

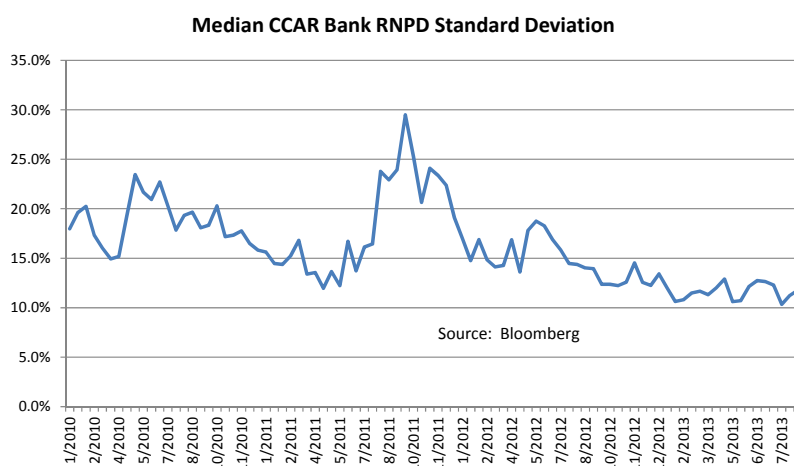
FEDERAL RESERVE BANK OF MINNEAPOLIS  
BANKING AND POLICY STUDIES

**Minneapolis Options Report – August 22<sup>nd</sup>**

*Banks & Insurance Companies*

Share prices for the banks and insurance companies in our reports fell over the past two weeks. However, they generally outperformed the broader market averages. The S&P 500 fell -2.4% while the average CCAR bank fell -1.3%. Options volumes were higher relative to two weeks ago though they remain historically low and at levels that are only about half of the trading activity for similar periods last summer.

Tail risks as measured by RNPD standard deviations were up slightly but also remain at low levels (see chart below). For the five insurance companies we are following, volumes were very light again this week. RNPD standard deviations moved up slightly consistent with falling share prices for insurance companies (average insurance company price change was -1.2%).



Additional notes:

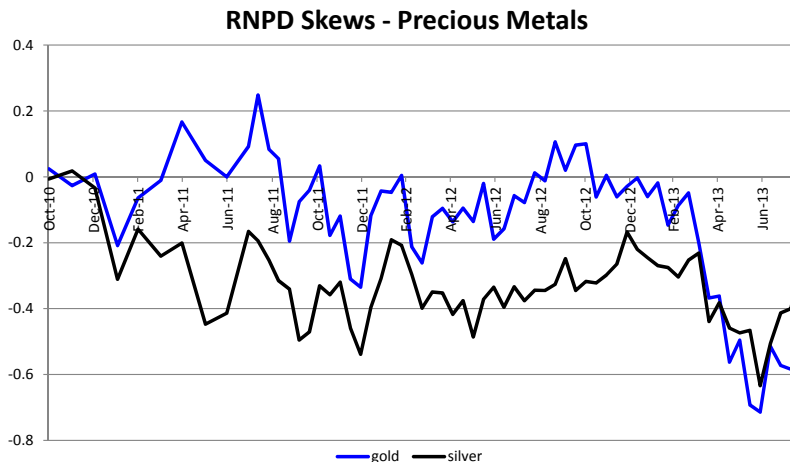
- In contrast to other banks, options trading on shares of WFC has risen steadily since the end of June. Over that time the RNPD standard deviation derived from options on WFC shares has dropped 60 basis points and its skew has become less negative.
- STI registered more negative skews as its share price fell. (*See STI report*)

### Other Commodity Markets

As noted above, the S&P 500 fell -240 basis points over the past two weeks while commodity prices rose smartly. Volumes were light for options on the equity index. In contrast, trading activity was very robust across all of the commodity and exchange rate markets we follow. Changes in tail risk as measured by RNPD standard deviation were mixed with higher risks associated with physical commodities and lower risks with exchange rates.

#### Additional notes:

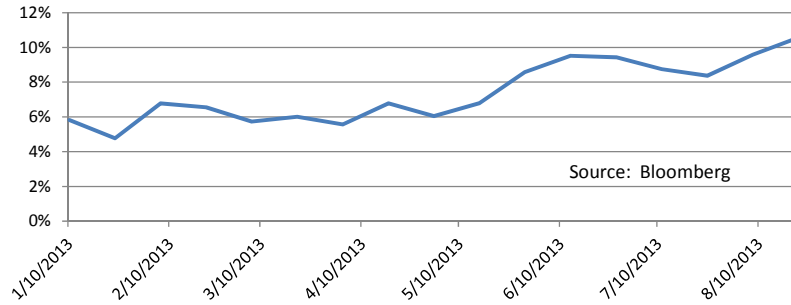
- Trading activity rose for options on the S&P 500 index with 12 months to expiry but fell for those with 6 months to expiry. Combined, and relative to recent history, the trading was extremely light. Tail risks were largely unchanged.
- Trading in options on WTI crude futures rose relative to two weeks ago and remained strong for options on Brent crude futures. Spot prices rose 2.6% and 3.2% for WTI and Brent respectively. RNPD standard deviations rose approximately 100 basis points and skews rose as well. (See *Oil Reports*).
- Activity in options on precious metals futures was strong. Volumes for options on silver futures was the second highest we have registered. Spot prices for gold and silver were also strong, rising 4.6% and 14.0% respectively. The RNPDs derived from options on gold and silver futures remained skewed to the downside. While the skew in the silver RNPD has recently risen, the skew in the gold RNPD remains firmly negative. (See *Gold and Silver Reports*).



- Tail risks measured by RNPD standard deviation rebounded slightly in the foreign exchange markets we follow. Trading volumes were strong again, especially for options on the dollar-euro and dollar-pound exchange rates. (See *exchange rate reports*)
- Grain prices were mixed over the past two weeks. The spot price of corn futures rose 1.0%, soybeans rose 8.7%, and wheat fell -2.0%. RNPD standard deviations rose more than 80 basis points for all three commodities last week. (See *grain market reports*)

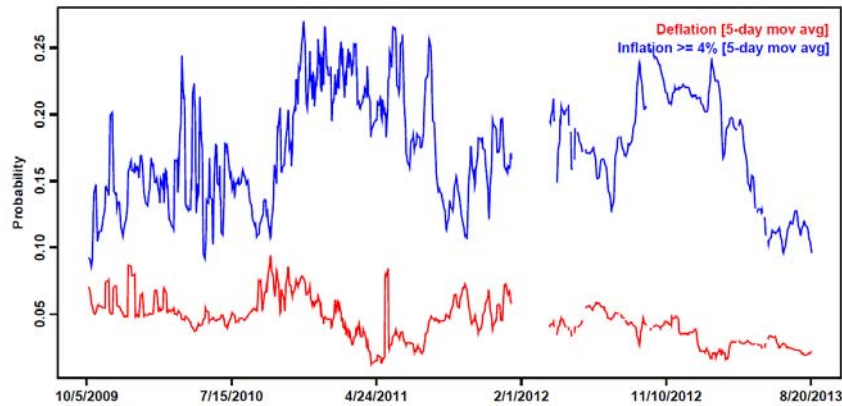
- The DJ Real Estate Index ETF dropped another -4.3% over the past two weeks. Tail risks continue to rise in this market. (See *Real Estate Report*)

**Standard Deviation of RNPD Derived from Options on the DJ Real Estate Index ETF**

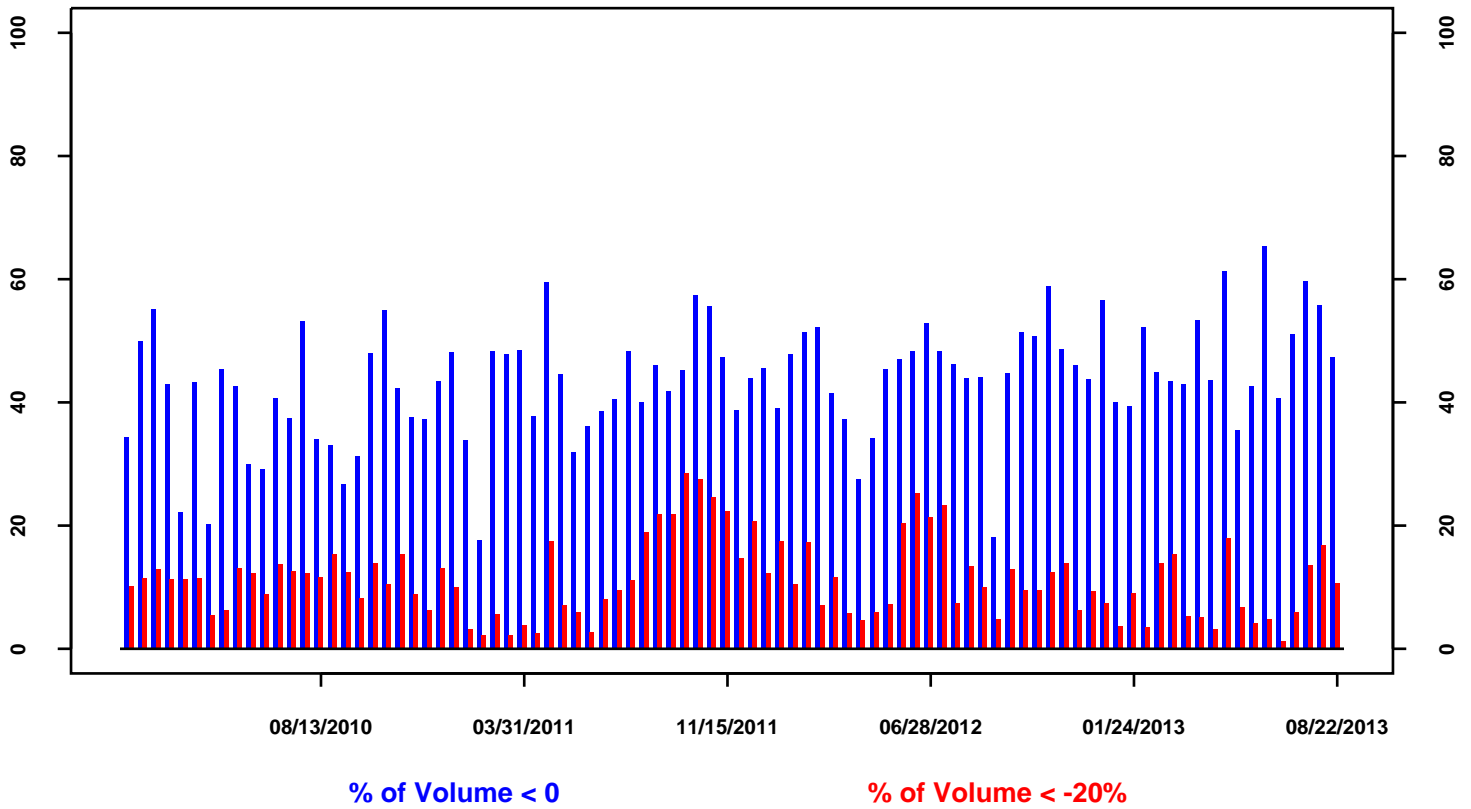


- Risk neutral expectations for high inflation over the next five years look poised to fall further. Longer term expectations for deflation also continue to their downward trend. (Also see *inflation reports*)

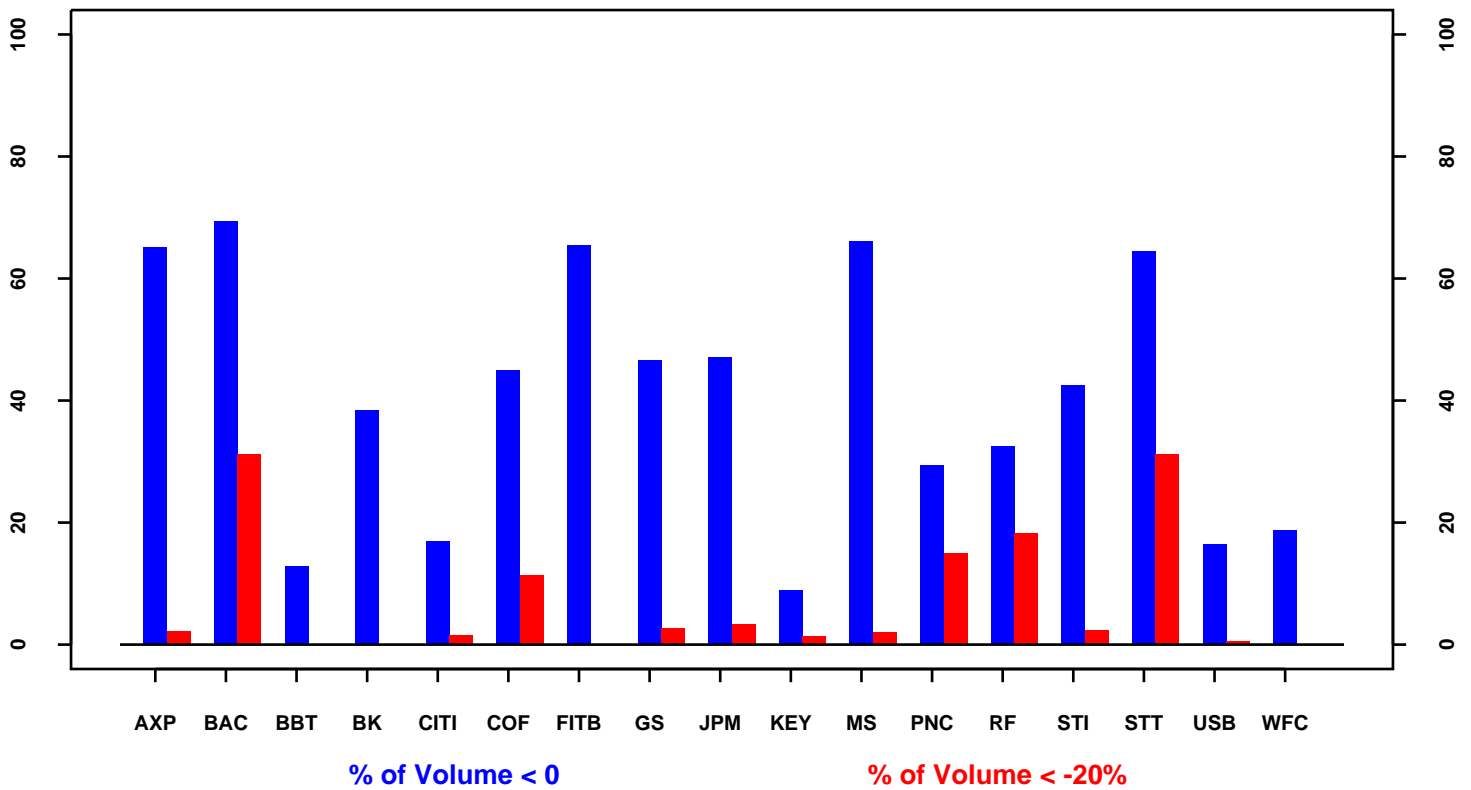
**Probability of Deflation and High Inflation over the next 5 Years**



### Aggregate Volumes for Options on CCAR Banks

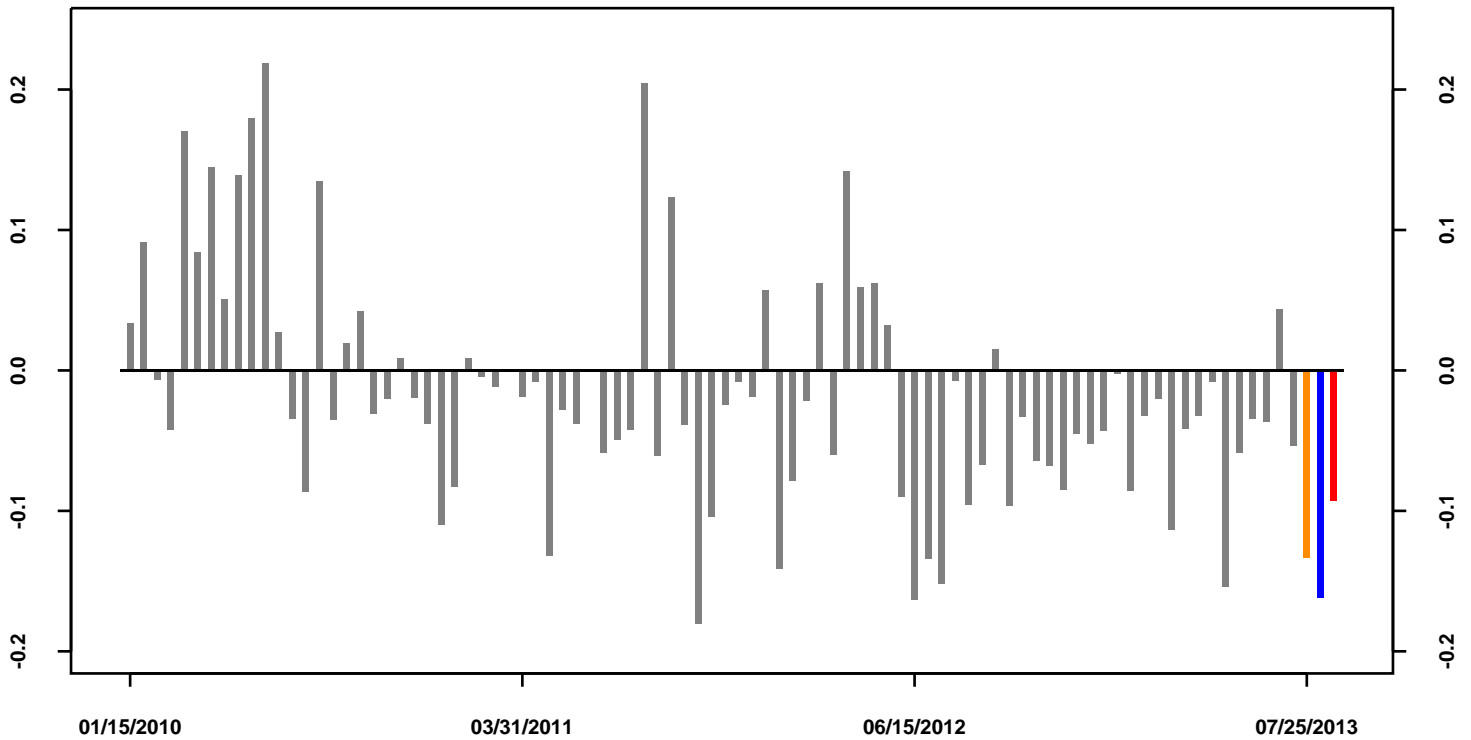


### Volumes for Options on CCAR Banks

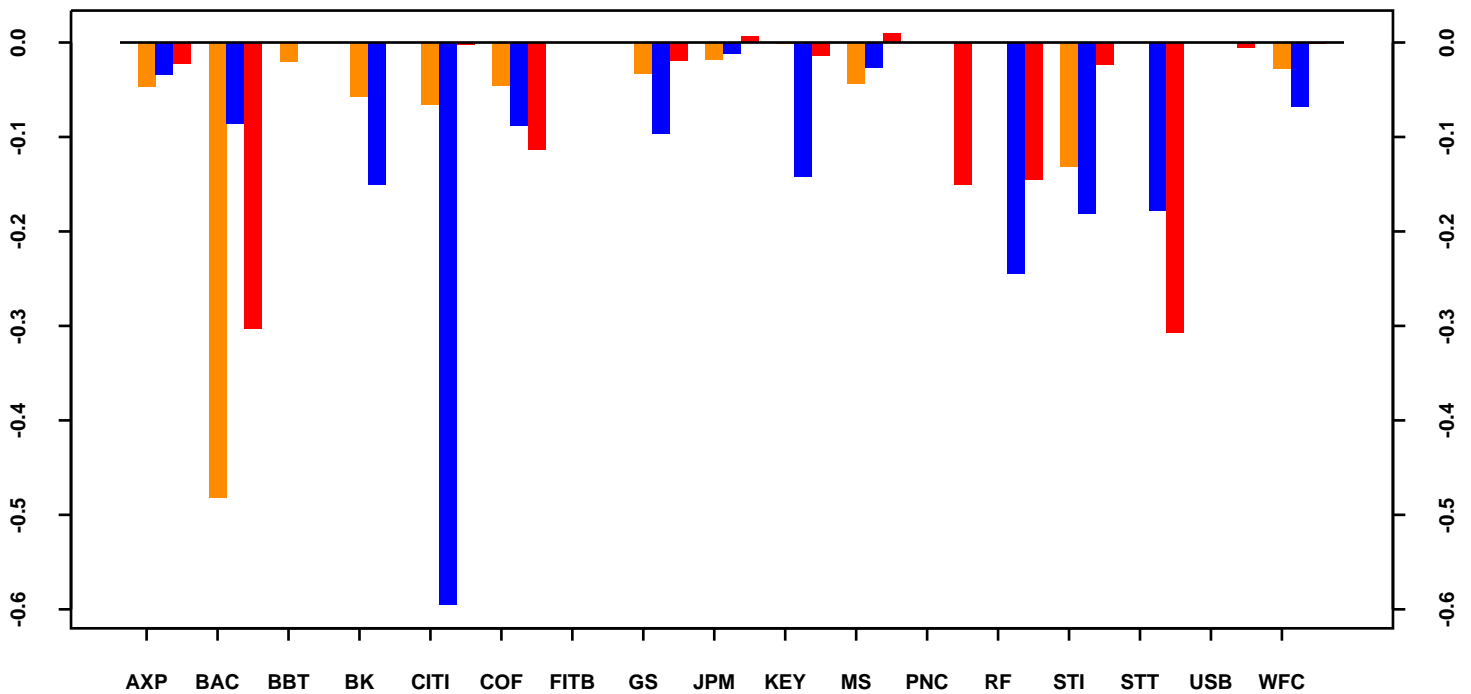


### Aggregate Volume Skew--CCAR Banks

(% 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



07/25/2013

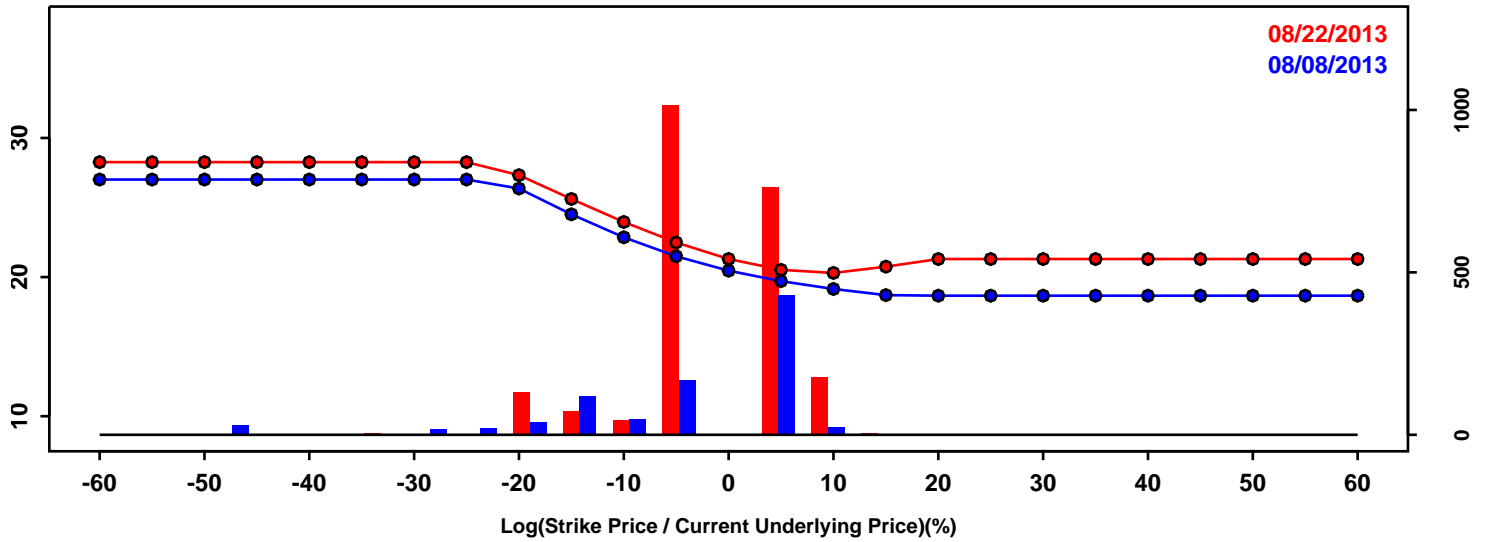
08/08/2013

08/22/2013

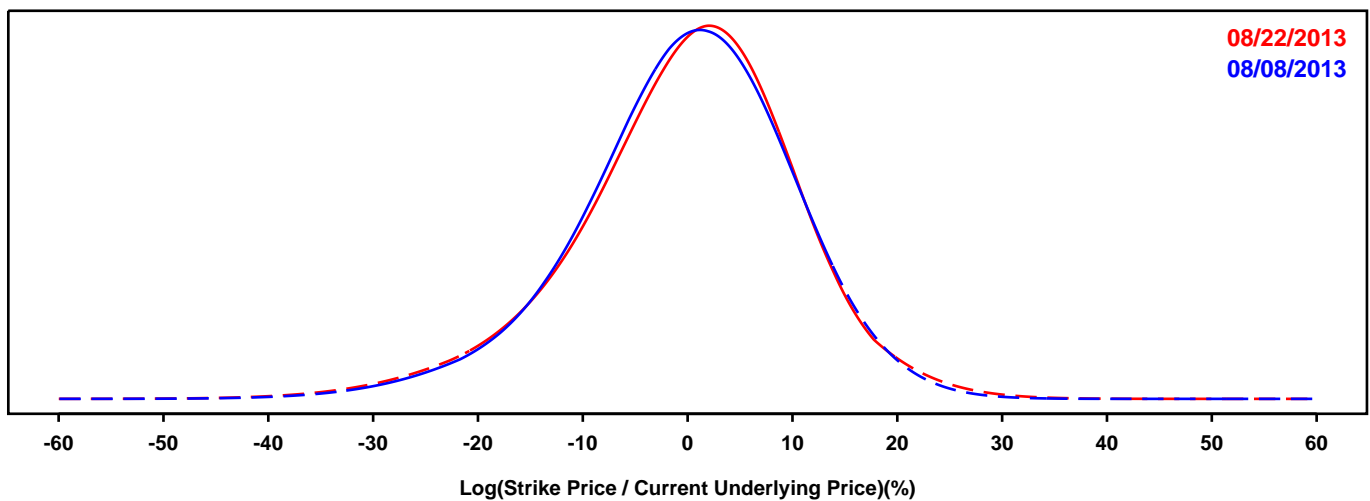
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AMERICAN EXPRESS

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

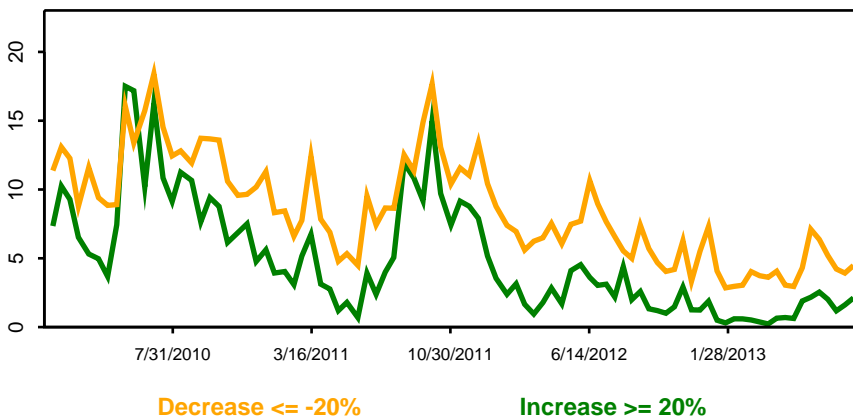
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

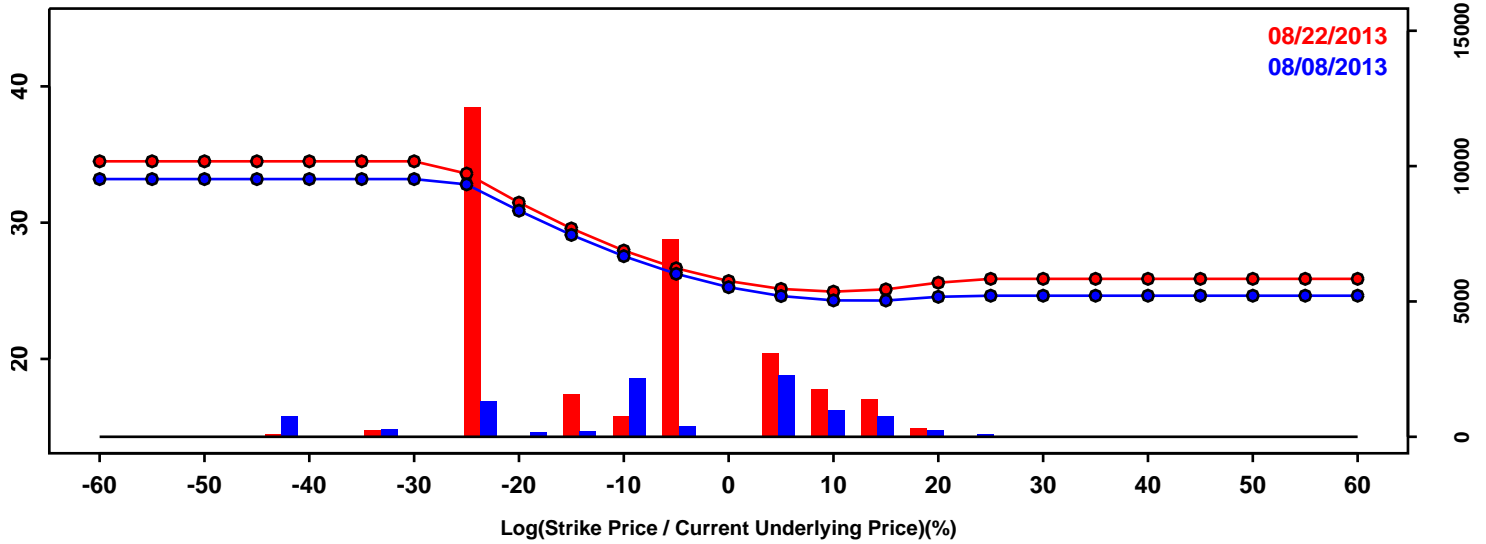


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-13.35%	-13.83%	-0.48%
50th Pct	0.40%	0.67%	0.27%
90th Pct	12.16%	12.31%	0.14%
Mean	-0.19%	-0.12%	0.07%
Std Dev	10.29%	10.66%	0.37%
Skew	-0.44	-0.46	-0.02
Kurtosis	0.66	0.84	0.18

