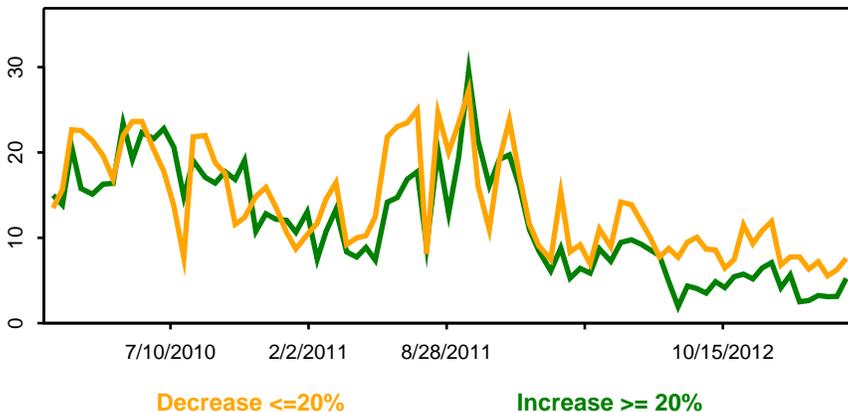
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

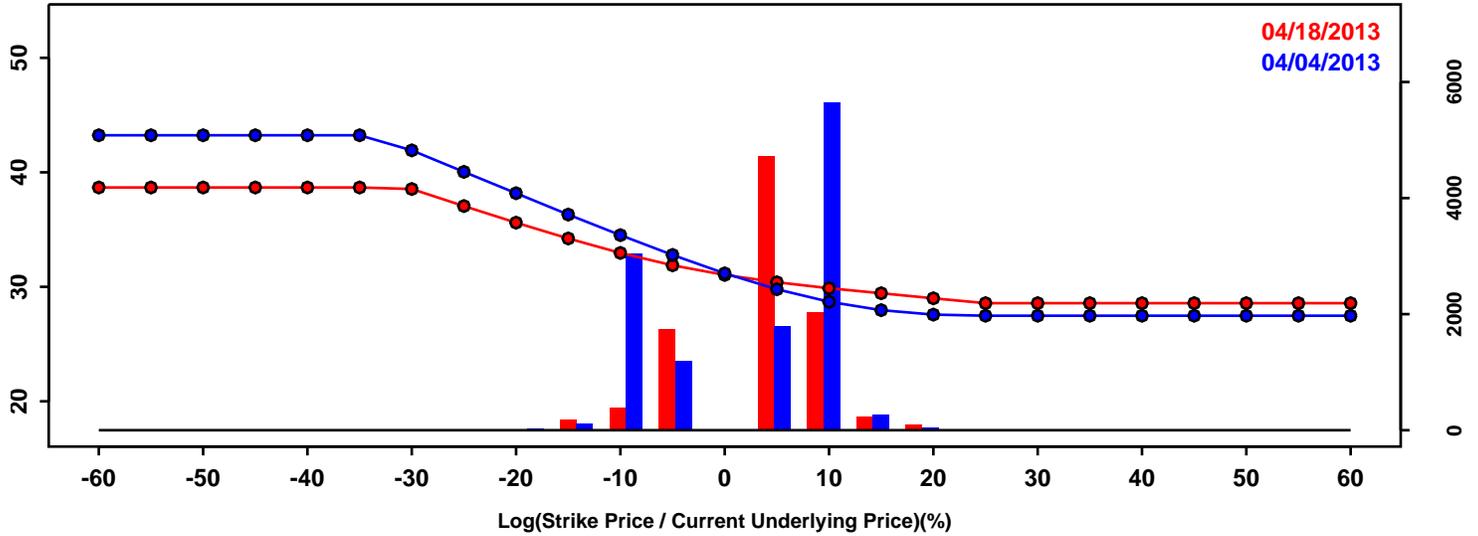


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-15.81%	-17.52%	-1.71%
50th Pct	0.10%	-0.80%	-0.89%
90th Pct	12.98%	14.56%	1.58%
Mean	-0.75%	-1.04%	-0.29%
Std Dev	12.07%	13.55%	1.48%
Skew	-0.47	0.01	0.48
Kurtosis	1.35	1.32	-0.03

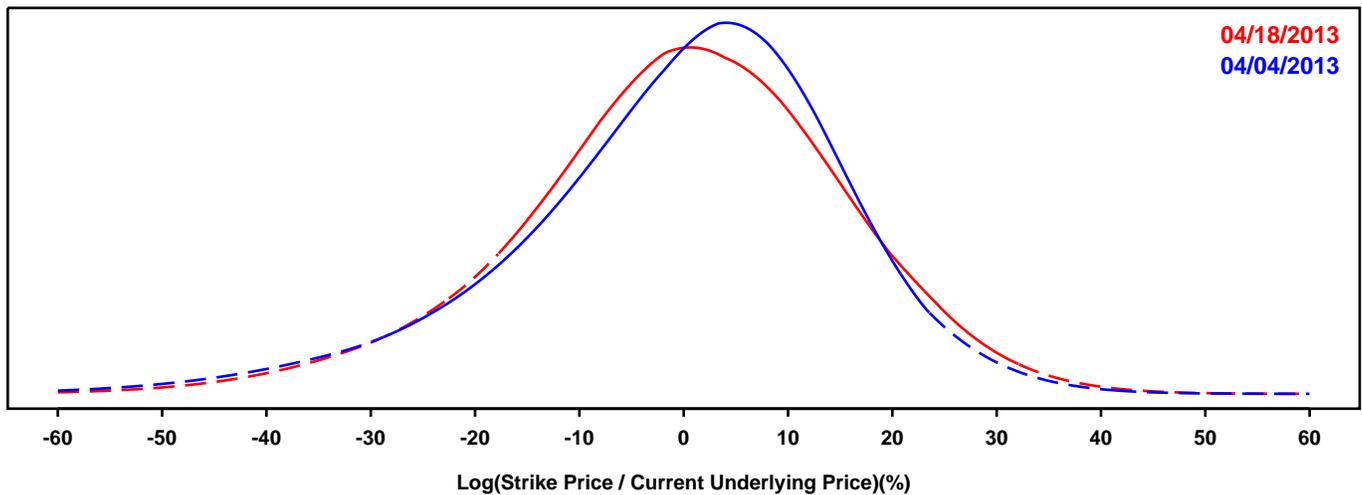
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- MORGAN STANLEY

