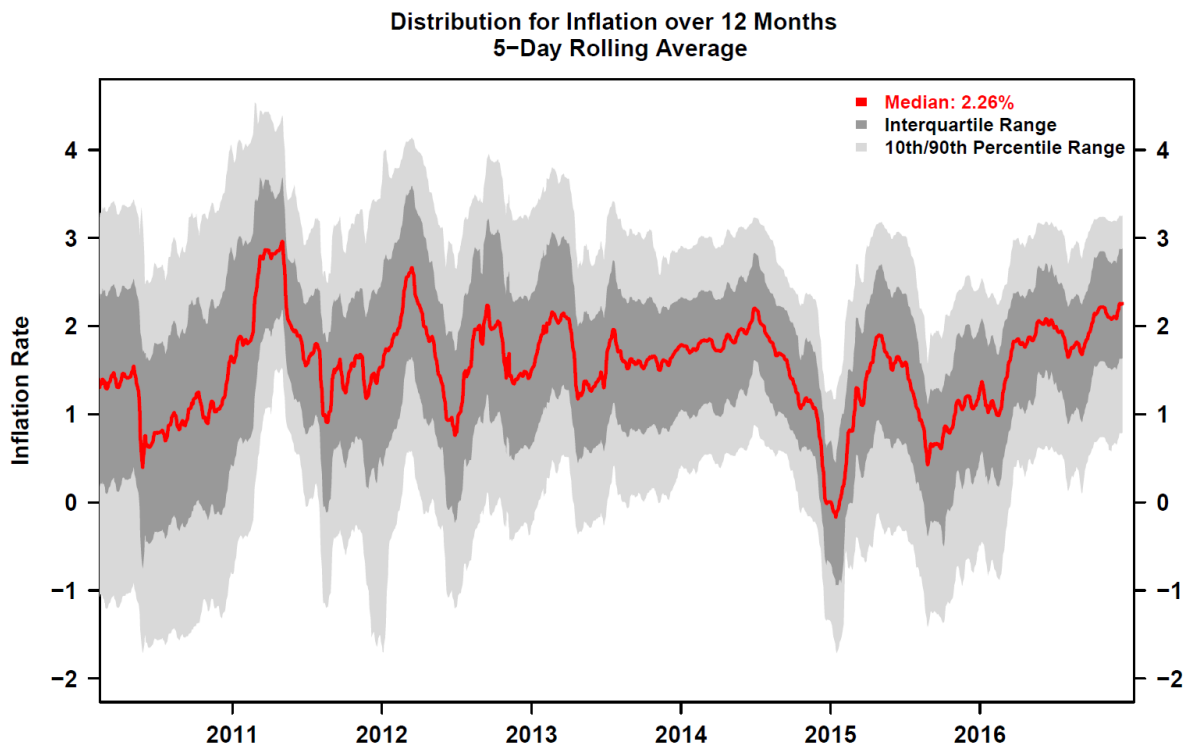


Minneapolis Options Report – Dec 16th

Median inflation expectations rose for both the 1- and 5-year inflation tenors over the two week period; of note, median expectations for the 5-year tenor have steadily increased since August 2016. Treasury prices registered new lows while MPD skews, which also set new lows, signal that investors are biased towards further price erosion in the future. The S&P 500 returned 2.5%; the 19 banks we follow outperformed the broader market posting an average 5.3% return whereas the 11 insurance firms we follow underperformed, on average, with a 2.3% return. USD-Euro and USD-Yen currency pairs experienced large decreases in MPD standard deviation implying that investor uncertainty has fallen regarding the two currency pairs. WTI crude rose by 4.4% while setting record combined volumes over the prior two weeks. Lean hogs surged by 25%.