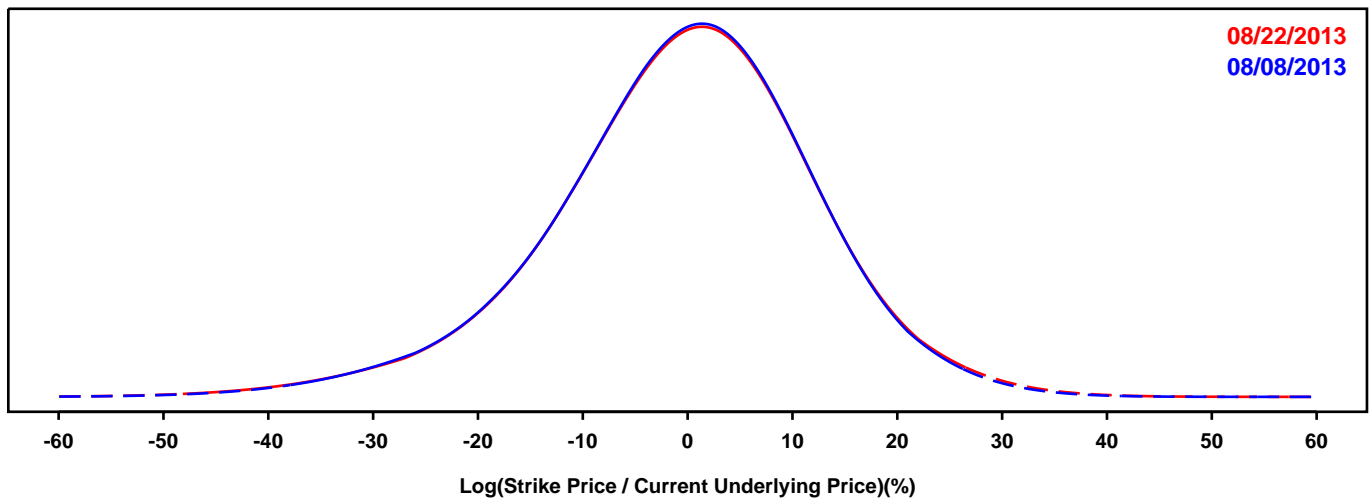
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF AMERICA

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

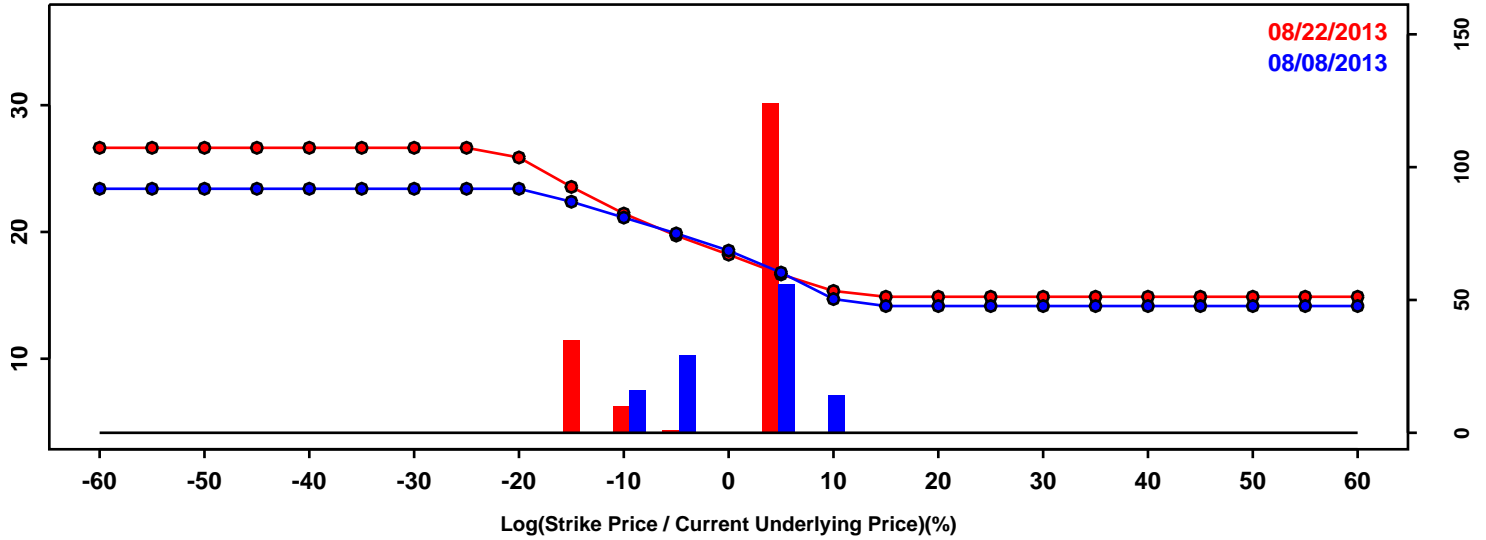


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-16.78%	-16.81%	-0.03%
50th Pct	0.17%	0.23%	0.06%
90th Pct	14.57%	14.90%	0.33%
Mean	-0.58%	-0.48%	0.10%
Std Dev	12.73%	12.93%	0.20%
Skew	-0.41	-0.40	0.01
Kurtosis	0.74	0.83	0.09

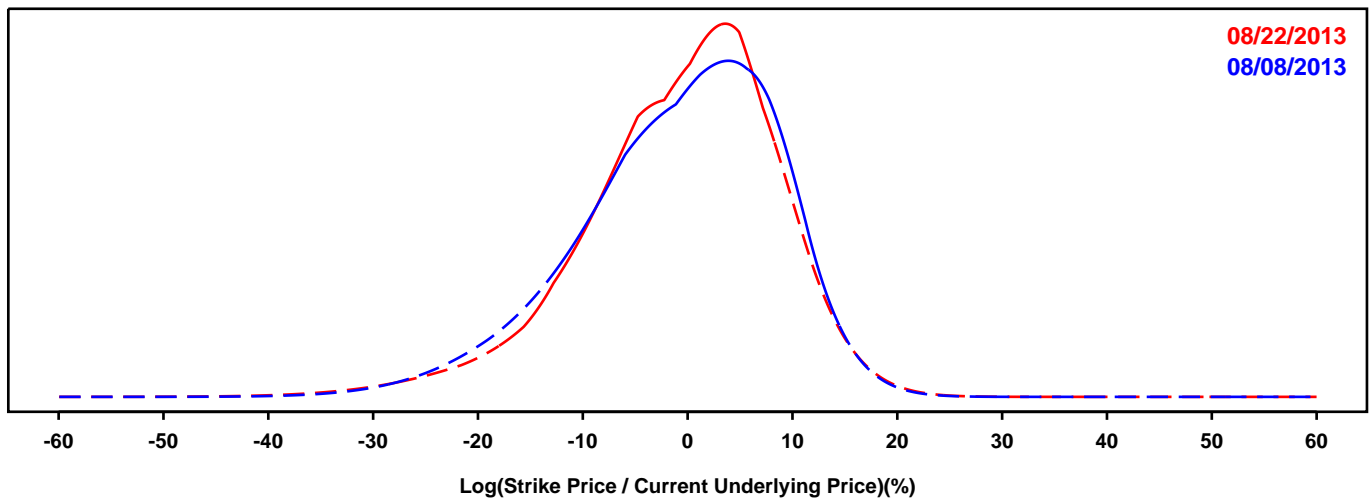
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BB&T

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

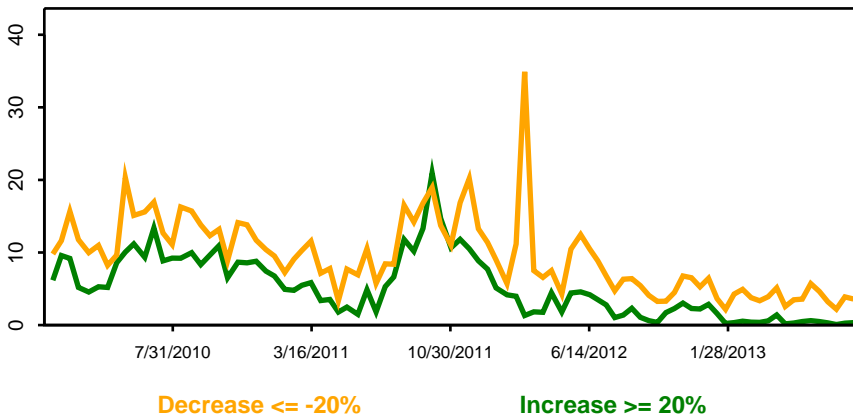
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



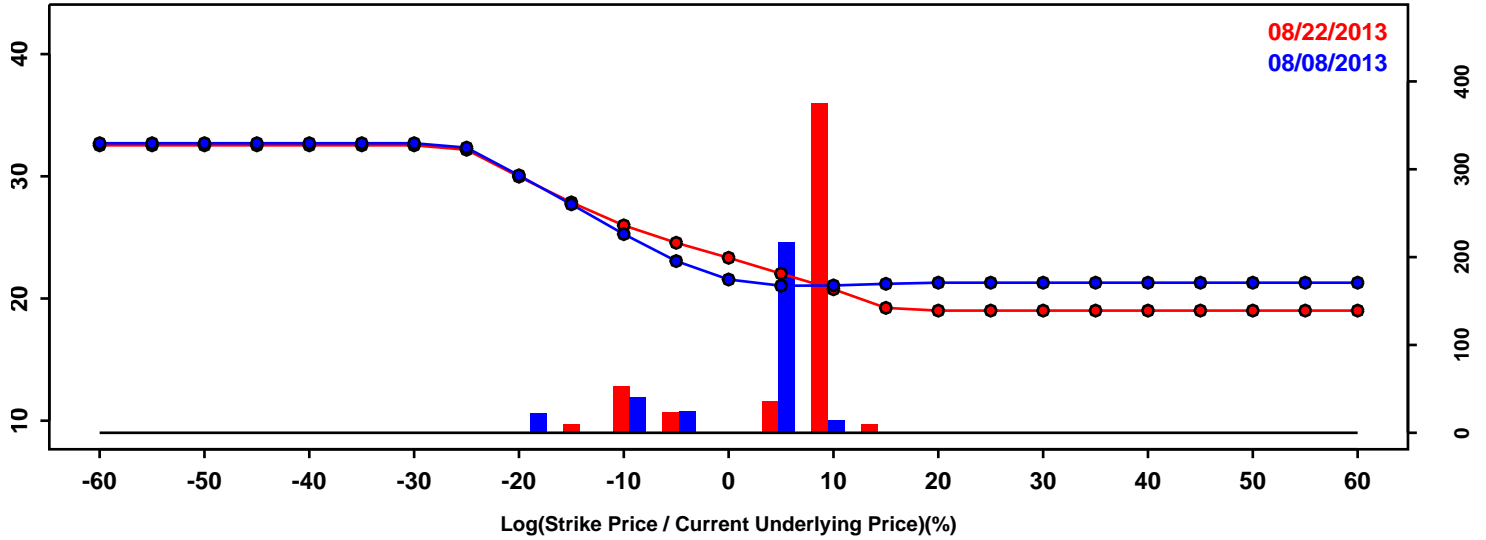
Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-13.83%	-12.71%	1.12%
50th Pct	0.29%	0.35%	0.06%
90th Pct	10.26%	9.99%	-0.28%
Mean	-0.88%	-0.75%	0.13%
Std Dev	9.56%	9.32%	-0.24%
Skew	-0.60	-0.71	-0.10
Kurtosis	0.35	1.02	0.67



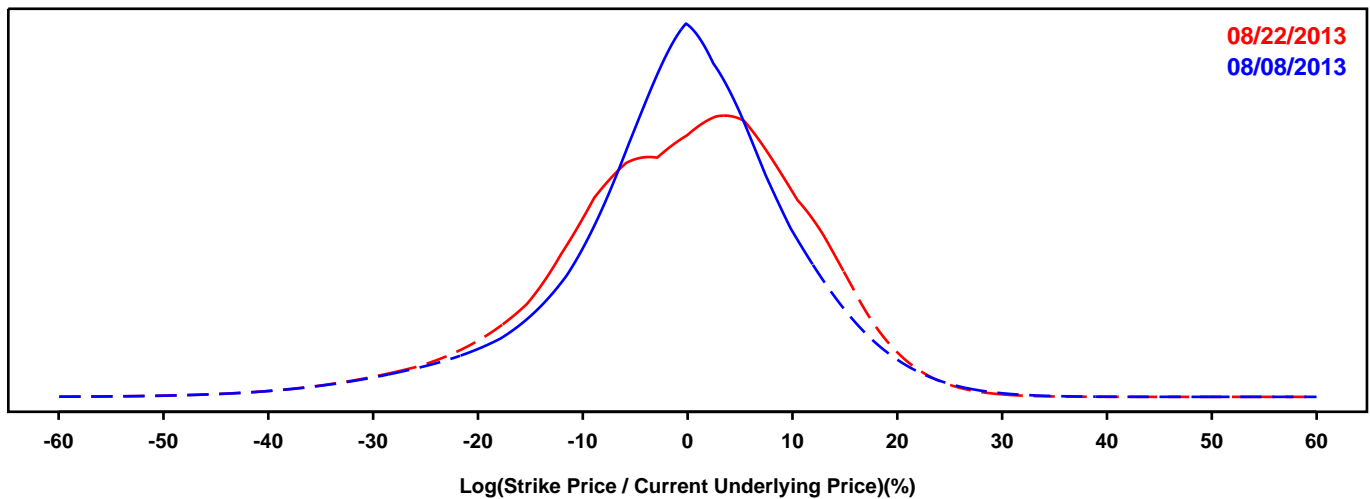
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF NEW YORK MELLON

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

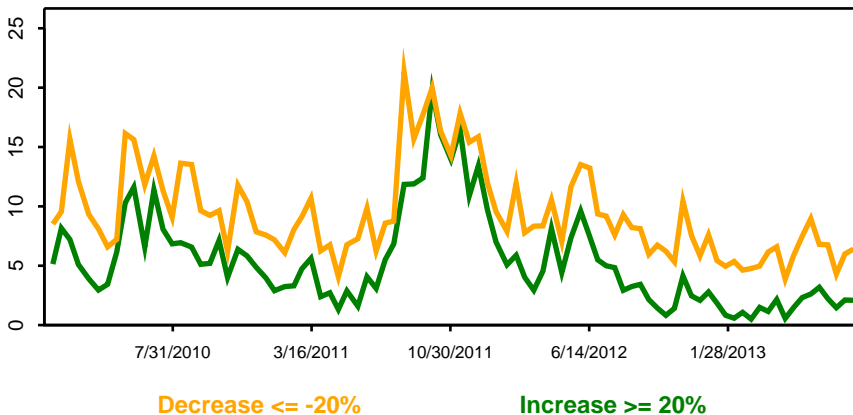
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

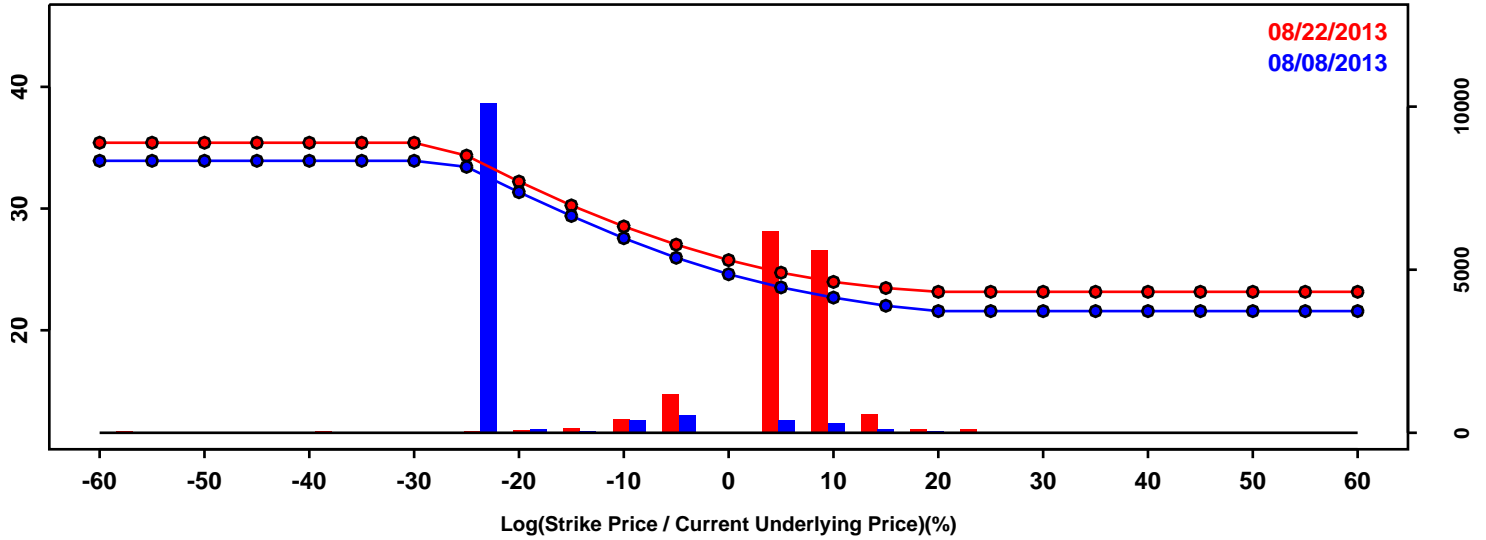


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-14.93%	-15.97%	-1.04%
50th Pct	-0.18%	0.27%	0.46%
90th Pct	12.00%	13.39%	1.39%
Mean	-1.00%	-0.79%	0.21%
Std Dev	11.24%	11.92%	0.68%
Skew	-0.66	-0.61	0.06
Kurtosis	1.55	0.79	-0.76

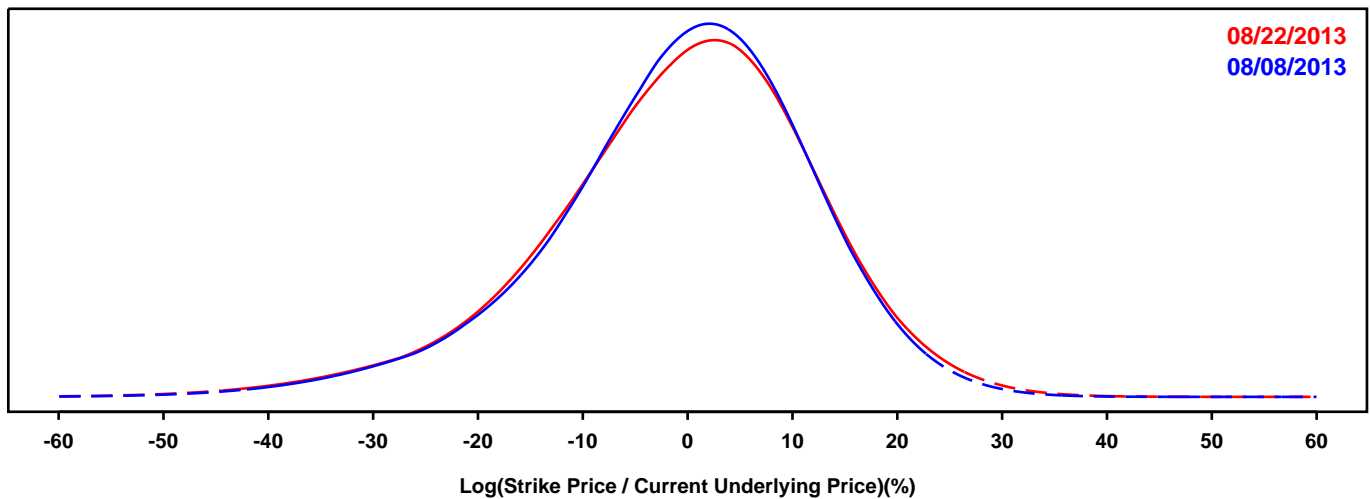
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CITIGROUP

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

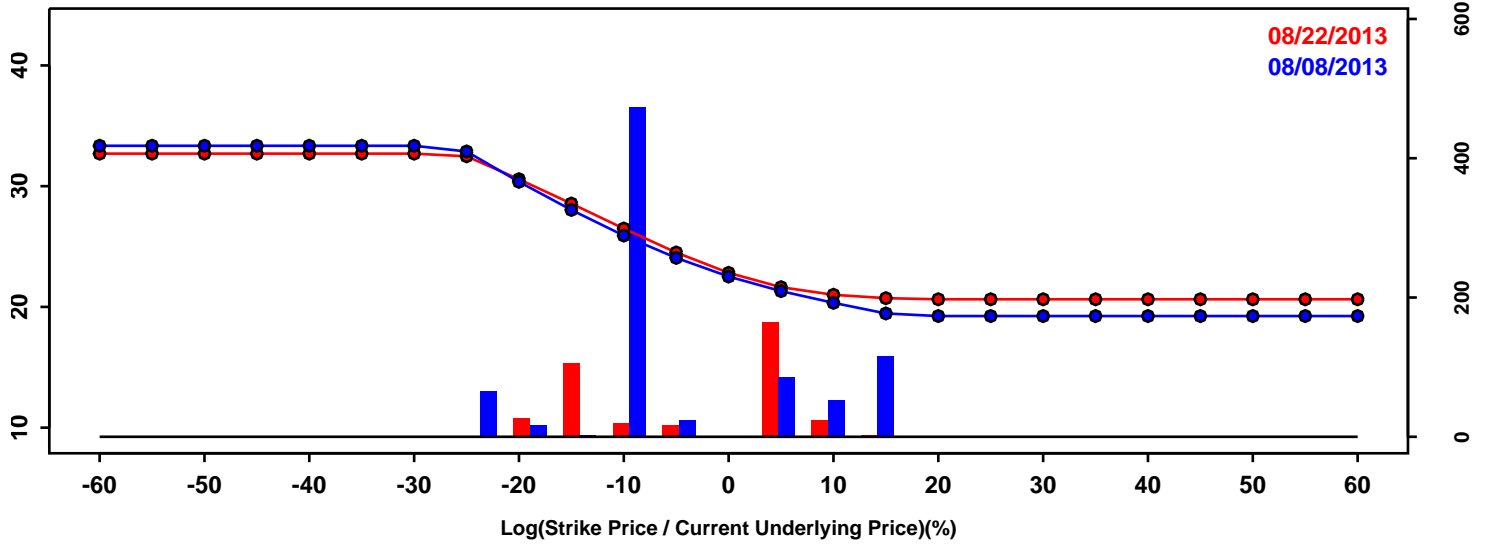


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-16.98%	-17.48%	-0.49%
50th Pct	0.44%	0.43%	-0.01%
90th Pct	14.10%	14.71%	0.61%
Mean	-0.69%	-0.67%	0.01%
Std Dev	12.59%	13.09%	0.50%
Skew	-0.59	-0.55	0.04
Kurtosis	0.86	0.84	-0.02

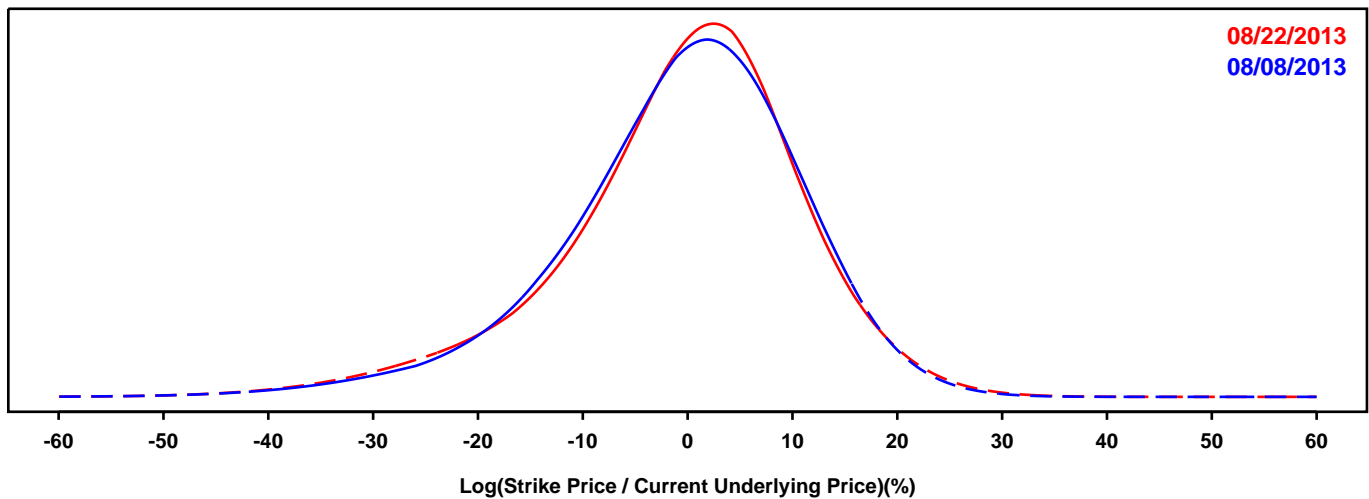
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CAPITAL ONE

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

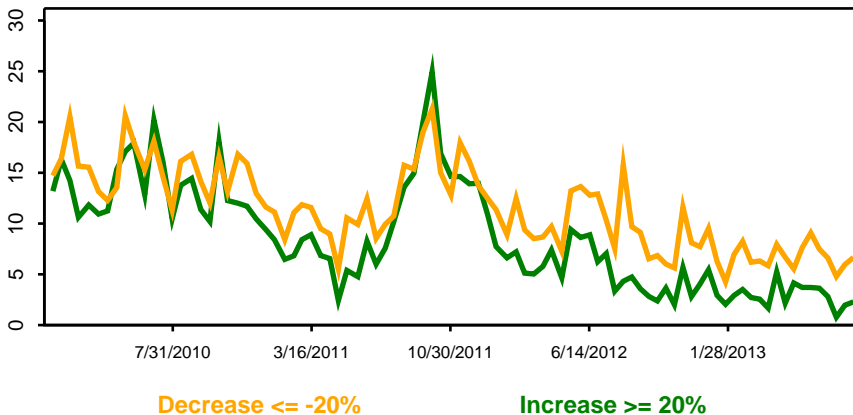
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

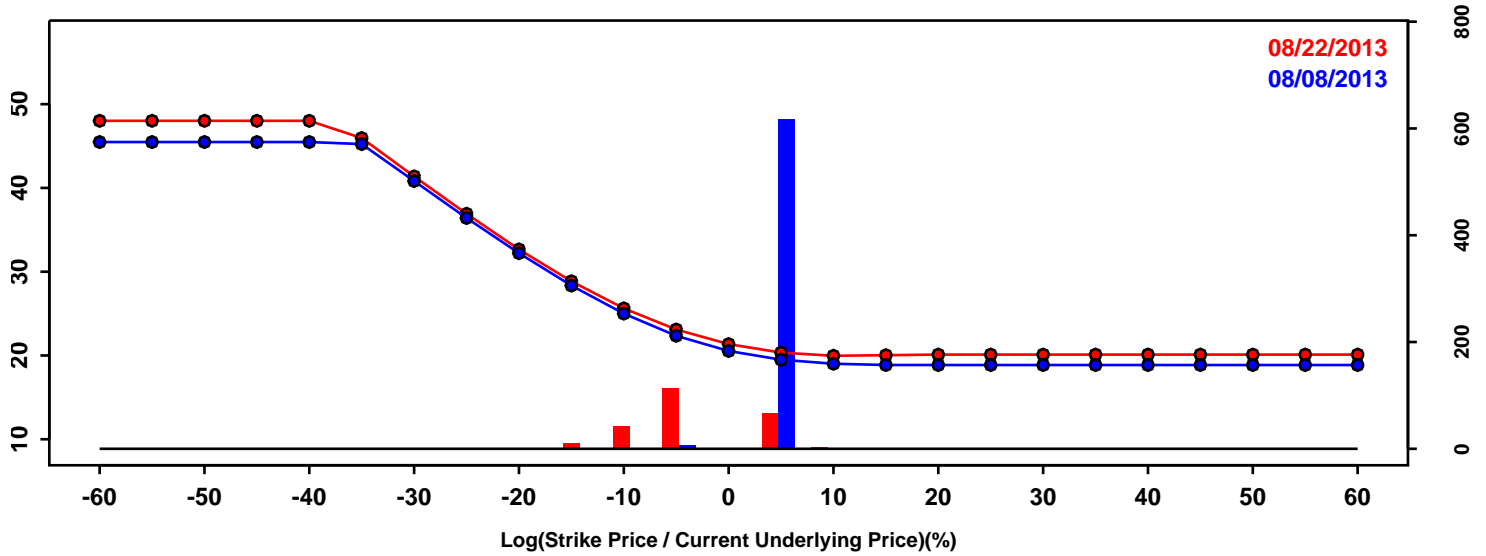


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-15.42%	-15.92%	-0.51%
50th Pct	0.48%	0.66%	0.18%
90th Pct	12.85%	12.79%	-0.07%
Mean	-0.61%	-0.63%	-0.01%
Std Dev	11.57%	11.78%	0.21%
Skew	-0.69	-0.71	-0.02
Kurtosis	1.15	1.19	0.04

