

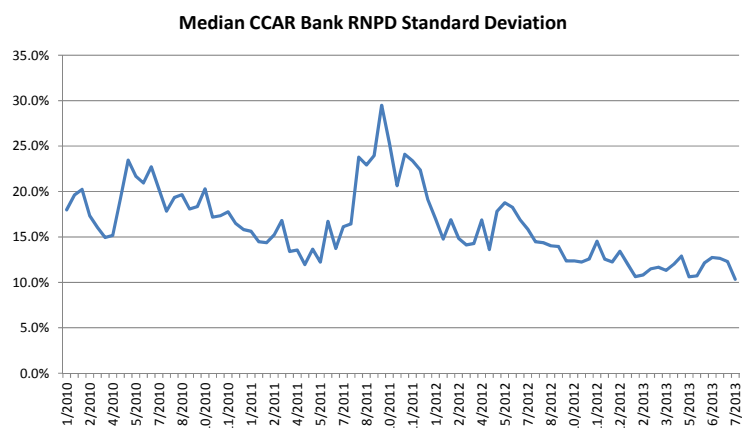
FEDERAL RESERVE BANK OF MINNEAPOLIS  
BANKING AND POLICY STUDIES

**Minneapolis Options Report – July 25<sup>th</sup>**

*Banks*

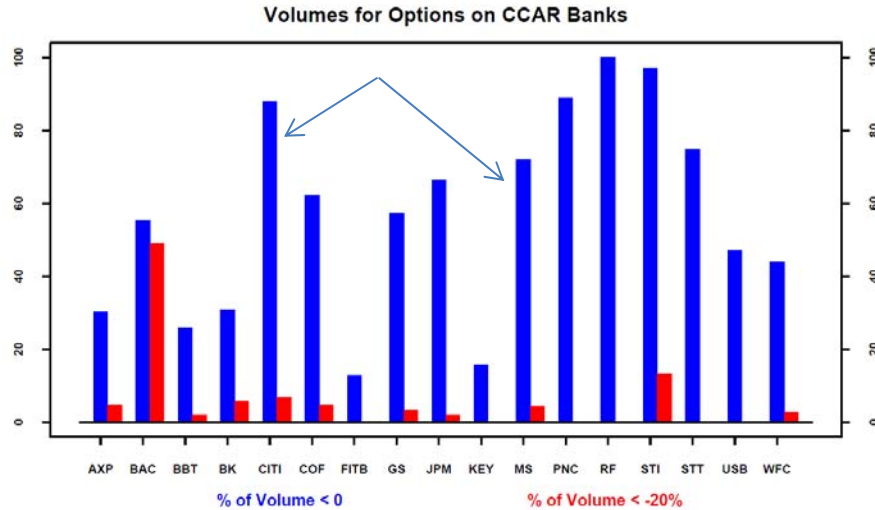
Trading volumes were higher relative to two weeks ago but remained light. Stocks with above average activity included: BBT, BK, C, WFC, KEY, and USB. The CCAR firms have reported earnings since our last report. The median earnings surprise was 5.4%, revenue surprise was 1.6%, and price response was 1.1%. 82% and 65% of the firms beat their street estimates for earnings and revenues respectively. Share prices are higher relative to two weeks ago. The median CCAR firm's stock price rose 4.2%

Tail risks fell pervasively across the industry as indicated by declines in RNPD standard deviations relative to last period. RNPD volatilities are near three and a half year lows for the universe of banks we follow. Correspondingly, risk neutral probabilities of large price changes are also extremely low.



Additional notes:

- The RNPD derived from options on MS shares skewed more to the downside after an 8.65% price increase. The majority of firms posted less negative skews.
- Trading in options on C and MS shares was dominated by put transactions (see arrows in chart below).
- Trading in options on BK, BBT, KEY, and USB was dominated by call transactions.



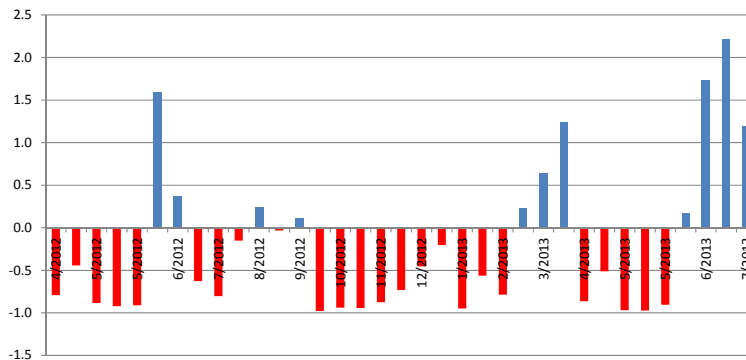
### Other Commodity Markets

Volumes for options on the S&P 500 index rose for twelve month expiries but fell substantially for six month expiries. The RNPDs associated with those options were largely unchanged. For the third report in a row, we highlight elevated activity in options on the grains. Options on gold, silver, and oil futures also continue to trade at above average levels. As with the bank RNPDs, RNPD standard deviations declined across the range of commodities.

### Additional notes:

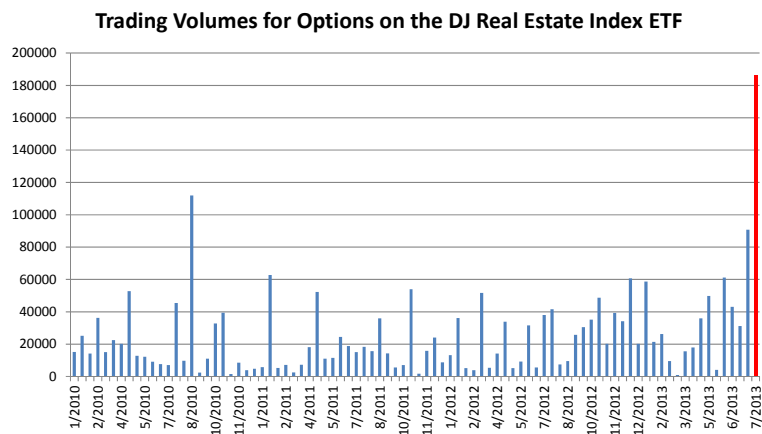
- Trading was again active for options on WTI crude futures but less so on Brent. Spot prices rose more than 1.5% for WTI and were flat for Brent relative to two weeks ago. We have begun to see an increase in trading on options on WTI futures relative to options on Brent futures. (See Oil Reports).

Options Trading Volume - WTI futures vs. Brent futures (6 month expiries)

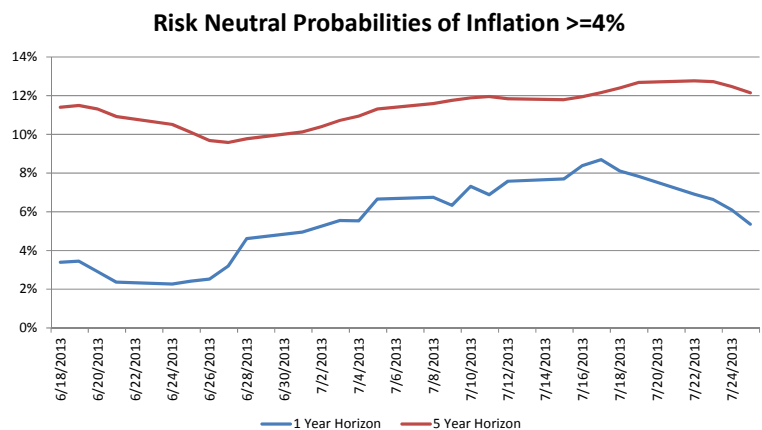


- Tail risks declined in foreign exchange markets. The decrease was particularly sharp in dollar-yen where the RNPD standard deviation dropped 100 basis points. The increased tail risk in the dollar-pound exchange rate market noted in the last report reversed. Volumes were brisk again in options on dollar-pound futures and above average in the other two markets. (See Exchange rate reports)

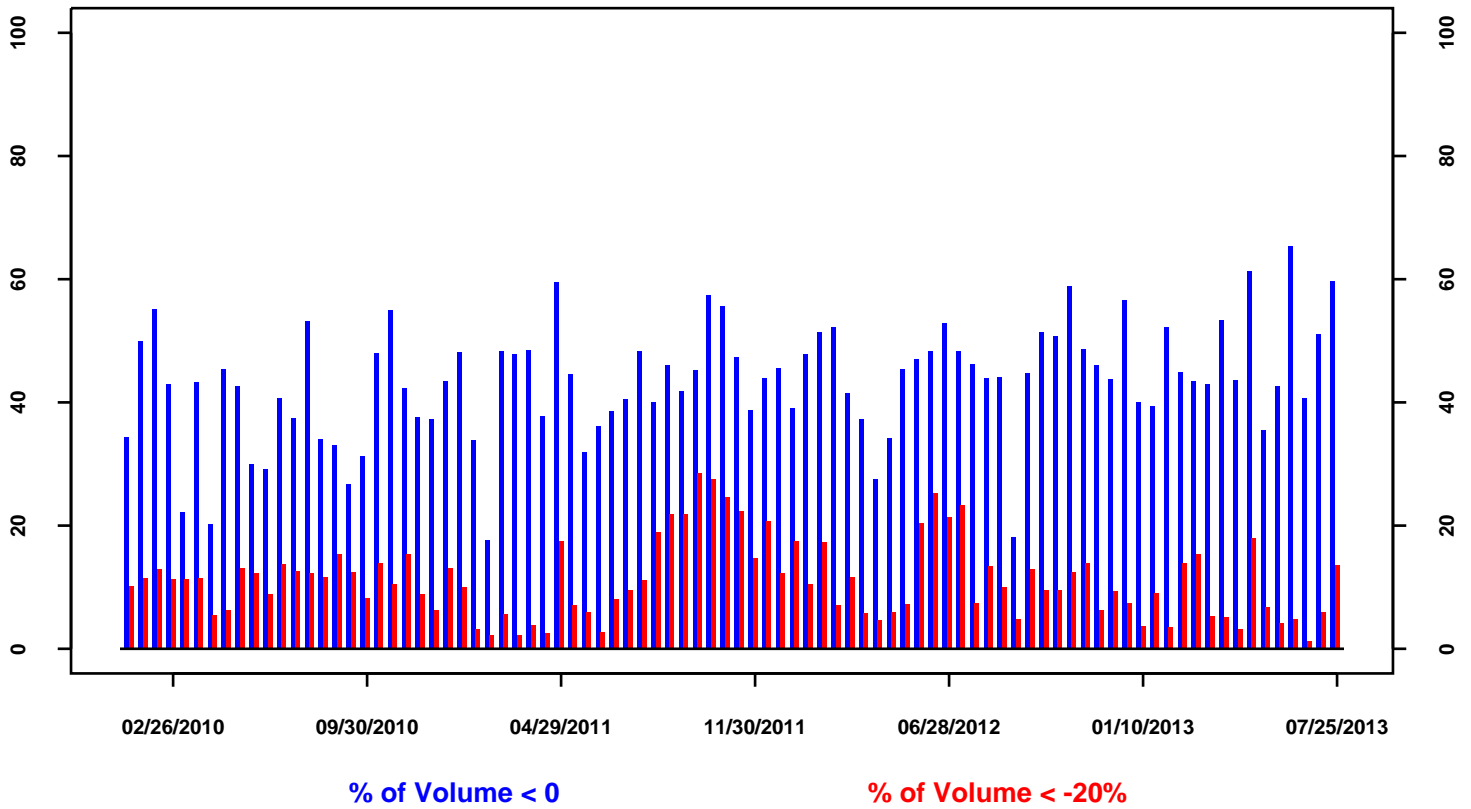
- Grain prices dropped precipitously over the past two weeks with corn falling -9.2%, soybeans falling -5.2%, and wheat falling -5.1%. At the same time, the RNP standard deviations for corn and wheat fell nearly -2%. On the other hand the RNP standard deviation for soybeans rose nearly 2%. (See grain market reports)
- Trading volumes for options on gold and silver futures remained high. Tail risks, as measured by RNP standard deviation fell for the second report in a row. (See gold and silver reports)
- The DJ Real Estate Index ETF fell -2.4% over the past two weeks. Options trading was highest we have measured since January 2010 and we note that many of the underlying REITs have been reporting earnings in recent days. Performance of the ETF has been very sensitive to changing market views of interest rates. Nevertheless, the shape of the RNP has changed only slightly since the last report. (See Real Estate report)



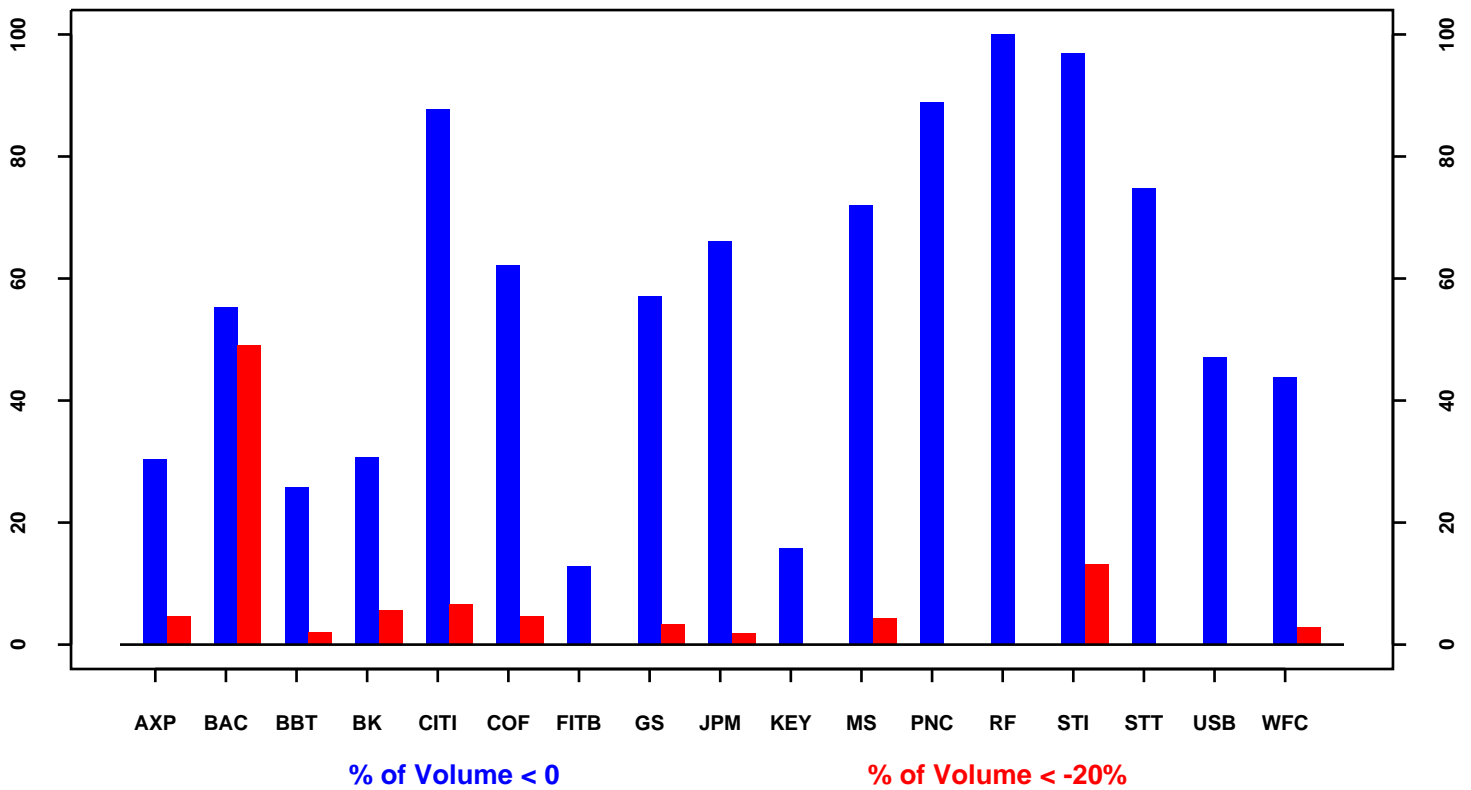
- Since the last FOMC meeting, risk neutral expectations for high inflation have risen. Notably, in recent days, near term expectations have begun to reverse while longer term expectations have not. (Also see inflation reports)



### Aggregate Volumes for Options on CCAR Banks

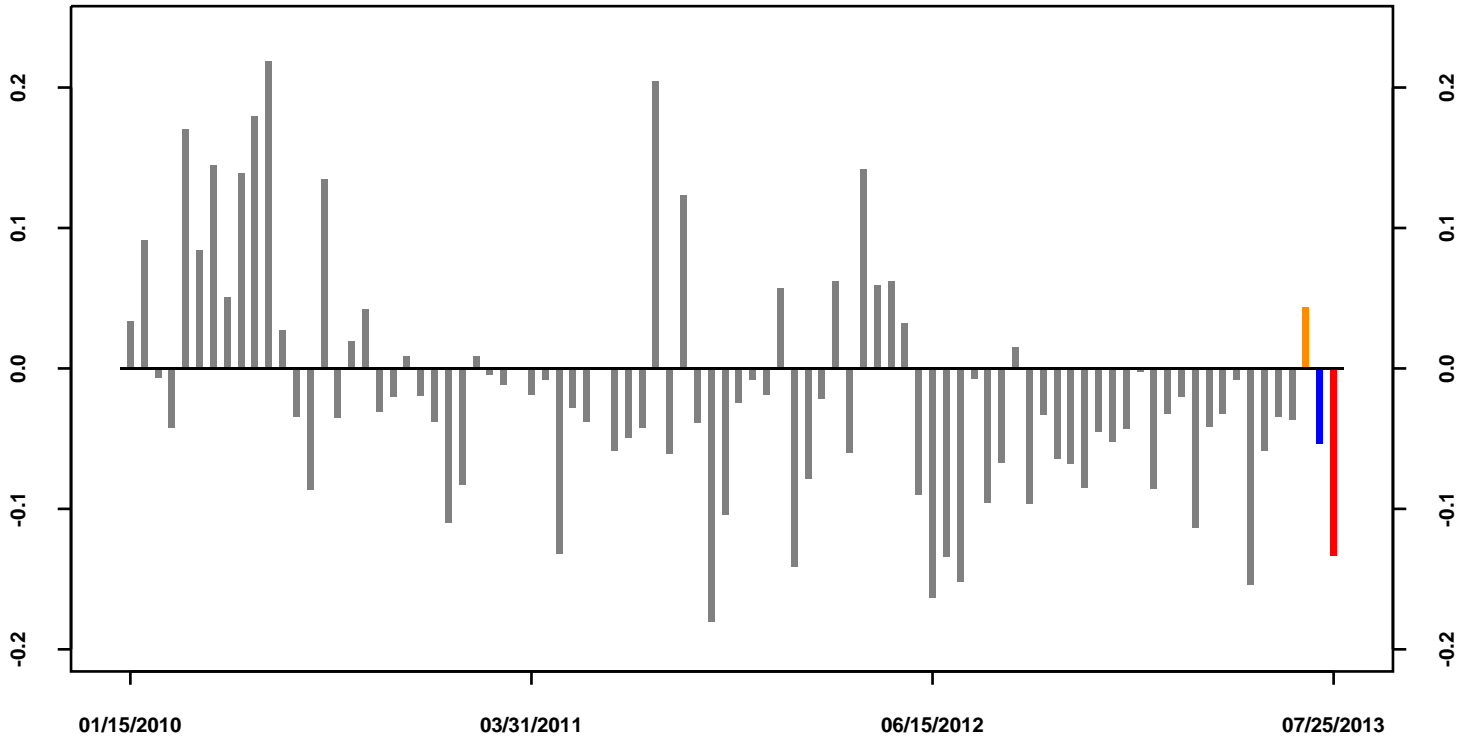


### Volumes for Options on CCAR Banks

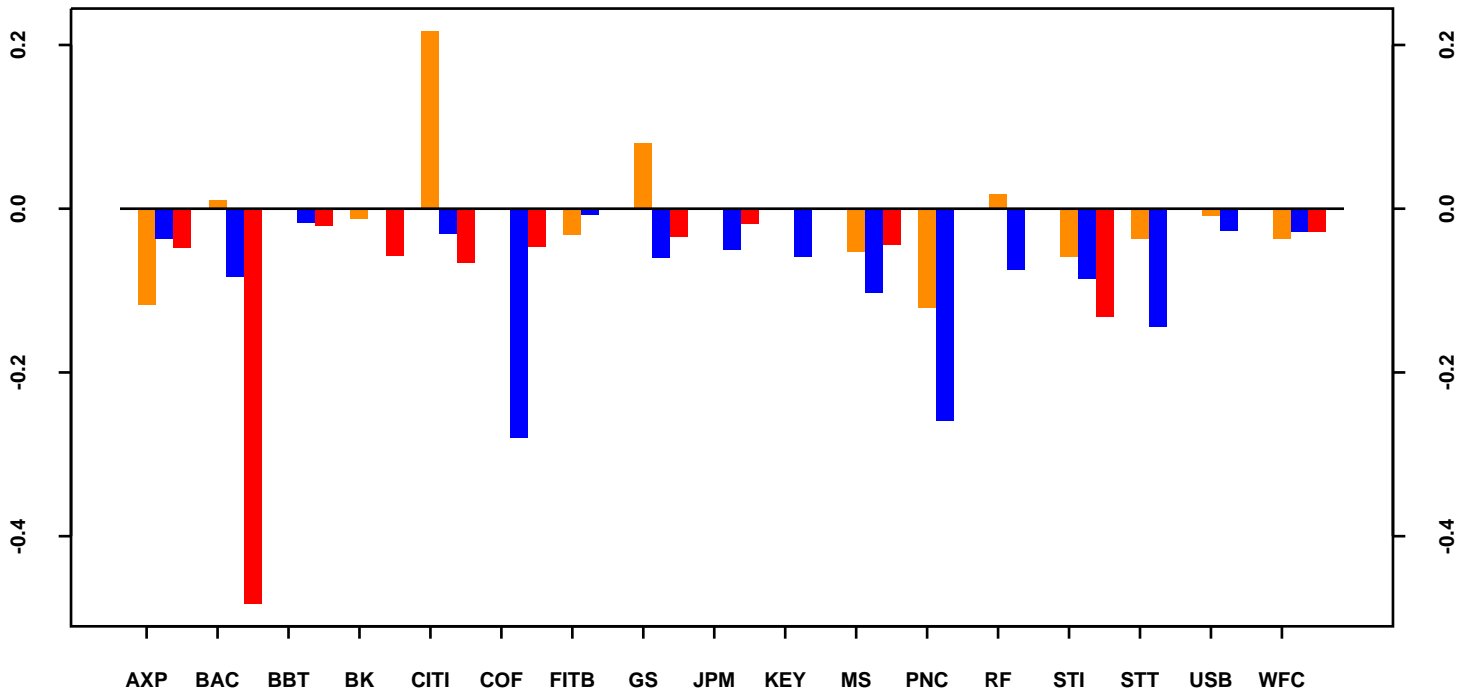


### Aggregate Volume Skew--CCAR Banks

(% 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



06/27/2013

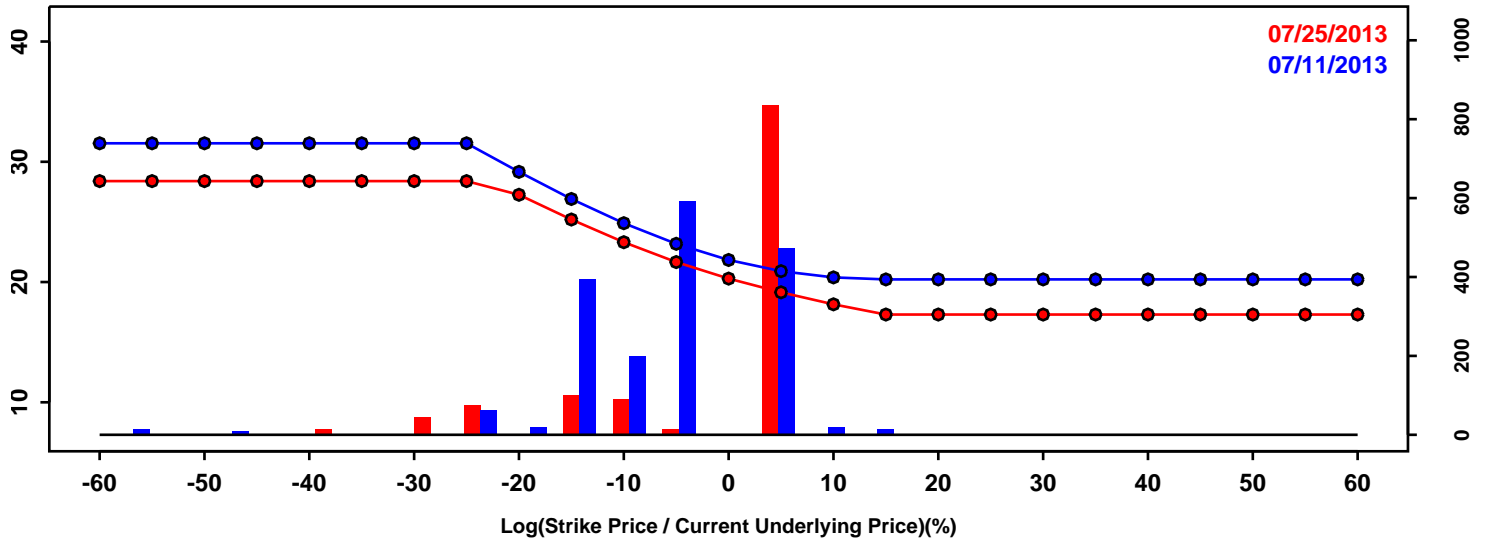
07/11/2013

07/25/2013

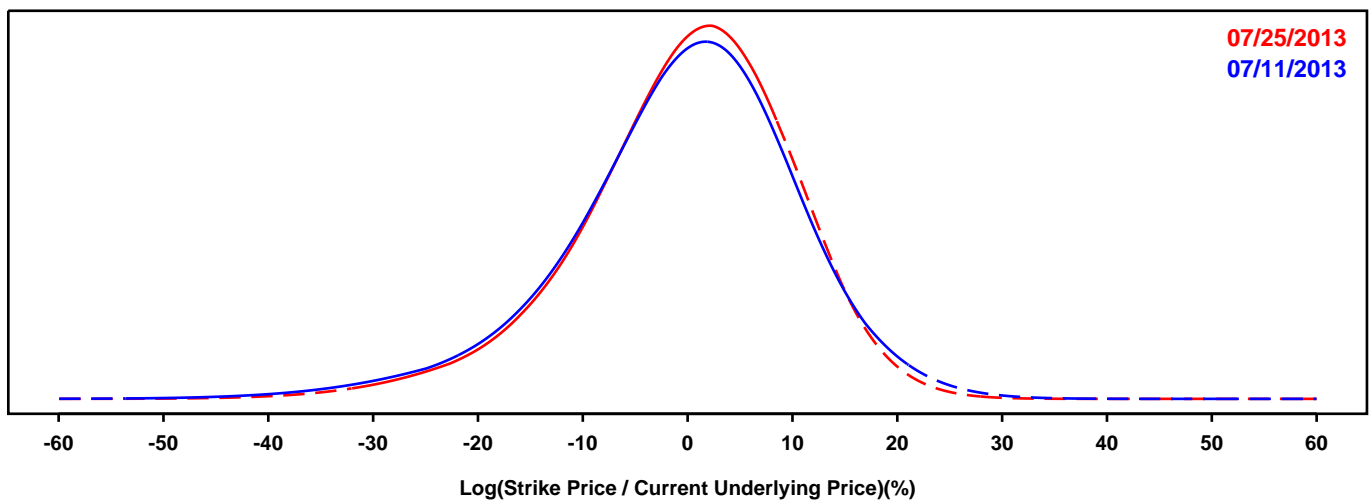
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AMERICAN EXPRESS