Inflation

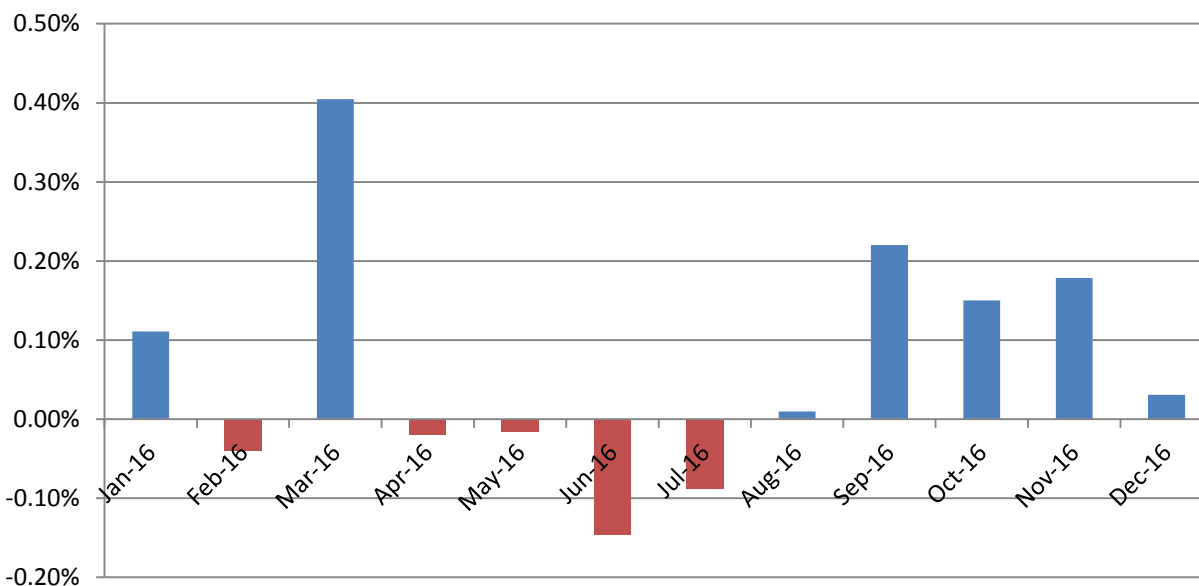
Market-based inflation expectations derived from caps and floors on the CPI for 1- and 5-year periods rose for both inflation tenors as the 1-year increased by 11 bps and the 5-year tenor gained 3.1 bps. Median inflation expectations currently stand at 2.26% and 2.12% for the 1- and 5-year tenors respectively. The increase registered by the 1-year tenor is shown for reference (see figure, below).



Additional detail:

- The probability of high inflation, defined as the market probability of more than 3% inflation climbed higher for the 1- and 5-year tenors, and mark 12-month highs for both. The metric has increased steadily for both tenors since early September 2016.
- Median expectations for the 5-year tenor are at the highest level in a year. Excepting slight declines from April 2016 through July 2016, the 5-year tenor has experienced increases for most of the year including five consecutive months beginning in August 2016 (see figure, below).

Monthly Changes in Median Inflation Expectations (5-year Expiry)



Interest Rate

Treasuries registered their lowest prices in a year with the 5- and 10-year Treasury notes declining by -0.6% and -0.9% respectively; as a consequence yields rose. MPD skews for the 5- and 10-year Treasury notes set new one year lows. Both MPD skews have trended lower since June 2016 and currently indicate that investors are biased towards lower treasury prices in the future. The 3- and 5-year LIBOR increased by a respective 12 bps and 45 bps over the two week period, with the 3-year LIBOR set a new 1-year high. MPD standard deviation increased to their highest levels within a year for both LIBOR tenors implying that investors have become more uncertain about the short interest rates.

Banks and Insurance Companies

The S&P 500 rose by 2.5% over the past two weeks, ending at an all-time high. The 6- and 12-month tenors posted an average MPD standard deviation decrease of -0.27 percentage points. The 19 banking firms we follow outperformed the S&P 500 with a 5.3% return. The 11 insurance companies we follow underperformed the broader market index returning 2.3% on average.

Additional details:

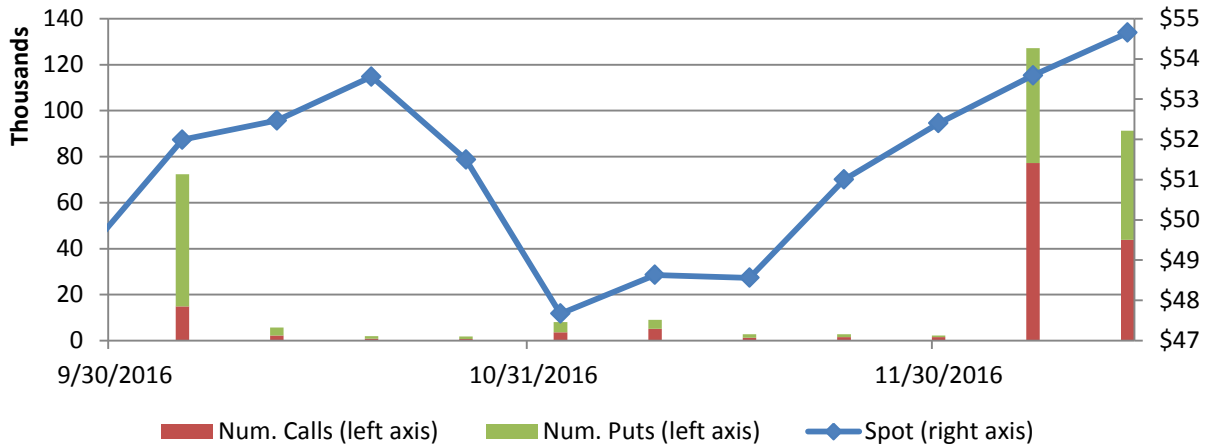
- While the S&P 500 posted a decline in MPD standard deviation, the metric increased for all 19 banks. MPD standard deviation level for 18 of the 19 banks currently stands above the 75th percentile value for the prior 48-months of observations indicating that investor uncertainty has increased for the banks.

