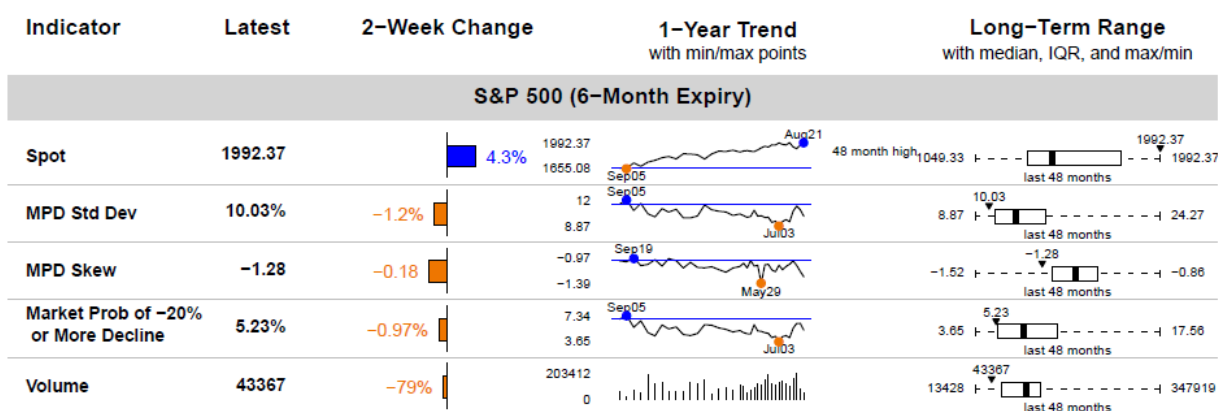


FEDERAL RESERVE BANK OF MINNEAPOLIS
BANKING AND POLICY STUDIES

Minneapolis Options Report Format Change

This week we introduce a new format for our reports. By utilizing spark tables, we can convey our information in a more compact way. The report had grown a length in excess of 50 pages. By adopting this structure we can reduce it to a more manageable 15 pages. We also believe that the new format will improve the reader’s ability to interpret the data and compare the data within and across markets.

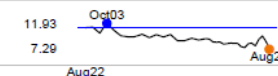
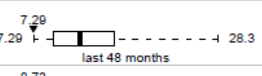
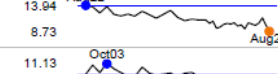
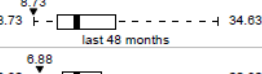

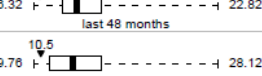
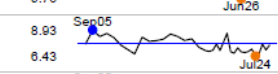

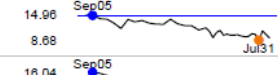

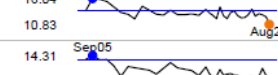
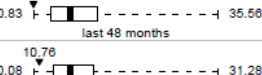
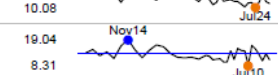
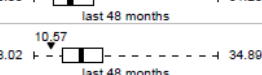
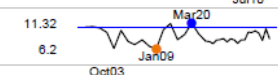
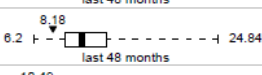

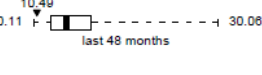
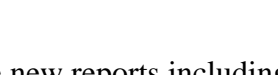
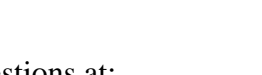

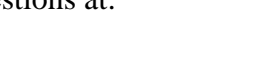
The table below illustrates the new format for the MPD statistics derived from options on the S&P 500 Index. For each statistic of interest, we report the last measured value, the change since our last report, the time series of the statistic over the past year of measurement, and the longer-term range of values including the interquartile range. We present these statistics for five different MPD features for each “market” we follow.



For non-equities and other physical commodities besides the S&P 500, we present these MPD statistics together for each market in order to provide the reader with a relatively complete representation of the attributes of each MPD.

For the bank and insurance company MPDs derived from options on equity share prices, we chose a different grouping. For this information we grouped the reports by MPD statistic so comparisons could be made across the set of peer firms. The table below illustrates the standard deviation information calculated from MPDs across the universe of insurance companies.

Insurance Company MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
MPD Standard Deviation (3-Month Expiry)				
Aflac	7.29%	-1.3%		
AIG	8.73%	-1.2%		
Allstate	6.88%	0.49%		
Ameriprise	10.5%	-0.51%		
Chubb	7.47%	0.46%		
Hartford Financial	9.28%	-0.88%		
Lincoln National	10.83%	-1.5%		
Met Life	10.76%	-0.32%		
Principle Financial	10.57%	-2.5%		
Progressive	8.18%	-2%		
Prudential	10.49%	-1.1%		

We welcome any, and all, feedback on the new reports including your questions at: option-report-feedback@mpls.frb.org.

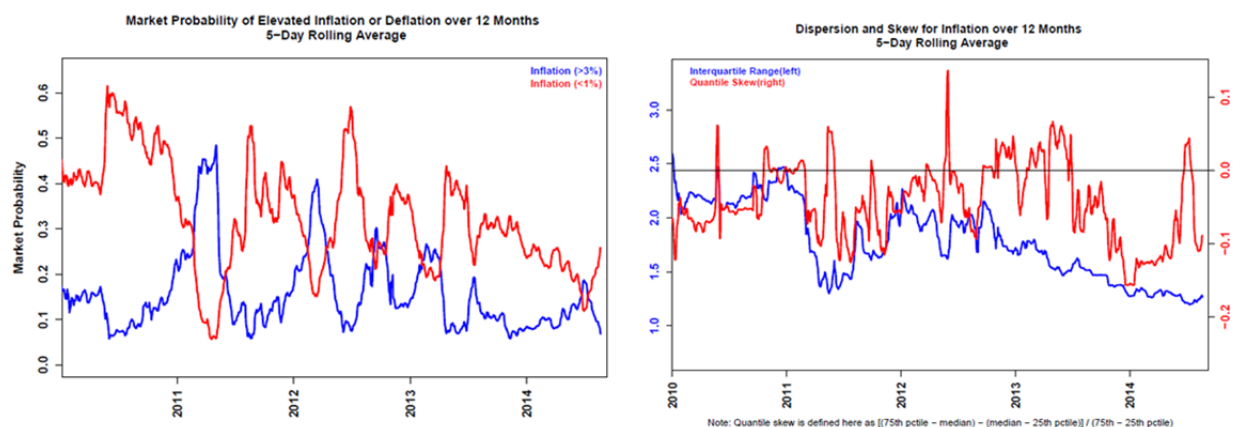
FEDERAL RESERVE BANK OF MINNEAPOLIS
BANKING AND POLICY STUDIES

Minneapolis Options Report – August 21st

Market-based probabilities continue to point toward lower inflation rate expectations. MPD data on long-term Treasury Note futures are consistent with those expectations as well as lower 10-year rates. Tail risks in the equity markets remain low. Commodity tail risks in the oil markets have begun to rise from low levels.

Inflation

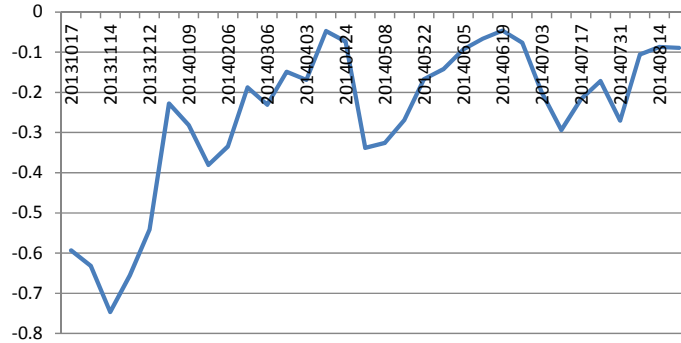
The median (risk-neutral) expected inflation rate for all expiries, as derived from caps and floors on the CPI, continues to decline. Market-based probability distributions have also shifted toward lower inflation expectations as evidenced by declining MPD skews (red line in the right chart) and rising market probabilities of lower inflation rates (red line in the left chart). A distinct change in market participants' inflation expectations now appears to be firmly in place.



Interest Rates

10-year Treasury futures prices are at the high end of their recent trading range. Directional bias as measured by the skew from the MPD derived from options on treasury futures continues to move up. Bias toward higher prices equates to lower 10-year interest rate expectations in the short term.

