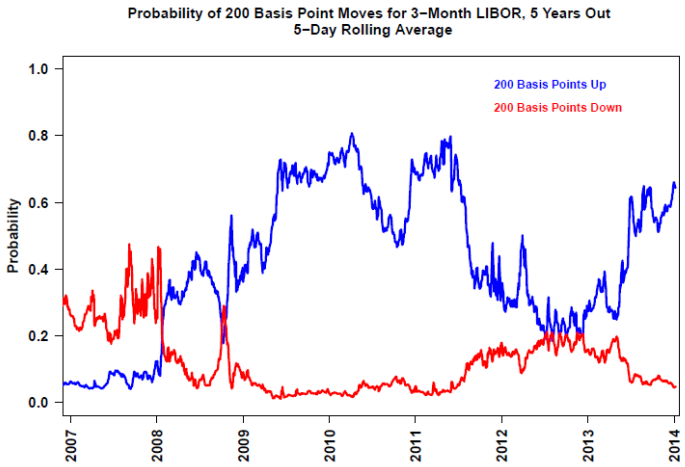
Minneapolis Options Report – January 9th

UPDATES: We now estimate RNPDs based on 3-month LIBOR. These distributions are derived from caps and floors with 5-year expiries. We report both changes in the distribution over three months and risk-neutral probabilities for rate changes of 200 basis points or more. A time series of risk-neutral probabilities for 200 basis point changes from the report is just below.



We have also added options on cattle futures to the list of physical commodities we follow. The RNPD is currently positively skewed. It has much less dispersion than its grain counterparts (adjusted for expiry). As with the other markets we follow, tail risk as measured by the RNPD standard deviation has been falling.

Banks & Insurance Companies
Bank stock price performance has been strong through the beginning of the year, outperforming the broader S&P 500 and insurance companies. Trading in options followed a familiar end of year pattern with light trading as we exited 2013 and more average trading over the past two weeks.

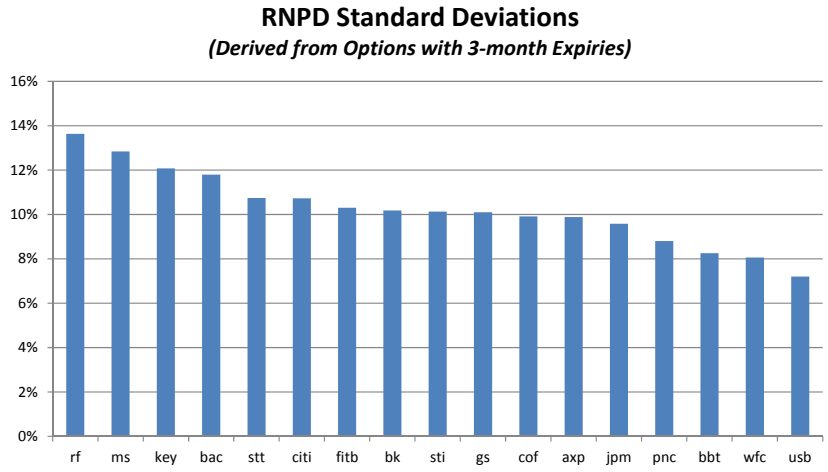
Additional Notes:

- RNPD standard deviations are at three year lows for banks, insurance companies, and the S&P 500. Similarly, risk neutral probabilities of large price changes have returned to pre-crisis levels. Tail risks continue to decline.

- As noted in our last report, skews are less negative than in the period surrounding the European issues of 2011 and approximate levels obtained at the beginning of 2010.

- Some deeply out of the money options at strikes below the spot price influenced the RNPD for BK causing its standard deviation to increase slightly last week.

- RNPD standard deviations derived from options on RF, MS, KEY, and BAC shares are the highest of the banks at this time.

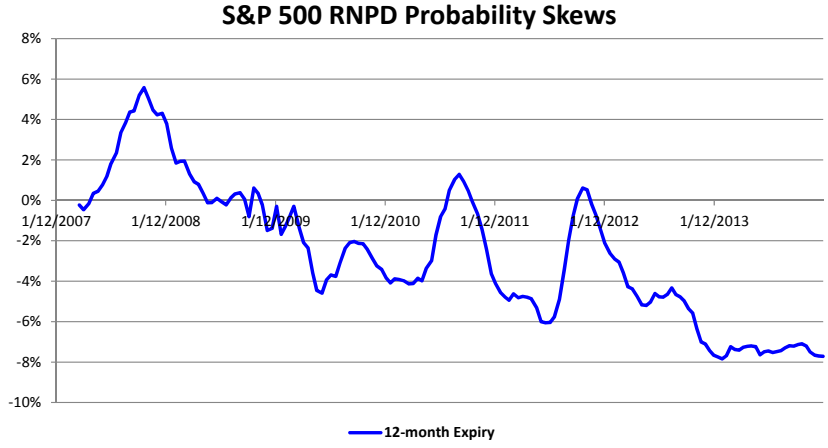


Other Commodity Markets

After a strong 2013, spot S&P 500 prices fell -21 basis points over the past two weeks. Commodity prices also generally fell: WTI Oil -7.3%, Brent -5.8%, Corn -3.3%, Soybeans -2.8%, Wheat -3.9%. The dollar was mixed.

Additional notes:

- Out of the money trading was biased toward strikes below the spot price for options on the S&P 500 Index. We noted some strong activity at deeply out of the money strike prices for options with 12 months to expiry. Large change probabilities derived from options with 12 month expiries continue show strong downside bias. (*See S&P 500 reports*)



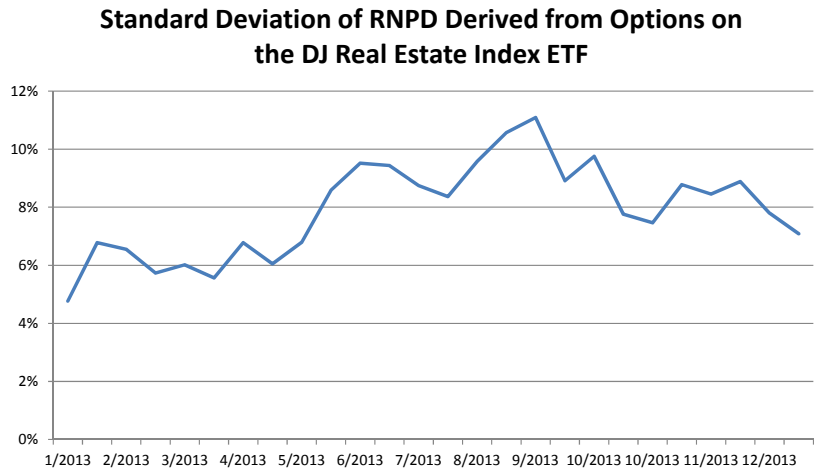
- RNPD standard deviations derived from options on crude oil futures jumped by over 200 basis points last week consistent with the sharp decline in spot prices. (*See Brent and WTI reports*)

- Out of the money trading in options on precious metals was biased toward strikes above the current spot price. RNPD standard deviations ticked lower. RNPDs derived from options on both gold and silver remain positively skewed. (*See Gold and Silver reports*)

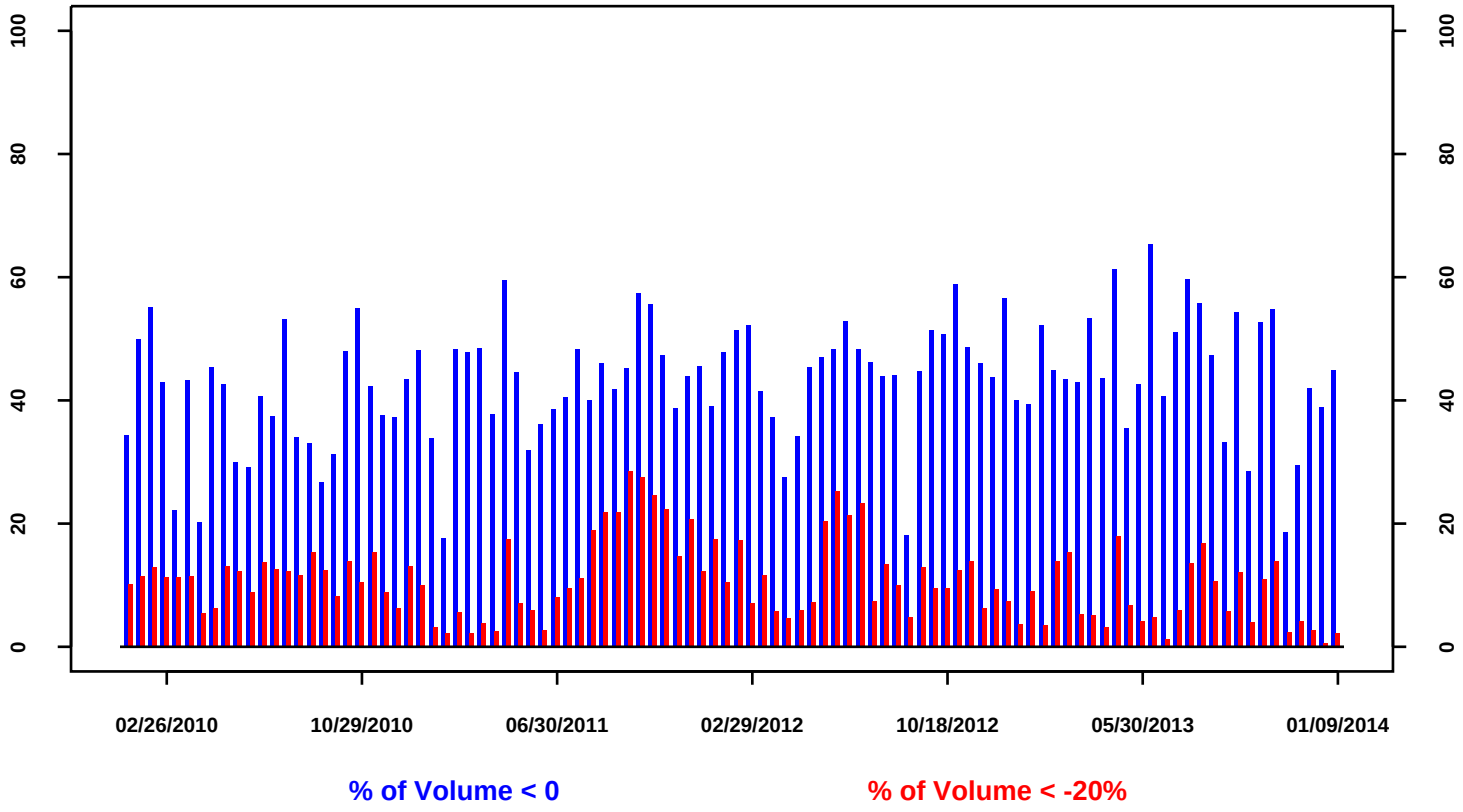
- RNPD skews are biased toward a weaker dollar in all three markets we follow. (*See Dollar-Euro, Dollar-Pound, and Dollar-Yen reports*)

- The RNPD derived from options on cattle futures is new. (*See Cattle report*)

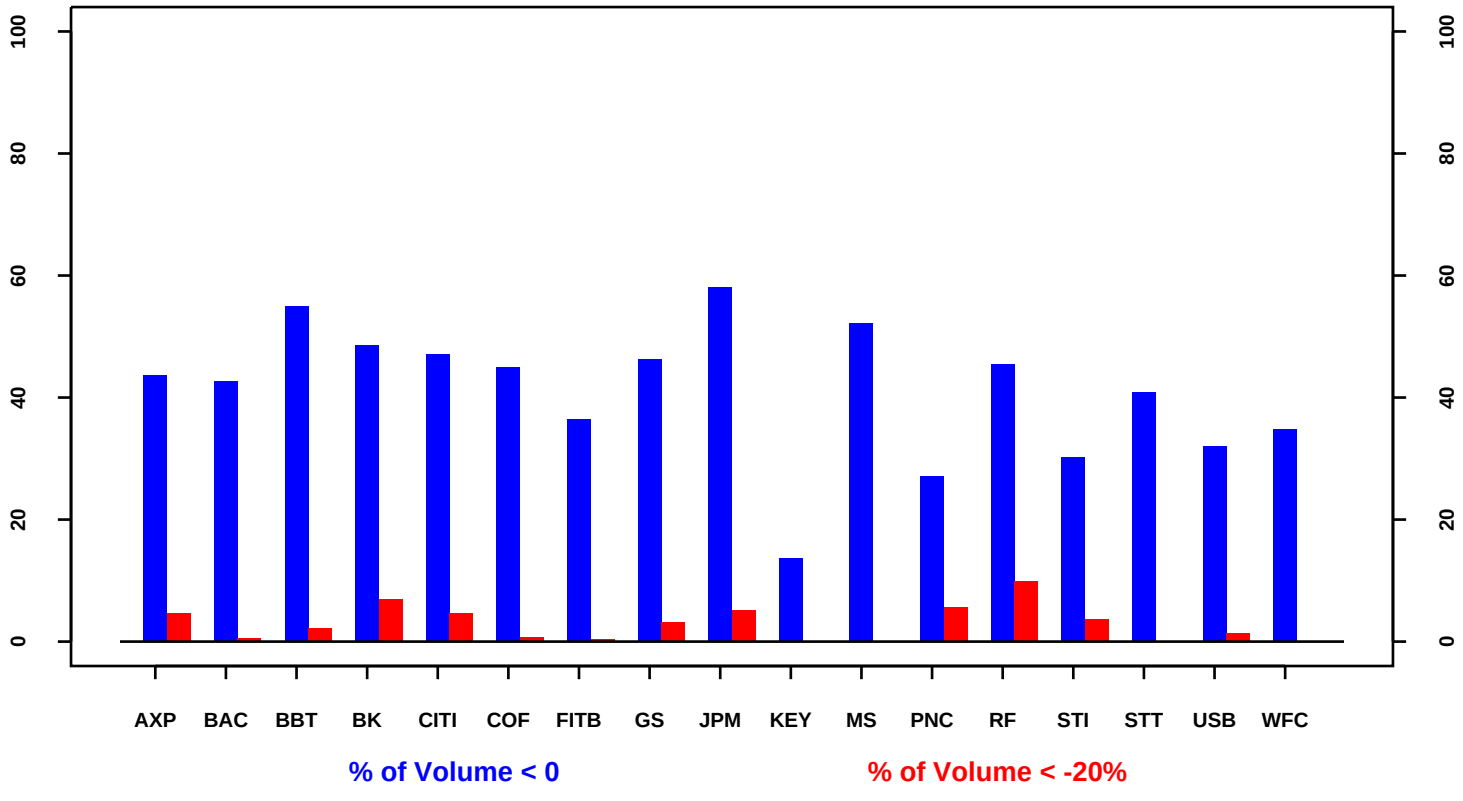
- RNPD standard deviations derived from options on the DJ Real Estate ETF have resumed their downward trajectory. (*See Real Estate Report*)



Aggregate Volumes for Options on CCAR Banks

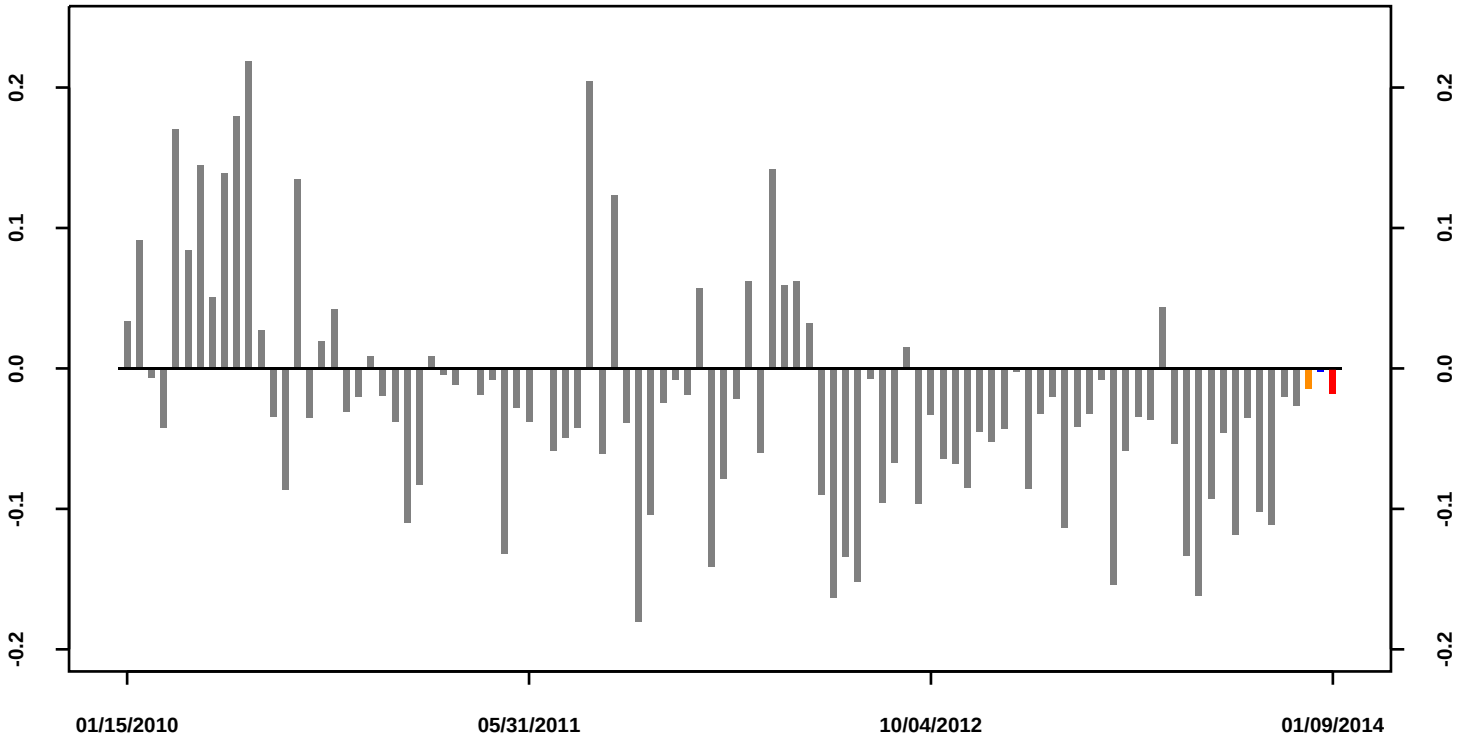


Volumes for Options on CCAR Banks

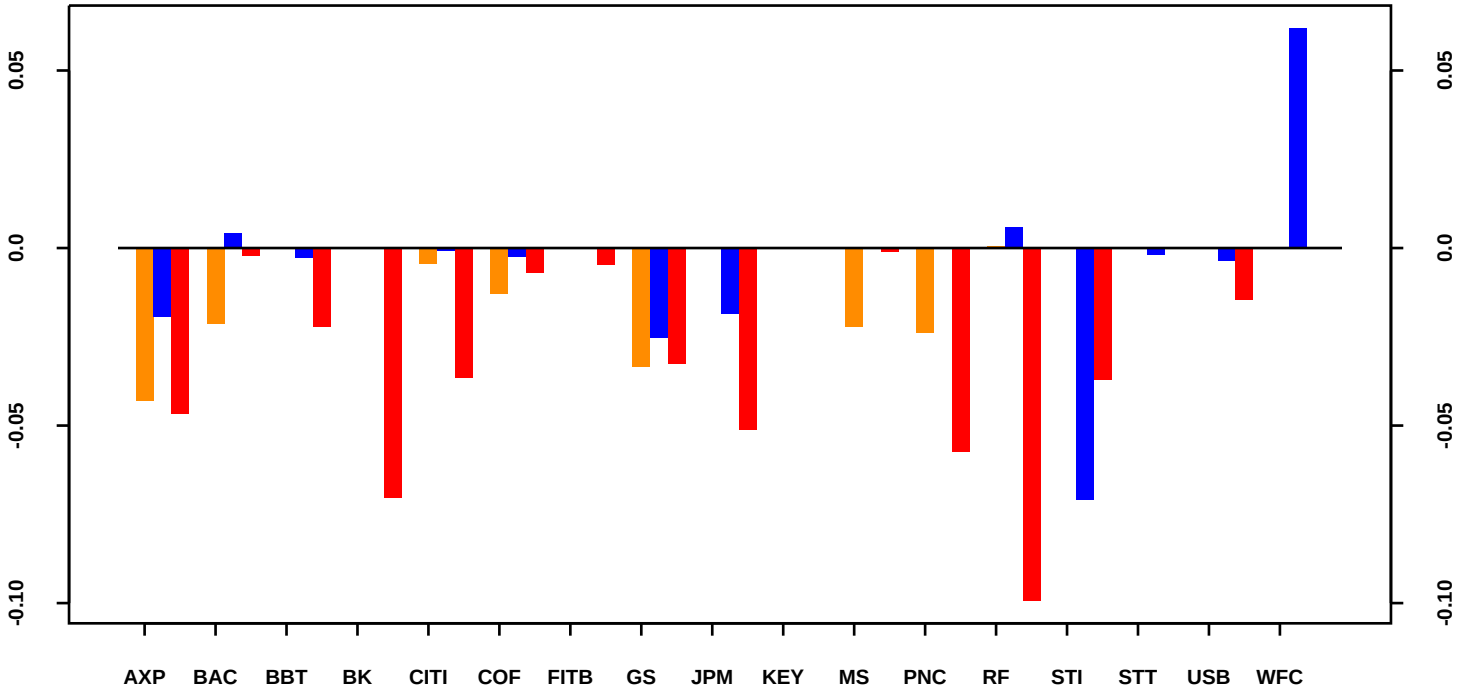


Aggregate Volume Skew--CCAR Banks

(% 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

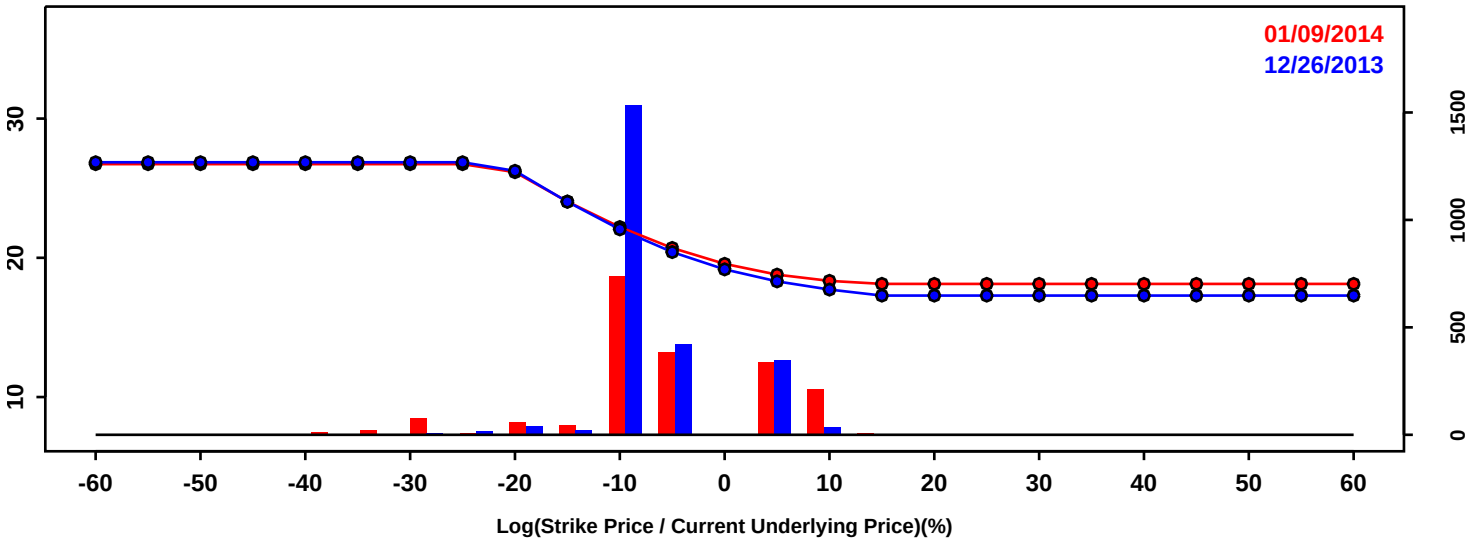


12/12/2013 12/26/2013 01/09/2014

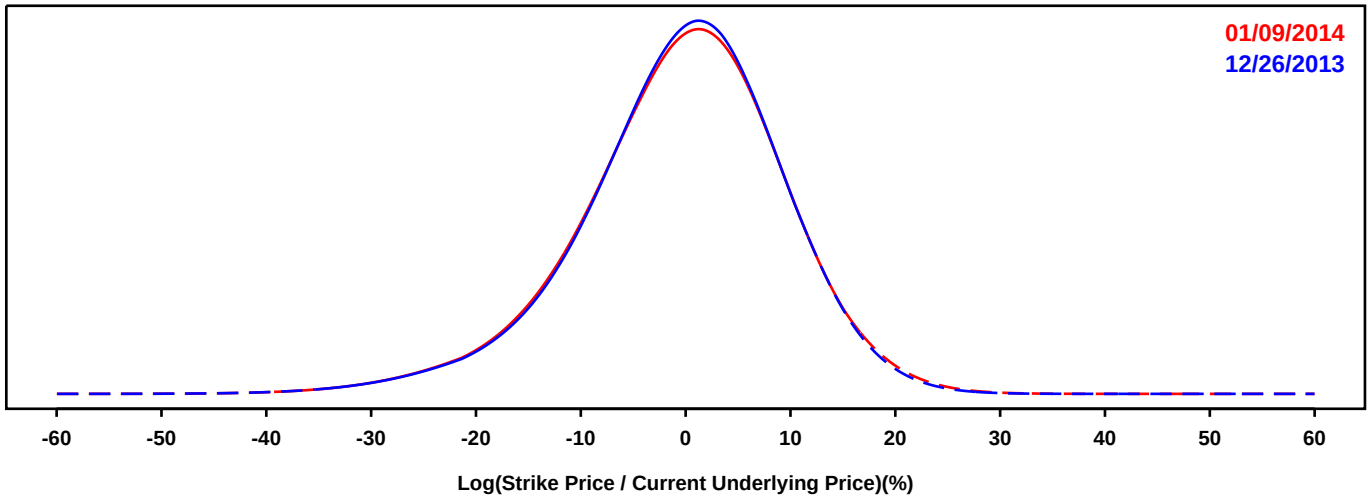
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AMERICAN EXPRESS

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

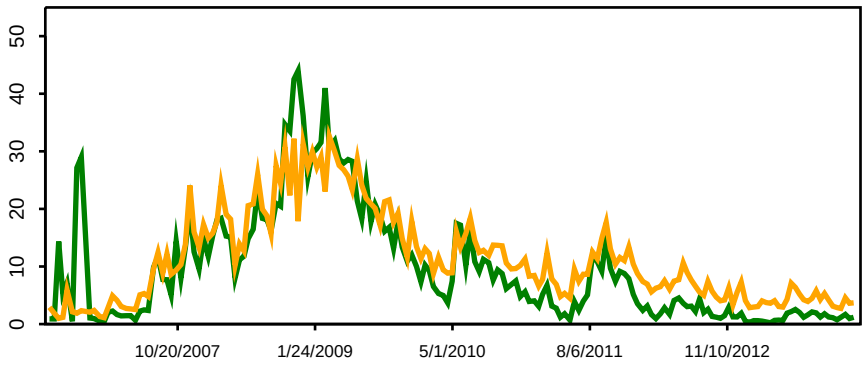
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

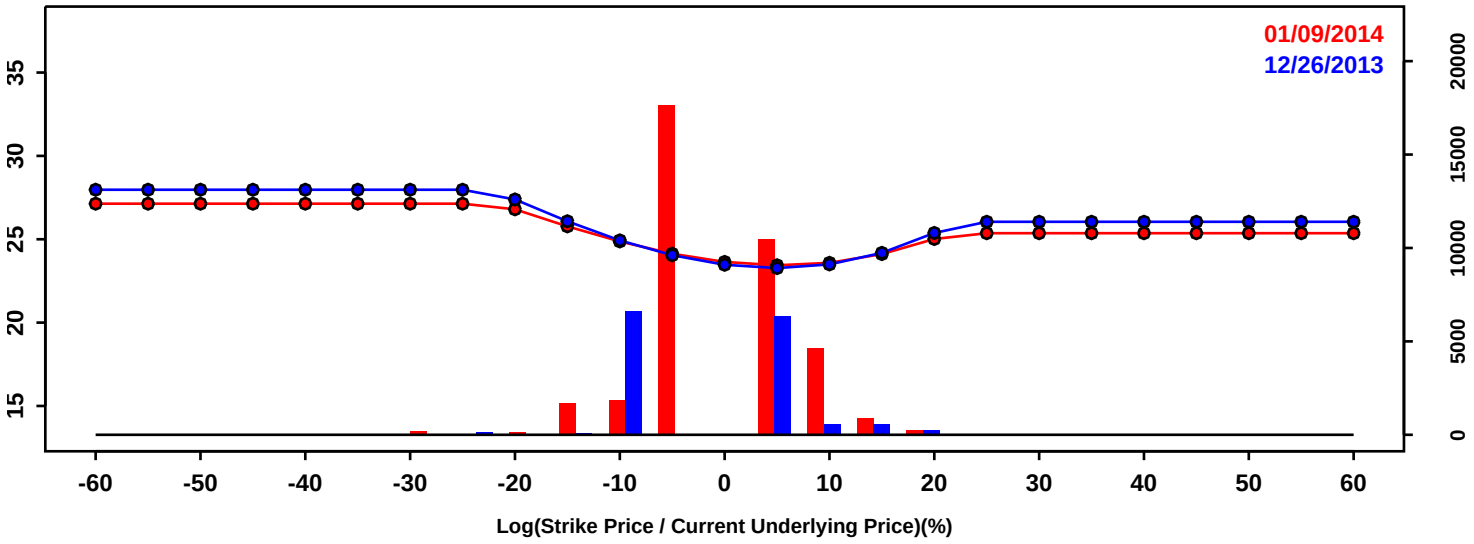
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-12.86%	-13.08%	-0.22%
50th Pct	0.24%	0.21%	-0.03%
90th Pct	11.10%	11.31%	0.21%
Mean	-0.46%	-0.45%	0.00%
Std Dev	9.74%	9.89%	0.15%
Skew	-0.53	-0.48	0.05
Kurtosis	0.89	0.80	-0.09

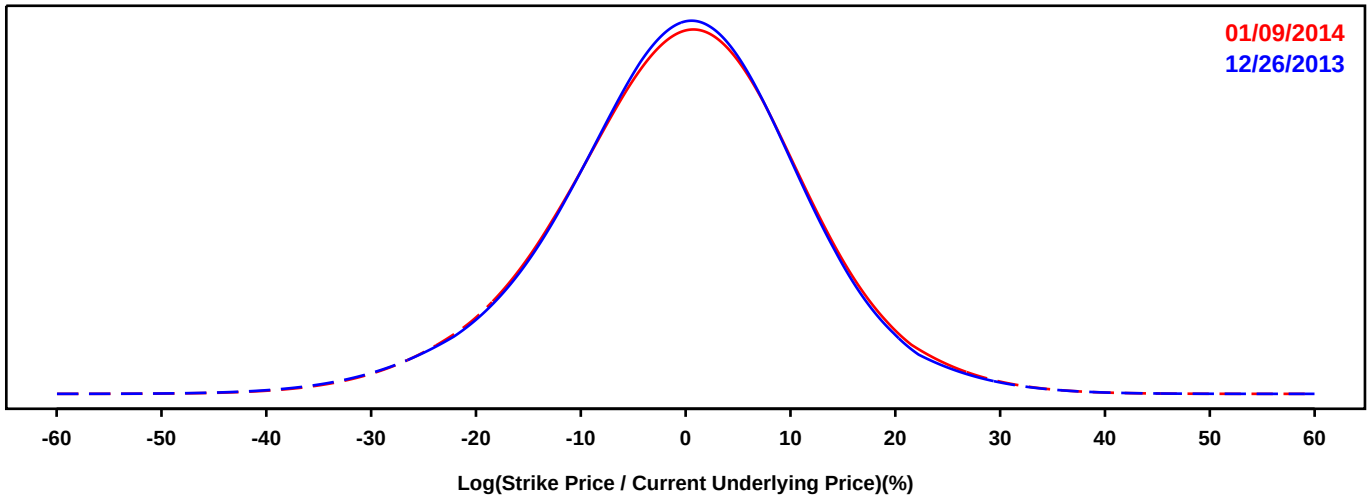
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF AMERICA

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

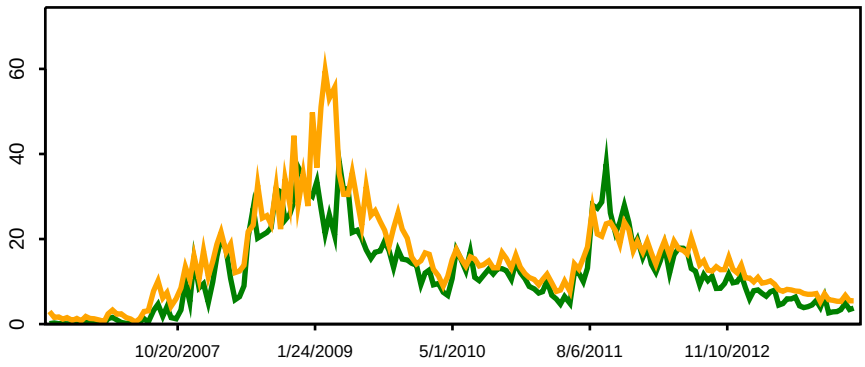
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

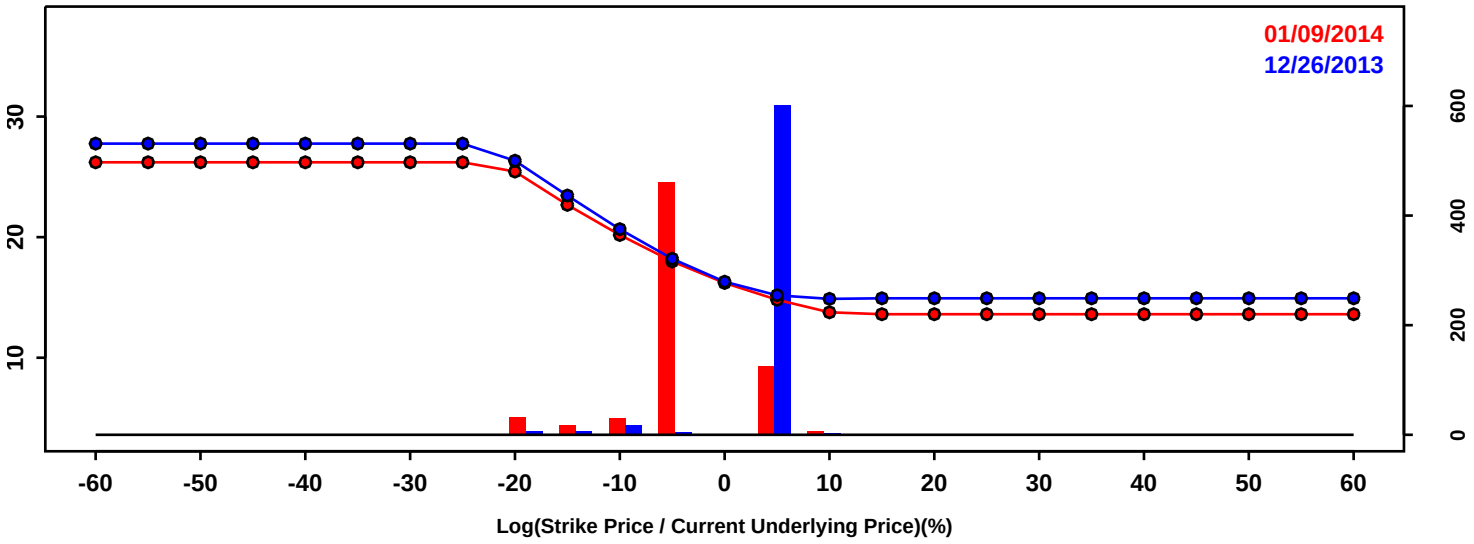
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-15.43%	-15.49%	-0.05%
50th Pct	-0.14%	-0.05%	0.09%
90th Pct	13.57%	13.94%	0.37%
Mean	-0.55%	-0.41%	0.14%
Std Dev	11.70%	11.79%	0.09%
Skew	-0.20	-0.16	0.04
Kurtosis	0.58	0.43	-0.14