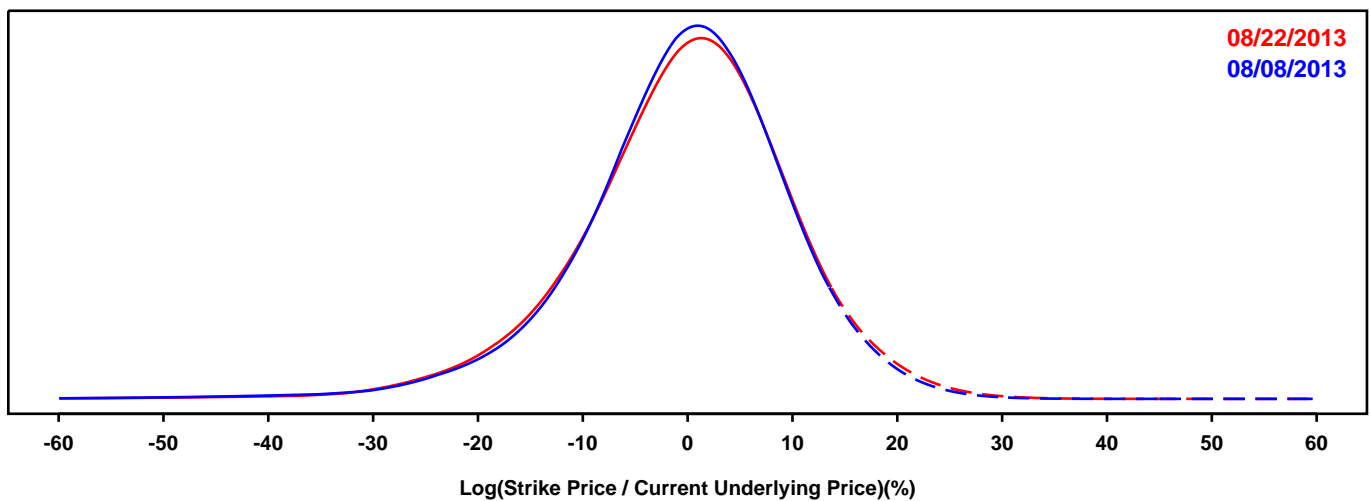
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- FIFTH THIRD

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

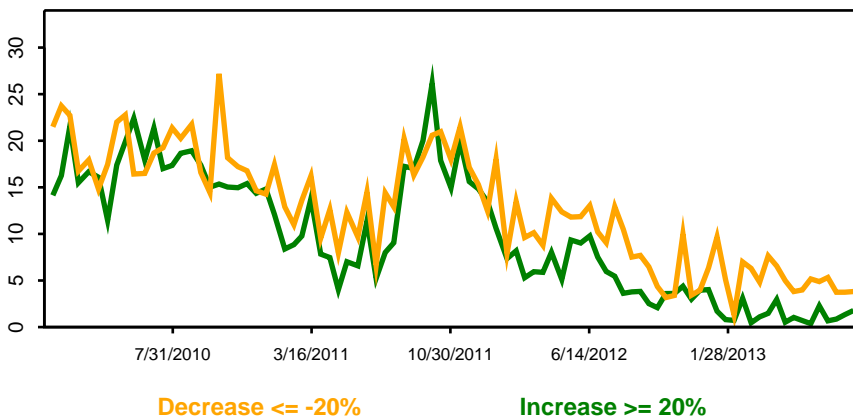
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

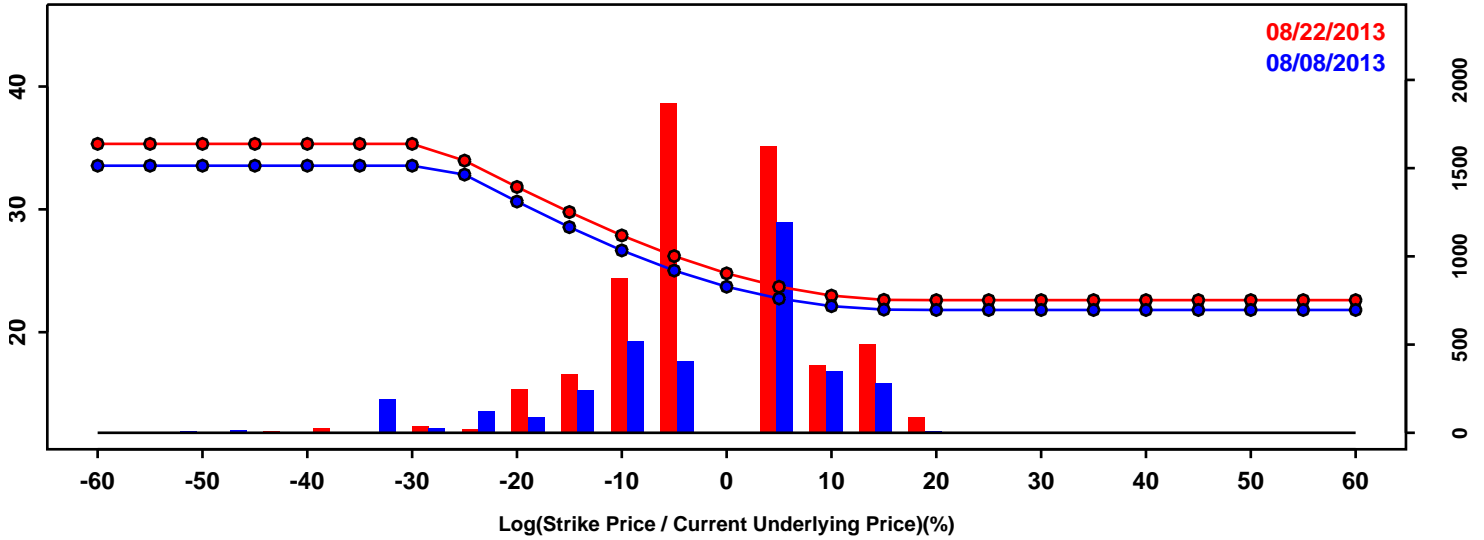


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-12.63%	-13.06%	-0.43%
50th Pct	0.34%	0.42%	0.07%
90th Pct	11.39%	11.85%	0.46%
Mean	-0.38%	-0.25%	0.13%
Std Dev	10.24%	10.44%	0.20%
Skew	-0.86	-0.72	0.14
Kurtosis	2.99	2.53	-0.47

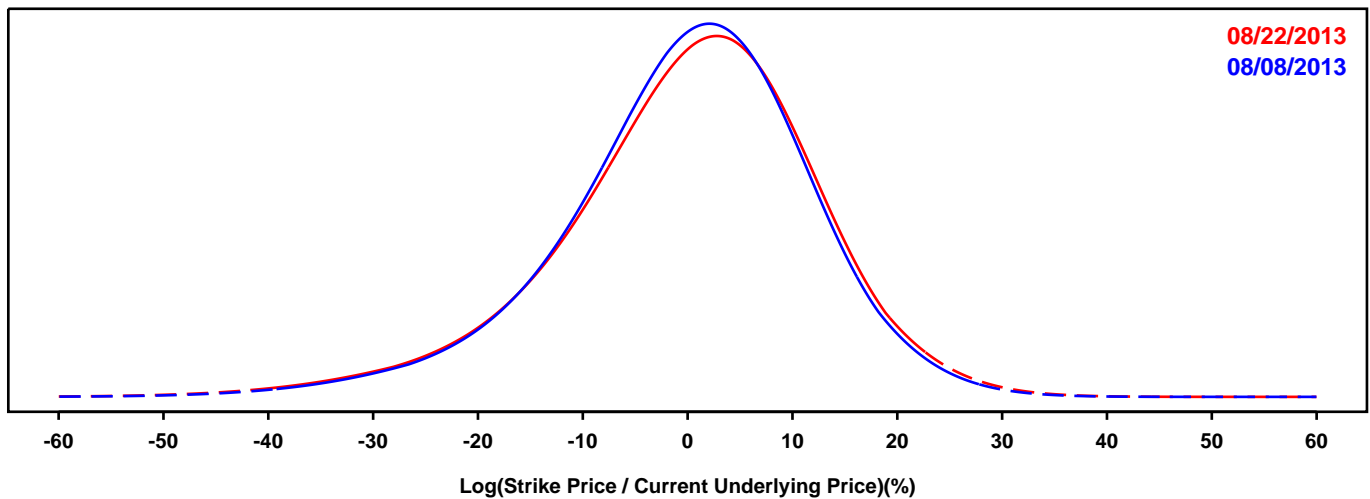
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLDMAN SACHS

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

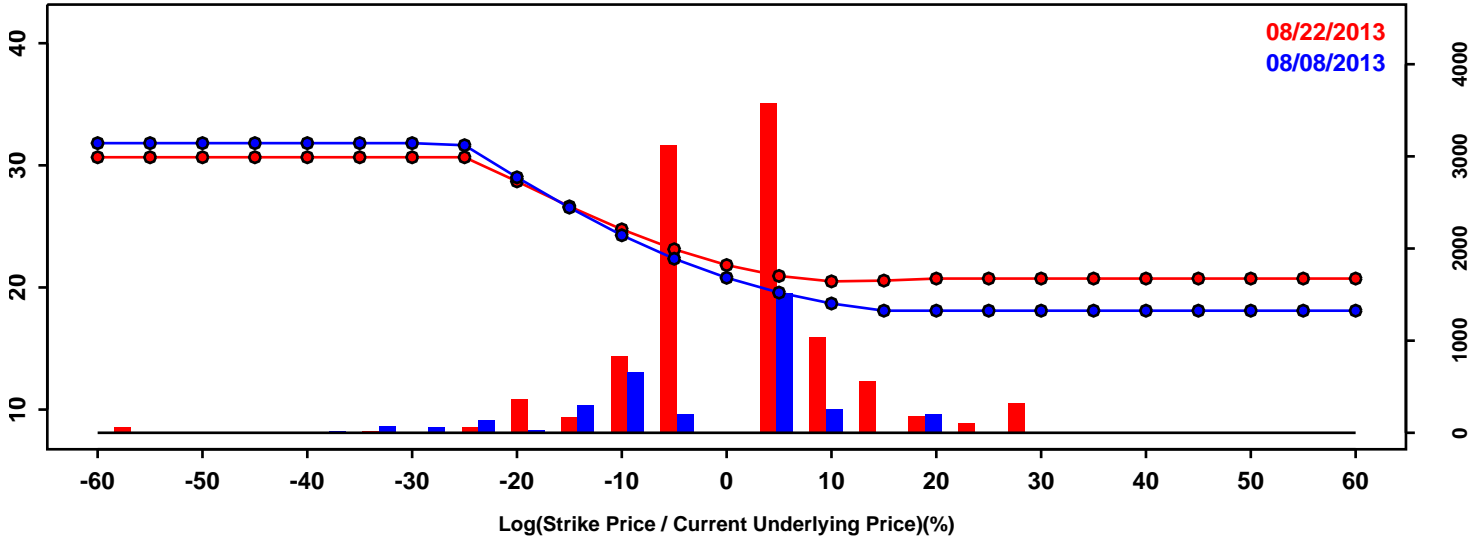


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-15.47%	-15.98%	-0.51%
50th Pct	0.70%	1.07%	0.36%
90th Pct	13.74%	14.43%	0.70%
Mean	-0.23%	-0.02%	0.22%
Std Dev	11.95%	12.47%	0.52%
Skew	-0.56	-0.60	-0.03
Kurtosis	1.00	1.04	0.05

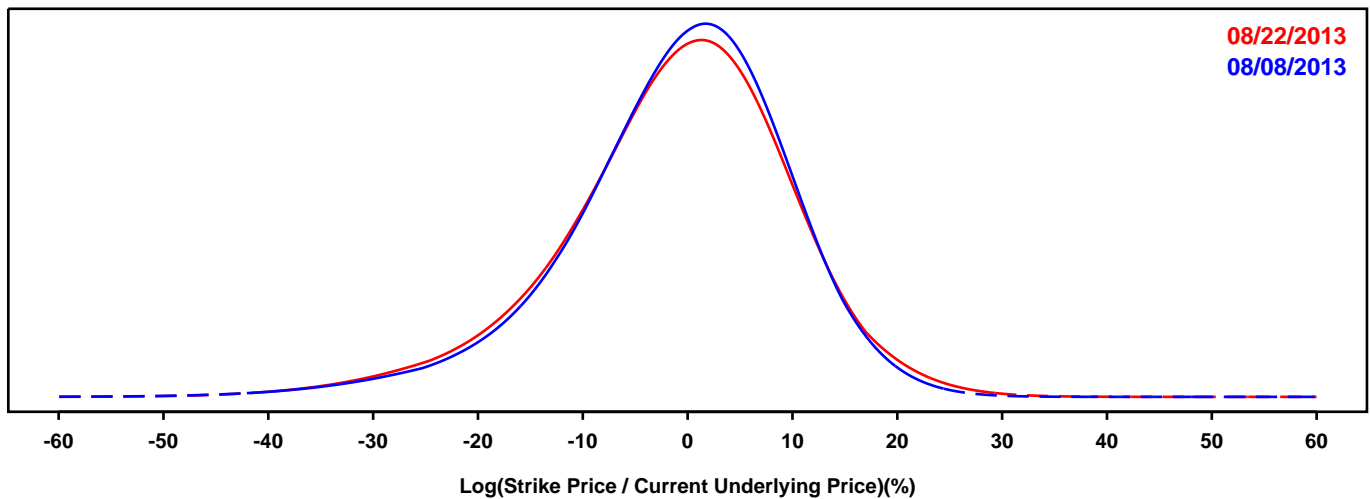
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- JP MORGAN

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

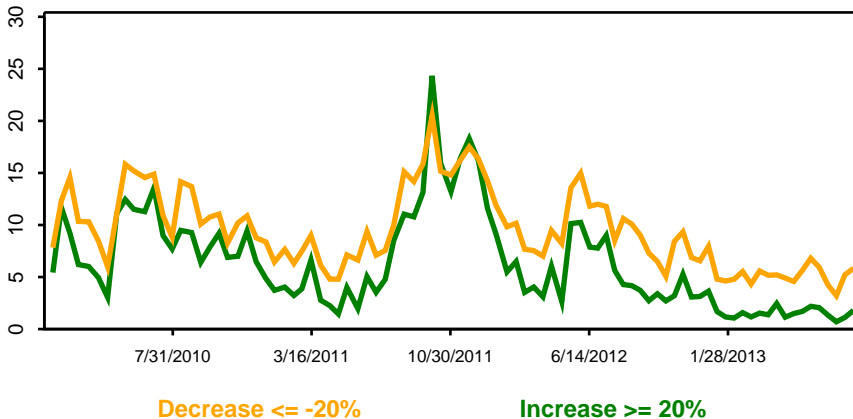
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

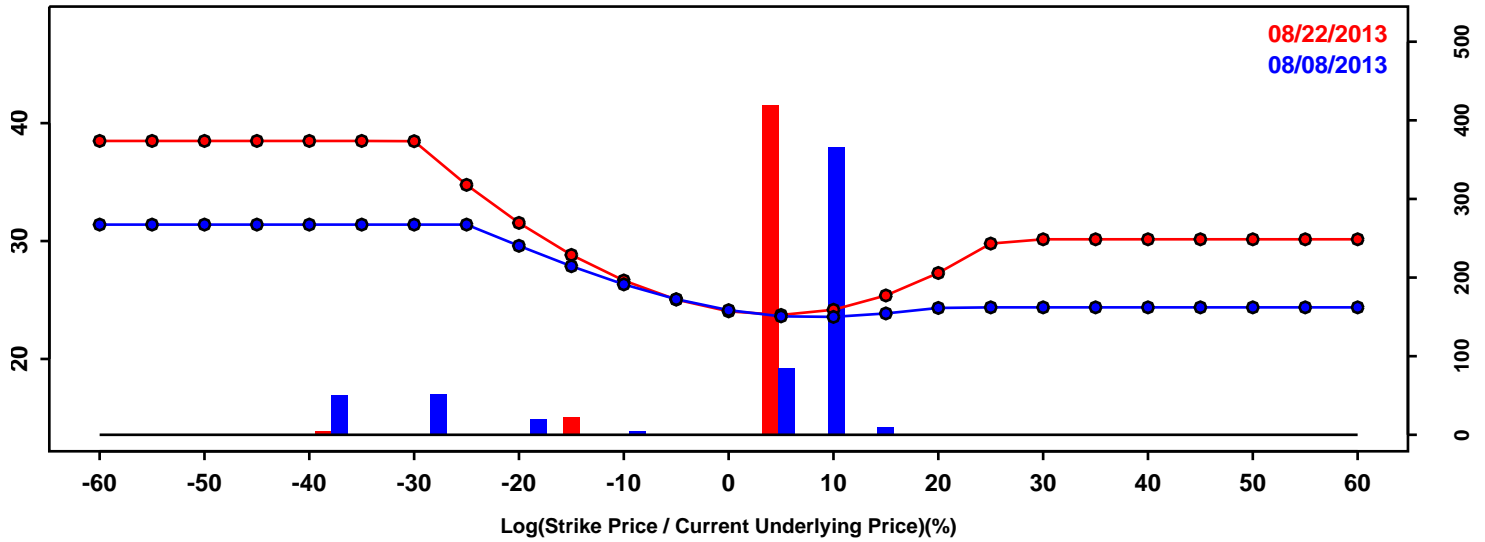


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-14.58%	-15.46%	-0.88%
50th Pct	0.04%	-0.19%	-0.23%
90th Pct	11.30%	11.81%	0.51%
Mean	-1.01%	-1.14%	-0.14%
Std Dev	10.71%	11.16%	0.46%
Skew	-0.72	-0.57	0.15
Kurtosis	1.31	0.98	-0.33

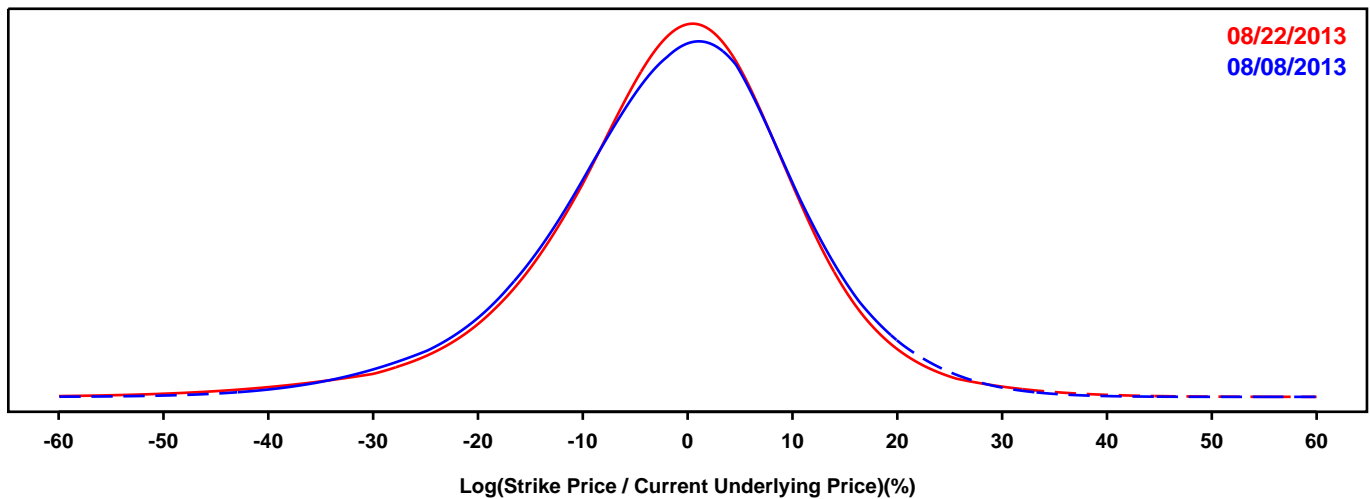
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- KEYCORP

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

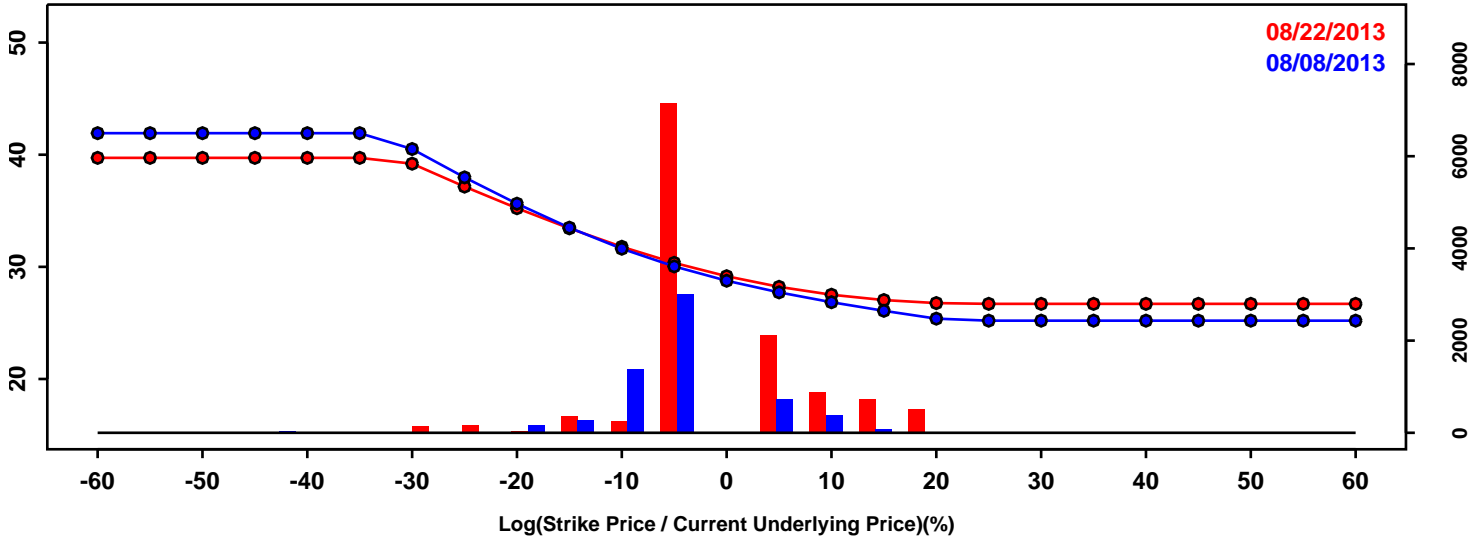


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-16.94%	-16.63%	0.31%
50th Pct	-0.59%	-0.66%	-0.07%
90th Pct	13.17%	12.62%	-0.55%
Mean	-1.36%	-1.48%	-0.12%
Std Dev	12.24%	12.44%	0.20%
Skew	-0.38	-0.53	-0.14
Kurtosis	0.75	1.70	0.95

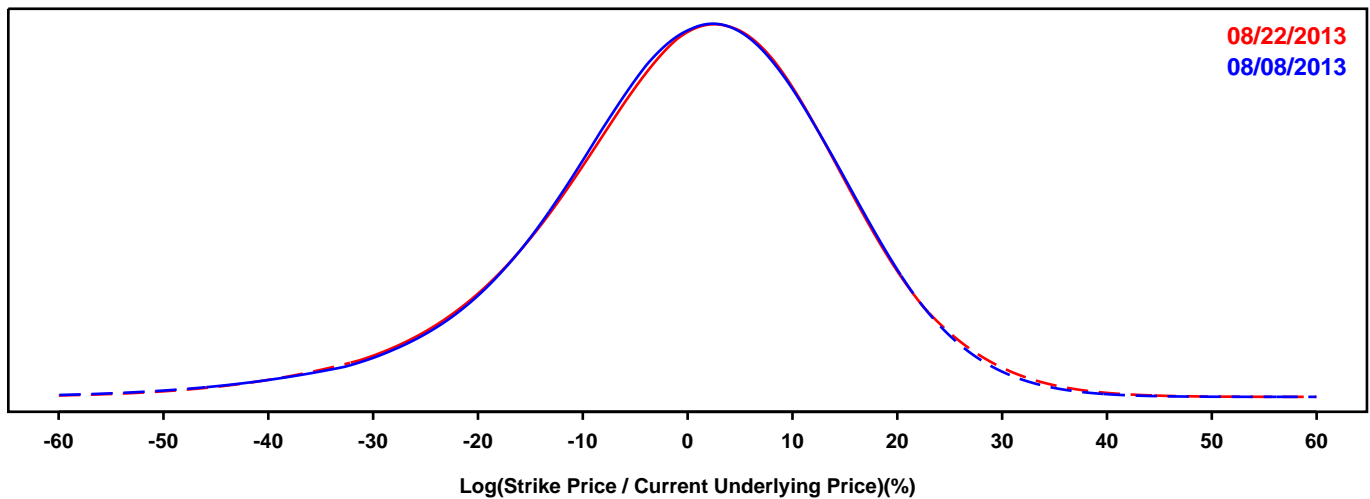
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- MORGAN STANLEY

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



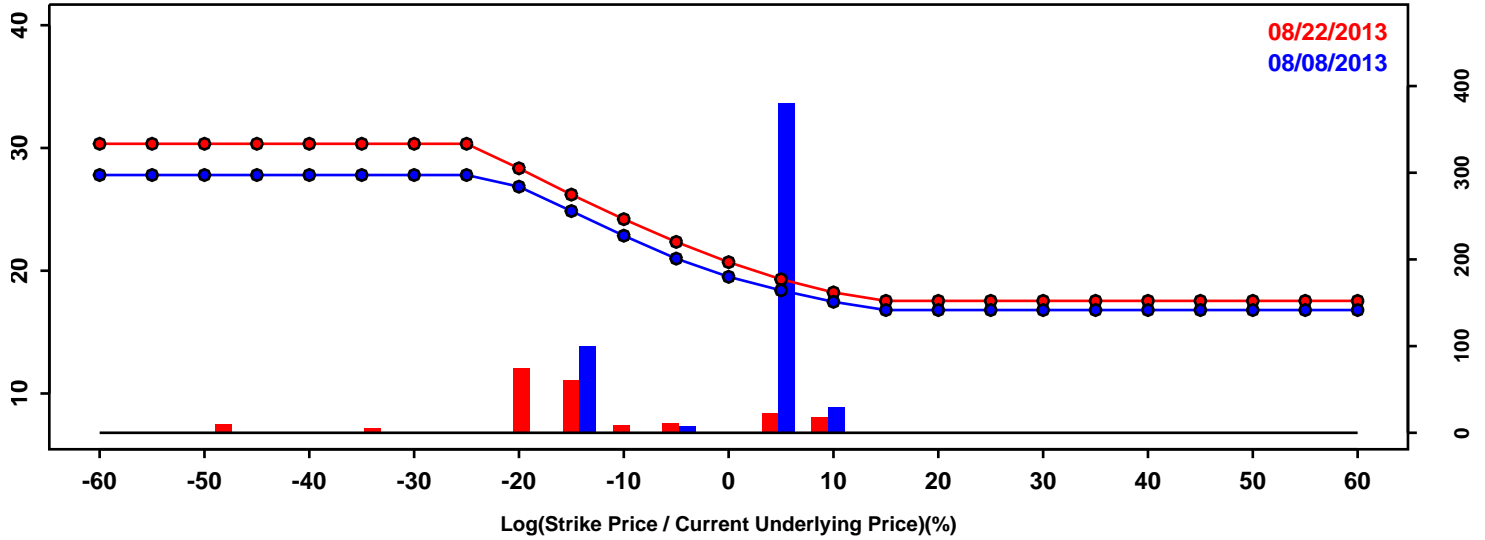
Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-18.52%	-18.76%	-0.24%
50th Pct	0.95%	1.07%	0.11%
90th Pct	17.03%	17.30%	0.27%
Mean	-0.15%	0.01%	0.15%
Std Dev	14.53%	14.63%	0.10%
Skew	-0.59	-0.51	0.08
Kurtosis	1.03	0.83	-0.21



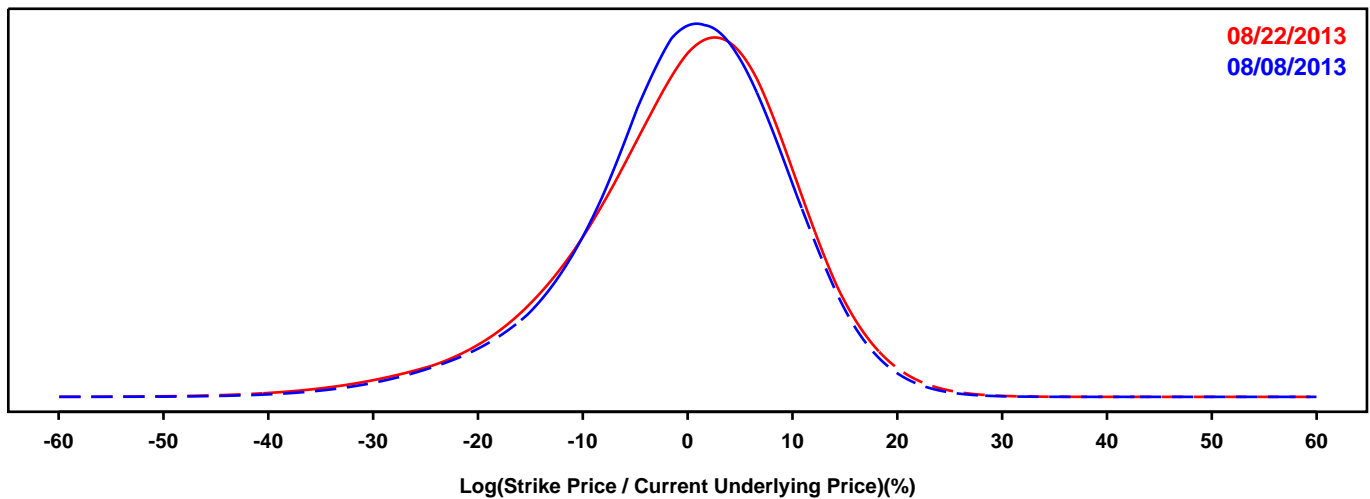
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PNC FINANCIAL