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

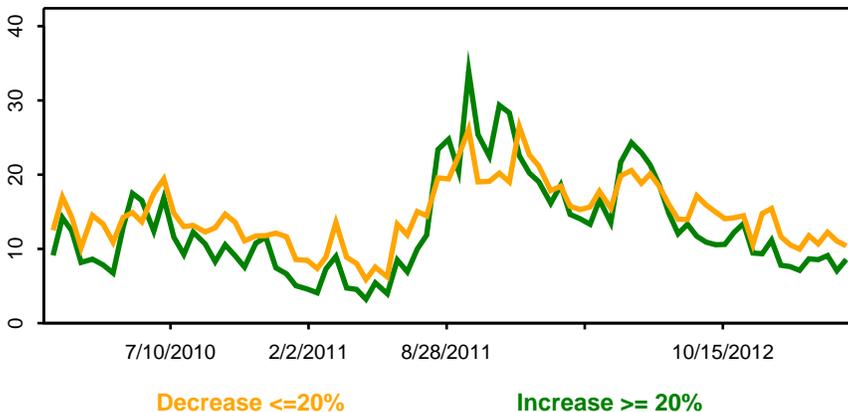
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

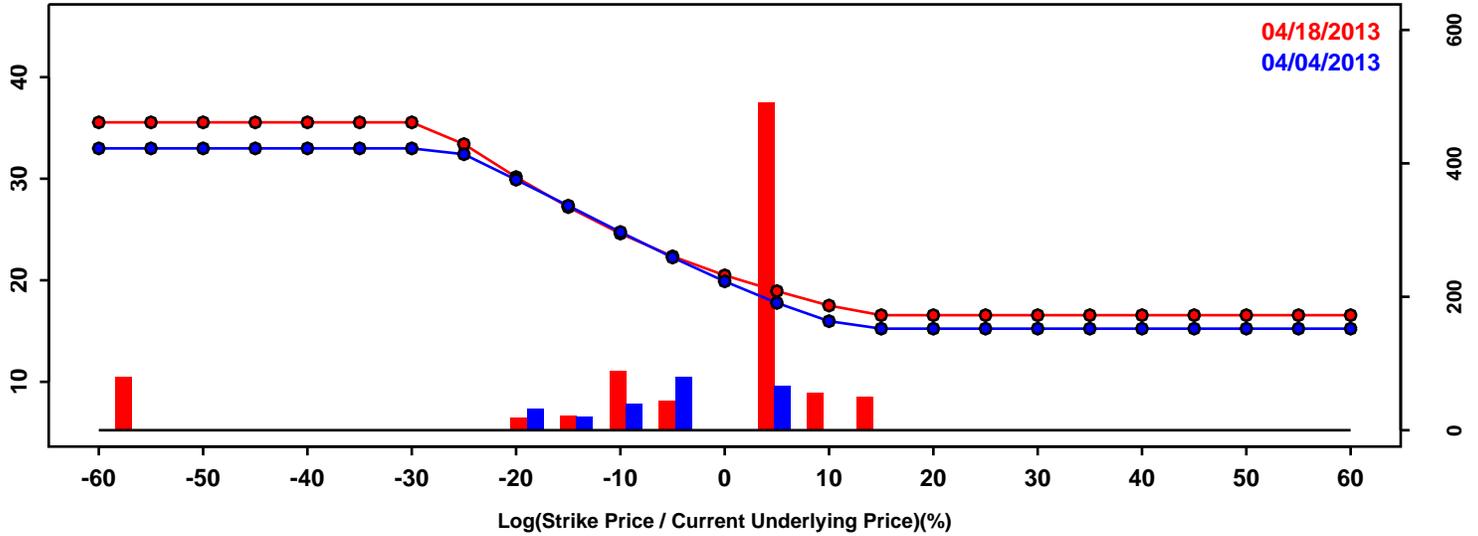


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-21.30%	-20.44%	0.85%
50th Pct	1.39%	0.48%	-0.91%
90th Pct	17.60%	18.80%	1.20%
Mean	-0.46%	-0.30%	0.16%
Std Dev	15.84%	15.65%	-0.19%
Skew	-0.67	-0.36	0.31
Kurtosis	0.98	0.49	-0.49