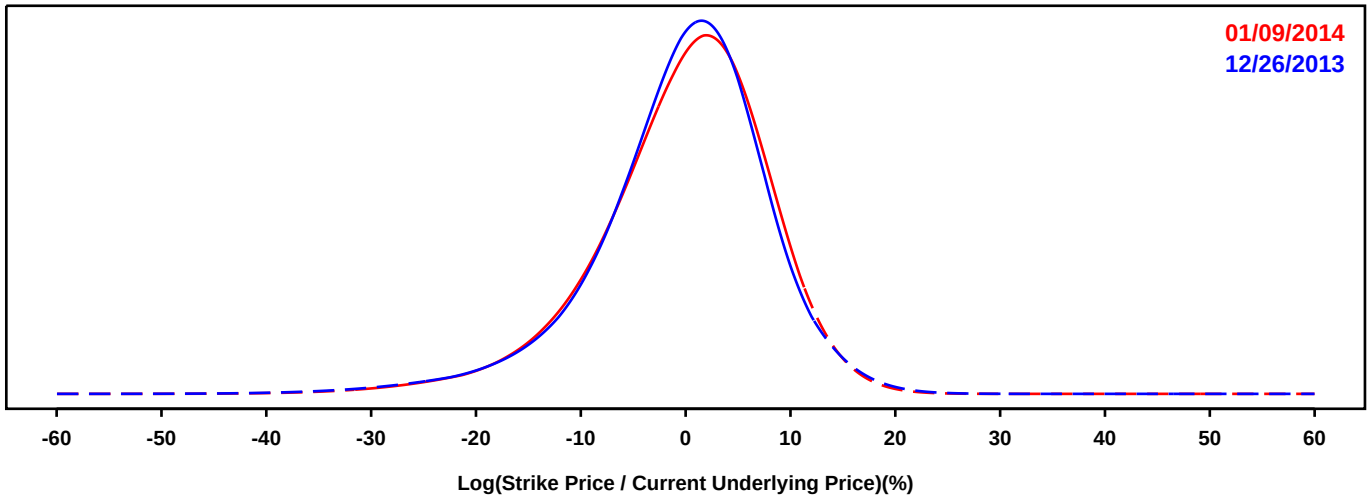
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BB&T

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

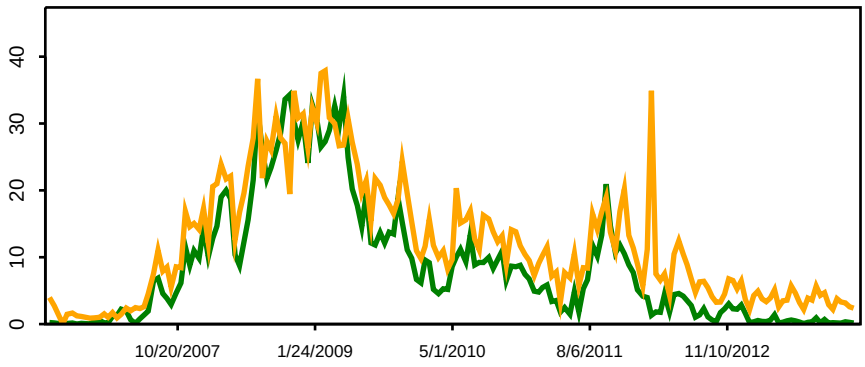
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

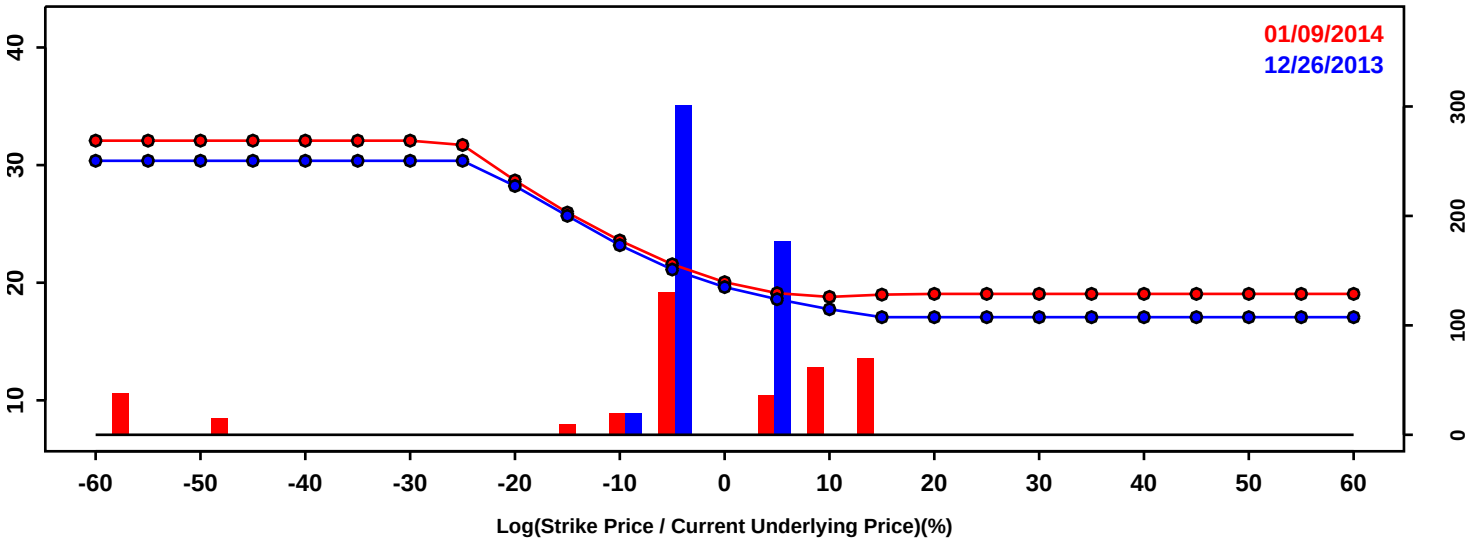
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-10.70%	-10.79%	-0.09%
50th Pct	0.41%	0.65%	0.23%
90th Pct	8.85%	9.11%	0.25%
Mean	-0.42%	-0.27%	0.15%
Std Dev	8.31%	8.25%	-0.06%
Skew	-0.85	-0.80	0.05
Kurtosis	2.01	1.52	-0.49

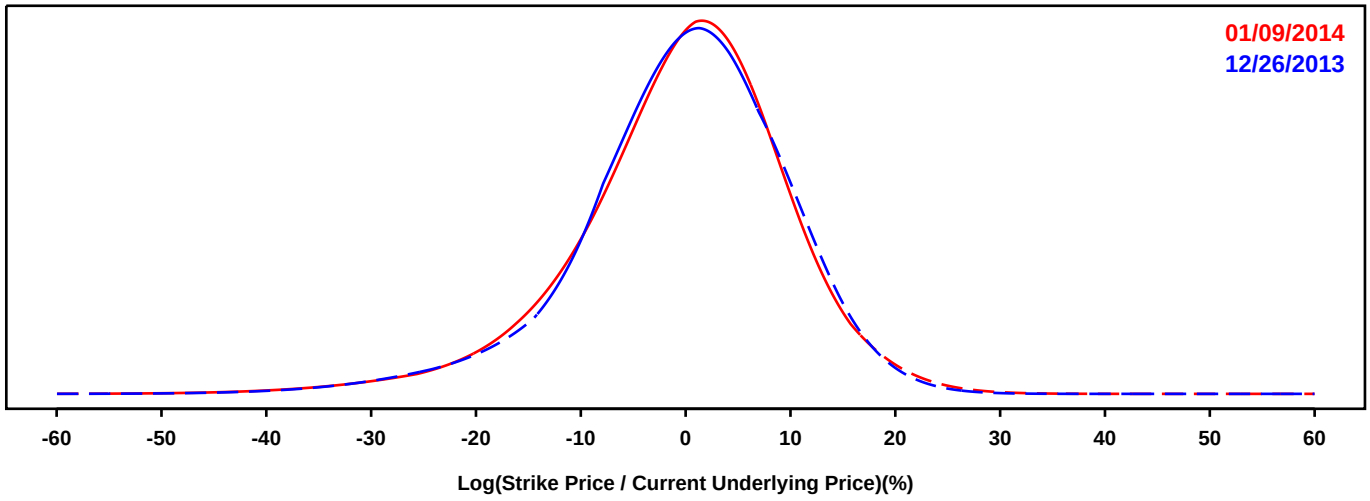
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- BANK OF NEW YORK MELLON

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

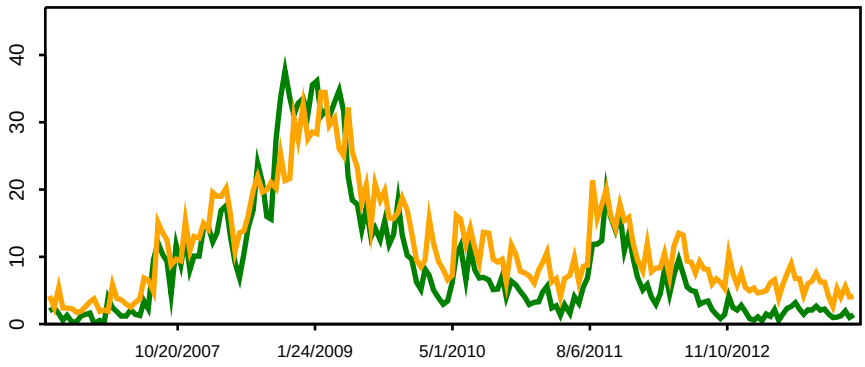
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

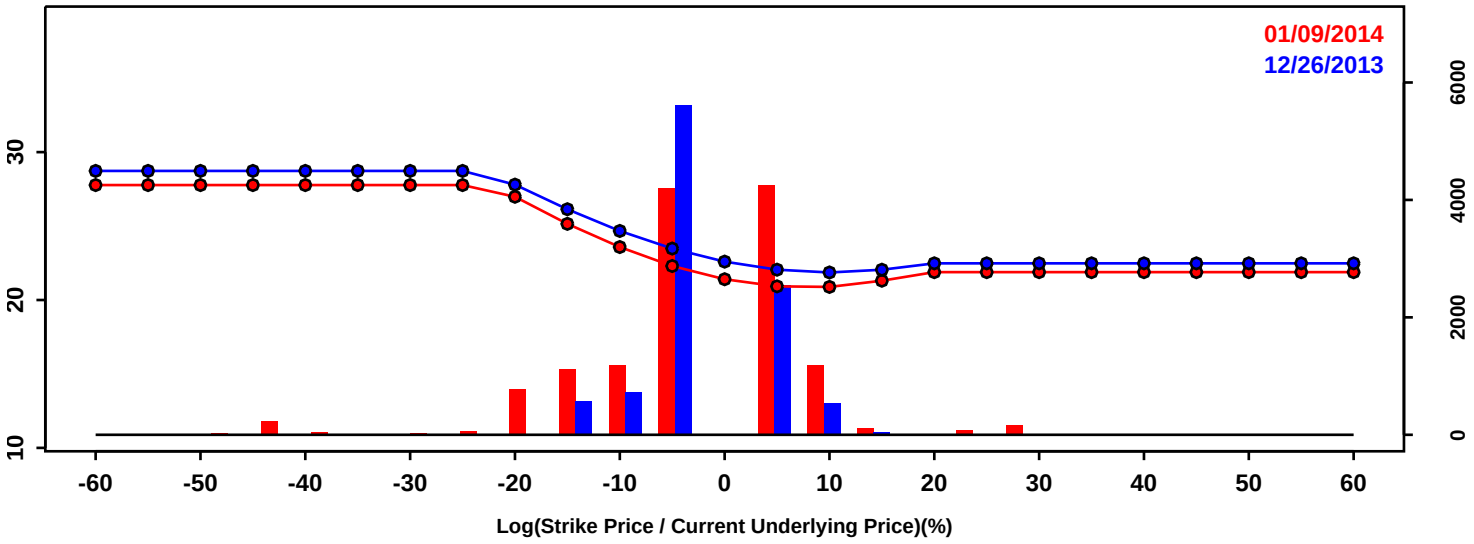
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-12.49%	-13.06%	-0.56%
50th Pct	0.50%	0.55%	0.04%
90th Pct	11.46%	11.33%	-0.14%
Mean	-0.24%	-0.34%	-0.11%
Std Dev	10.00%	10.18%	0.18%
Skew	-0.70	-0.68	0.03
Kurtosis	1.42	1.53	0.11

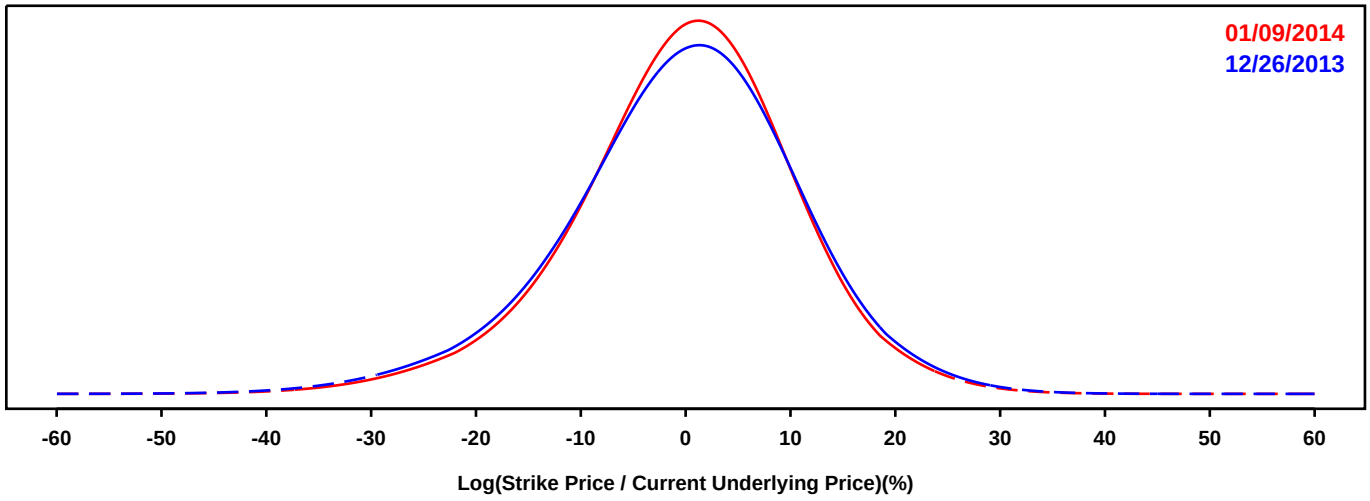
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CITIGROUP

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

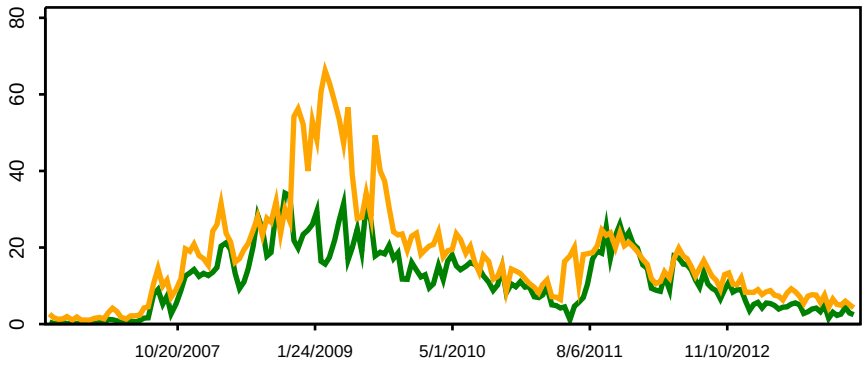
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



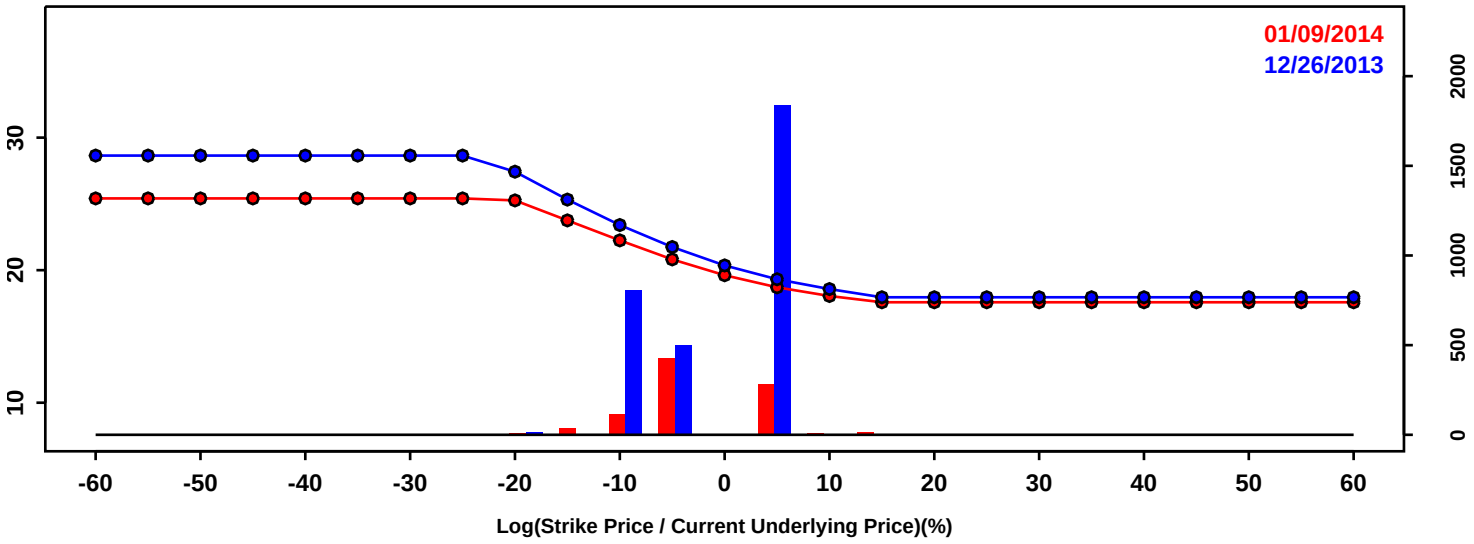
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-14.74%	-13.79%	0.96%
50th Pct	0.28%	0.40%	0.12%
90th Pct	13.29%	12.66%	-0.62%
Mean	-0.30%	-0.16%	0.14%
Std Dev	11.33%	10.73%	-0.61%
Skew	-0.35	-0.34	0.01
Kurtosis	0.63	0.73	0.09

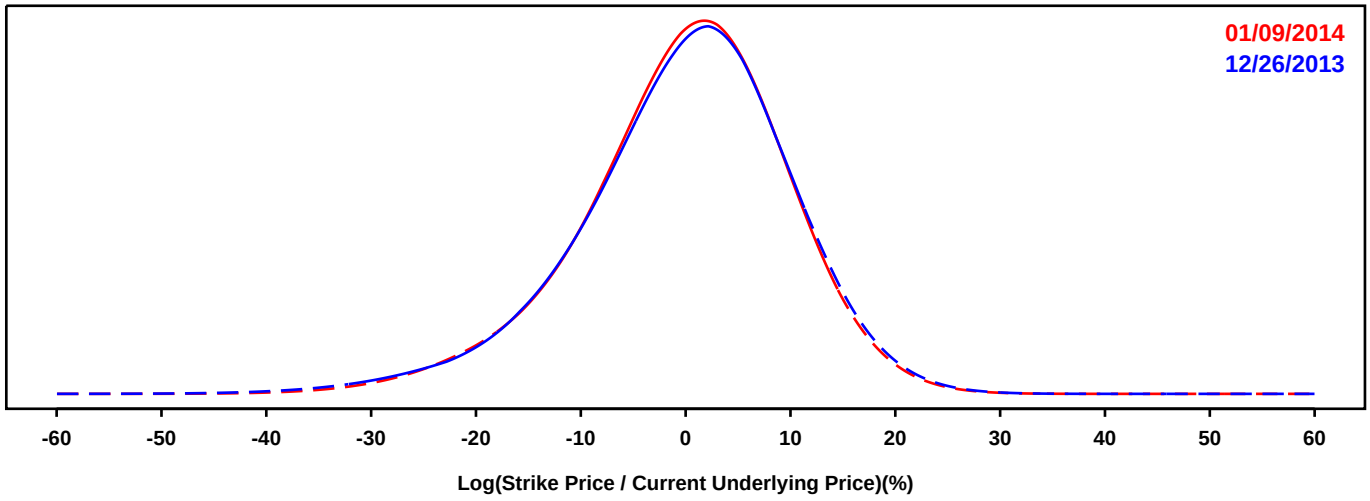
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CAPITAL ONE

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

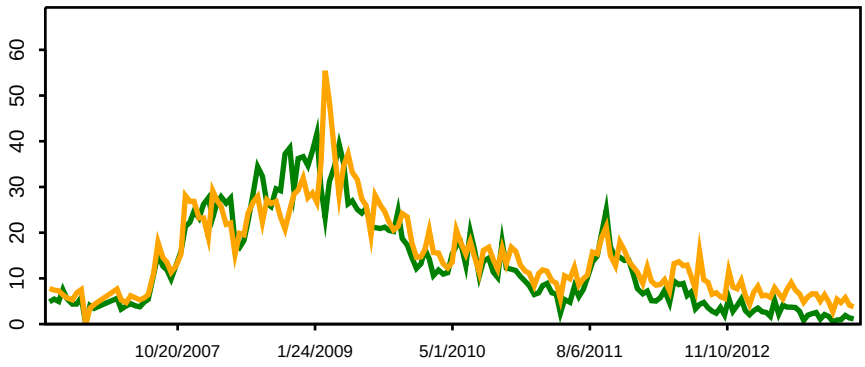
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

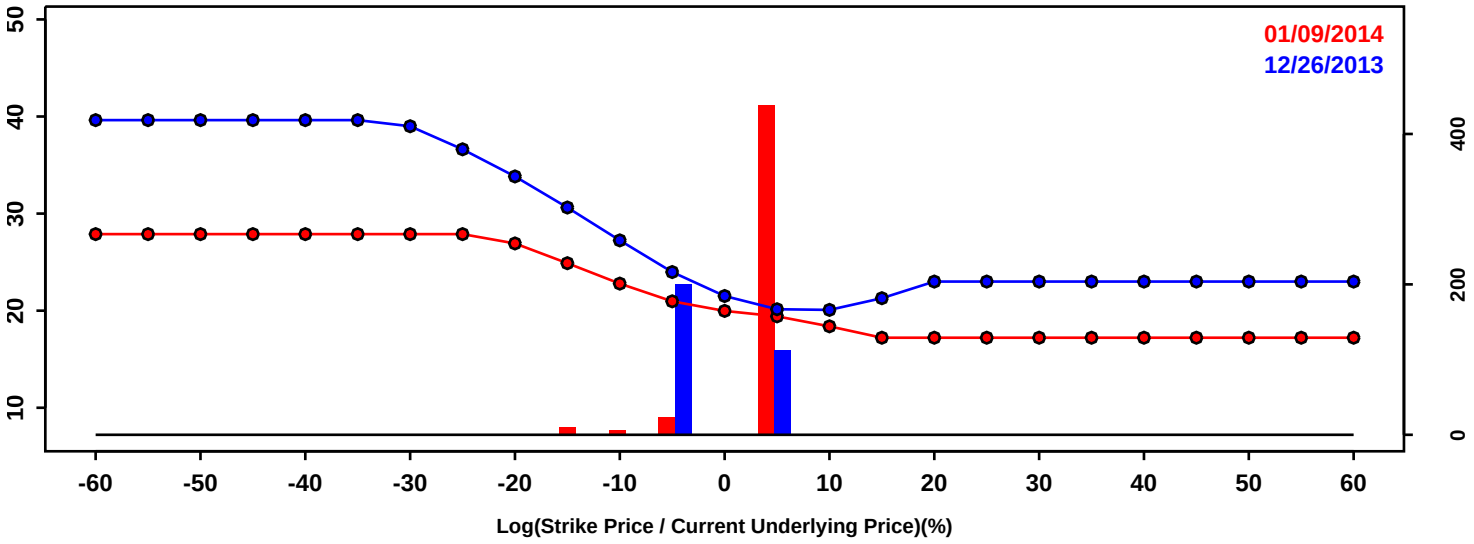
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-13.43%	-13.17%	0.26%
50th Pct	0.69%	0.55%	-0.14%
90th Pct	11.95%	11.55%	-0.40%
Mean	-0.19%	-0.22%	-0.03%
Std Dev	10.28%	9.91%	-0.37%
Skew	-0.57	-0.49	0.08
Kurtosis	0.91	0.63	-0.28

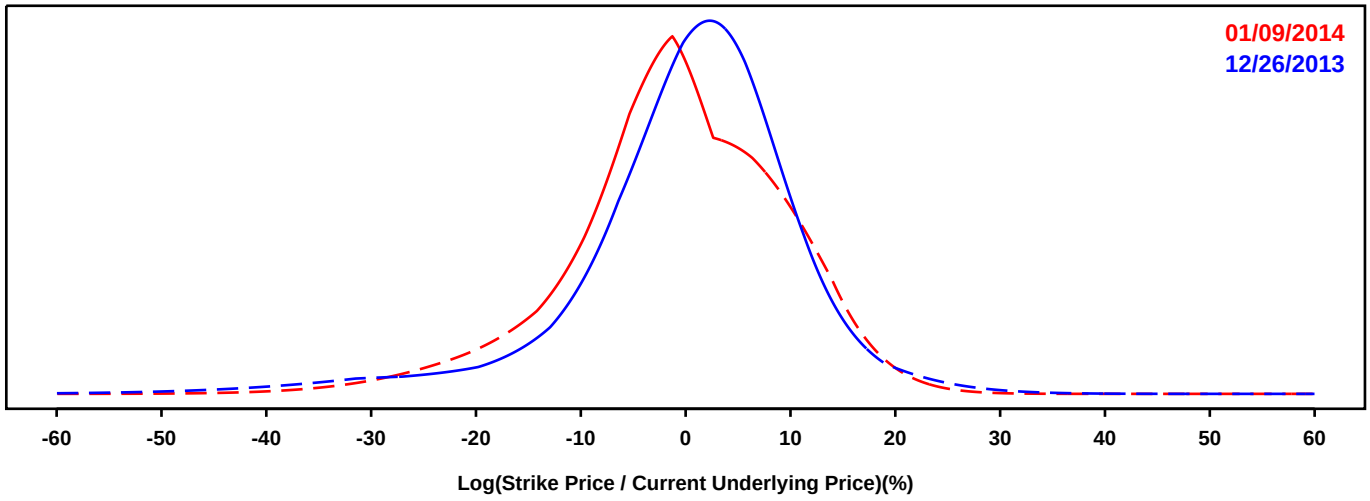
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- FIFTH THIRD

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

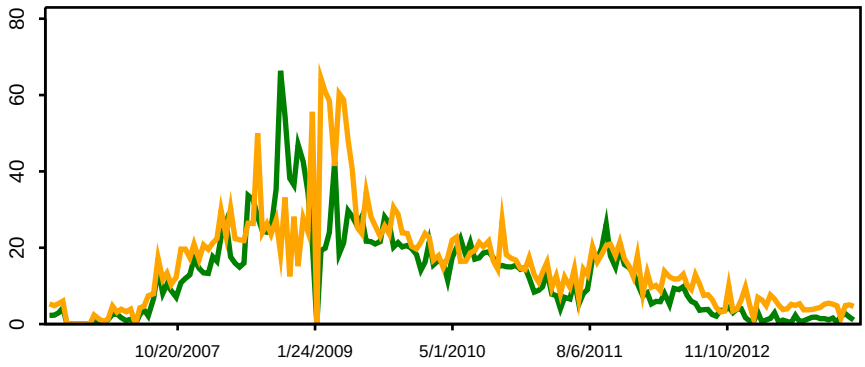
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

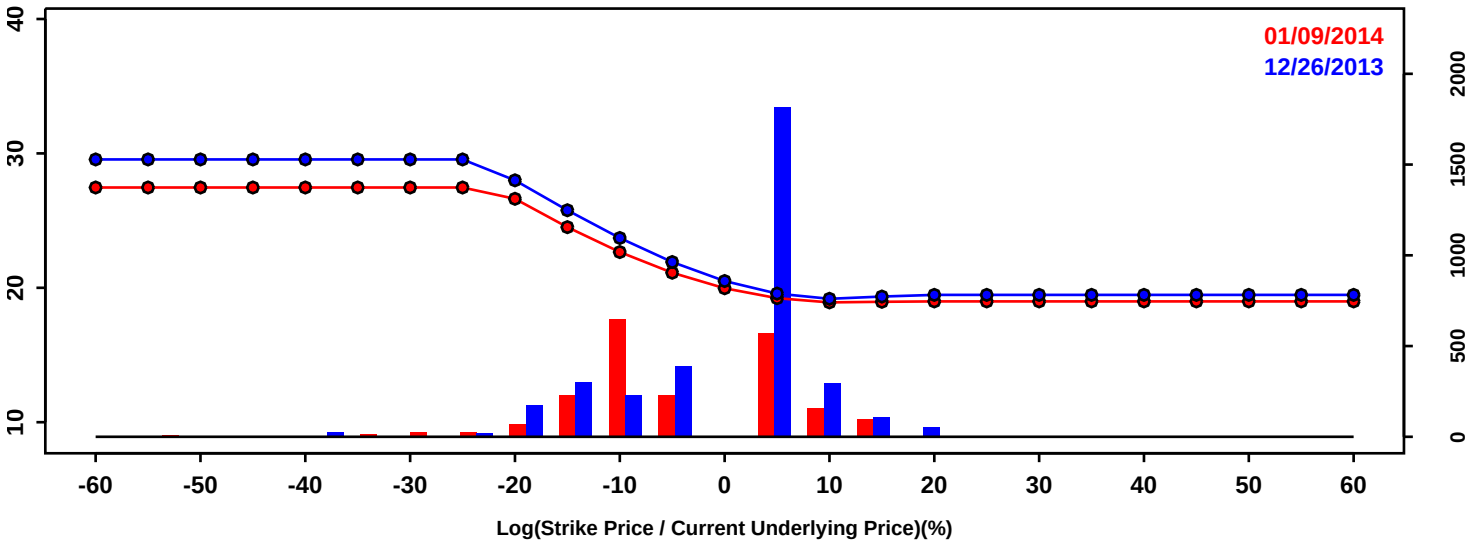
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-12.01%	-13.70%	-1.70%
50th Pct	1.36%	-0.56%	-1.92%
90th Pct	11.49%	11.81%	0.32%
Mean	0.12%	-0.82%	-0.94%
Std Dev	11.01%	10.30%	-0.70%
Skew	-1.20	-0.54	0.67
Kurtosis	3.70	0.89	-2.82

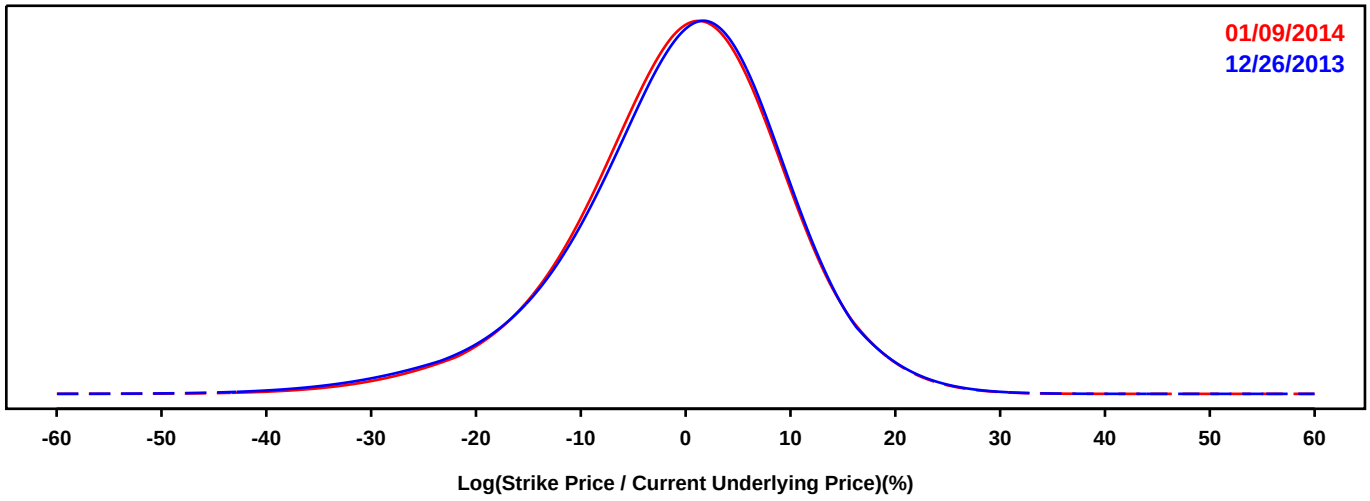
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLDMAN SACHS

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

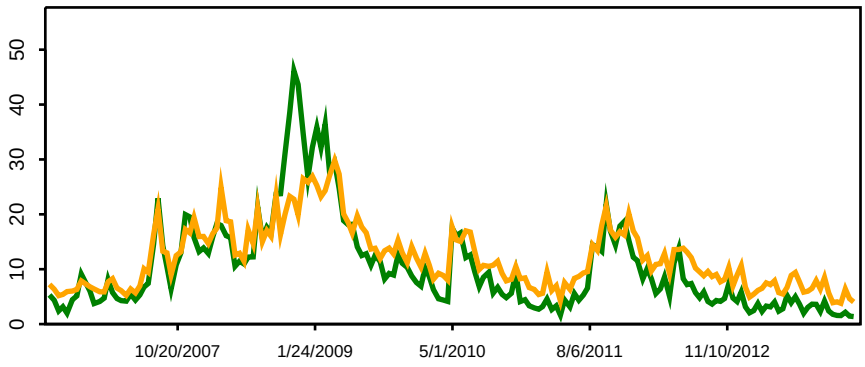
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

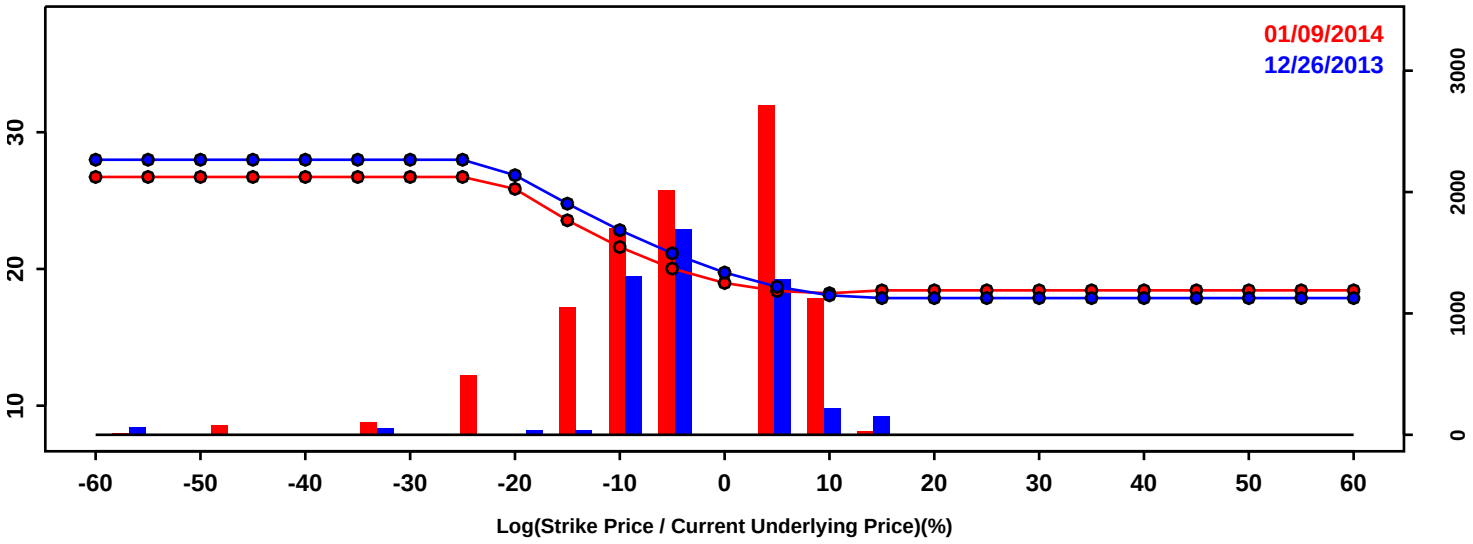
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-13.88%	-13.43%	0.45%
50th Pct	0.32%	0.17%	-0.15%
90th Pct	11.45%	11.35%	-0.10%
Mean	-0.60%	-0.55%	0.05%
Std Dev	10.44%	10.10%	-0.33%
Skew	-0.61	-0.49	0.12
Kurtosis	1.13	0.87	-0.26