MPD Skew - 10y Treasury Futures



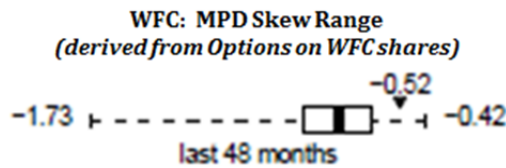
Banks & Insurance Companies

The S&P 500 rallied 4.3% over the past two weeks. Banks and insurance companies contributed to the performance. The average price change of our 17 bank universe was about 4.1% and the average price change of our 11 insurance company universe was about 5.7%. Trading was near recent average levels for the past 20 weeks but not particularly strong relative to longer history.

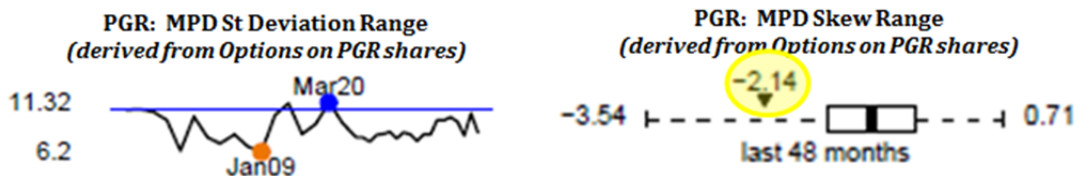
Tail risks remain low. The recent increases in MPD standard deviations that coincided with the market selloff at the end of July and the beginning of August have reversed over the past two weeks as have market probabilities for large downside price moves.

Additional Details:

- A number of firms' MPDs registered skews that indicated less market expectation for downside price moves: BBT, RF, USB, and WFC.



- Over the past year, tail risks for Progressive have been relatively stable (left graphic below) as opposed to most of its peers which have declined. On the other hand, recent options market activity indicates increased expectation for downside price changes as evidenced by a drop in MPD skew (right graphic below).

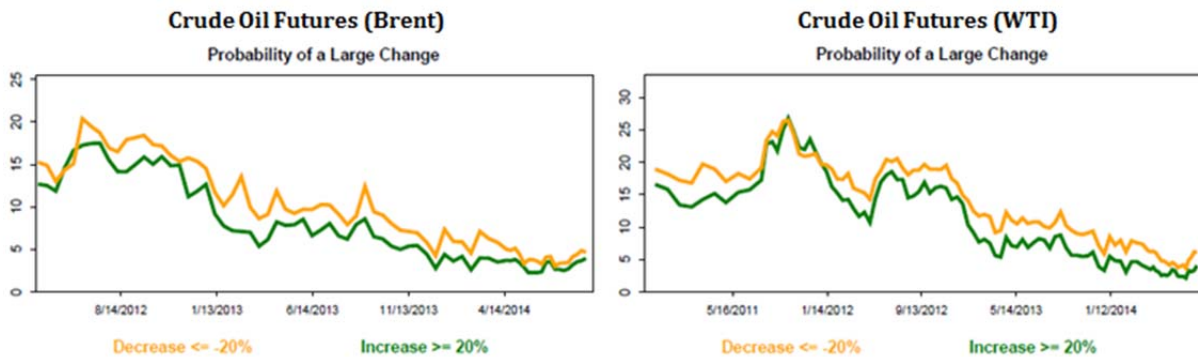


Other Commodity Markets

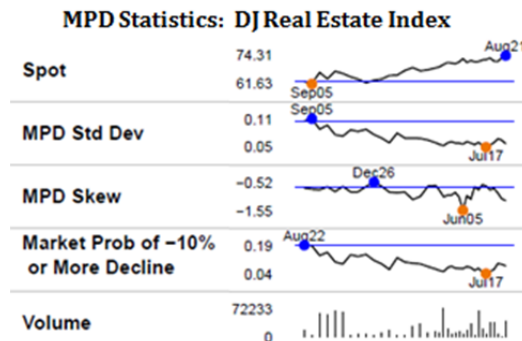
Spot prices were lower across the range of physical commodities we track. Participants traded at average levels and tail risks, as measured by standard deviations derived from options on futures prices, generally fell.

Additional Details:

- Trading in options on oil futures has focused more on the Brent crude market as opposed to the WTI market. Changes in MPD characteristics for both types of futures moved similarly despite the large difference in activity. Tail risks in these oil markets *rose* and appear to have bottomed suggesting expectations of greater oil price volatility in the near term.



- Trading was active in all three currency markets we follow. MPD characteristics have remained stable, nevertheless.
- ETF prices for the DJ Real Estate Index continue to climb (top panel below) and tail risks remain low (second panel). Over the past month we note an increase in downside market expectations (declining MPD skew, third panel) and a slight rise in market probability in the downside tail (fourth panel).



Equity, Bond, and Index MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
S&P 500 (6-Month Expiry)				
Spot	1992.37	4.3%		
MPD Std Dev	10.03%	-1.2%		
MPD Skew	-1.28	-0.18		
Market Prob of -20% or More Decline	5.23%	-0.97%		
Volume	43367	-79%		
S&P 500 (12-Month Expiry)				
Spot	1992.37	4.3%		
MPD Std Dev	15.15%	-2.6%		
MPD Skew	-1.26	-0.077		
Market Prob of -20% or More Decline	10.56%	-3.1%		
Volume	43247	-6.9%		
10 Year Treasury (3-Month Expiry)				
Spot	125.36	0.14%		
MPD Std Dev	2.41%	-0.036%		
MPD Skew	-0.09	0.017		
Market Prob of -5% or More Decline	2.51%	-0.16%		
Volume	271563	86%		
iShares US Real Estate Index (3-Month Expiry)				
Spot	74.31	3.8%		
MPD Std Dev	5.92%	-1%		
MPD Skew	-1.19	-0.27		
Market Prob of -10% or More Decline	8.48%	-1.1%		
Volume	40917	480%		

Exchange Rate MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Dollar-Euro Futures (3-Month Expiry)				
Spot	1.33	-0.58%		
MPD Std Dev	2.9%	0.36%		
MPD Skew	0.02	0.11		
Market Prob of -10% or More Decline	0.05%	0.029%		
Volume	35299	-13%		
Dollar-Pound Futures (3-Month Expiry)				
Spot	165.83	-1.5%		
MPD Std Dev	2.47%	0.0083%		
MPD Skew	-0.07	0.033		
Market Prob of -10% or More Decline	0.01%	0.00043%		
Volume	12534	-35%		
Dollar-Yen Futures (3-Month Expiry)				
Spot	96.36	-1.7%		
MPD Std Dev	3.38%	0.32%		
MPD Skew	-0.06	-0.051		
Market Prob of -10% or More Decline	0.3%	0.17%		
Volume	21927	7.9%		

Metal and Energy Commodity MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Gold (6-Month Expiry)				
Spot	1276.3	-2.8%		
MPD Std Dev	9.91%	-0.26%		
MPD Skew	-0.05	0.029		
Market Prob of -20% or More Decline	2.93%	-0.45%		
Volume	3117	-17%		
Silver (6-Month Expiry)				
Spot	19.49	-2.9%		
MPD Std Dev	13.72%	-0.46%		
MPD Skew	0	-0.065		
Market Prob of -20% or More Decline	7.1%	-0.71%		
Volume	4619	-50%		
West Texas Intermediate Crude (6-Month Expiry)				
Spot	92.68	-2.7%		
MPD Std Dev	12.22%	0.75%		
MPD Skew	-0.25	0.065		
Market Prob of -20% or More Decline	6.09%	0.74%		
Volume	1141	-24%		
Brent Crude (6-Month Expiry)				
Spot	103.85	-2.7%		
MPD Std Dev	11.52%	0.28%		
MPD Skew	-0.13	0.021		
Market Prob of -20% or More Decline	4.65%	0.25%		
Volume	84745	13%		