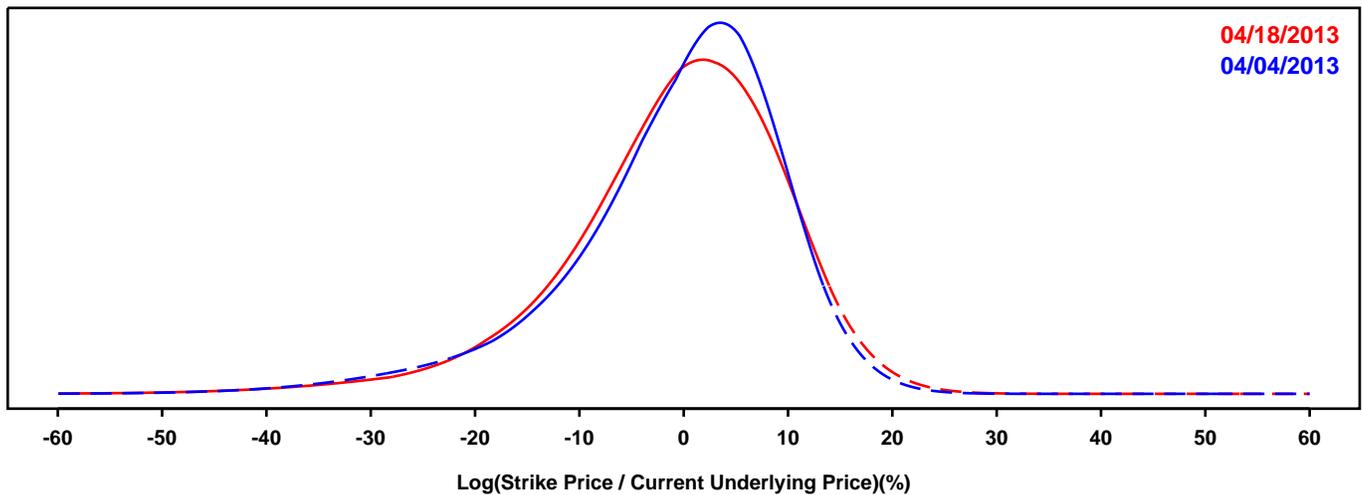
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PNC FINANCIAL

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

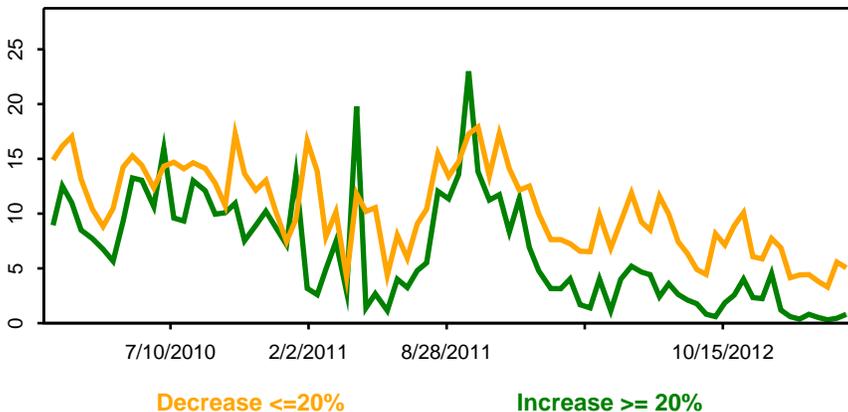
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

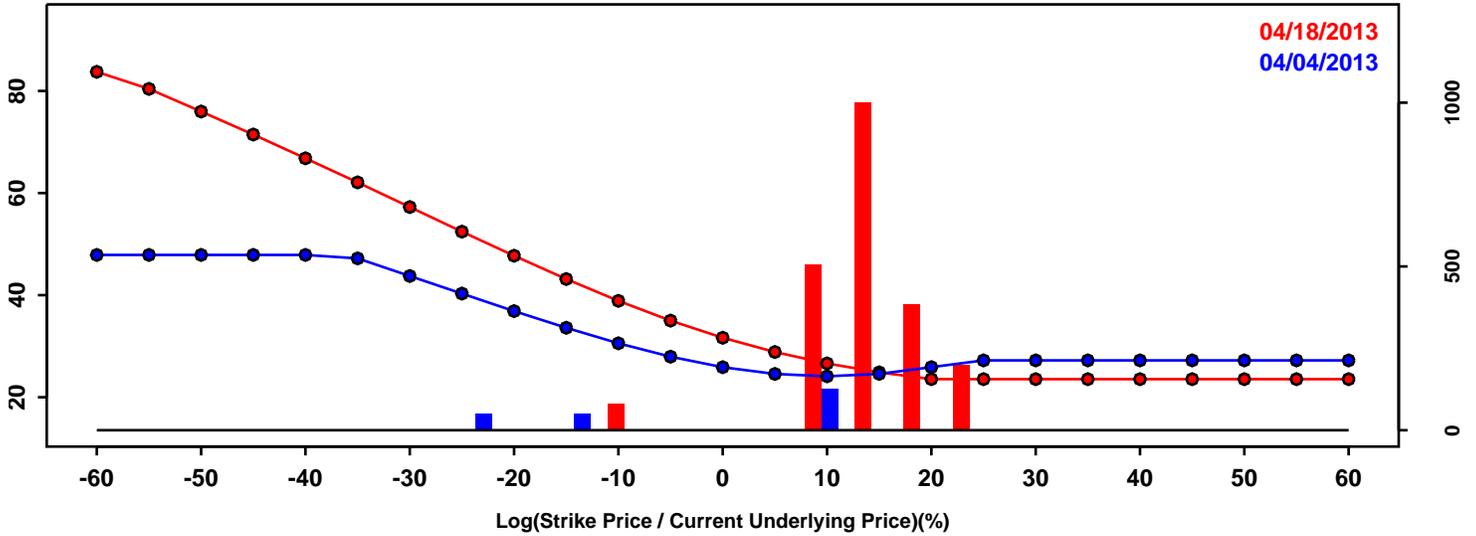


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-14.40%	-14.30%	0.10%
50th Pct	0.95%	0.43%	-0.52%
90th Pct	10.62%	11.30%	0.68%
Mean	-0.75%	-0.78%	-0.03%
Std Dev	10.55%	10.70%	0.15%
Skew	-1.07	-0.91	0.16
Kurtosis	1.97	1.87	-0.11