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

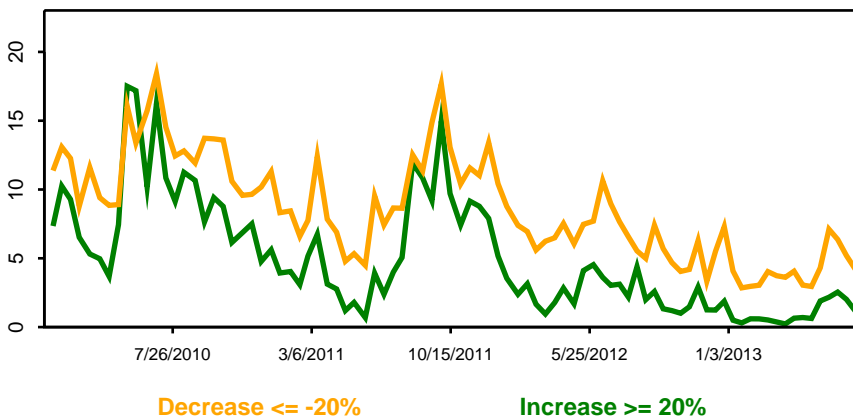
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

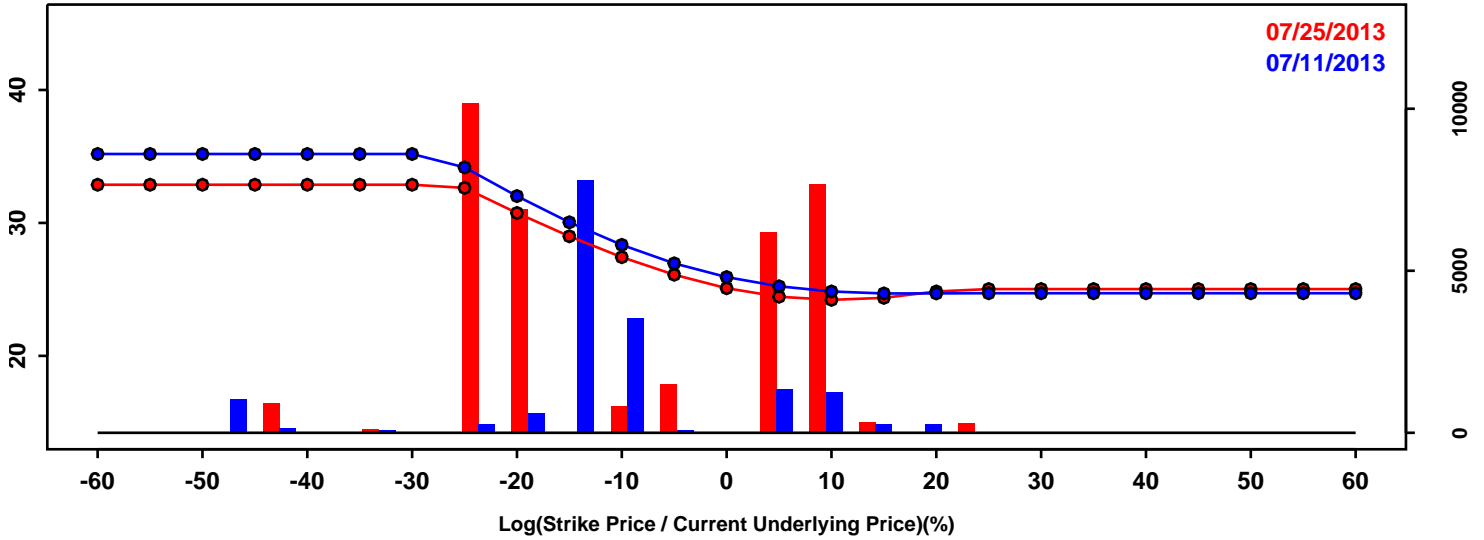


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-14.61%	-13.53%	1.07%
50th Pct	0.39%	0.69%	0.31%
90th Pct	12.41%	11.93%	-0.48%
Mean	-0.50%	-0.20%	0.30%
Std Dev	11.09%	10.30%	-0.79%
Skew	-0.59	-0.60	-0.01
Kurtosis	1.08	0.86	-0.22

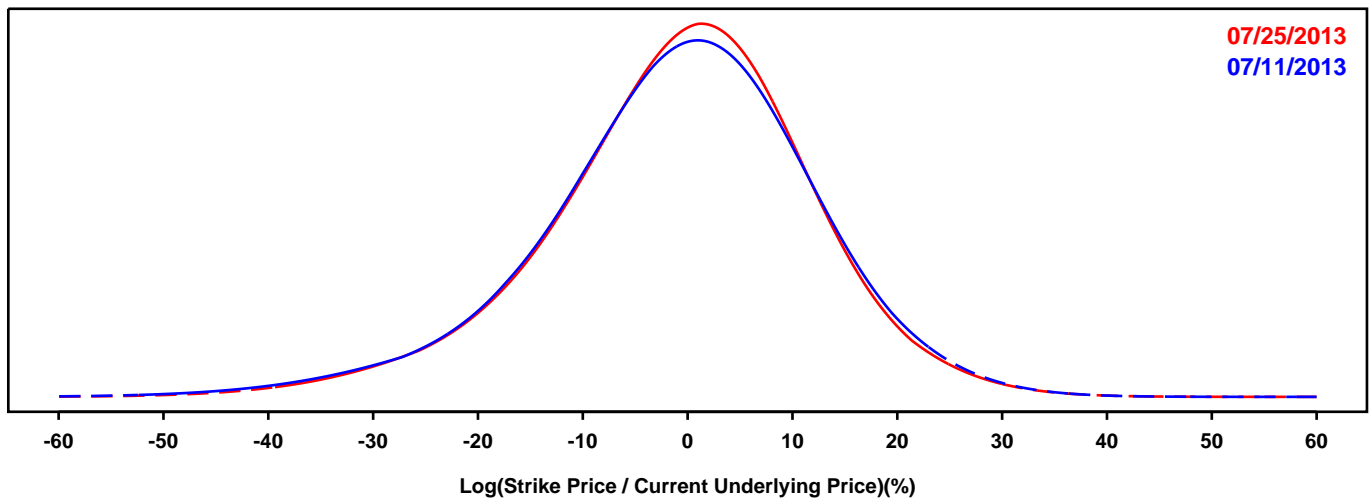
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF AMERICA

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

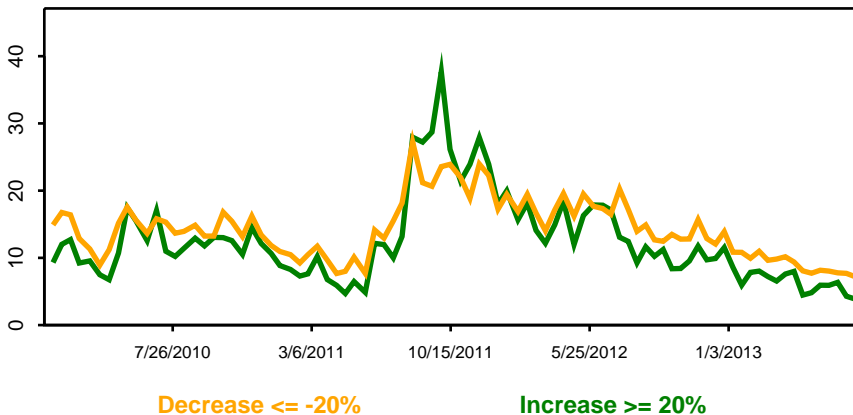
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

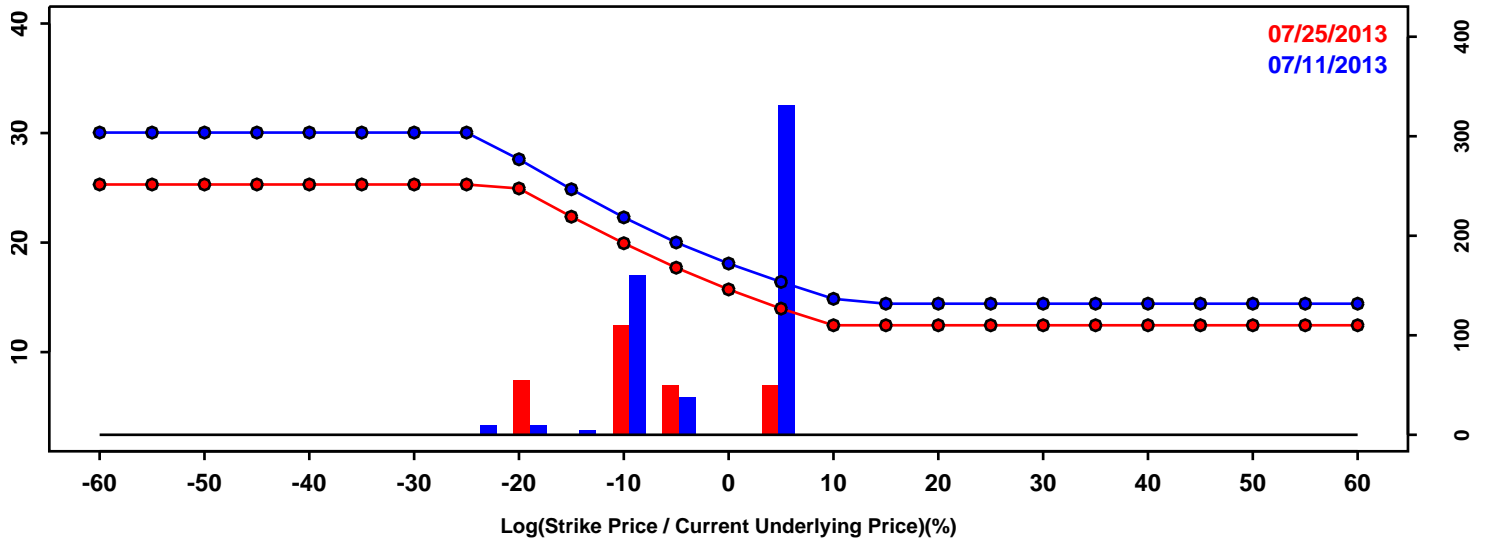


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-17.52%	-17.02%	0.50%
50th Pct	-0.07%	0.04%	0.12%
90th Pct	14.74%	14.21%	-0.53%
Mean	-0.90%	-0.78%	0.12%
Std Dev	13.14%	12.68%	-0.45%
Skew	-0.46	-0.42	0.04
Kurtosis	0.84	0.76	-0.08

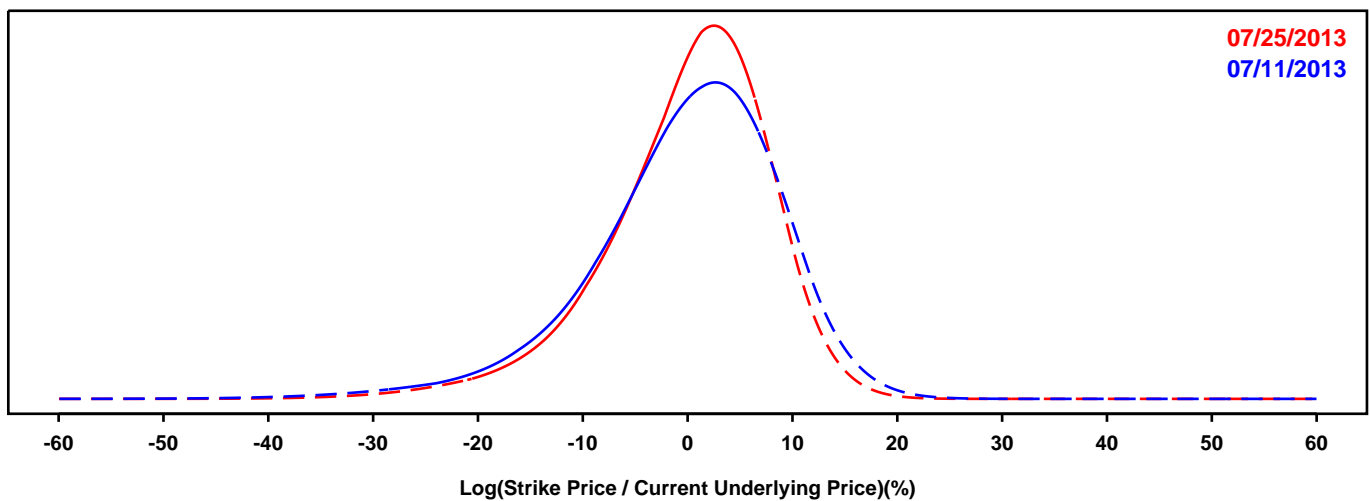
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BB&T

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

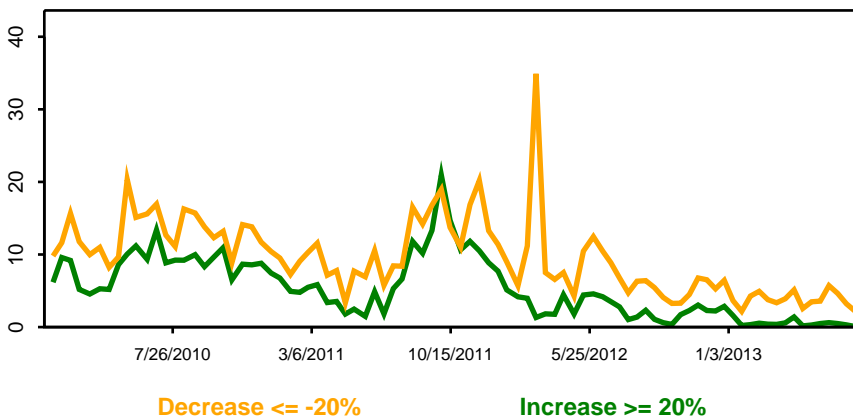
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



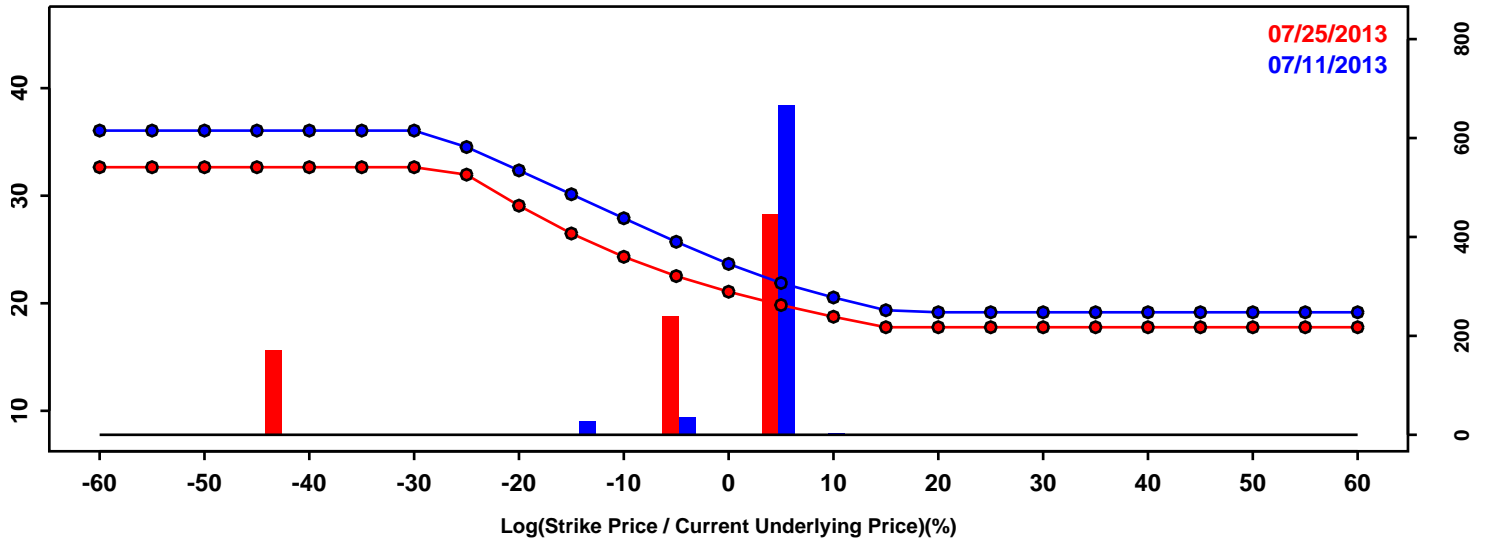
Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-11.80%	-10.33%	1.47%
50th Pct	0.86%	1.02%	0.16%
90th Pct	10.18%	8.92%	-1.26%
Mean	-0.18%	-0.02%	0.17%
Std Dev	9.16%	7.99%	-1.17%
Skew	-0.87	-0.88	-0.01
Kurtosis	1.70	1.57	-0.13



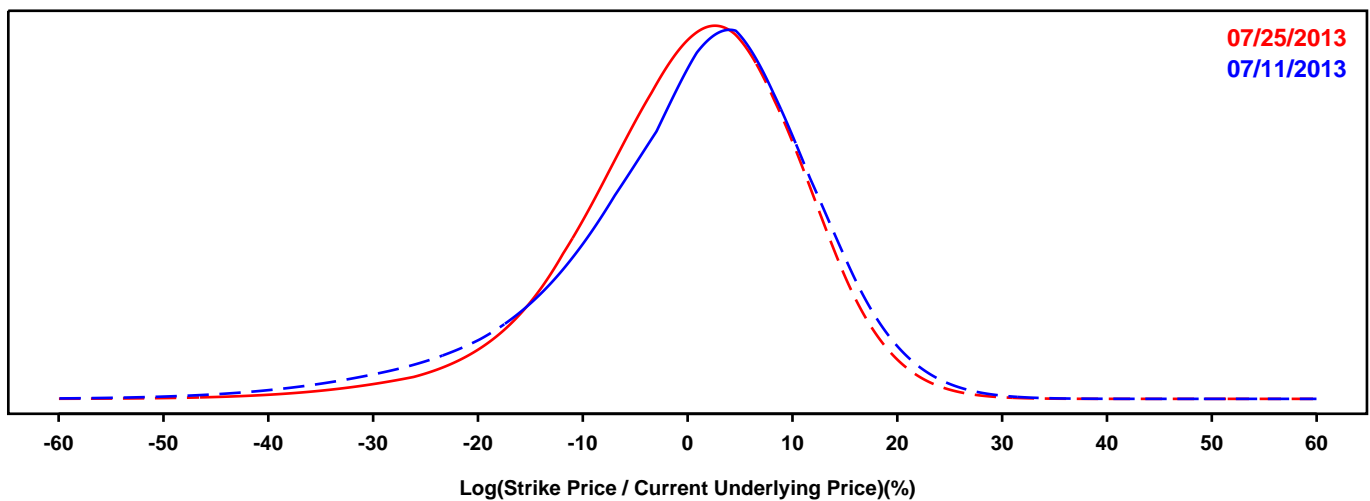
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF NEW YORK MELLON

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

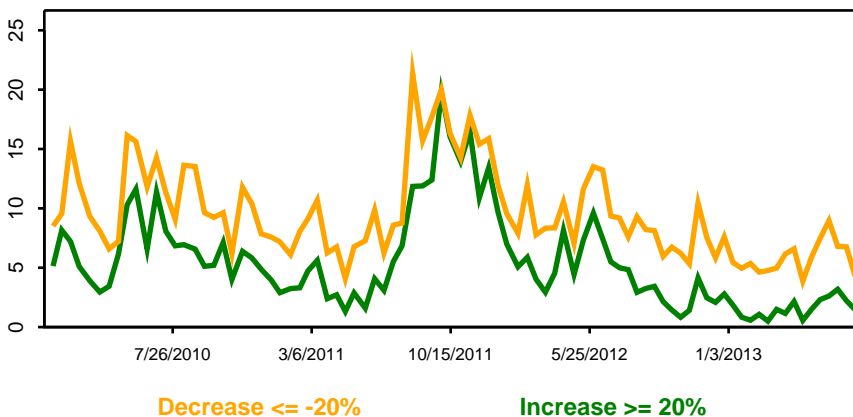
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

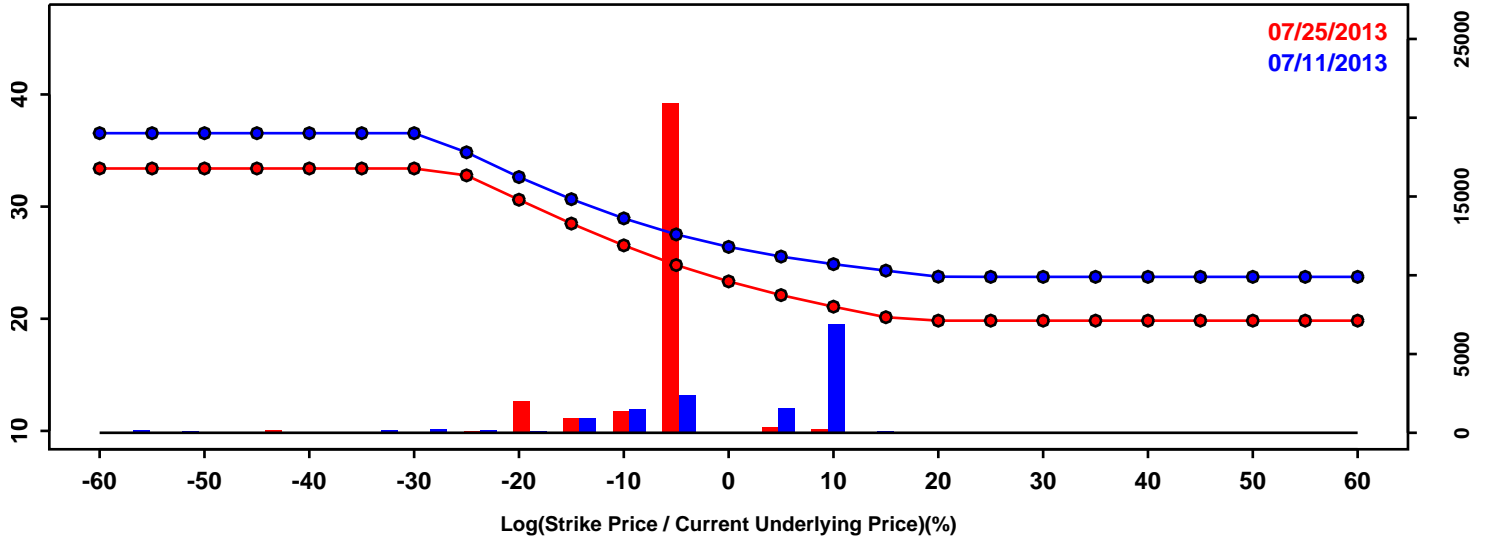


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-15.93%	-13.45%	2.48%
50th Pct	1.56%	0.96%	-0.60%
90th Pct	13.47%	12.47%	-1.00%
Mean	-0.09%	0.02%	0.11%
Std Dev	12.15%	10.64%	-1.50%
Skew	-0.88	-0.67	0.21
Kurtosis	1.47	1.19	-0.28