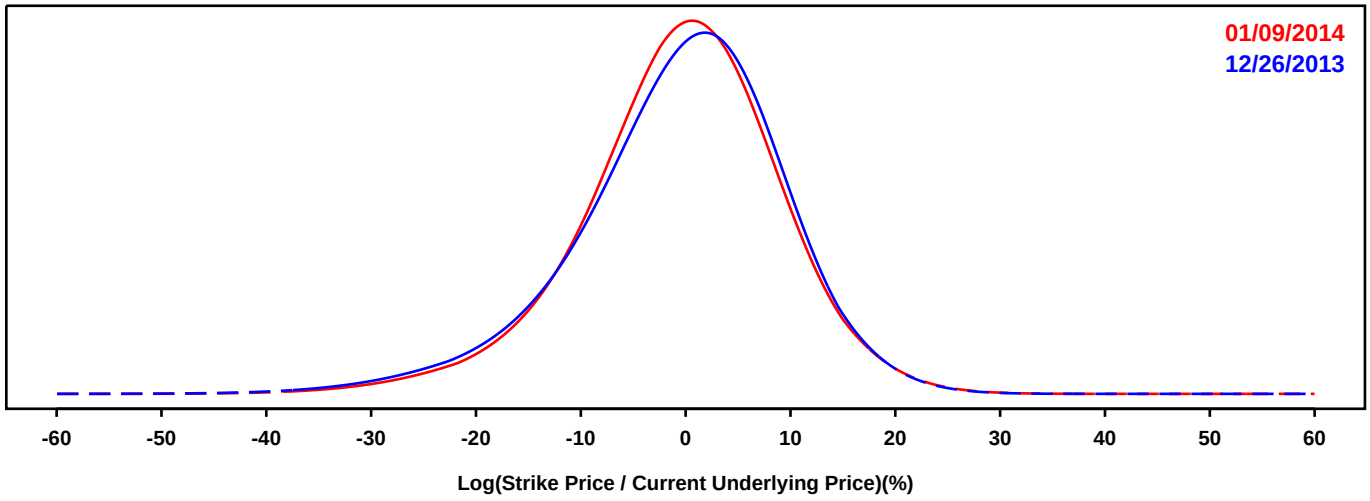
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- JP MORGAN

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

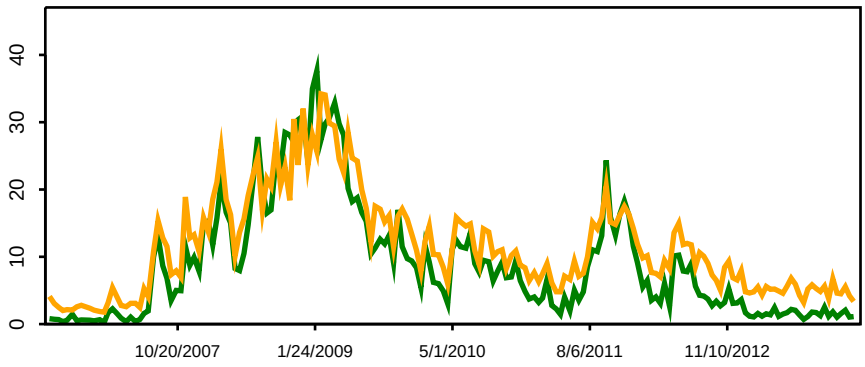
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

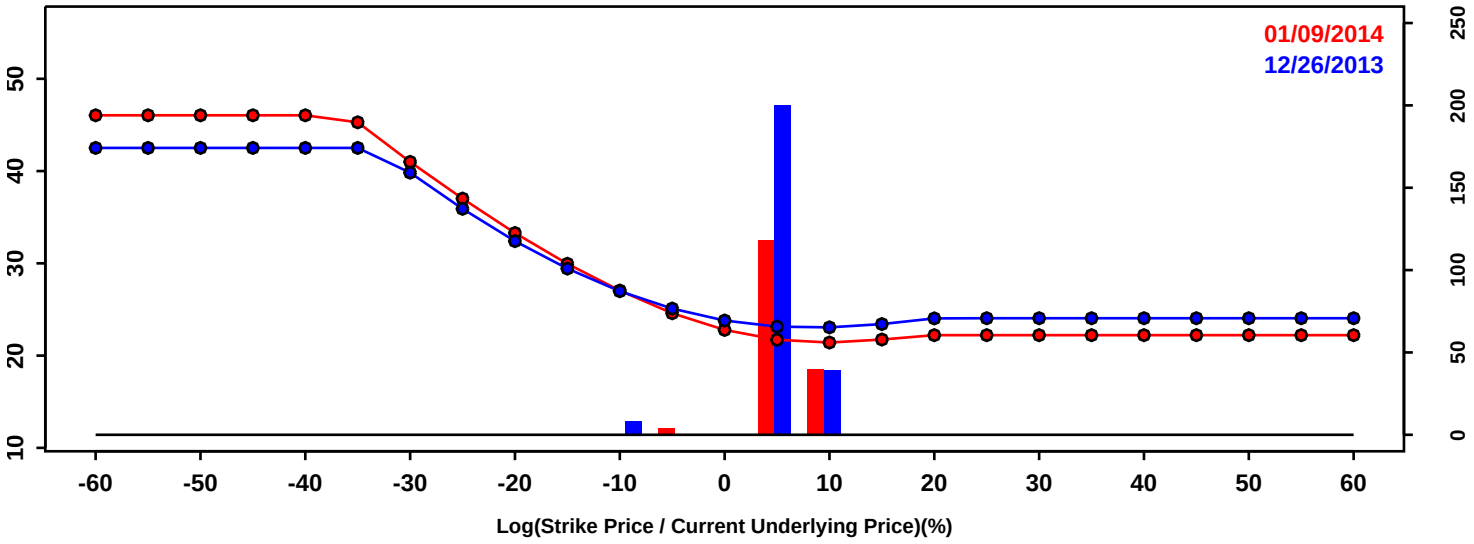
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-13.48%	-12.61%	0.87%
50th Pct	0.32%	0.00%	-0.32%
90th Pct	11.05%	10.83%	-0.22%
Mean	-0.58%	-0.56%	0.03%
Std Dev	10.04%	9.58%	-0.45%
Skew	-0.60	-0.46	0.15
Kurtosis	0.98	0.93	-0.05

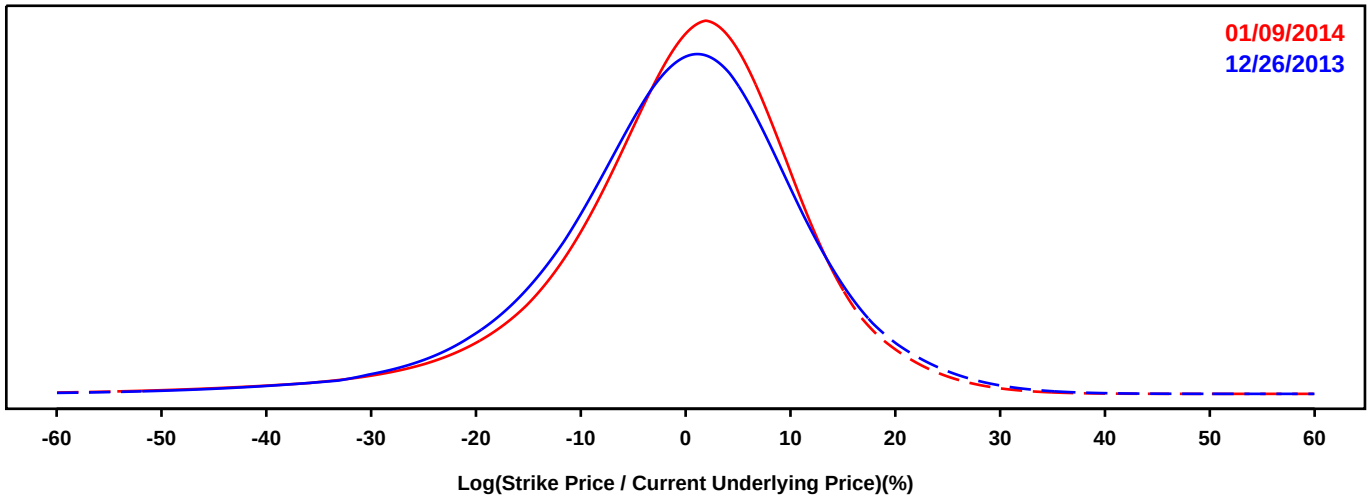
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- KEYCORP

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

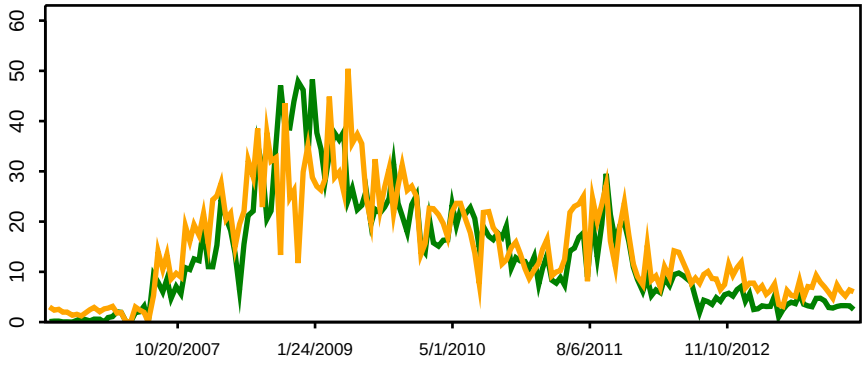
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



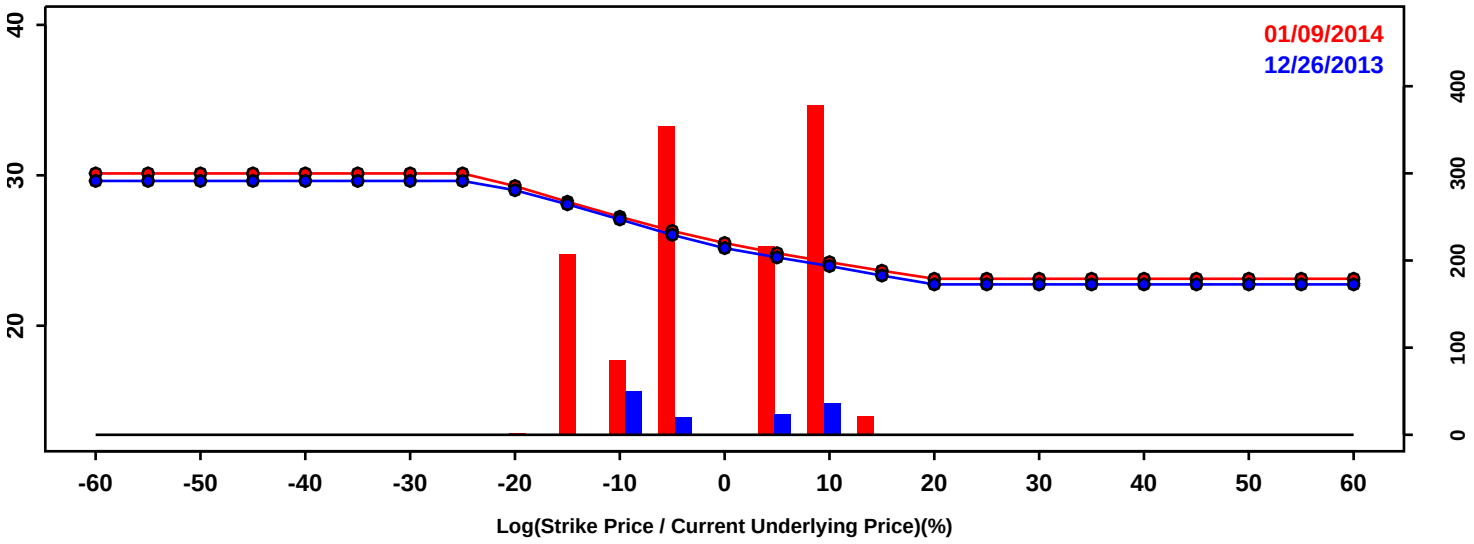
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-15.91%	-14.97%	0.94%
50th Pct	0.05%	0.65%	0.60%
90th Pct	13.29%	12.57%	-0.71%
Mean	-0.85%	-0.58%	0.27%
Std Dev	12.37%	12.08%	-0.29%
Skew	-0.69	-1.02	-0.33
Kurtosis	1.96	3.03	1.07

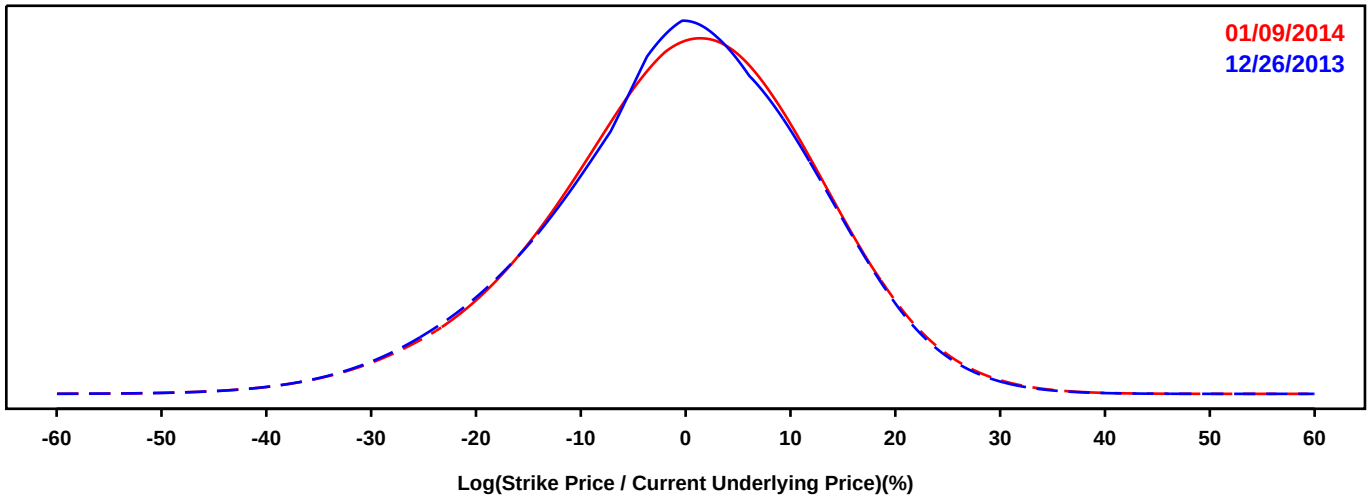
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- MORGAN STANLEY

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

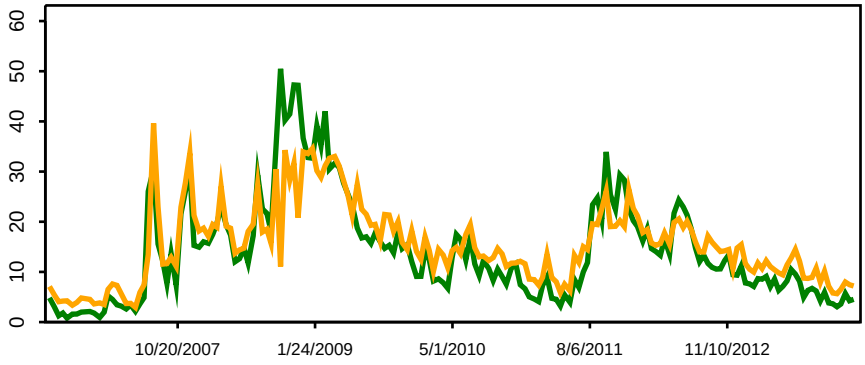
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



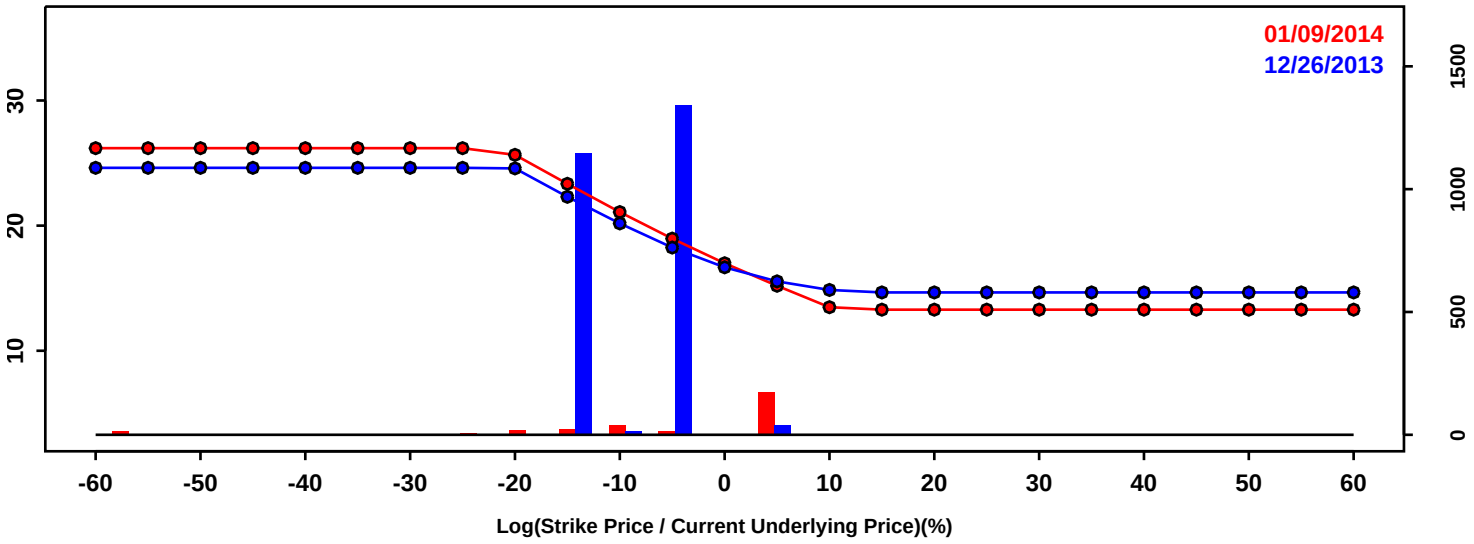
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-17.42%	-17.15%	0.27%
50th Pct	0.18%	0.35%	0.16%
90th Pct	15.16%	15.38%	0.22%
Mean	-0.51%	-0.32%	0.19%
Std Dev	12.79%	12.84%	0.06%
Skew	-0.34	-0.33	0.01
Kurtosis	0.28	0.29	0.01

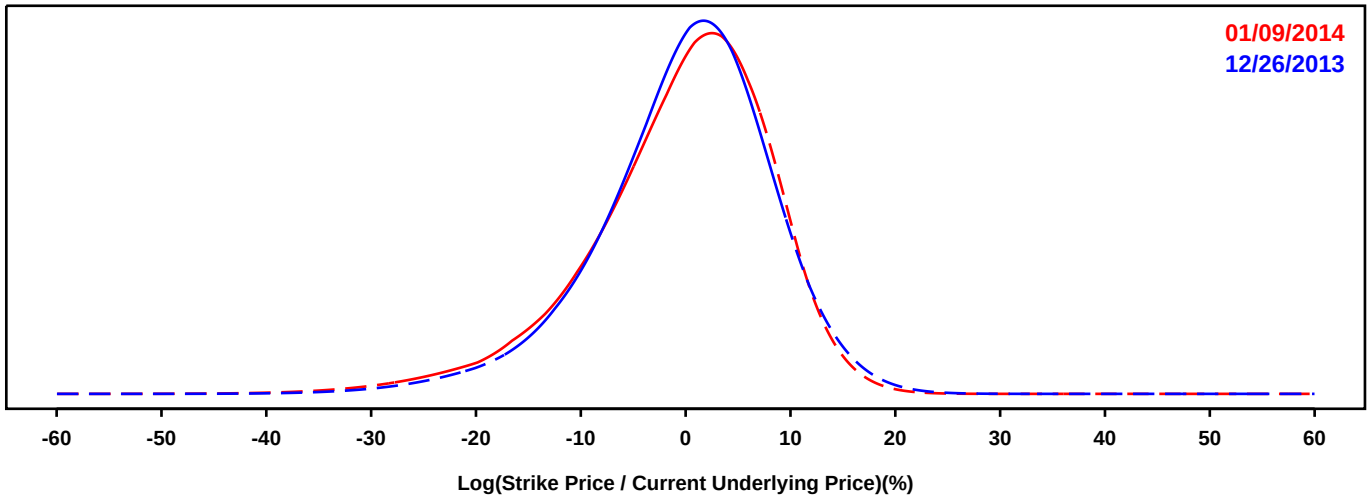
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PNC FINANCIAL

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

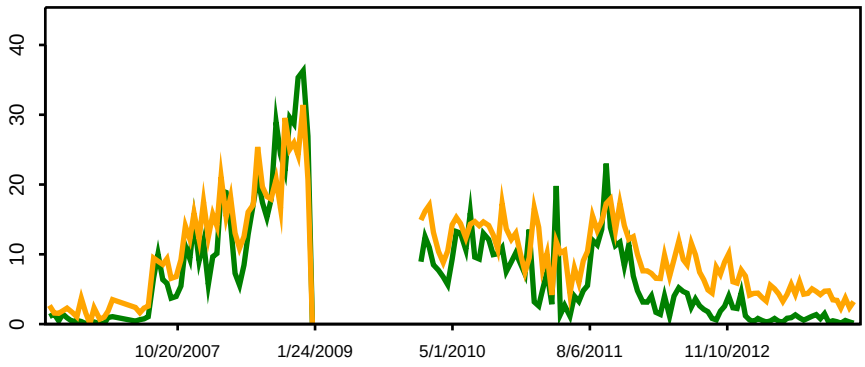
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



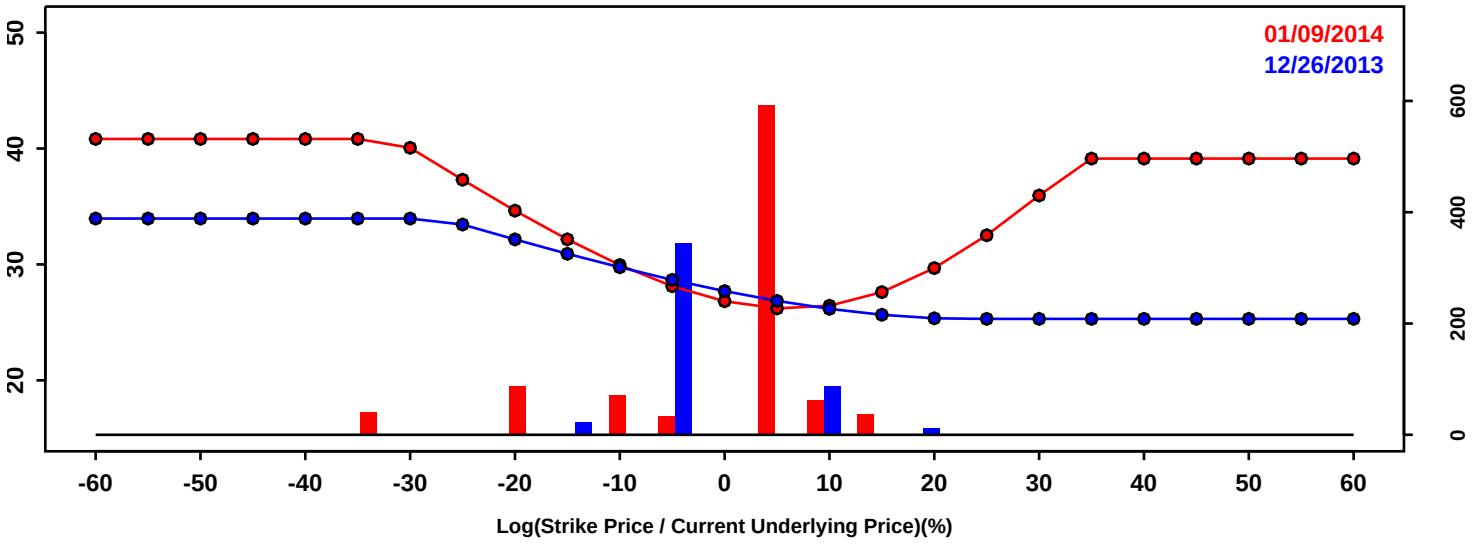
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-10.89%	-12.08%	-1.19%
50th Pct	0.68%	0.64%	-0.04%
90th Pct	9.61%	9.33%	-0.28%
Mean	-0.12%	-0.56%	-0.44%
Std Dev	8.40%	8.80%	0.40%
Skew	-0.65	-0.87	-0.21
Kurtosis	1.15	1.36	0.21

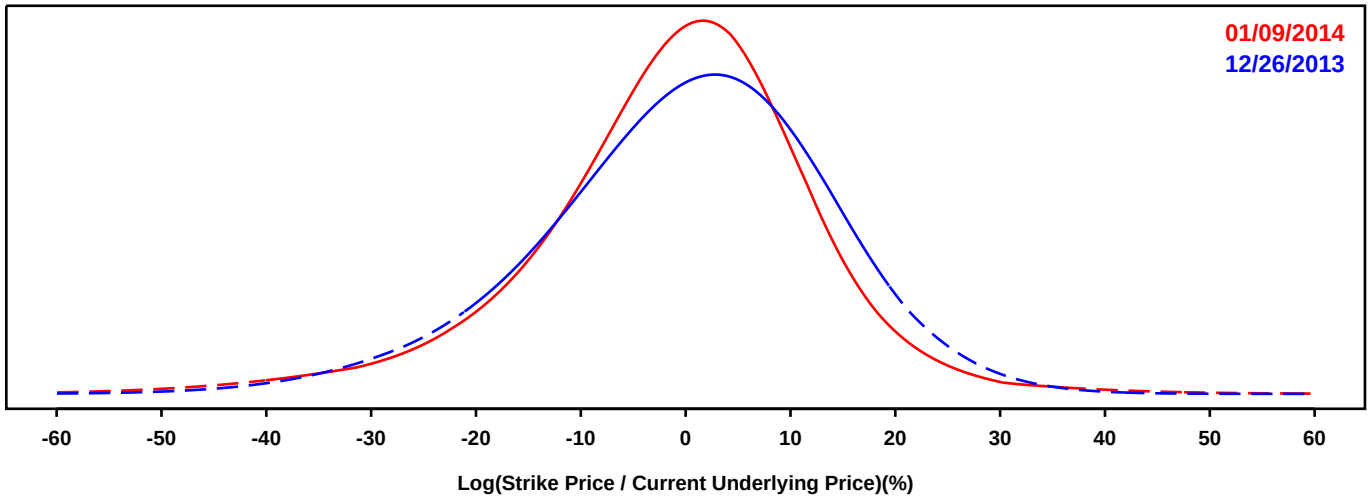
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- REGIONS FINANCIAL

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

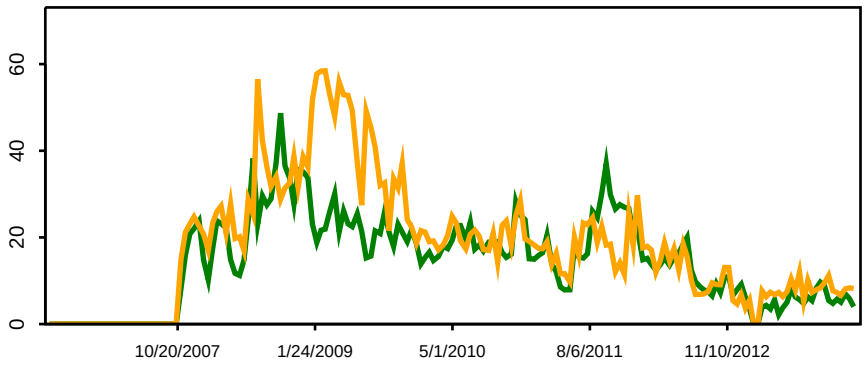
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

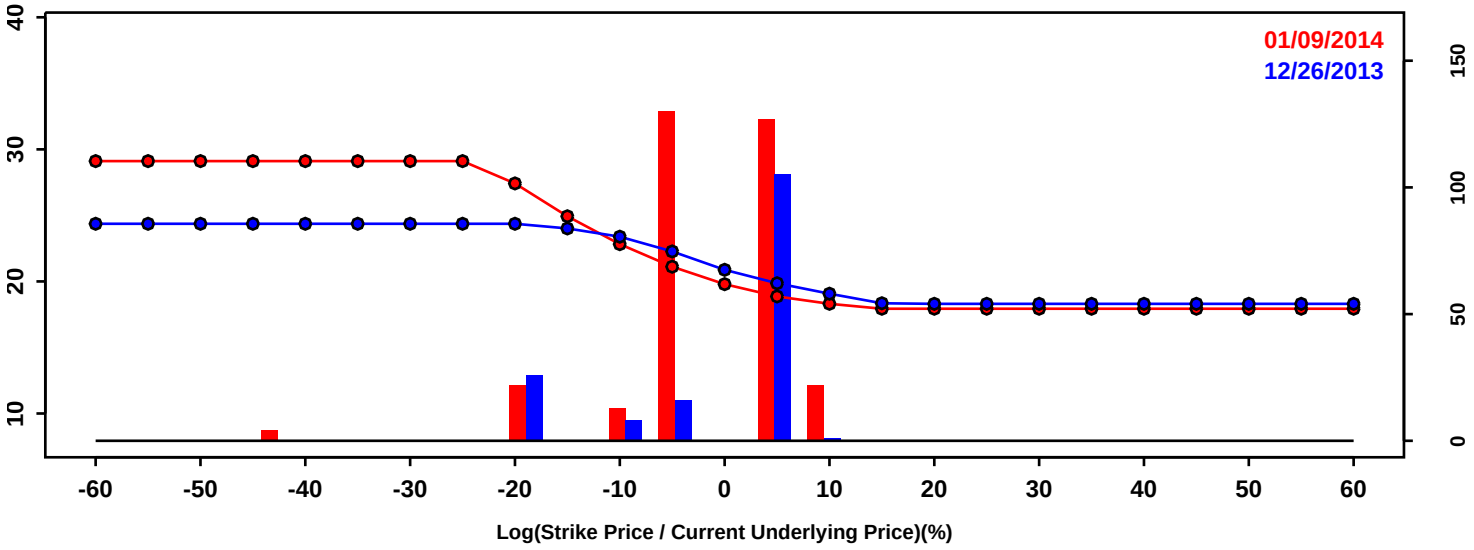
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-18.27%	-17.96%	0.31%
50th Pct	0.91%	-0.07%	-0.98%
90th Pct	16.57%	13.93%	-2.63%
Mean	-0.07%	-1.16%	-1.09%
Std Dev	13.89%	13.64%	-0.25%
Skew	-0.40	-0.53	-0.13
Kurtosis	0.43	1.82	1.38

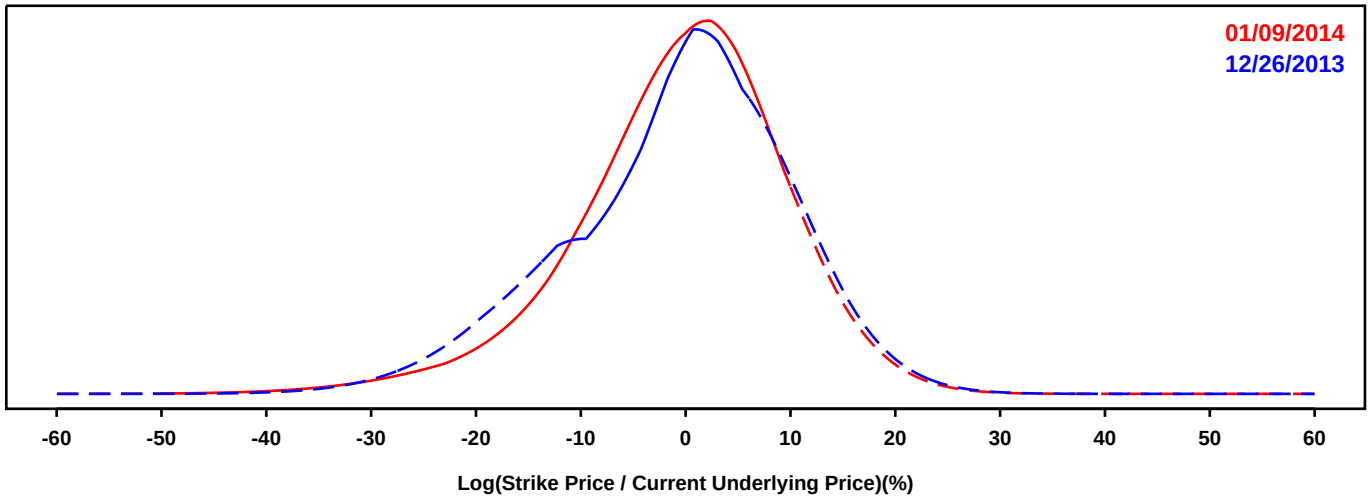
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SUNTRUST

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

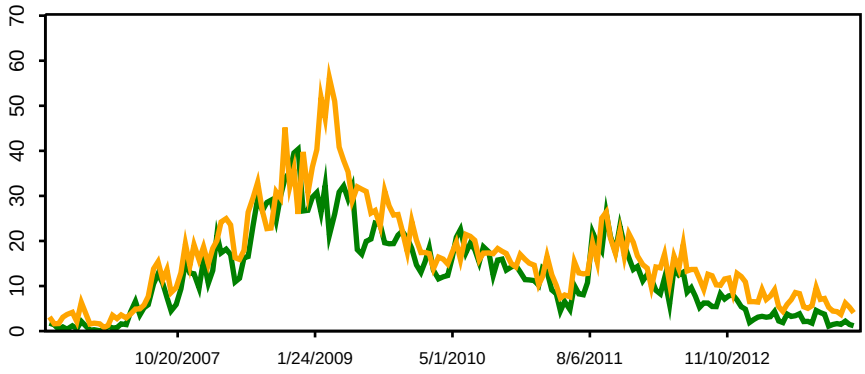
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

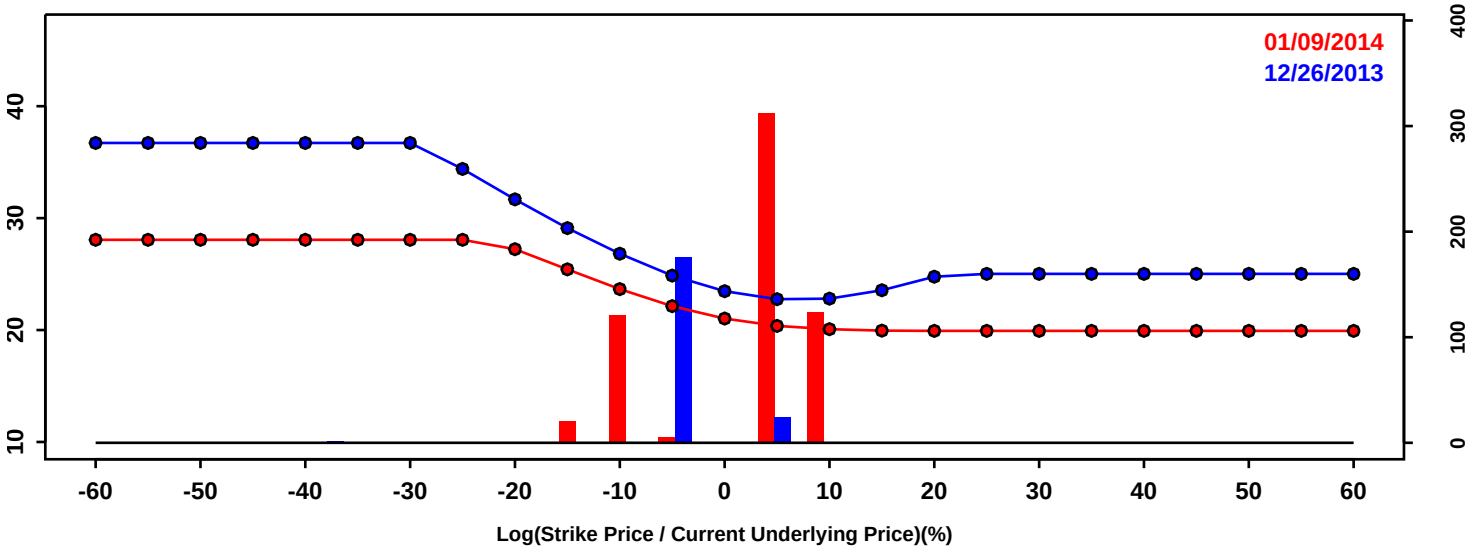
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-15.67%	-13.33%	2.34%
50th Pct	0.44%	0.38%	-0.06%
90th Pct	12.12%	11.46%	-0.66%
Mean	-0.71%	-0.46%	0.26%
Std Dev	10.79%	10.13%	-0.66%
Skew	-0.45	-0.59	-0.14
Kurtosis	0.22	1.06	0.84