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

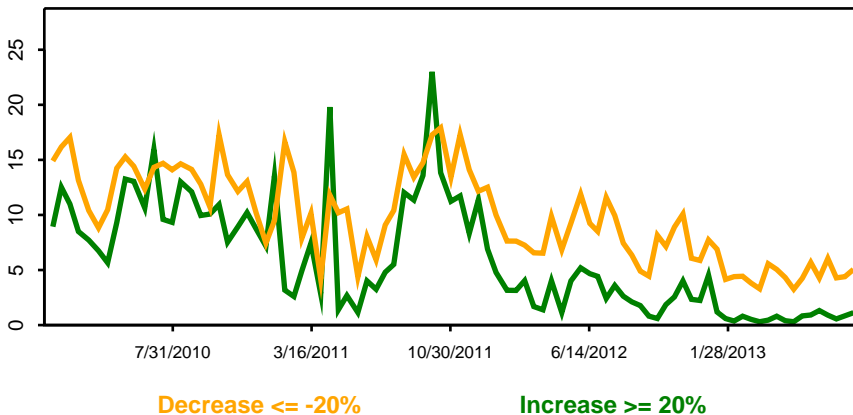
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

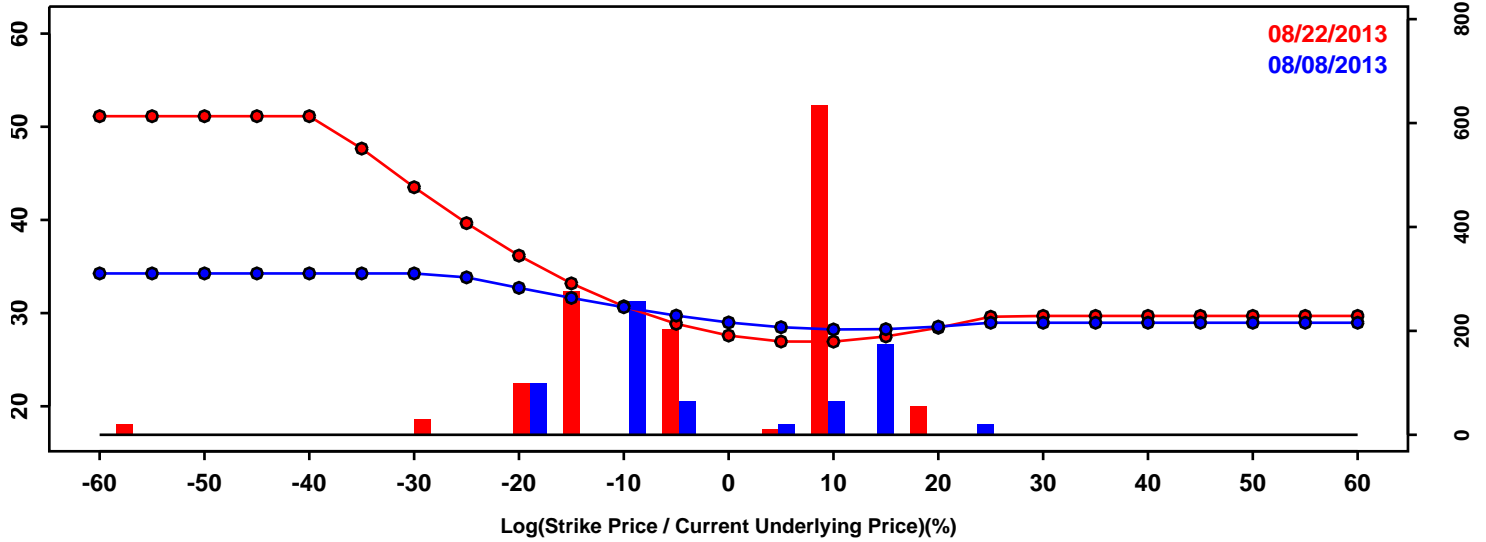


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-13.46%	-14.38%	-0.92%
50th Pct	0.30%	0.69%	0.39%
90th Pct	11.12%	11.64%	0.52%
Mean	-0.58%	-0.52%	0.05%
Std Dev	10.02%	10.64%	0.61%
Skew	-0.66	-0.72	-0.07
Kurtosis	1.02	1.10	0.08

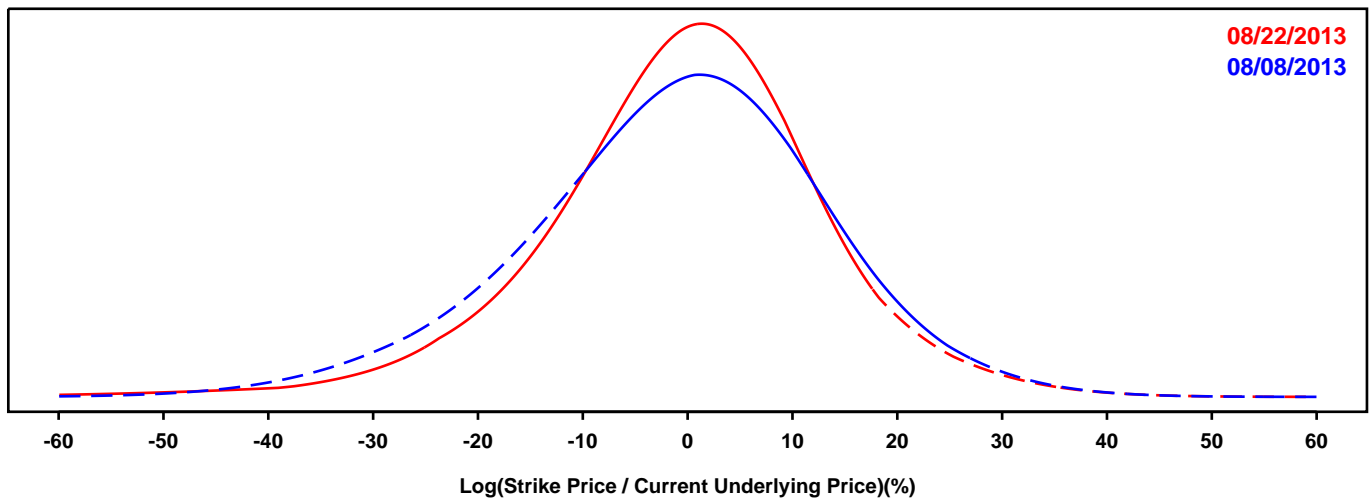
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- REGIONS FINANCIAL

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

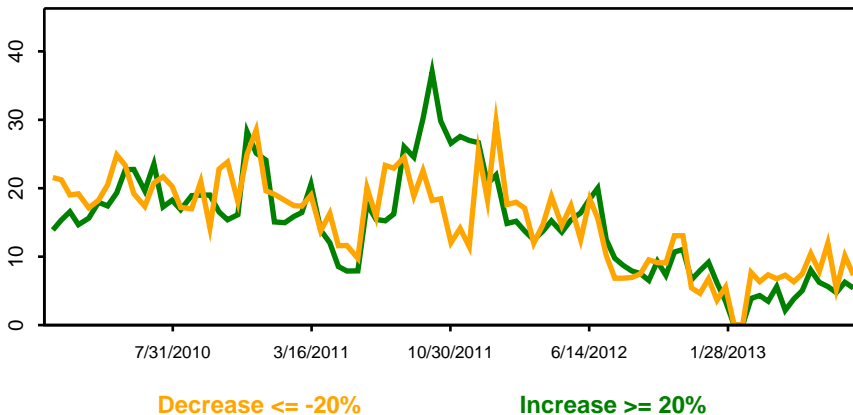
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

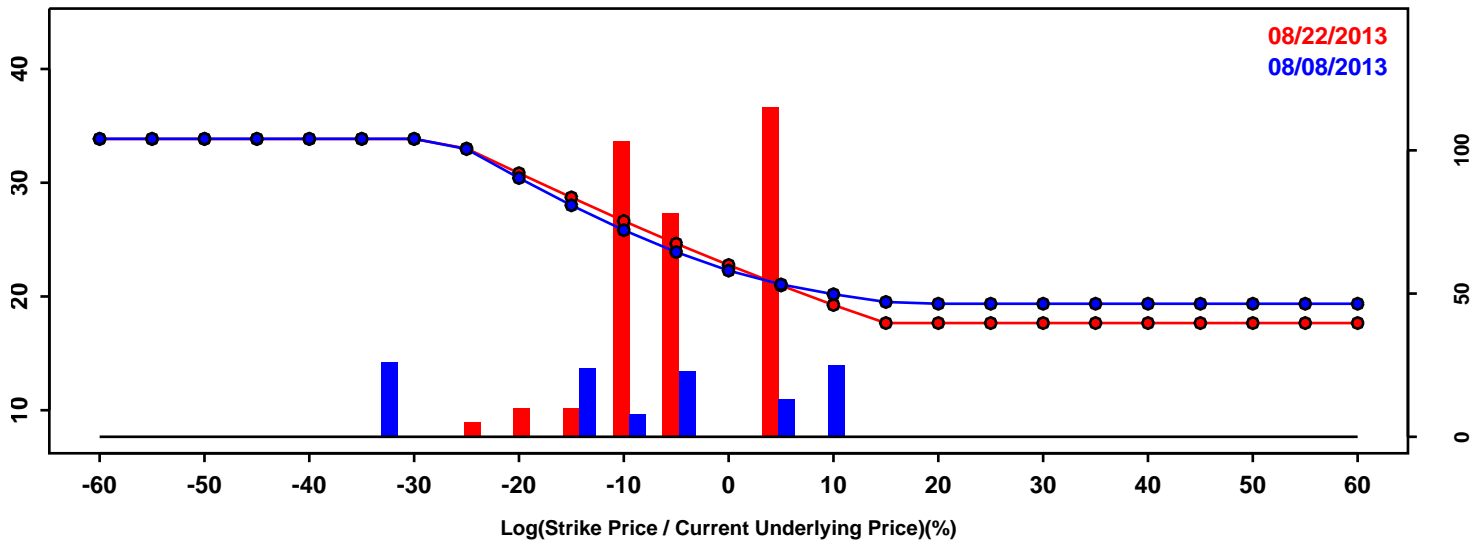


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-20.10%	-17.08%	3.02%
50th Pct	-0.30%	0.32%	0.62%
90th Pct	16.54%	15.42%	-1.12%
Mean	-1.09%	-0.42%	0.67%
Std Dev	14.61%	13.76%	-0.85%
Skew	-0.28	-0.56	-0.28
Kurtosis	0.41	2.07	1.66

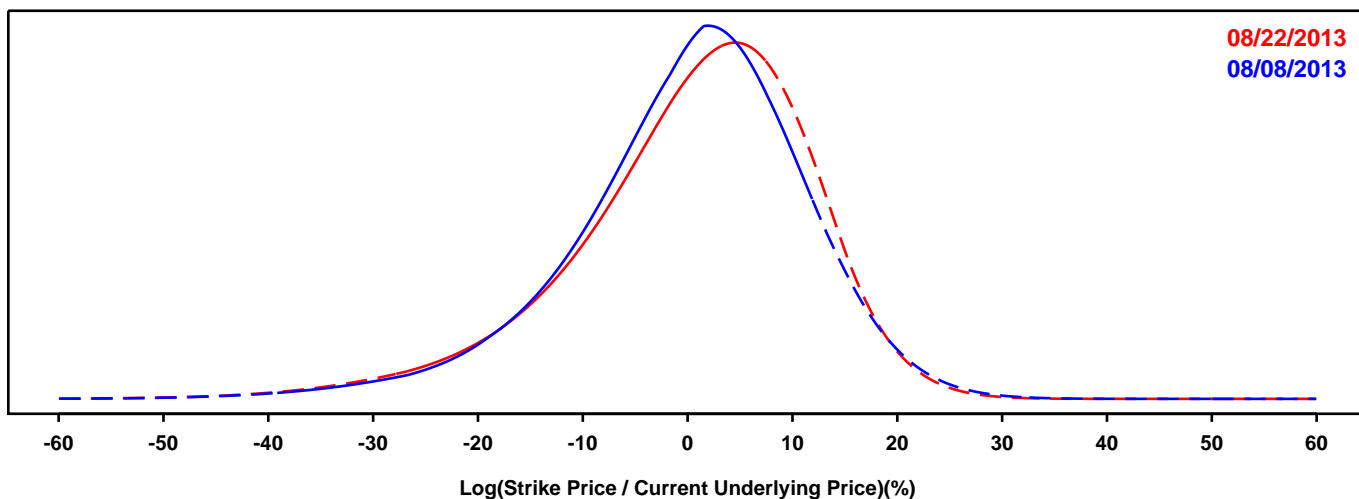
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SUNTRUST

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

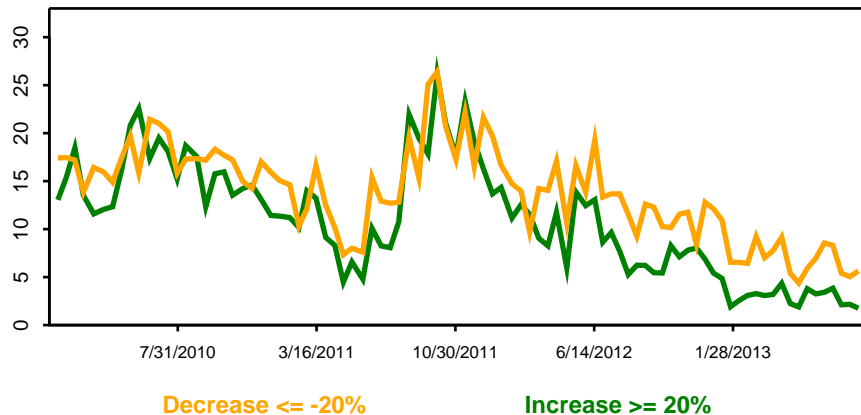
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



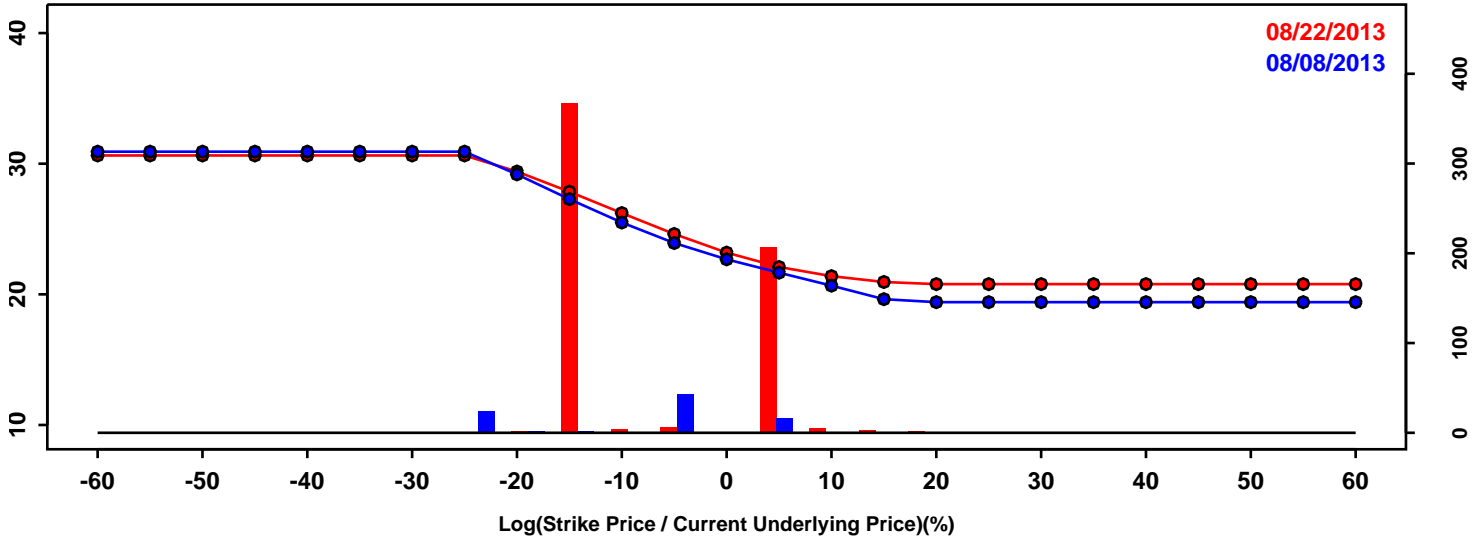
Statistics of the Log Return Distributions

	08/08/2013	08/22/2013	Change
10th Pct	-14.26%	-14.78%	-0.51%
50th Pct	1.10%	1.90%	0.79%
90th Pct	13.11%	13.37%	0.26%
Mean	0.06%	0.38%	0.32%
Std Dev	11.24%	11.52%	0.28%
Skew	-0.68	-0.83	-0.14
Kurtosis	1.27	1.24	-0.04

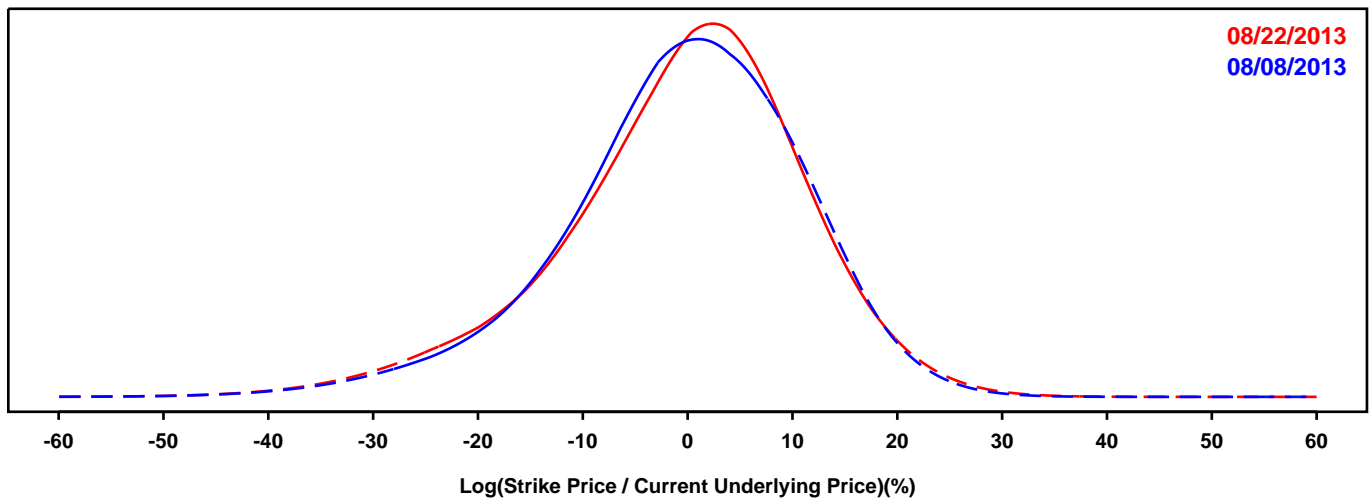
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- STATE STREET

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

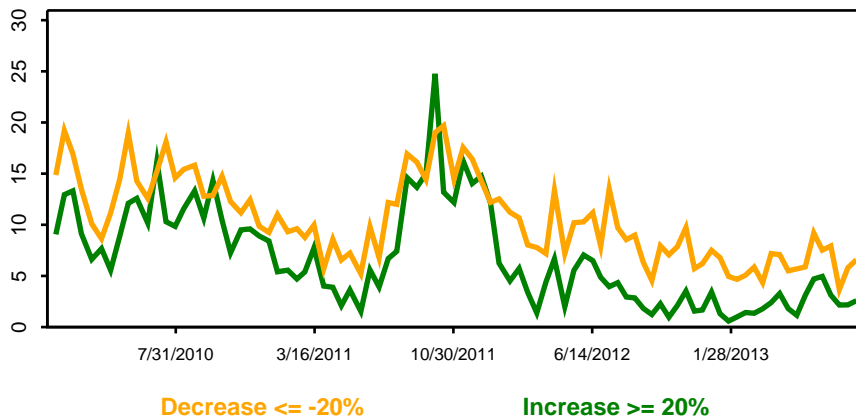
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

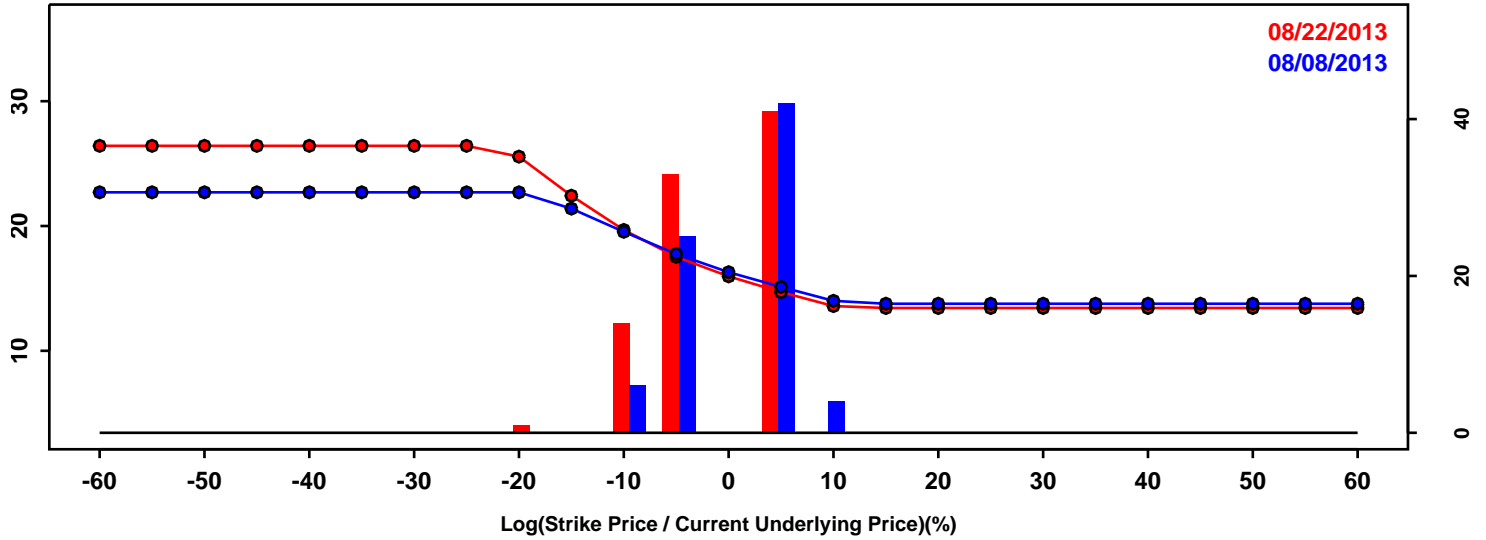


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-15.31%	-16.10%	-0.79%
50th Pct	0.39%	0.65%	0.26%
90th Pct	13.23%	13.28%	0.05%
Mean	-0.47%	-0.50%	-0.02%
Std Dev	11.53%	11.84%	0.31%
Skew	-0.56	-0.58	-0.01
Kurtosis	0.78	0.77	-0.01

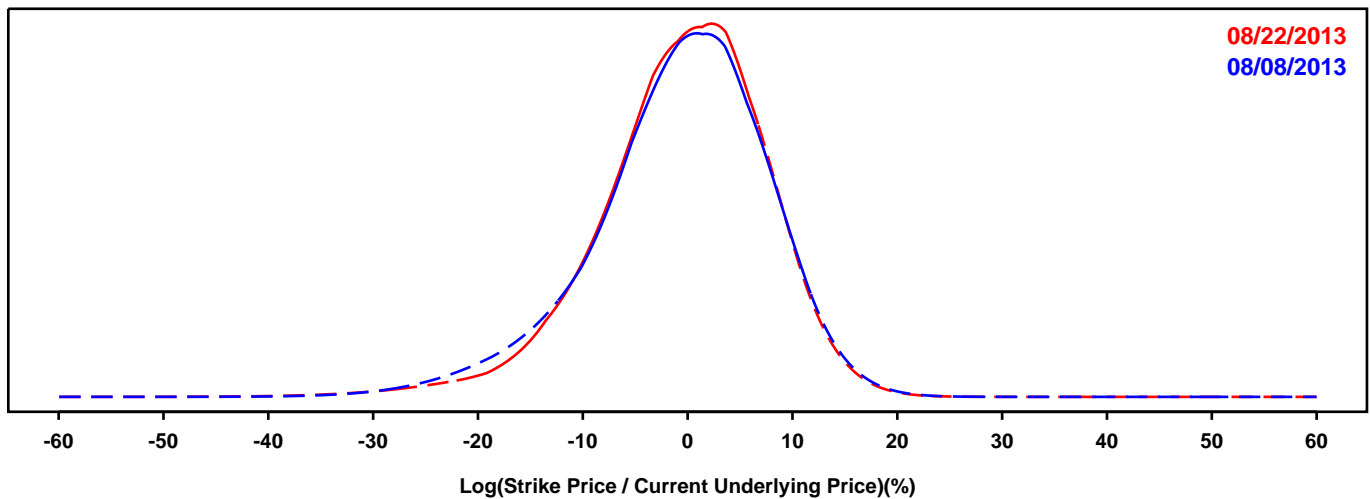
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- US BANCORP

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

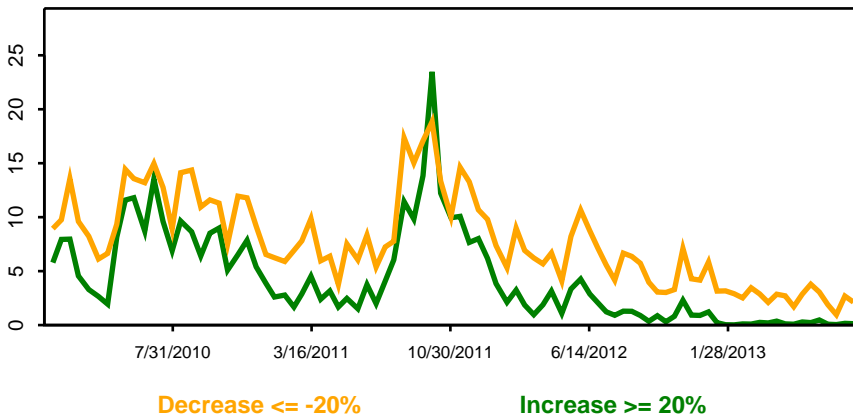
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

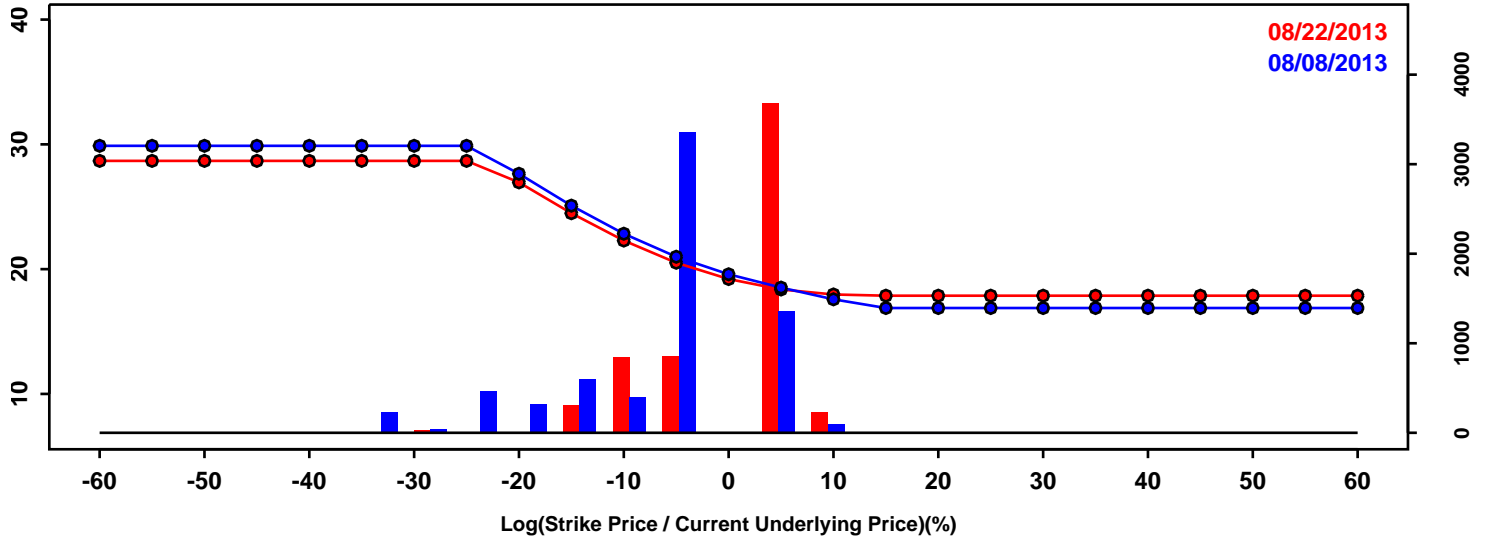


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-11.81%	-10.71%	1.10%
50th Pct	0.04%	0.16%	0.12%
90th Pct	9.09%	8.91%	-0.18%
Mean	-0.77%	-0.53%	0.25%
Std Dev	8.43%	8.09%	-0.34%
Skew	-0.64	-0.73	-0.08
Kurtosis	0.86	1.48	0.62