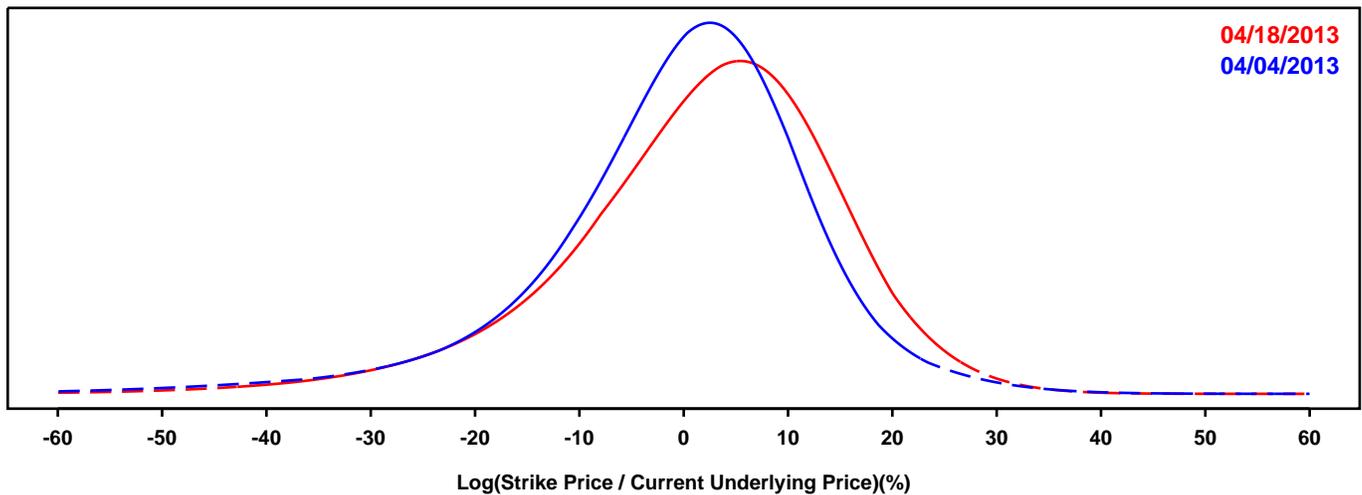
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- REGIONS FINANCIAL

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

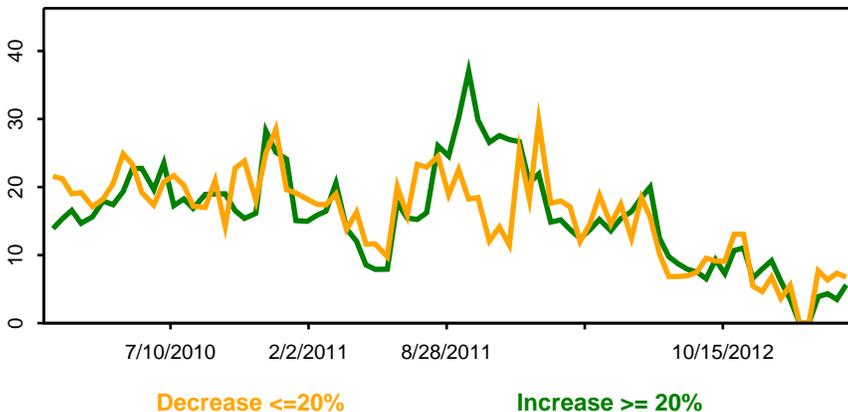
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

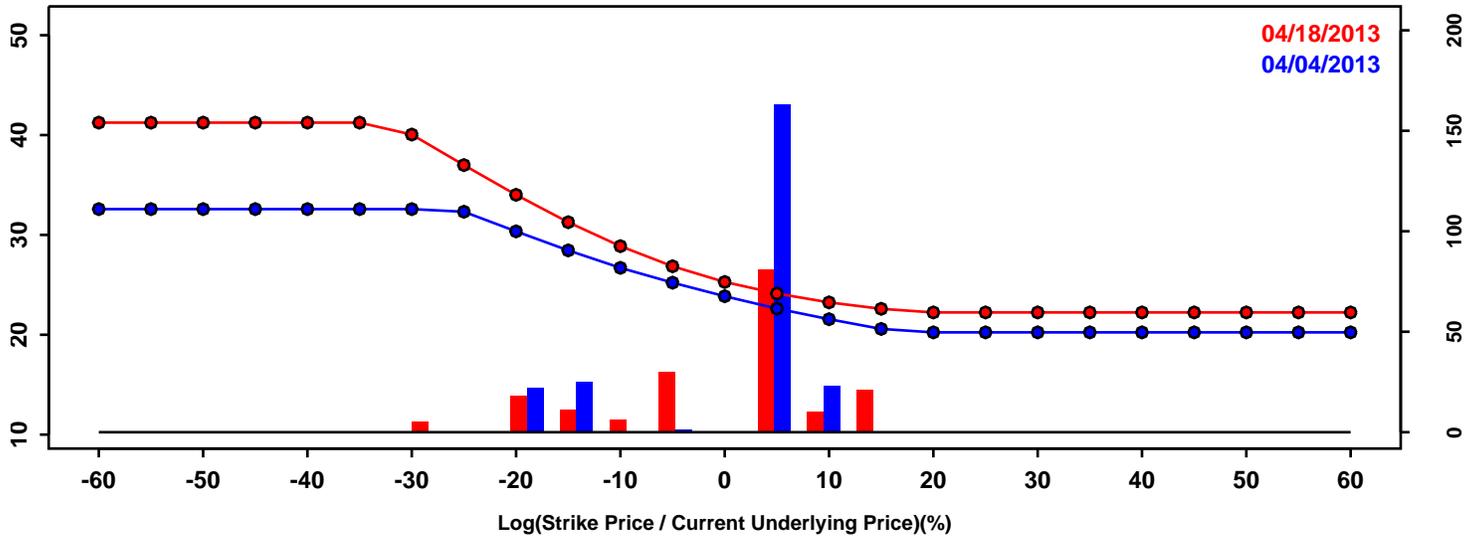


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-16.53%	-15.74%	0.80%
50th Pct	0.84%	3.10%	2.25%
90th Pct	13.70%	16.79%	3.09%
Mean	-0.64%	1.42%	2.05%
Std Dev	13.38%	14.06%	0.68%
Skew	-1.01	-1.24	-0.23
Kurtosis	2.95	4.67	1.72