Other Markets

- The iShares US Real Estate Index underperformed the market returning 2%.
- The dollar was stronger against the yen and weaker against the pound. MPD standard deviation fell across all currencies we follow with the USD-Euro and USD-Yen declining by -3.6 and -2.3 percentage points.
- Silver jumped by 4.4% over the two-week period. MPD skews for gold and silver indicated neutral investor bias towards future prices.
- WTI crude gained 4.3% over the two week period, the current spot price coincides with its highest level in 12 months. MPD standard deviation decreased by -3.1 percentage points signaling a decrease in investor uncertainty. Options volume, this week and last, for WTI crude

was at its highest level for any two consecutive weeks this year. Call and put volume was roughly equal for each of these weeks (see plot, below).

WTI Crude Options Volume and Spot Price for 2016Q4



- Corn and wheat logged an average increase of 3.5%. While changes in MPD statistics were largely flat, MPD skews for both crops currently signal investor bias towards higher future prices.
- Lean hogs jumped by 25% over the two week period. MPD standard deviation fell by -4.5 percentage points, continuing a decline which began in September, 2016.



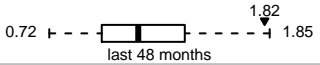

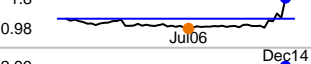
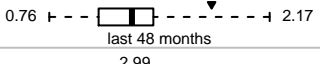

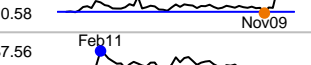
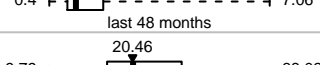


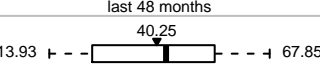





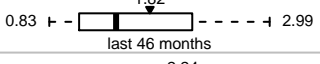

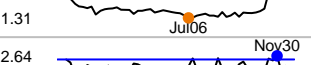
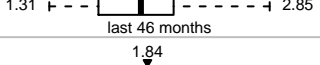

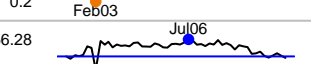
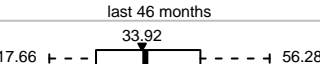


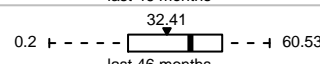



Inflation MPD Statistics as of December 14, 2016

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Inflation (1-Year Expiry)				
Median	2.26%	0.11%		
MPD Std Dev	0.98%	-0.023%		
MPD Skew	-1.47	-0.11		
Market Prob of Less Than 1% Inflation	12.7%	-1.9%		
Market Prob of More Than 3% Inflation	20.24%	2.5%		
Inflation (5-Year Expiry)				
Median	2.12%	0.031%		
MPD Std Dev	1%	-0.0027%		
MPD Skew	-0.23	-0.015		
Market Prob of Less Than 1% Inflation	12.12%	-0.75%		
Market Prob of More Than 3% Inflation	18.41%	0.97%		

Medium-to-Long Bond Price MPD Statistics as of December 14, 2016

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
5 Year Treasury (3-Month Expiry)				
Spot	117.13	-0.59%	122.32 117.13 	117.13 122.32 last 27 months
MPD Std Dev	1.79%	-0.15%	1.96 1.3 	1.3 2.3 last 27 months 1.79
MPD Skew	-0.67	-0.14	0.19 -0.67 	-0.67 0.36 last 27 months
Market Prob of -3% or More Decline	5.56%	-0.95%	6.51 1.84 	1.84 8.74 last 27 months 5.56
Volume	30138	-50%	335039 0 	1678 377550 last 27 months 30138
10 Year Treasury (3-Month Expiry)				
Spot	123.41	-0.89%	133.67 123.41 	122.97 133.67 last 38 months
MPD Std Dev	3.1%	-0.12%	3.28 2.14 	2.14 3.8 last 38 months 3.1
MPD Skew	-0.31	-0.054	0.21 -0.31 	-0.75 0.31 last 38 months -0.31
Market Prob of -5% or More Decline	5.85%	-0.6%	6.45 1.54 	1.54 8.48 last 38 months 5.85
Volume	324856	84%	1143418 0 	5226 1185091 last 38 months 324856