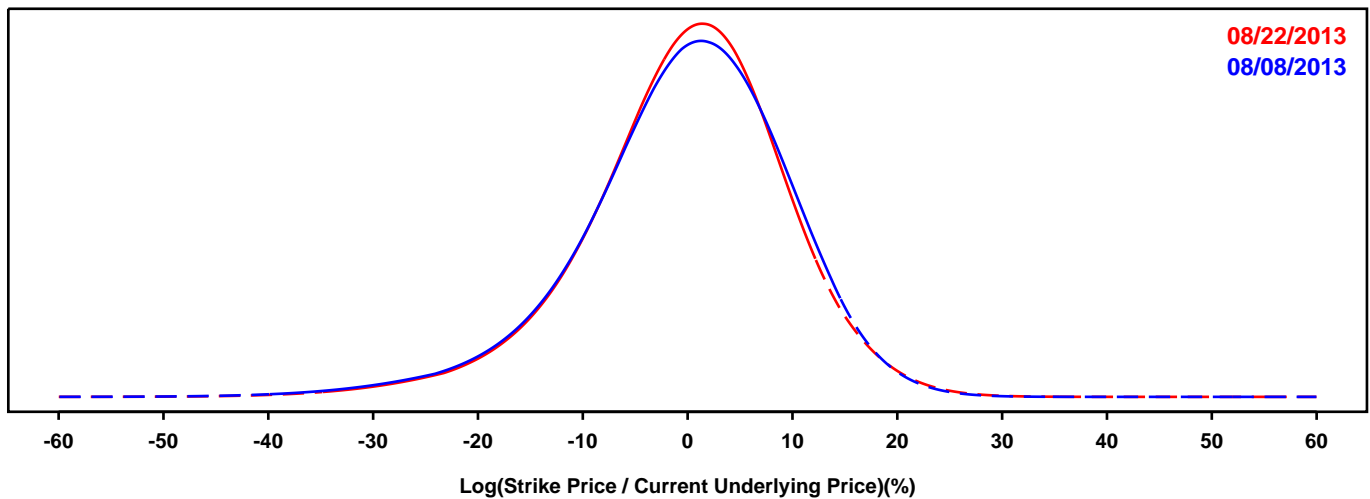
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WELLS FARGO

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

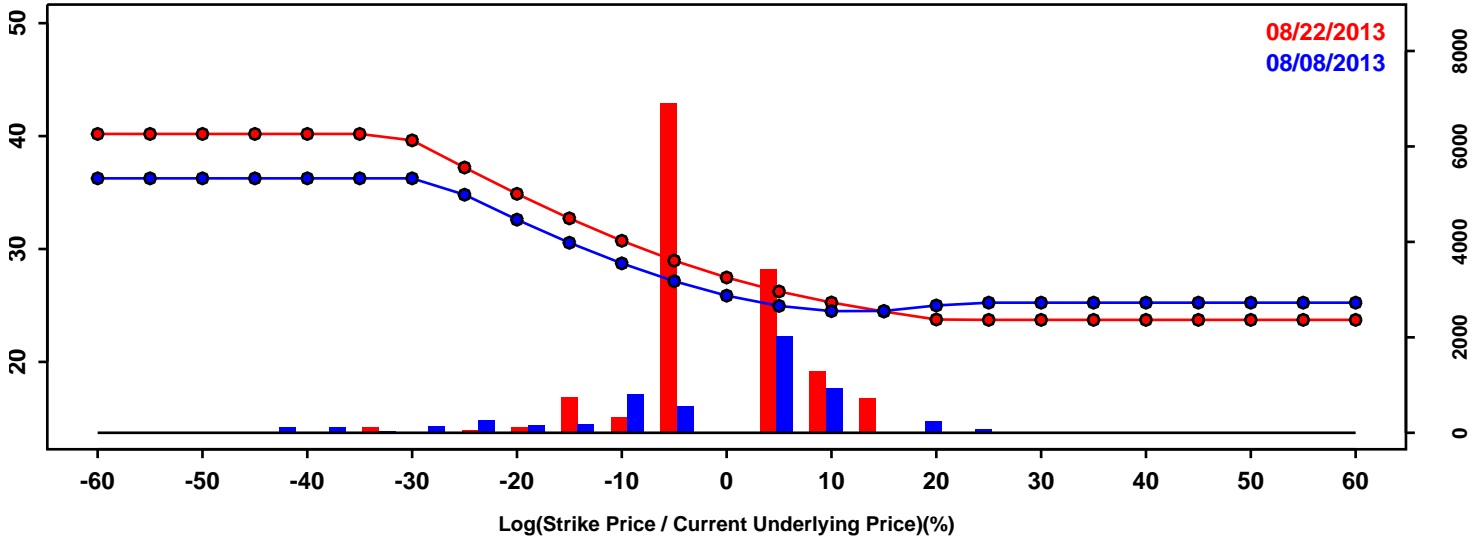


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-12.84%	-12.40%	0.45%
50th Pct	0.50%	0.45%	-0.05%
90th Pct	11.44%	11.08%	-0.36%
Mean	-0.29%	-0.24%	0.05%
Std Dev	9.94%	9.67%	-0.28%
Skew	-0.64	-0.56	0.08
Kurtosis	1.17	1.14	-0.03

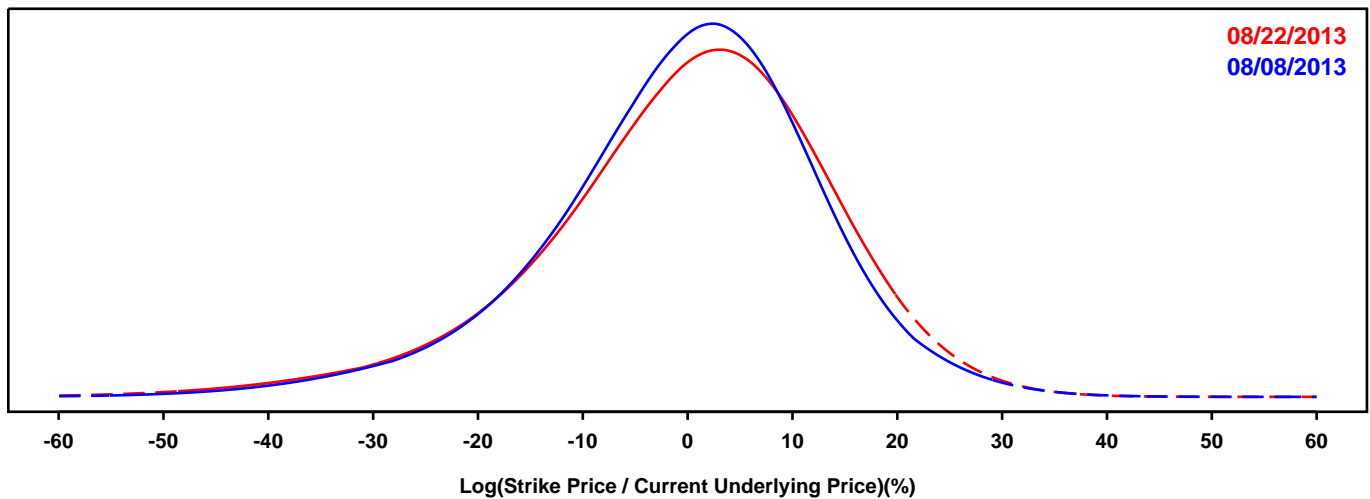
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AIG

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

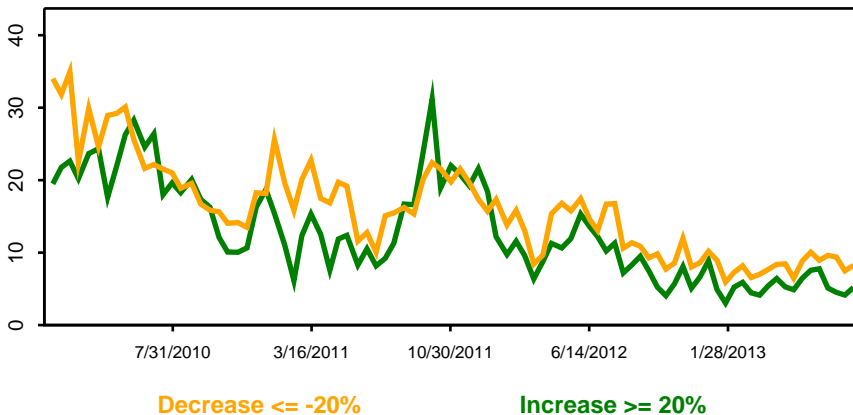
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

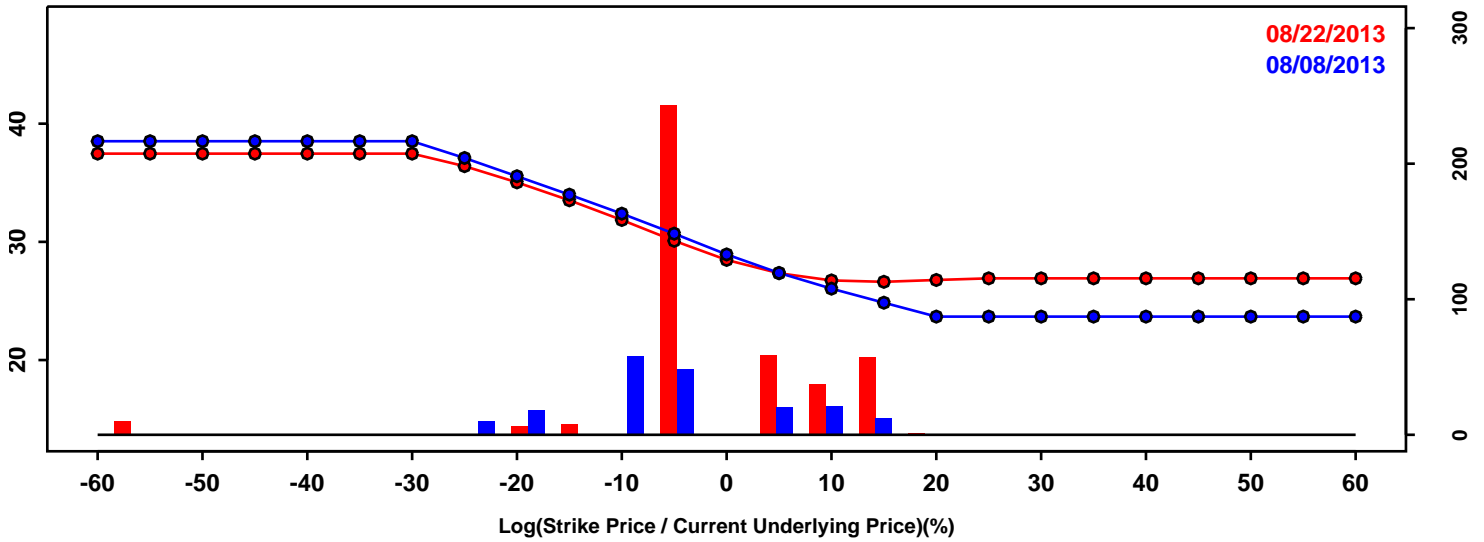


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-17.19%	-17.96%	-0.77%
50th Pct	0.60%	1.15%	0.55%
90th Pct	14.68%	16.09%	1.41%
Mean	-0.49%	-0.13%	0.36%
Std Dev	13.09%	13.94%	0.85%
Skew	-0.54	-0.66	-0.12
Kurtosis	1.02	1.12	0.10

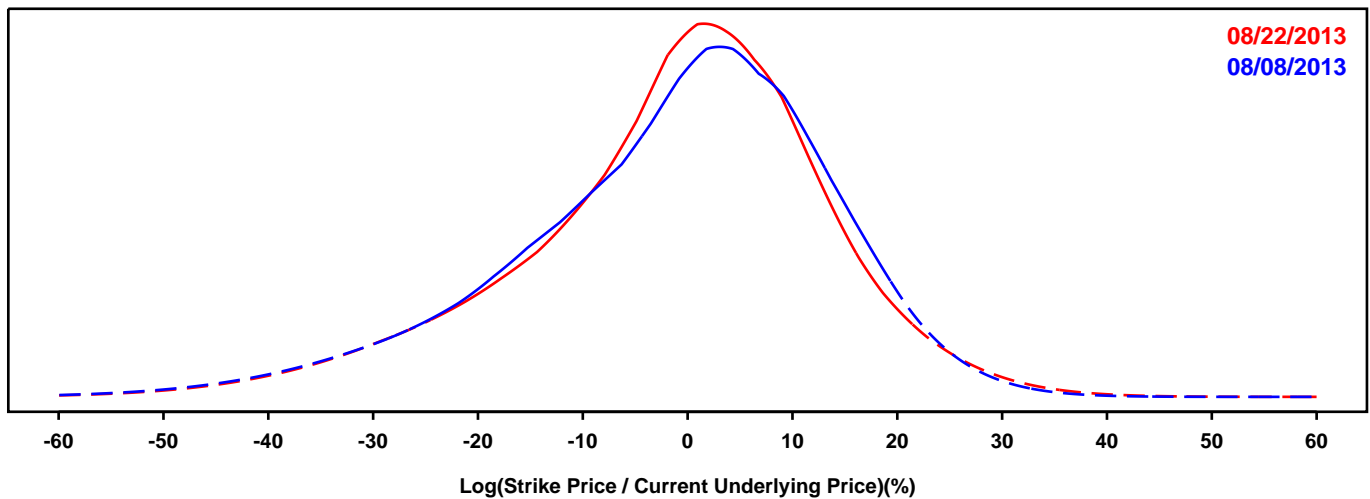
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- HARTFORD FINANCIAL

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

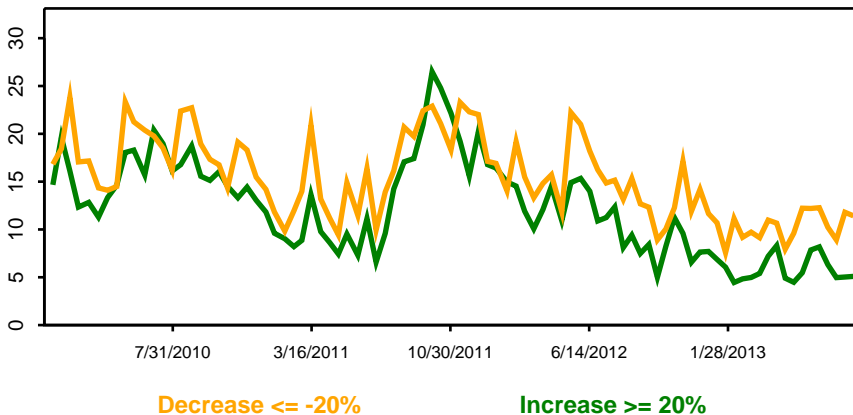
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



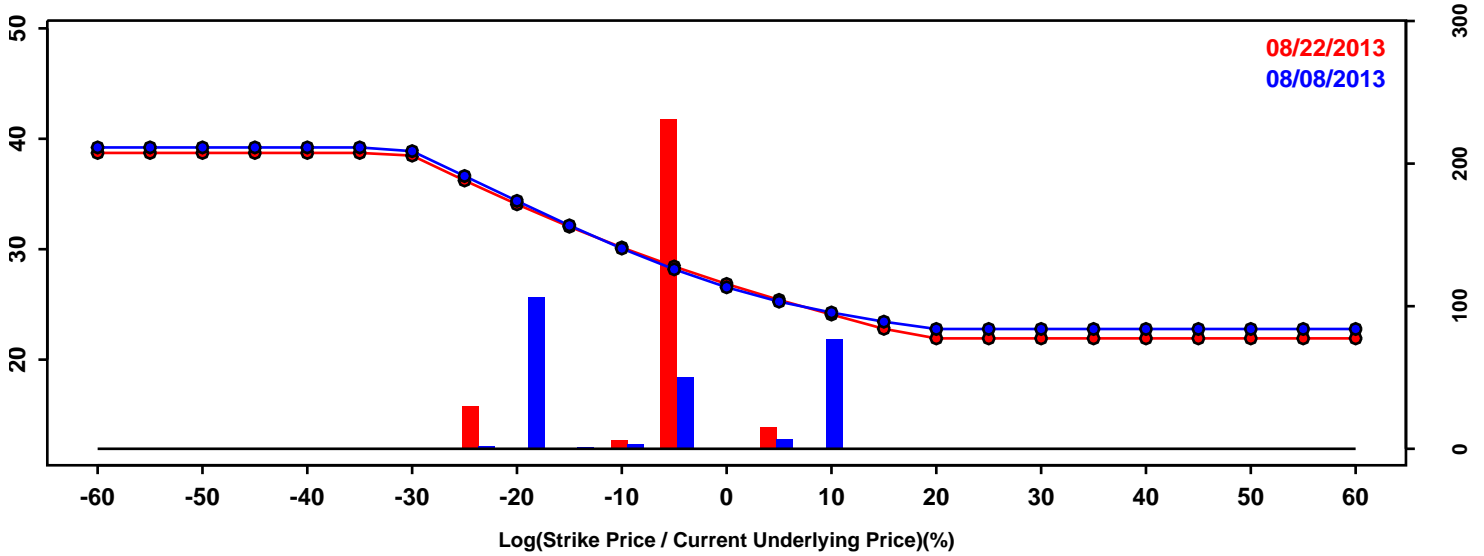
Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-21.97%	-21.62%	0.35%
50th Pct	0.62%	0.31%	-0.31%
90th Pct	16.00%	15.37%	-0.64%
Mean	-1.42%	-1.46%	-0.04%
Std Dev	15.15%	14.83%	-0.32%
Skew	-0.67	-0.60	0.07
Kurtosis	0.67	0.79	0.12



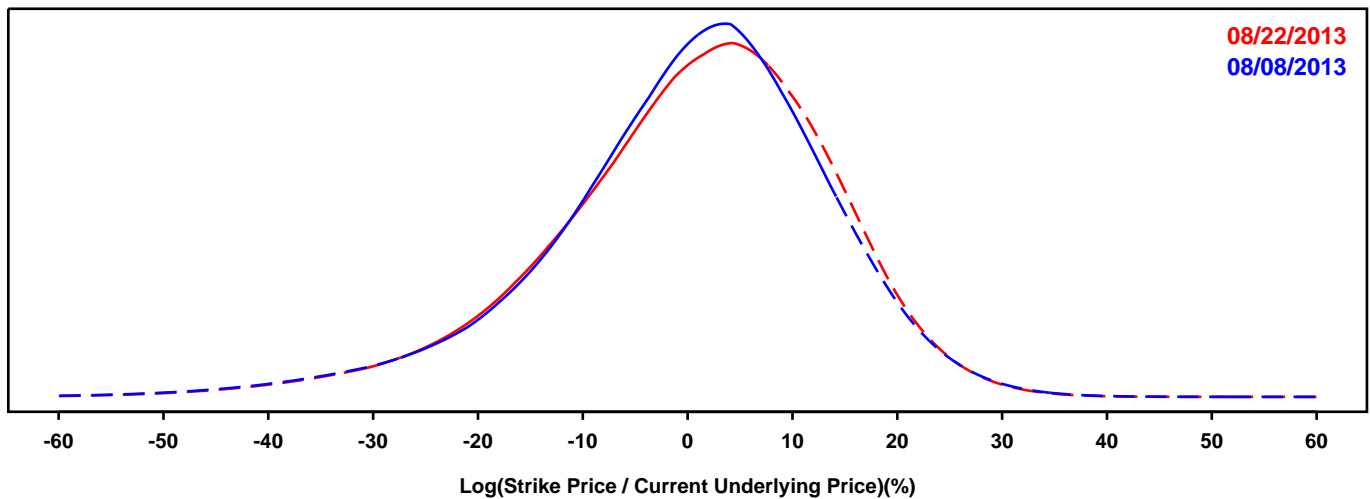
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- LINCOLN NATIONAL

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

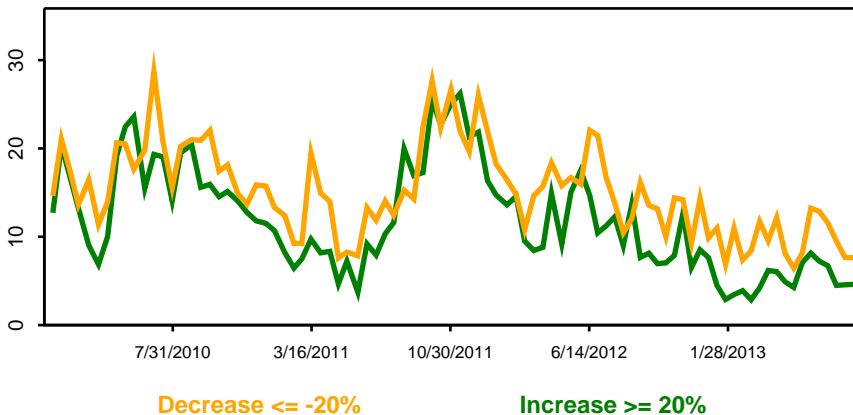
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

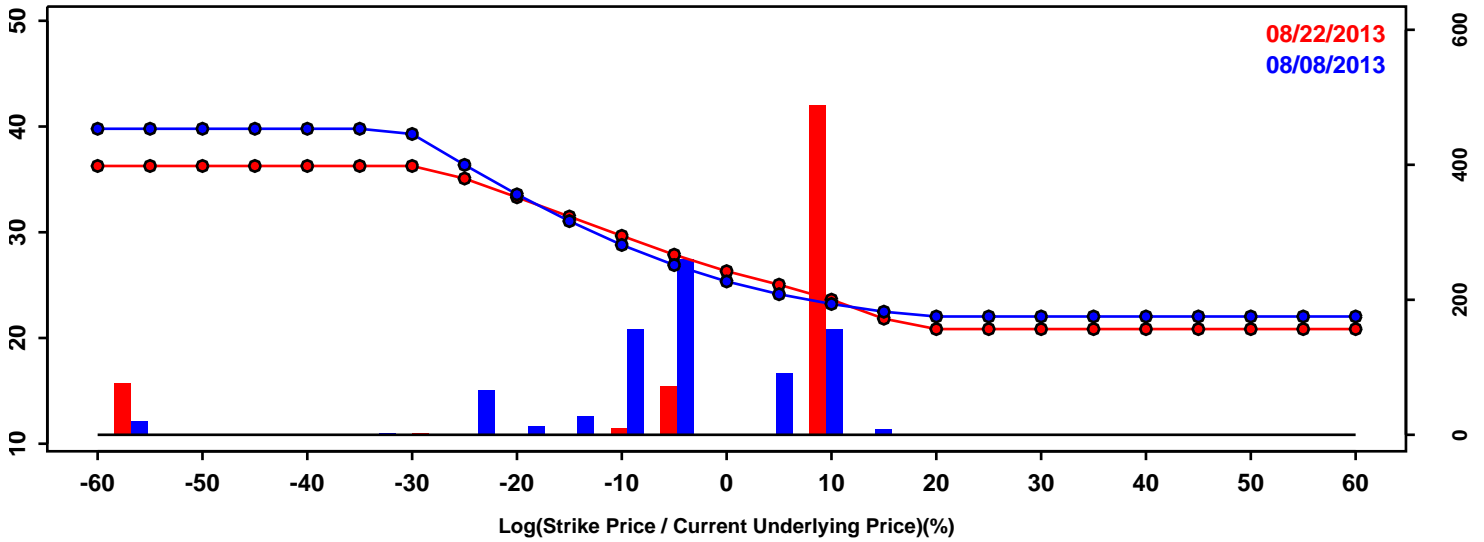


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-17.22%	-17.27%	-0.05%
50th Pct	1.30%	1.68%	0.37%
90th Pct	15.55%	15.93%	0.38%
Mean	-0.03%	0.27%	0.29%
Std Dev	13.46%	13.52%	0.06%
Skew	-0.70	-0.69	0.01
Kurtosis	1.23	1.01	-0.22

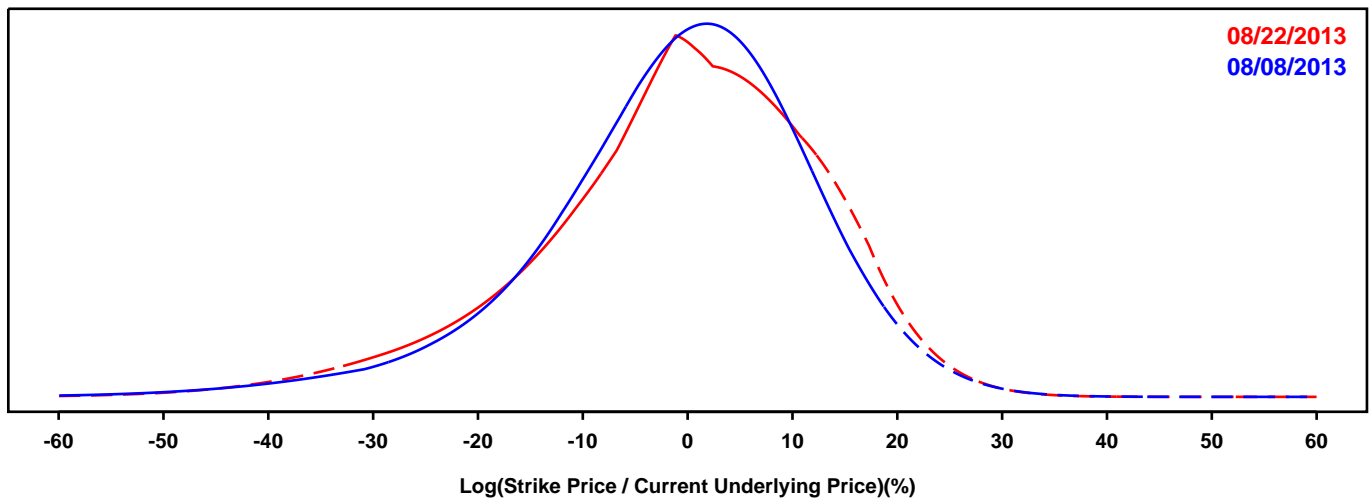
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- METLIFE

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

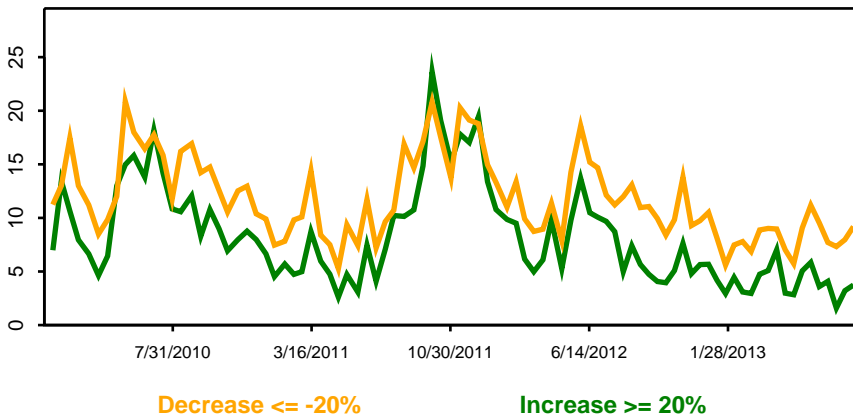
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

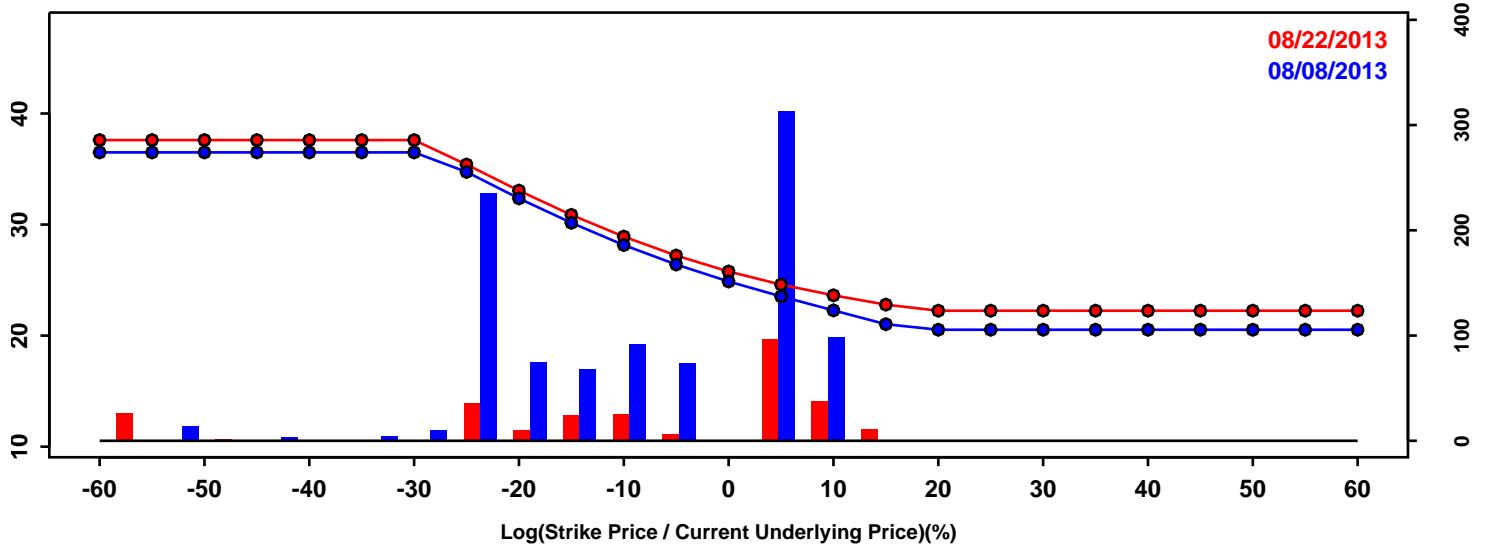


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-17.67%	-19.06%	-1.40%
50th Pct	0.11%	0.39%	0.28%
90th Pct	13.98%	15.30%	1.32%
Mean	-1.14%	-0.86%	0.28%
Std Dev	13.13%	13.73%	0.60%
Skew	-0.75	-0.68	0.07
Kurtosis	1.44	0.80	-0.64