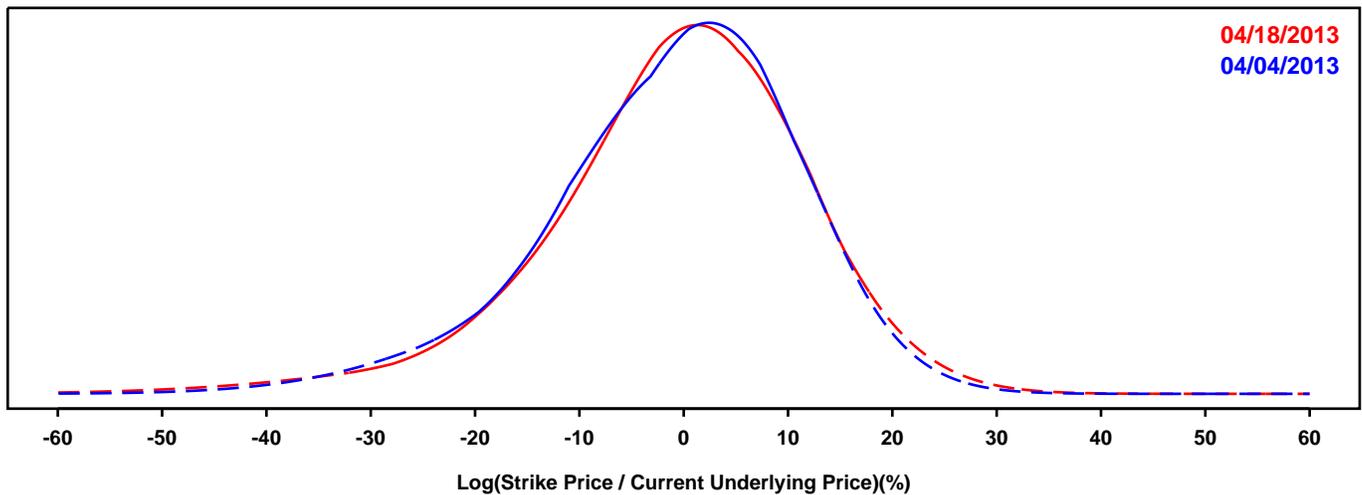
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- STATE STREET

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

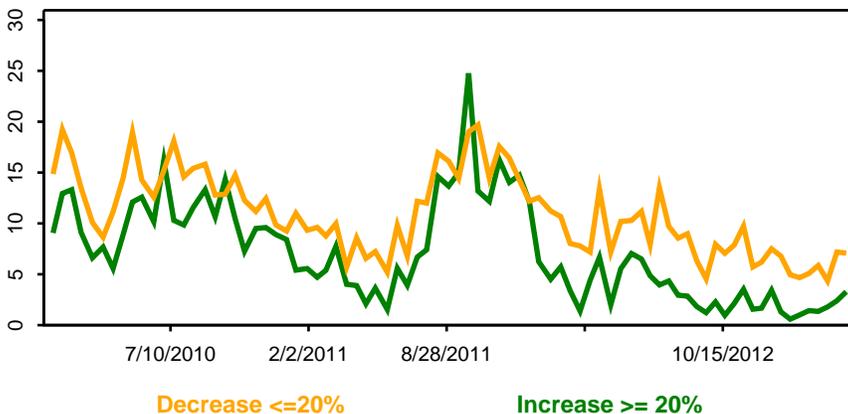
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

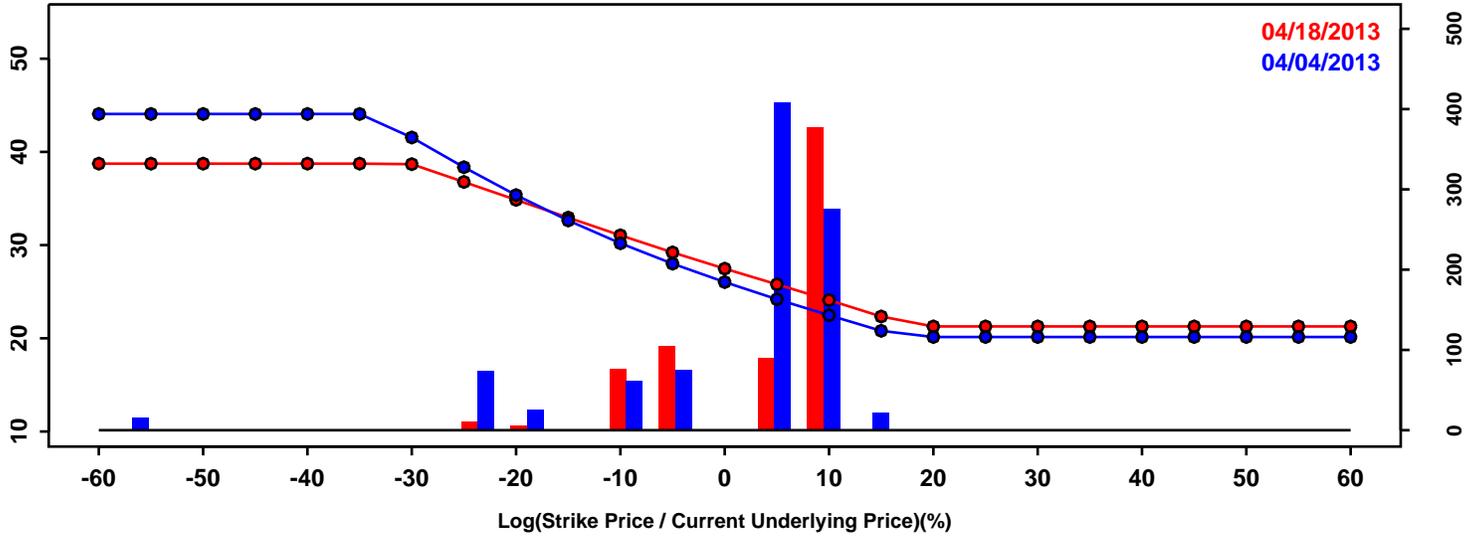


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-16.89%	-16.72%	0.17%
50th Pct	0.15%	0.31%	0.16%
90th Pct	13.32%	14.02%	0.70%
Mean	-1.05%	-0.80%	0.25%
Std Dev	12.25%	12.89%	0.64%
Skew	-0.60	-0.76	-0.16
Kurtosis	0.77	1.69	0.91