Agricultural Commodity MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Corn (6-Month Expiry)				
Spot	369	-0.61%		46 month low 367 369 823.75 last 46 months
MPD Std Dev	15.22%	-1.9%		12.43 15.22 29.14 last 46 months
MPD Skew	-0.07	0.017		-0.12 -0.07 0.36 last 46 months
Market Prob of -20% or More Decline	9.25%	-2.7%		5.73 9.25 29.69 last 46 months
Volume	145852	14%		6059 145852 472954 last 46 months
Soybeans (6-Month Expiry)				
Spot	1045.25	-3.8%		46 month low 1045.25 1045.25 1691.25 last 46 months
MPD Std Dev	12.86%	-0.74%		10.93 12.86 23.07 last 46 months
MPD Skew	-0.23	0.082		46 month low -0.32 -0.23 0.75 last 46 months
Market Prob of -20% or More Decline	6.96%	-1.3%		4.07 6.96 22.49 last 46 months
Volume	12797	46%		679 12797 326132 last 46 months
Wheat (6-Month Expiry)				
Spot	555.5	-4.1%		46 month low 550.25 555.5 930 last 46 months
MPD Std Dev	16.43%	-0.65%		12.95 16.43 28.19 last 46 months
MPD Skew	0.27	0.027		0.01 0.27 0.54 last 46 months
Market Prob of -20% or More Decline	10.81%	-1.2%		5.67 10.81 29.32 last 46 months
Volume	29361	-37%		362 29361 51689 last 46 months
Cattle (3-Month Expiry)				
Spot	148.6	-3%		13 month high 129.05 148.6 158.1 last 13 months
MPD Std Dev	7.4%	0.21%		13 month high 3.6 7.4 7.6 last 13 months
MPD Skew	-0.35	0.27		-0.94 -0.35 -0.17 last 13 months
Market Prob of -5% or More Decline	23.56%	2.3%		13 month high 8.46 23.56 24.31 last 13 months
Volume	20840	22%		1263 20840 33850 last 13 months

Bank MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
MPD Standard Deviation (3-Month Expiry)				
American Express	8.09%	-0.58%		48 month low 8.09 8.09 ----- 24.05 last 48 months
Bank of America	10.22%	-0.8%		48 month low 10.22 10.22 ----- 44.07 last 48 months
BB&T	7.82%	-0.66%		7.82 7.29 ----- 27.58 last 48 months
Barclays	12.78%	-1.2%		12.78 12.36 ----- 42.39 last 48 months
Bank of NY Mellon	9.13%	-1.3%		48 month low 9.13 7.88 ----- 27.34 last 48 months
Citigroup	8.95%	-0.77%		48 month low 8.95 8.52 ----- 33.38 last 48 months
Capital One	8.91%	-0.54%		48 month low 8.91 7.72 ----- 29.49 last 48 months
Credit Suisse	12.24%	-0.23%		12.24 9.84 ----- 34.13 last 48 months
Deutsche Bank	13.78%	-0.61%		13.78 11.33 ----- 41.68 last 48 months
Fifth Third	8.77%	-2.2%		8.77 8.21 ----- 30.73 last 48 months
Goldman Sachs	8.37%	-0.62%		8.37 8.23 ----- 31.2 last 48 months
JP Morgan	8.48%	-0.67%		48 month low 8.48 7.41 ----- 30.37 last 48 months
Keycorp	12.12%	-0.12%		12.12 9.76 ----- 35.48 last 48 months
Morgan Stanley	10.12%	-0.9%		48 month low 10.12 10.11 ----- 41.77 last 48 months
PNC Financial	7.52%	-1.2%		7.52 7.45 ----- 26.31 last 48 months
Regions Financial	11.04%	-1.5%		48 month low 11.04 11.04 ----- 39.37 last 48 months
SunTrust	8.87%	-0.97%		48 month low 8.87 8.87 ----- 34.43 last 48 months
State Street	8.9%	-2.3%		48 month low 8.9 8.9 ----- 27.95 last 48 months
UBS	10.49%	-5e-04%		48 month low 10.49 10.49 ----- 39.87 last 48 months
US Bancorp	7.23%	-0.79%		Last time higher Jun2013 7.23 6.58 ----- 26.01 last 48 months
Wells Fargo	7.51%	-0.31%		7.51 7.16 ----- 28.37 last 48 months

Bank MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
MPD Skew (3-Month Expiry)				
American Express	-0.41	0.022		48 month high -1.32 last 48 months -0.41 -0.21
Bank of America	-0.4	0.0032		-1.17 last 48 months -0.4 -0.02
BB&T	-0.42	0.047		Last time higher Dec2012 -1.54 last 48 months -0.42 -0.15
Barclays	-0.6	-0.61		-1.97 last 48 months -0.6 1.94
Bank of NY Mellon	-0.59	0.098		48 month high -1.56 last 48 months -0.59 0.14
Citigroup	-0.49	0.062		-1.23 last 48 months -0.49 0.63
Capital One	-0.61	-0.2		48 month high -1.38 last 48 months -0.61 -0.24
Credit Suisse	-0.46	-0.31		-2.07 last 48 months -0.46 0.43
Deutsche Bank	-0.53	-0.16		-1.31 last 48 months -0.53 0.48
Fifth Third	-0.63	0.0045		-1.45 last 48 months -0.63 0.3
Goldman Sachs	-0.72	-0.065		Last time lower Dec2012 -1.38 last 48 months -0.72 -0.34
JP Morgan	-0.56	0.099		Last time lower Aug2013 -1.44 last 48 months -0.56 -0.33
Keycorp	-0.69	-0.42		-2.24 last 48 months -0.69 0.4
Morgan Stanley	-0.48	-0.092		Last time higher Mar2013 -1.2 last 48 months -0.48 -0.25
PNC Financial	-0.74	-0.073		Last time higher Apr2011 -1.51 last 48 months -0.74 0.07
Regions Financial	-0.24	-0.27		Last time higher Jul2013 -1.94 last 48 months -0.24 0.1
SunTrust	-0.52	-0.092		Last time higher Feb2011 -1.16 last 48 months -0.52 -0.18
State Street	-0.77	-0.64		Last time lower May2013 -1.28 last 48 months -0.77 -0.13
UBS	-1.22	-0.016		Last time higher Oct2012 -3.36 last 48 months -1.22 0.97
US Bancorp	-0.51	0.42		48 month high -1.45 last 48 months -0.51 -0.31
Wells Fargo	-0.52	0.23		Last time lower Jun2013 -1.73 last 48 months -0.52 -0.42

Bank MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Market Probability of -20% or More Decline (3-Month Expiry)				
American Express	1.76%	-0.65%		48 month low 1.76, last 48 months IQR: 1.76-3.89, Max: 17.67
Bank of America	3.89%	-0.96%		48 month low 3.13, last 48 months IQR: 3.13-3.89, Max: 27.24
BB&T	1.82%	-0.92%		48 month low 1.82, last 48 months IQR: 1.82-1.82, Max: 34.9
Barclays	7.81%	-0.74%		48 month low 5.75, last 48 months IQR: 5.75-7.81, Max: 30.94
Bank of NY Mellon	3.32%	-1.3%		48 month low 1.72, last 48 months IQR: 1.72-3.32, Max: 21.34
Citigroup	2.54%	-1%		48 month low 1.93, last 48 months IQR: 1.93-2.54, Max: 24.59
Capital One	2.91%	-0.65%		48 month low 1.64, last 48 months IQR: 1.64-2.91, Max: 21.29
Credit Suisse	6.82%	0.038%		48 month low 3.77, last 48 months IQR: 3.77-6.82, Max: 28.61
Deutsche Bank	8%	-1.4%		48 month low 4.99, last 48 months IQR: 4.99-8, Max: 29.63
Fifth Third	3.17%	-1.1%		48 month low 0.99, last 48 months IQR: 0.99-3.17, Max: 27.19
Goldman Sachs	2.29%	-0.53%		48 month low 1.79, last 48 months IQR: 1.79-2.29, Max: 21.46
JP Morgan	2.59%	-0.9%		48 month low 1.31, last 48 months IQR: 1.31-2.59, Max: 20.52
Keycorp	6.73%	-0.16%		48 month low 2.82, last 48 months IQR: 2.82-6.73, Max: 27.26
Morgan Stanley	3.79%	-0.99%		48 month low 3.79, last 48 months IQR: 3.79-3.79, Max: 26.47
PNC Financial	1.76%	-1.4%		48 month low 1.66, last 48 months IQR: 1.66-1.76, Max: 17.91
Regions Financial	5.17%	-1.7%		48 month low 4.32, last 48 months IQR: 4.32-5.17, Max: 29.69
SunTrust	2%	-1.4%		48 month low 1.73, last 48 months IQR: 1.73-2, Max: 26.4
State Street	3.08%	-1.8%		48 month low 3.08, last 48 months IQR: 3.08-3.08, Max: 19.69
UBS	4.96%	-0.44%		48 month low 3.89, last 48 months IQR: 3.89-4.96, Max: 27.33
US Bancorp	1.28%	-0.89%		48 month low 0.74, last 48 months IQR: 0.74-1.28, Max: 18.85
Wells Fargo	1.51%	-0.42%		48 month low 1.3, last 48 months IQR: 1.3-1.51, Max: 20.71