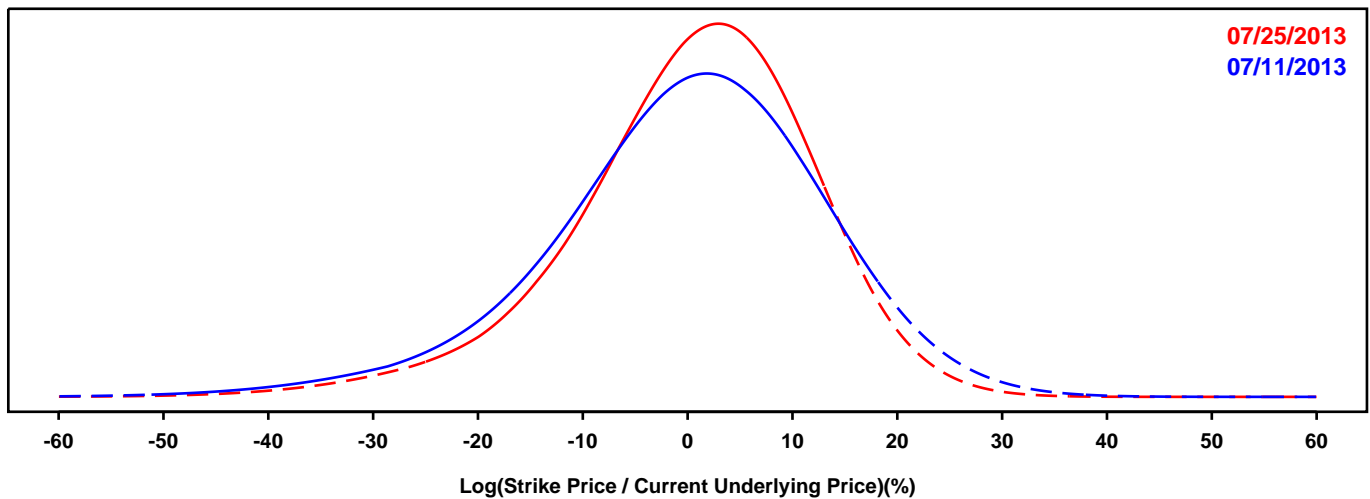
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CITIGROUP

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

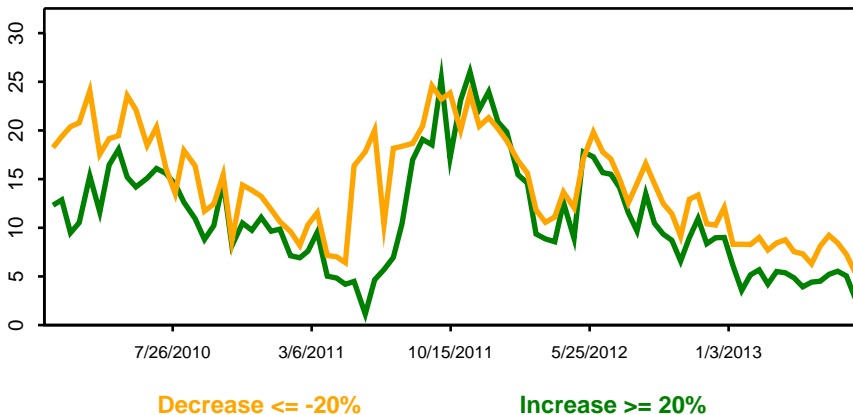
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

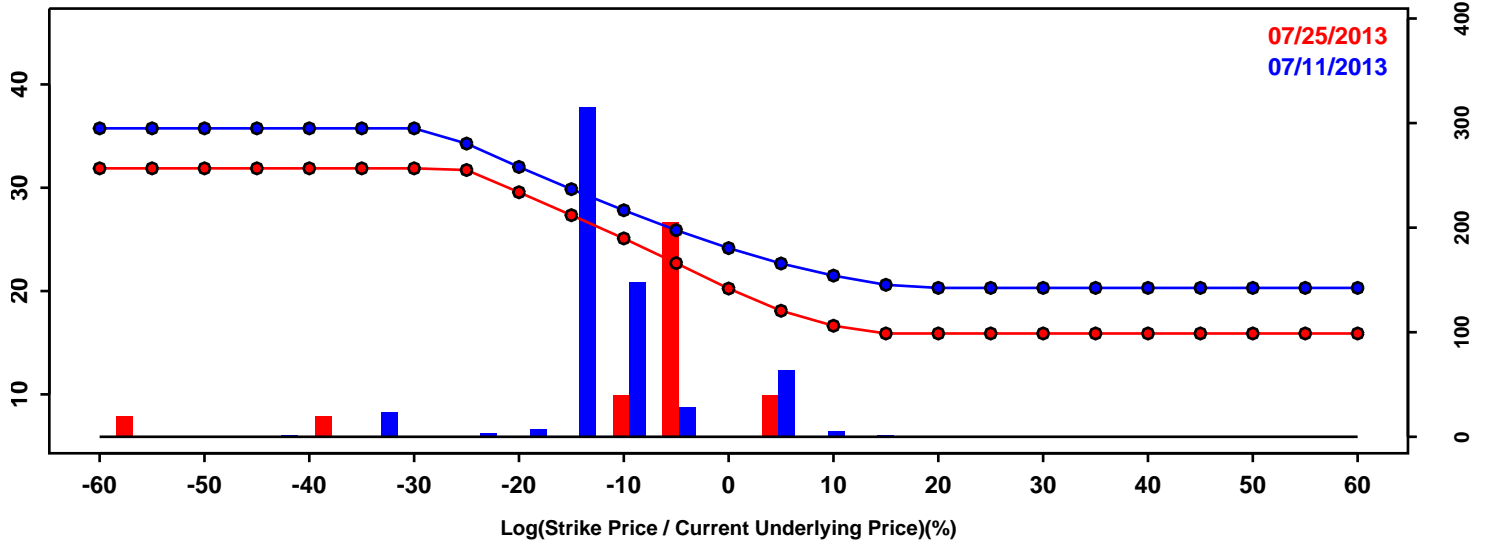


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-16.93%	-14.59%	2.34%
50th Pct	0.81%	1.41%	0.60%
90th Pct	15.88%	14.05%	-1.83%
Mean	-0.04%	0.38%	0.42%
Std Dev	13.31%	11.70%	-1.61%
Skew	-0.50	-0.64	-0.14
Kurtosis	0.82	1.02	0.20

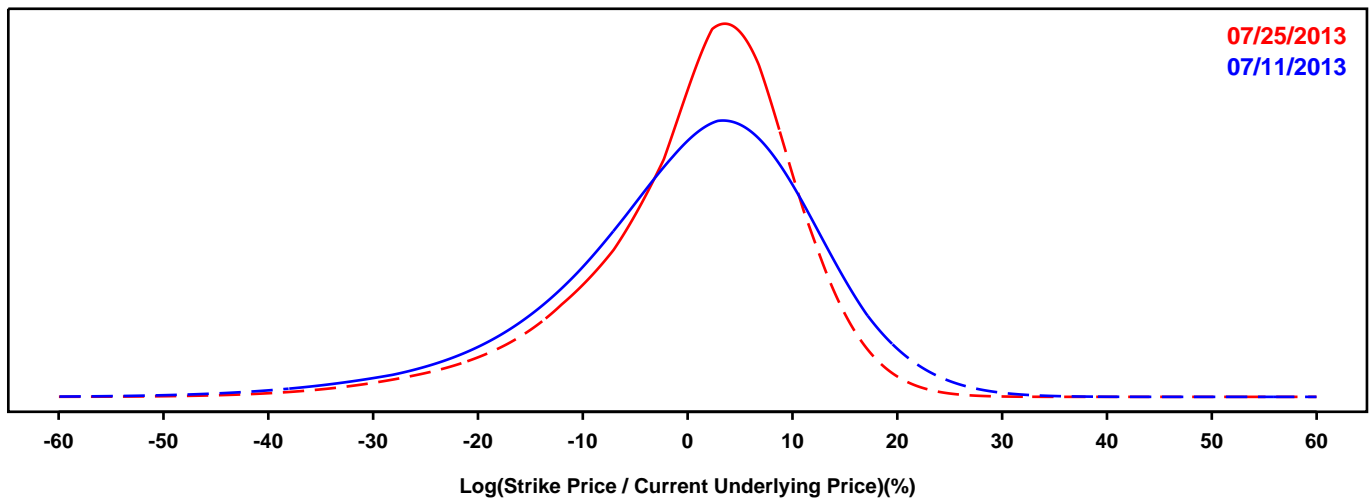
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CAPITAL ONE

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

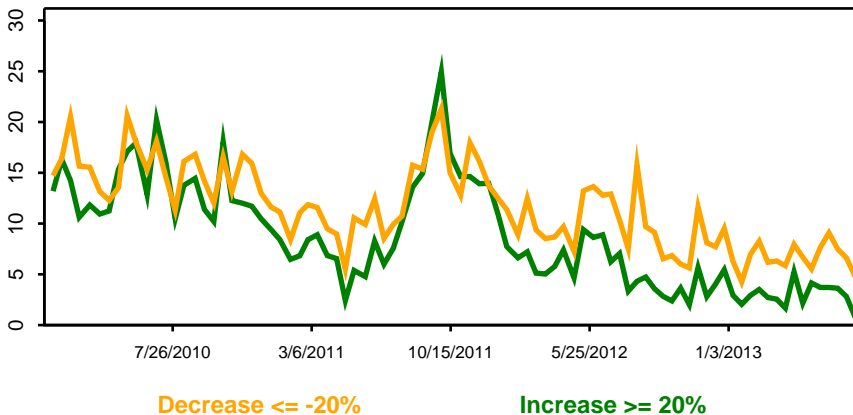
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

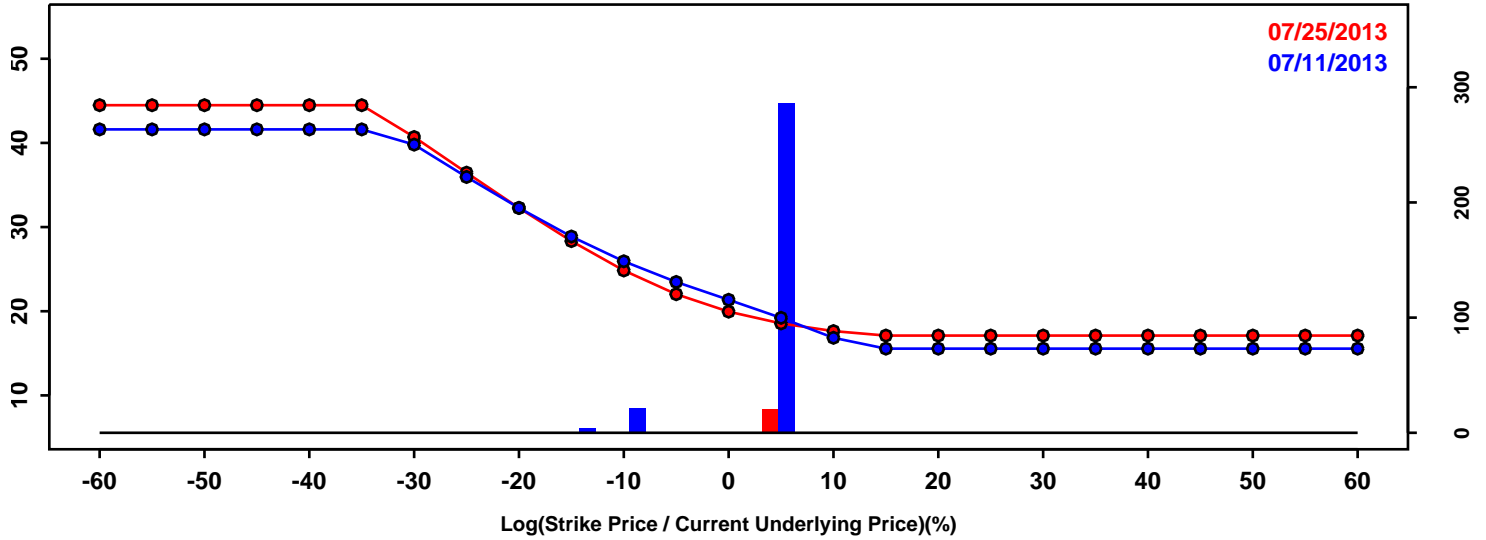


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-15.99%	-13.39%	2.60%
50th Pct	1.41%	2.03%	0.61%
90th Pct	13.97%	11.49%	-2.48%
Mean	0.01%	0.34%	0.34%
Std Dev	12.29%	10.34%	-1.95%
Skew	-0.75	-1.02	-0.26
Kurtosis	1.21	1.79	0.58

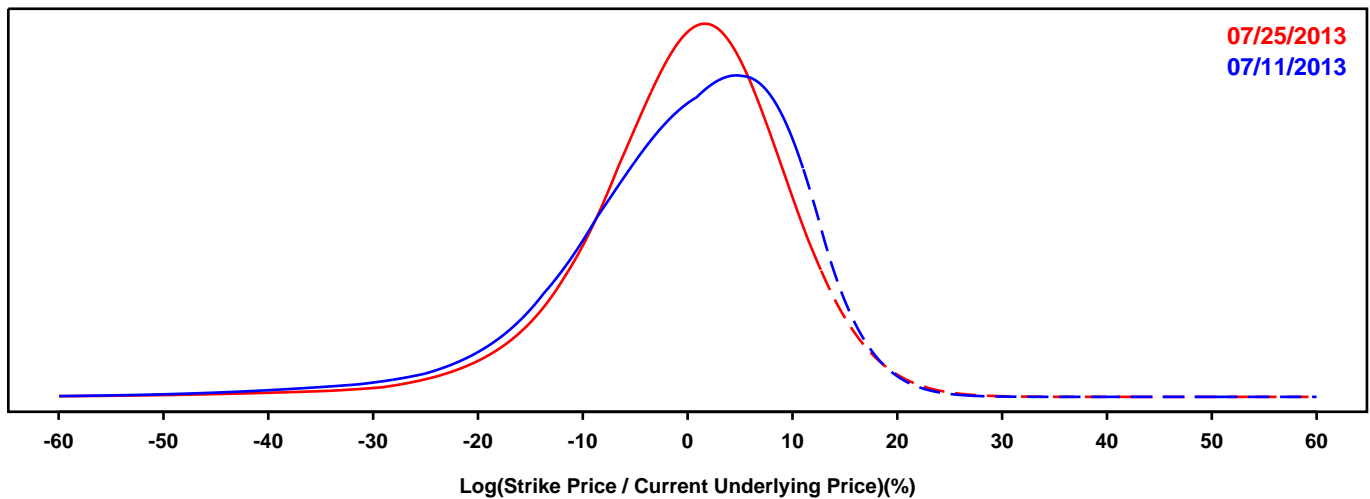
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- FIFTH THIRD

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

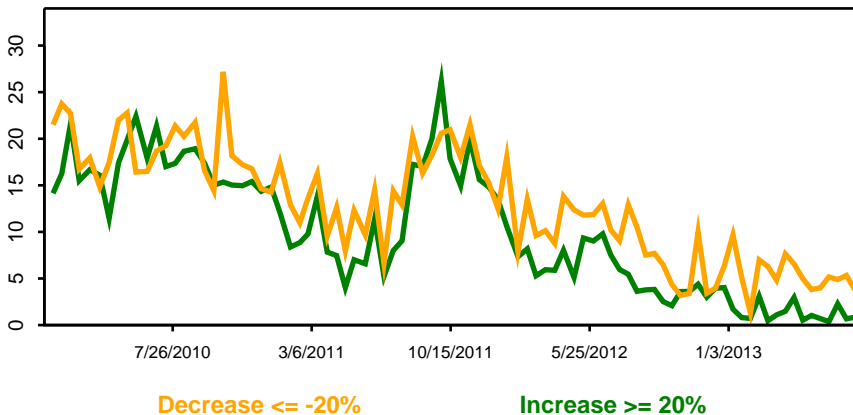
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

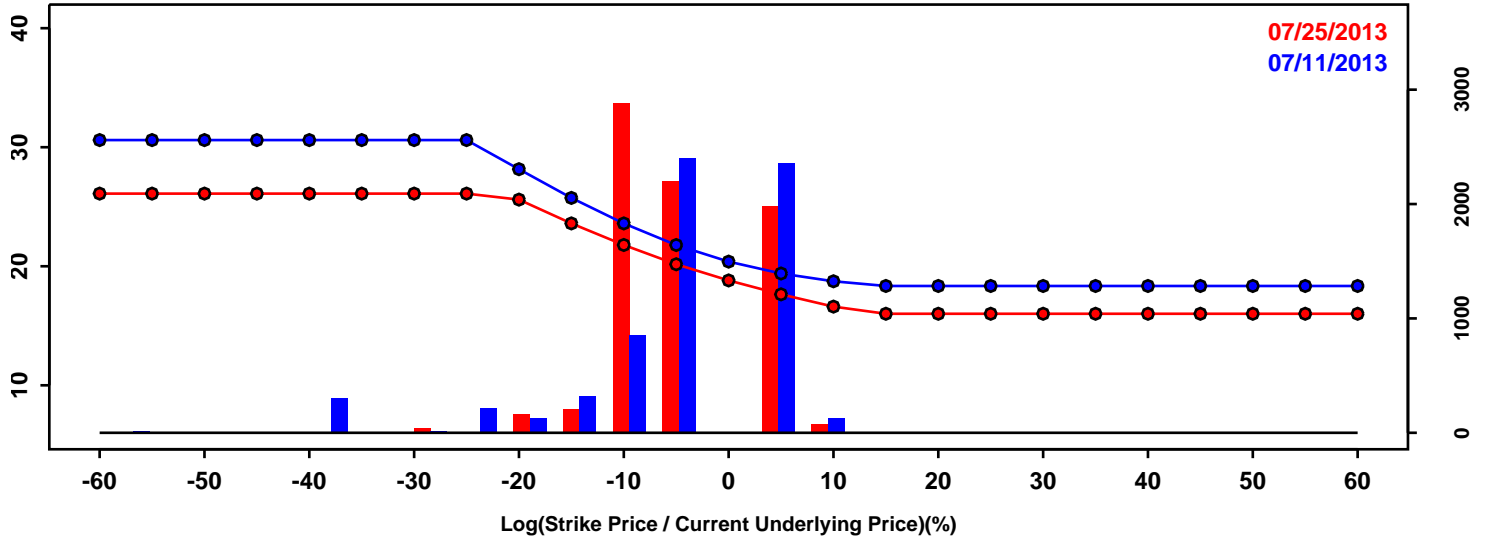


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-14.40%	-12.42%	1.98%
50th Pct	0.98%	0.52%	-0.46%
90th Pct	11.72%	10.95%	-0.77%
Mean	-0.58%	-0.41%	0.17%
Std Dev	11.26%	10.14%	-1.12%
Skew	-1.16	-1.09	0.07
Kurtosis	2.75	3.64	0.88

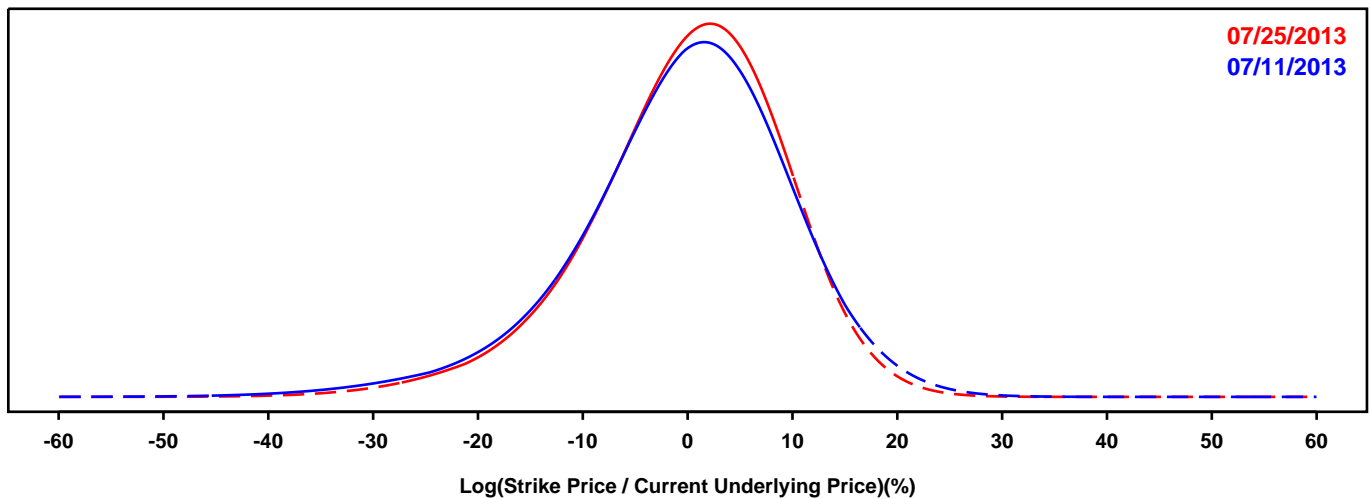
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- JP MORGAN

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

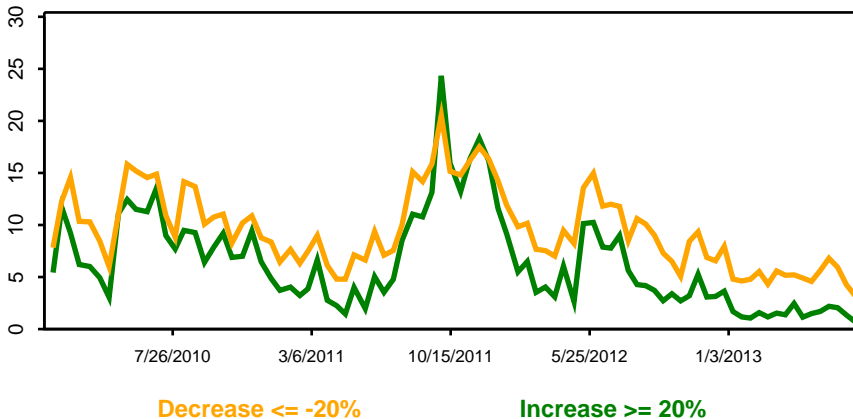
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

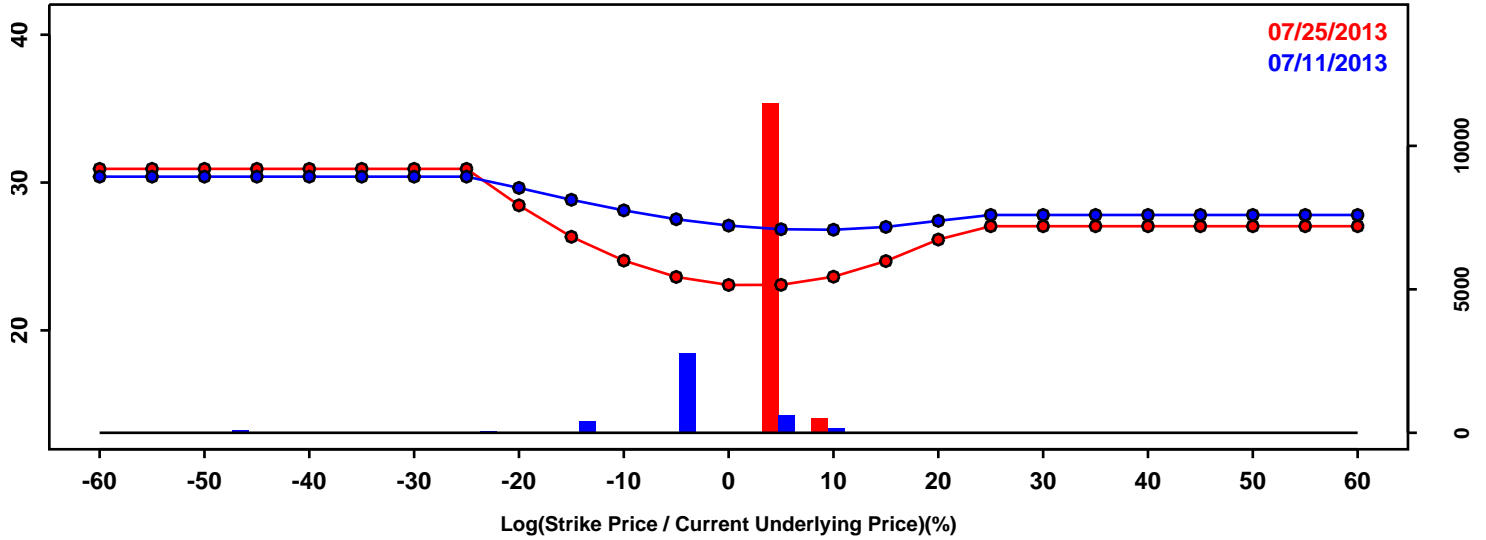


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-13.45%	-12.32%	1.13%
50th Pct	0.51%	0.74%	0.23%
90th Pct	11.70%	11.07%	-0.63%
Mean	-0.35%	-0.08%	0.27%
Std Dev	10.34%	9.46%	-0.88%
Skew	-0.62	-0.58	0.04
Kurtosis	1.17	0.81	-0.36