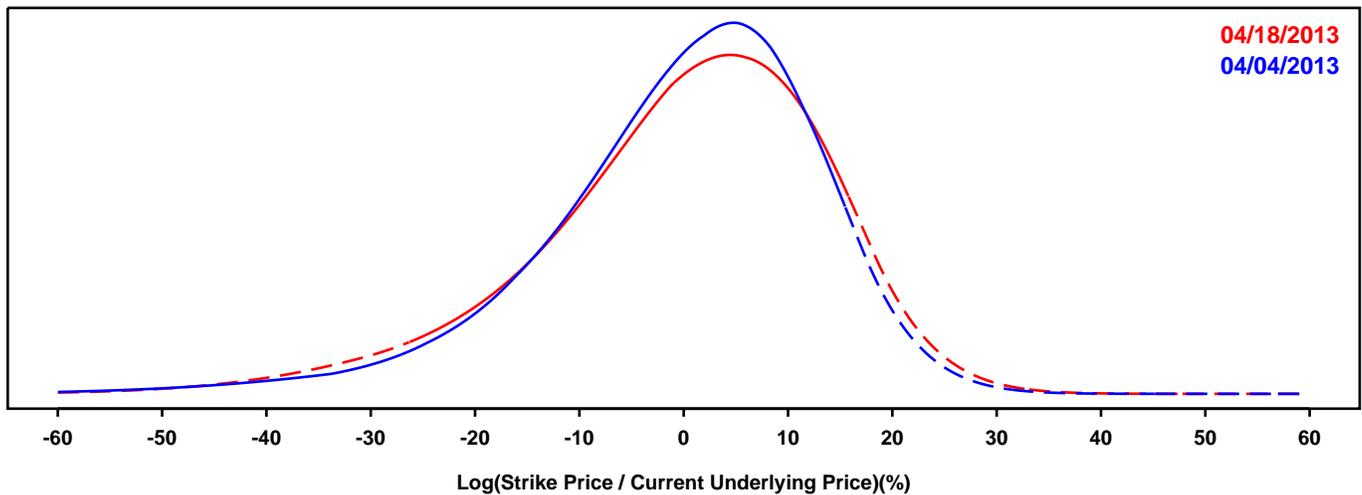
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SUNTRUST

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

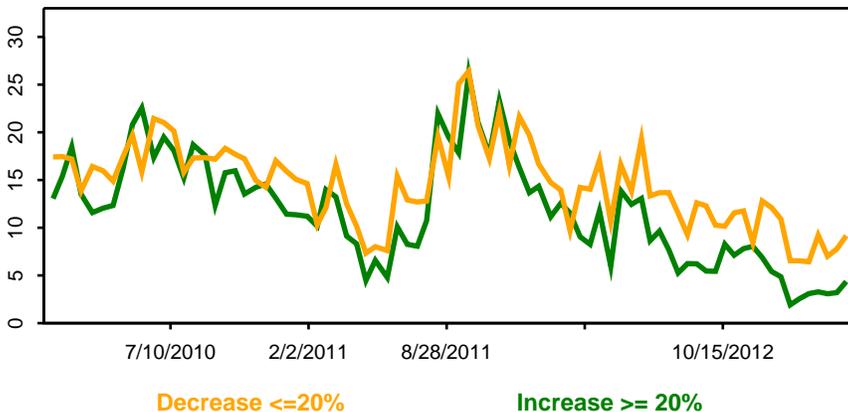
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