Bank MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Volume (3-Month Expiry)				
American Express	7239	190%	11926 0	623 - 7239 - 23041 last 48 months
Bank of America	81732	54%	132589 0	7419 - 81732 - 363160 last 48 months
BB&T	3219	62%	6490 0	190 - 3219 - 6903 last 48 months
Barclays	351	320%	2910 0	29 - 351 - 15208 last 48 months
Bank of NY Mellon	74	-83%	15678 0	59 - 74 - 17091 last 48 months
Citigroup	5925	230%	78527 0	1104 - 5925 - 284278 last 48 months
Capital One	1153	360%	9311 0	189 - 1153 - 38646 last 48 months
Credit Suisse	61	-27%	4011 0	0 - 61 - 14201 last 48 months
Deutsche Bank	2249	-14%	7910 0	62 - 2249 - 29575 last 48 months
Fifth Third	4588	400%	15351 0	28 - 4588 - 19324 last 48 months
Goldman Sachs	6689	89%	21840 0	296 - 6689 - 43413 last 48 months
JP Morgan	7444	86%	52517 0	943 - 7444 - 119246 last 48 months
Keycorp	333	400%	2780 0	66 - 333 - 76270 last 48 months
Morgan Stanley	9928	37%	32137 0	327 - 9928 - 84281 last 48 months
PNC Financial	970	110%	4810 0	118 - 970 - 13224 last 48 months
Regions Financial	3585	66%	6989 0	20 - 3585 - 19649 last 48 months
SunTrust	3905	440%	4232 0	61 - 3905 - 13788 last 48 months
State Street	471	140%	5339 0	42 - 471 - 5370 last 48 months
UBS	87	-19%	2766 0	6 - 87 - 6502 last 48 months
US Bancorp	523	-59%	5746 0	261 - 523 - 29201 last 48 months
Wells Fargo	9272	160%	121351 0	950 - 9272 - 167820 last 48 months

Insurance Company MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
MPD Standard Deviation (3-Month Expiry)				
Aflac	7.29%	-1.3%		
AIG	8.73%	-1.2%		
Allstate	6.88%	0.49%		
Ameriprise	10.5%	-0.51%		
Chubb	7.47%	0.46%		
Hartford Financial	9.28%	-0.88%		
Lincoln National	10.83%	-1.5%		
Met Life	10.76%	-0.32%		
Principle Financial	10.57%	-2.5%		
Progressive	8.18%	-2%		
Prudential	10.49%	-1.1%		

Insurance Company MPD Statistics as of August 21, 2014

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
MPD Skew (3-Month Expiry)				
Aflac	-0.66	0.054		
AIG	-0.56	-0.018		
Allstate	-1.11	0.079		
Ameriprise	-0.68	-0.082		
Chubb	-0.47	-0.26		
Hartford Financial	-0.86	-0.0035		
Lincoln National	-0.57	-0.089		
Met Life	-0.58	-0.075		
Principle Financial	-2.8	-1.1		
Progressive	-2.14	-1.7		
Prudential	-0.77	-0.046		

Insurance Company MPD Statistics as of August 21, 2014

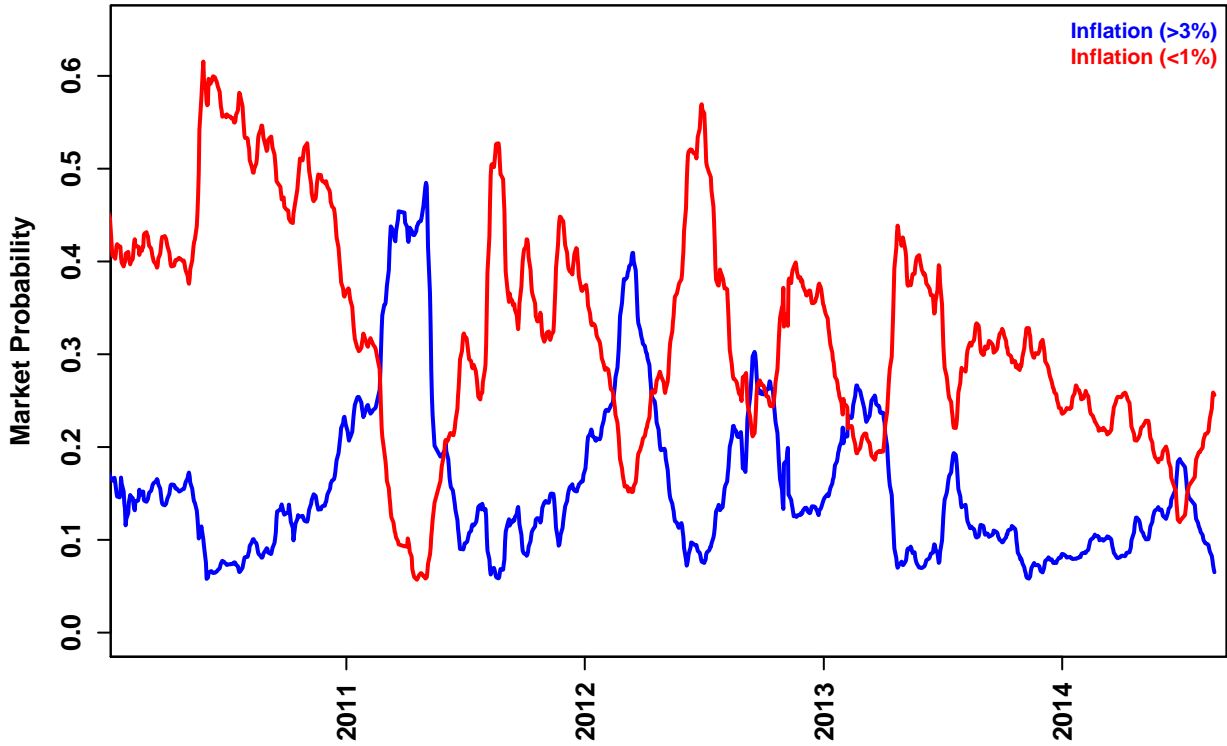
Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Market Probability of -20% or More Decline (3-Month Expiry)				
Aflac	1.55%	-1.2%		
AIG	2.59%	-1.1%		
Allstate	1.41%	0.19%		
Ameriprise	4.89%	-0.58%		
Chubb	1.49%	0.85%		
Hartford Financial	3.62%	-1.1%		
Lincoln National	4.7%	-1.9%		
Met Life	5.05%	-1%		
Principle Financial	7.07%	0.15%		
Progressive	2.49%	-1.6%		
Prudential	5.21%	-2.2%		