Short Interest Rates MPD Statistics as of December 14, 2016

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
3 Month LIBOR (3-Year Expiry)				
Median	1.82%	 0.12%		
MPD Std Dev	1.8%	 0.42%		
MPD Skew	2.99	 0.63		
Market Prob of Less Than 0.5% LIBOR	20.46%	 4.1%		
Market Prob of More Than 1% + Spot	40.25%	 3.6%		
3 Month LIBOR (5-Year Expiry)				
Median	1.82%	 0.45%		
MPD Std Dev	2.24%	 0.011%		
MPD Skew	1.84	 -0.8		
Market Prob of Less Than 1% LIBOR	33.92%	 -5.6%		
Market Prob of More Than 2% + Spot	32.41%	 3%		

Equity Index MPD Statistics as of December 14, 2016

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	2253.28	2.5%		
MPD Std Dev	10.9%	-0.26%		
MPD Skew	-1.13	0.028		
Market Prob of -20% or More Decline	5.49%	-0.39%		
Volume	157494	200%		
S&P 500 (12-Month Expiry)				
Spot	2253.28	2.5%		
MPD Std Dev	17.19%	-0.29%		
MPD Skew	-1.2	0.065		
Market Prob of -20% or More Decline	12.04%	-0.47%		
Volume	101891	130%		
iShares US Real Estate Index (3-Month Expiry)				
Spot	76.36	2%		
MPD Std Dev	9.77%	0.069%		
MPD Skew	-0.74	0.11		
Market Prob of -10% or More Decline	15.49%	0.046%		
Volume	10114	-35%		

Exchange Rate MPD Statistics as of December 14, 2016

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	1.06	0%	1.15 1.06 May04 Nov23 Nov30	1.05 - 1.39 last 48 months
MPD Std Dev	5.14%	-3.6%	8.76 3.74 Aug10	2.4 - 8.76 last 48 months
MPD Skew	-0.42	-0.36	0.16 -0.6 Feb04 Jun15	-0.6 - 0.2 last 48 months
Market Prob of -10% or More Decline	3.52%	-7.6%	11.08 0.63 Aug10 Nov30	0.02 - 11.08 last 48 months
Volume	41489	-48%	110627 0	5162 - 110627 last 48 months
Dollar-Pound Futures (3-Month Expiry)				
Spot	126.29	0.95%	150.67 122.1 Dec16 Oct12	122.1 - 171.39 last 48 months
MPD Std Dev	4.95%	-0.63%	9.66 3.77 Dec16 Jun15	2.36 - 9.66 last 48 months
MPD Skew	-0.41	-0.26	0 -1.09 Aug31 Jun22	-1.09 - 0.1 last 48 months
Market Prob of -10% or More Decline	3.28%	-0.57%	14.78 0.96 Dec16 Jun15	0.01 - 14.78 last 48 months
Volume	3707	-66%	32199 0	992 - 38626 last 48 months
Dollar-Yen Futures (3-Month Expiry)				
Spot	86.3	-1.4%	99.92 82.3 Dec16 Aug17	80.11 - 116.32 last 48 months
MPD Std Dev	5.92%	-2.3%	8.22 4.13 Dec24 Nov30	2.76 - 8.83 last 48 months
MPD Skew	0.18	0.11	0.46 -0.05 Jun22 May25	-0.4 - 0.46 last 48 months
Market Prob of -10% or More Decline	4.25%	-5.5%	9.77 0.82 Jan01 Nov30	0.02 - 11.17 last 48 months
Volume	10764	-68%	61215 0	1611 - 61215 last 48 months