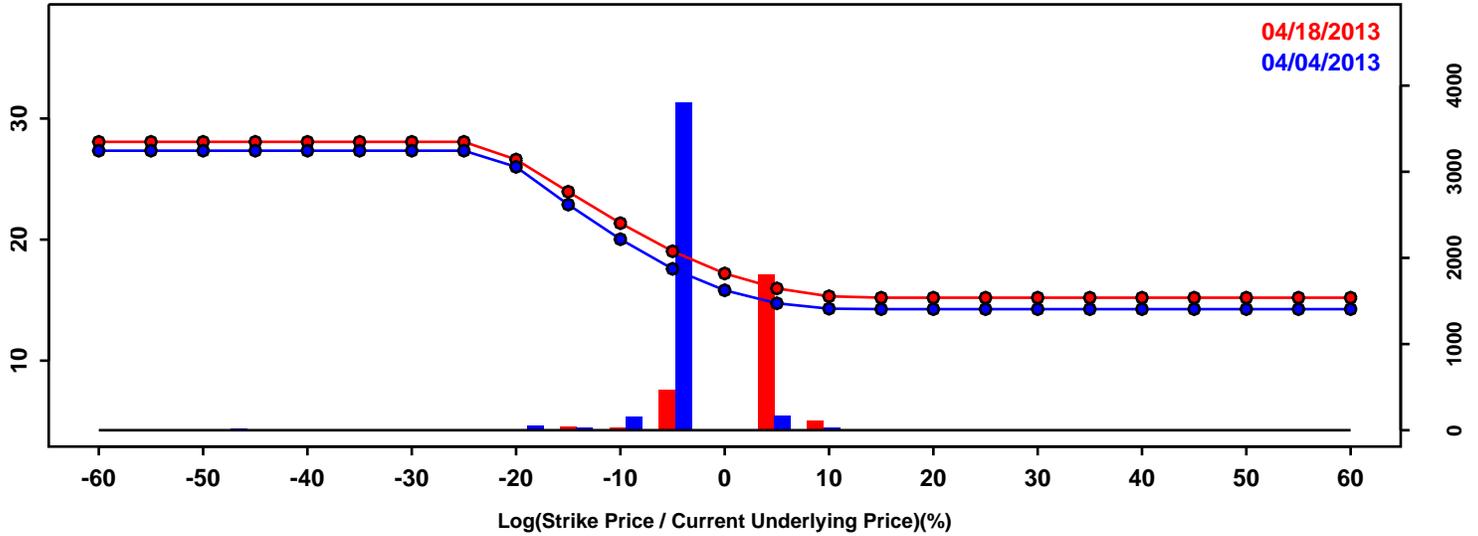


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-17.37%	-19.02%	-1.65%
50th Pct	1.47%	1.54%	0.06%
90th Pct	14.79%	15.91%	1.12%
Mean	-0.27%	-0.24%	0.03%
Std Dev	13.43%	14.13%	0.70%
Skew	-0.94	-0.77	0.17
Kurtosis	1.82	0.96	-0.87

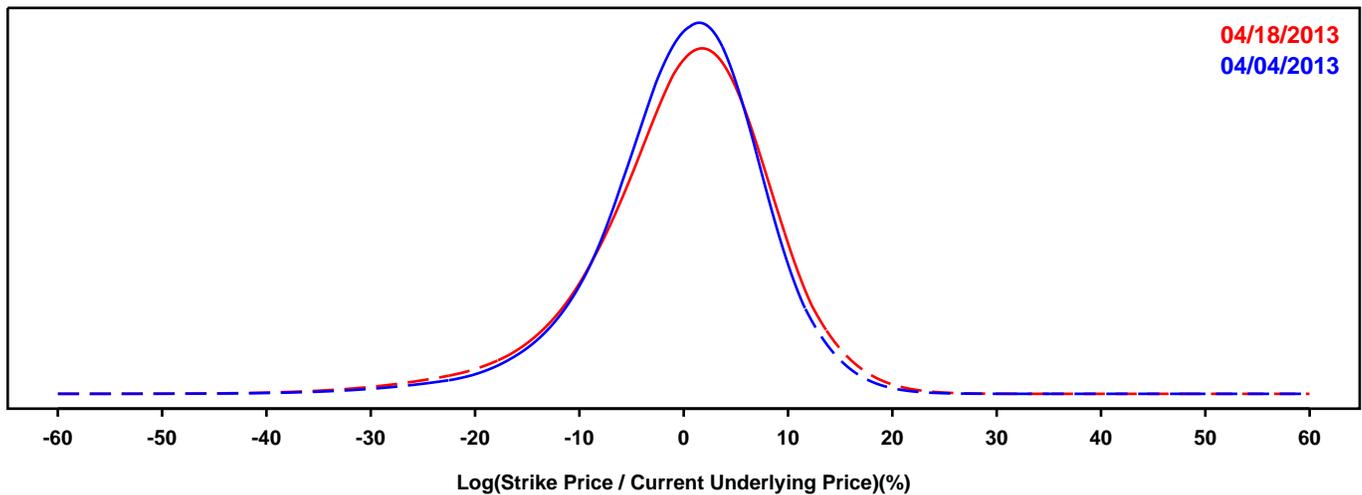
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- US BANCORP

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

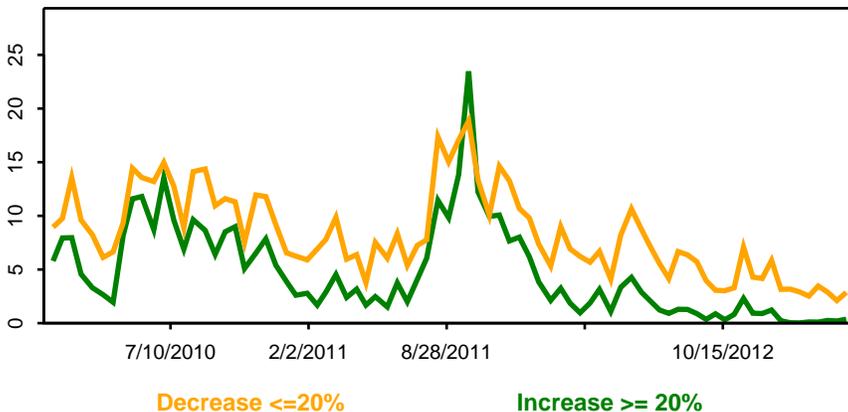
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