Insurance Company MPD Statistics as of August 21, 2014

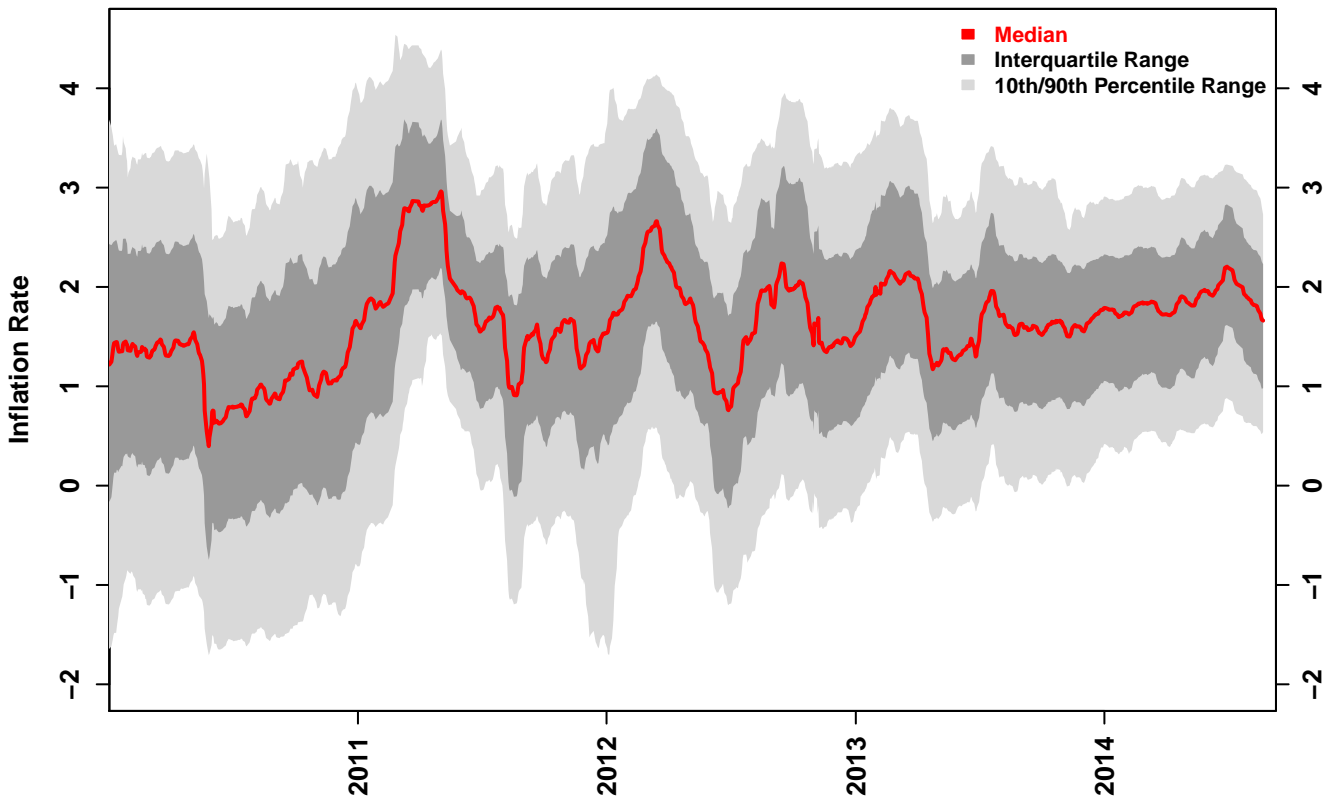
Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Volume (3-Month Expiry)				
Aflac	2499	110%	3933 0	2499 541 22718 last 48 months
AIG	12368	-57%	38744 0	12368 432 103998 last 48 months
Allstate	403	1.8%	5708 0	403 119 93106 last 48 months
Ameriprise	143	70%	1114 0	143 5 1317 last 48 months
Chubb	81	-44%	2541 0	81 43 30168 last 48 months
Hartford Financial	1887	-52%	13441 0	1887 198 37285 last 48 months
Lincoln National	752	330%	8403 0	752 51 41277 last 48 months
Met Life	378	-54%	14685 0	378 319 161416 last 48 months
Principle Financial	78	44%	306 0	78 2 36464 last 48 months
Progressive	365	4000%	680 0	365 0 4335 last 48 months
Prudential	911	-88%	13225 0	911 222 13225 last 48 months

MARKET PROBABILITY DENSITY FUNCTIONS -- Inflation Rate Caps & Floors

Market Probability of Elevated Inflation or Deflation over 12 Months 5-Day Rolling Average

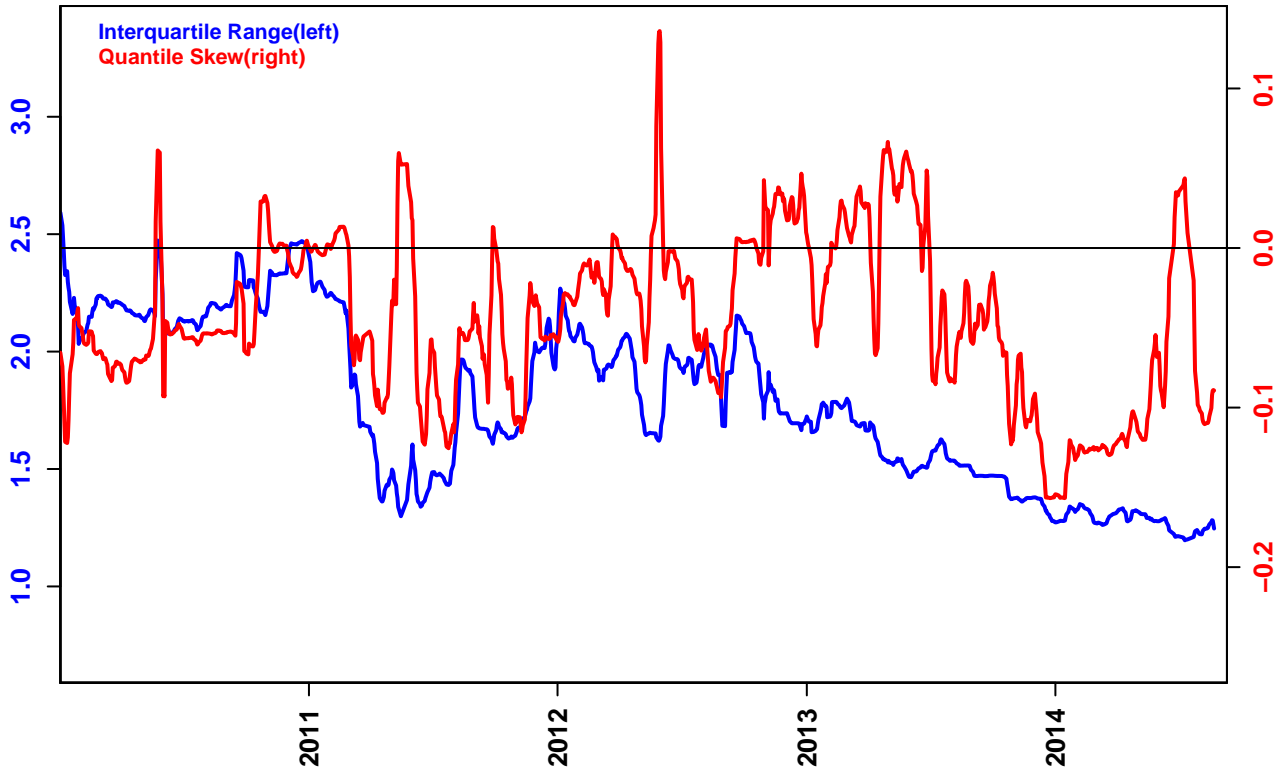


Distribution for Inflation over 12 Months 5-Day Rolling Average



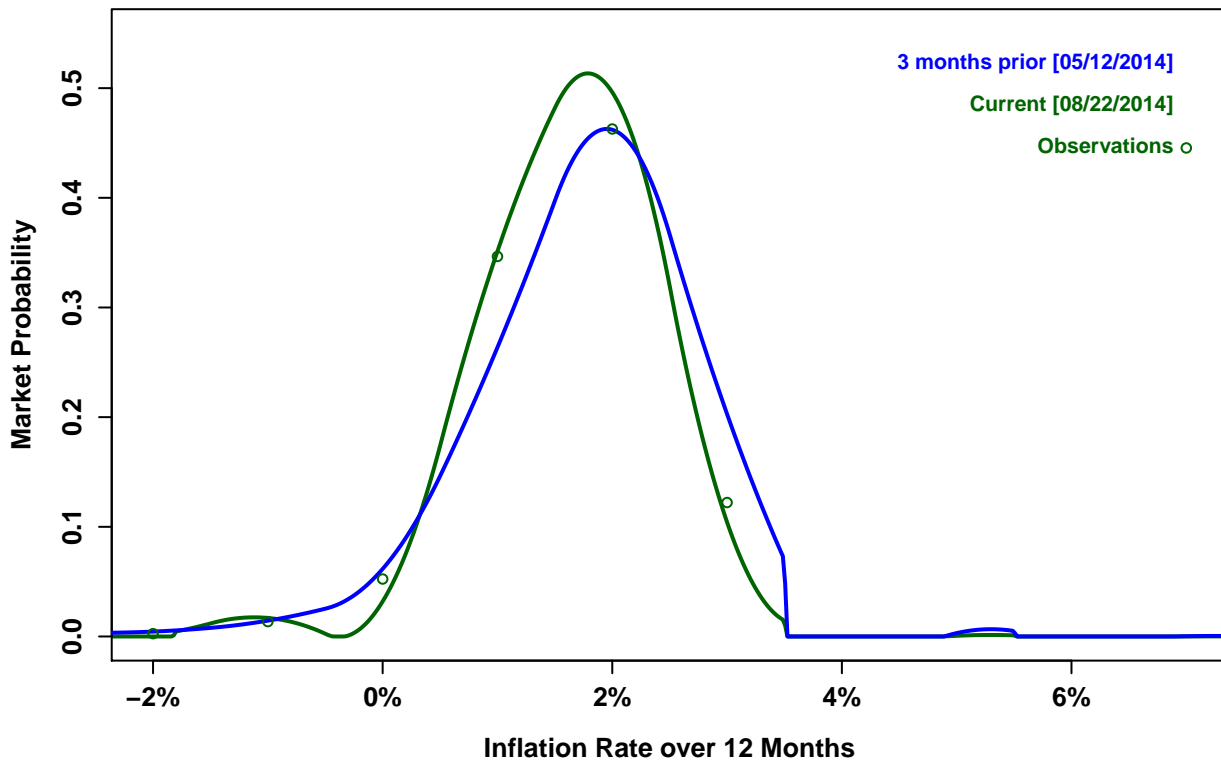
MARKET PROBABILITY DENSITY FUNCTIONS -- Inflation Rate Caps & Floors