Metal and Energy Commodity MPD Statistics as of December 14, 2016

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	1168.58	-0.63%		
MPD Std Dev	11.84%	0.11%		
MPD Skew	-0.07	0.32		
Market Prob of -20% or More Decline	5.42%	0.019%		
Volume	20522	230%		
Silver (6-Month Expiry)				
Spot	17.26	4.4%		
MPD Std Dev	18.05%	-0.11%		
MPD Skew	0	0.084		
Market Prob of -20% or More Decline	13.63%	-0.38%		
Volume	753	-60%		
West Texas Intermediate Crude (6-Month Expiry)				
Spot	54.65	4.3%		
MPD Std Dev	22.19%	-3.1%		
MPD Skew	-0.71	-0.14		
Market Prob of -20% or More Decline	17.83%	-3.7%		
Volume	91257	4100%		

Agricultural Crop Commodity MPD Statistics as of December 14, 2016

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	368.4	3.6%		
MPD Std Dev	14.67%	0.84%		
MPD Skew	0.21	0.085		
Market Prob of -20% or More Decline	8.78%	1.1%		
Volume	7091	-3.2%		
Soybeans (6-Month Expiry)				
Spot	1041.56	-0.66%		
MPD Std Dev	12.89%	-0.5%		
MPD Skew	0.09	-0.01		
Market Prob of -20% or More Decline	6.27%	-0.88%		
Volume	11610	-22%		
Wheat (6-Month Expiry)				
Spot	428.57	3.3%		
MPD Std Dev	15.31%	-0.14%		
MPD Skew	0.53	0.069		
Market Prob of -20% or More Decline	9.1%	-0.6%		
Volume	2037	28%		

Agricultural Livestock Commodity MPD Statistics as of December 14, 2016

Indicator	Latest	2-Week Change	1-Year Trend with min/max points	Long-Term Range with median, IQR, and max/min
Cattle (6-Month Expiry)				
Spot	103.18	-7.7%		
MPD Std Dev	12.99%	-0.5%		
MPD Skew	-0.7	-0.057		
Market Prob of -5% or More Decline	30.81%	-0.098%		
Volume	5468	-51%		
Hogs (6-Month Expiry)				
Spot	77.17	25%		
MPD Std Dev	13.08%	-4.5%		
MPD Skew	-0.73	0.042		
Market Prob of -20% or More Decline	7.78%	-5.4%		
Volume	6855	120%		

Bank MPD Statistics as of December 14, 2016

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	12.35%	0.86%		
Bank of America	16.31%	2.2%		
BB&T	11.39%	0.63%		
Barclays	18.2%	2.9%		
Bank of NY Mellon	12.64%	0.75%		
Citigroup	14.27%	1.1%		
Capital One	14.34%	0.29%		
Credit Suisse	17.95%	0.83%		
Deutsche Bank	23.69%			
Fifth Third	14.5%	0.5%		
Goldman Sachs	13.9%	2.2%		
JP Morgan	12.02%	0.95%		
Keycorp	15.36%	0.6%		
Morgan Stanley	15.1%	1.7%		
PNC Financial	11.56%	0.42%		
Regions Financial	17.23%	1.5%		
SunTrust	13.24%	1.3%		
State Street	14.16%	1.3%		
UBS	13.36%			
US Bancorp	10.53%	1.3%		
Wells Fargo	13.13%	2.3%		

Bank MPD Statistics as of December 14, 2016

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	-0.63	0.038		
Bank of America	-0.2	0.16		
BB&T	-0.9	0.31		
Barclays	-0.47	-0.18		
Bank of NY Mellon	-0.54	0.3		
Citigroup	-0.4	0.19		
Capital One	-0.58	0.023		
Credit Suisse	-0.13	-0.098		
Deutsche Bank	-0.79			
Fifth Third	-0.49	-0.065		
Goldman Sachs	-0.57	-0.075		
JP Morgan	-0.53	0.14		
Keycorp	-0.41	0.032		
Morgan Stanley	-0.51	-0.031		
PNC Financial	-0.58	0.21		
Regions Financial	-0.23	0.1		
SunTrust	-0.57	-0.056		
State Street	-0.68	0.19		
UBS	-0.04			
US Bancorp	-0.54	0.23		
Wells Fargo	-0.31	0.026		

Bank MPD Statistics as of December 14, 2016

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	7.08%	1.9%		
Bank of America	11.18%	2.8%		
BB&T	5.32%	0.24%		
Barclays	13.64%	3%		
Bank of NY Mellon	7.56%	0.65%		
Citigroup	8.88%	1.3%		
Capital One	9.27%	0.23%		
Credit Suisse	14.63%	2.6%		
Deutsche Bank	13.61%			
Fifth Third	8.54%	0.79%		
Goldman Sachs	8.9%	3.6%		
JP Morgan	6.26%	0.89%		
Keycorp	10.69%	1.3%		
Morgan Stanley	10.55%	3.4%		
PNC Financial	5.36%	0.16%		
Regions Financial	11.96%	1.1%		
SunTrust	8.15%	2.5%		
State Street	8.21%	0.74%		
UBS	7.28%			
US Bancorp	4.41%	1%		
Wells Fargo	8.14%	3.8%		