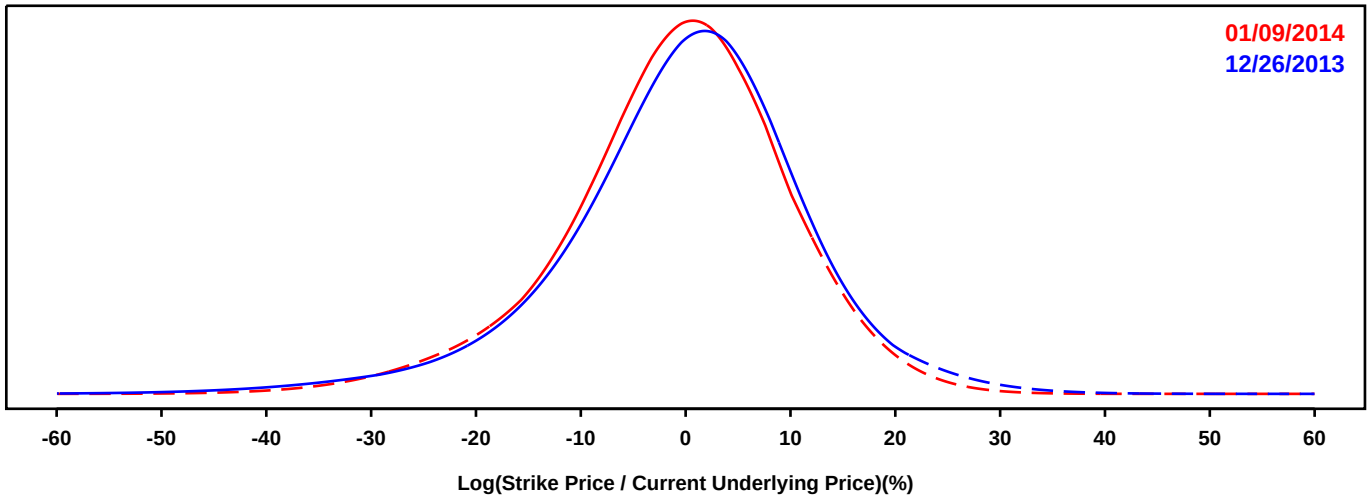
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- STATE STREET

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

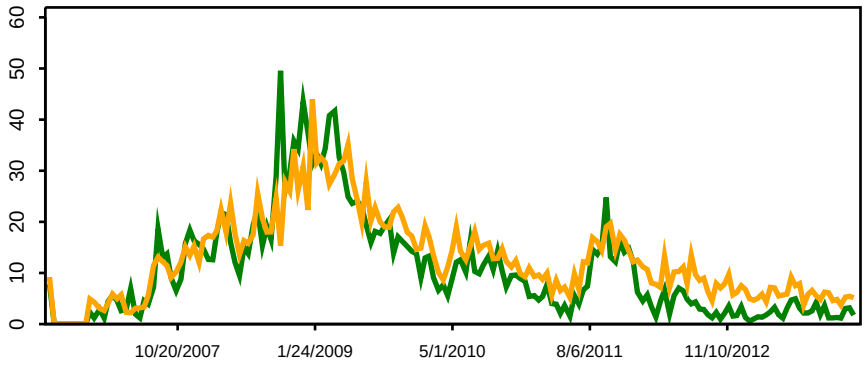
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



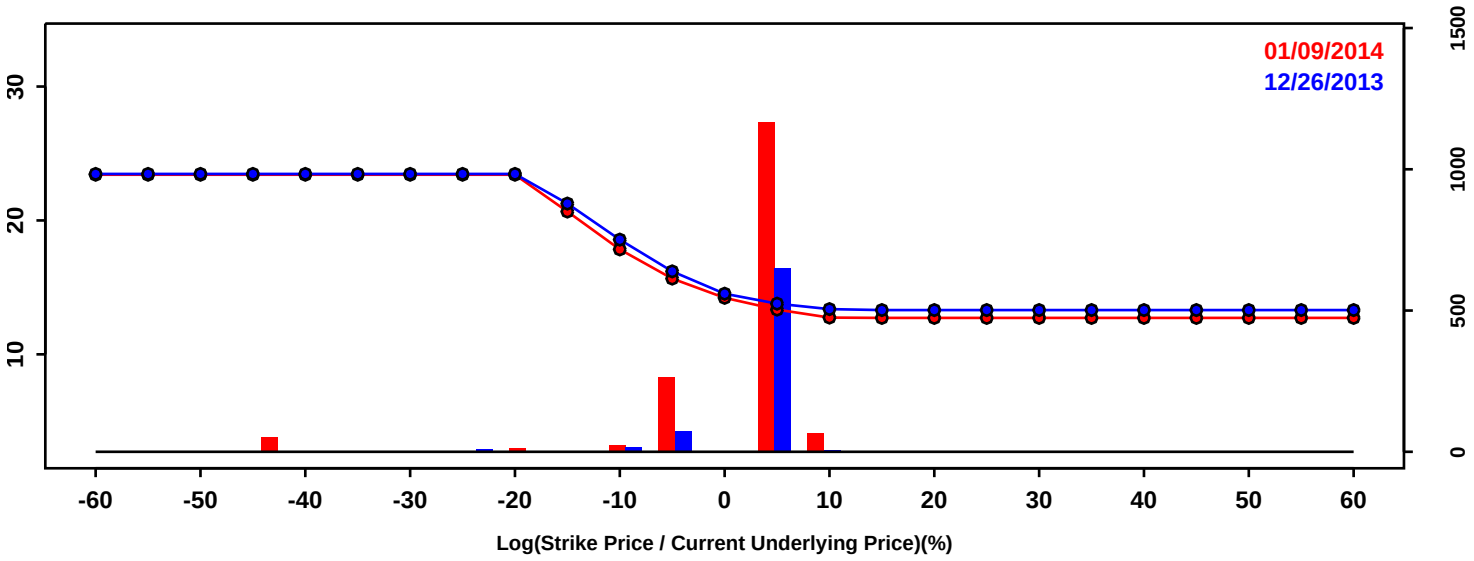
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-14.59%	-14.64%	-0.05%
50th Pct	0.68%	-0.19%	-0.87%
90th Pct	13.19%	11.91%	-1.28%
Mean	-0.15%	-0.89%	-0.74%
Std Dev	11.75%	10.74%	-1.00%
Skew	-0.58	-0.47	0.10
Kurtosis	1.63	0.80	-0.83

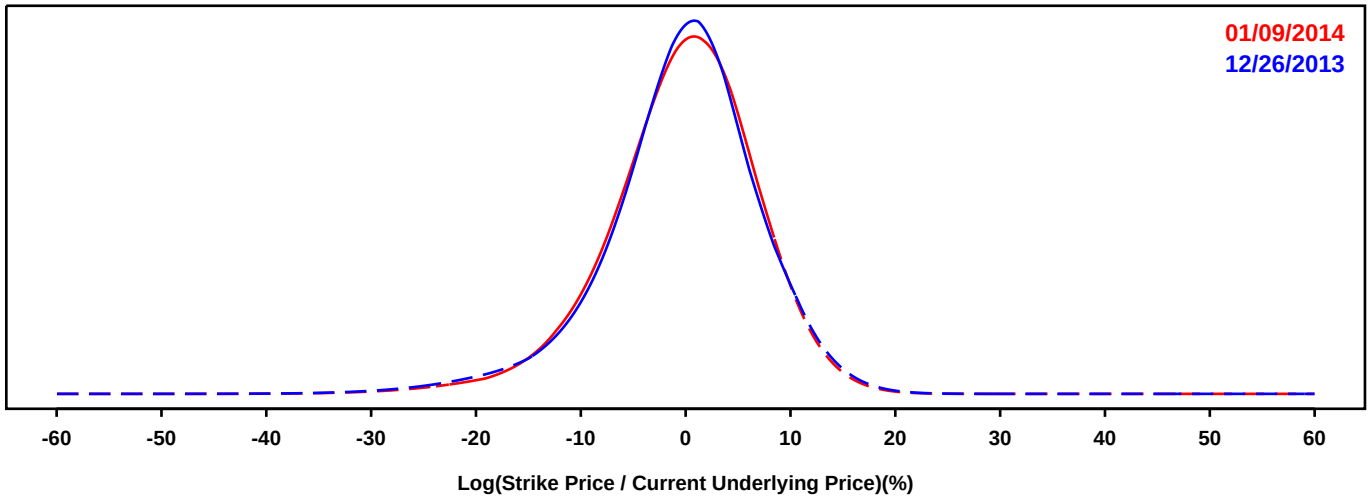
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- US BANCORP

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

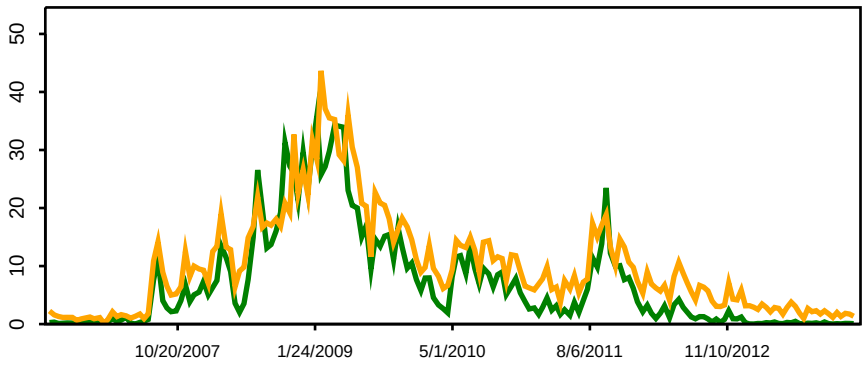
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

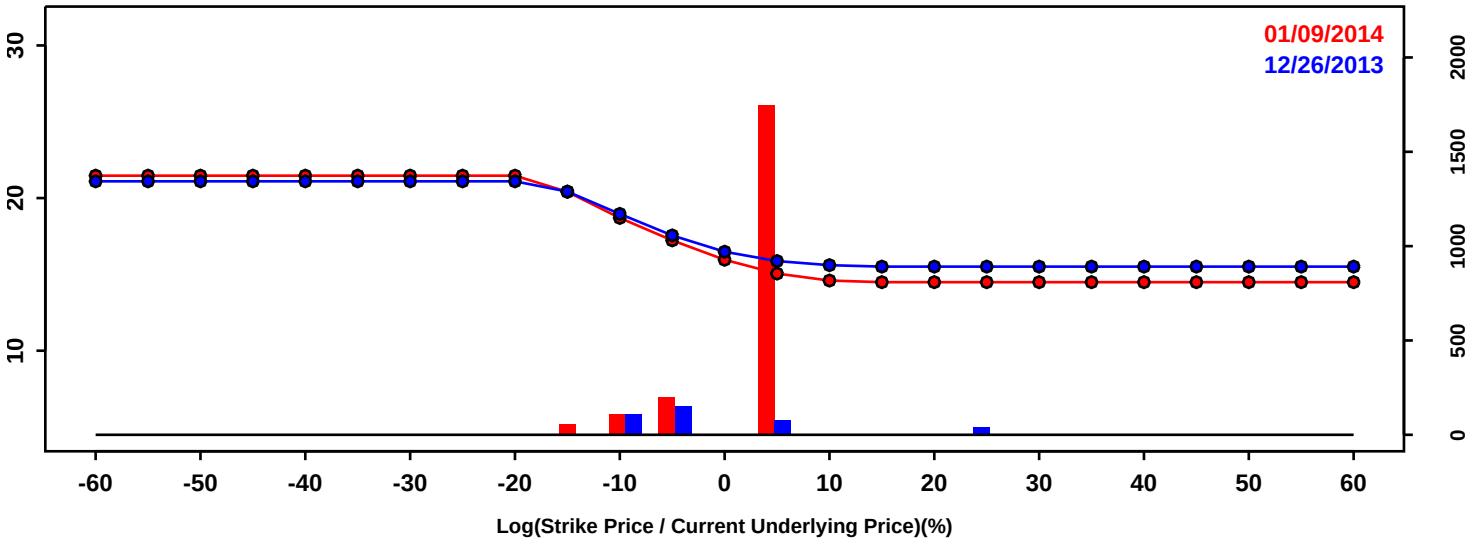
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-9.39%	-9.32%	0.07%
50th Pct	0.18%	0.20%	0.02%
90th Pct	8.35%	8.19%	-0.16%
Mean	-0.33%	-0.31%	0.02%
Std Dev	7.42%	7.21%	-0.21%
Skew	-0.70	-0.63	0.07
Kurtosis	1.65	1.38	-0.27

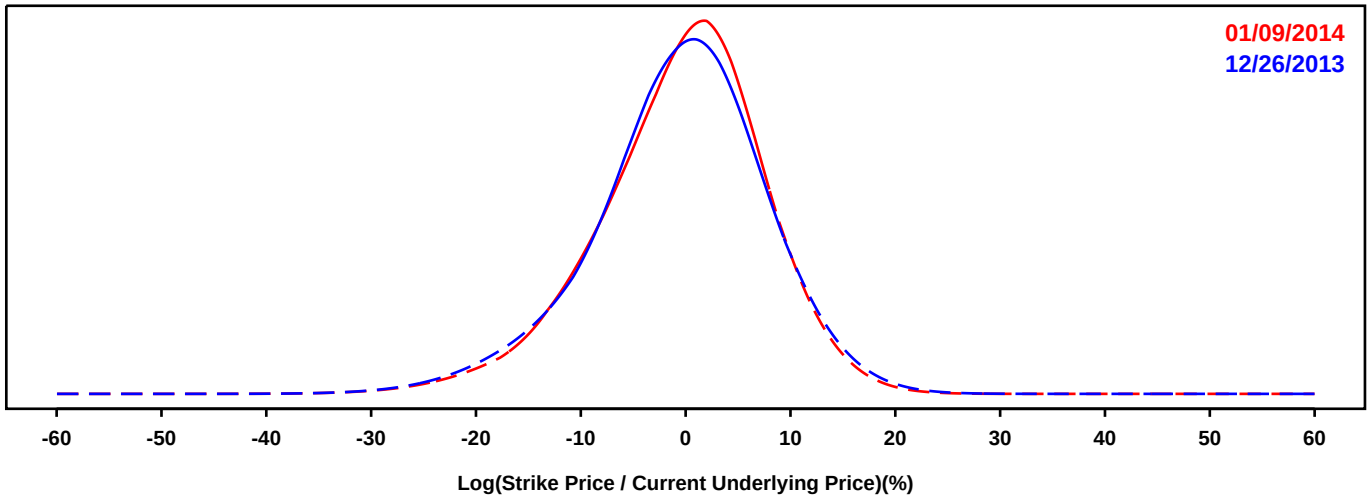
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WELLS FARGO

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

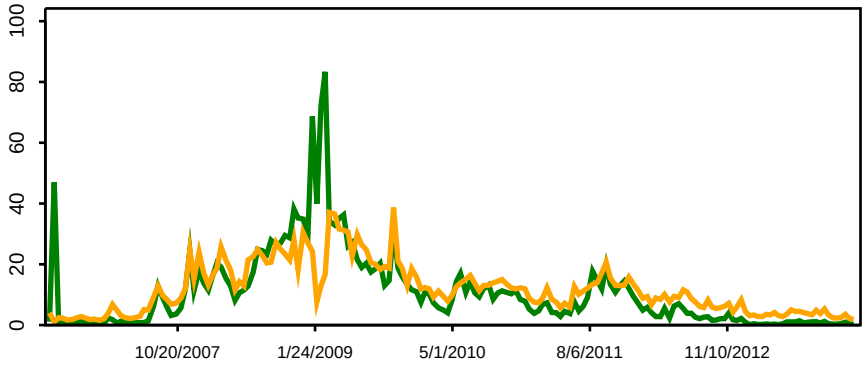
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

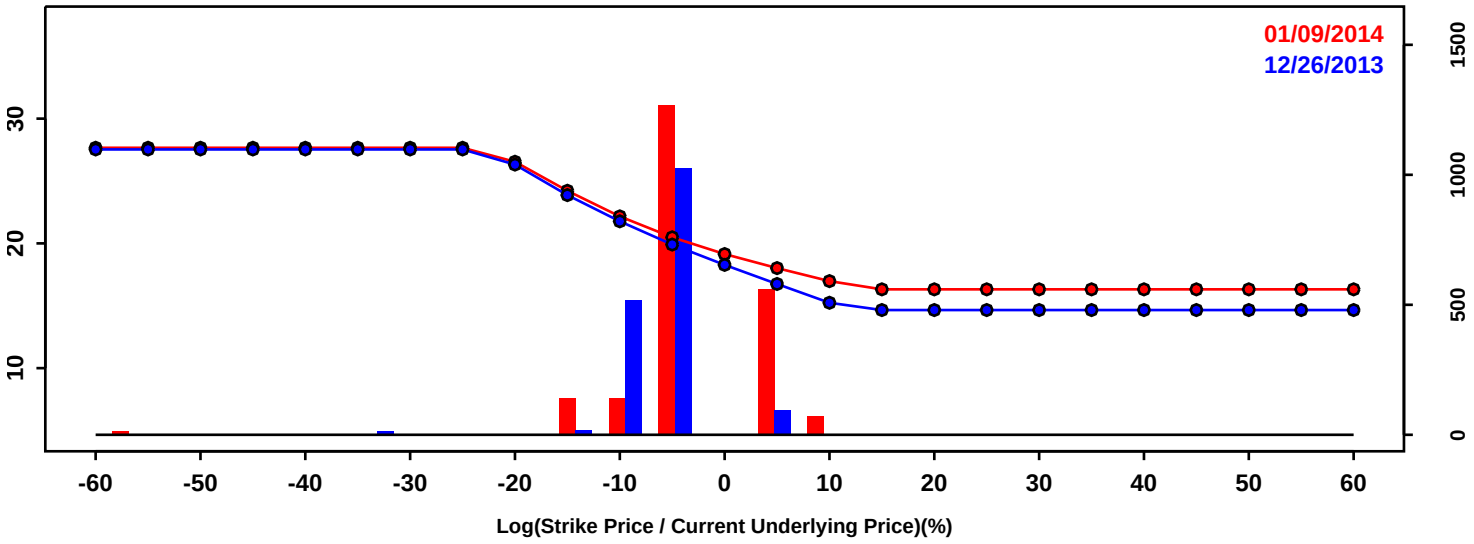
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-11.46%	-11.01%	0.46%
50th Pct	-0.09%	0.20%	0.29%
90th Pct	9.44%	9.06%	-0.38%
Mean	-0.60%	-0.46%	0.14%
Std Dev	8.37%	8.06%	-0.31%
Skew	-0.42	-0.50	-0.07
Kurtosis	0.62	0.70	0.07

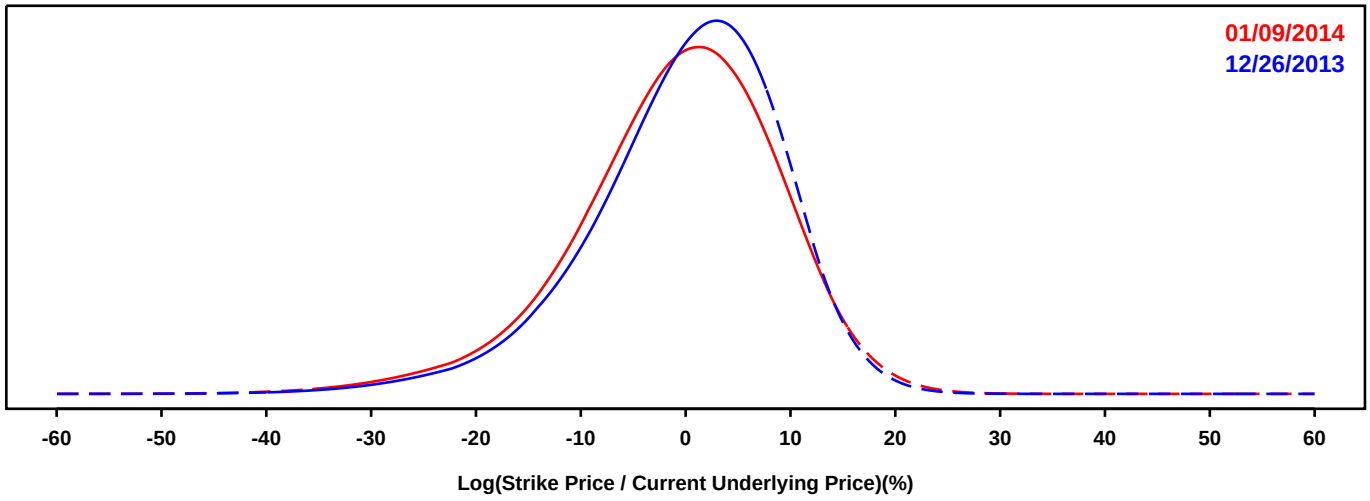
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AFLAC

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

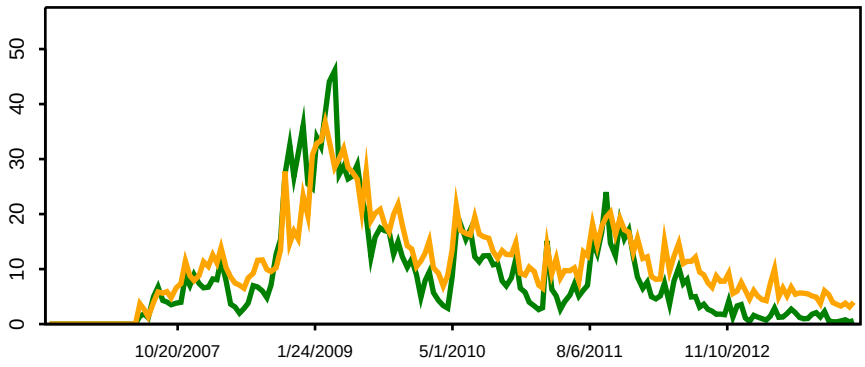
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

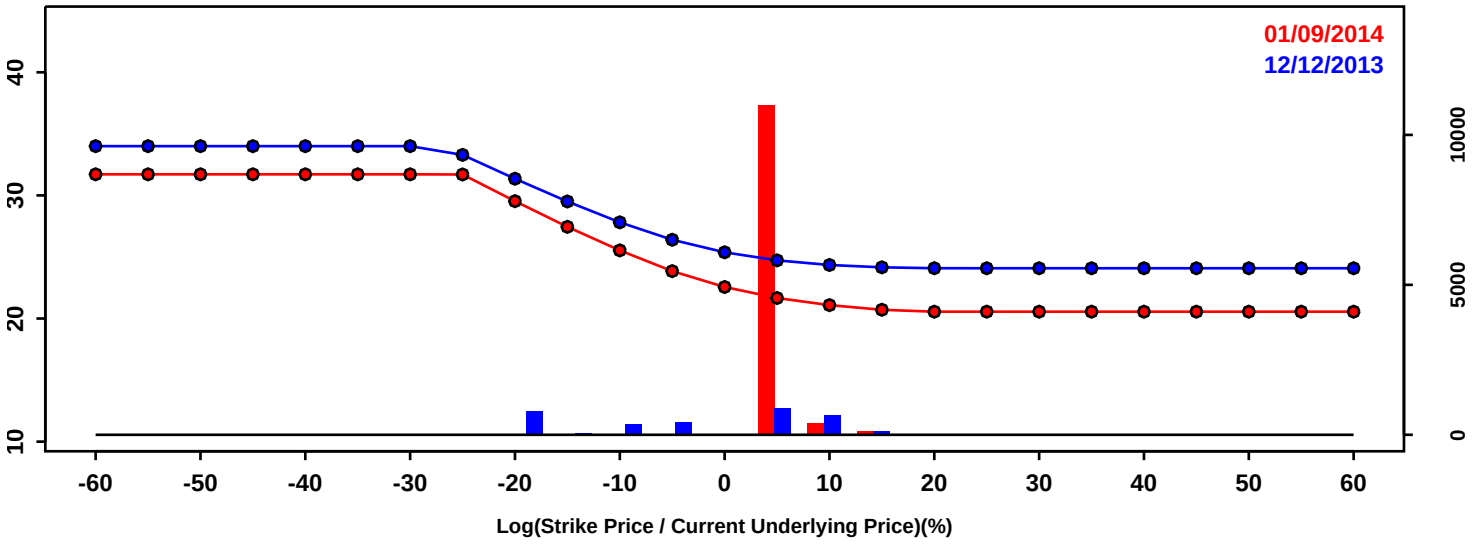
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-12.07%	-13.39%	-1.33%
50th Pct	1.02%	-0.04%	-1.05%
90th Pct	10.66%	10.69%	0.04%
Mean	-0.00%	-0.85%	-0.84%
Std Dev	9.27%	9.80%	0.53%
Skew	-0.73	-0.62	0.12
Kurtosis	1.10	0.94	-0.16

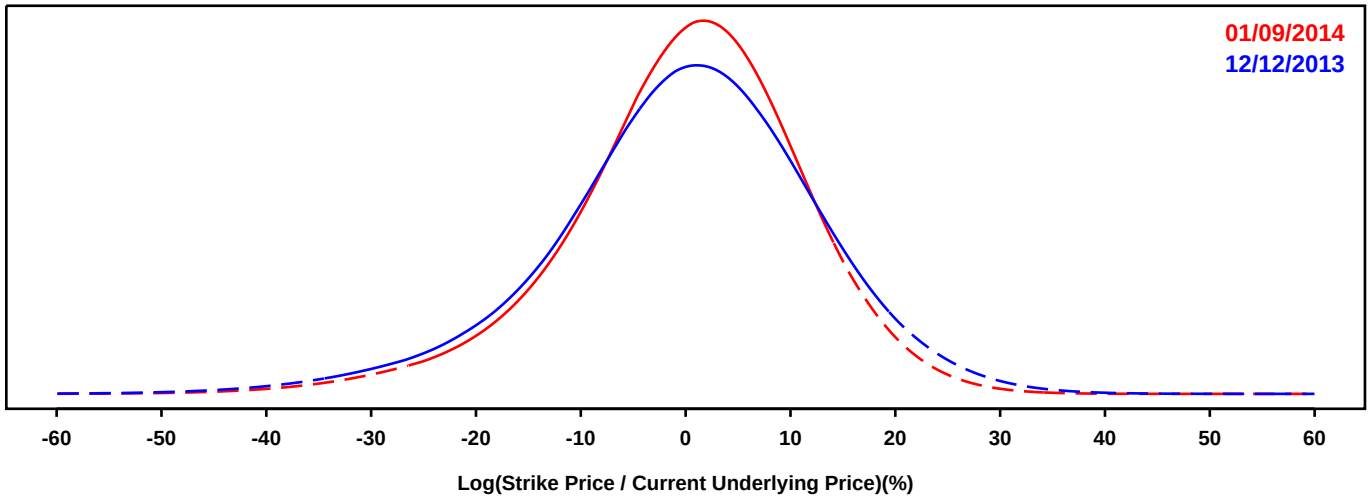
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AIG

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

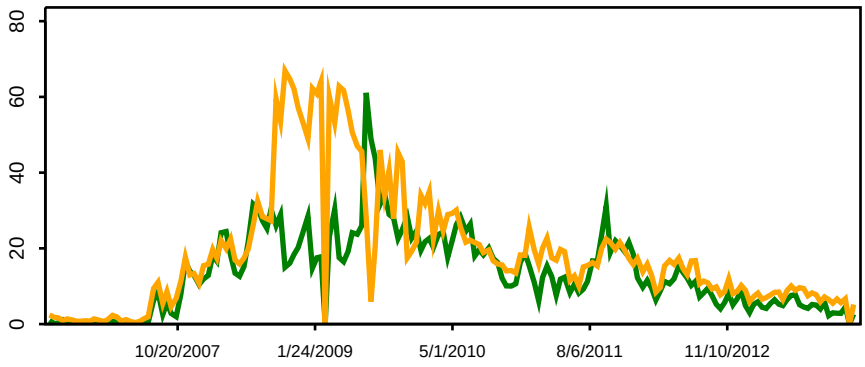
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

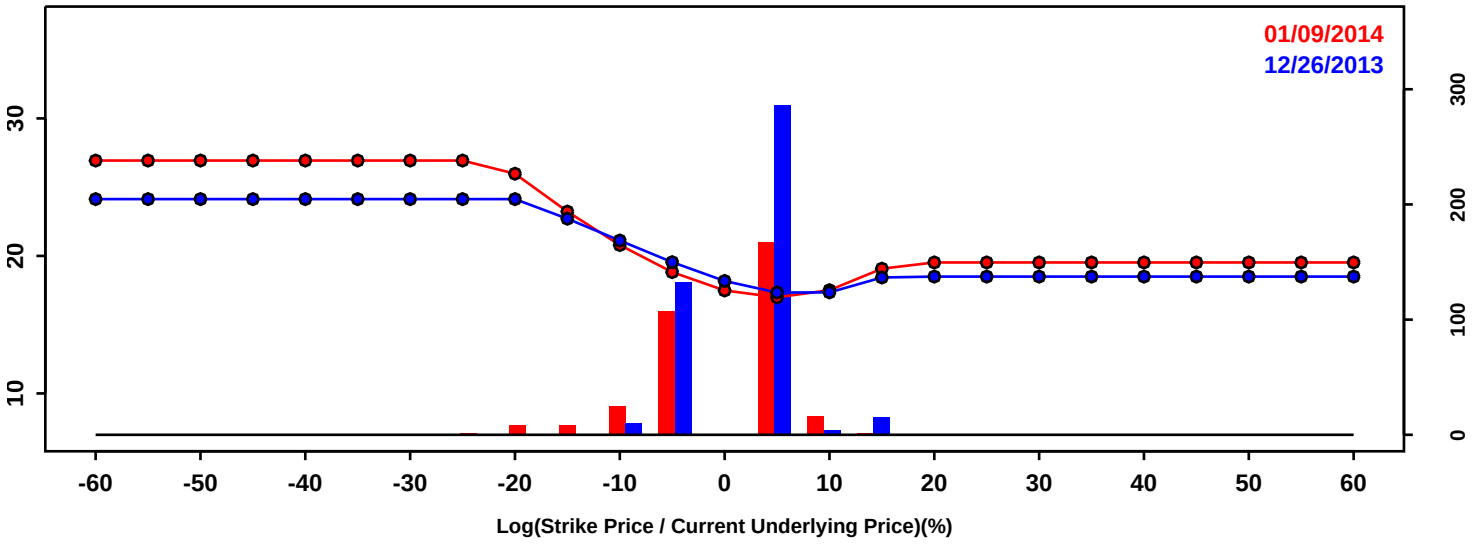
Statistics of the Log Return Distributions

	12/12/2013	01/09/2014	Change
10th Pct	-16.22%	-14.46%	1.76%
50th Pct	0.56%	0.79%	0.24%
90th Pct	15.17%	13.41%	-1.76%
Mean	-0.12%	-0.02%	0.11%
Std Dev	12.75%	11.36%	-1.39%
Skew	-0.43	-0.54	-0.11
Kurtosis	0.80	0.97	0.17

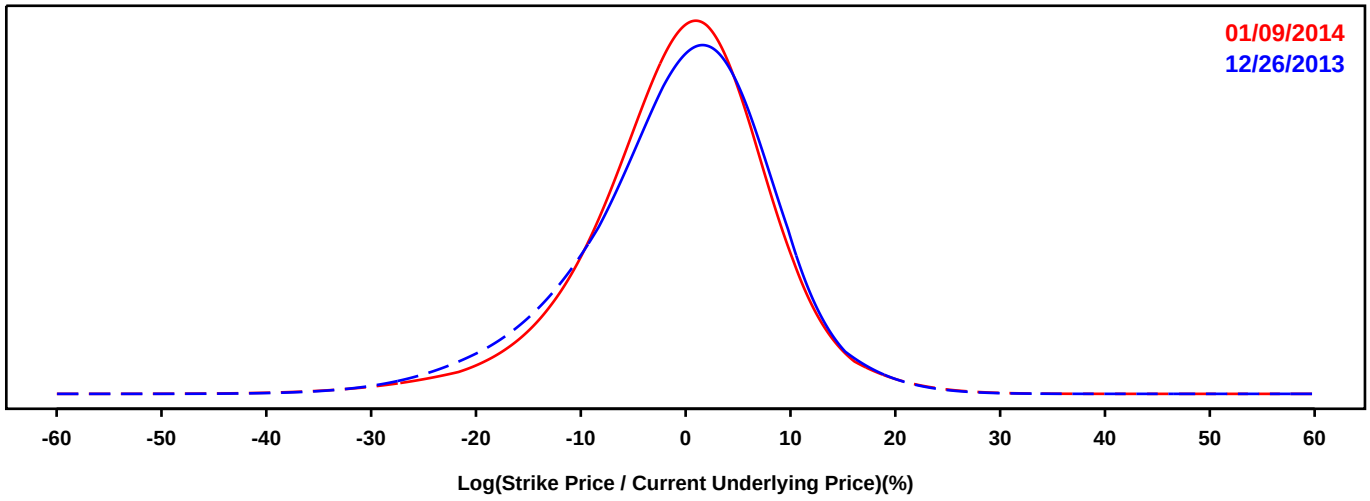
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- ALLSTATE

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

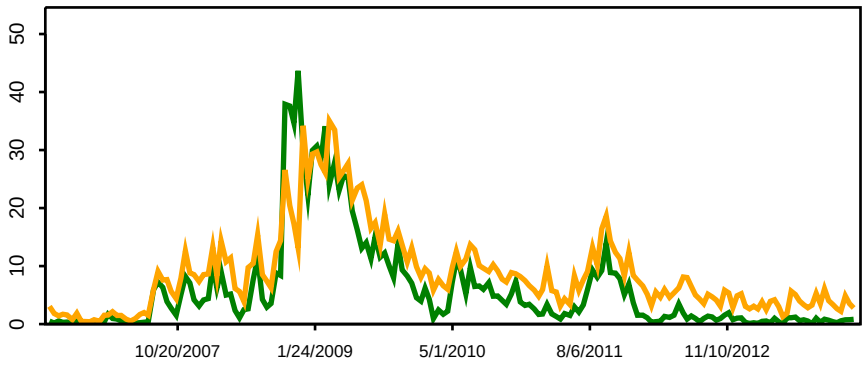
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