Dispersion and Skew for Inflation over 12 Months 5-Day Rolling Average



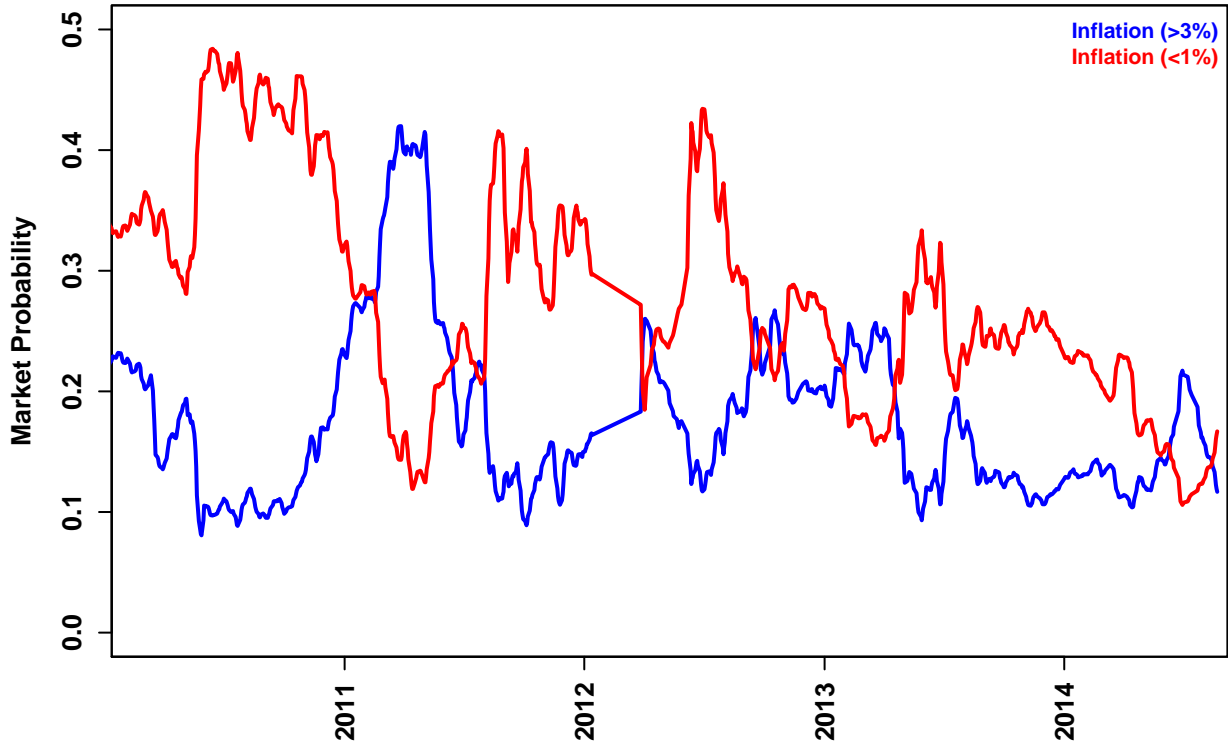
Note: Quantile skew is defined here as $[(75\text{th pctile} - \text{median}) - (\text{median} - 25\text{th pctile})] / (75\text{th} - 25\text{th pctile})$

Market Probability Density Function for Inflation over the Next 12 Months

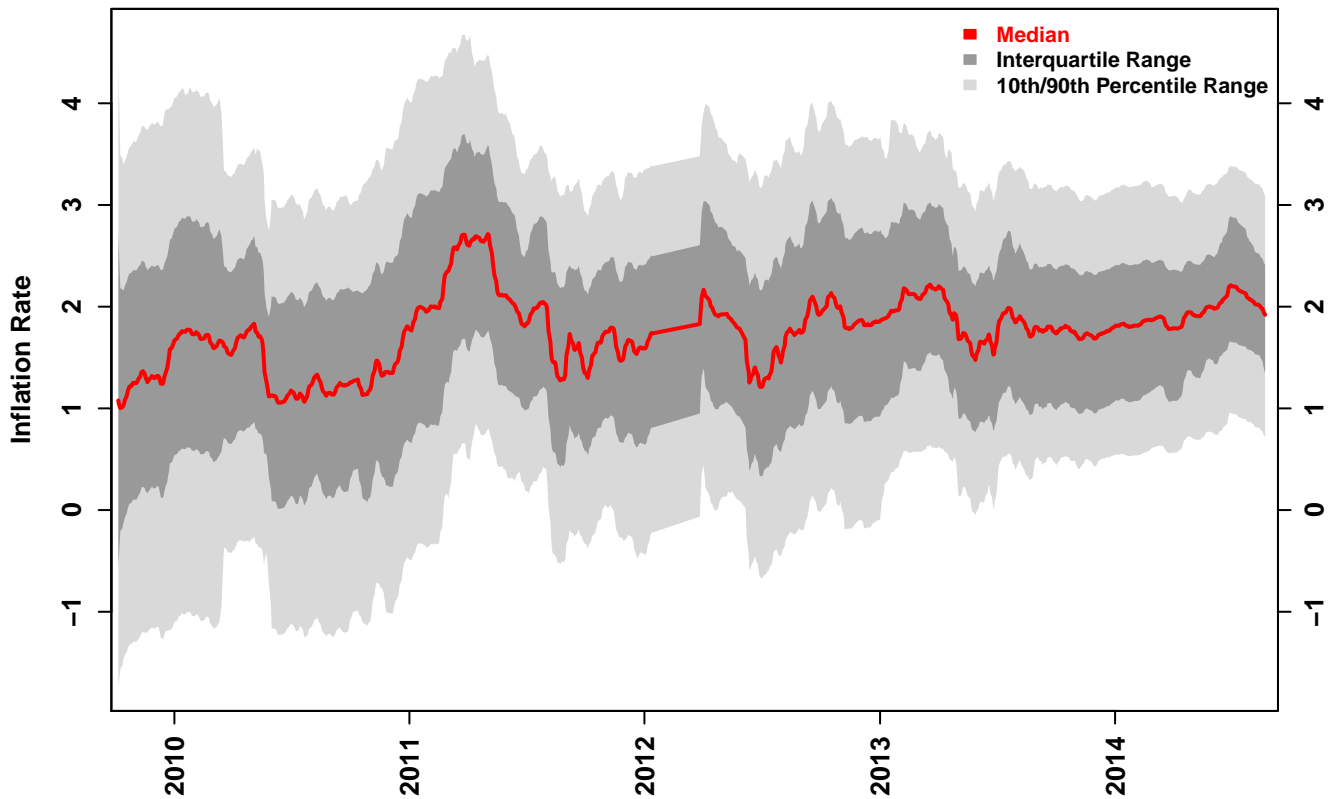


MARKET PROBABILITY DENSITY FUNCTIONS -- Inflation Rate Caps & Floors

Market Probability of Elevated Inflation or Deflation over 2 Years, 5-Day Rolling Average