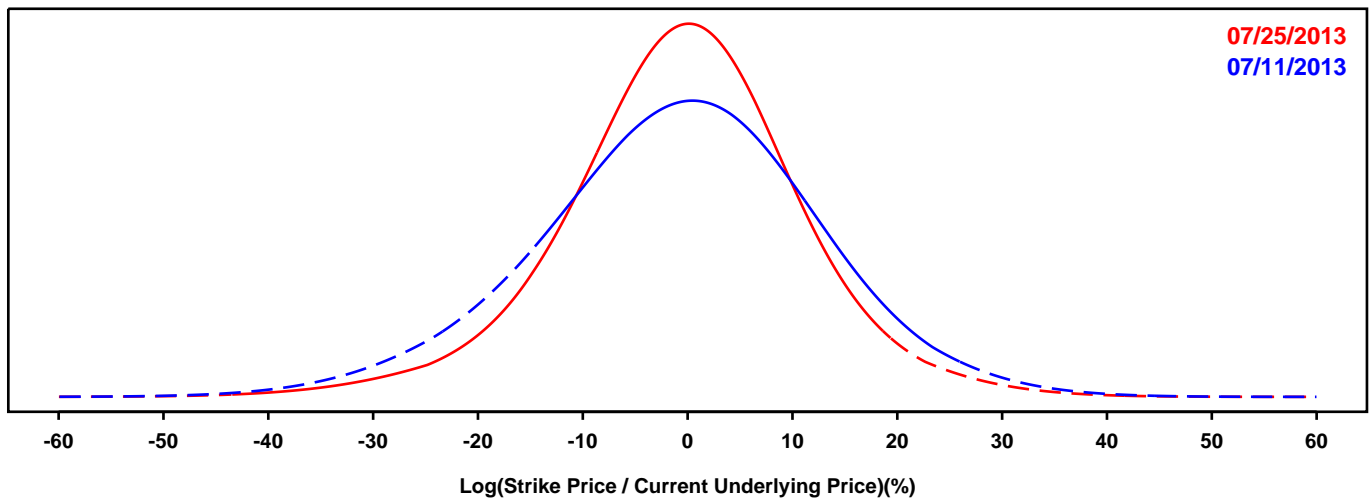
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- KEYCORP

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

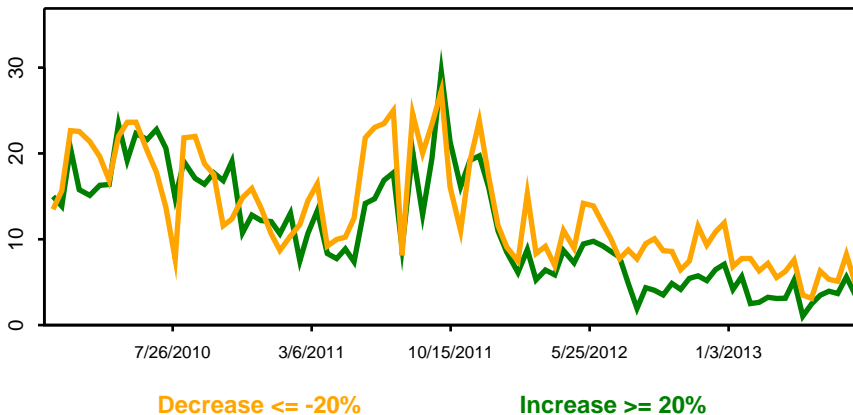
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

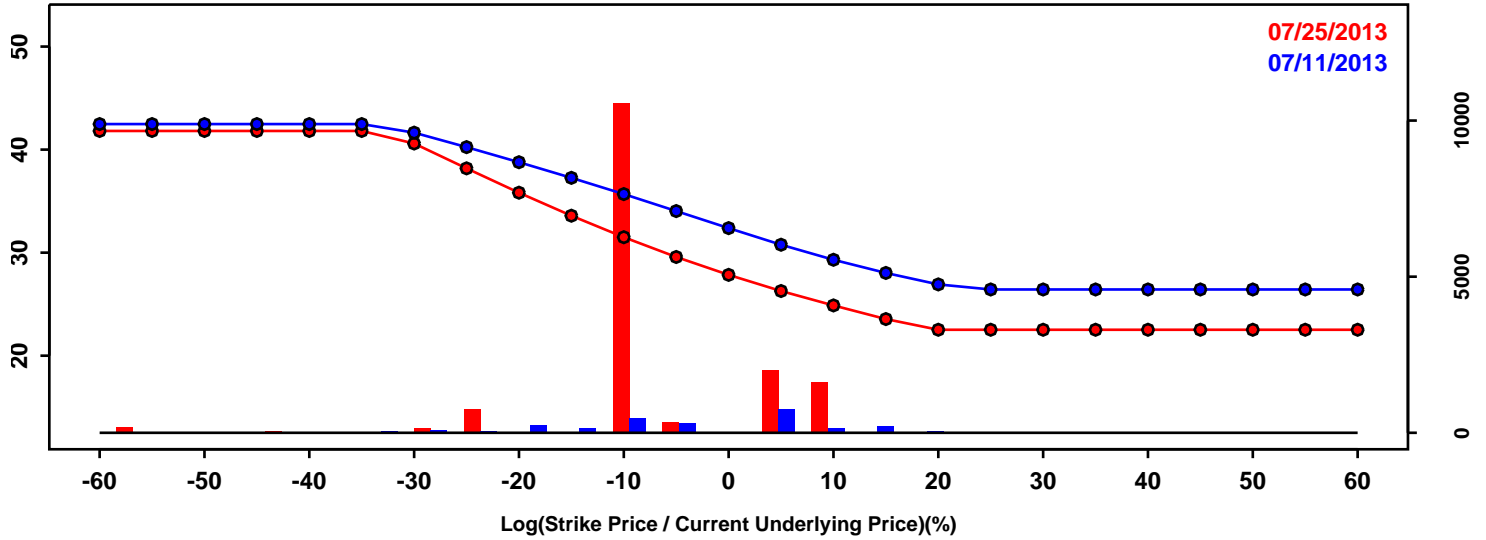


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-18.29%	-14.65%	3.64%
50th Pct	-0.41%	-0.23%	0.18%
90th Pct	15.88%	13.29%	-2.59%
Mean	-0.82%	-0.50%	0.32%
Std Dev	13.56%	11.55%	-2.01%
Skew	-0.16	-0.19	-0.03
Kurtosis	0.30	0.97	0.67

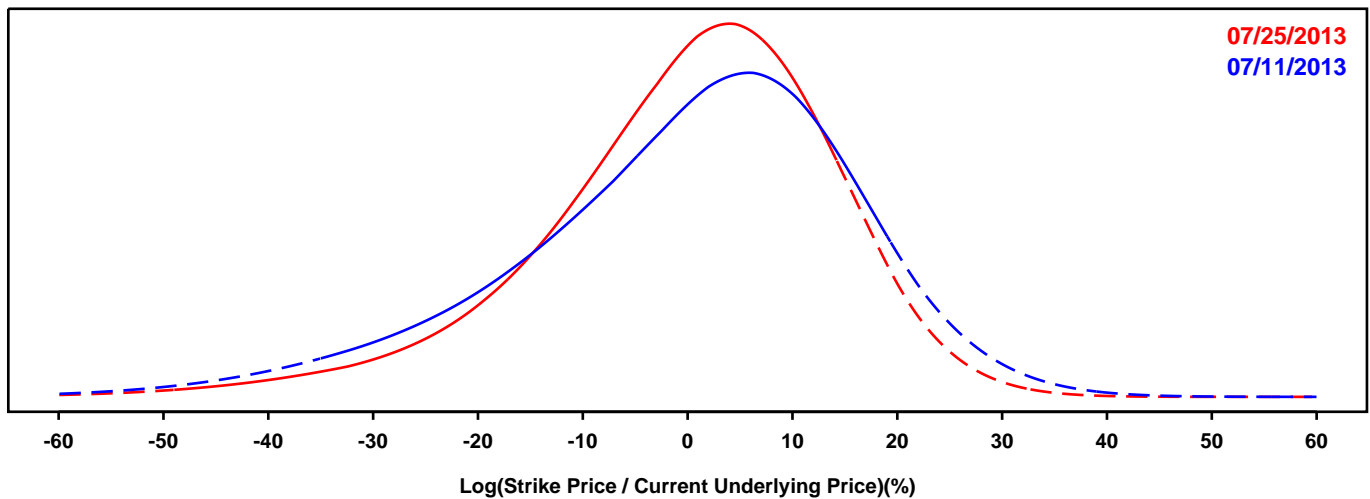
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- MORGAN STANLEY

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

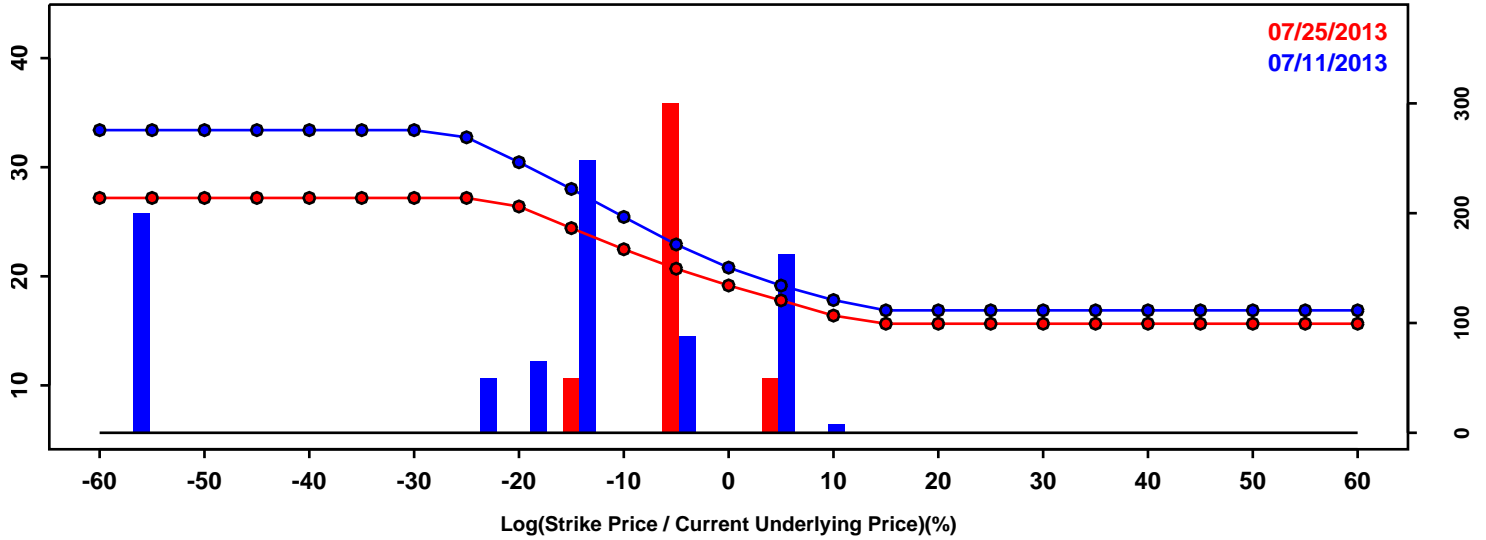


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-22.54%	-18.56%	3.98%
50th Pct	1.91%	1.47%	-0.44%
90th Pct	18.63%	16.13%	-2.49%
Mean	-0.24%	-0.16%	0.08%
Std Dev	16.49%	14.23%	-2.25%
Skew	-0.67	-0.78	-0.11
Kurtosis	0.69	1.25	0.56

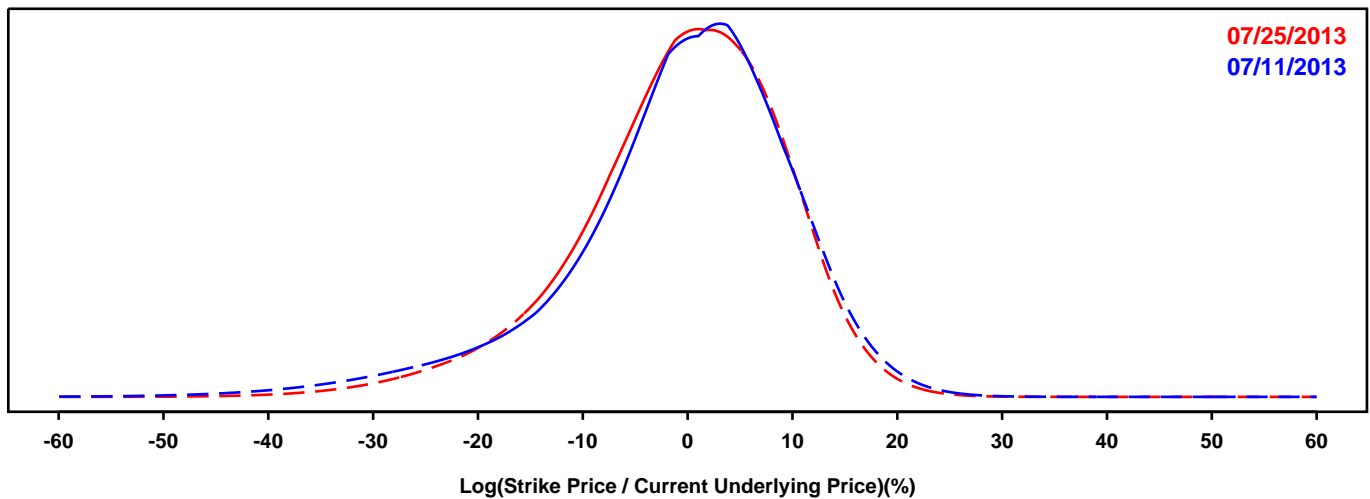
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PNC FINANCIAL

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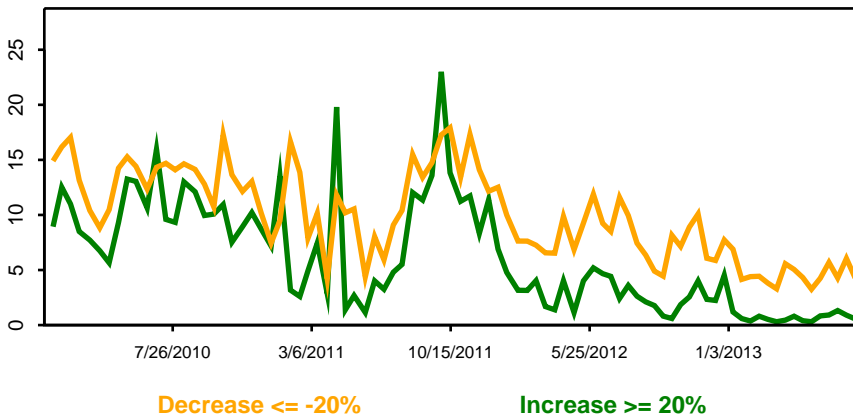
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



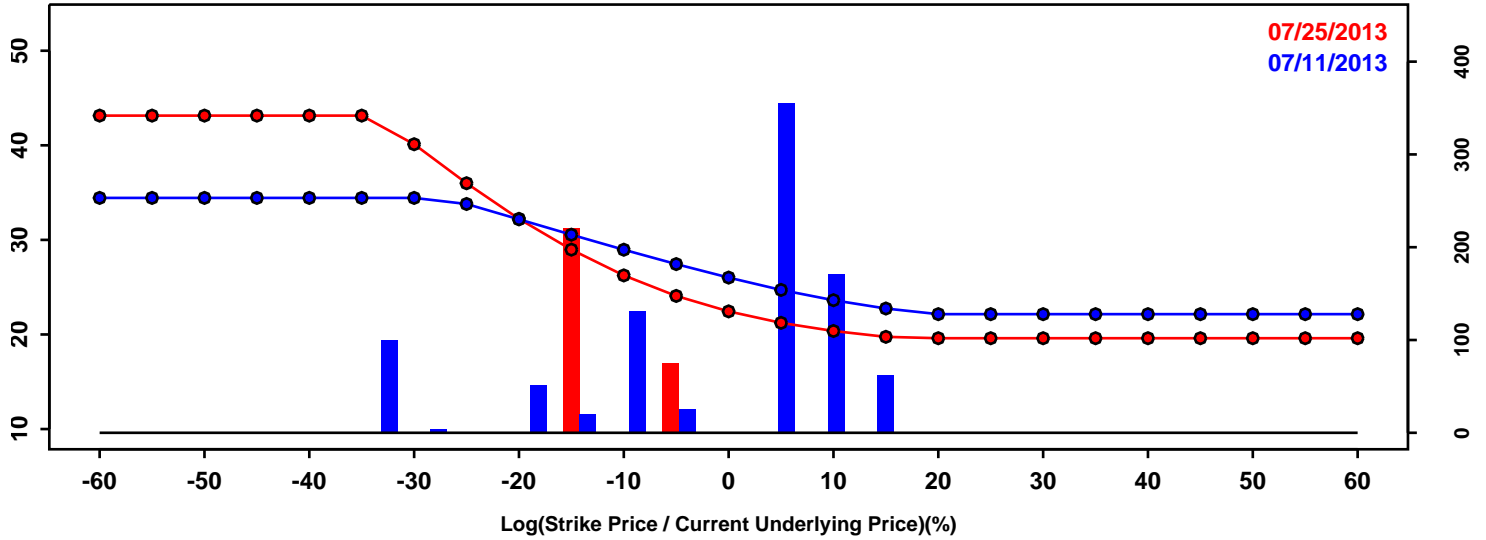
Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-14.76%	-13.54%	1.23%
50th Pct	0.68%	0.36%	-0.32%
90th Pct	11.45%	10.84%	-0.61%
Mean	-0.73%	-0.64%	0.09%
Std Dev	10.99%	9.88%	-1.11%
Skew	-0.98	-0.69	0.29
Kurtosis	1.83	0.93	-0.91



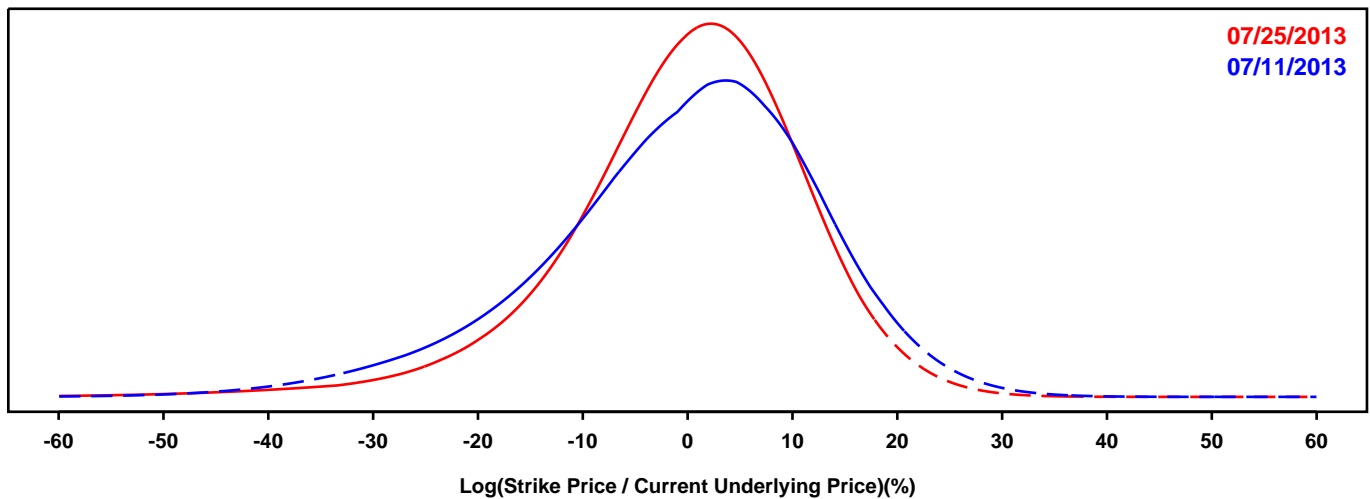
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SUNTRUST

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

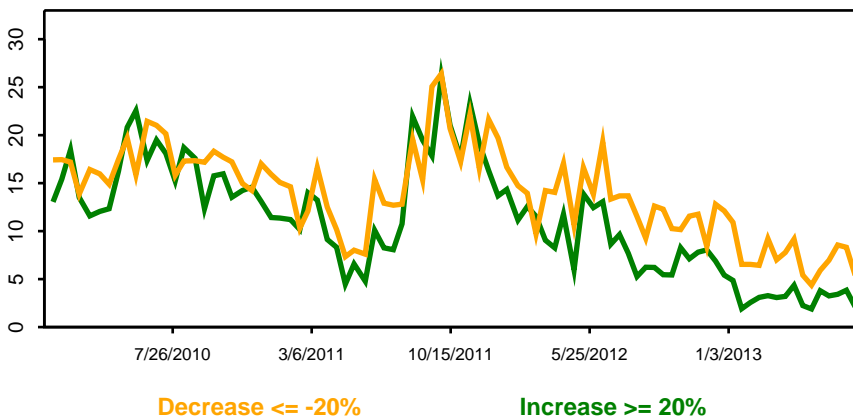
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

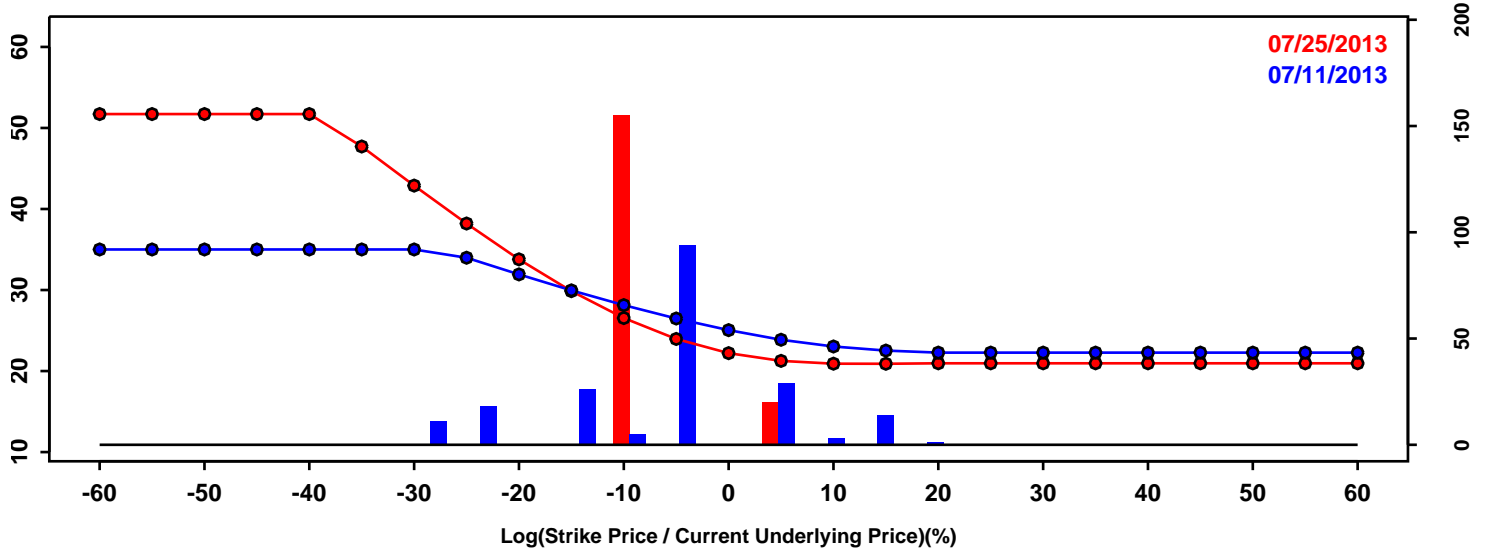


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-18.11%	-14.60%	3.52%
50th Pct	0.85%	0.79%	-0.07%
90th Pct	14.86%	12.91%	-1.95%
Mean	-0.56%	-0.32%	0.24%
Std Dev	13.27%	11.65%	-1.61%
Skew	-0.60	-0.89	-0.29
Kurtosis	0.70	2.30	1.60

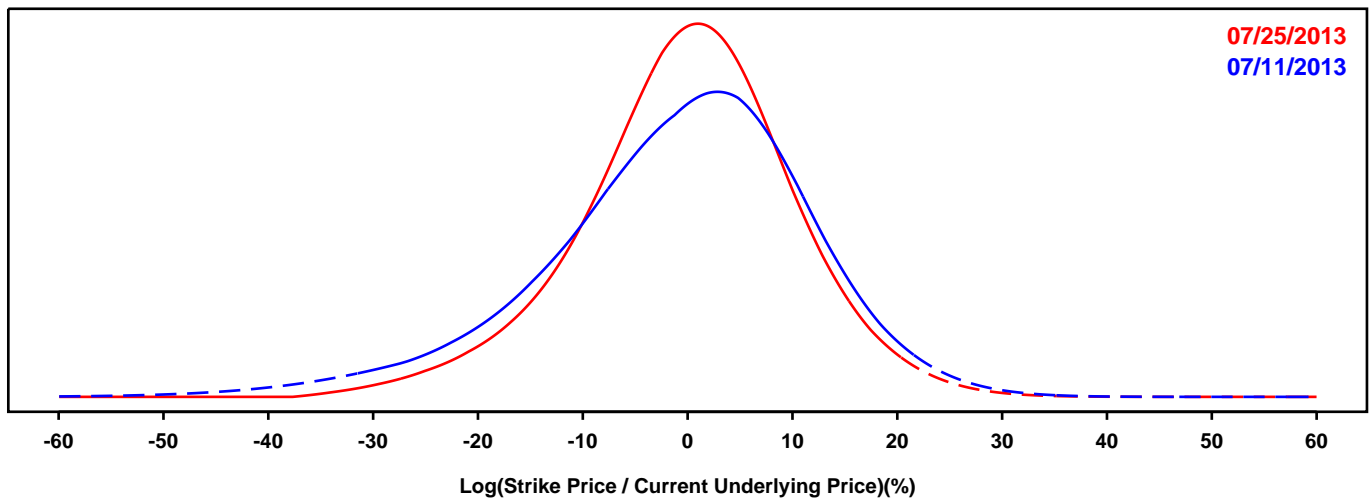
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- STATE STREET