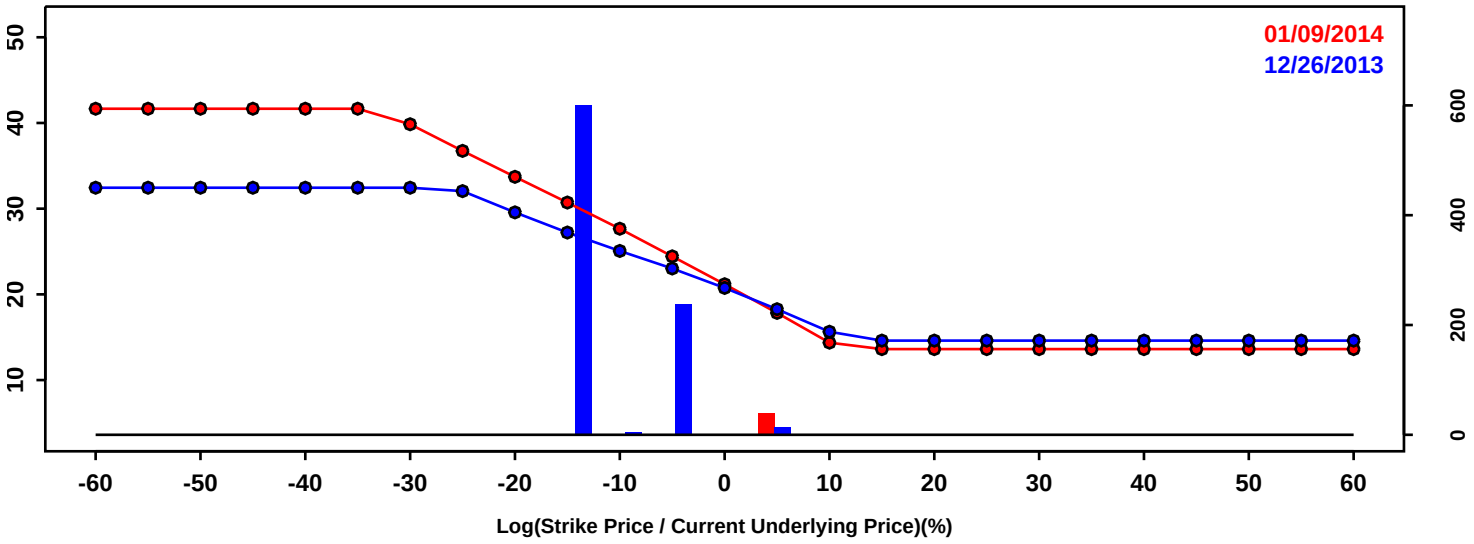
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-13.05%	-11.59%	1.46%
50th Pct	0.08%	0.00%	-0.08%
90th Pct	9.68%	9.37%	-0.31%
Mean	-0.84%	-0.65%	0.19%
Std Dev	9.24%	8.81%	-0.43%
Skew	-0.55	-0.55	0.00
Kurtosis	0.86	1.50	0.64

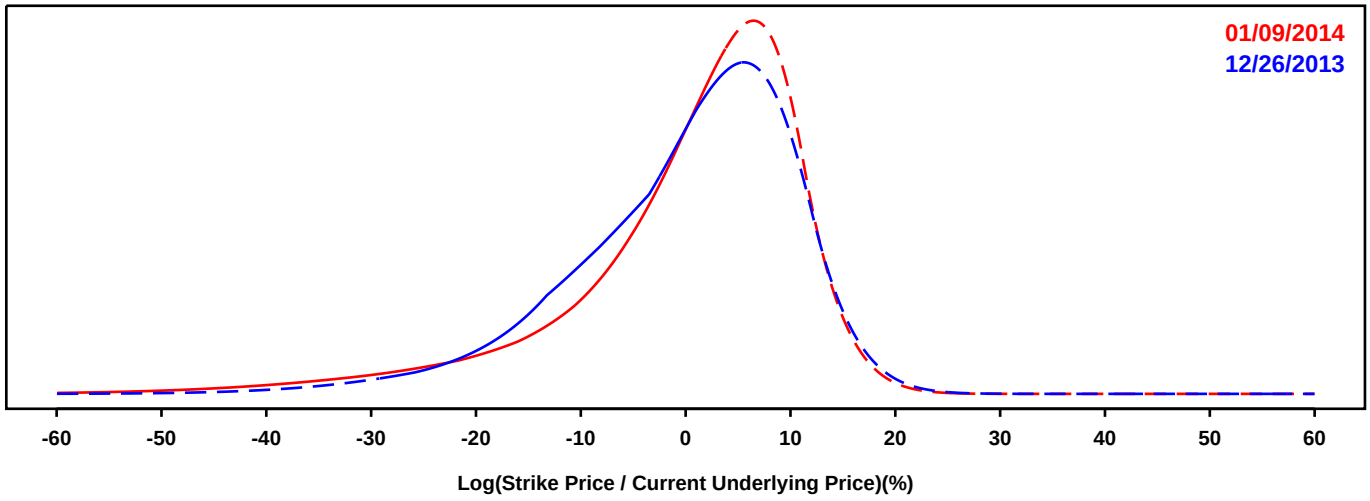
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- AMERIPRISE

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

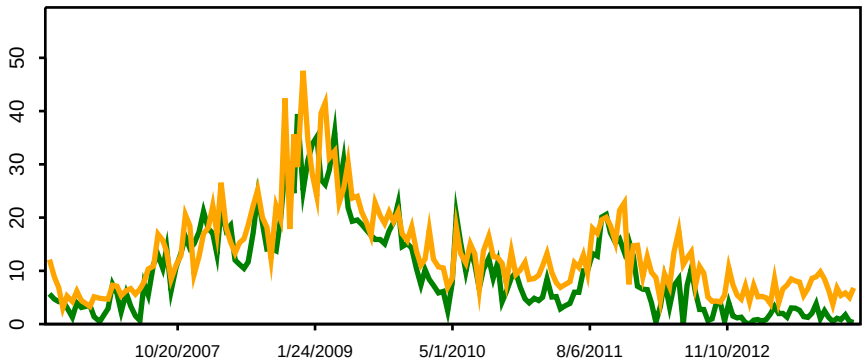
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



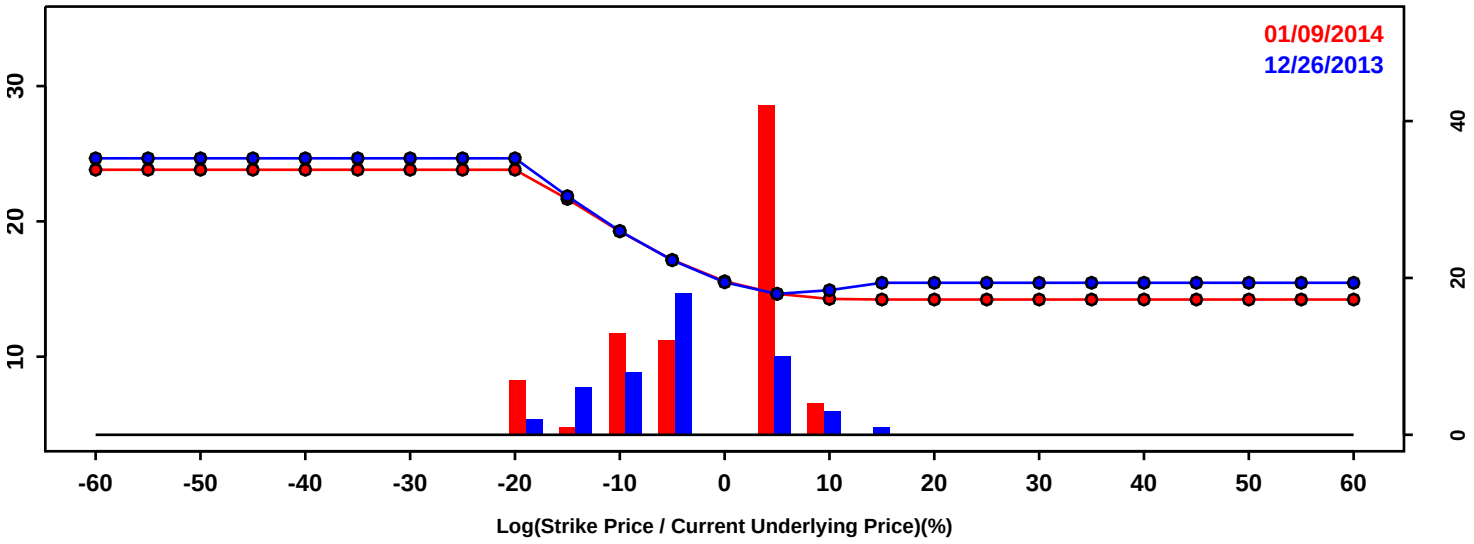
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-14.27%	-15.03%	-0.76%
50th Pct	1.95%	2.80%	0.85%
90th Pct	11.50%	11.33%	-0.18%
Mean	0.00%	0.08%	0.08%
Std Dev	10.65%	11.73%	1.08%
Skew	-0.99	-1.59	-0.61
Kurtosis	1.44	3.60	2.15

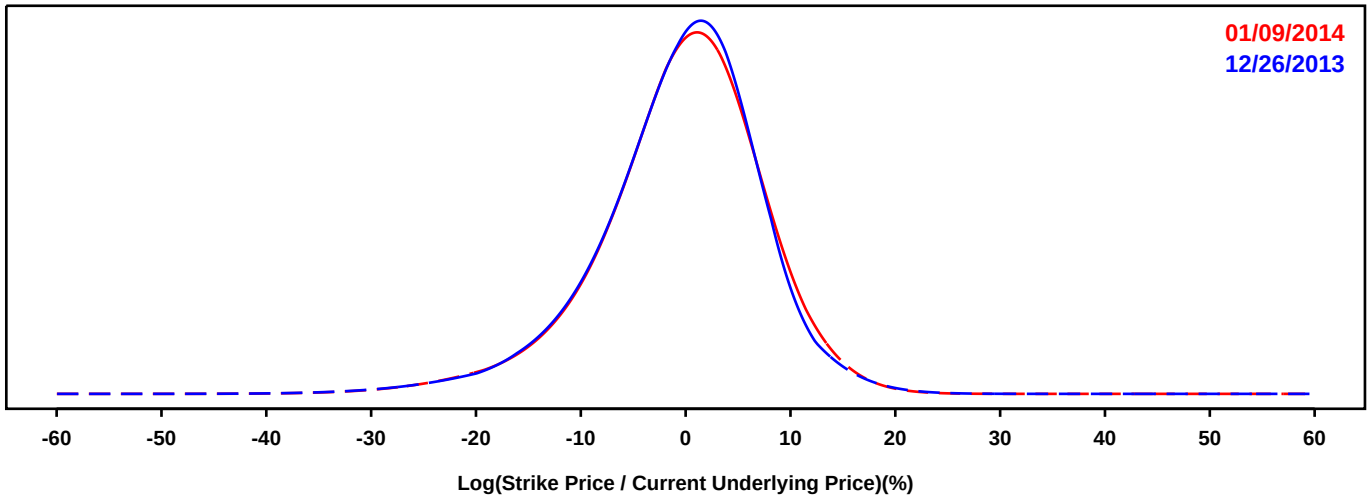
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CHUBB

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

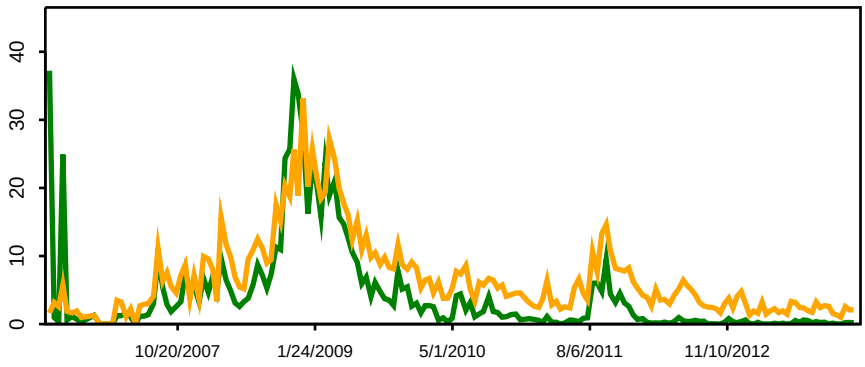
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



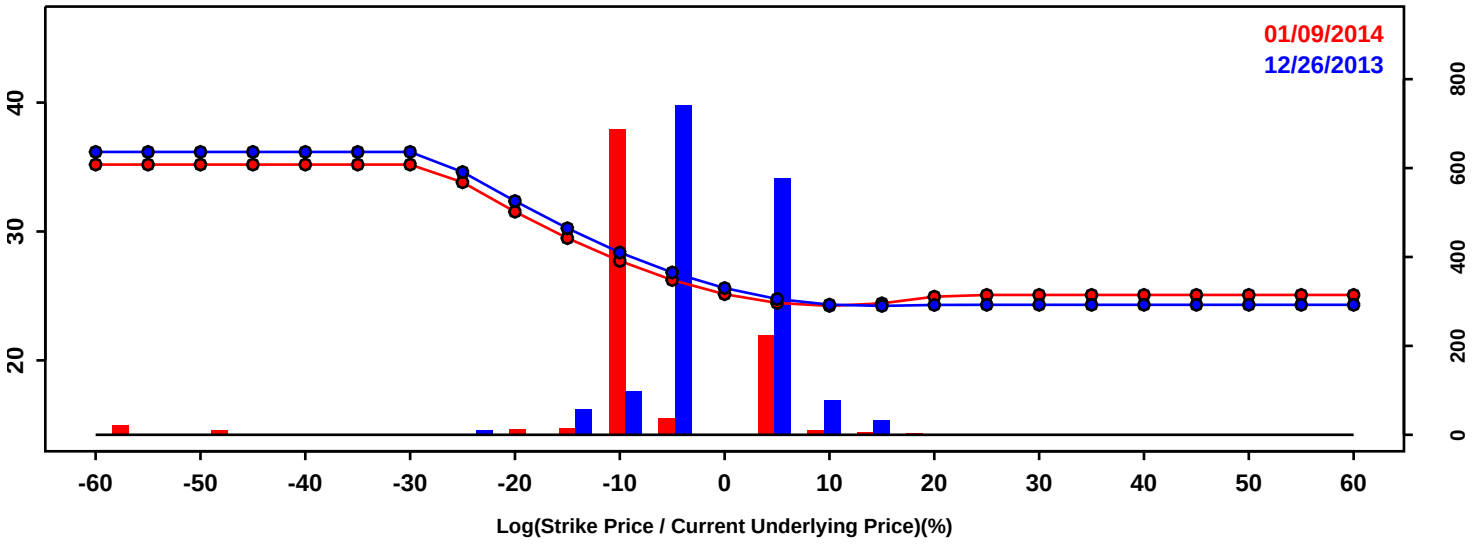
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-10.49%	-10.39%	0.10%
50th Pct	0.16%	0.21%	0.05%
90th Pct	8.20%	8.67%	0.48%
Mean	-0.61%	-0.45%	0.16%
Std Dev	7.85%	7.91%	0.06%
Skew	-0.70	-0.67	0.03
Kurtosis	1.59	1.35	-0.24

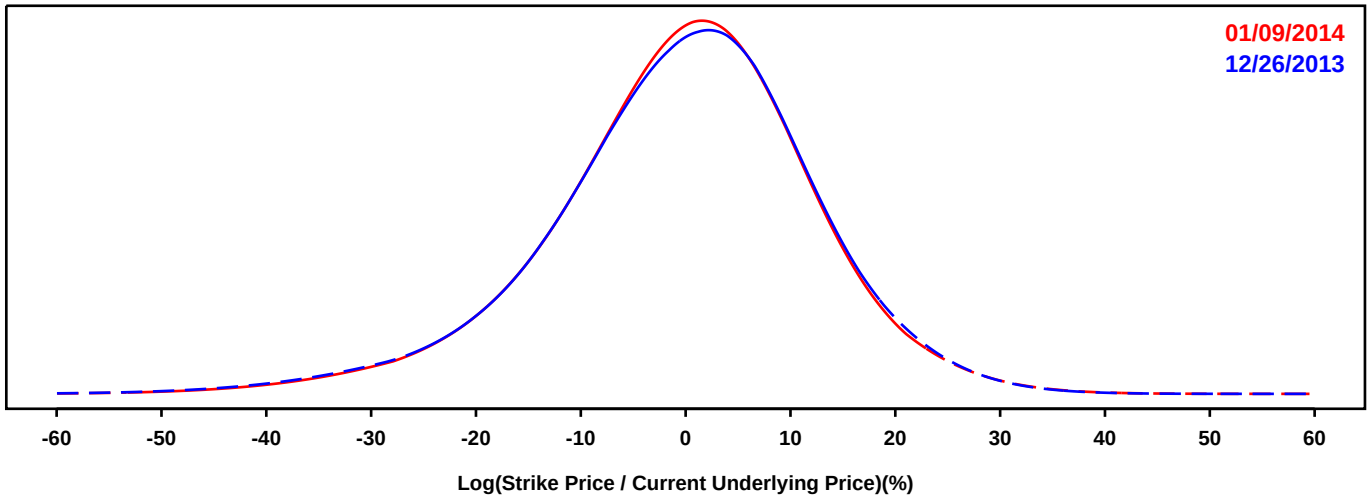
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- HARTFORD FINANCIAL

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

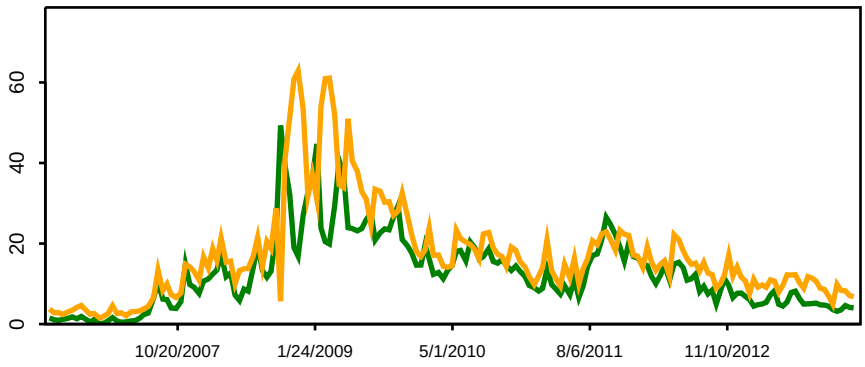
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

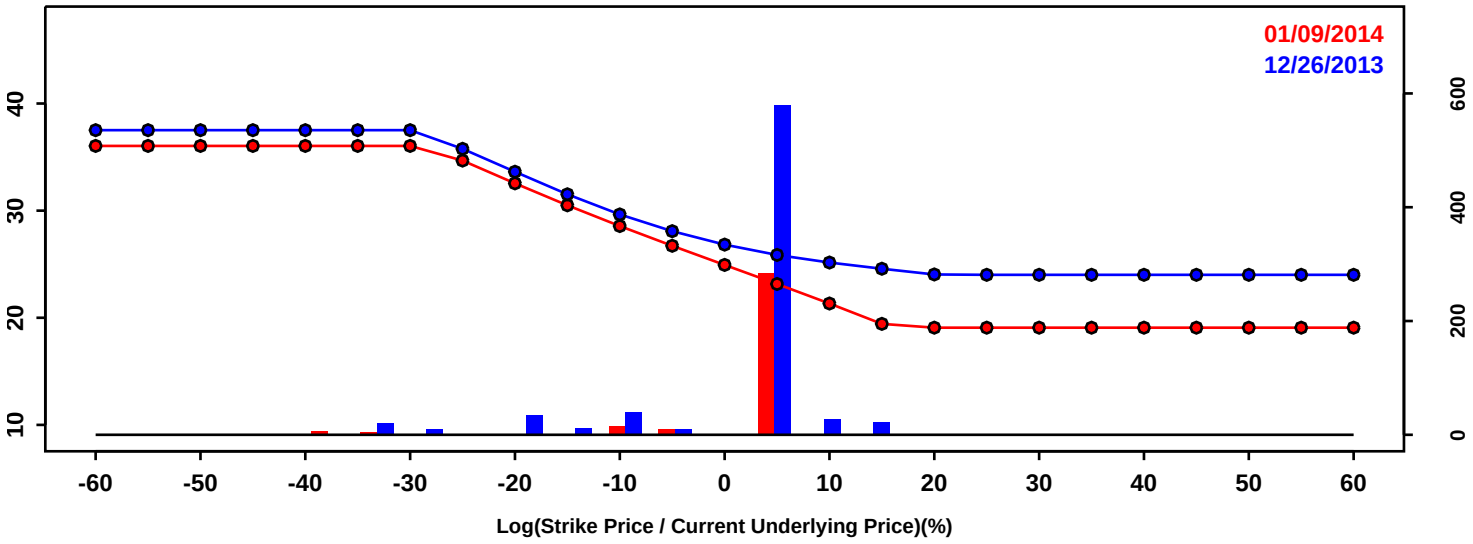
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-16.77%	-16.46%	0.31%
50th Pct	0.41%	0.30%	-0.11%
90th Pct	14.61%	14.33%	-0.27%
Mean	-0.52%	-0.51%	0.01%
Std Dev	12.90%	12.66%	-0.24%
Skew	-0.52	-0.47	0.06
Kurtosis	1.03	0.99	-0.03

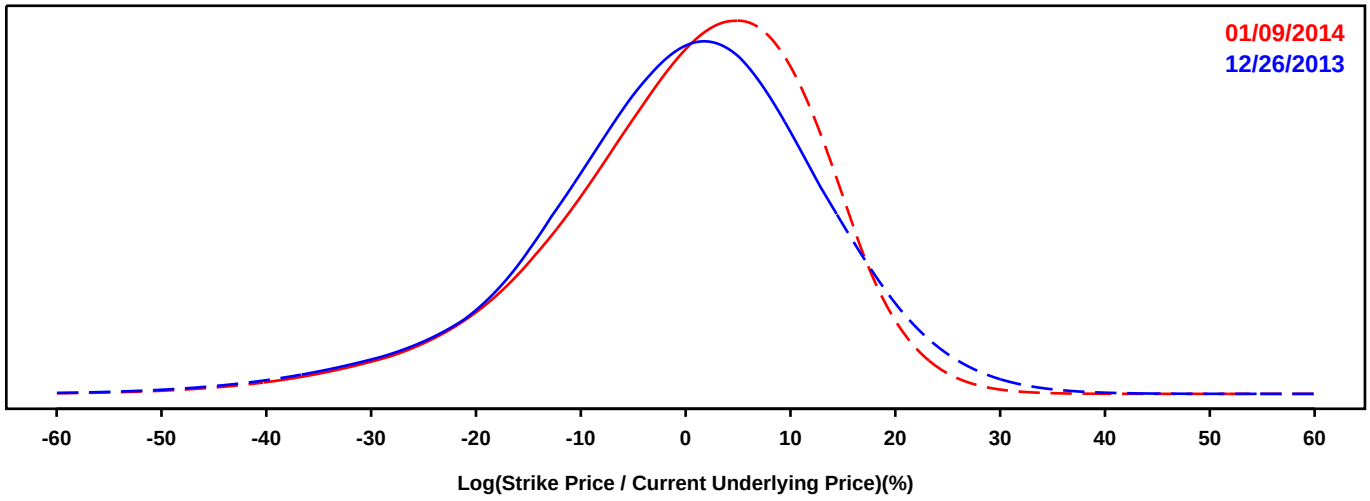
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- LINCOLN NATIONAL

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

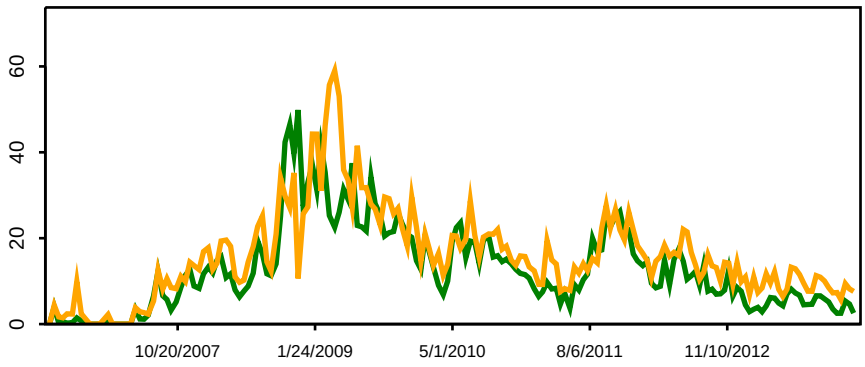
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



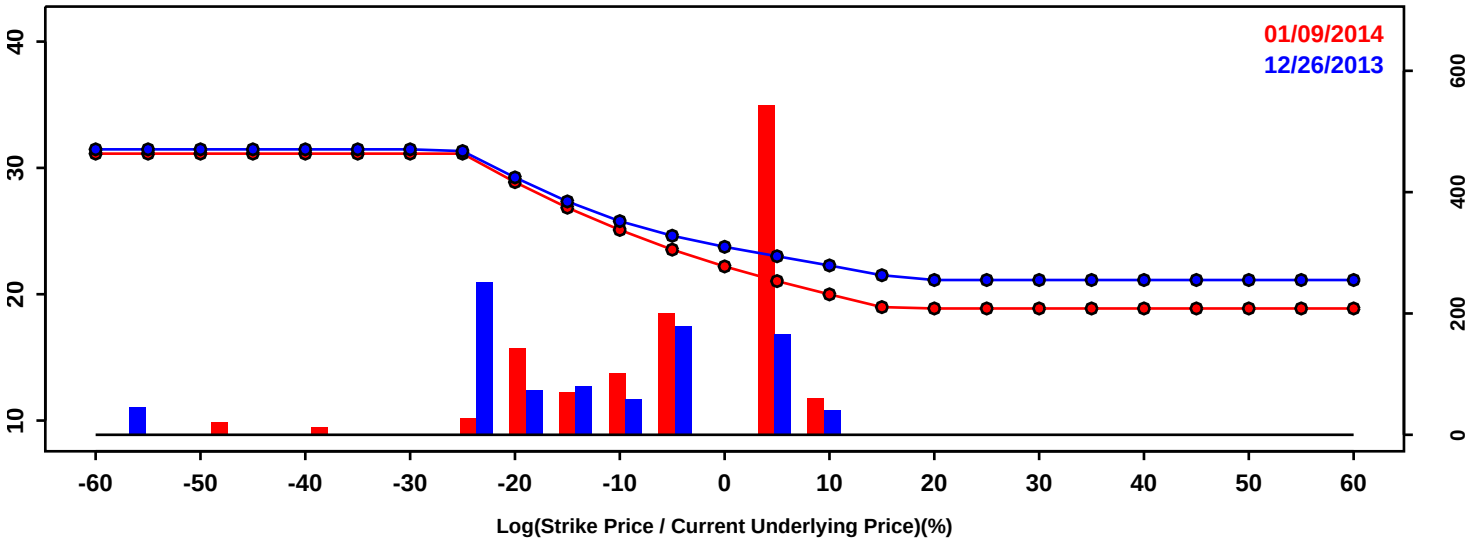
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-17.94%	-17.27%	0.67%
50th Pct	0.28%	1.39%	1.11%
90th Pct	15.40%	14.24%	-1.16%
Mean	-0.75%	-0.30%	0.45%
Std Dev	13.64%	12.83%	-0.81%
Skew	-0.57	-0.79	-0.22
Kurtosis	0.97	1.03	0.06

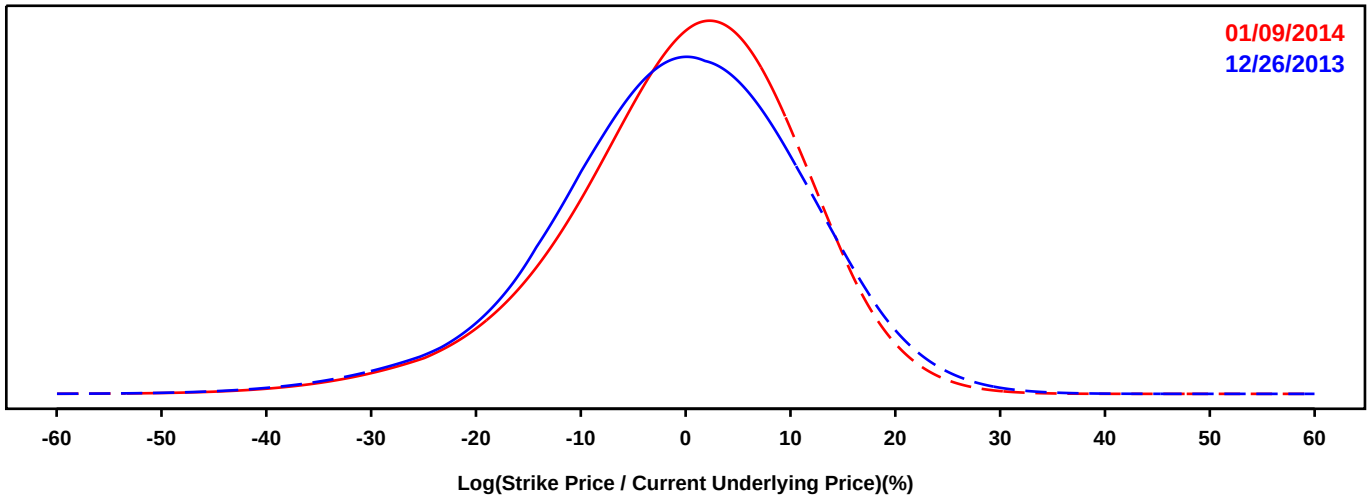
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- METLIFE

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

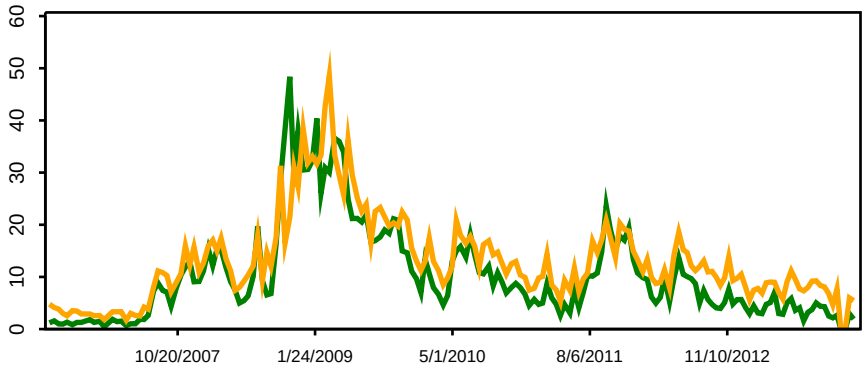
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

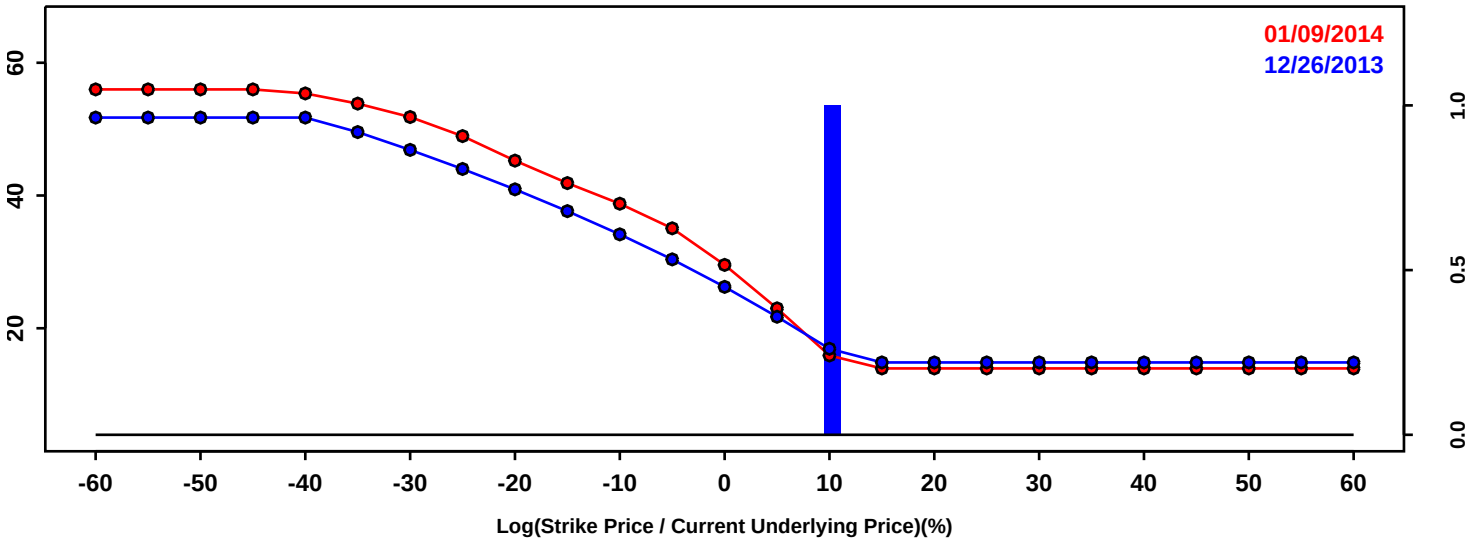
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-15.80%	-15.03%	0.77%
50th Pct	-0.18%	0.65%	0.83%
90th Pct	13.85%	12.97%	-0.88%
Mean	-0.75%	-0.35%	0.40%
Std Dev	11.95%	11.31%	-0.64%
Skew	-0.42	-0.60	-0.18
Kurtosis	0.60	0.82	0.22

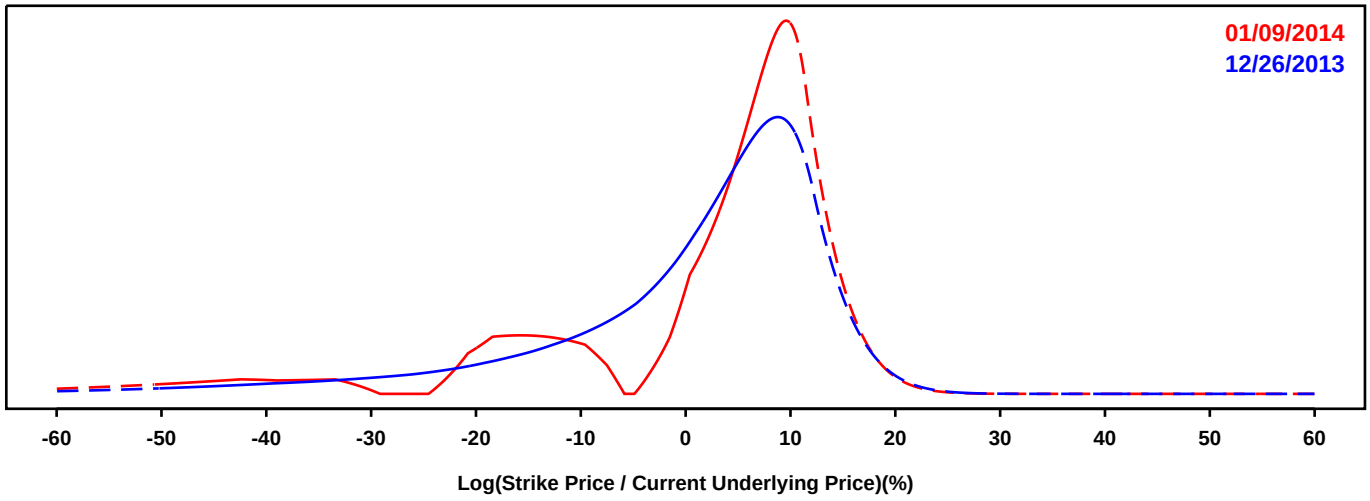
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PRINCIPAL FINANCIAL

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

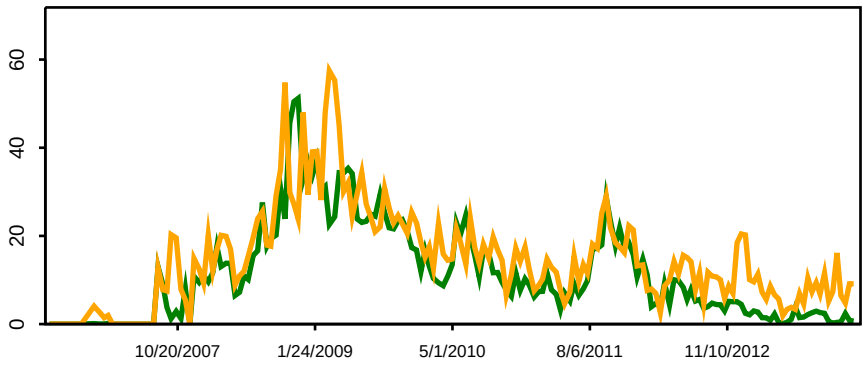
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