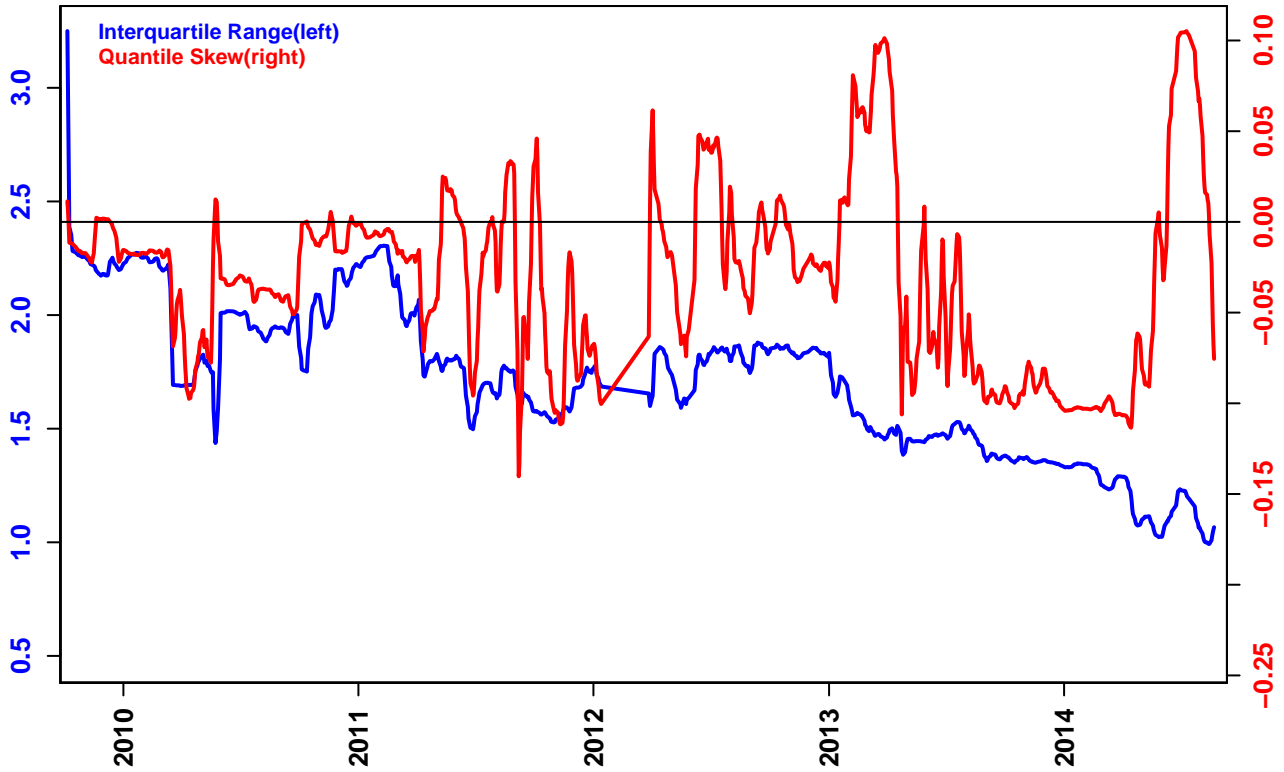


Distribution for Inflation over 2 Years 5-Day Rolling Average



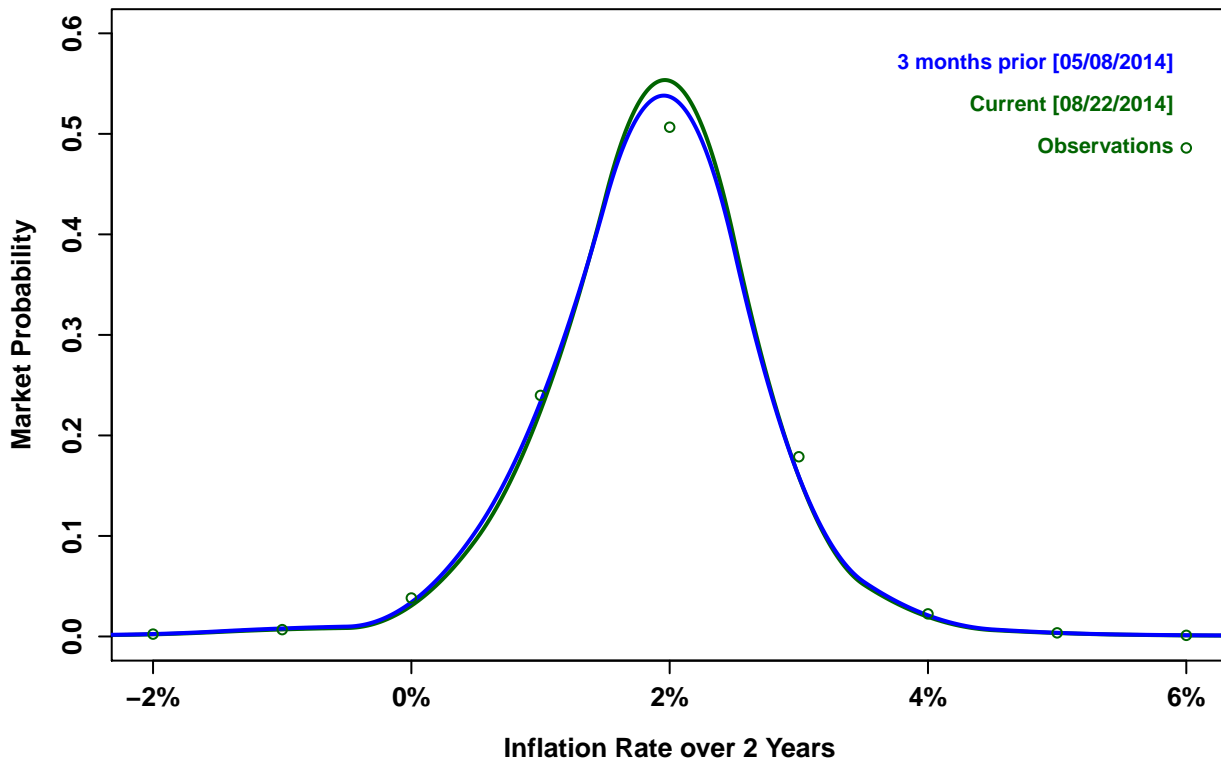
MARKET PROBABILITY DENSITY FUNCTIONS -- Inflation Rate Caps & Floors

Dispersion and Skew for Inflation over 2 Years 5-Day Rolling Average



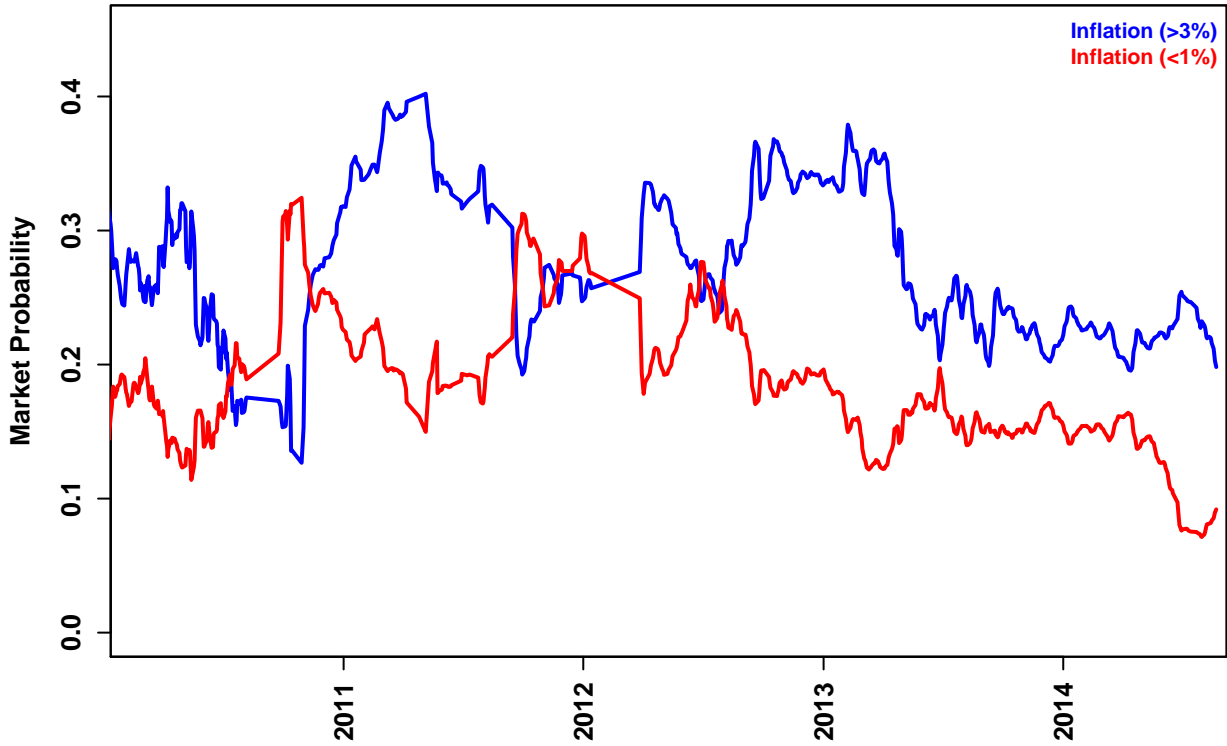
Note: Quantile skew is defined here as $[(75\text{th pctile} - \text{median}) - (\text{median} - 25\text{th pctile})] / (75\text{th} - 25\text{th pctile})$