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

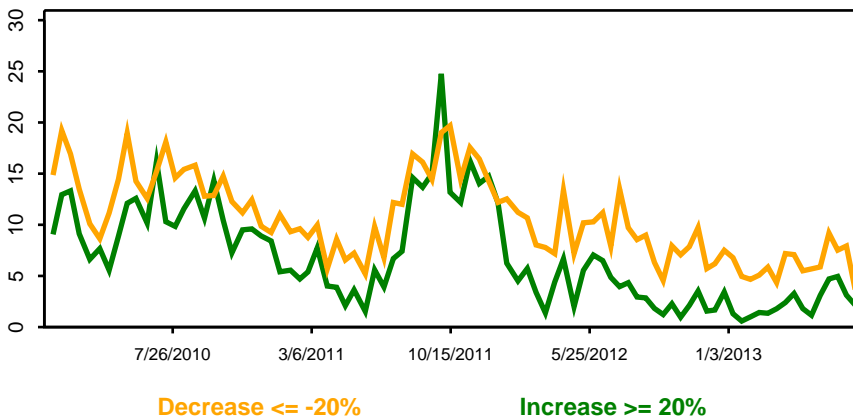
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

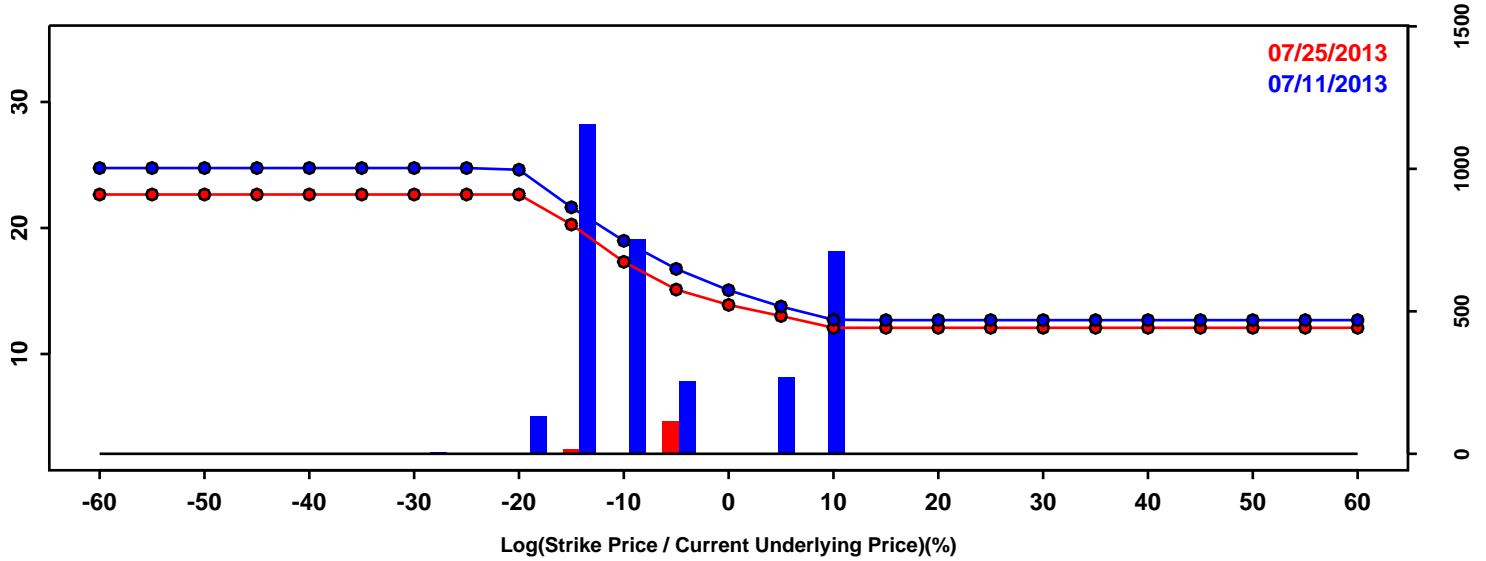


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-17.71%	-13.16%	4.54%
50th Pct	0.23%	0.40%	0.17%
90th Pct	13.78%	12.37%	-1.41%
Mean	-1.06%	-0.04%	1.02%
Std Dev	12.83%	10.19%	-2.64%
Skew	-0.63	-0.24	0.39
Kurtosis	0.94	0.40	-0.54

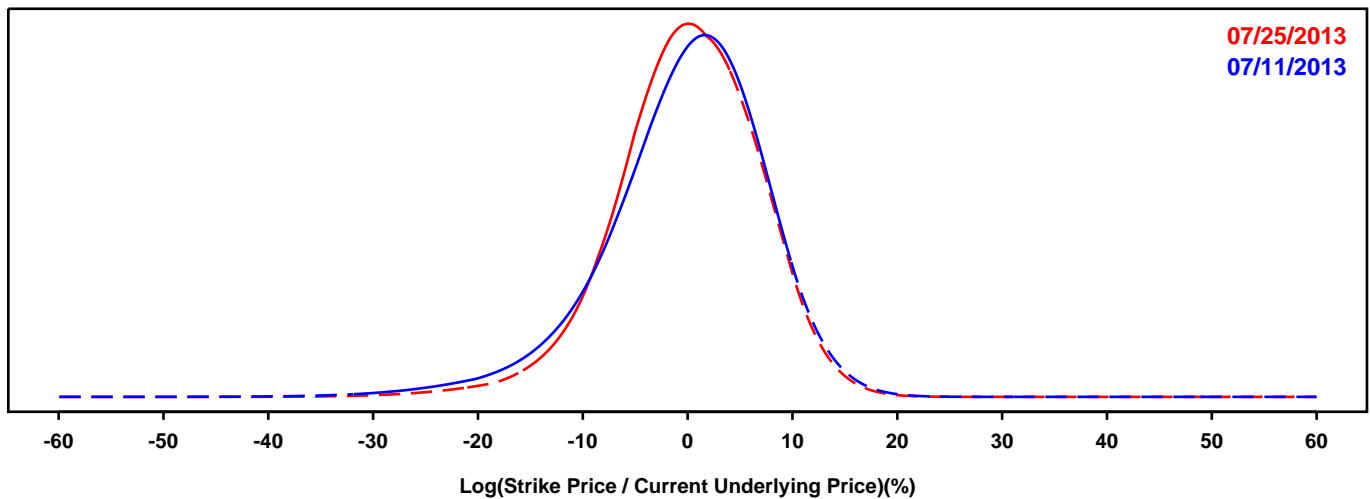
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- US BANCORP

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

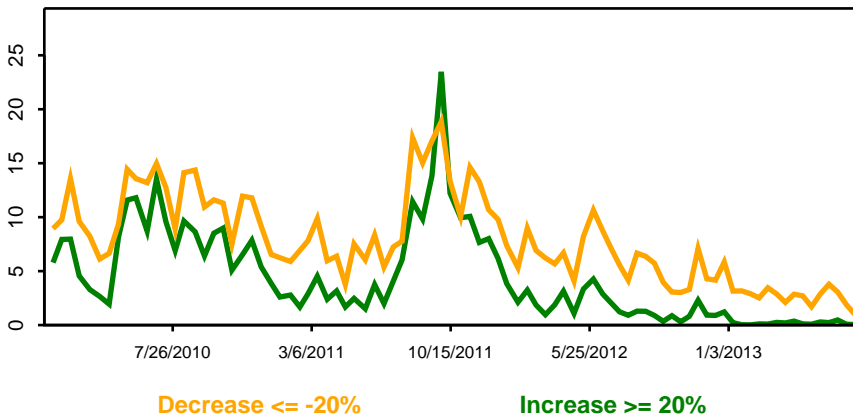
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

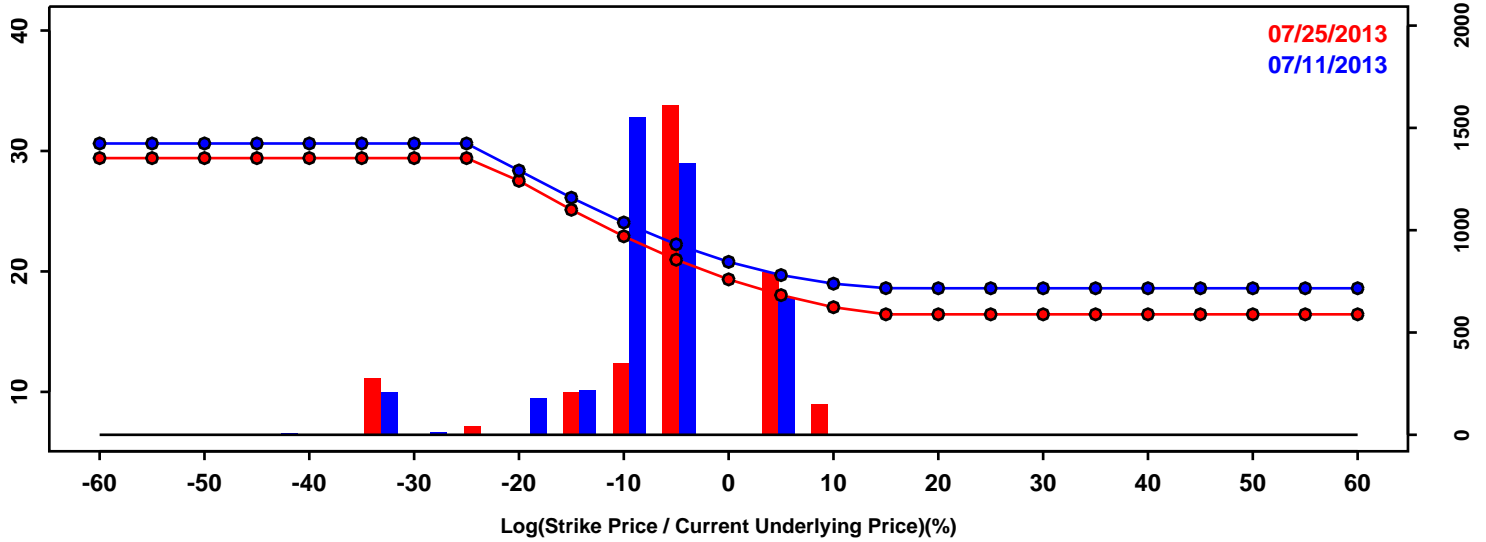


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-9.96%	-8.56%	1.40%
50th Pct	0.51%	0.23%	-0.28%
90th Pct	8.60%	8.29%	-0.31%
Mean	-0.24%	-0.06%	0.18%
Std Dev	7.70%	6.89%	-0.81%
Skew	-0.78	-0.53	0.25
Kurtosis	1.53	1.14	-0.40

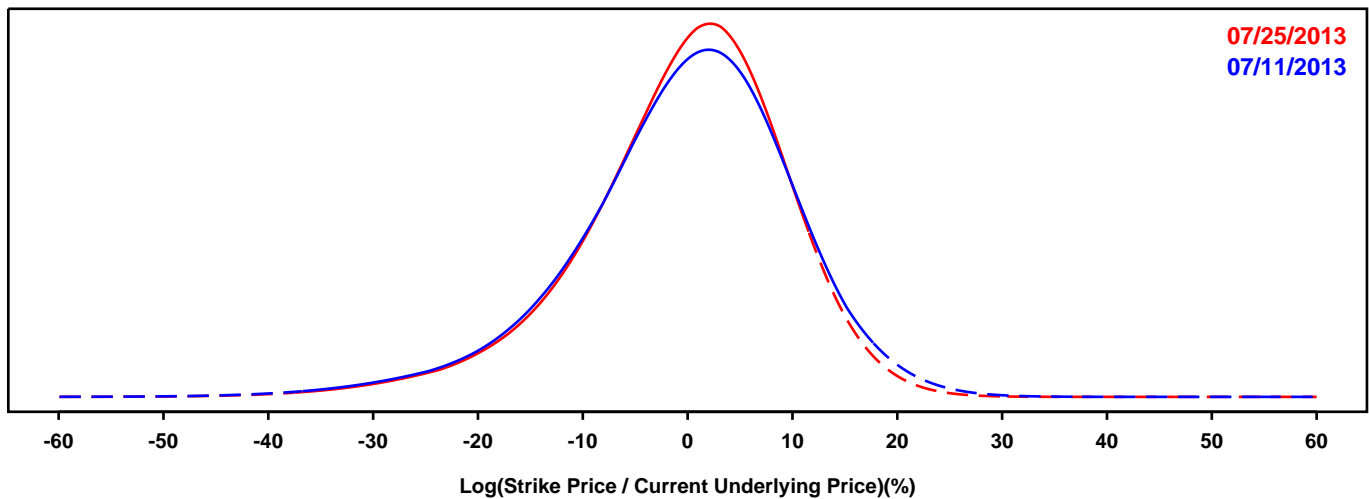
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WELLS FARGO

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

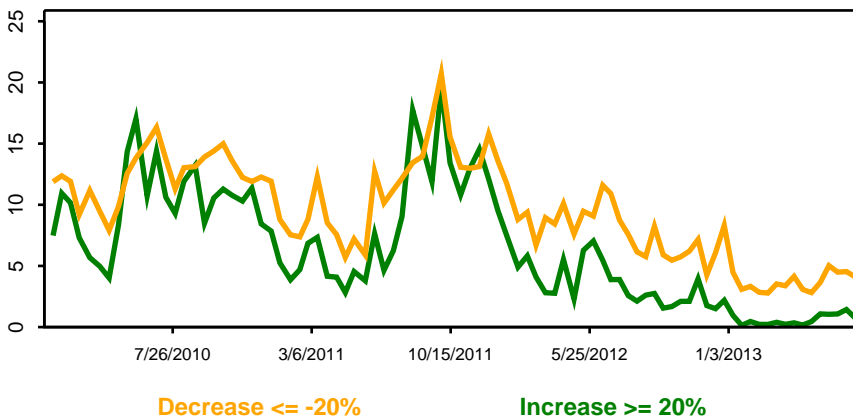
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

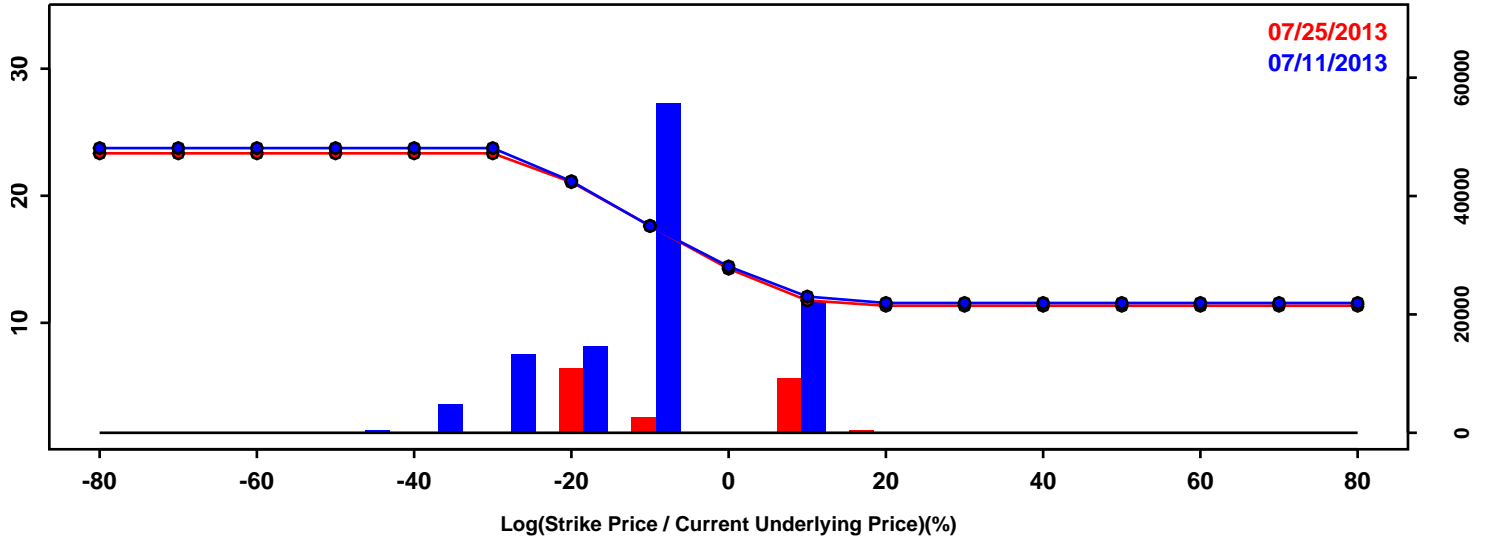


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-13.79%	-13.22%	0.57%
50th Pct	0.56%	0.56%	-0.00%
90th Pct	11.84%	10.93%	-0.91%
Mean	-0.36%	-0.46%	-0.10%
Std Dev	10.52%	9.92%	-0.59%
Skew	-0.64	-0.73	-0.09
Kurtosis	1.13	1.24	0.11

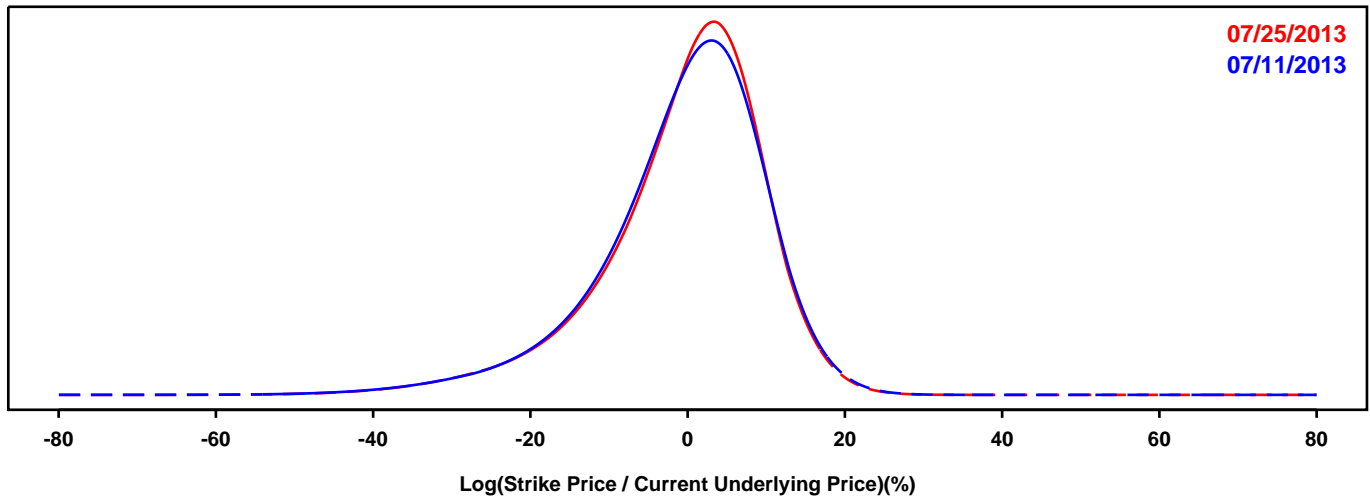
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

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

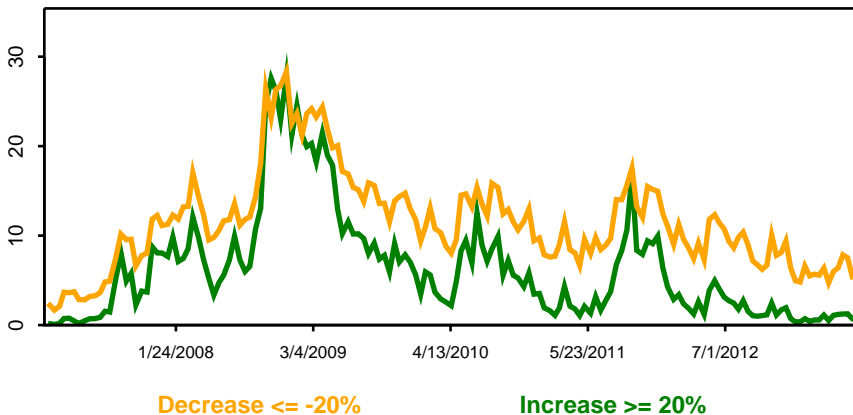
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

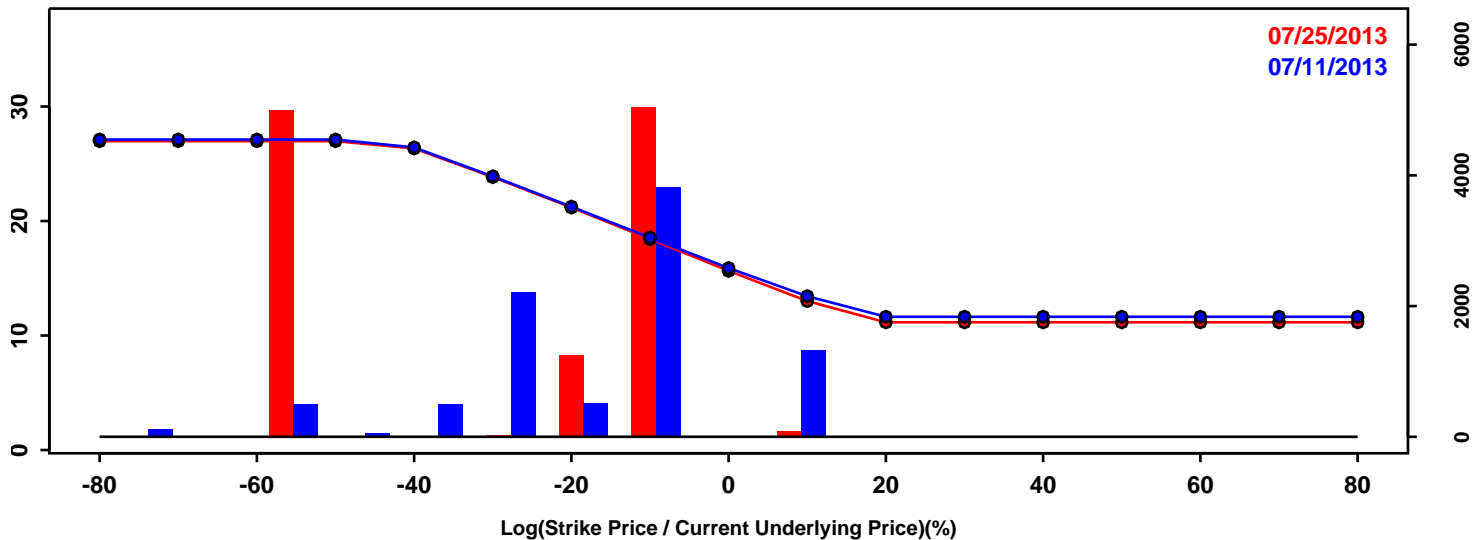


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-14.36%	-14.18%	0.18%
50th Pct	0.85%	1.09%	0.24%
90th Pct	11.03%	10.79%	-0.25%
Mean	-0.65%	-0.53%	0.13%
Std Dev	10.63%	10.49%	-0.14%
Skew	-0.98	-1.03	-0.05
Kurtosis	1.82	1.90	0.09

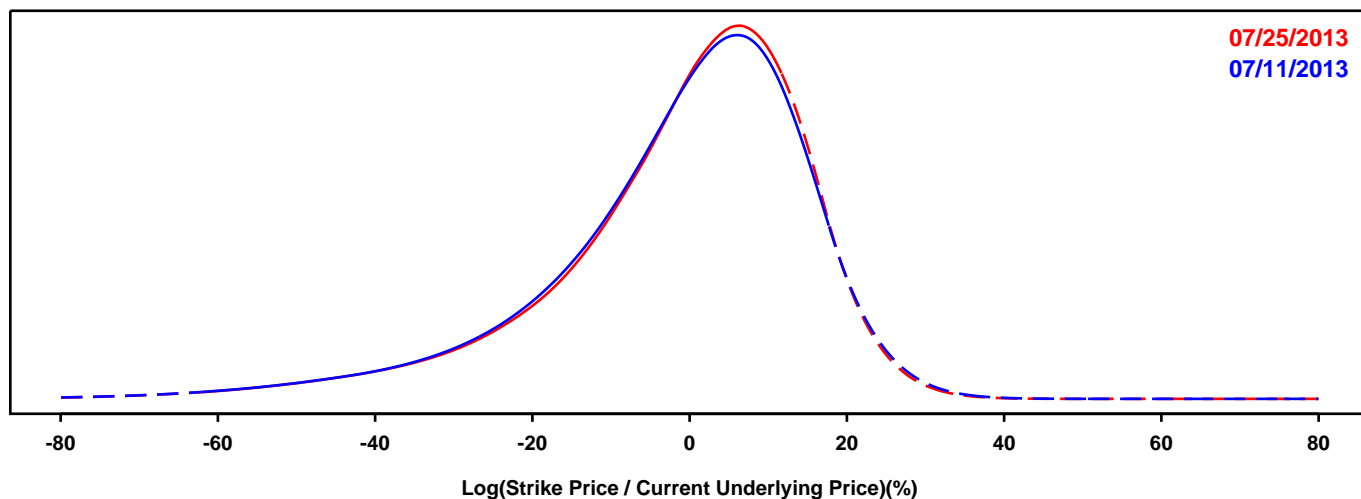
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