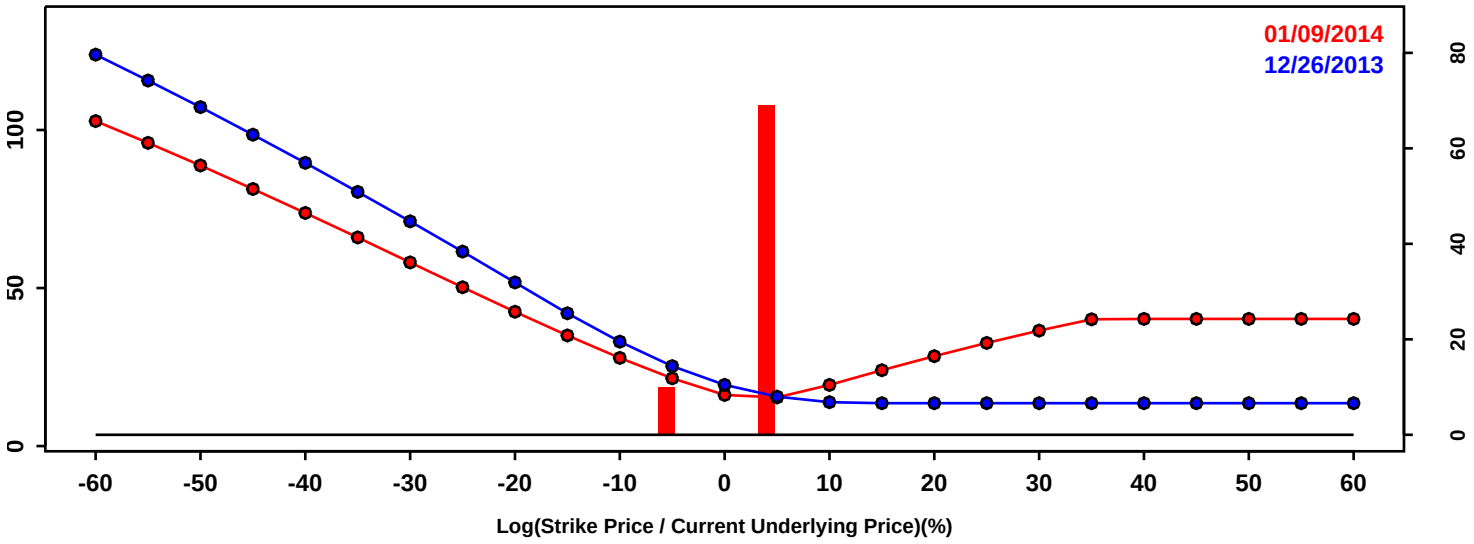
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-18.52%	-19.07%	-0.54%
50th Pct	4.48%	6.64%	2.16%
90th Pct	13.09%	13.36%	0.27%
Mean	0.32%	0.77%	0.45%
Std Dev	14.52%	16.76%	2.24%
Skew	-1.85	-2.14	-0.29
Kurtosis	4.42	5.01	0.59

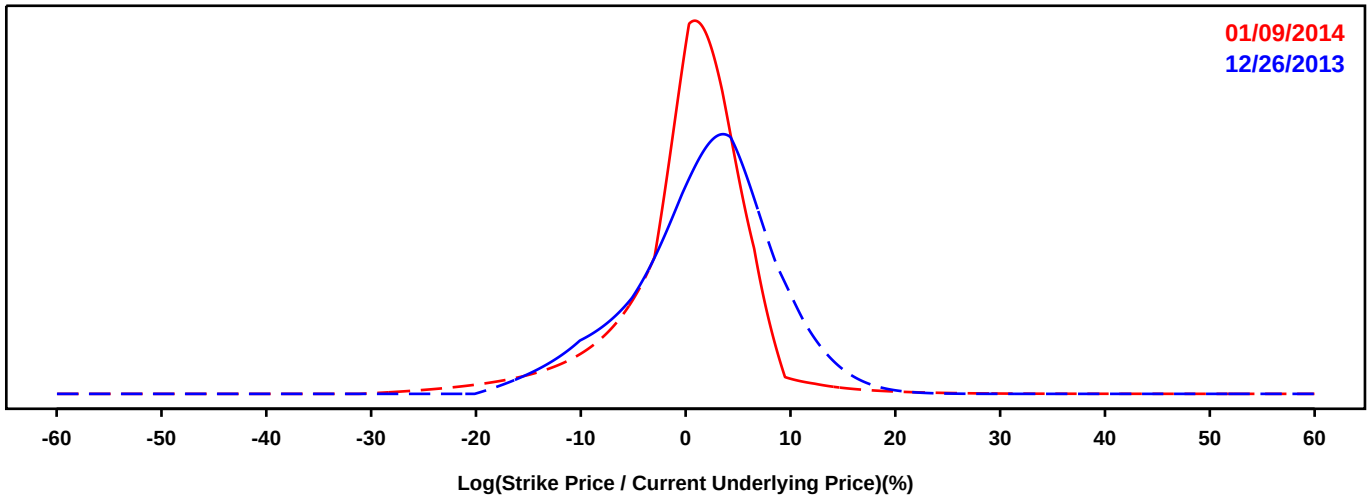
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PROGRESSIVE

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

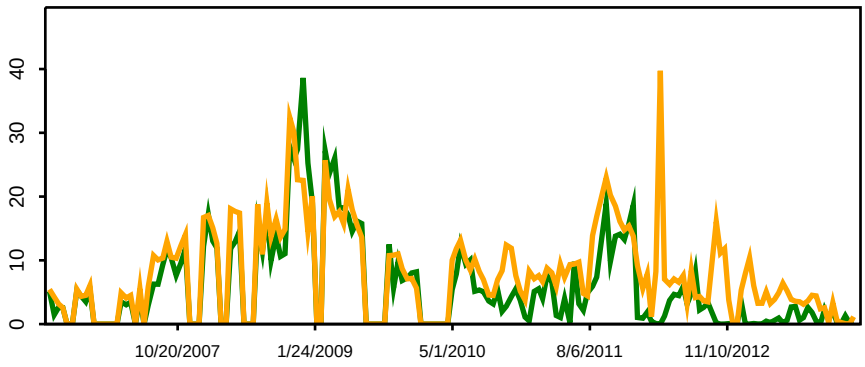
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

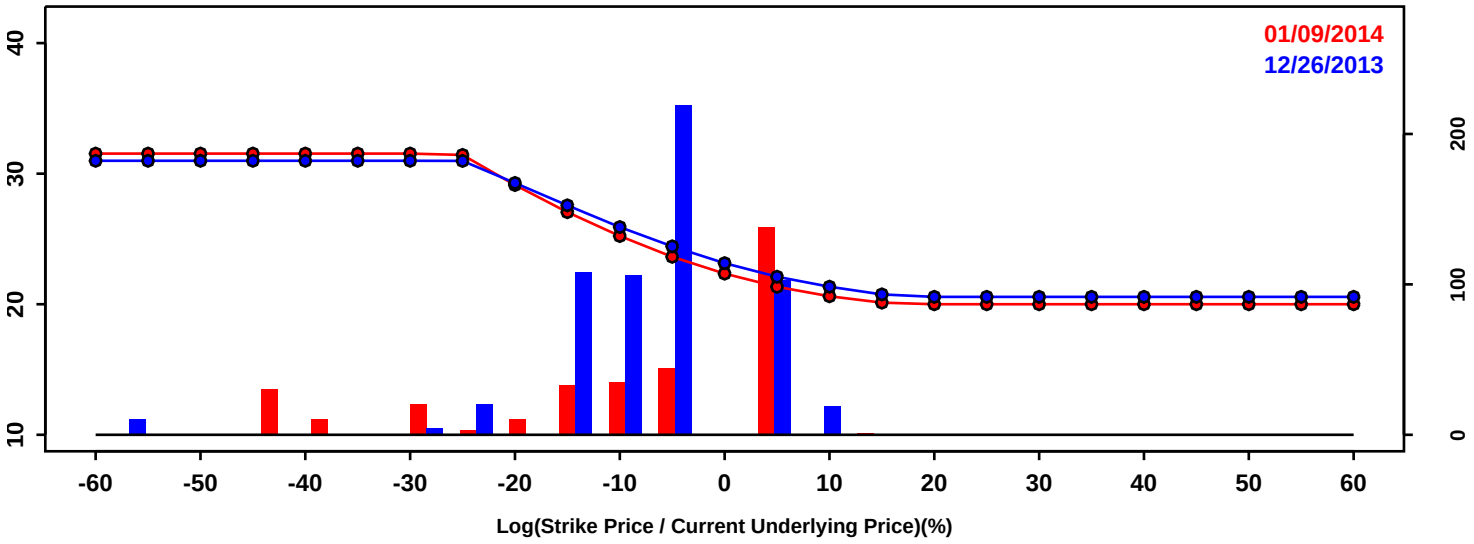
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-7.53%	-7.53%	0.00%
50th Pct	2.31%	0.97%	-1.34%
90th Pct	9.72%	6.11%	-3.60%
Mean	1.74%	0.12%	-1.61%
Std Dev	6.70%	6.20%	-0.50%
Skew	-0.33	-0.80	-0.47
Kurtosis	0.20	3.89	3.69

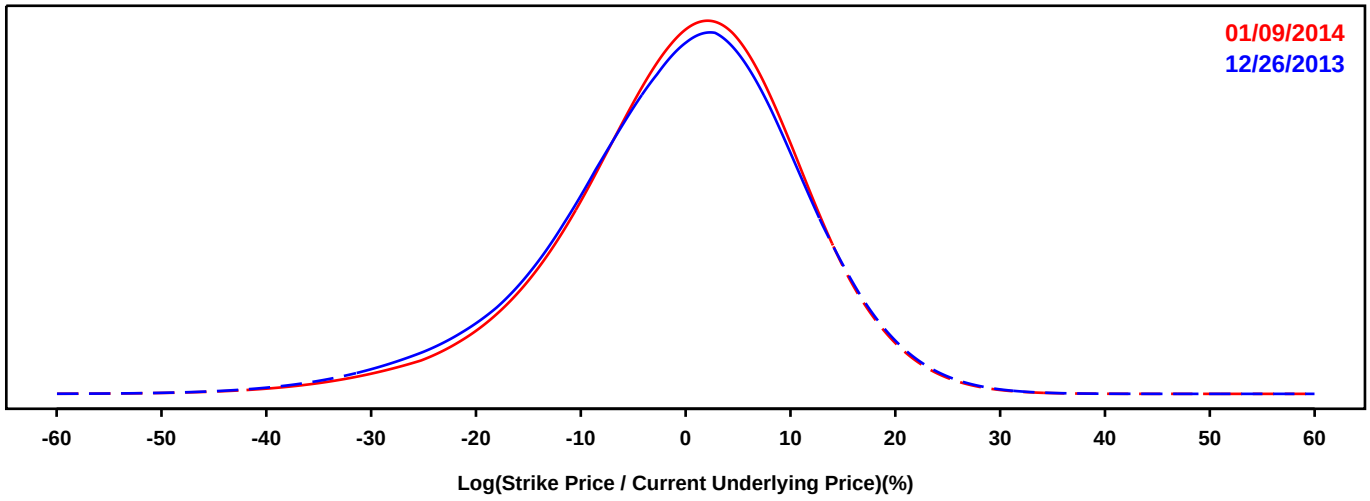
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- PRUDENTIAL

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

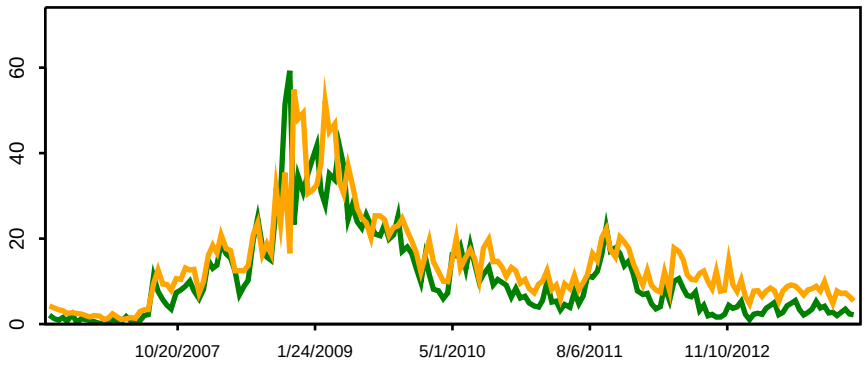
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

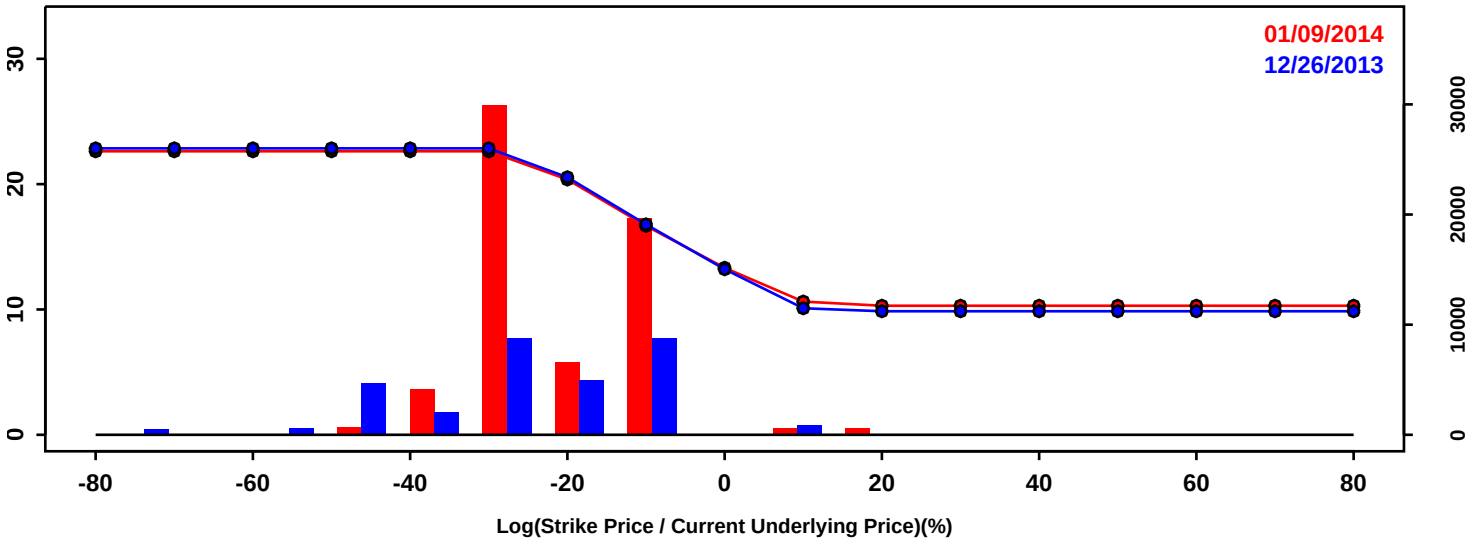
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-16.13%	-14.92%	1.21%
50th Pct	0.23%	0.55%	0.32%
90th Pct	13.05%	12.88%	-0.16%
Mean	-0.82%	-0.40%	0.41%
Std Dev	11.77%	11.32%	-0.45%
Skew	-0.55	-0.57	-0.02
Kurtosis	0.75	0.91	0.16

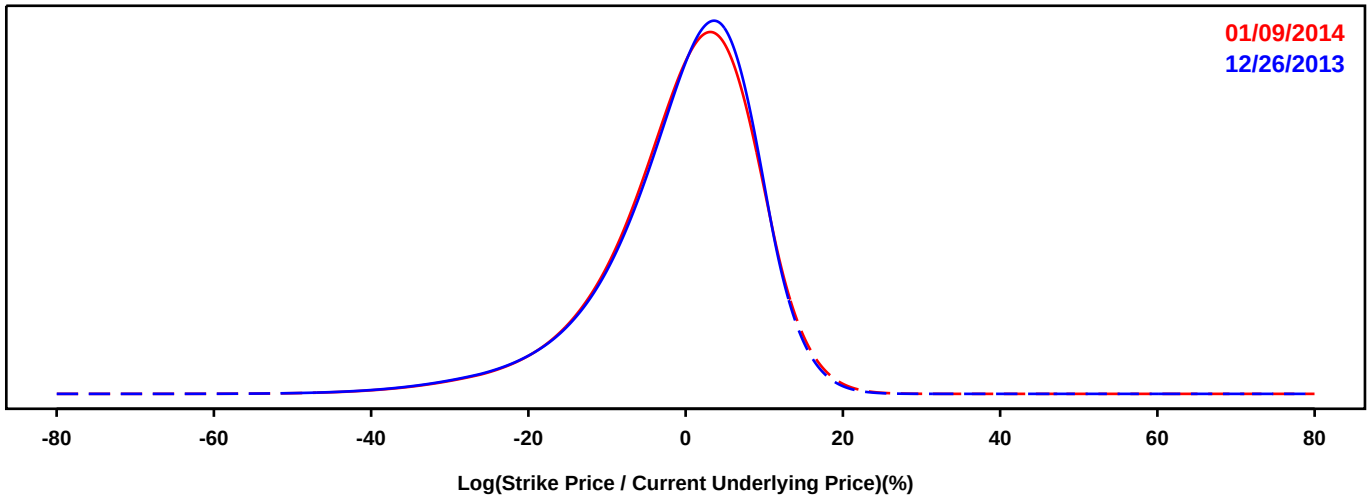
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

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

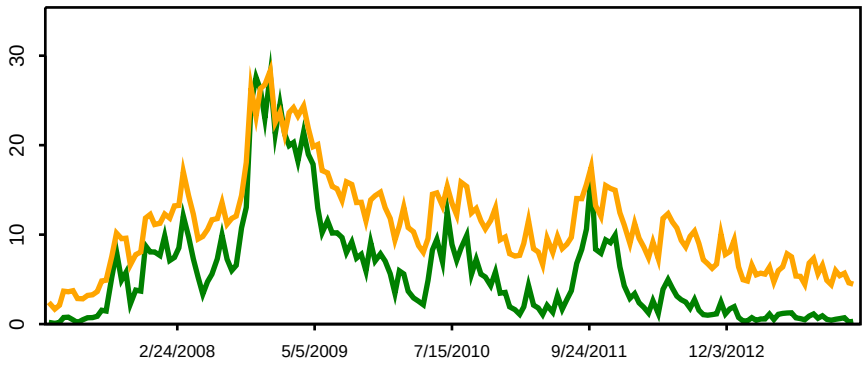
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

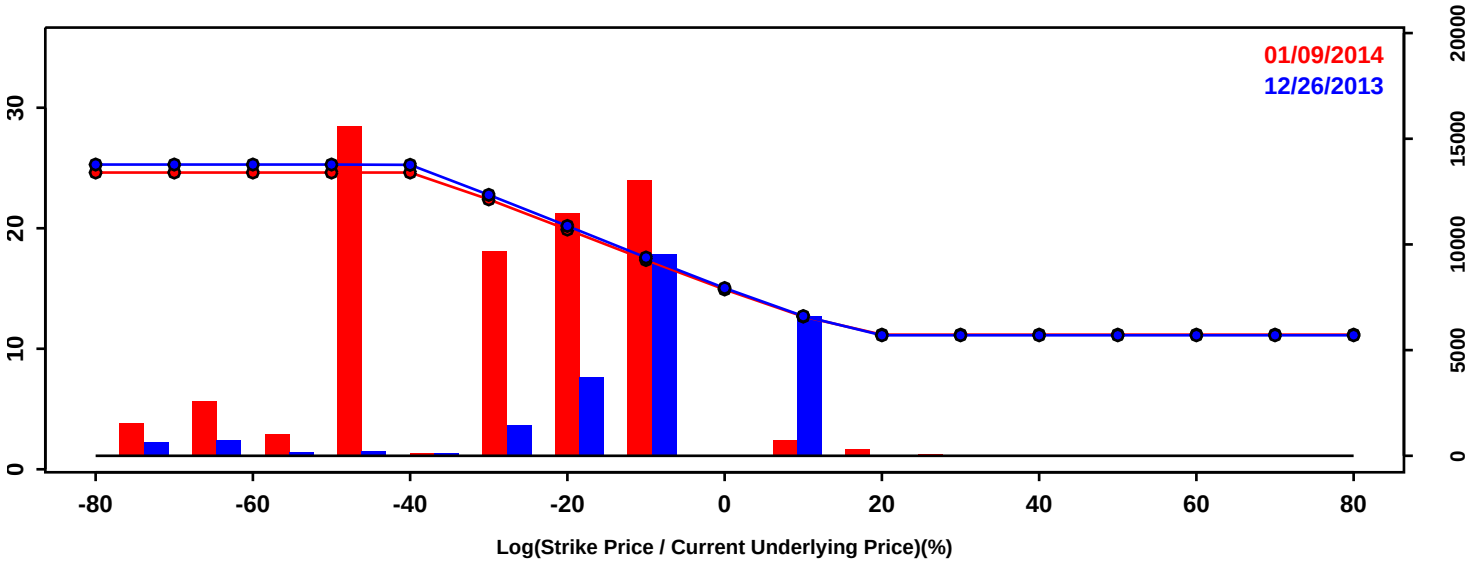
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-13.21%	-13.14%	0.07%
50th Pct	1.13%	0.94%	-0.19%
90th Pct	9.98%	10.20%	0.22%
Mean	-0.50%	-0.50%	-0.00%
Std Dev	9.83%	9.83%	0.00%
Skew	-1.14	-1.04	0.09
Kurtosis	2.21	2.02	-0.20

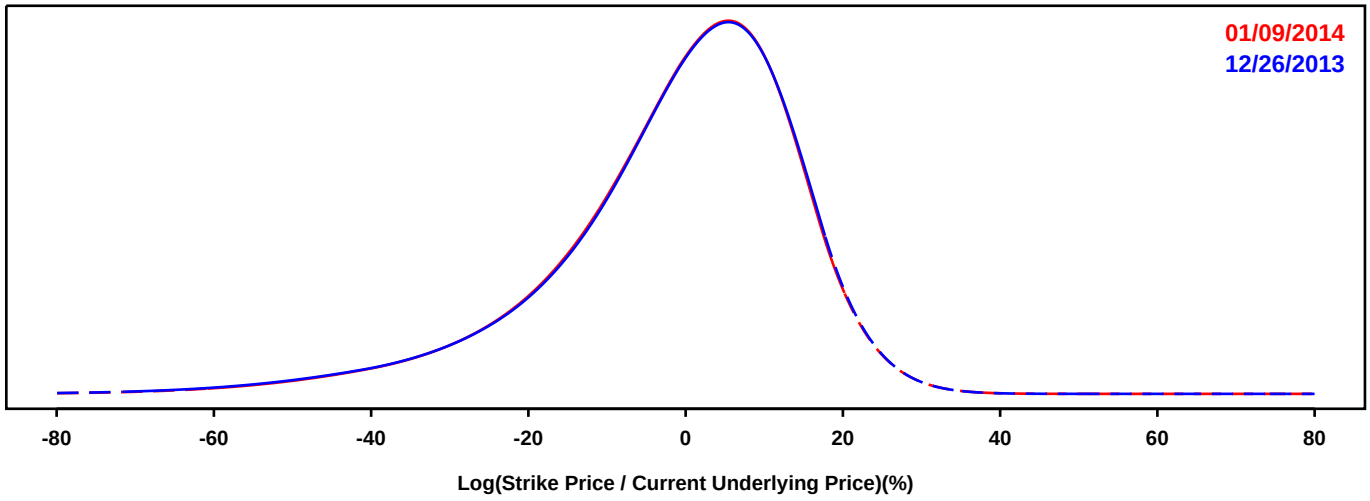
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- S&P 500

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

Decrease <= -20% Increase >= 20%

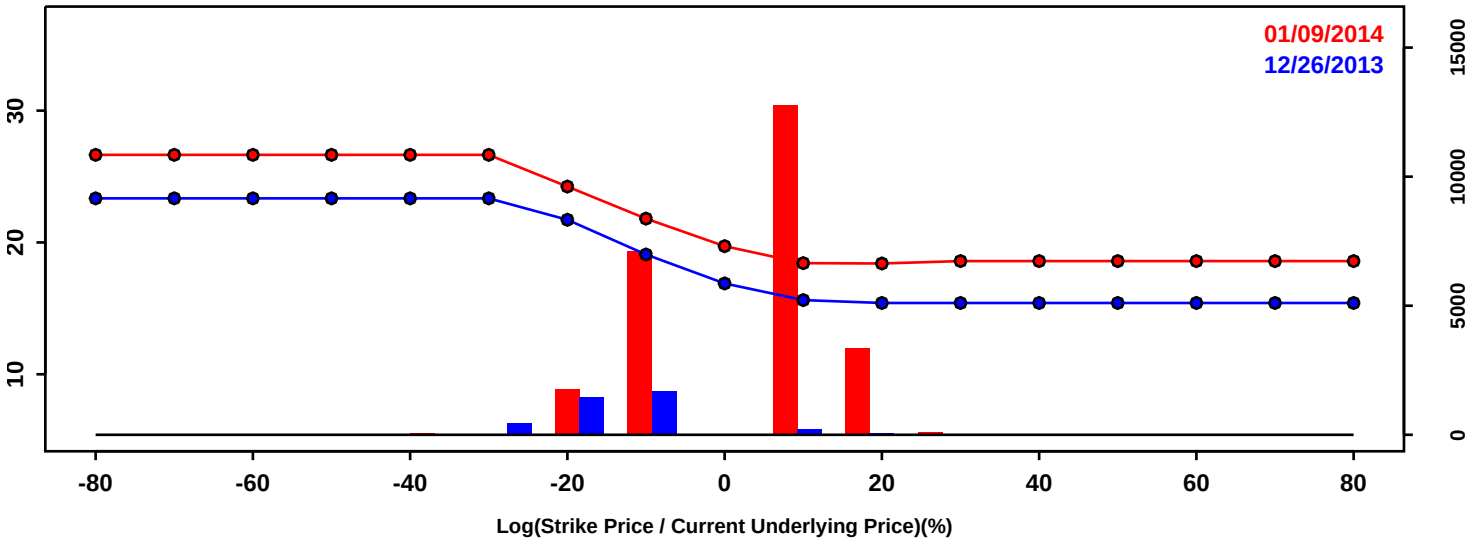
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-22.50%	-22.29%	0.21%
50th Pct	1.30%	1.23%	-0.07%
90th Pct	15.64%	15.54%	-0.10%
Mean	-1.47%	-1.45%	0.01%
Std Dev	16.07%	15.86%	-0.21%
Skew	-1.13	-1.09	0.04
Kurtosis	2.05	1.91	-0.14

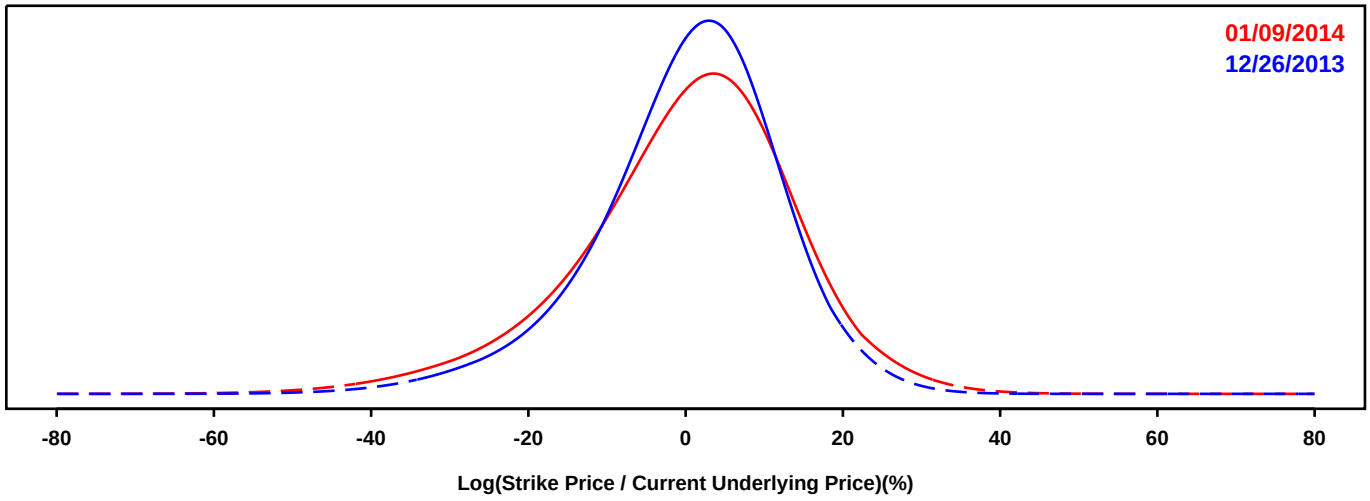
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (WTI)

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

Decrease <= -20% Increase >= 20%

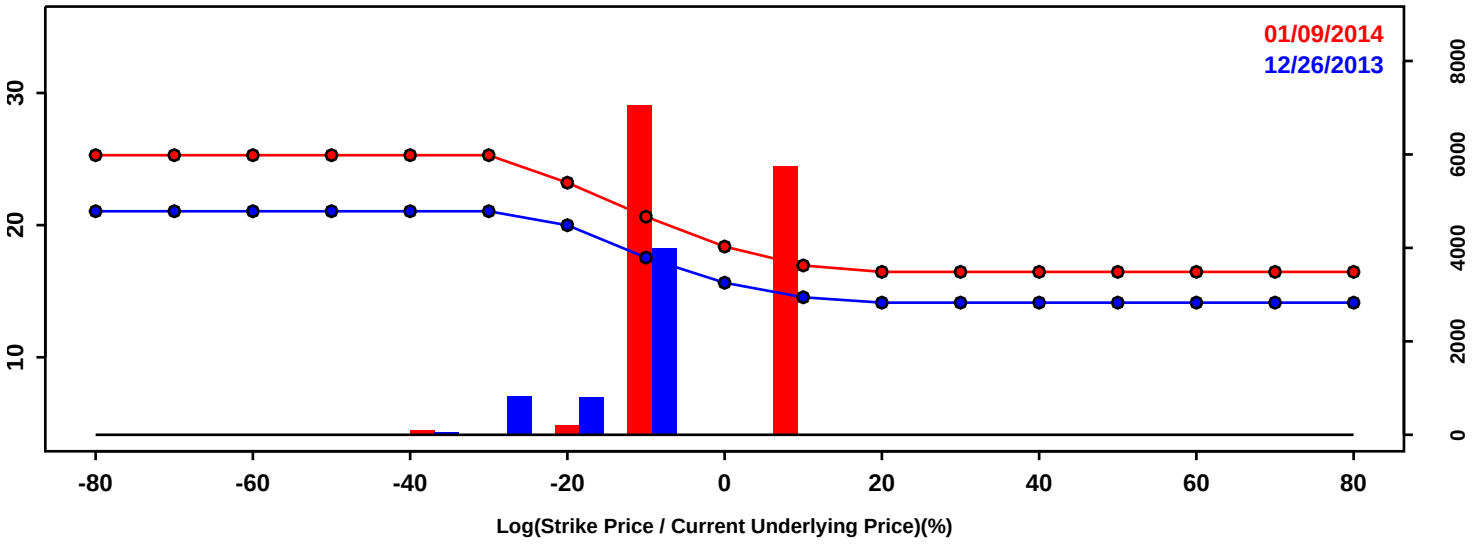
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-15.17%	-18.28%	-3.11%
50th Pct	1.31%	1.33%	0.02%
90th Pct	14.13%	16.13%	2.00%
Mean	0.25%	-0.00%	-0.26%
Std Dev	11.97%	14.02%	2.05%
Skew	-0.58	-0.56	0.02
Kurtosis	0.96	0.90	-0.06

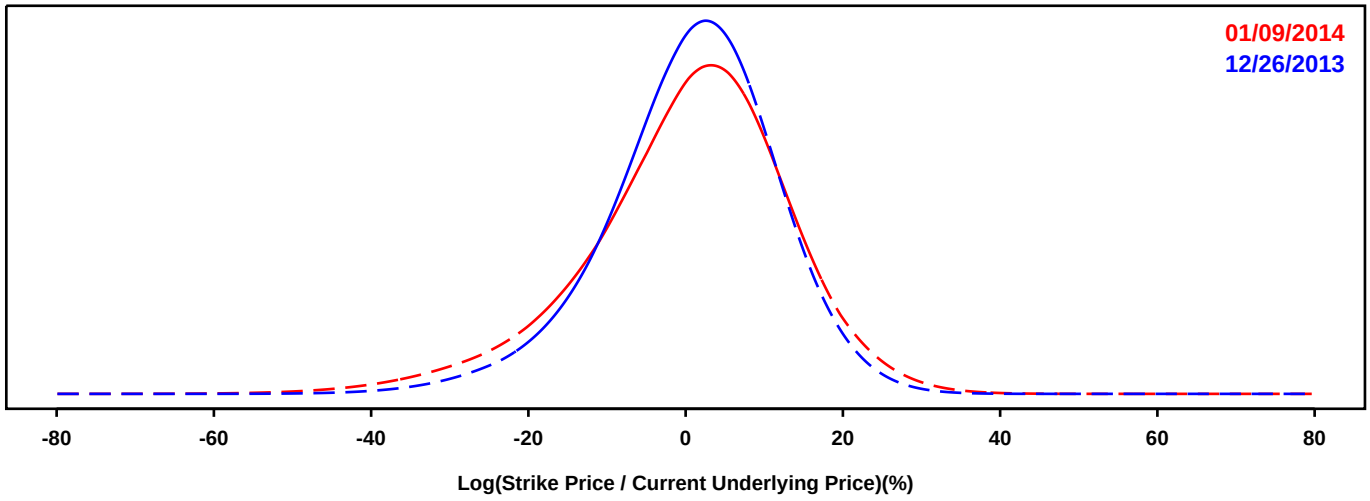
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CRUDE OIL FUTURES (Brent)

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

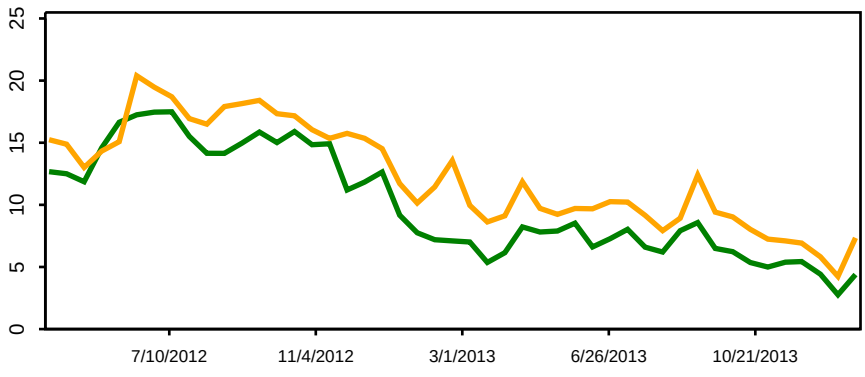
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

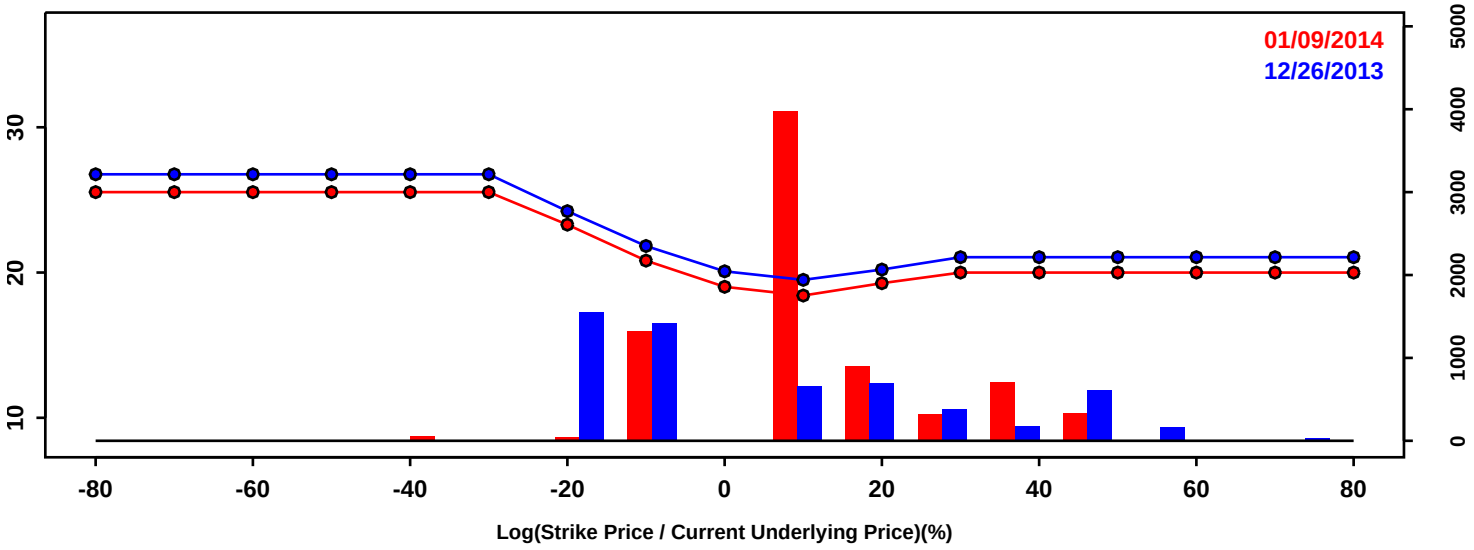
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-13.37%	-16.87%	-3.50%
50th Pct	1.45%	1.40%	-0.04%
90th Pct	13.82%	15.28%	1.47%
Mean	0.76%	0.14%	-0.62%
Std Dev	10.97%	13.09%	2.12%
Skew	-0.48	-0.61	-0.13
Kurtosis	0.76	0.95	0.19