Market Probability Density Function for Inflation over the Next 2 Years

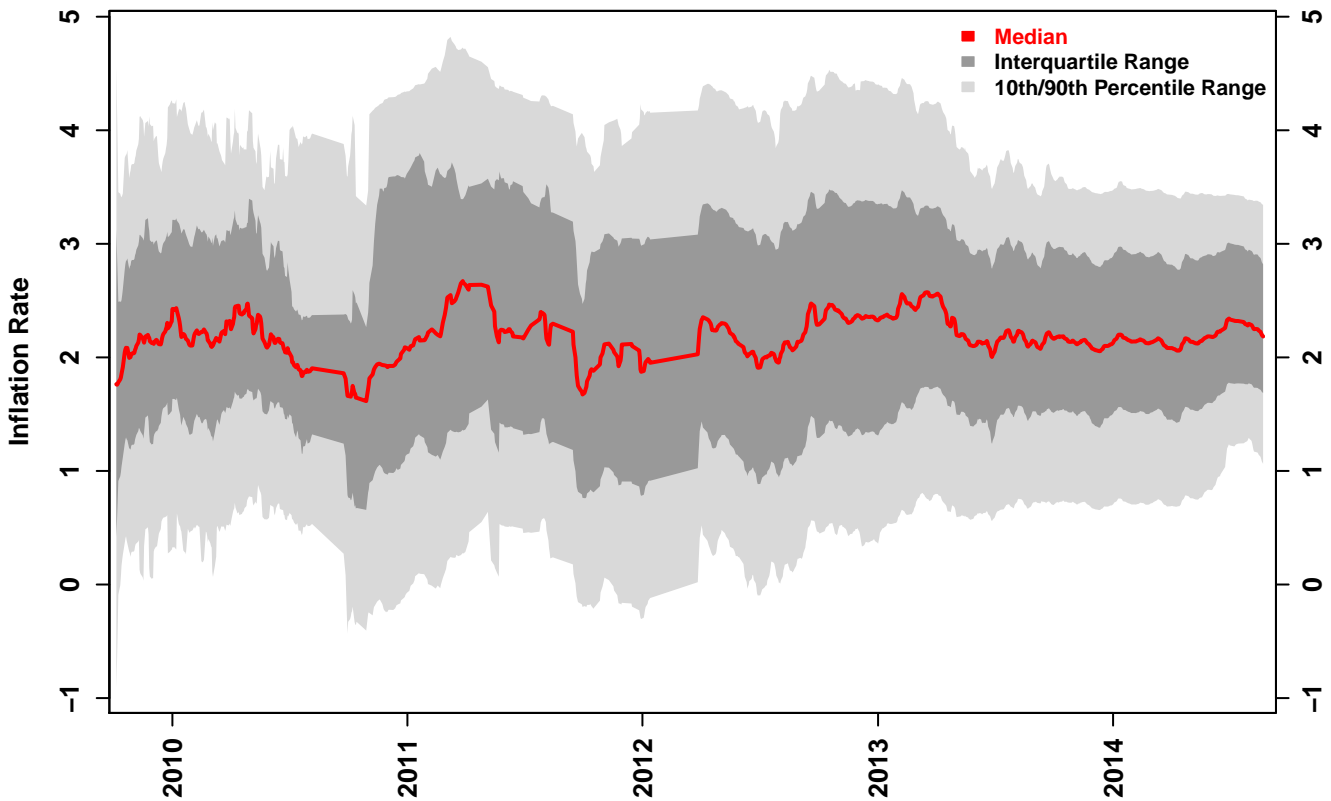


MARKET PROBABILITY DENSITY FUNCTIONS -- Inflation Rate Caps & Floors

Market Probability of Elevated Inflation or Deflation over 5 Years, 5-Day Rolling Average

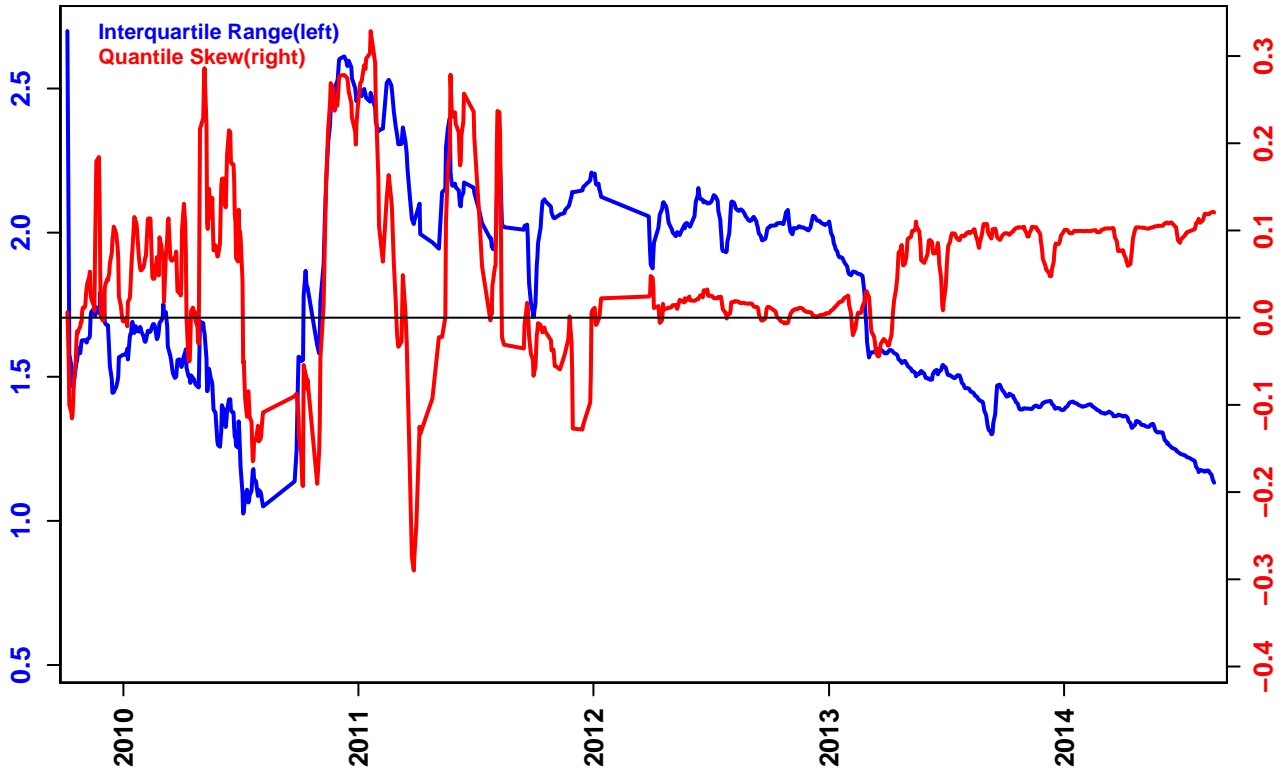


Distribution for Inflation over 5 Years 5-Day Rolling Average



MARKET PROBABILITY DENSITY FUNCTIONS -- Inflation Rate Caps & Floors

Dispersion and Skew for Inflation over 5 Years 5-Day Rolling Average



Note: Quantile skew is defined here as $[(75\text{th pctile} - \text{median}) - (\text{median} - 25\text{th pctile})] / (75\text{th} - 25\text{th pctile})$

Market Probability Density Function for Inflation over the Next 5 Years