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



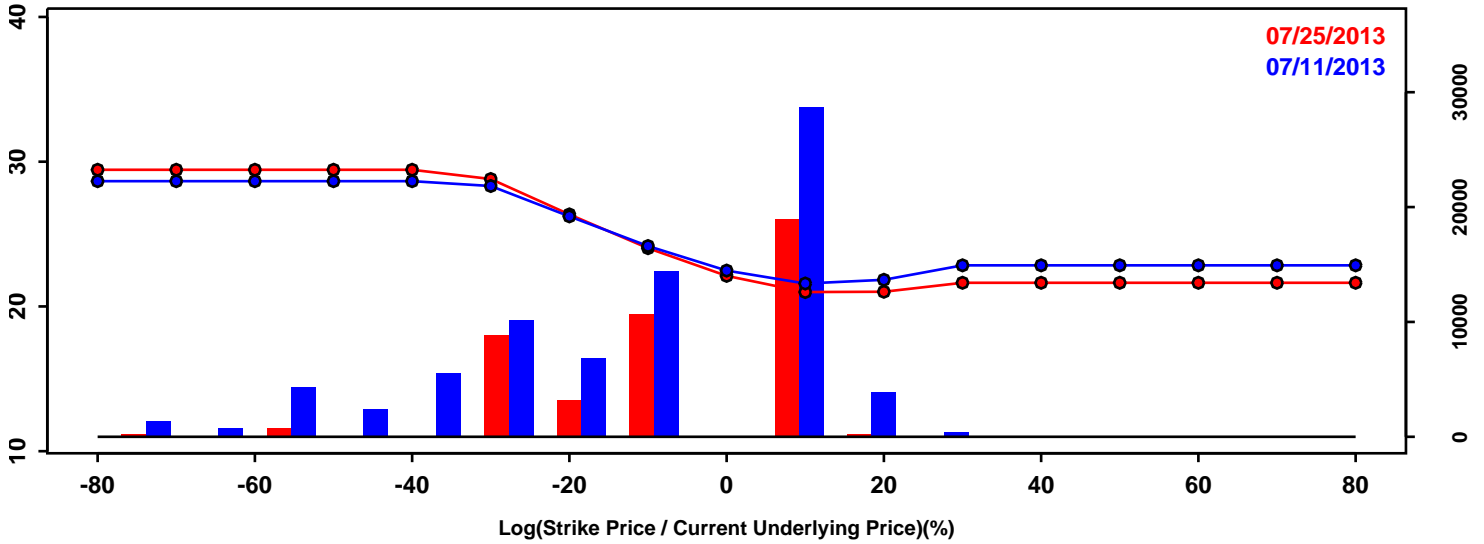
Statistics of the Log Return Distributions

	07/11/2013	07/25/2013	Change
10th Pct	-23.65%	-23.27%	0.38%
50th Pct	1.60%	1.91%	0.31%
90th Pct	16.39%	16.22%	-0.17%
Mean	-1.48%	-1.26%	0.22%
Std Dev	16.98%	16.80%	-0.18%
Skew	-1.18	-1.24	-0.05
Kurtosis	2.22	2.34	0.12

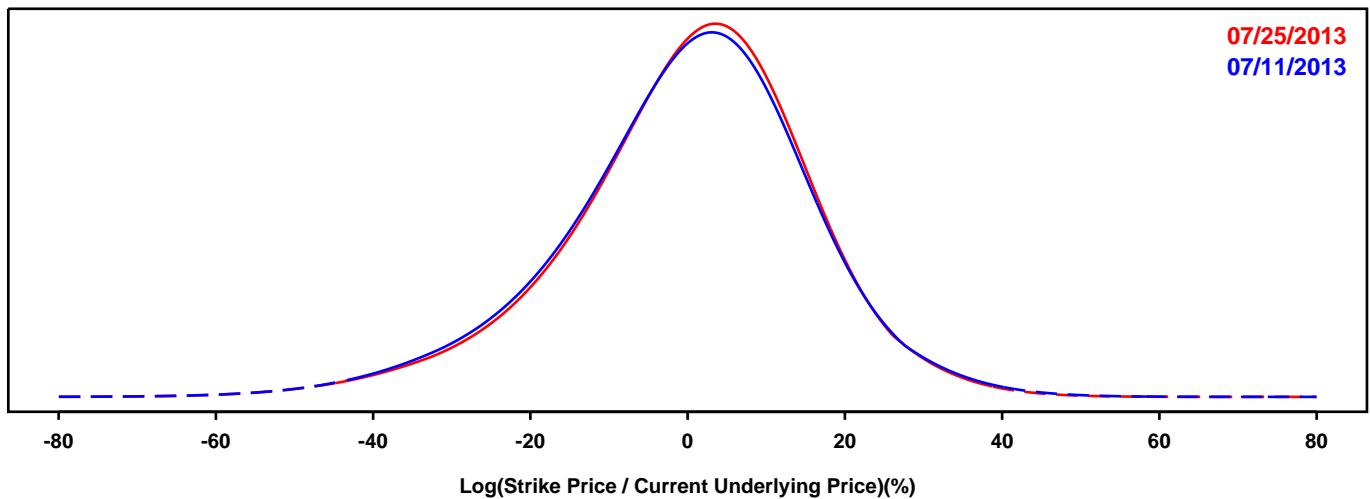
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (WTI)

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

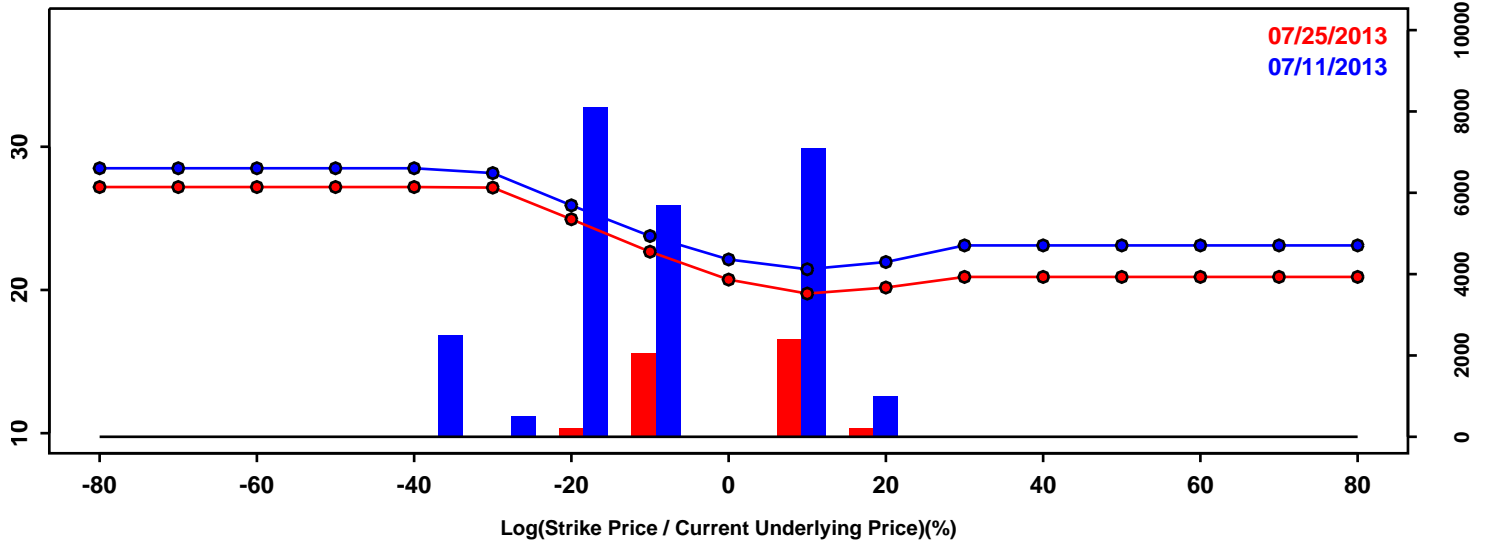


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-20.90%	-20.10%	0.80%
50th Pct	1.02%	1.37%	0.35%
90th Pct	18.46%	18.26%	-0.19%
Mean	-0.19%	0.10%	0.29%
Std Dev	15.95%	15.66%	-0.29%
Skew	-0.42	-0.50	-0.08
Kurtosis	0.73	0.86	0.13

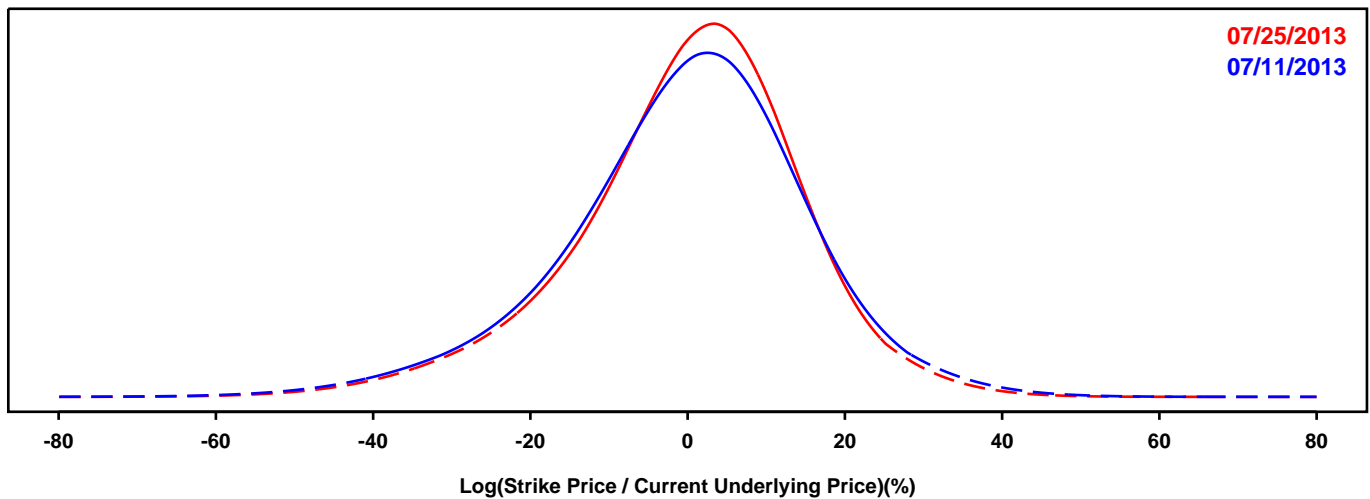
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (Brent)

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

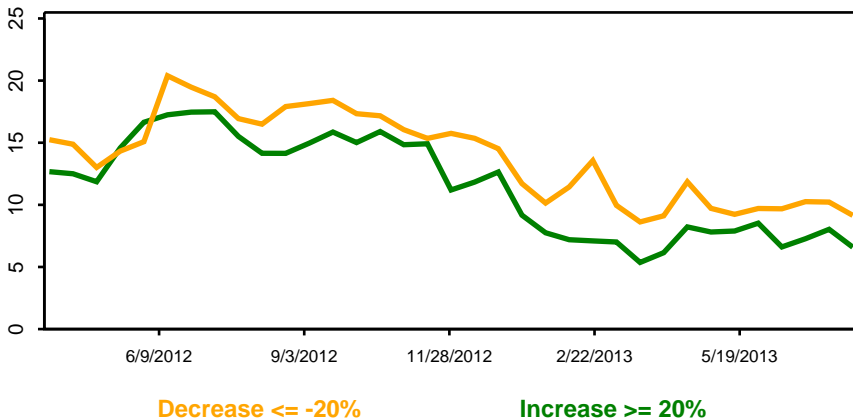
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



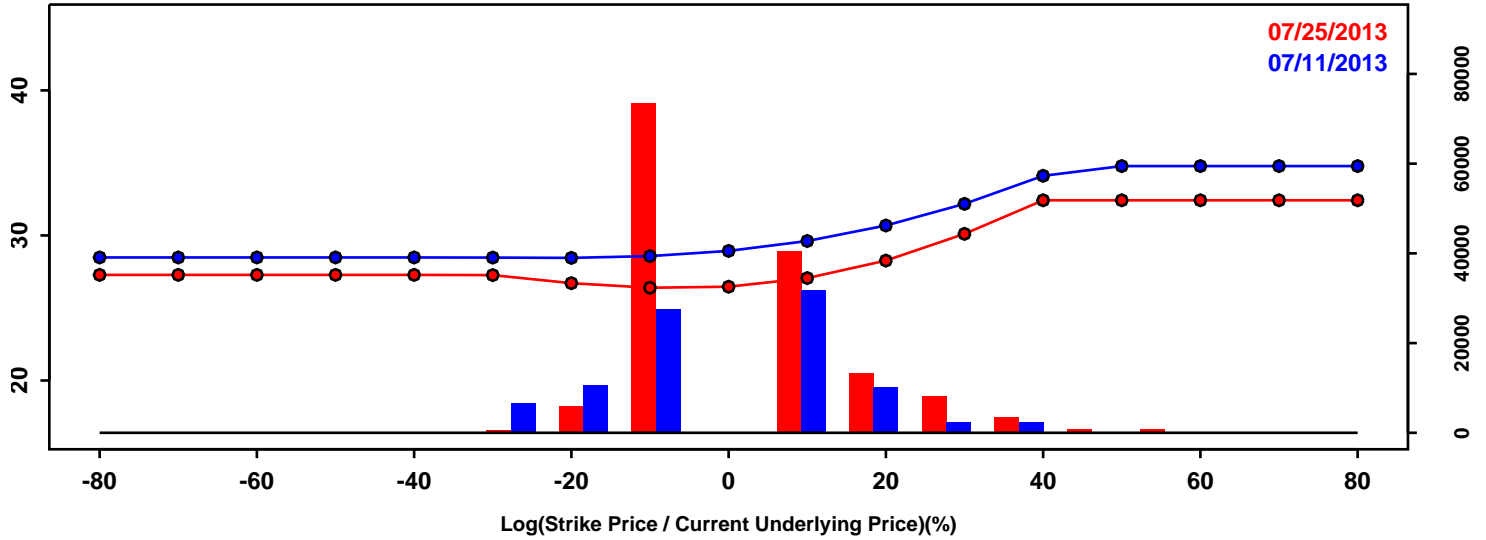
Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-20.27%	-18.98%	1.29%
50th Pct	0.88%	1.34%	0.46%
90th Pct	18.20%	17.03%	-1.17%
Mean	-0.16%	0.08%	0.24%
Std Dev	15.67%	14.69%	-0.98%
Skew	-0.39	-0.48	-0.09
Kurtosis	0.81	0.87	0.06



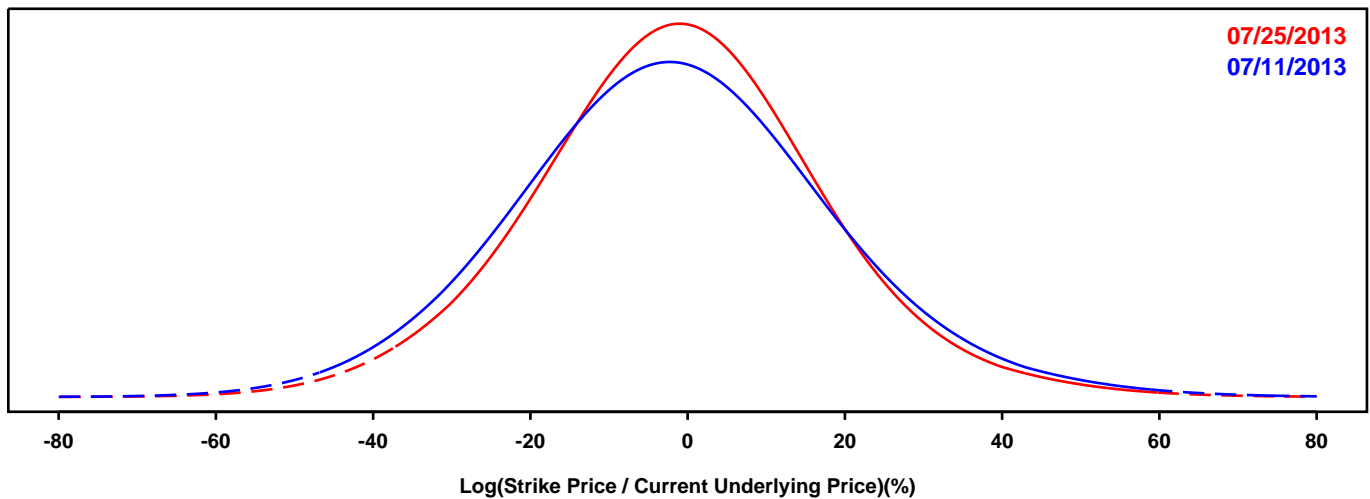
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CORN FUTURES

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

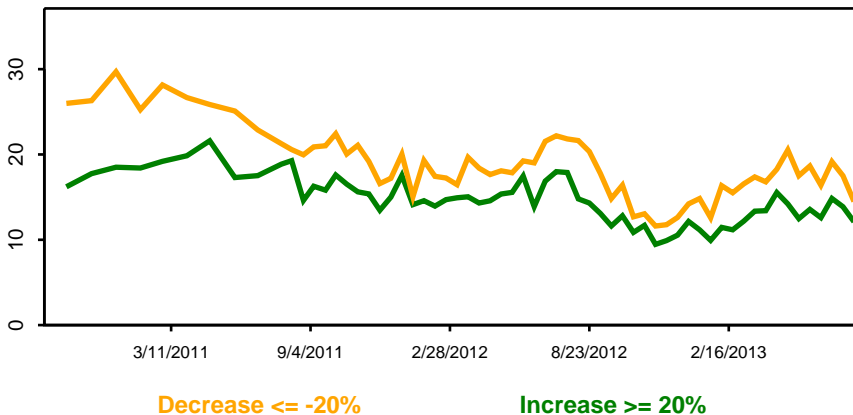
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

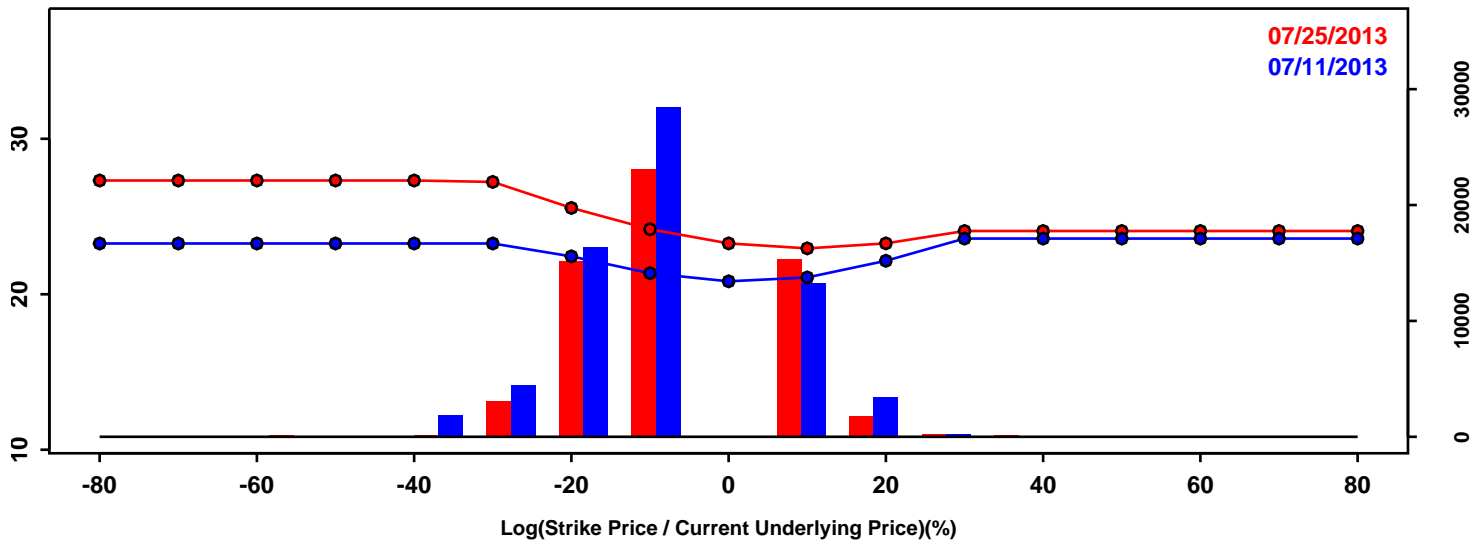


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-26.88%	-24.25%	2.62%
50th Pct	-1.85%	-1.11%	0.74%
90th Pct	24.31%	22.20%	-2.11%
Mean	-1.44%	-0.92%	0.52%
Std Dev	20.35%	18.61%	-1.74%
Skew	0.17	0.11	-0.05
Kurtosis	0.35	0.47	0.12

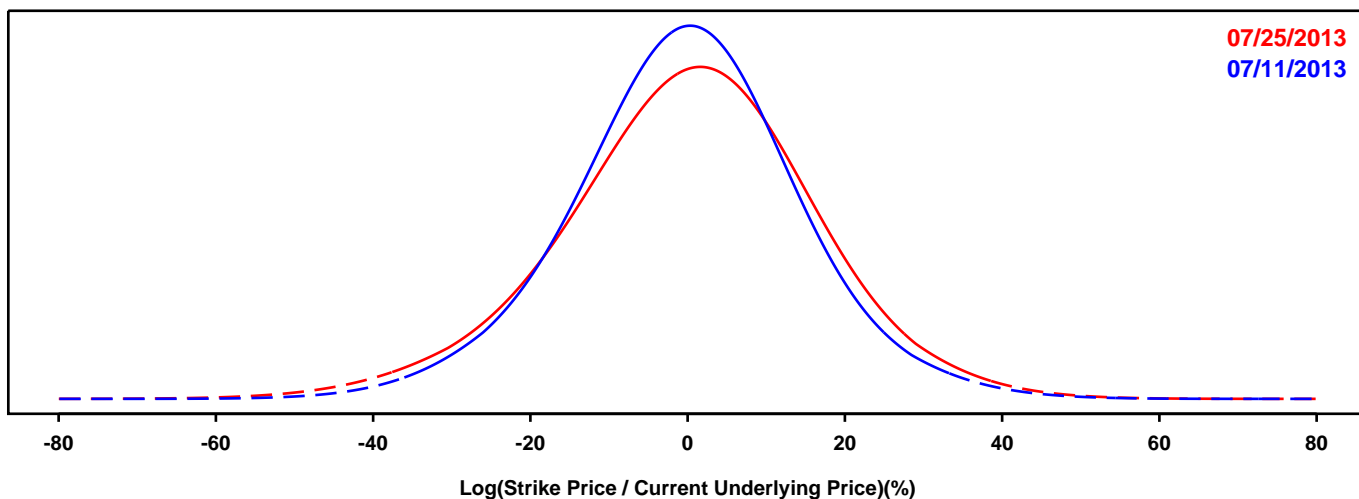
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SOYBEAN FUTURES

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

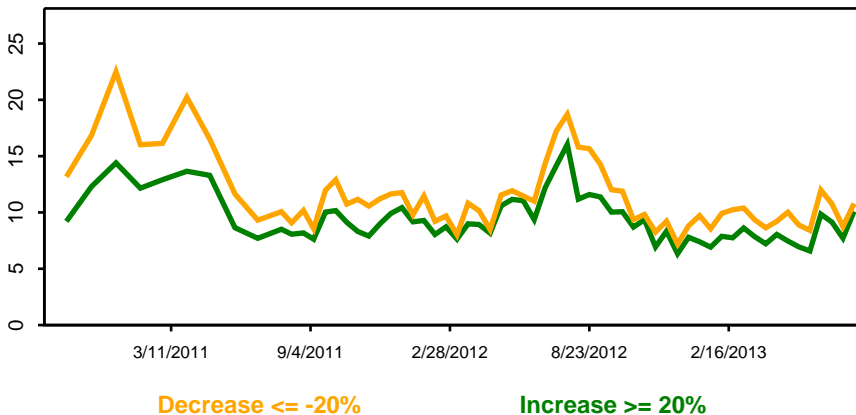
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