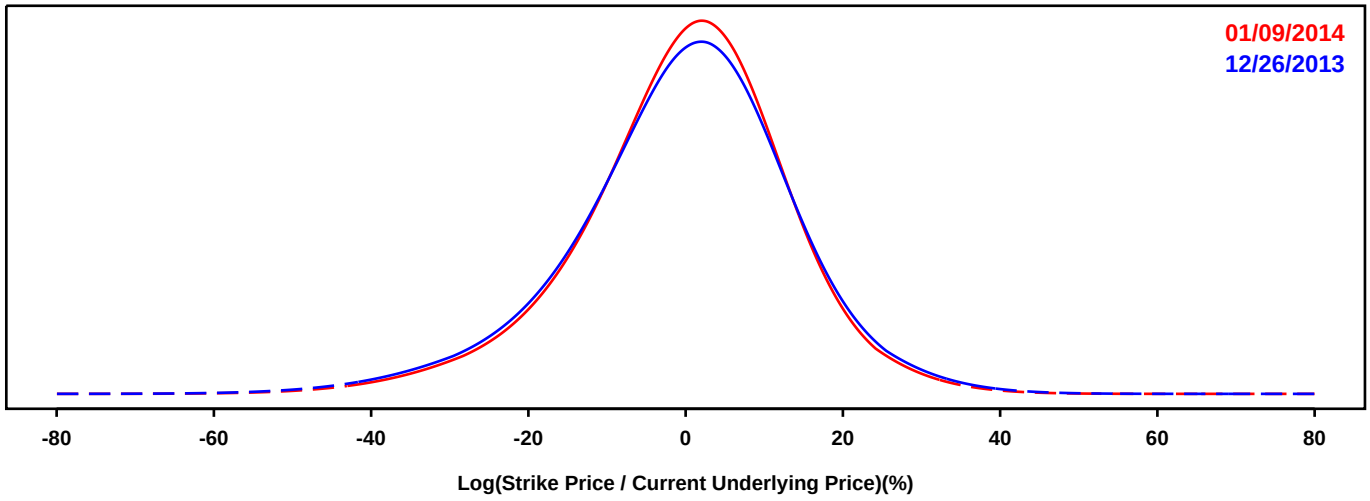
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- GOLD FUTURES

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

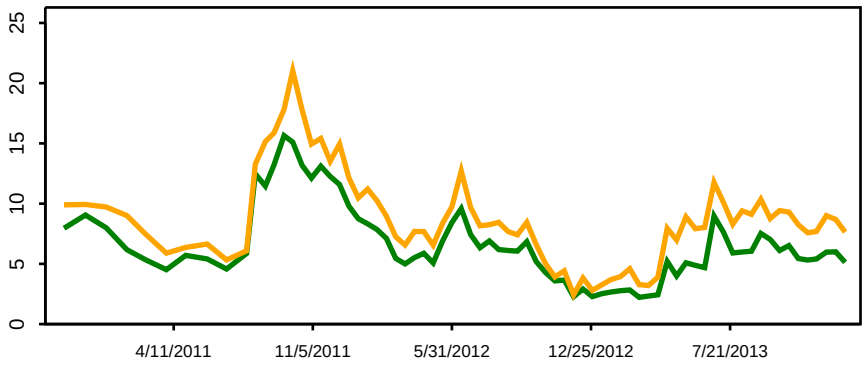
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

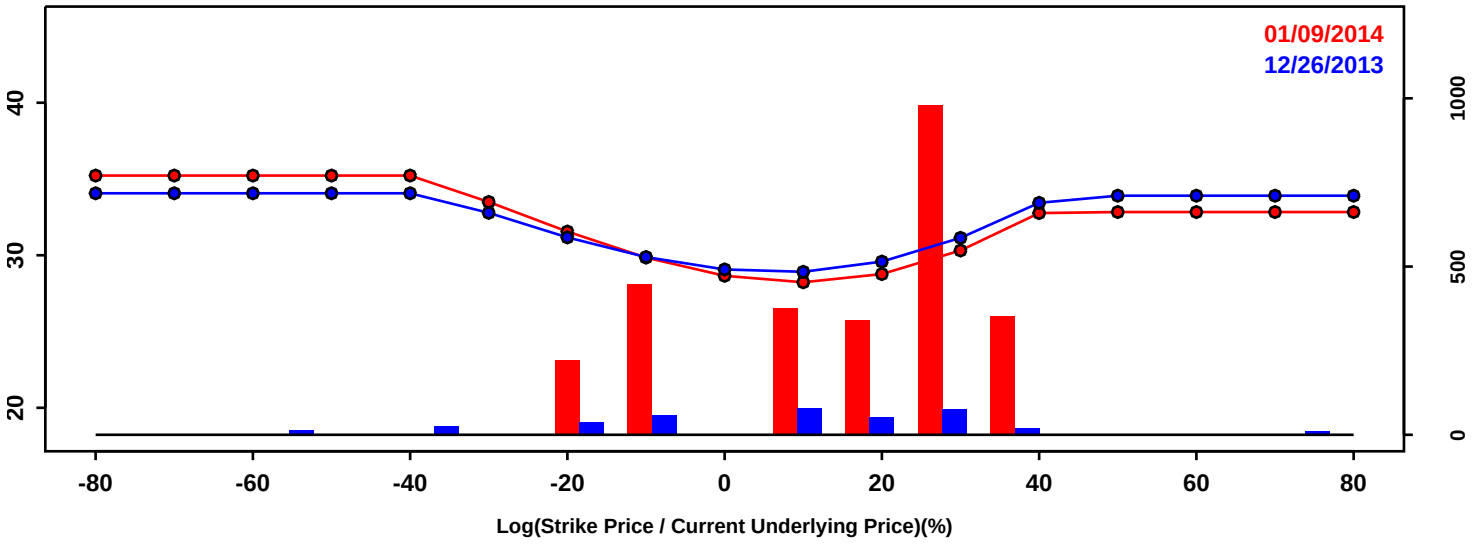
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-18.53%	-17.35%	1.19%
50th Pct	0.54%	0.71%	0.18%
90th Pct	16.31%	15.51%	-0.80%
Mean	-0.38%	-0.20%	0.18%
Std Dev	14.27%	13.48%	-0.78%
Skew	-0.42	-0.43	-0.01
Kurtosis	0.92	0.95	0.03

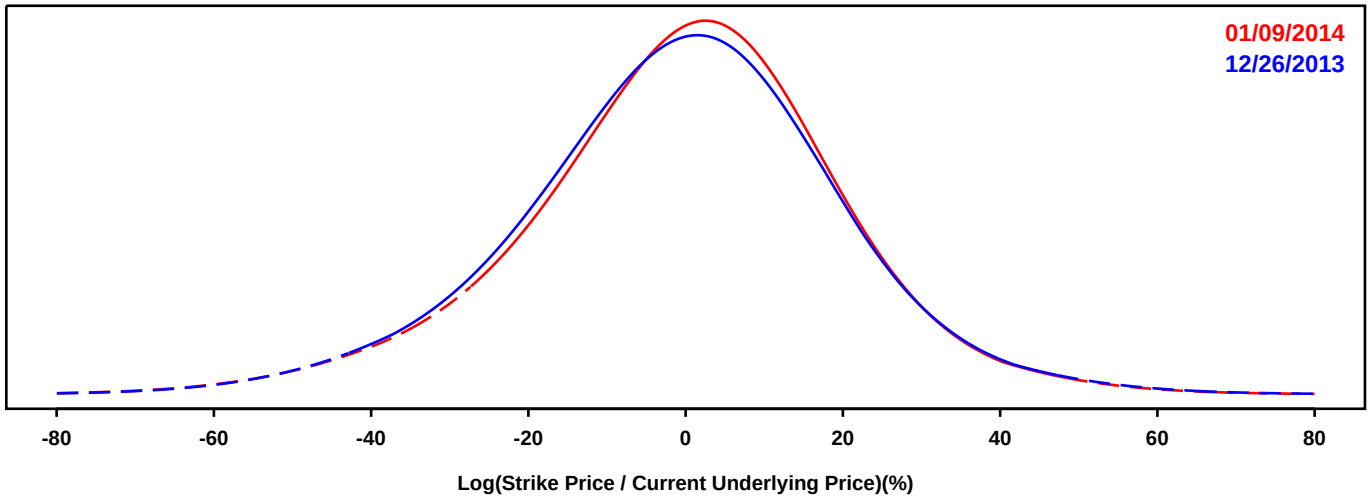
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SILVER FUTURES

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

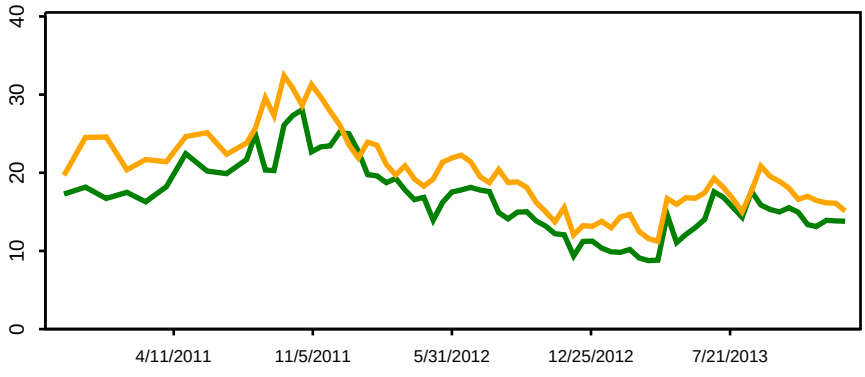
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

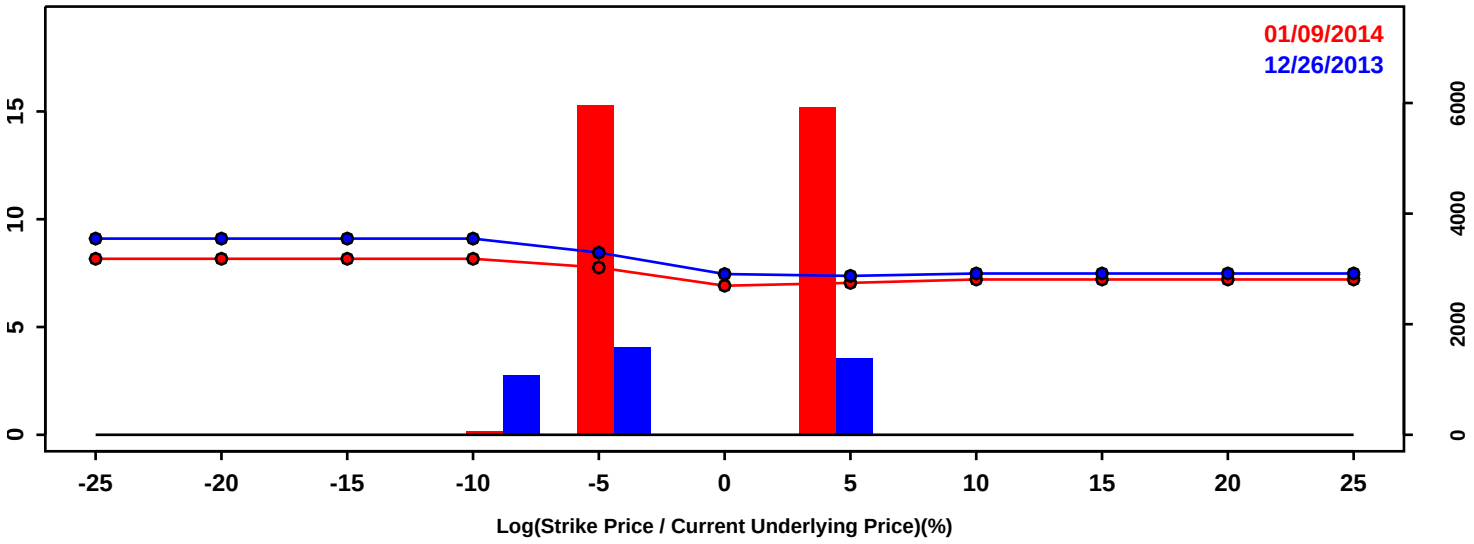
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-26.73%	-26.03%	0.70%
50th Pct	-0.05%	0.70%	0.76%
90th Pct	23.80%	23.63%	-0.17%
Mean	-0.73%	-0.27%	0.46%
Std Dev	20.47%	20.23%	-0.24%
Skew	-0.15	-0.25	-0.10
Kurtosis	0.62	0.75	0.13

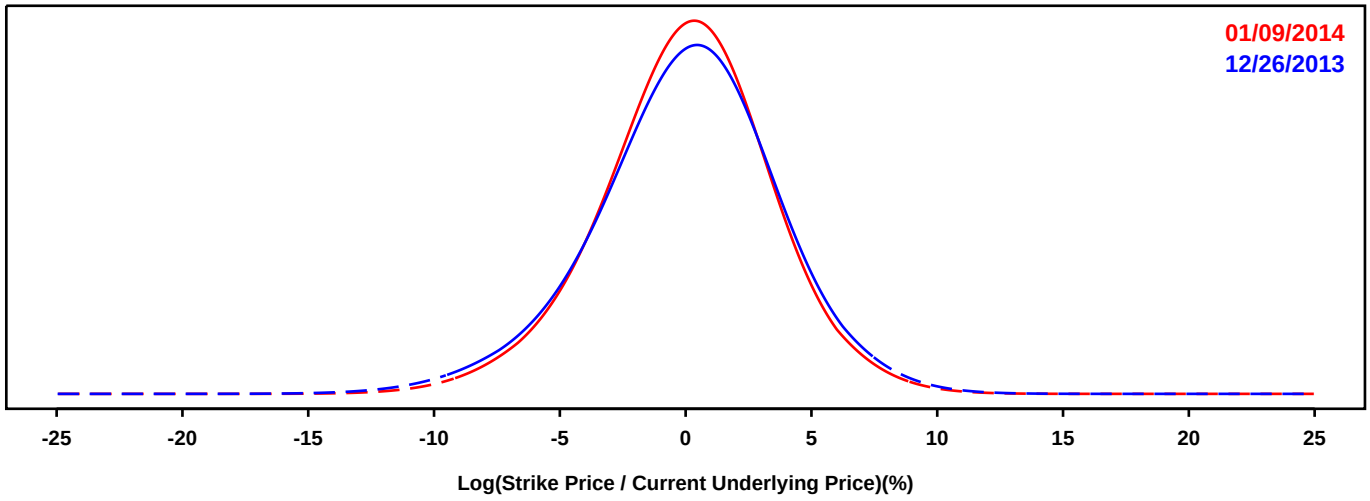
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-EURO EXCHANGE RATE FUTURES

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

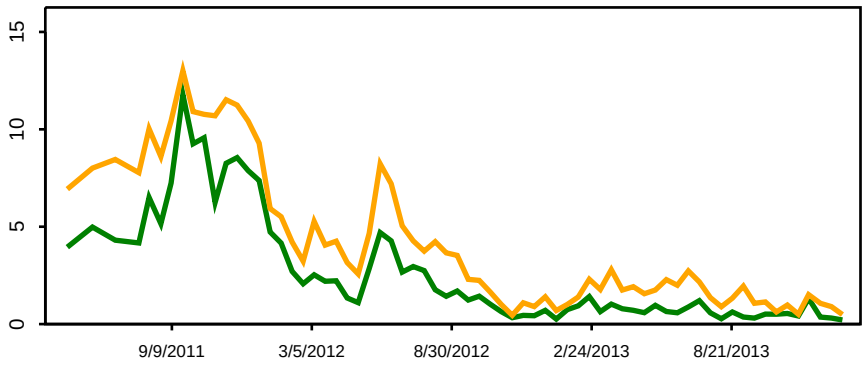
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



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

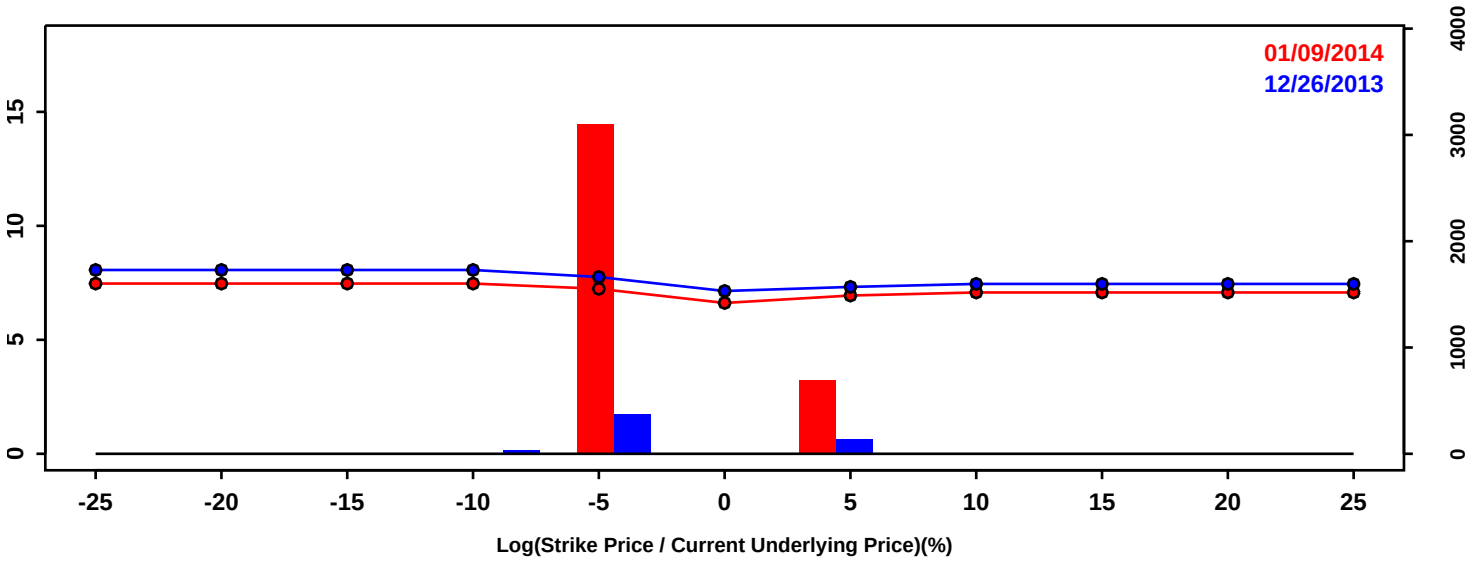
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-4.73%	-4.37%	0.37%
50th Pct	0.15%	0.11%	-0.04%
90th Pct	4.54%	4.22%	-0.32%
Mean	0.03%	0.04%	0.01%
Std Dev	3.72%	3.45%	-0.27%
Skew	-0.27	-0.19	0.08
Kurtosis	0.52	0.46	-0.06

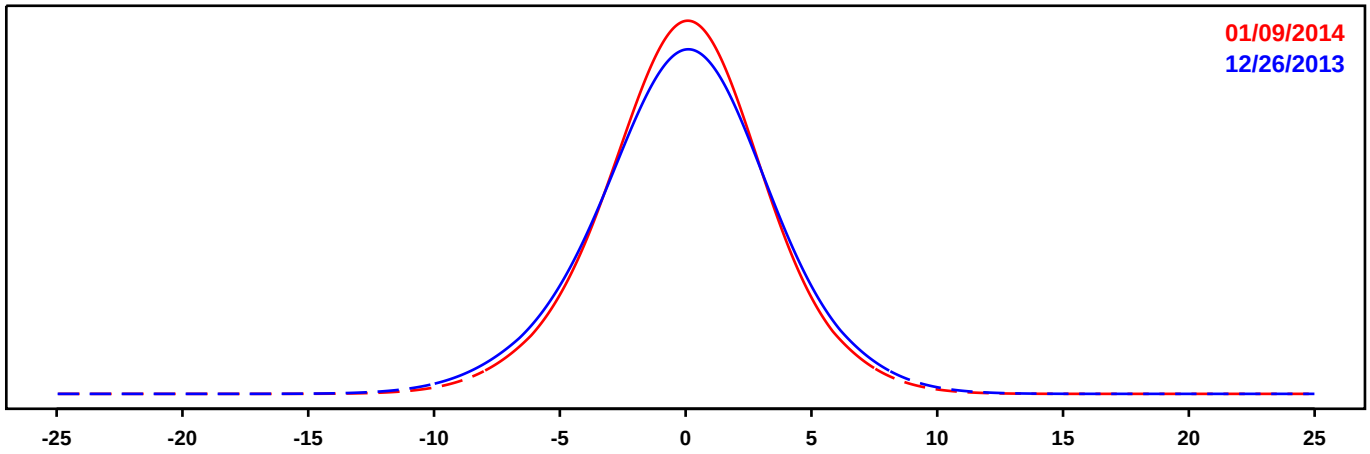
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-POUND EXCHANGE RATE FUTURES

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

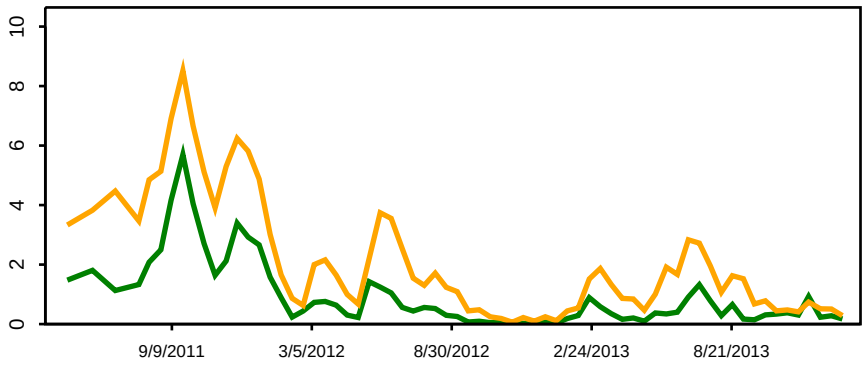
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



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

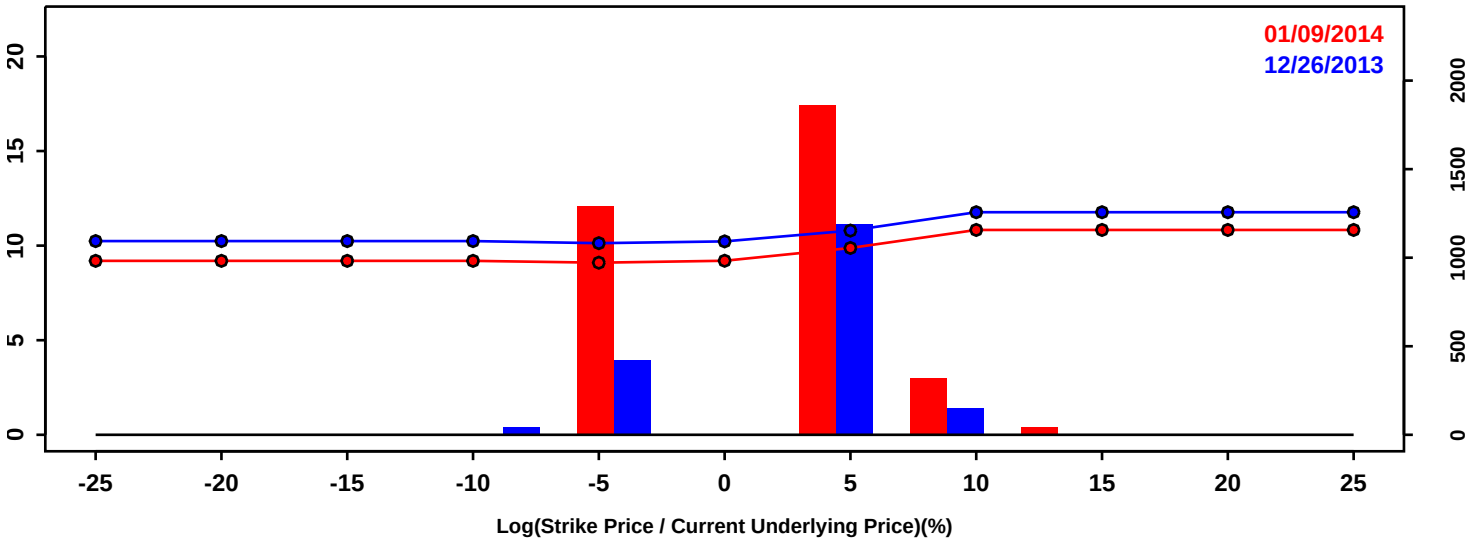
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-4.57%	-4.19%	0.38%
50th Pct	0.00%	0.00%	0.00%
90th Pct	4.35%	4.06%	-0.29%
Mean	-0.03%	-0.01%	0.02%
Std Dev	3.57%	3.30%	-0.26%
Skew	-0.11	-0.08	0.03
Kurtosis	0.36	0.39	0.04

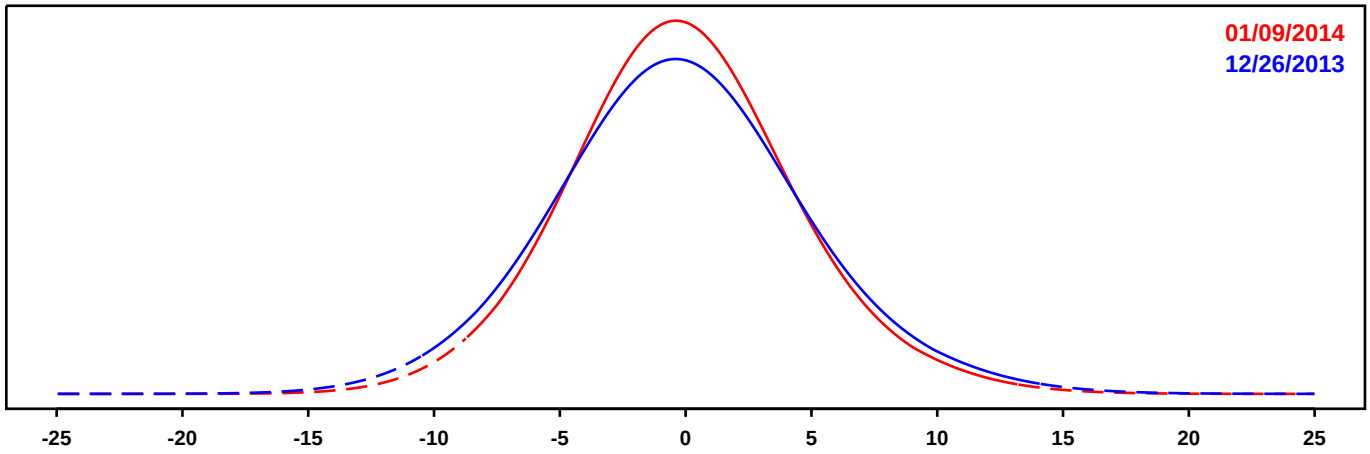
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- DOLLAR-YEN EXCHANGE RATE FUTURES

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

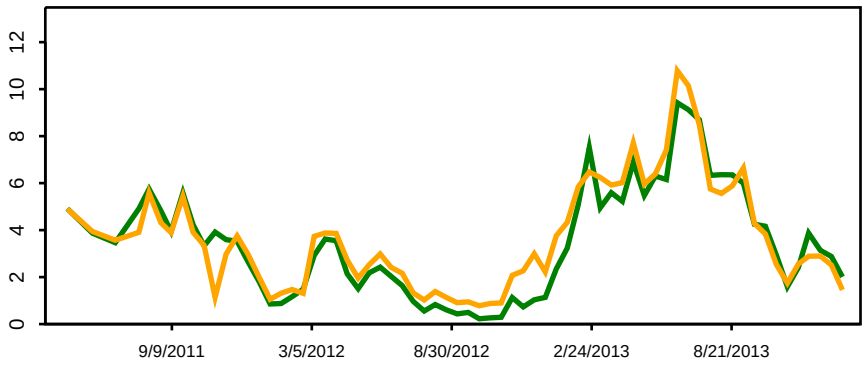
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



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

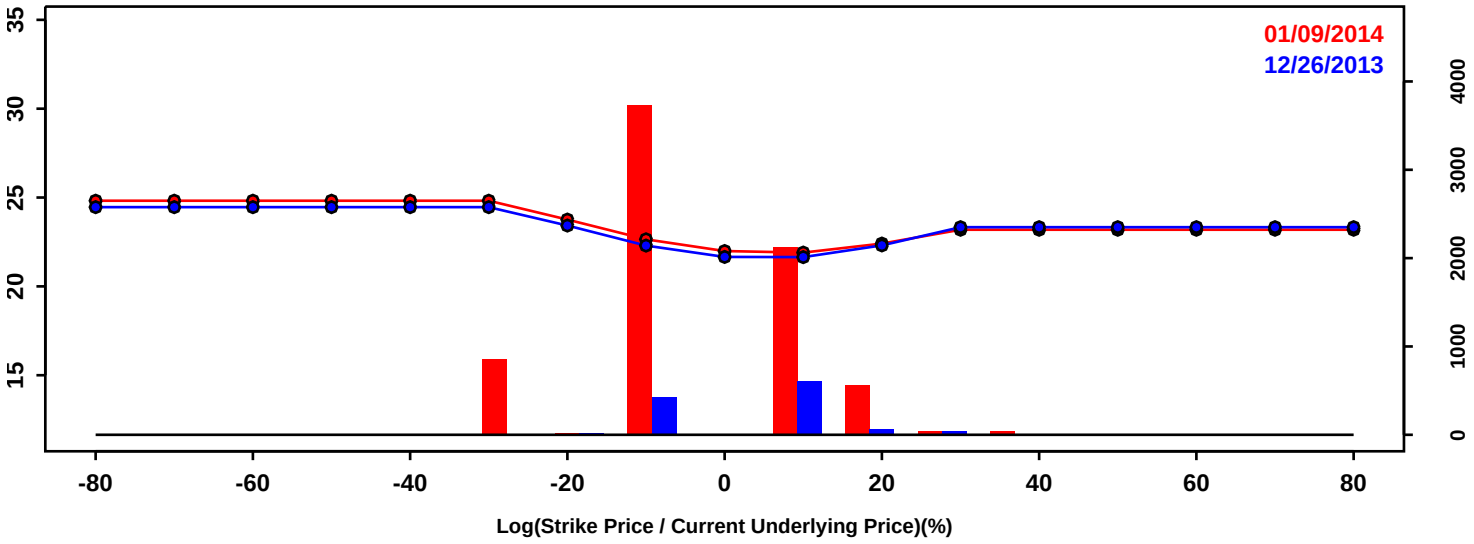
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-6.53%	-5.82%	0.71%
50th Pct	-0.25%	-0.22%	0.03%
90th Pct	6.32%	5.72%	-0.60%
Mean	-0.14%	-0.08%	0.05%
Std Dev	5.10%	4.59%	-0.51%
Skew	0.15	0.17	0.03
Kurtosis	0.32	0.37	0.05

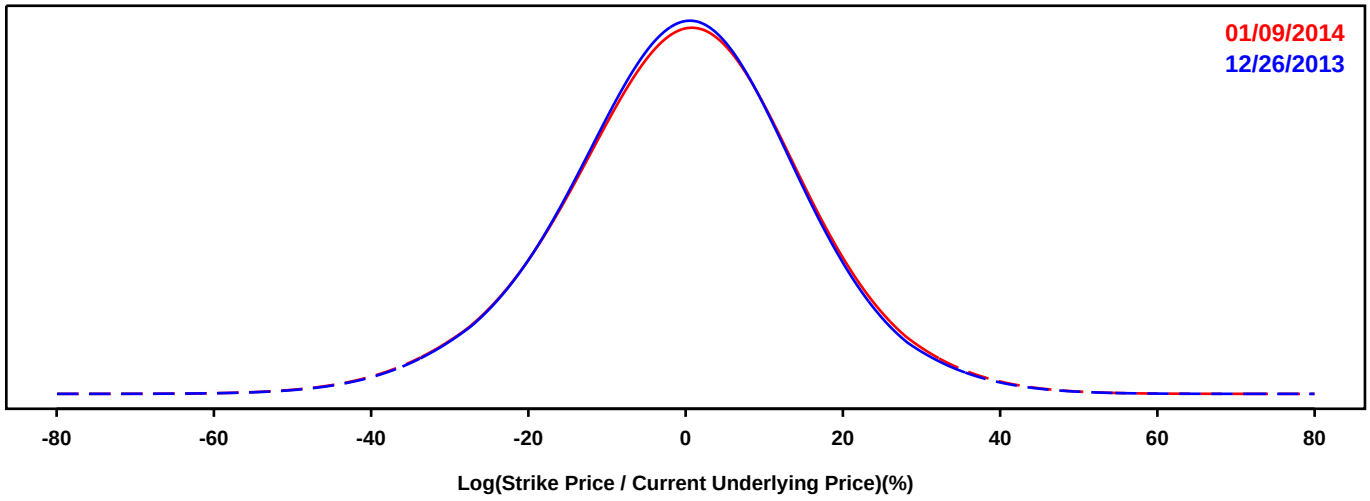
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CORN FUTURES

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

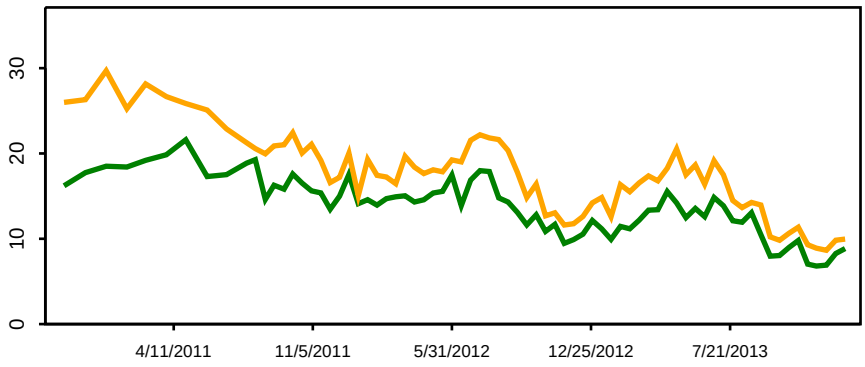
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

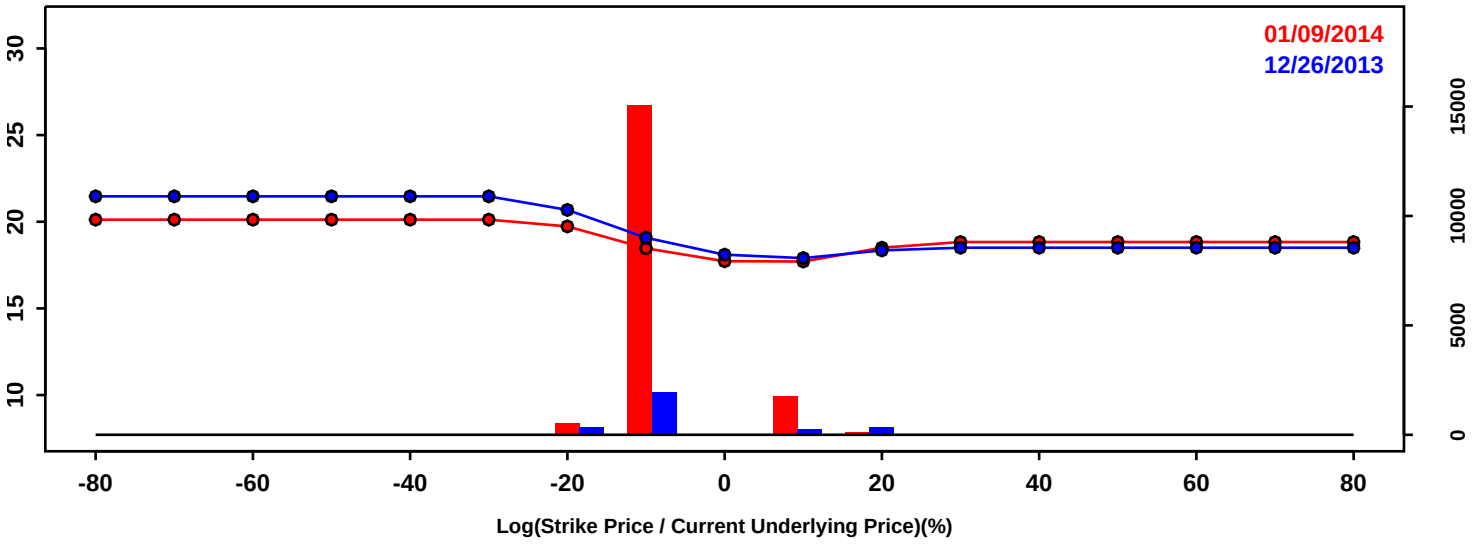
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-19.77%	-19.93%	-0.15%
50th Pct	-0.11%	0.12%	0.23%
90th Pct	18.41%	18.96%	0.54%
Mean	-0.40%	-0.20%	0.19%
Std Dev	15.27%	15.52%	0.25%
Skew	-0.11	-0.12	-0.01
Kurtosis	0.40	0.37	-0.03