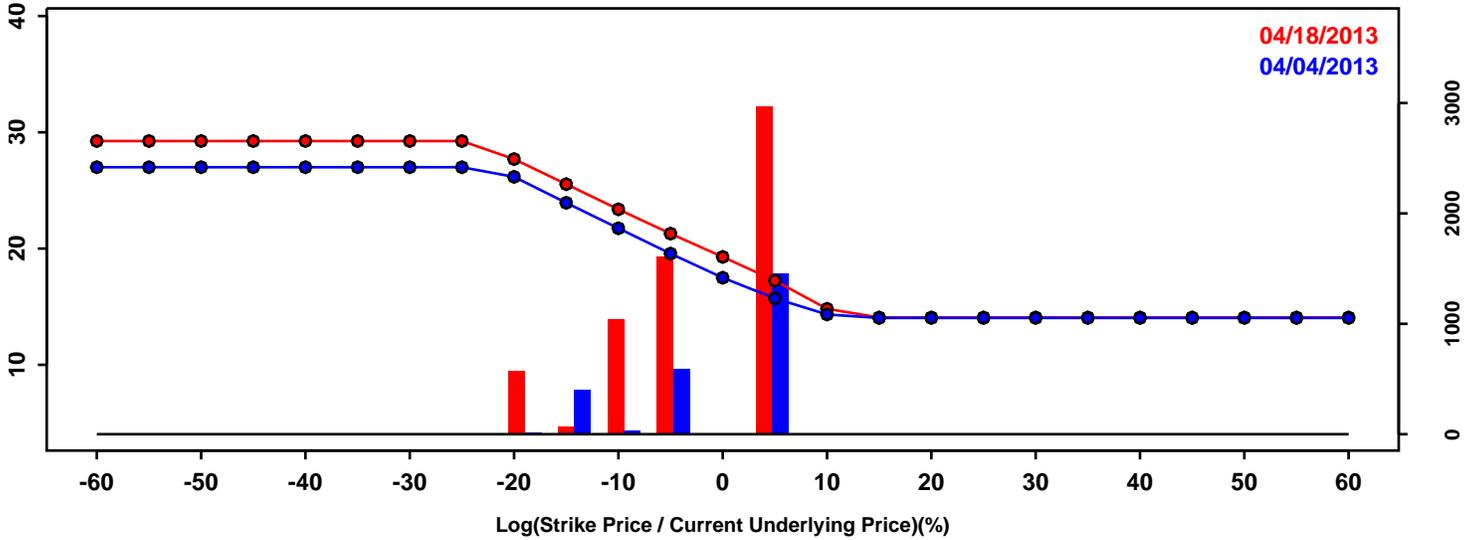


Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-10.12%	-11.06%	-0.94%
50th Pct	0.43%	0.69%	0.26%
90th Pct	8.81%	9.68%	0.87%
Mean	-0.29%	-0.18%	0.10%
Std Dev	7.98%	8.72%	0.74%
Skew	-0.79	-0.81	-0.02
Kurtosis	1.92	1.75	-0.17

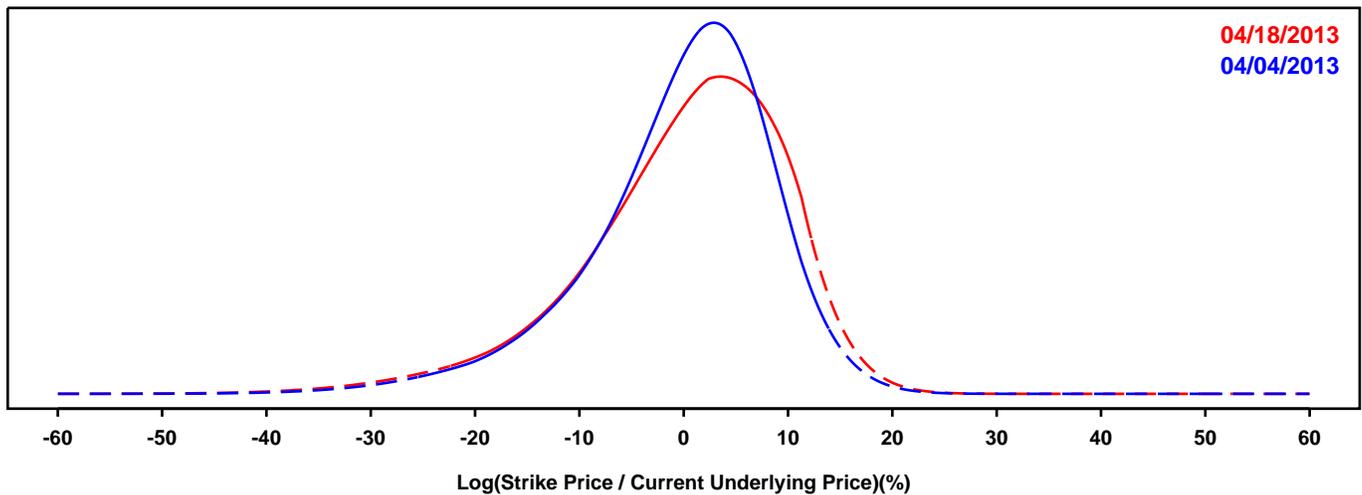
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WELLS FARGO

Log returns are based on the risk neutral density function of the underlying asset derived from options that expire in approximately 3 months.

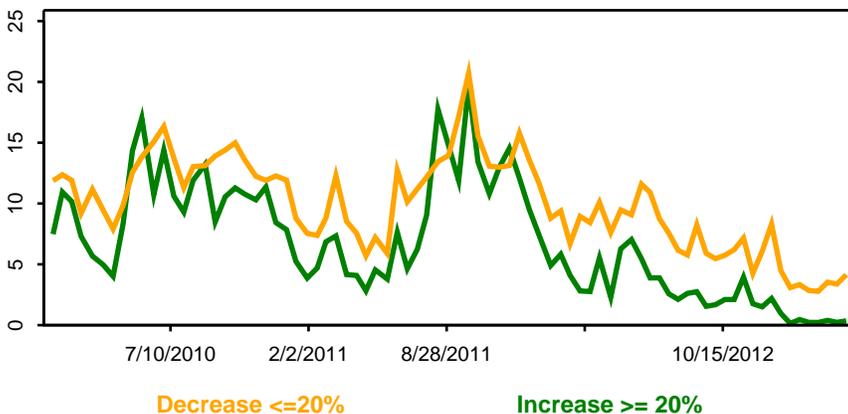
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Statistics of the Log Return Distributions			
	04/04/2013	04/18/2013	Change
10th Pct	-12.09%	-12.93%	-0.84%
50th Pct	0.96%	1.48%	0.52%
90th Pct	9.69%	11.09%	1.39%
Mean	-0.27%	0.08%	0.35%
Std Dev	8.99%	9.87%	0.89%
Skew	-0.89	-0.90	-0.01
Kurtosis	1.47	1.32	-0.15