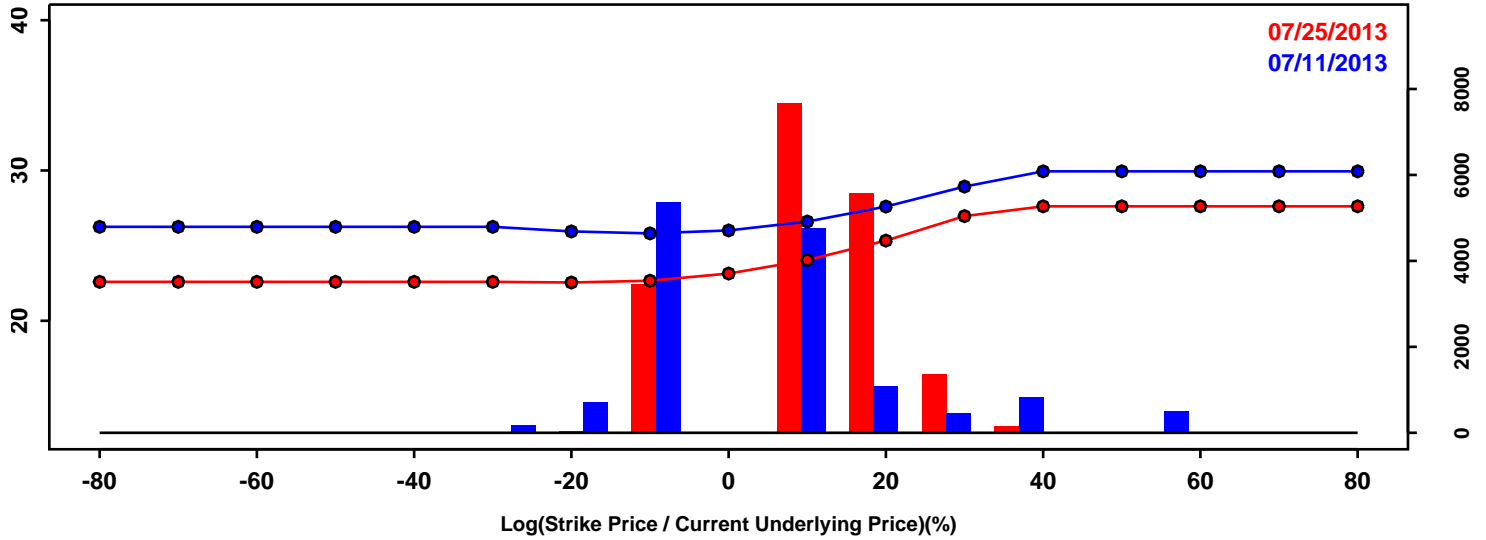
Statistics of the Log Return Distributions

	07/11/2013	07/25/2013	Change
10th Pct	-18.75%	-20.82%	-2.06%
50th Pct	-0.12%	0.63%	0.75%
90th Pct	17.81%	20.08%	2.27%
Mean	-0.25%	0.08%	0.34%
Std Dev	14.68%	16.40%	1.73%
Skew	-0.04	-0.19	-0.15
Kurtosis	0.48	0.45	-0.03

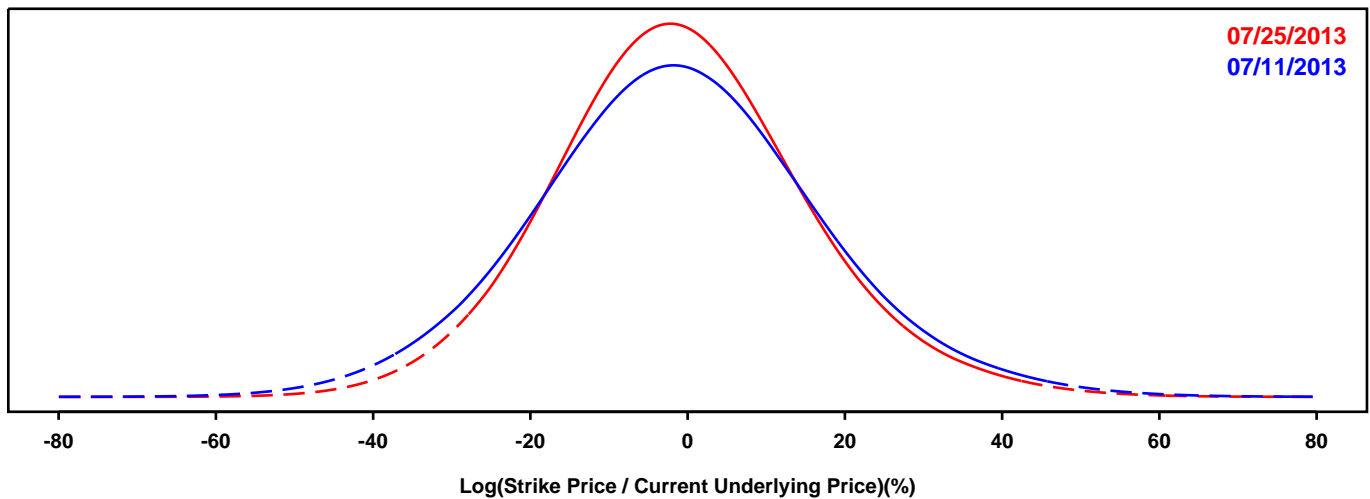
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WHEAT FUTURES

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

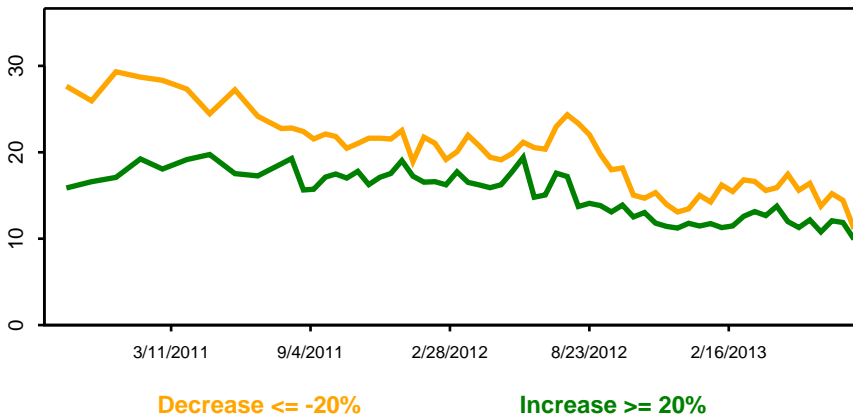
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

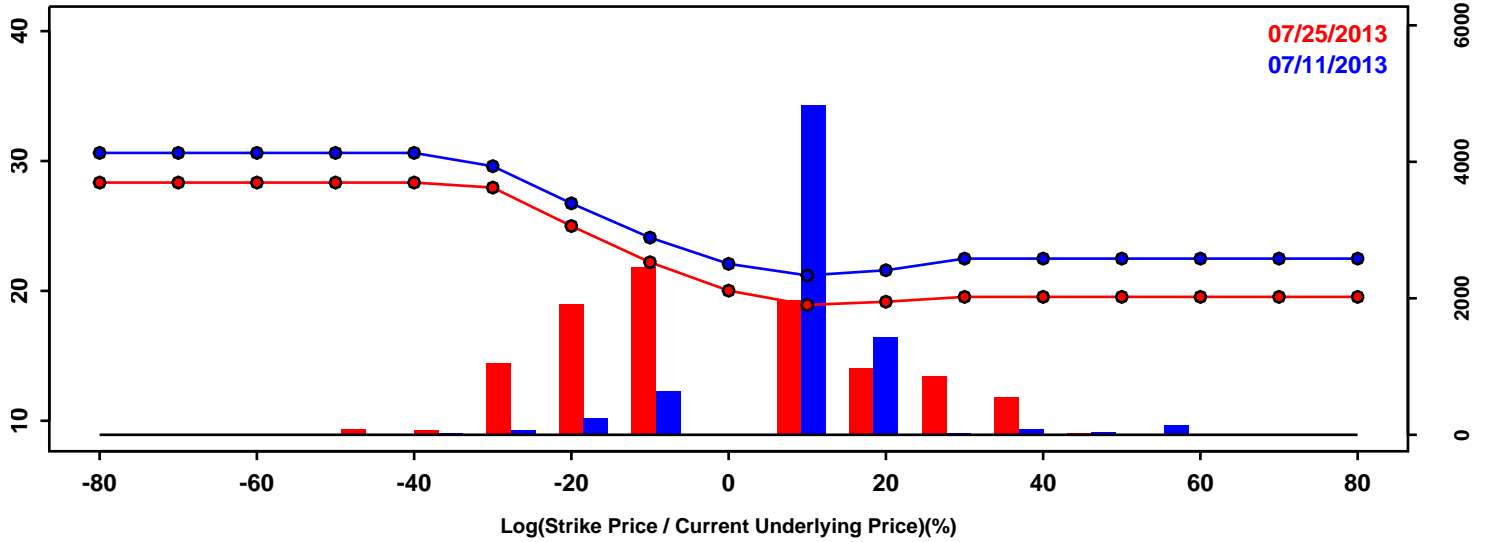


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-24.07%	-20.99%	3.08%
50th Pct	-1.42%	-1.34%	0.09%
90th Pct	21.98%	19.95%	-2.03%
Mean	-1.12%	-0.81%	0.31%
Std Dev	18.30%	16.29%	-2.01%
Skew	0.12	0.22	0.10
Kurtosis	0.32	0.37	0.05

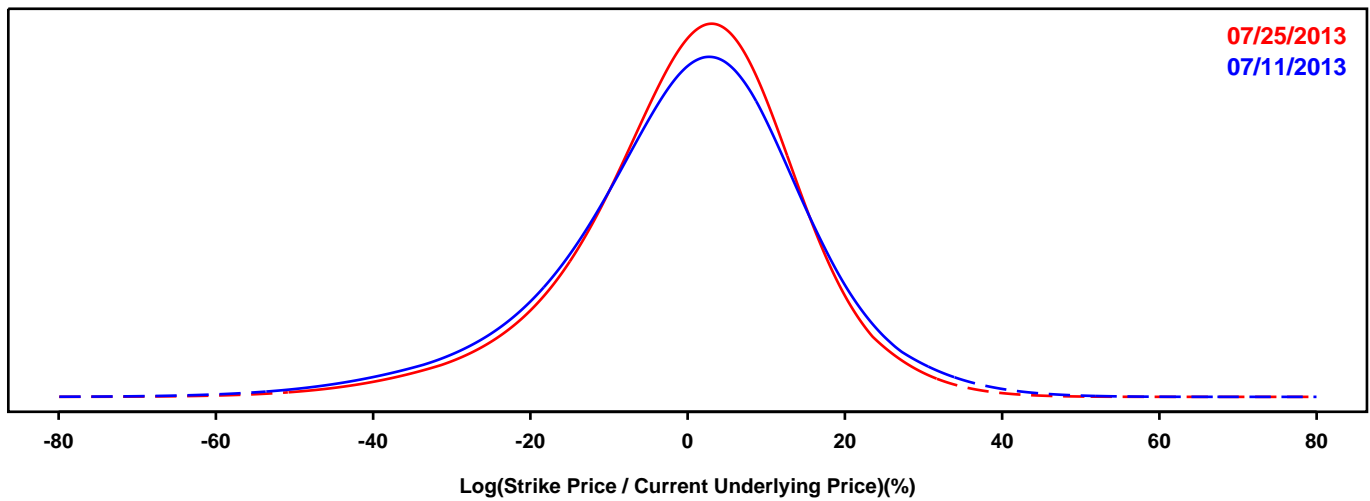
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLD FUTURES

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

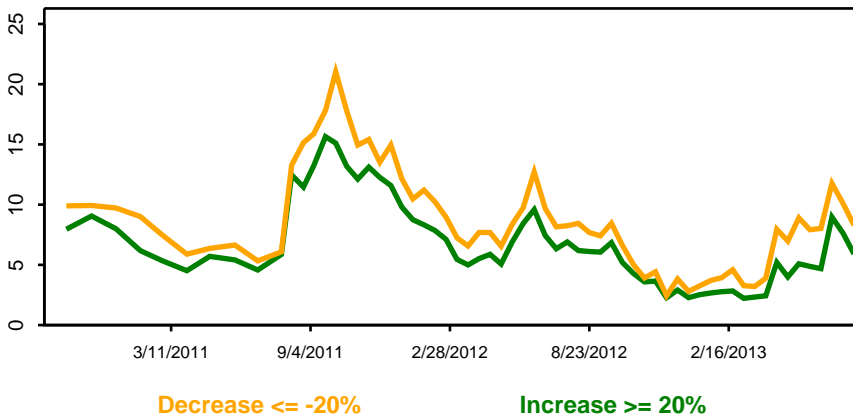
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

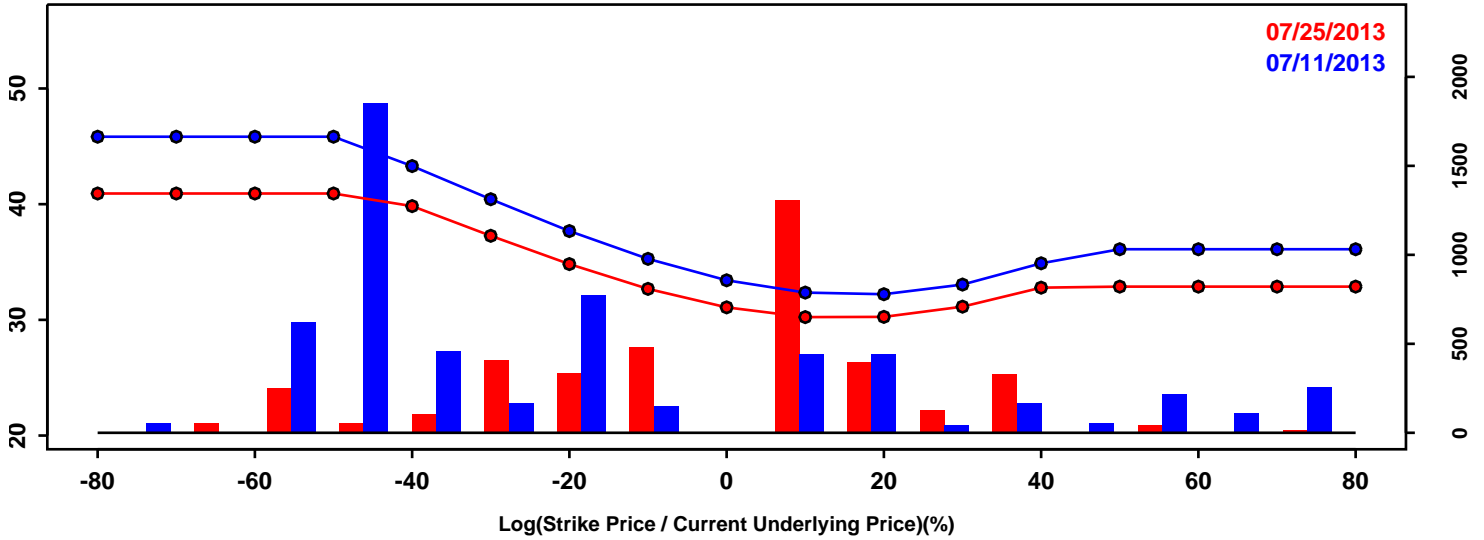


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-20.10%	-17.97%	2.14%
50th Pct	1.03%	1.31%	0.28%
90th Pct	17.89%	16.44%	-1.45%
Mean	-0.21%	0.09%	0.30%
Std Dev	15.68%	14.20%	-1.49%
Skew	-0.51	-0.57	-0.06
Kurtosis	1.10	1.14	0.04

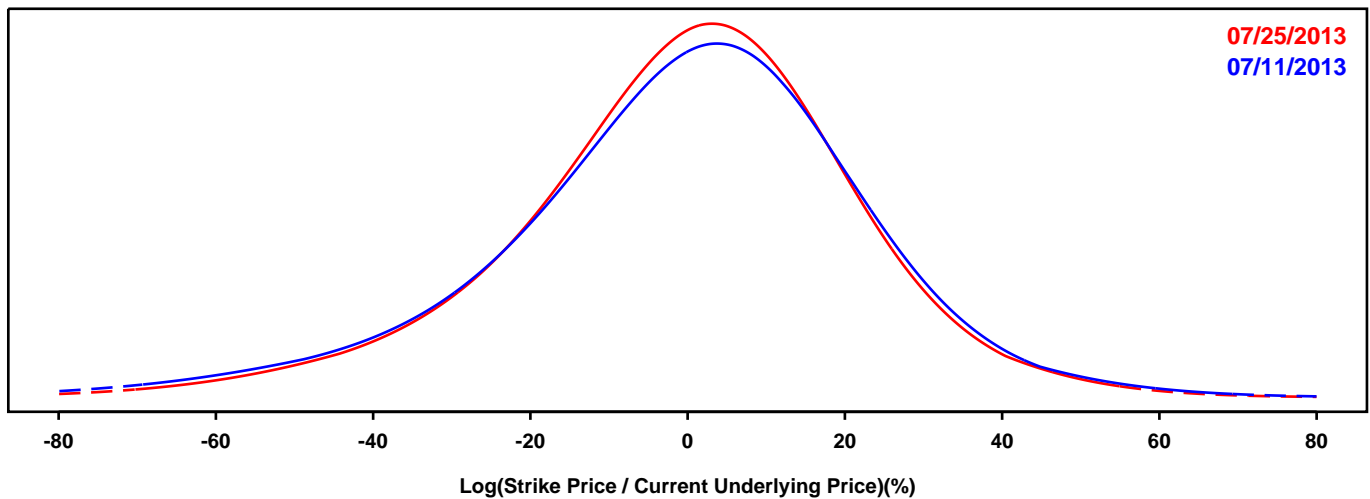
# RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SILVER FUTURES

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

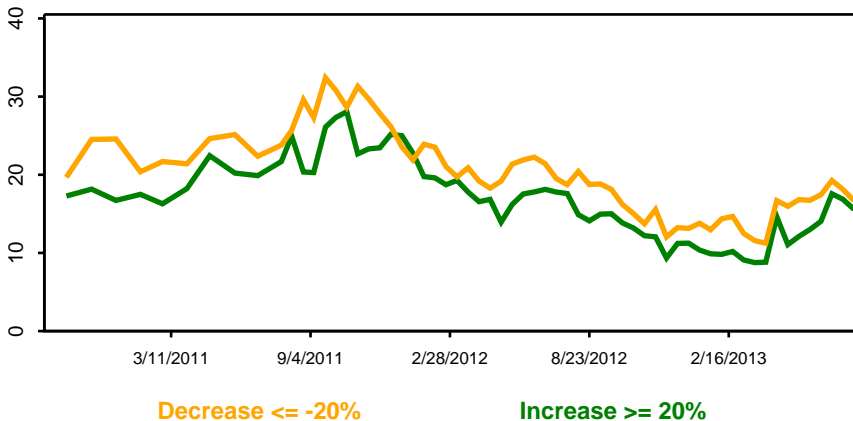
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change

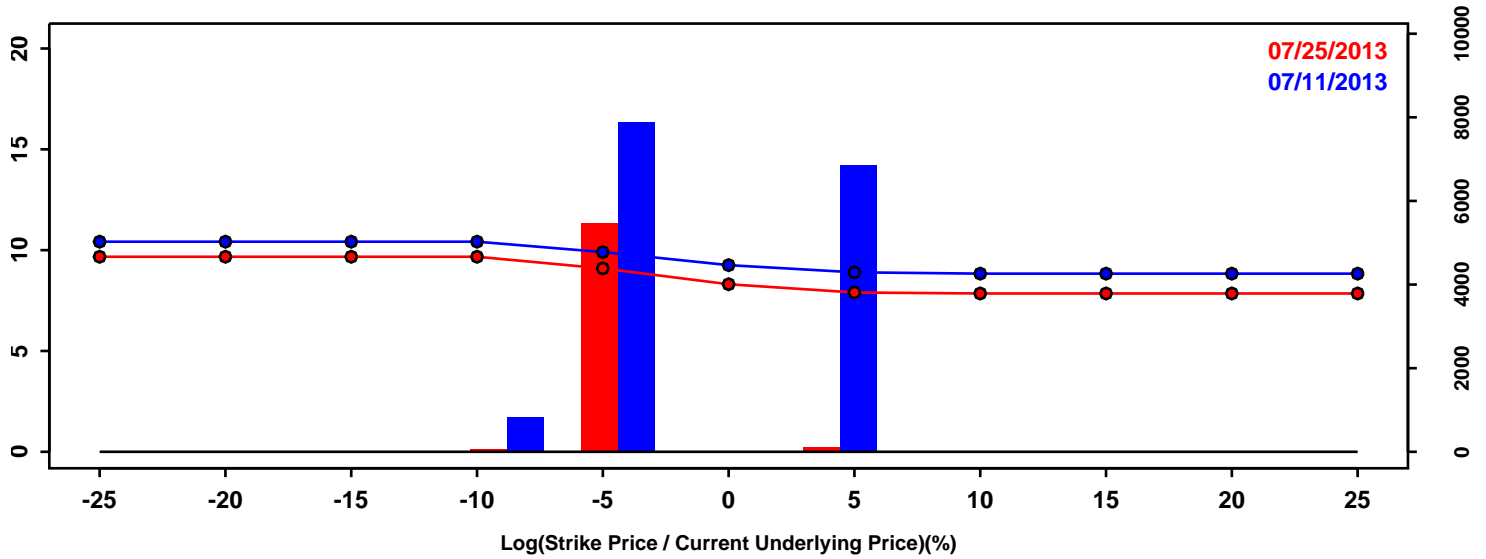


Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-30.89%	-28.49%	2.40%
50th Pct	1.09%	0.98%	-0.10%
90th Pct	26.53%	25.26%	-1.27%
Mean	-0.78%	-0.47%	0.30%
Std Dev	23.74%	22.01%	-1.73%
Skew	-0.51	-0.41	0.09
Kurtosis	1.11	0.90	-0.21

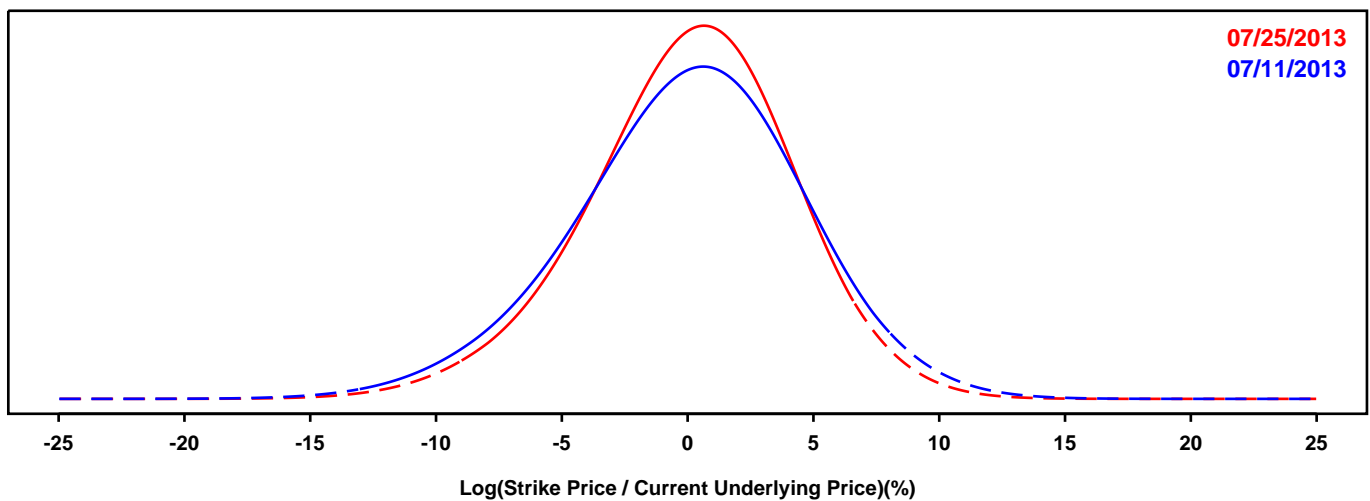
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-EURO EXCHANGE RATE FUTURES

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

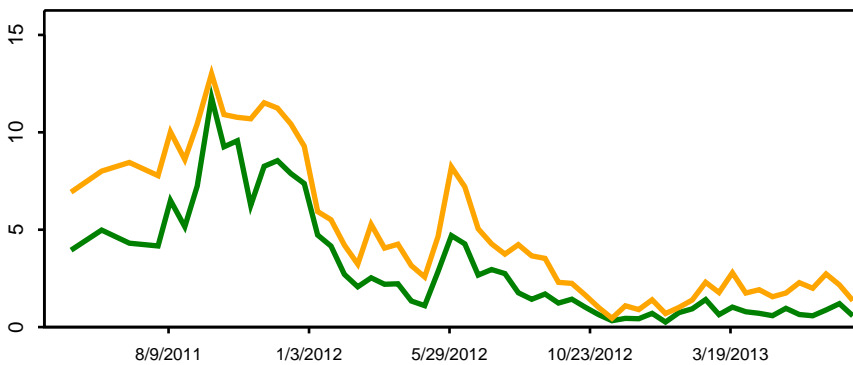
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