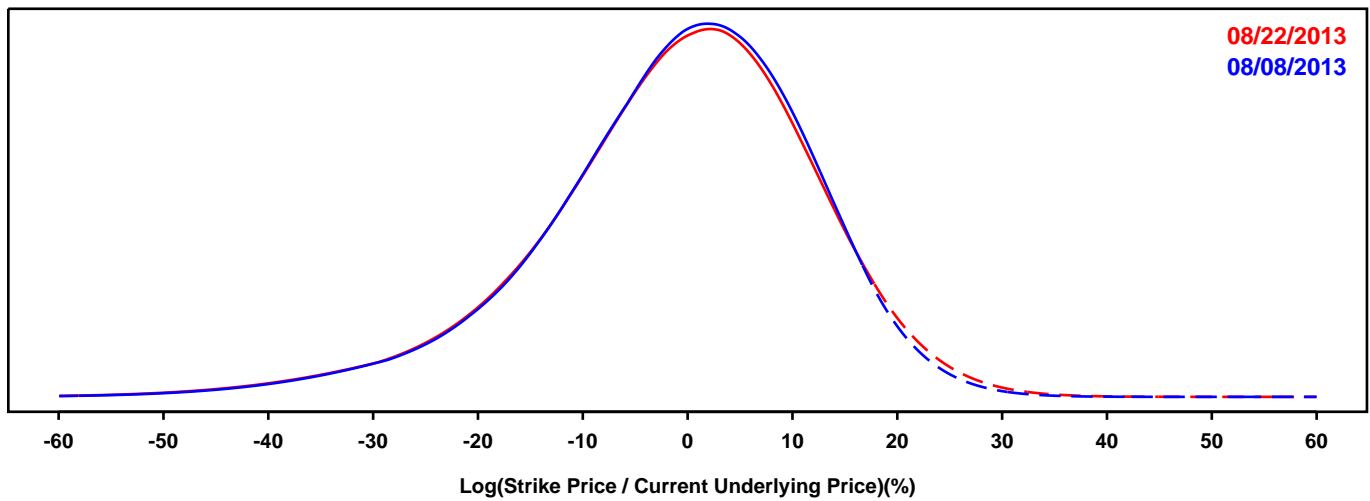
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PRUDENTIAL

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

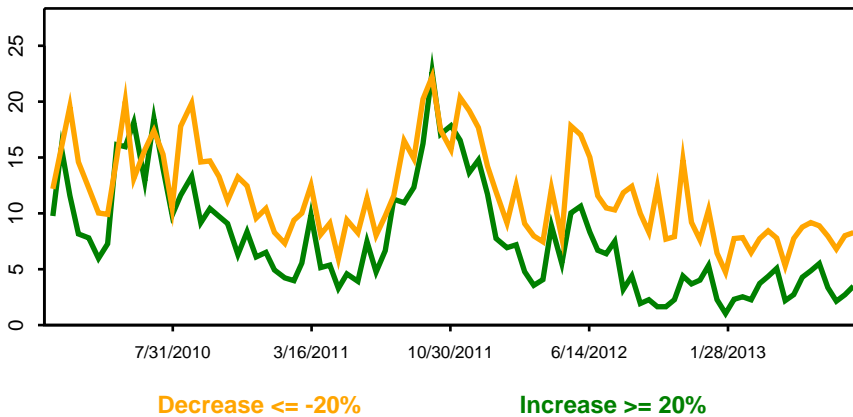
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

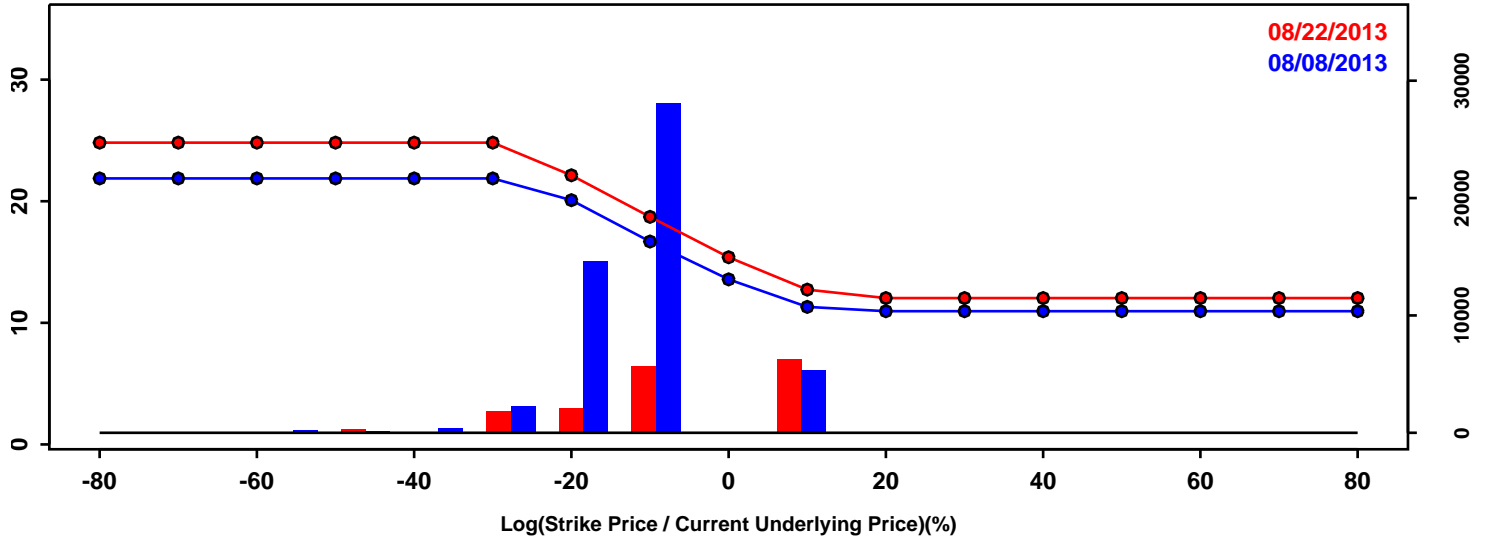


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-17.76%	-18.10%	-0.34%
50th Pct	0.18%	0.12%	-0.07%
90th Pct	13.82%	14.35%	0.53%
Mean	-1.14%	-1.10%	0.04%
Std Dev	12.90%	13.26%	0.36%
Skew	-0.71	-0.66	0.05
Kurtosis	1.06	1.07	0.01

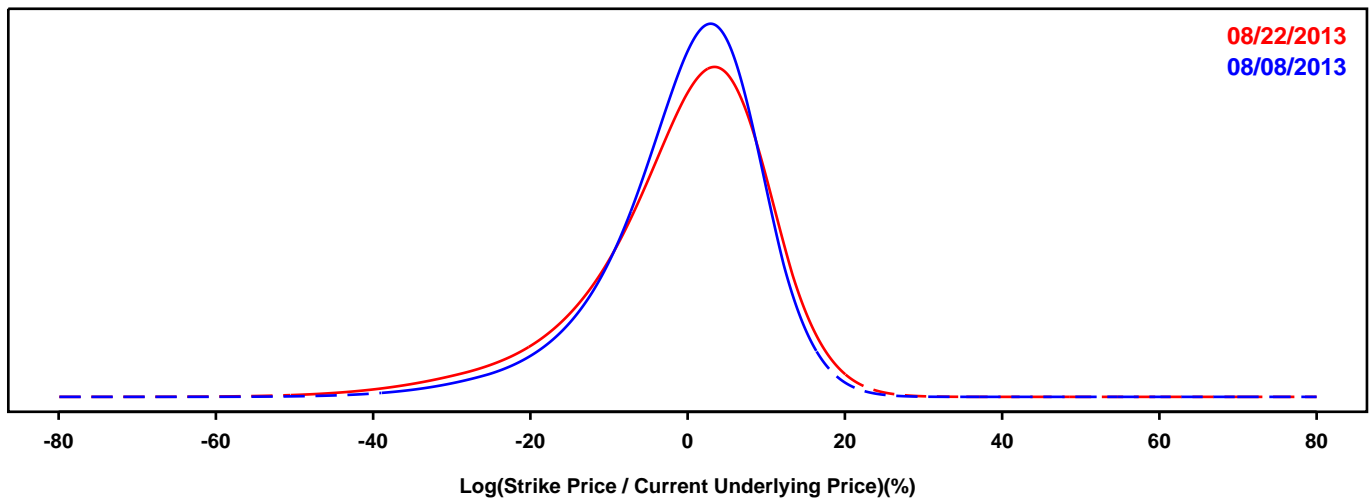
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

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

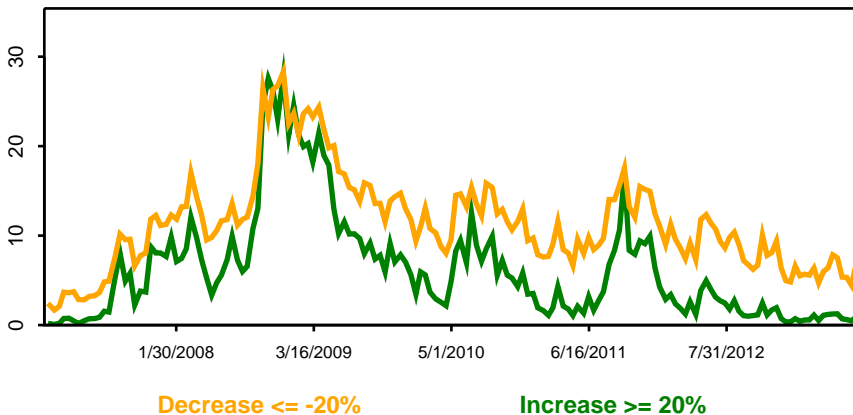
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

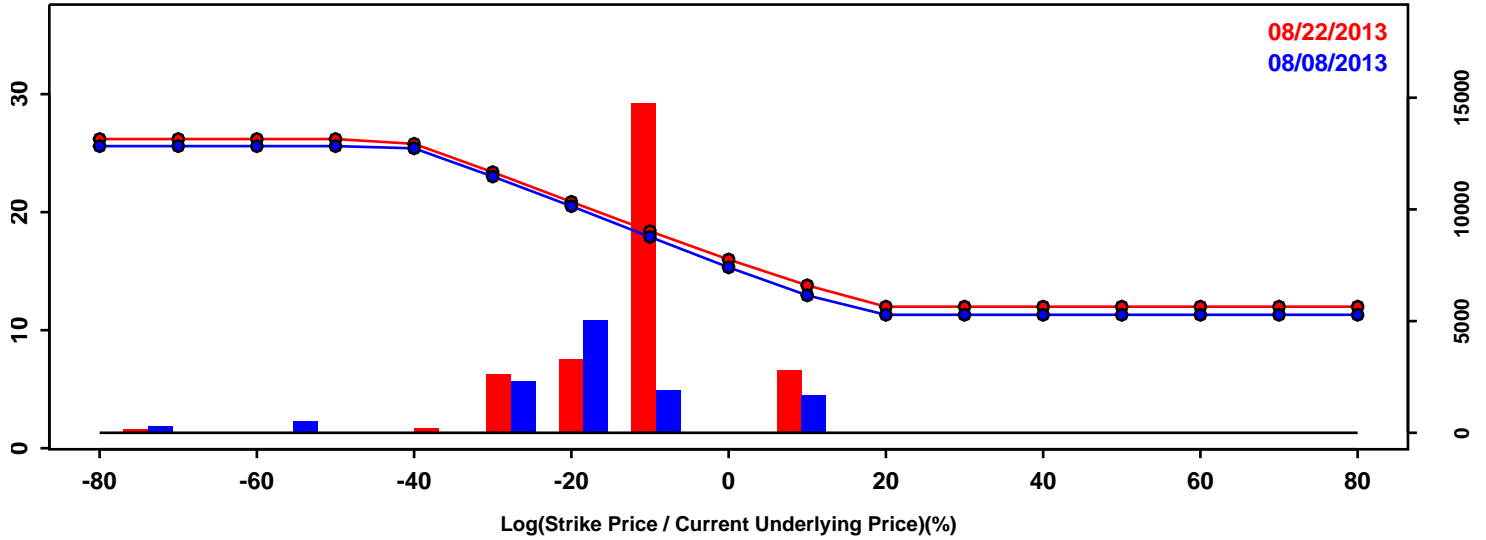


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-13.27%	-16.06%	-2.79%
50th Pct	0.93%	0.78%	-0.15%
90th Pct	10.50%	11.44%	0.95%
Mean	-0.44%	-1.01%	-0.57%
Std Dev	9.90%	11.50%	1.60%
Skew	-0.94	-1.02	-0.08
Kurtosis	1.71	1.77	0.06

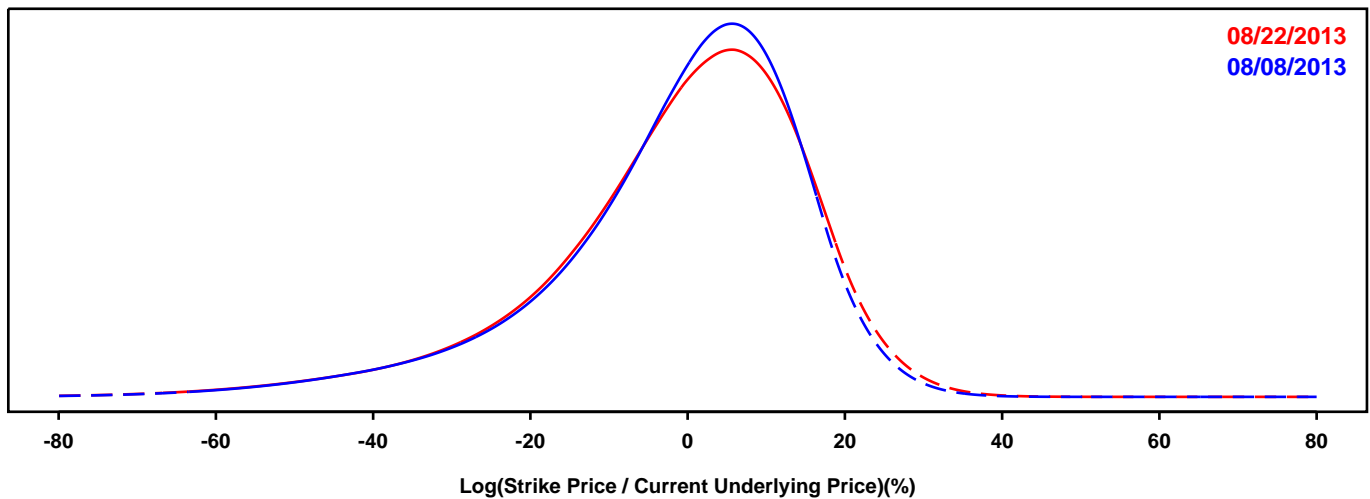
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

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

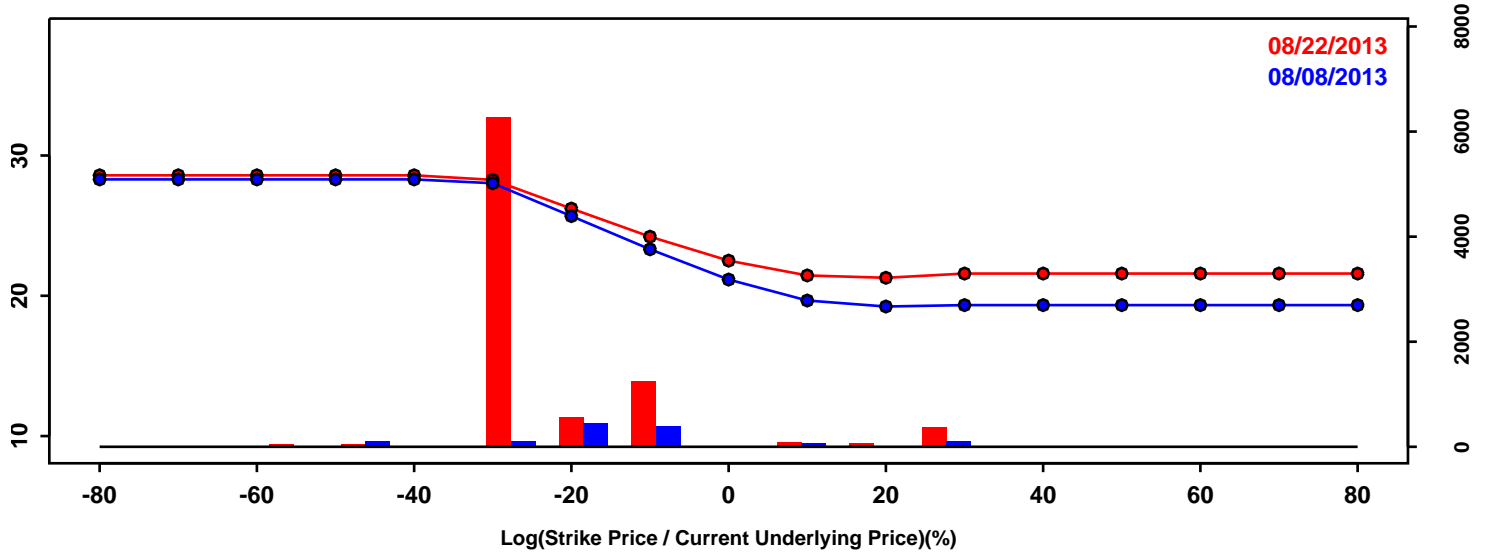


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-22.85%	-23.26%	-0.41%
50th Pct	1.57%	1.42%	-0.16%
90th Pct	15.98%	16.89%	0.92%
Mean	-1.34%	-1.30%	0.05%
Std Dev	16.36%	16.84%	0.48%
Skew	-1.14	-1.06	0.08
Kurtosis	2.05	1.87	-0.18

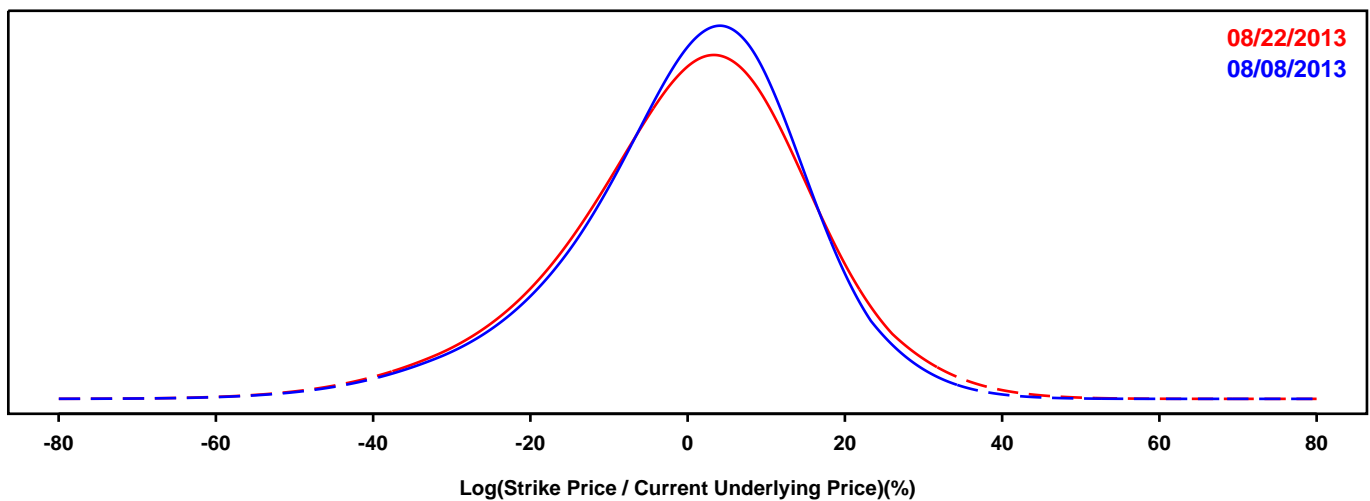
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (WTI)

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

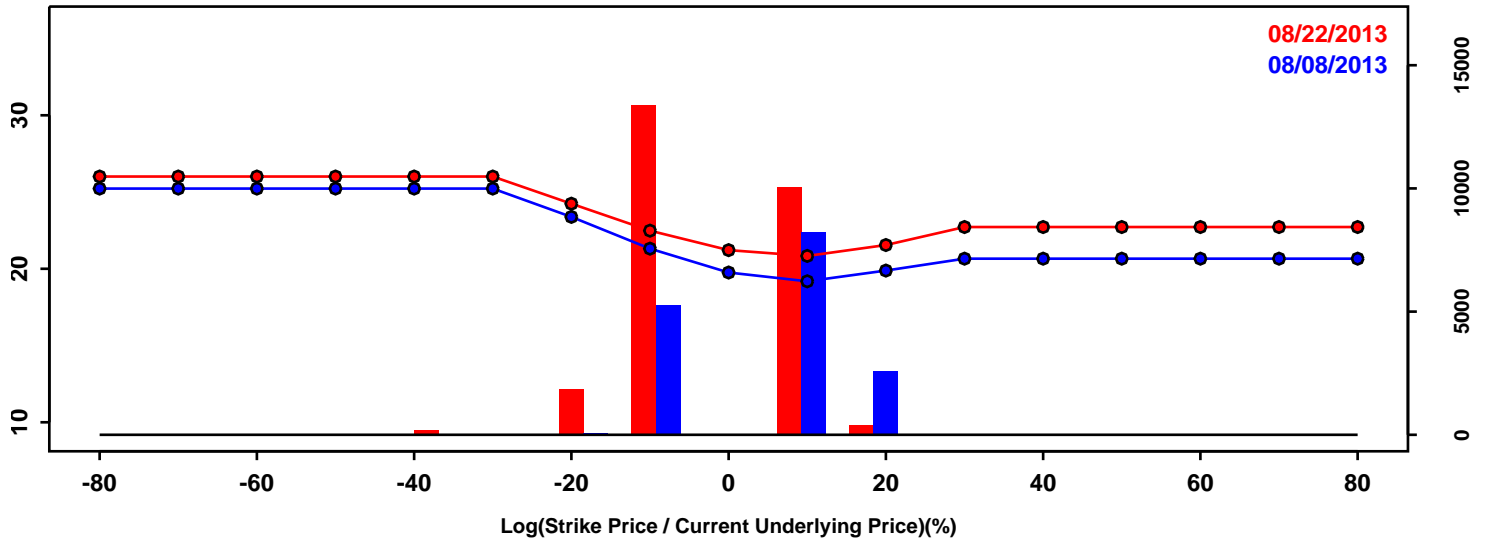


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-19.88%	-20.86%	-0.99%
50th Pct	1.53%	1.23%	-0.30%
90th Pct	17.34%	18.77%	1.42%
Mean	-0.02%	-0.02%	-0.00%
Std Dev	15.09%	15.96%	0.87%
Skew	-0.59	-0.44	0.15
Kurtosis	0.85	0.66	-0.19

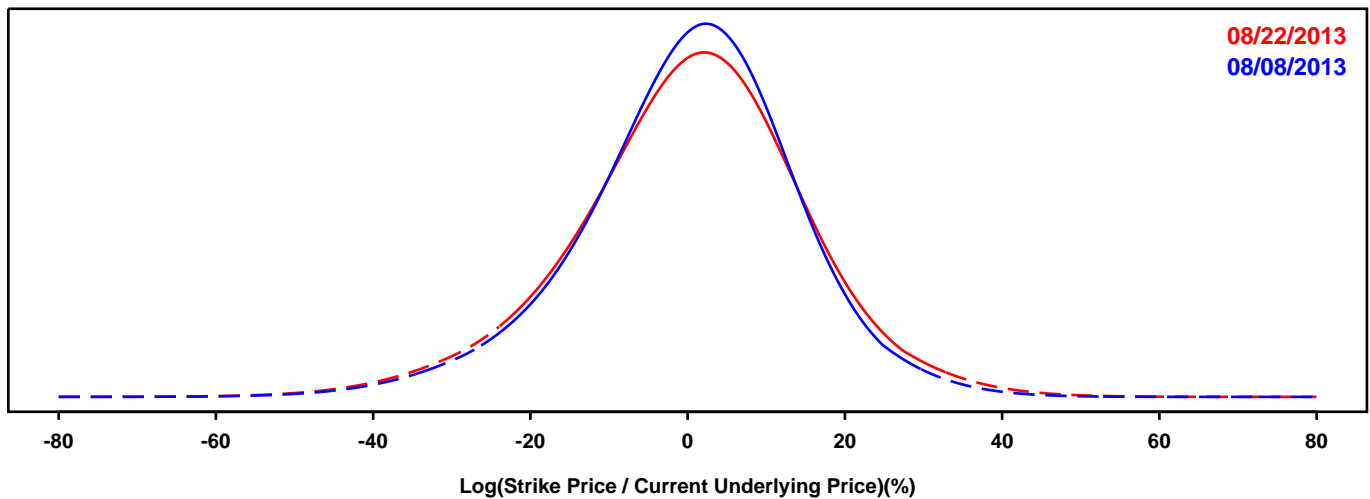
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (Brent)

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

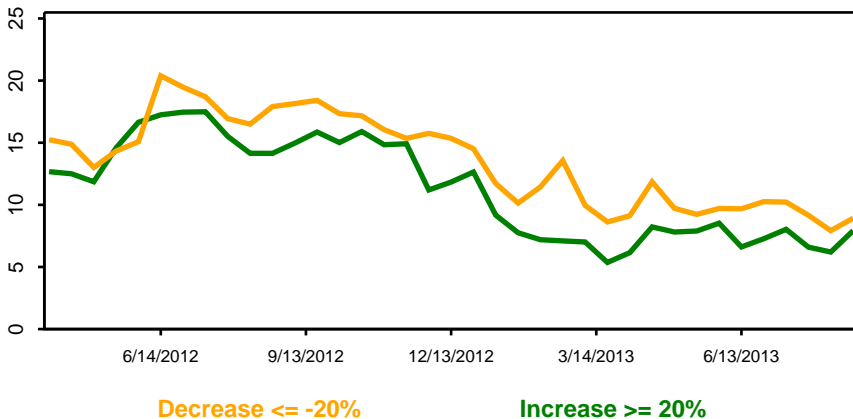
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

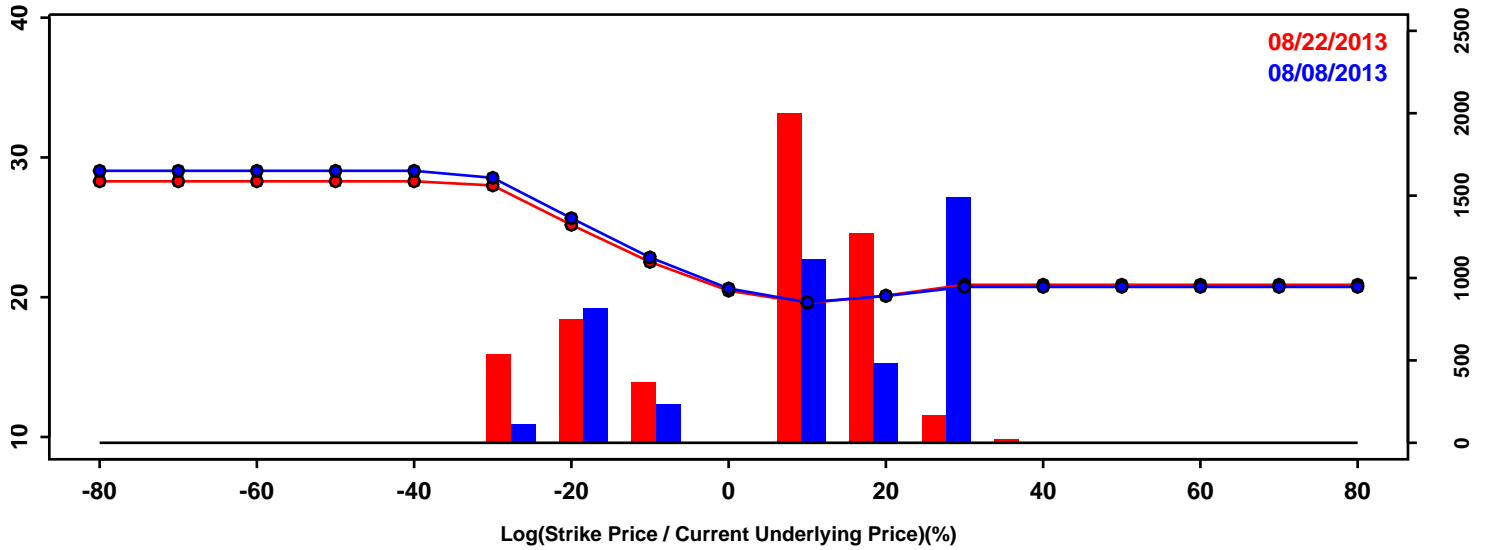


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-17.70%	-18.82%	-1.12%
50th Pct	0.99%	0.94%	-0.05%
90th Pct	16.59%	18.12%	1.53%
Mean	0.17%	0.28%	0.12%
Std Dev	13.94%	14.95%	1.01%
Skew	-0.35	-0.26	0.09
Kurtosis	0.75	0.65	-0.11