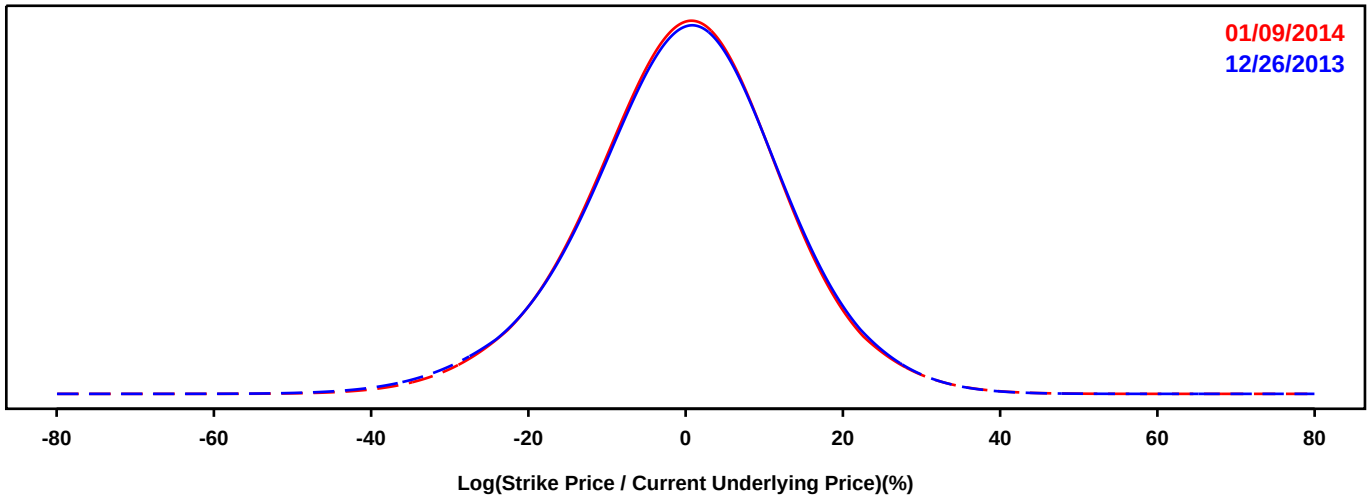
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- SOYBEAN FUTURES

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

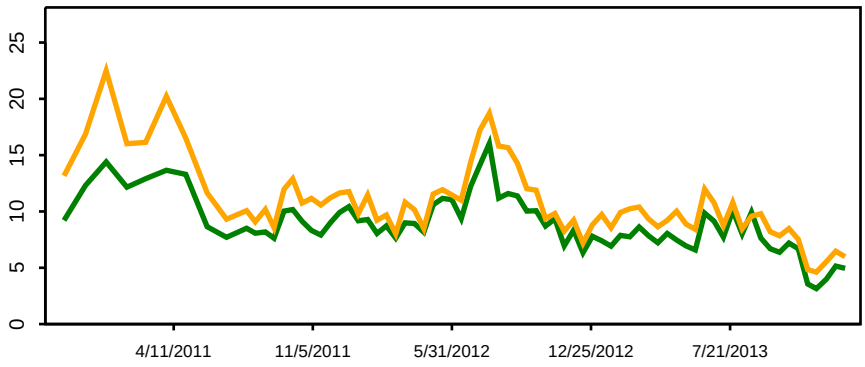
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

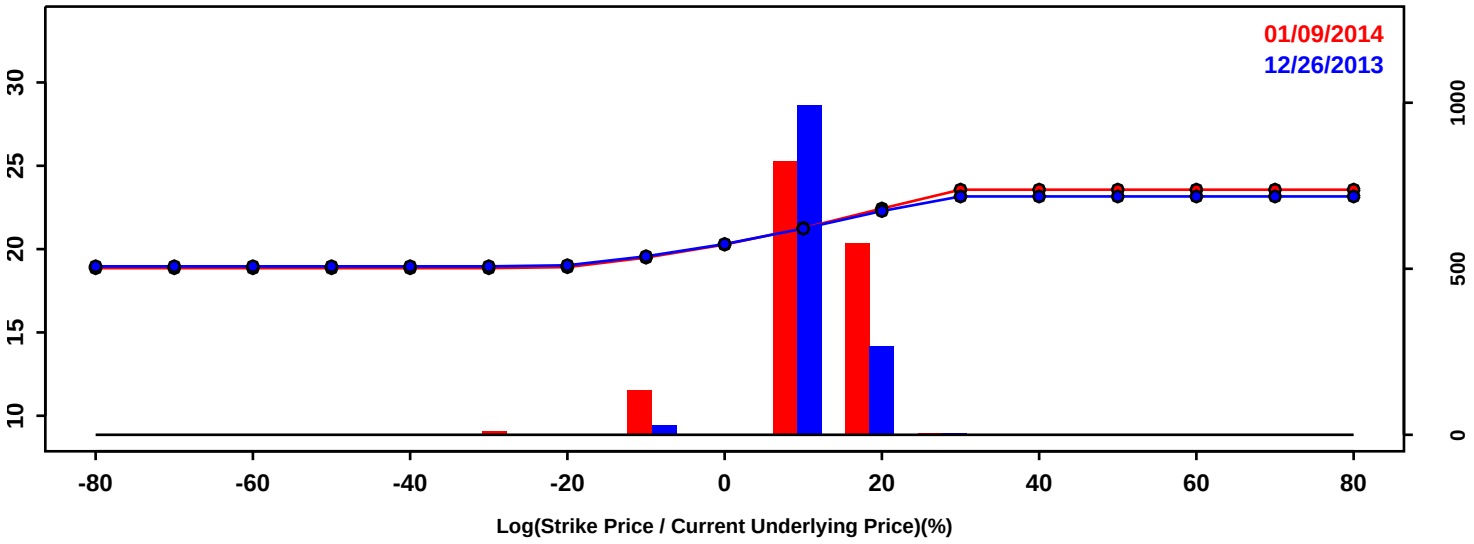
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-16.40%	-16.05%	0.35%
50th Pct	0.22%	0.18%	-0.05%
90th Pct	15.54%	15.28%	-0.26%
Mean	-0.14%	-0.11%	0.04%
Std Dev	12.78%	12.50%	-0.28%
Skew	-0.20	-0.12	0.07
Kurtosis	0.46	0.39	-0.06

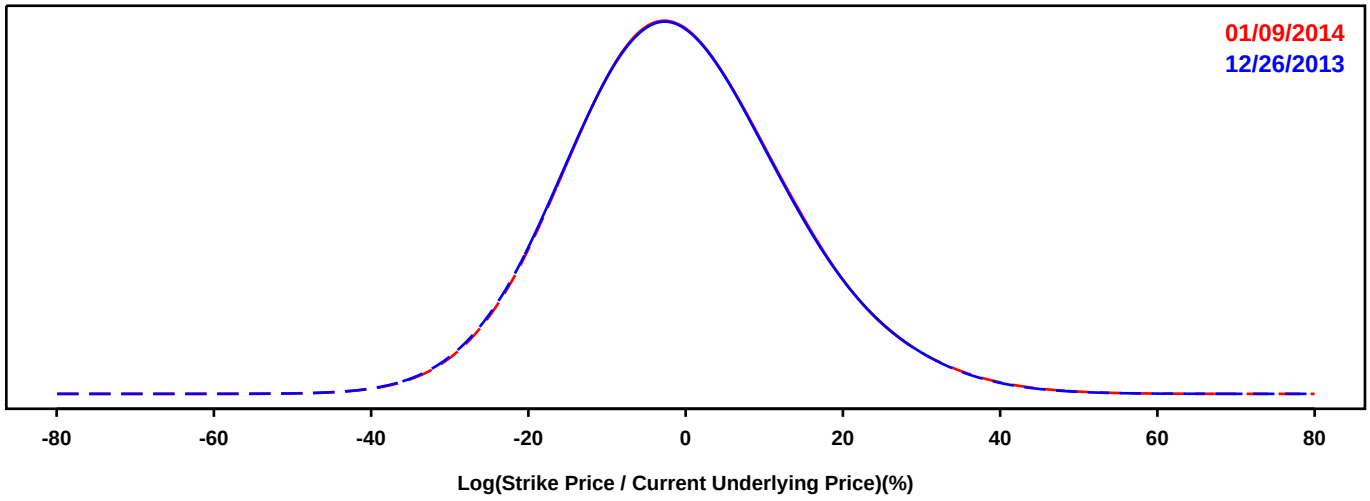
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- WHEAT FUTURES

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

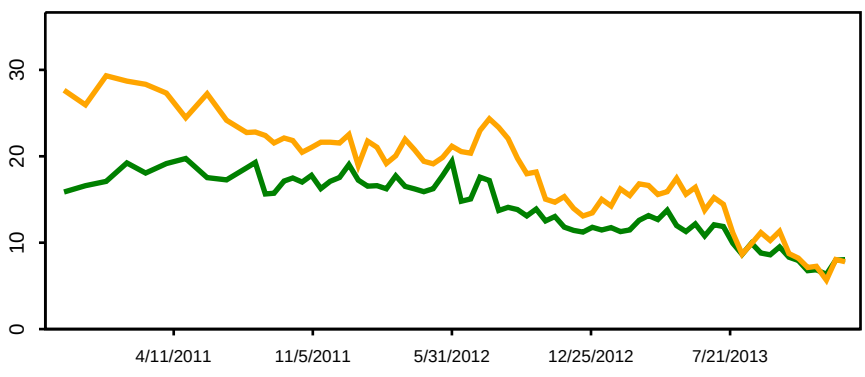
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <= -20% Increase >= 20%

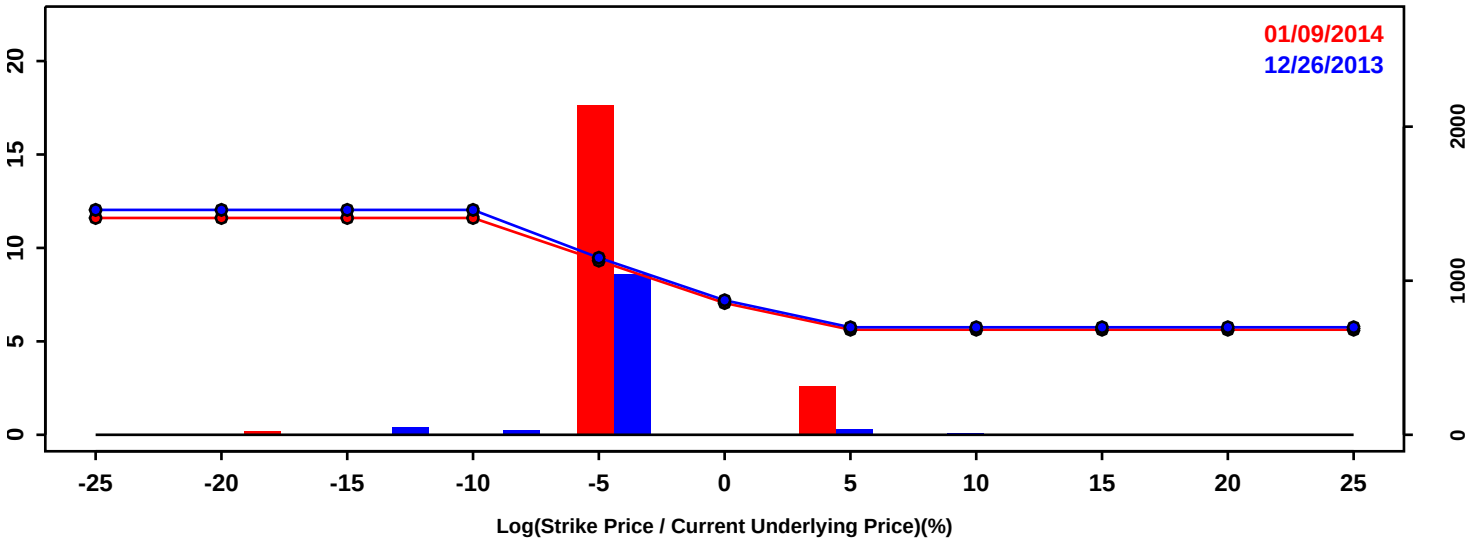
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-18.42%	-18.24%	0.18%
50th Pct	-1.38%	-1.29%	0.09%
90th Pct	17.94%	18.00%	0.06%
Mean	-0.69%	-0.57%	0.12%
Std Dev	14.33%	14.31%	-0.01%
Skew	0.25	0.27	0.02
Kurtosis	0.21	0.25	0.04

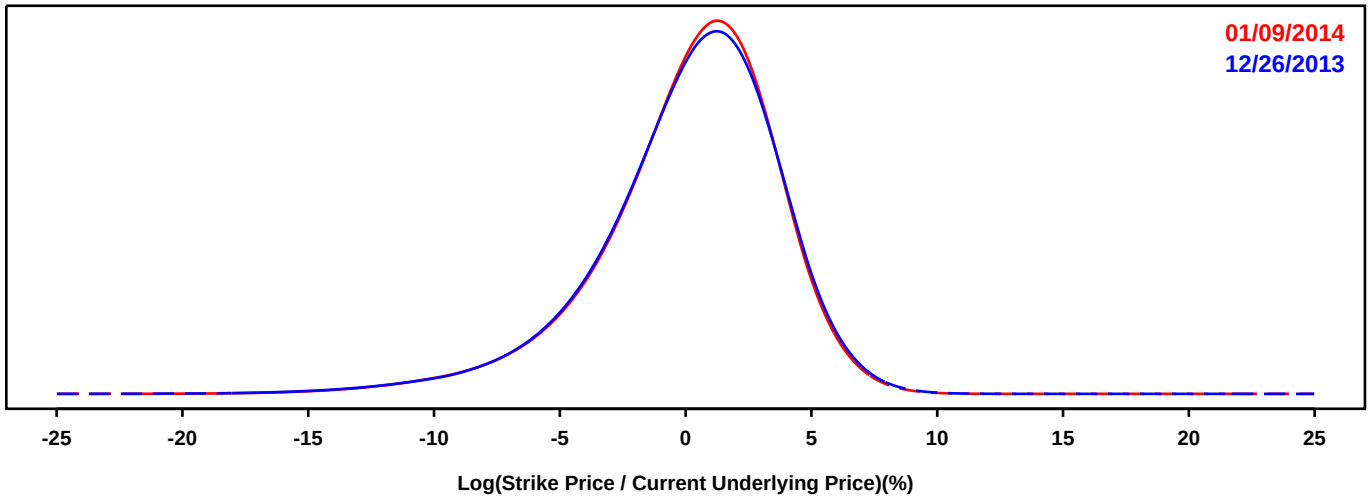
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- CATTLE FUTURES

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

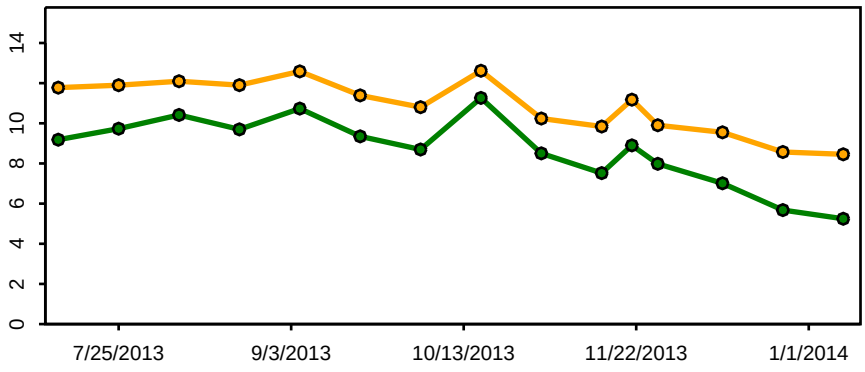
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



Decrease <=5% Increase >= 5%

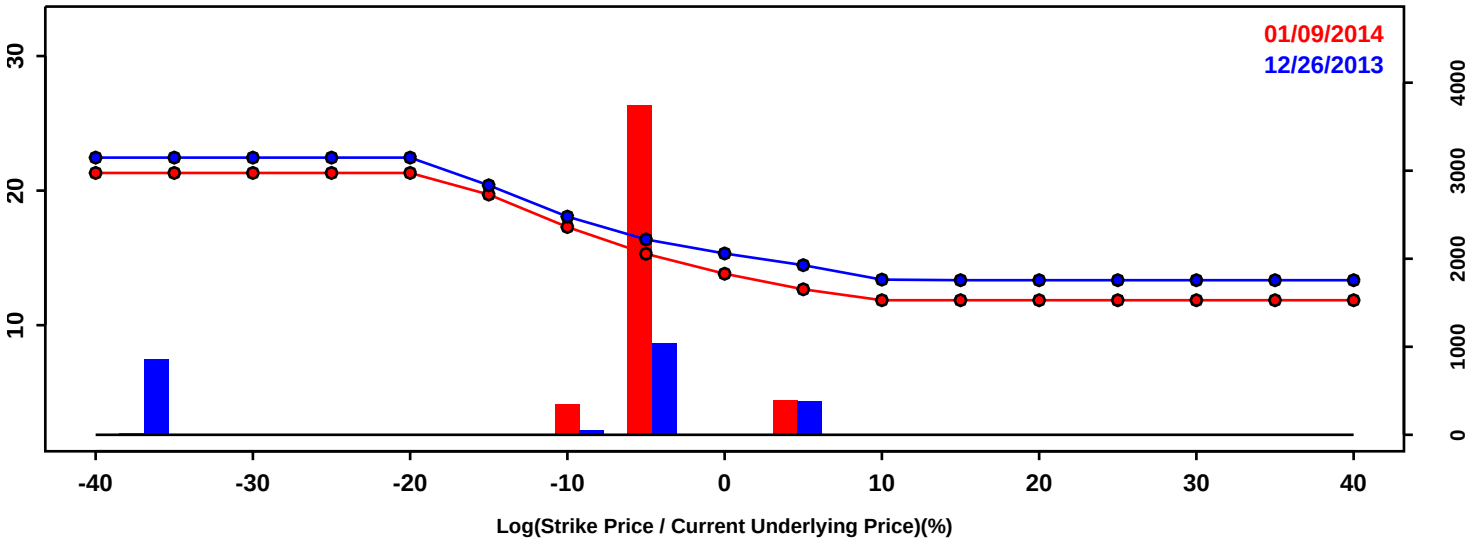
Statistics of the Log Return Distributions

	12/26/2013	01/09/2014	Change
10th Pct	-4.53%	-4.50%	0.03%
50th Pct	0.57%	0.59%	0.02%
90th Pct	4.21%	4.09%	-0.12%
Mean	0.12%	0.12%	-0.00%
Std Dev	3.66%	3.60%	-0.06%
Skew	-0.93	-0.94	-0.01
Kurtosis	1.86	1.82	-0.04

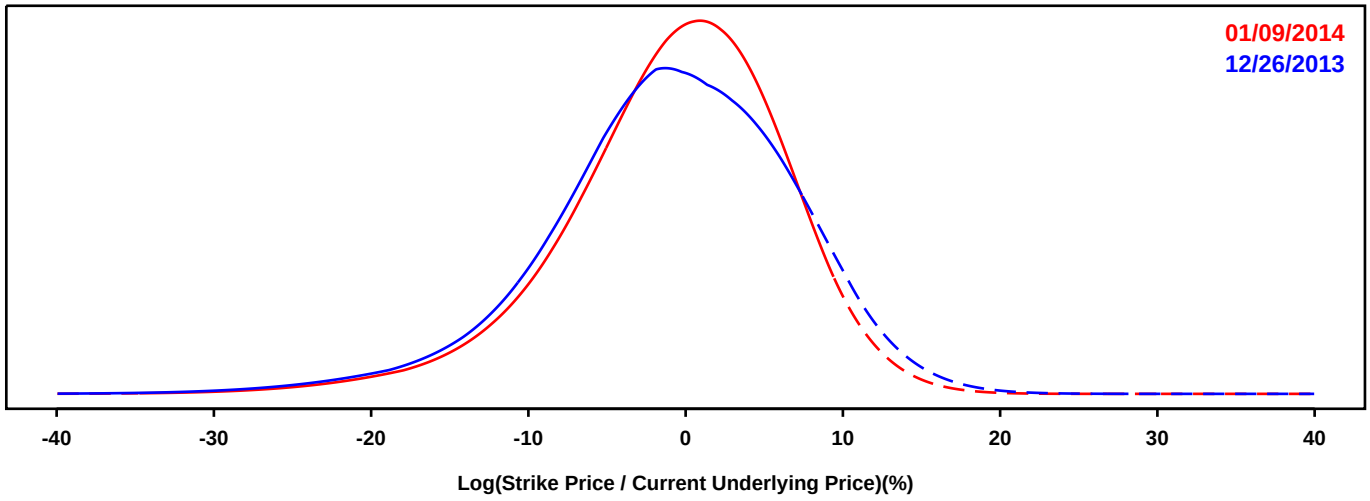
RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- iSHARES DOW JONES US REAL ESTATE

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

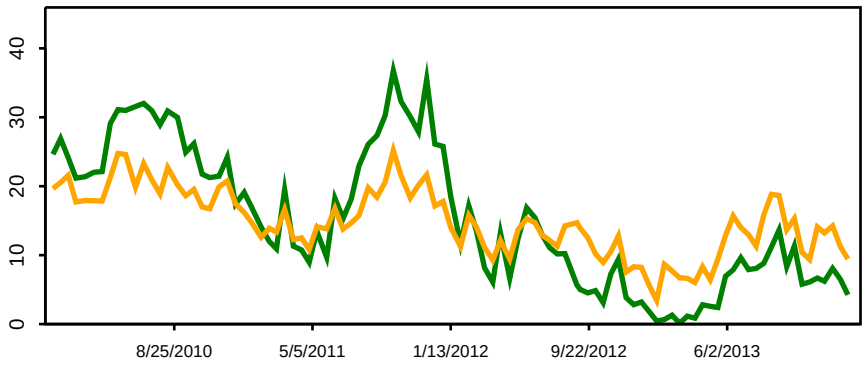
Implied Volatilities (lines--left axis) and Volume (bars--right axis)



Risk Neutral PDF of the Log Return Distribution



Probability of a Large Change



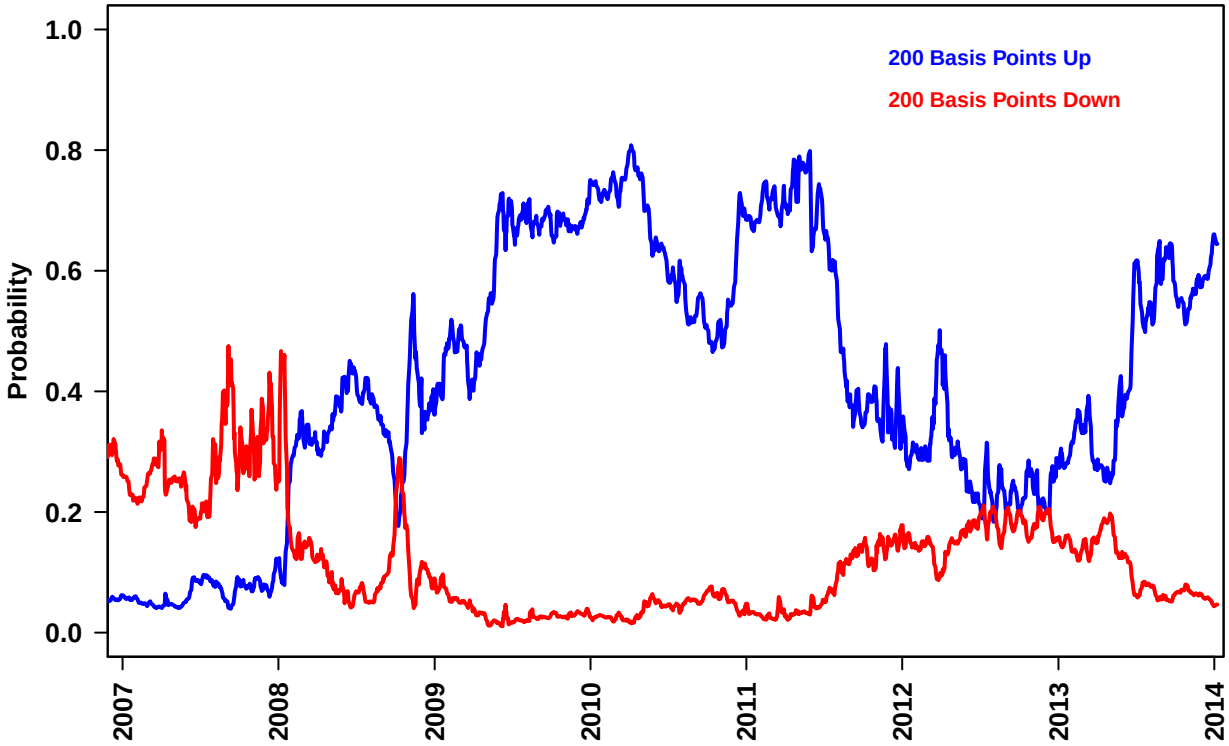
Decrease <= -10% Increase >= 10%

Statistics of the Log Return Distributions

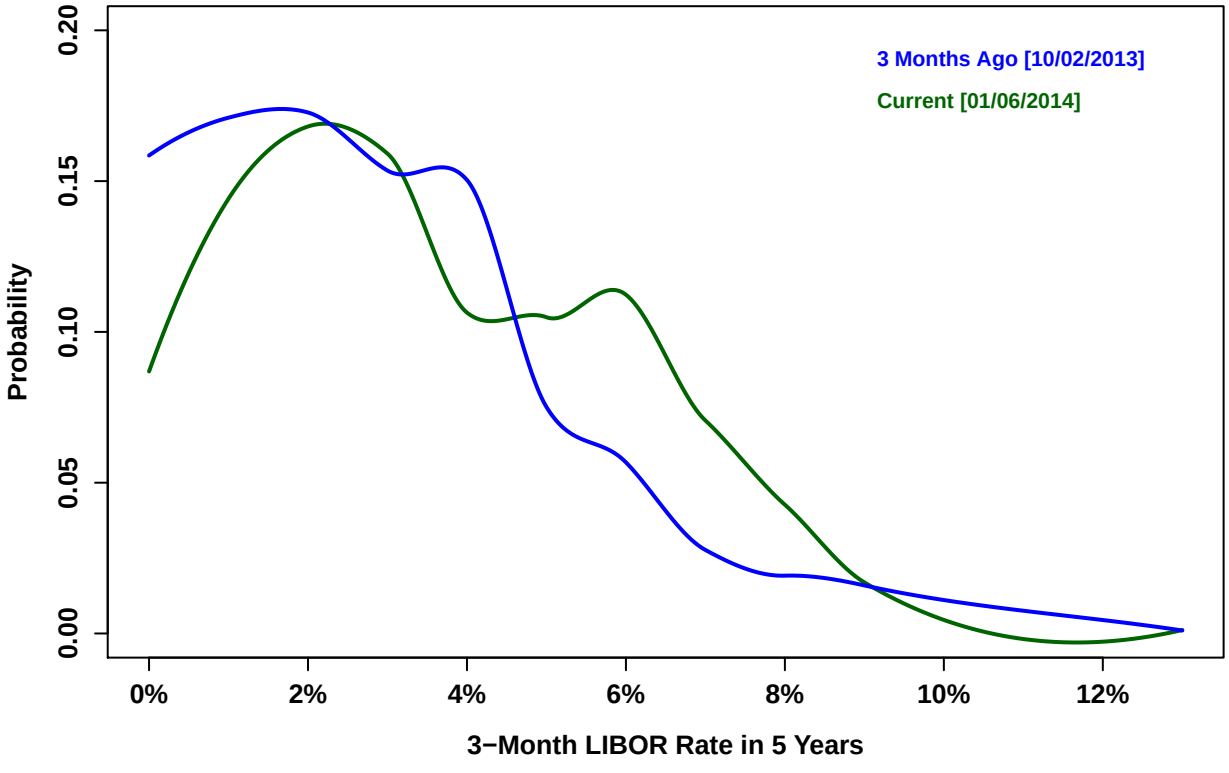
	12/26/2013	01/09/2014	Change
10th Pct	-10.60%	-9.70%	0.90%
50th Pct	-0.50%	-0.05%	0.46%
90th Pct	8.56%	7.59%	-0.97%
Mean	-0.86%	-0.69%	0.17%
Std Dev	7.80%	7.09%	-0.71%
Skew	-0.52	-0.67	-0.16
Kurtosis	0.87	1.16	0.29

RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS −− Interest Rate Caps & Floors

Probability of 200 Basis Point Moves for 3−Month LIBOR, 5 Years Out
5−Day Rolling Average

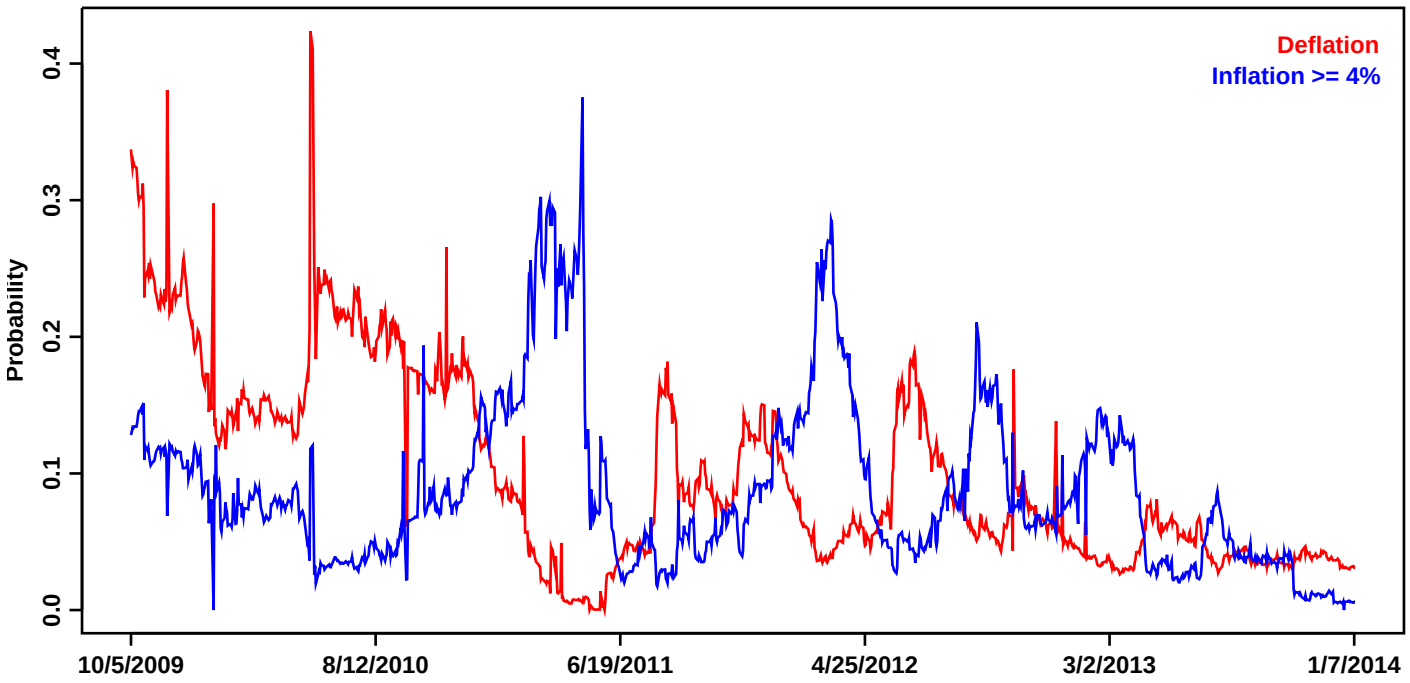


Risk Neutral Density Function for 3−Month LIBOR, 5 Years Out

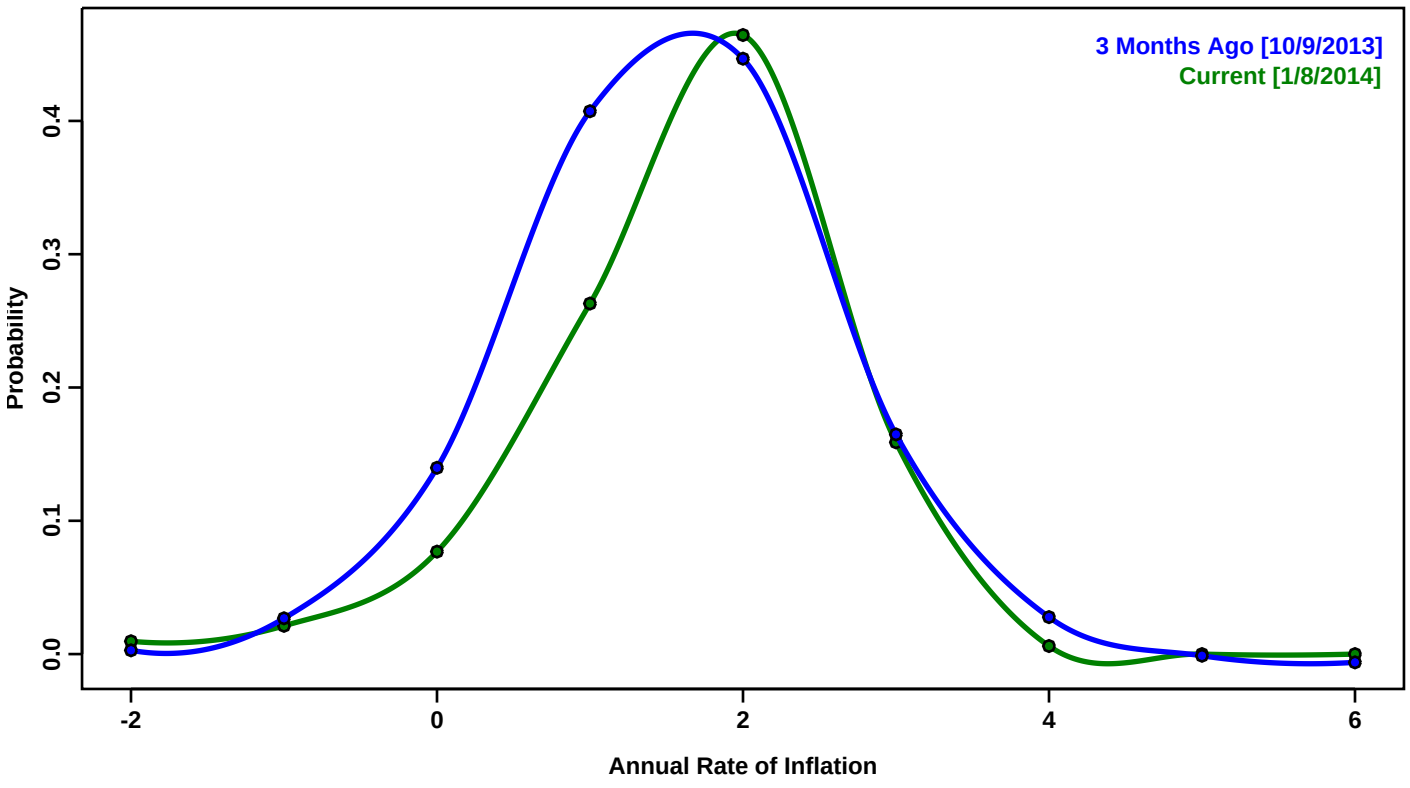


RISK NEUTRAL PROBABILITY DENSITY FUNCTIONS -- Inflation Caps & Floors

Probabilty 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