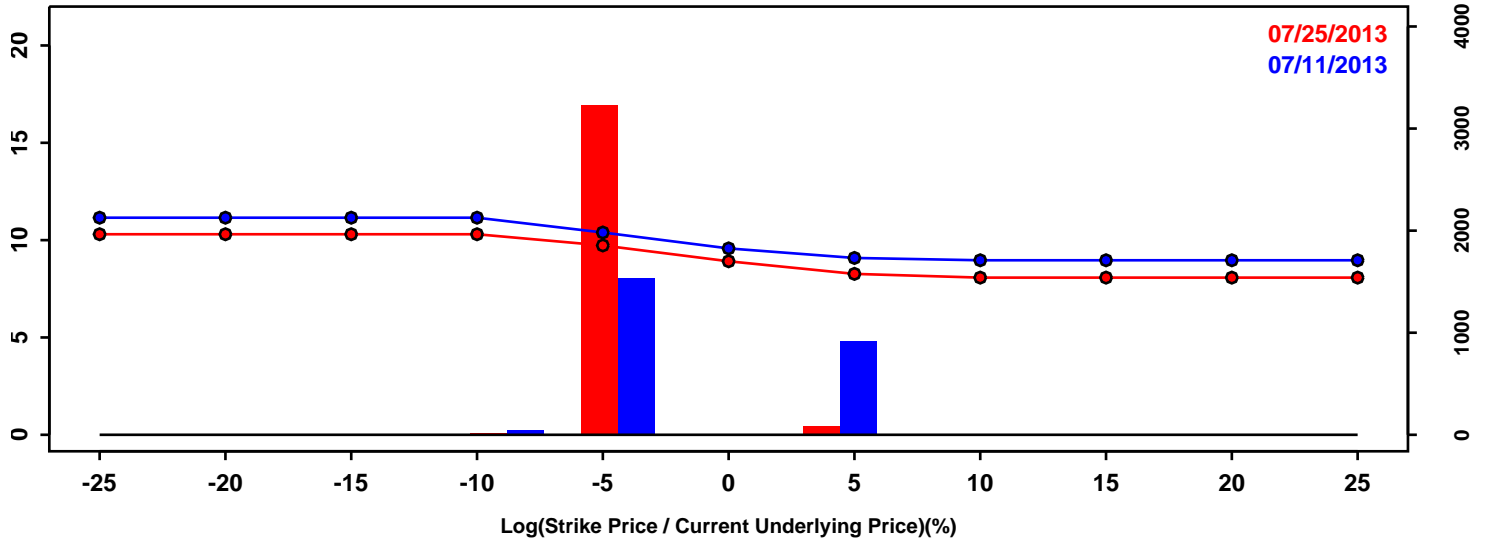
Decrease  $\leq$  -10% [stronger \$]    Increase  $\geq$  10% [weaker \$]

Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-5.97%	-5.33%	0.64%
50th Pct	0.23%	0.27%	0.04%
90th Pct	5.76%	5.15%	-0.62%
Mean	0.07%	0.11%	0.04%
Std Dev	4.63%	4.15%	-0.48%
Skew	-0.22	-0.27	-0.05
Kurtosis	0.21	0.29	0.08

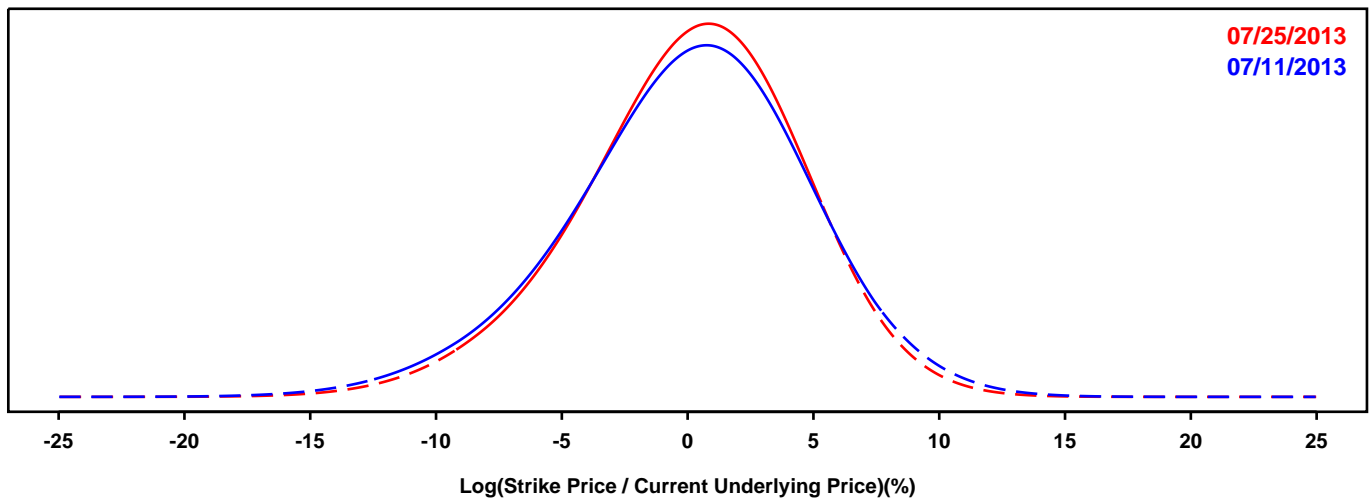
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-POUND EXCHANGE RATE FUTURES

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

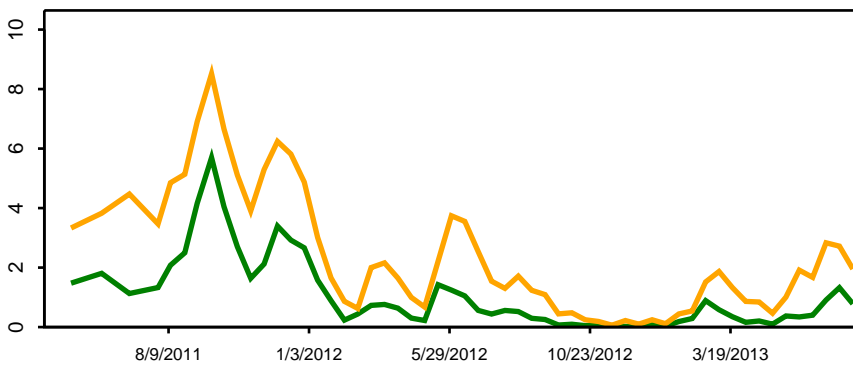
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



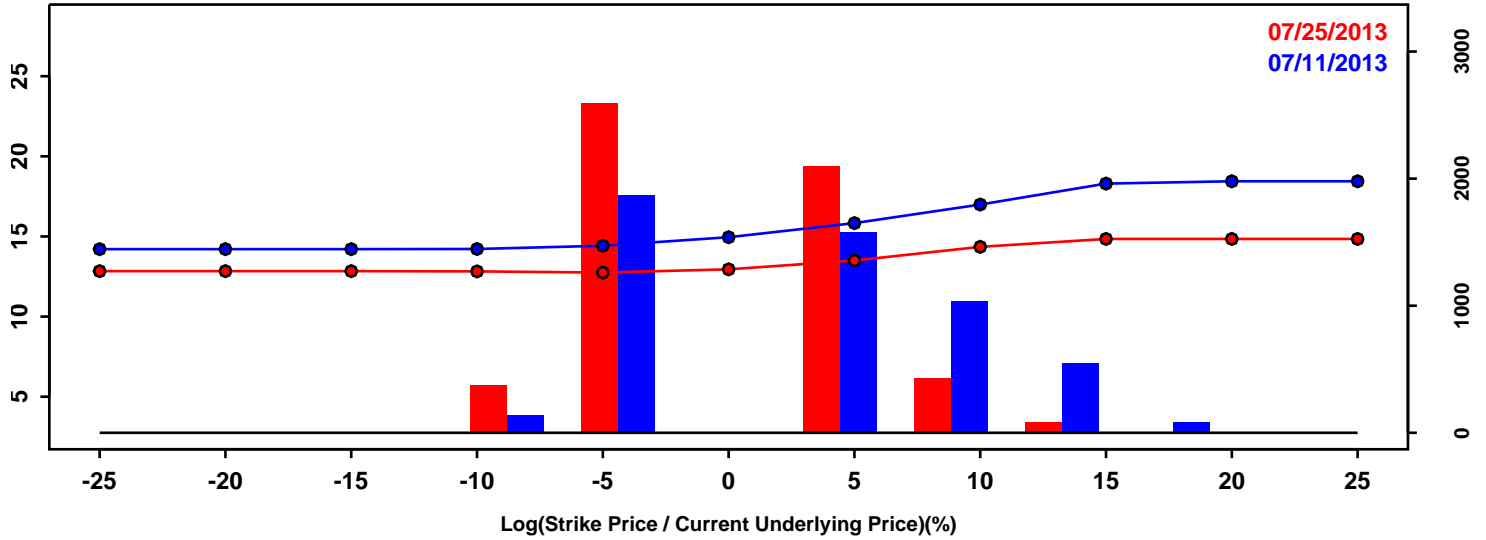
Decrease <= -10% [stronger \$]    Increase >= 10% [weaker \$]

Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-6.21%	-5.74%	0.47%
50th Pct	0.29%	0.33%	0.05%
90th Pct	5.87%	5.53%	-0.34%
Mean	0.05%	0.12%	0.07%
Std Dev	4.79%	4.46%	-0.33%
Skew	-0.29	-0.31	-0.02
Kurtosis	0.29	0.23	-0.06

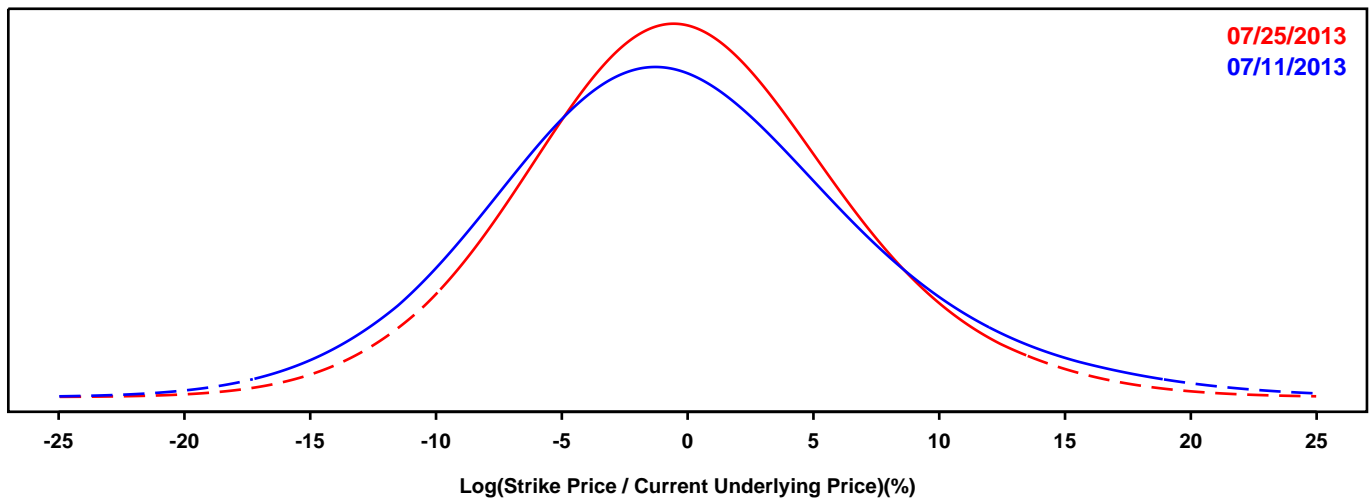
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-YEN EXCHANGE RATE FUTURES

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

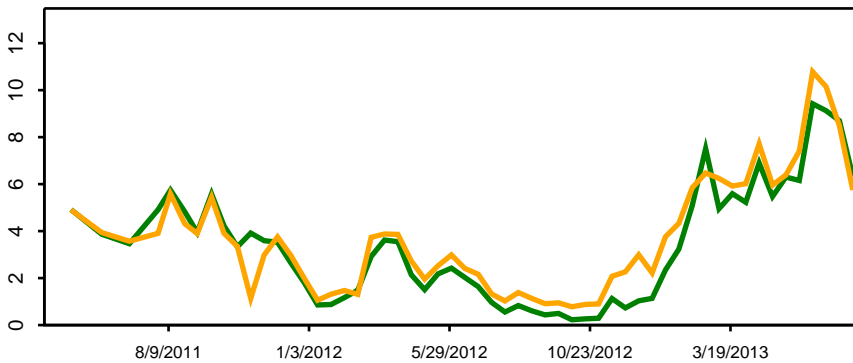
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



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

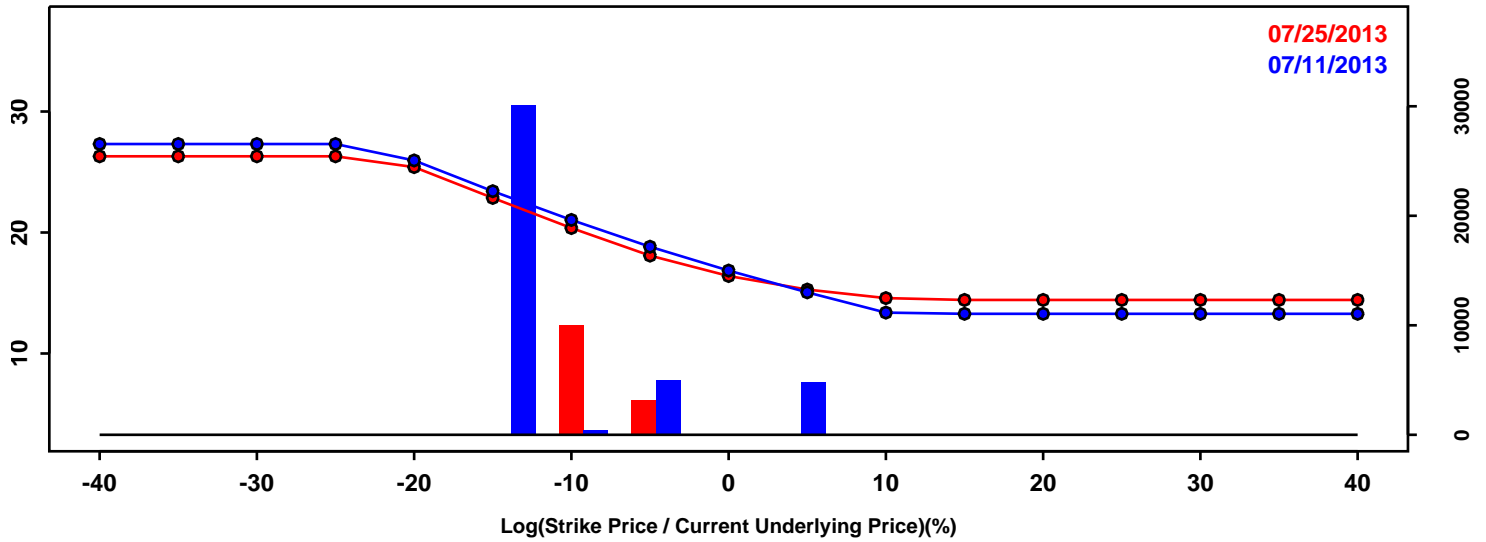
Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-9.38%	-8.10%	1.27%
50th Pct	-0.69%	-0.26%	0.42%
90th Pct	9.33%	8.19%	-1.14%
Mean	-0.25%	-0.06%	0.19%
Std Dev	7.46%	6.47%	-1.00%
Skew	0.32	0.17	-0.15
Kurtosis	0.47	0.30	-0.17



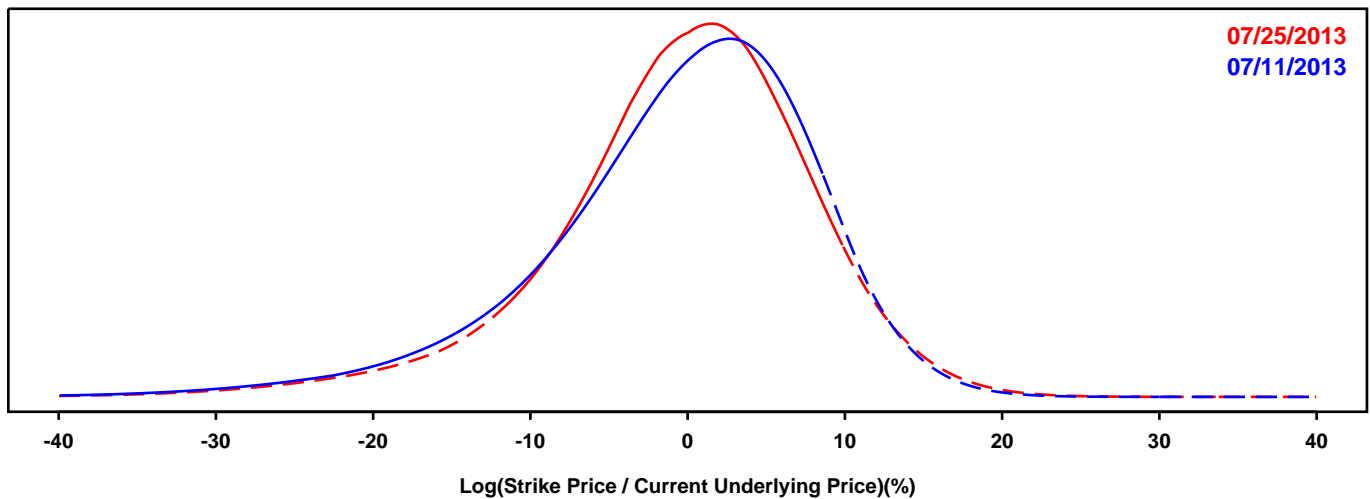
### RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- iSHARES DOW JONES US REAL ESTATE

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

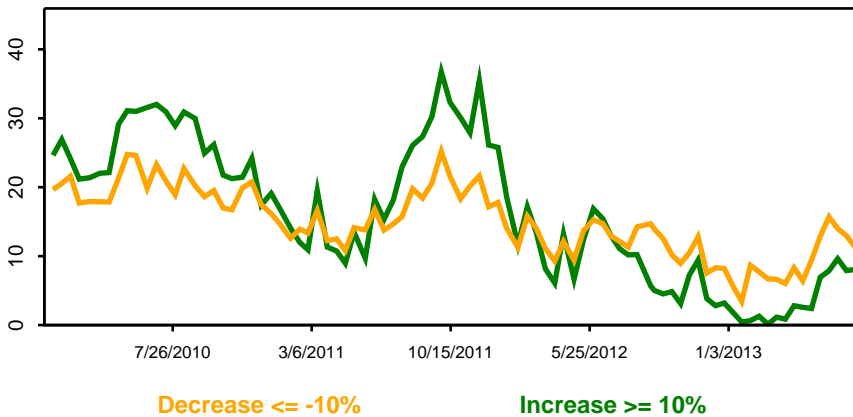
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



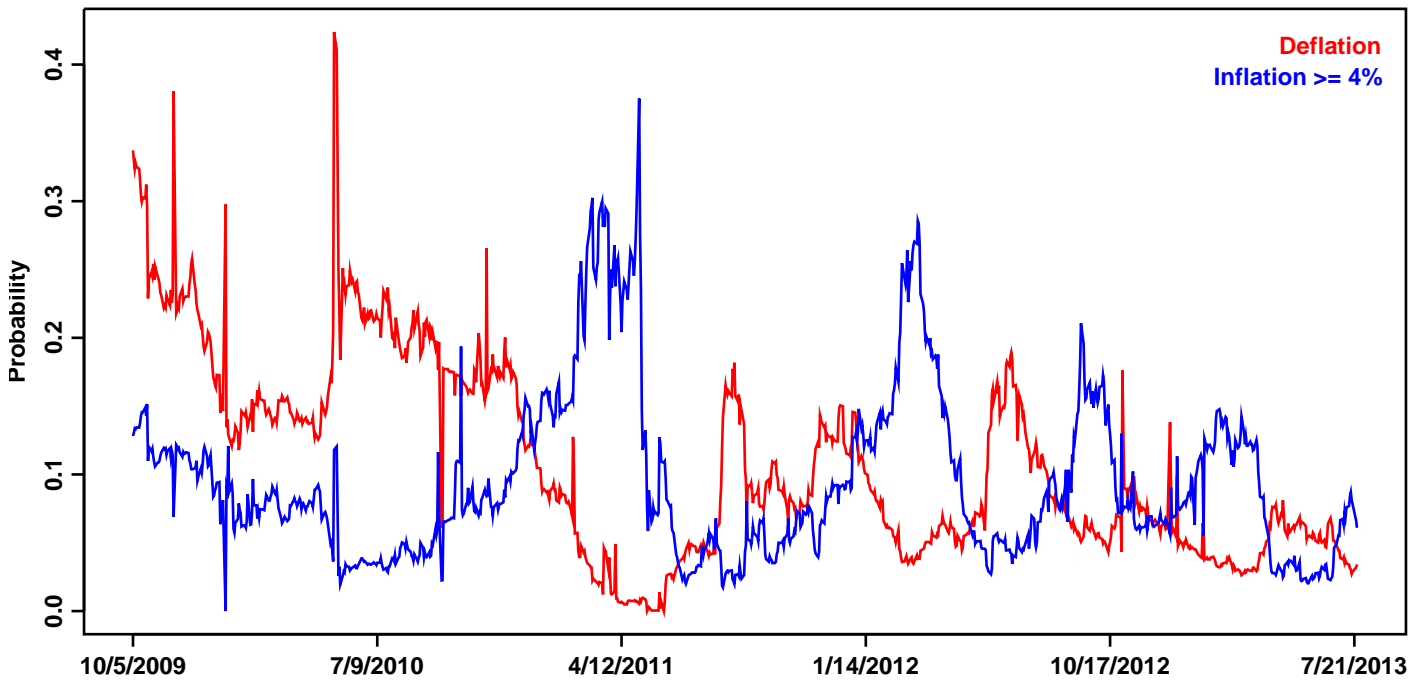
Probability of a Large Change



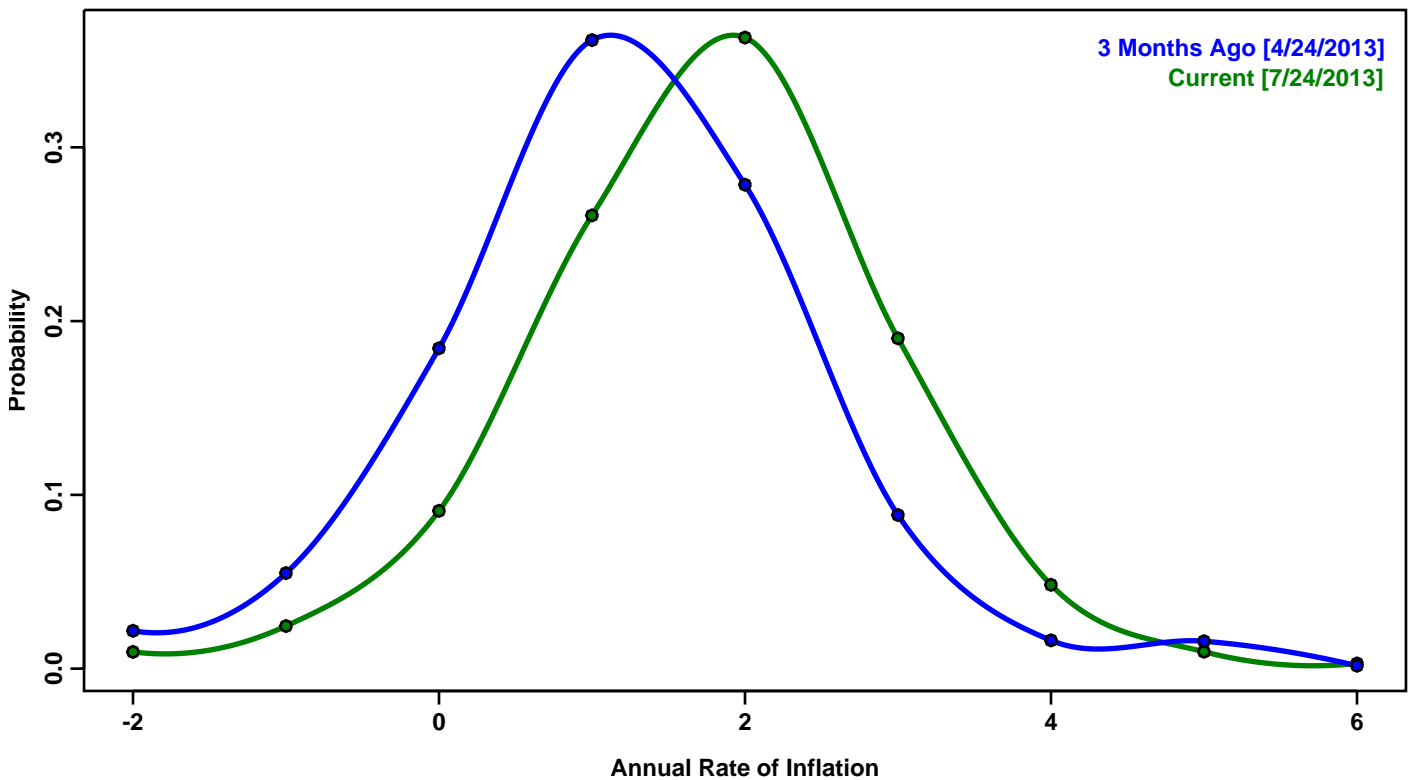
Statistics of the Log Return Distributions			
	07/11/2013	07/25/2013	Change
10th Pct	-11.86%	-10.83%	1.03%
50th Pct	0.61%	0.34%	-0.27%
90th Pct	9.21%	9.19%	-0.02%
Mean	-0.53%	-0.42%	0.12%
Std Dev	8.75%	8.37%	-0.38%
Skew	-0.91	-0.77	0.14
Kurtosis	1.56	1.61	0.05

# 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