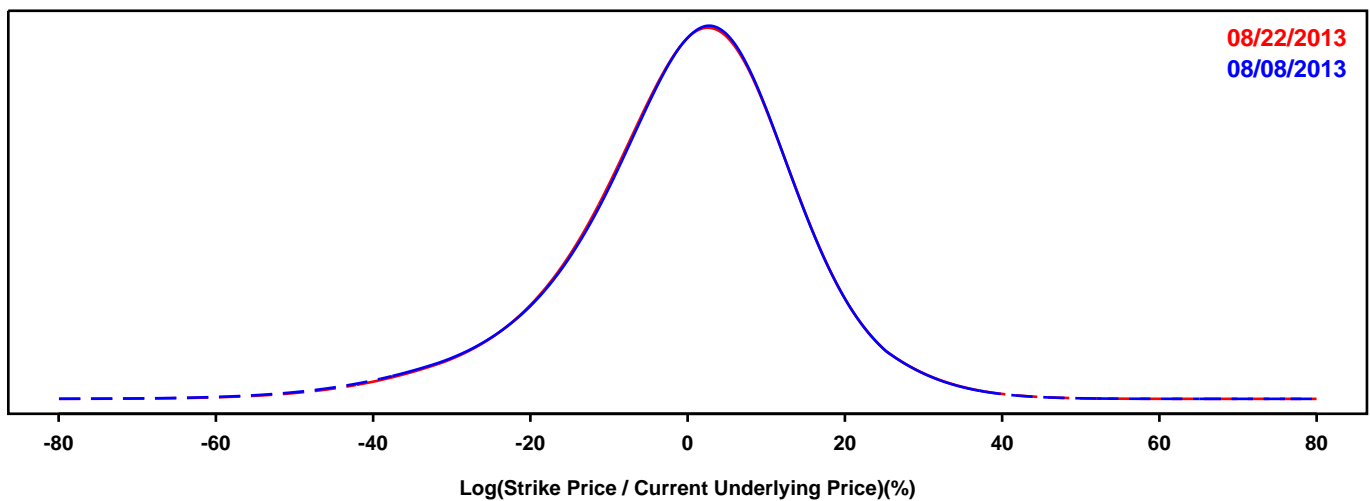
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLD FUTURES

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

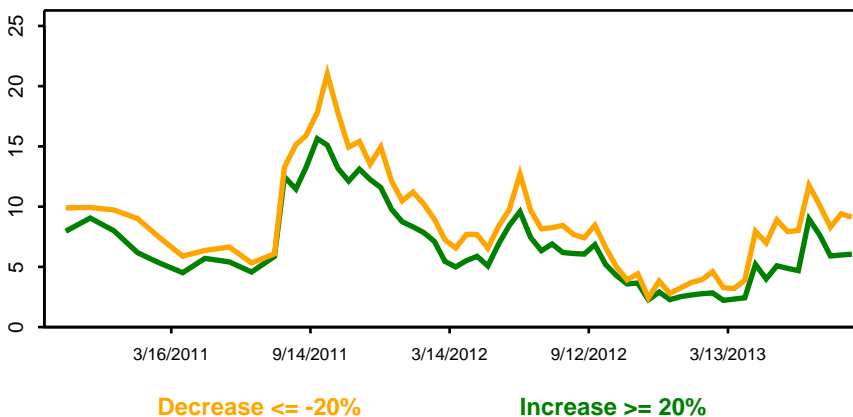
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



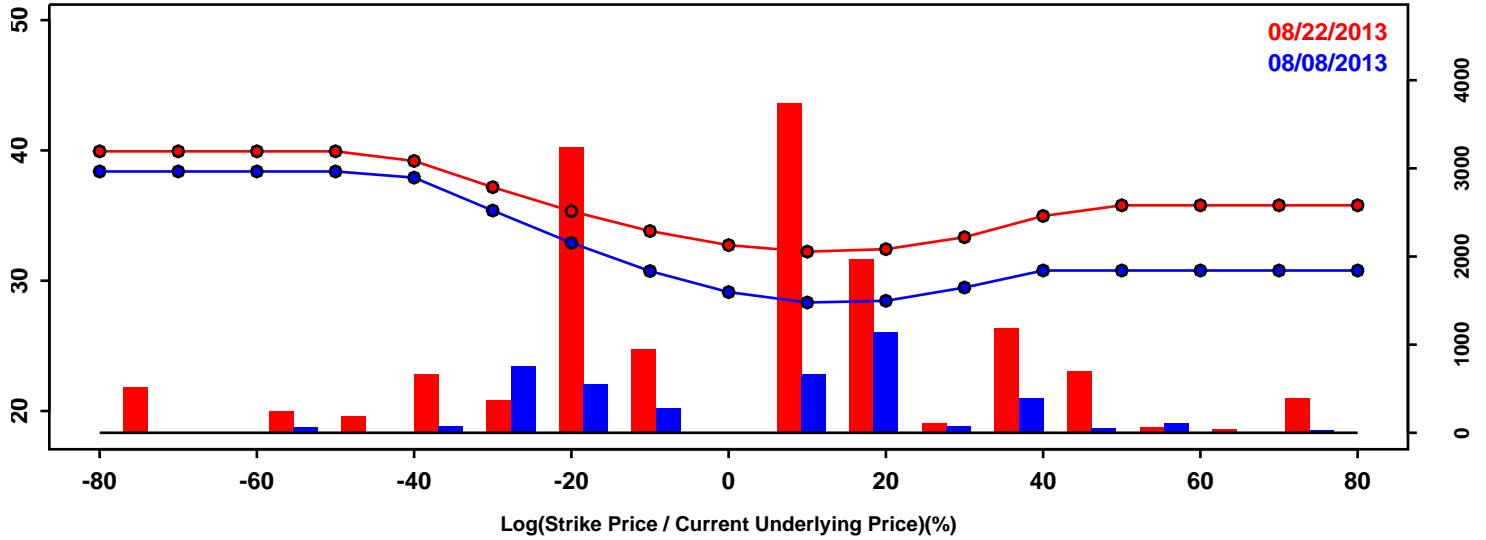
Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-19.28%	-18.98%	0.31%
50th Pct	0.87%	0.82%	-0.06%
90th Pct	16.39%	16.41%	0.02%
Mean	-0.45%	-0.36%	0.09%
Std Dev	14.75%	14.59%	-0.16%
Skew	-0.58	-0.53	0.06
Kurtosis	1.18	1.08	-0.10



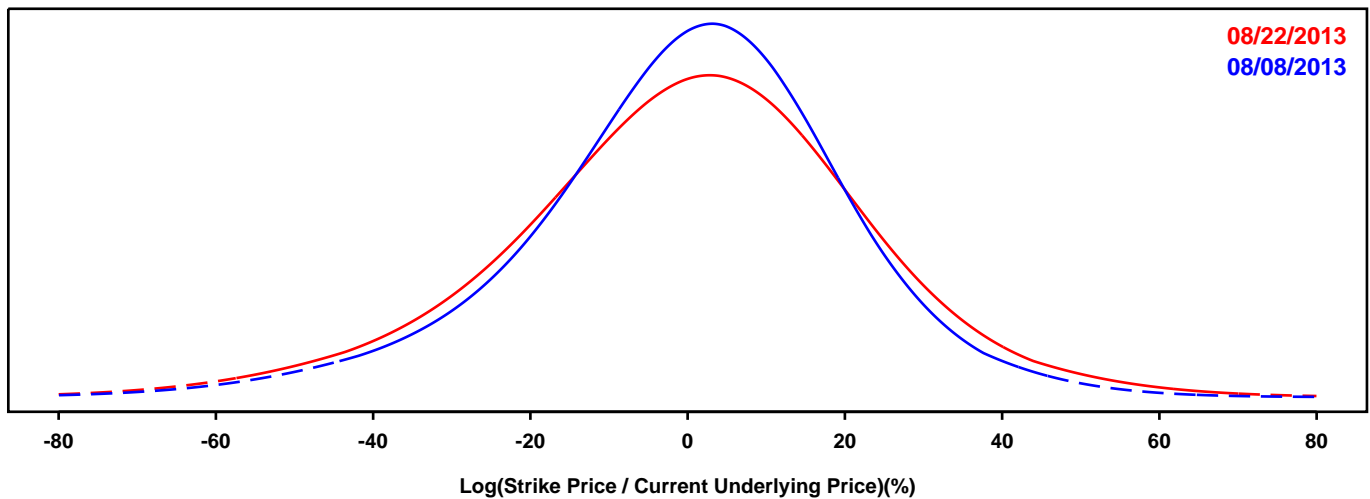
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SILVER FUTURES

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

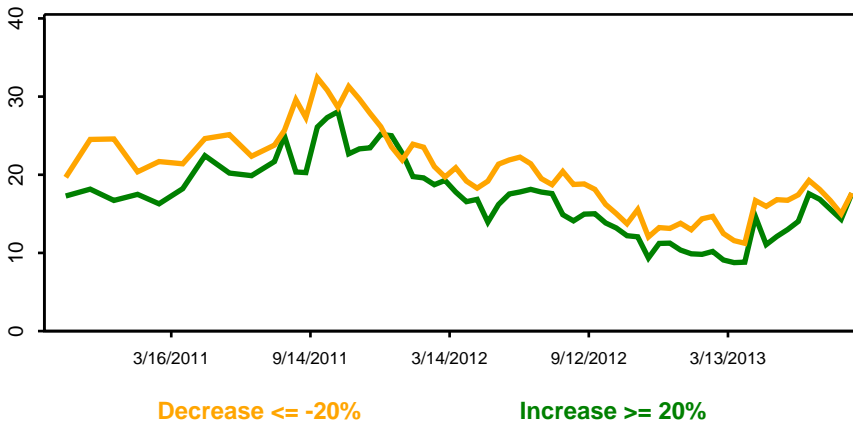
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

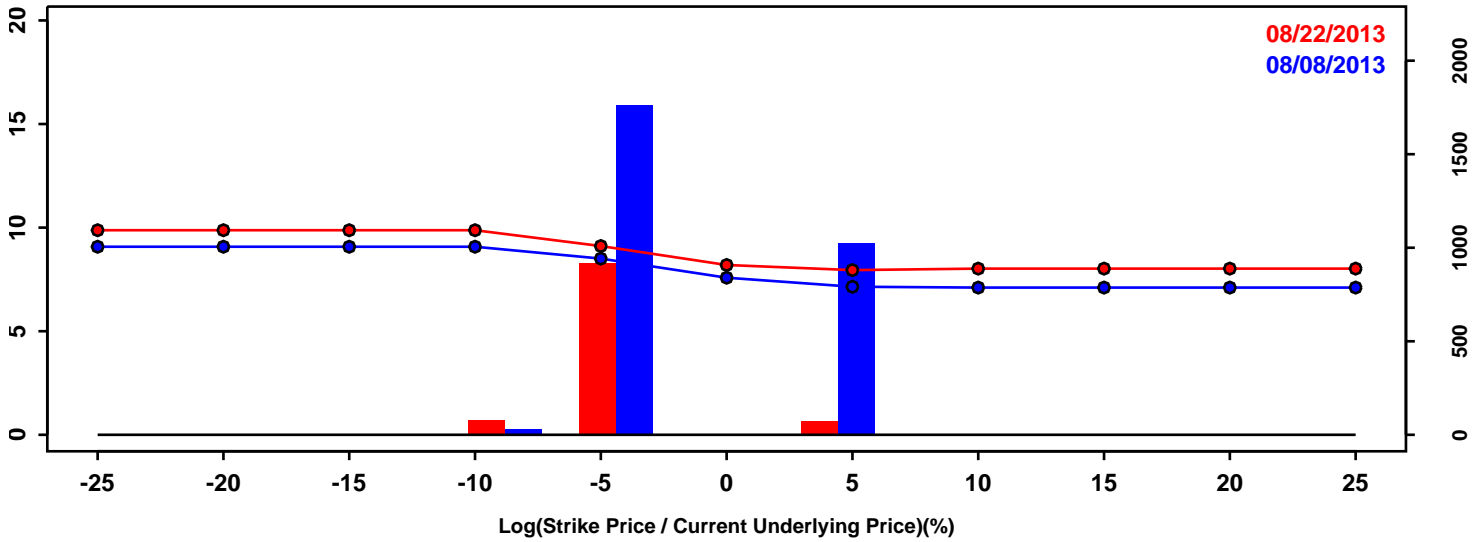


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-26.21%	-29.34%	-3.13%
50th Pct	1.21%	0.99%	-0.22%
90th Pct	24.03%	27.58%	3.54%
Mean	-0.08%	-0.00%	0.08%
Std Dev	20.58%	23.05%	2.46%
Skew	-0.40	-0.24	0.16
Kurtosis	0.91	0.65	-0.26

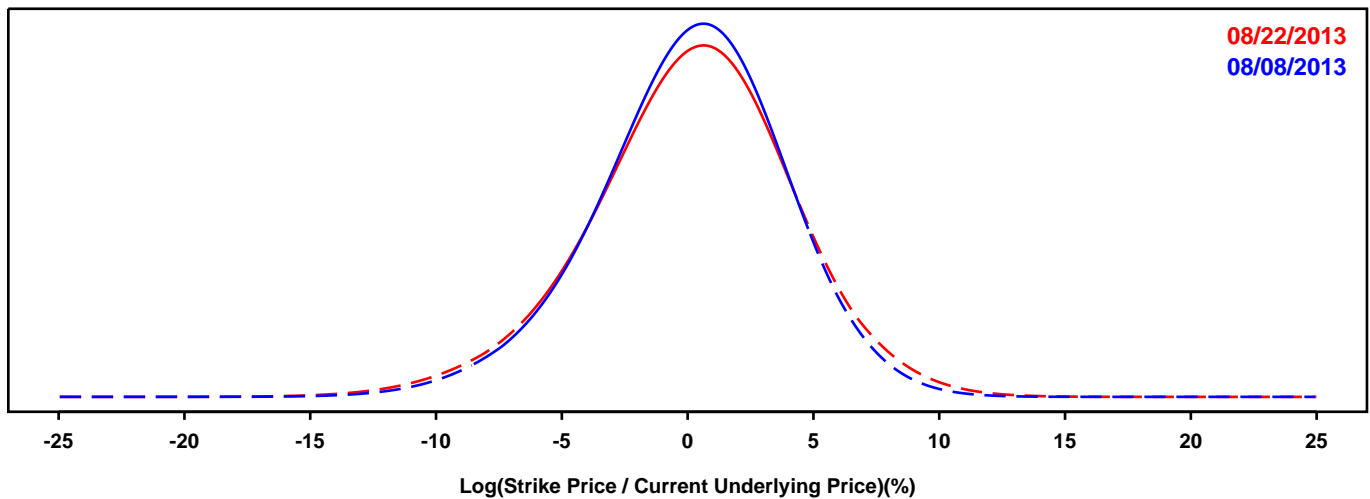
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-EURO EXCHANGE RATE FUTURES

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

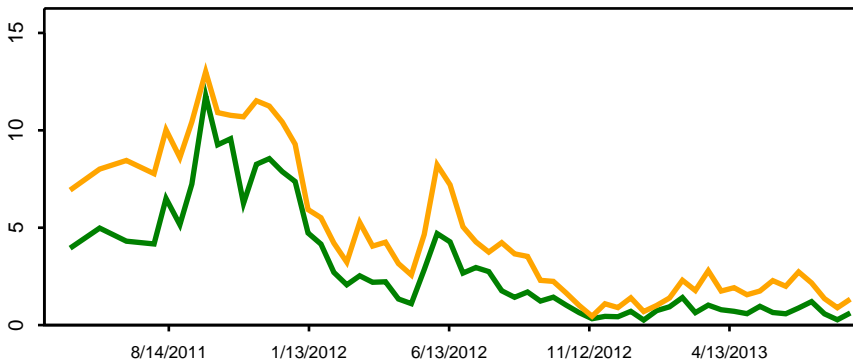
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



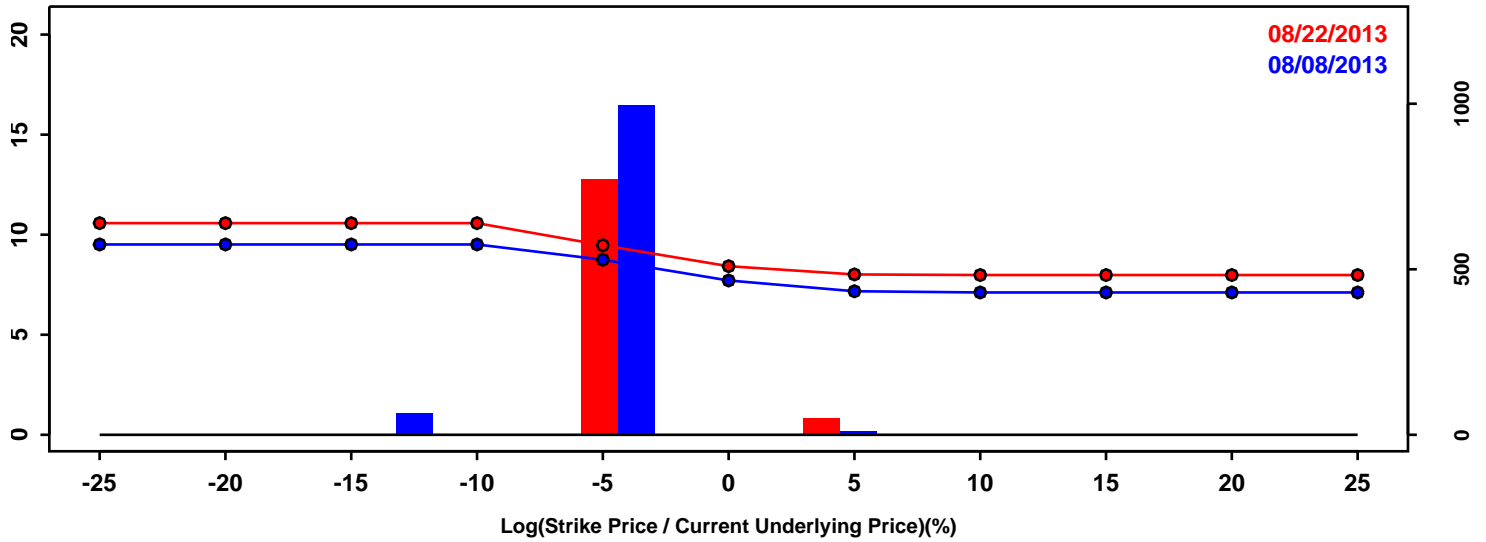
Decrease  $\leq$  -10% [stronger \$] Increase  $\geq$  10% [weaker \$]

Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-4.79%	-5.04%	-0.24%
50th Pct	0.32%	0.34%	0.02%
90th Pct	4.75%	5.17%	0.42%
Mean	0.15%	0.20%	0.05%
Std Dev	3.78%	4.08%	0.30%
Skew	-0.30	-0.26	0.03
Kurtosis	0.36	0.44	0.08

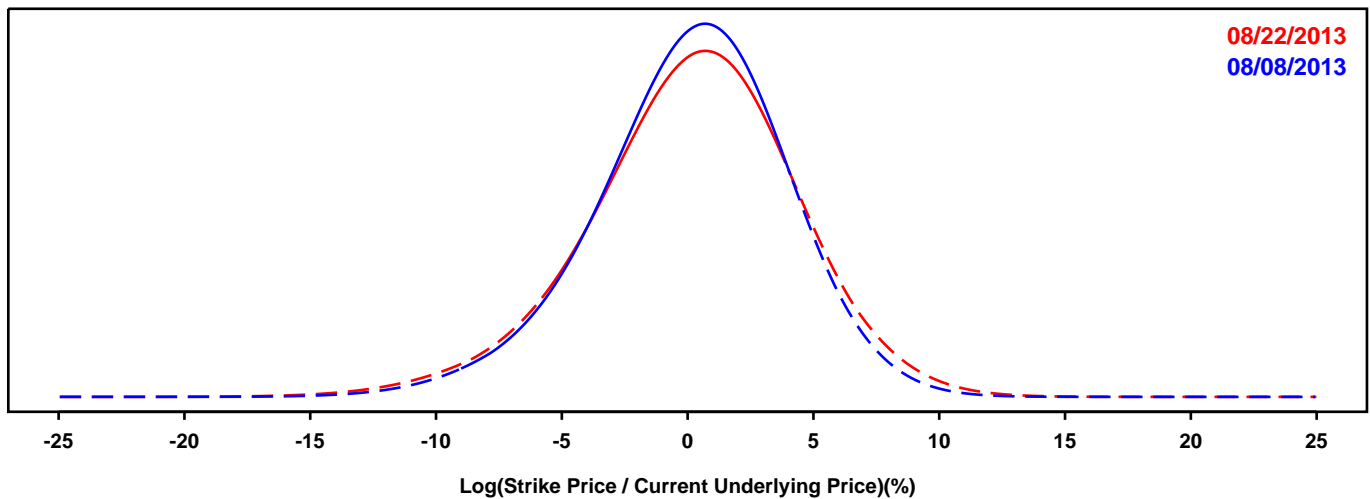
## RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-POUND EXCHANGE RATE FUTURES

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

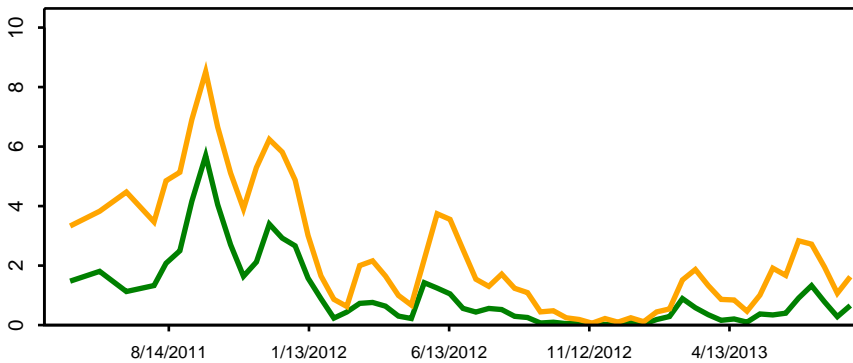
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -10% [stronger \$]    Increase >= 10% [weaker \$]

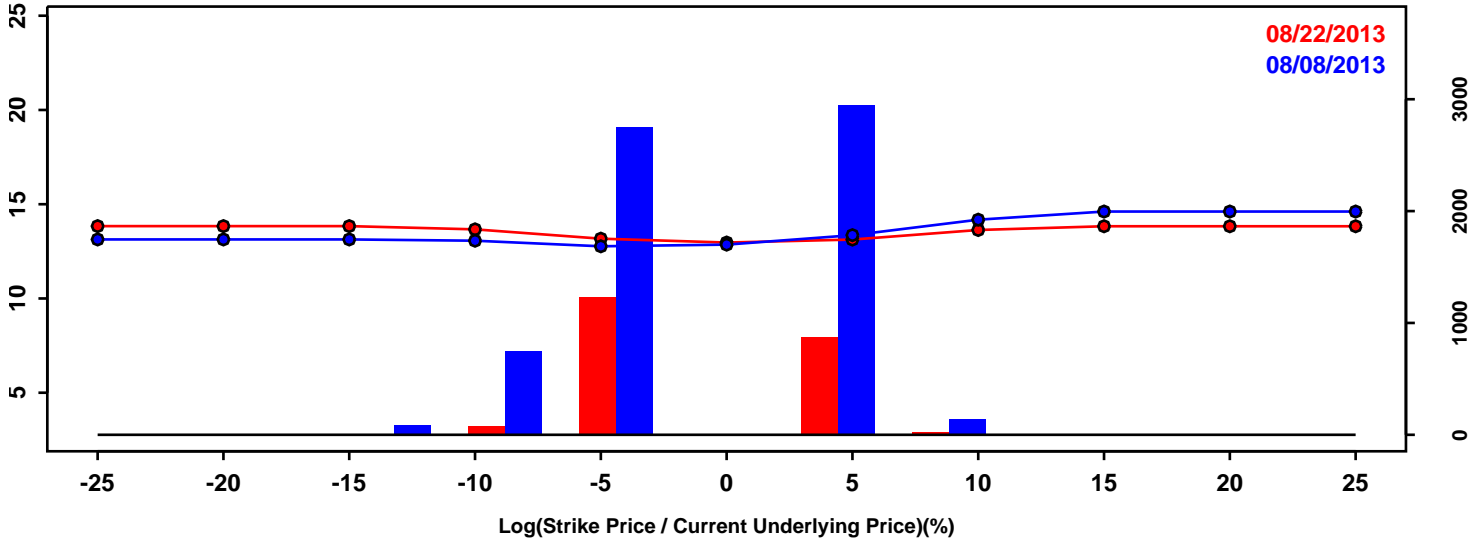
Statistics of the Log Return Distributions

	08/08/2013	08/22/2013	Change
10th Pct	-4.88%	-5.15%	-0.28%
50th Pct	0.32%	0.34%	0.02%
90th Pct	4.83%	5.28%	0.45%
Mean	0.16%	0.22%	0.07%
Std Dev	3.85%	4.20%	0.35%
Skew	-0.35	-0.33	0.02
Kurtosis	0.43	0.50	0.08

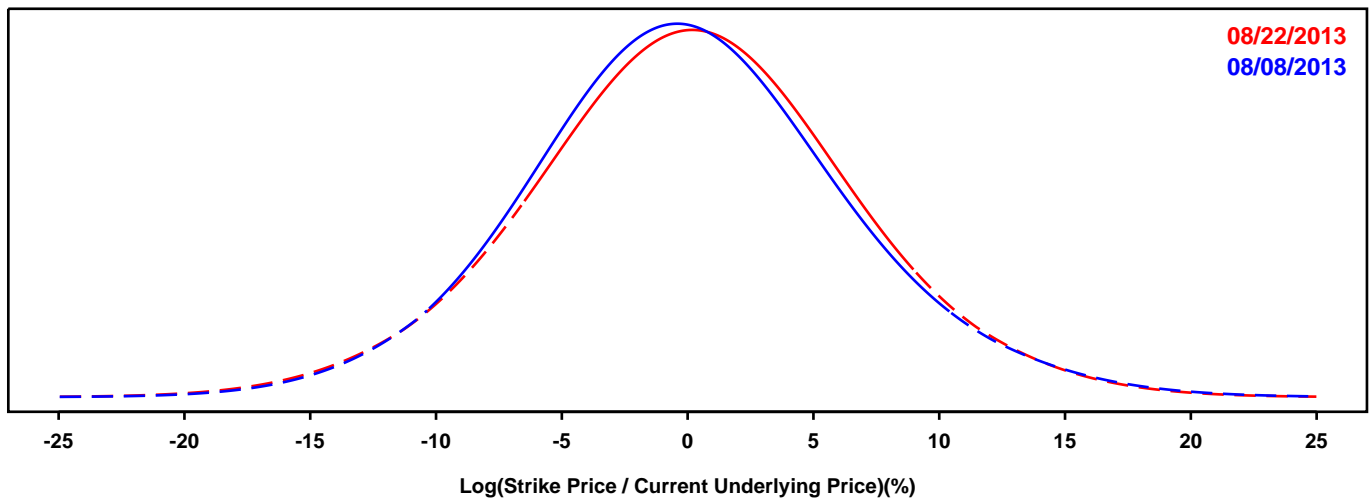
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-YEN EXCHANGE RATE FUTURES

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

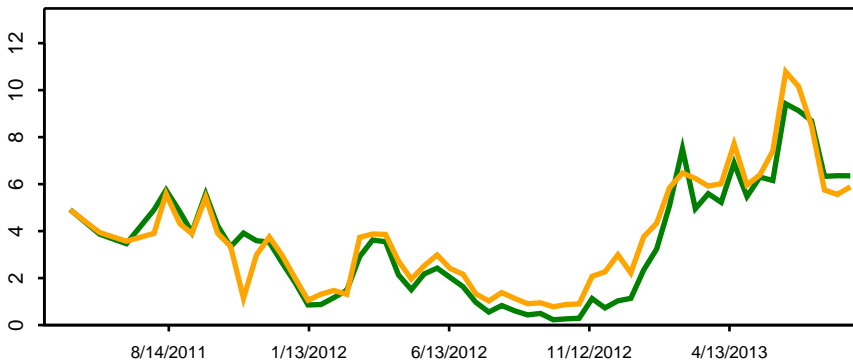
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



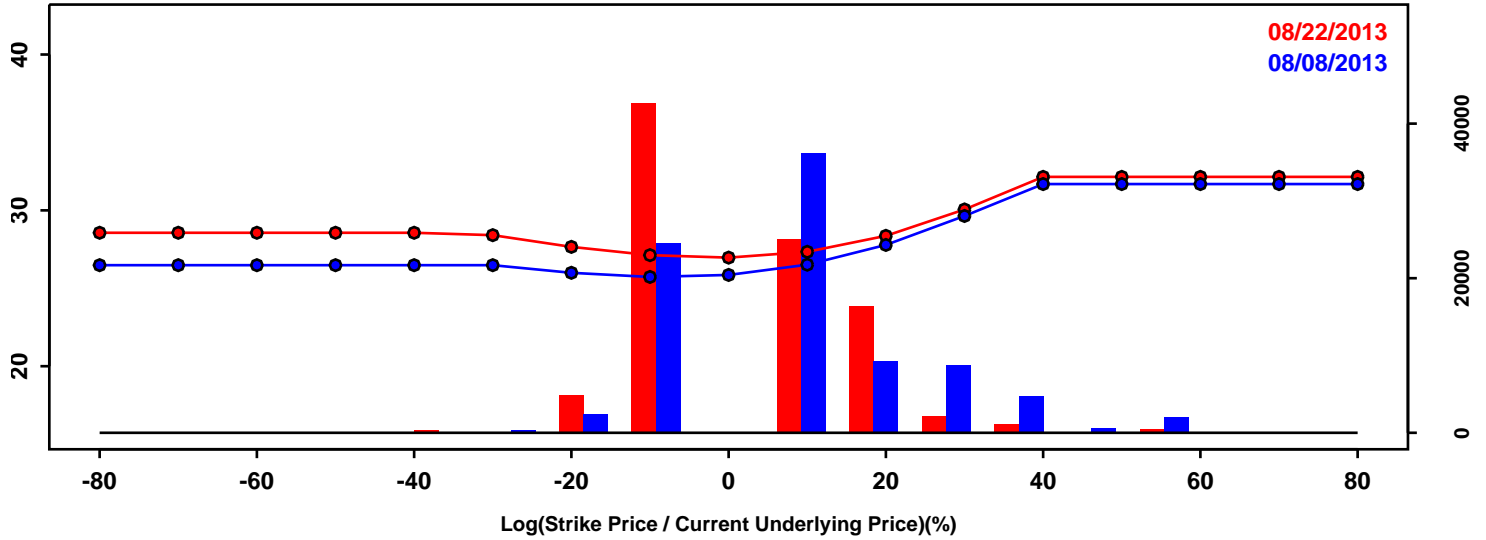
Decrease <= -10% [stronger \$]    Increase >= 10% [weaker \$]

Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-7.95%	-7.95%	0.00%
50th Pct	-0.16%	0.23%	0.39%
90th Pct	8.23%	8.37%	0.14%
Mean	0.05%	0.23%	0.18%
Std Dev	6.42%	6.47%	0.05%
Skew	0.14	-0.00	-0.14
Kurtosis	0.33	0.26	-0.06

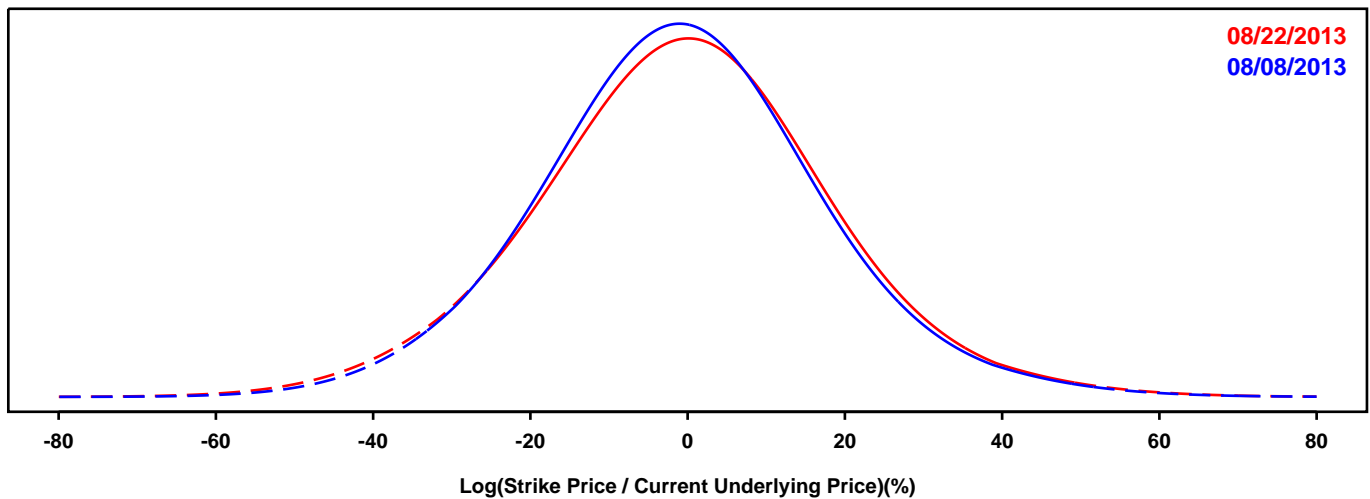
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CORN FUTURES

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

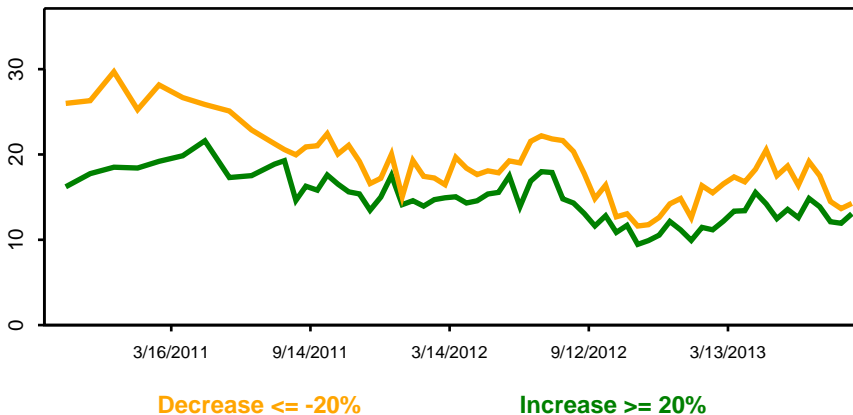
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

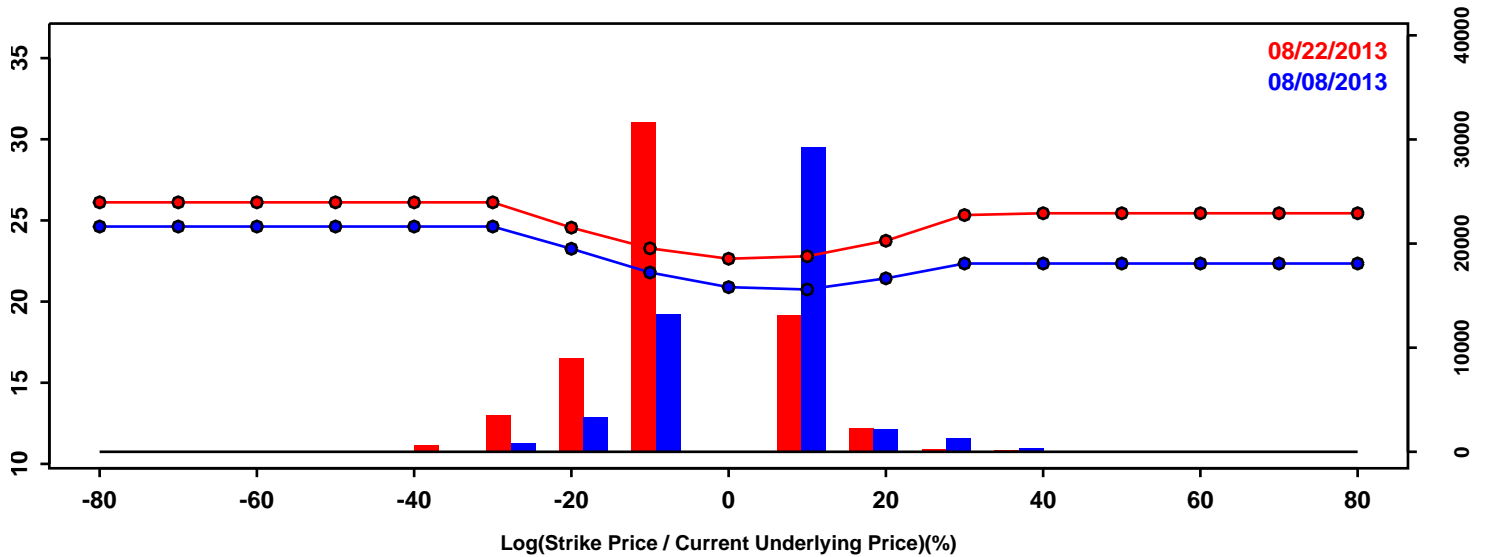


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-23.38%	-24.23%	-0.85%
50th Pct	-0.94%	-0.31%	0.63%
90th Pct	22.01%	23.12%	1.11%
Mean	-0.66%	-0.33%	0.34%
Std Dev	18.21%	18.98%	0.78%
Skew	0.14	0.05	-0.09
Kurtosis	0.47	0.45	-0.02

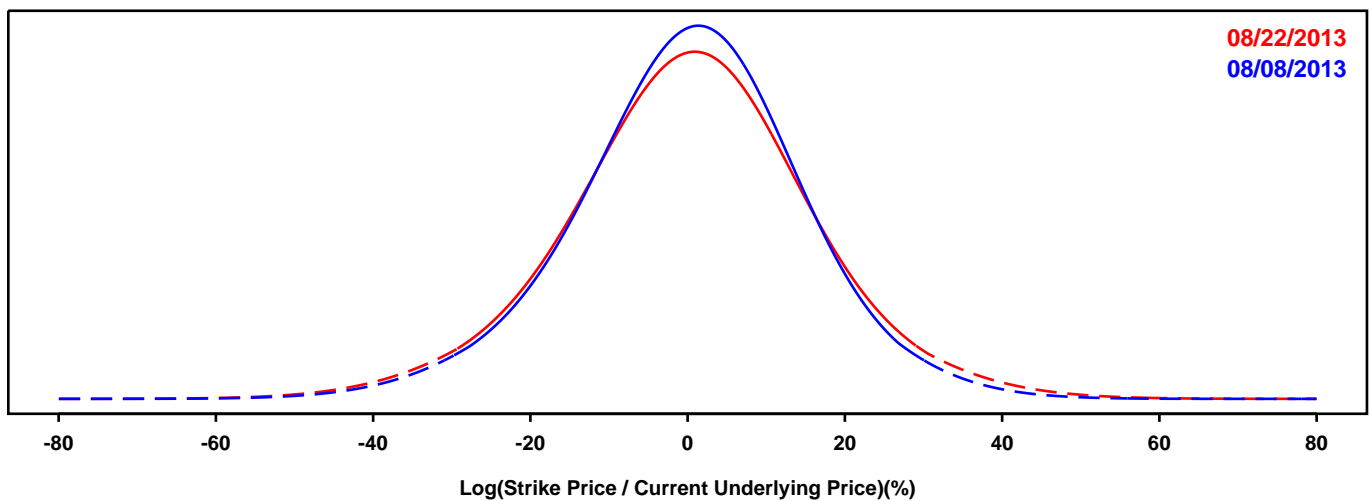
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SOYBEAN FUTURES

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

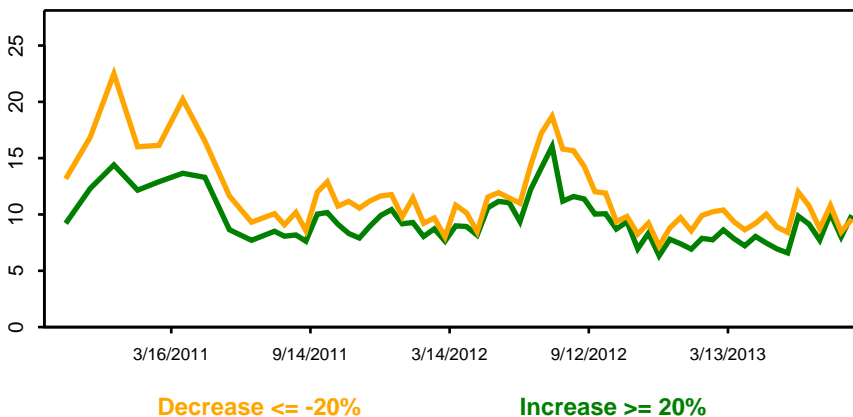
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

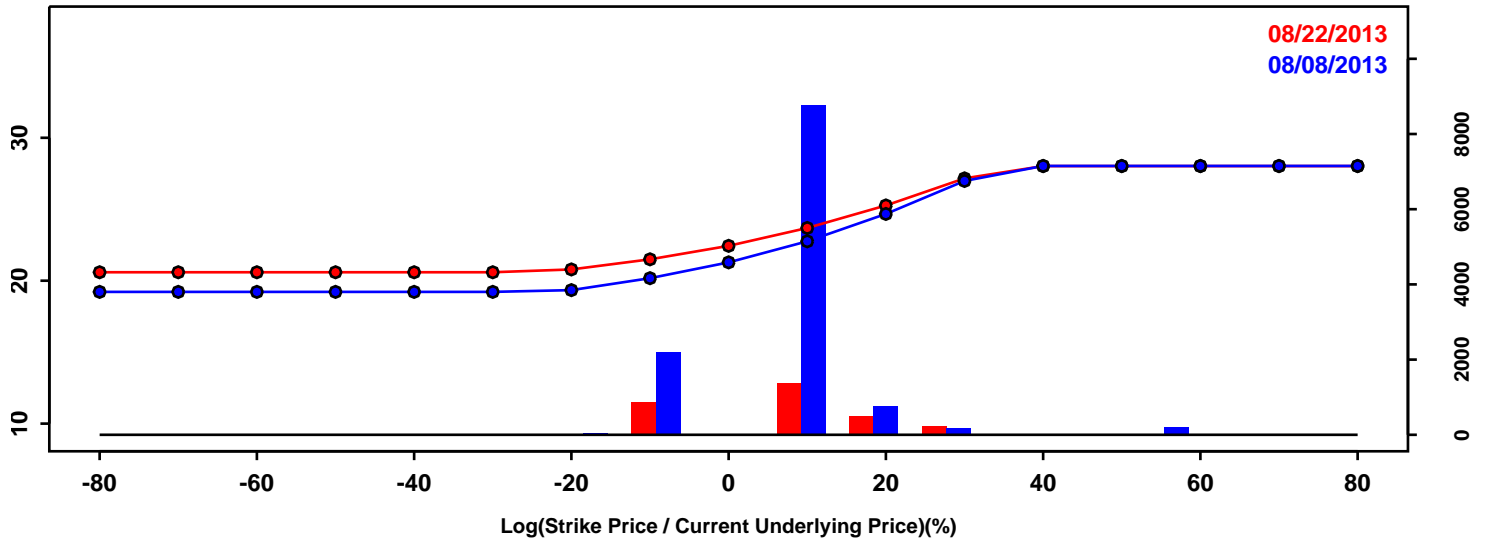


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-18.36%	-19.54%	-1.17%
50th Pct	0.62%	0.53%	-0.09%
90th Pct	18.17%	19.95%	1.78%
Mean	0.24%	0.41%	0.17%
Std Dev	14.70%	15.93%	1.23%
Skew	-0.16	-0.06	0.10
Kurtosis	0.51	0.55	0.04

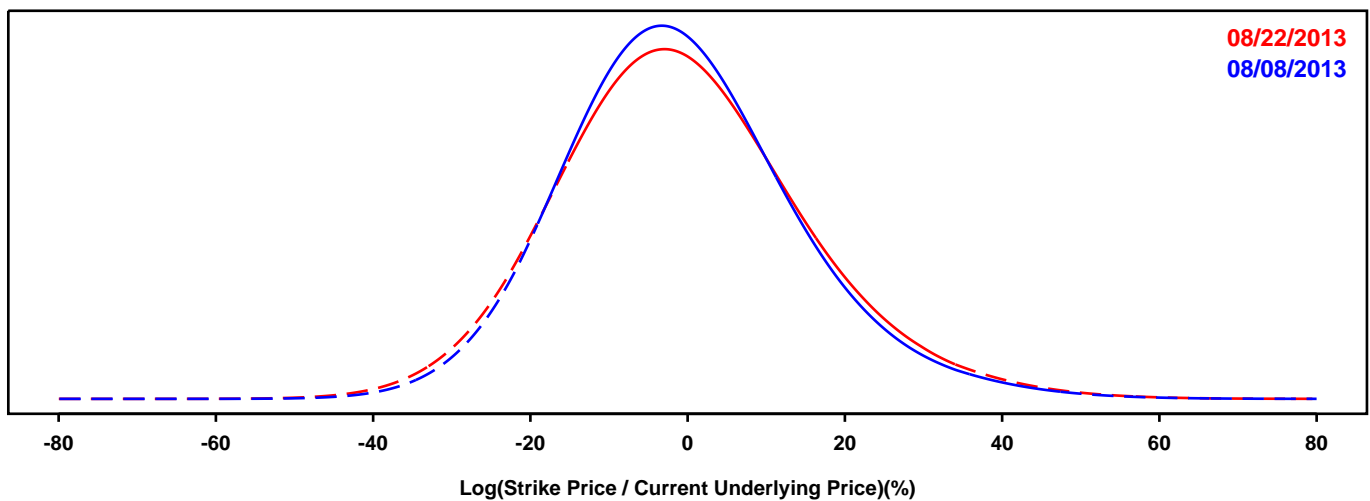
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WHEAT FUTURES

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

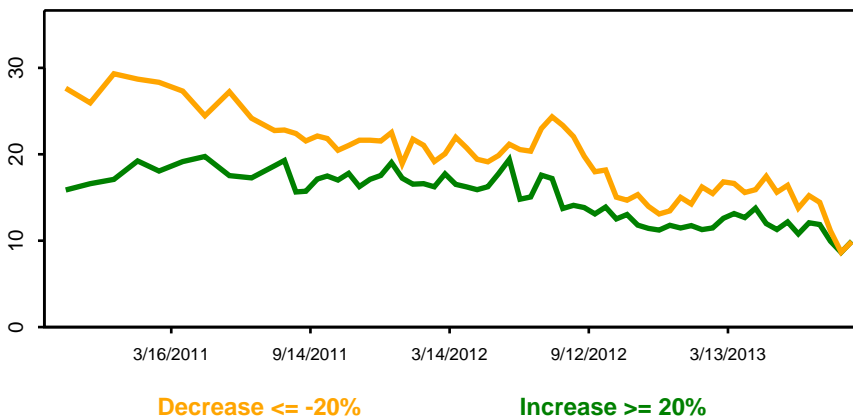
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

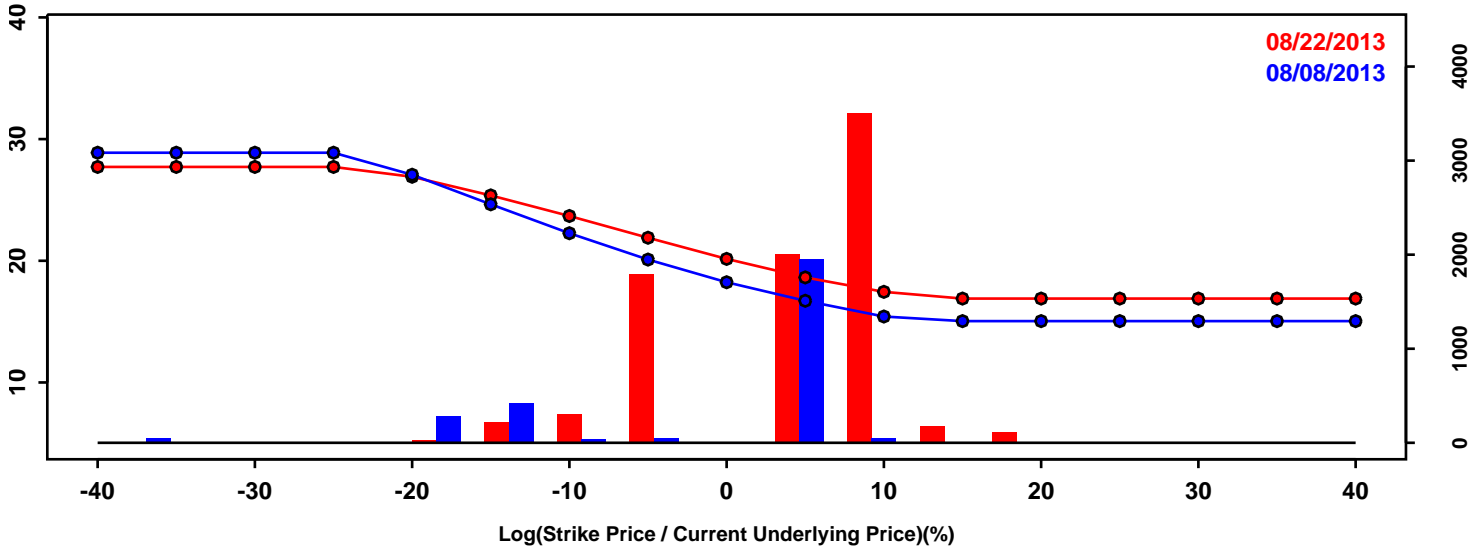


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-18.96%	-19.94%	-0.98%
50th Pct	-1.78%	-1.46%	0.32%
90th Pct	18.53%	19.97%	1.44%
Mean	-0.77%	-0.53%	0.24%
Std Dev	15.03%	15.89%	0.86%
Skew	0.42	0.35	-0.07
Kurtosis	0.58	0.43	-0.16

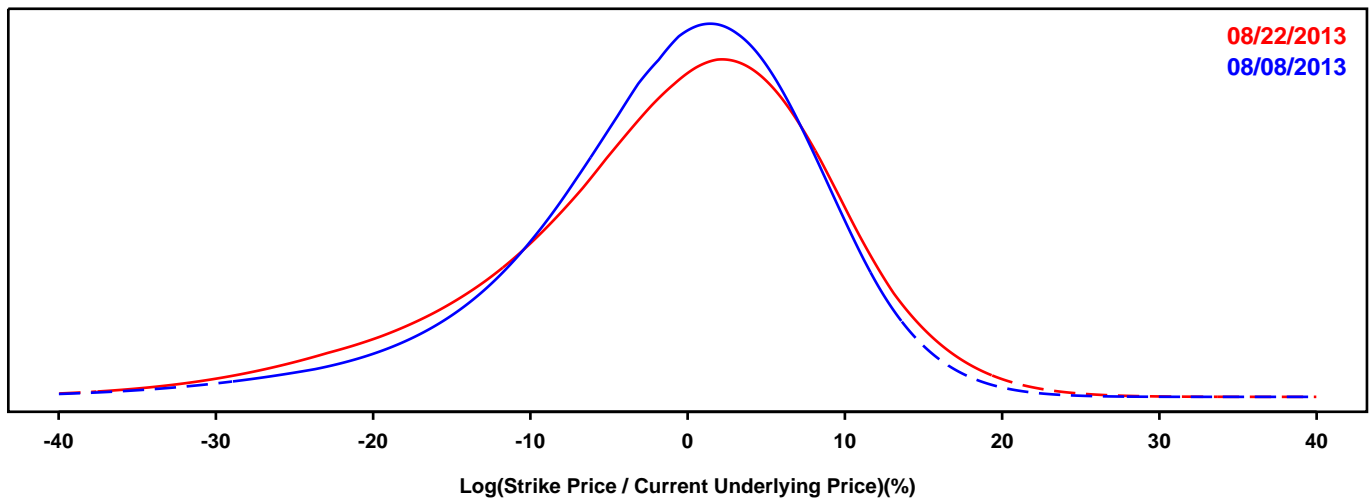
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- iSHARES DOW JONES US REAL ESTATE

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

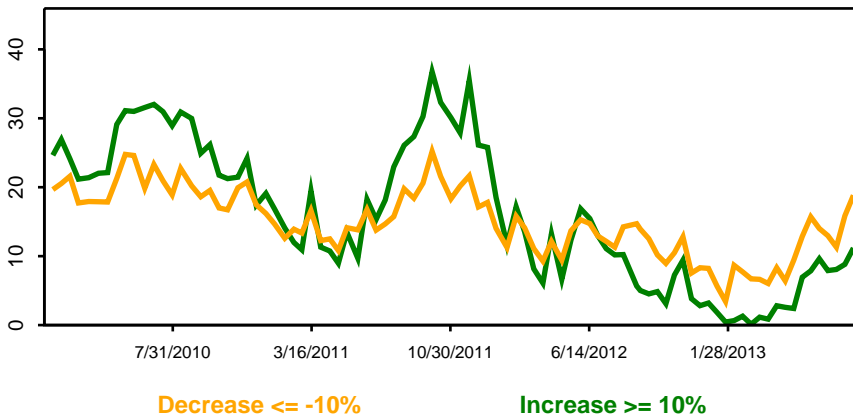
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

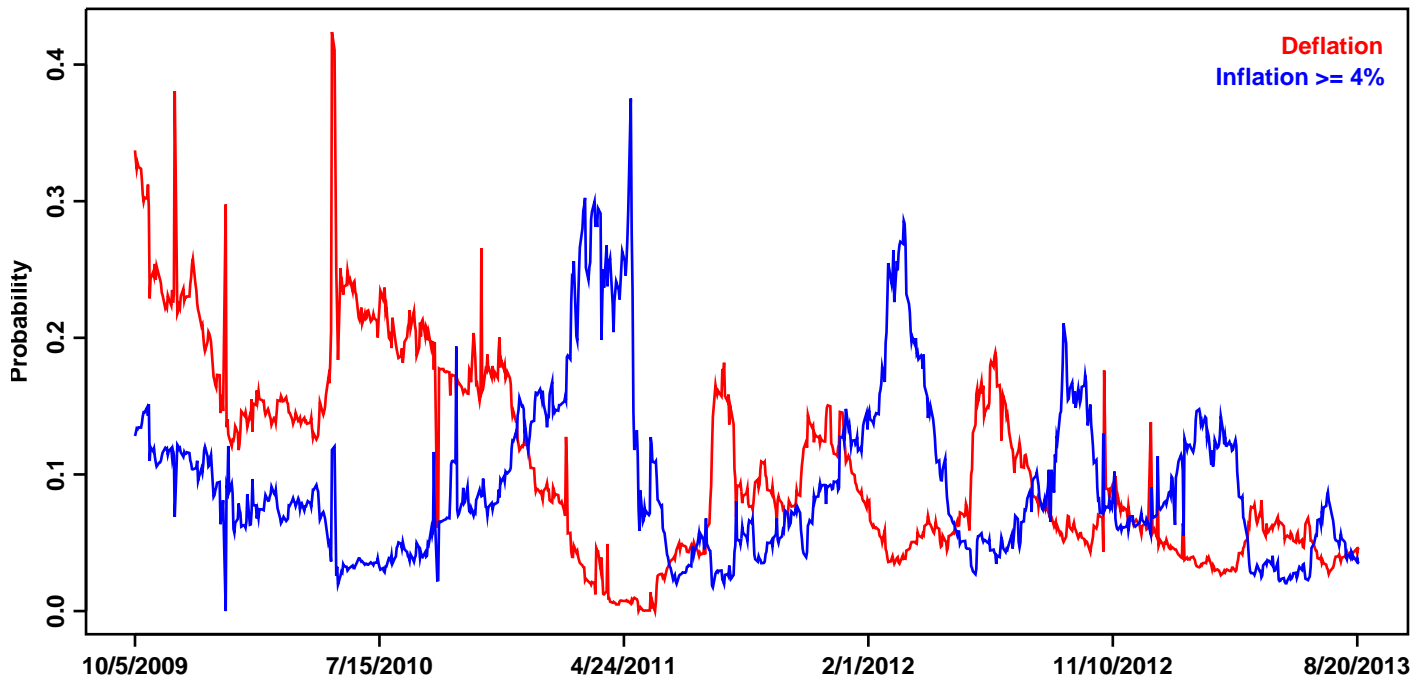


Statistics of the Log Return Distributions			
	08/08/2013	08/22/2013	Change
10th Pct	-13.62%	-15.78%	-2.17%
50th Pct	-0.15%	-0.08%	0.07%
90th Pct	9.51%	10.47%	0.96%
Mean	-1.29%	-1.47%	-0.18%
Std Dev	9.58%	10.57%	0.99%
Skew	-0.86	-0.72	0.13
Kurtosis	1.49	0.84	-0.65

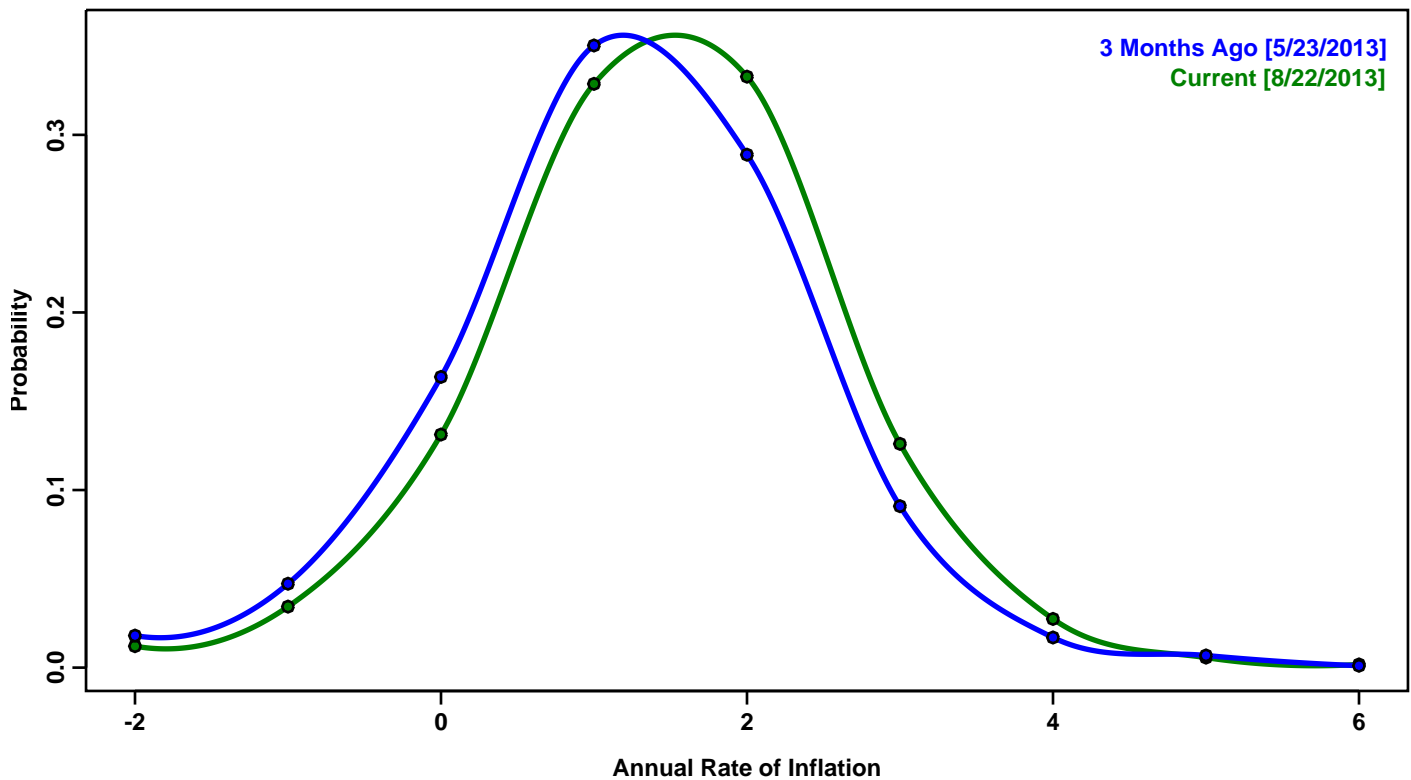


# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- Inflation Caps & Floors

## 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