Bank MPD Statistics as of December 14, 2016

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	4193	-47%	15162 0	532 - 4193 - 32713 last 48 months
Bank of America	215456	30%	215456 0	7419 - 215456 last 48 months
BB&T	2595	-49%	5986 0	126 - 2595 - 6490 last 48 months
Barclays	1203	40%	18909 0	8 - 1203 - 18909 last 48 months
Bank of NY Mellon	2150	2100%	33235 0	44 - 2150 - 33235 last 48 months
Citigroup	35825	380%	90561 0	1810 - 35825 - 140439 last 48 months
Capital One	10334	19%	10334 0	136 - 10334 - 16299 last 48 months
Credit Suisse	727	-9.1%	31577 0	1 - 727 - 31577 last 48 months
Deutsche Bank	29624		99132 0	76 - 29624 - 99132 last 42 months
Fifth Third	876	-63%	6123 0	24 - 876 - 19127 last 48 months
Goldman Sachs	12087	-66%	40920 0	612 - 12087 - 40920 last 48 months
JP Morgan	14948	180%	55464 0	951 - 14948 - 132116 last 48 months
Keycorp	5095	280%	5129 0	44 - 5095 - 27404 last 48 months
Morgan Stanley	6837	-63%	32733 0	327 - 6837 - 69872 last 48 months
PNC Financial	963	-13%	4932 0	42 - 963 - 4932 last 48 months
Regions Financial	2827	-69%	47587 0	20 - 2827 - 47940 last 47 months
SunTrust	716	-77%	11023 0	61 - 716 - 13788 last 48 months
State Street	1016	140%	2700 0	19 - 1016 - 5339 last 48 months
UBS	124		2034 0	23 - 124 - 2766 last 25 months
US Bancorp	8581	-20%	33496 0	52 - 8581 - 33496 last 48 months
Wells Fargo	15002	-67%	80746 0	950 - 15002 - 121351 last 48 months

Insurance Company MPD Statistics as of December 14, 2016

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	10.08%	0.75%		
AIG	14.04%	4.9%		
Allstate	8.74%	-0.057%		
Ameriprise	14.64%	1.2%		
Chubb	8.37%	0.17%		
Hartford Financial	12.14%	0.44%		
Lincoln National	16.75%	1.7%		
Met Life	14.75%	0.64%		
Principal Financial	13.52%	0.8%		
Progressive	13.93%	-1%		
Prudential	14.04%	0.83%		

Insurance Company MPD Statistics as of December 14, 2016

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	-0.6	0.27	-0.06 -1.25	-1.31 - -0.06 last 48 months
AIG	-0.32	0.076	-0.32 -1.14	-1.16 - -0.23 last 48 months
Allstate	-0.9	0.022	-0.59 -1.39	-1.5 - -0.12 last 48 months
Ameriprise	-0.6	-0.39	-0.21 -1.47	-4.03 - -0.11 last 48 months
Chubb	-0.9	-0.26	-0.38 -1.65	-1.65 - 0.09 last 48 months
Hartford Financial	-0.69	-0.11	-0.16 -1.55	-1.67 - -0.09 last 48 months
Lincoln National	-0.71	0.077	-0.33 -1.07	-1.15 - 0.15 last 48 months
Met Life	-0.28	0.09	-0.28 -1.24	-1.24 - -0.28 last 48 months
Principal Financial	-1.74	-0.43	0.13 -2.73	-2.95 - 0.42 last 48 months
Progressive	-2.48	-1.9	0.38 -2.48	-3.54 - 0.42 last 47 months
Prudential	-0.55	0.046	-0.47 -1.2	-1.2 - -0.33 last 48 months

Insurance Company MPD Statistics as of December 14, 2016

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	4.05%	0.57%		
AIG	6.42%	4%		
Allstate	3.07%	0.27%		
Ameriprise	9.46%	0.35%		
Chubb	2.51%	0.39%		
Hartford Financial	6.35%	0.5%		
Lincoln National	12.69%	3.1%		
Met Life	9.78%	0.57%		
Principal Financial	6.2%	-0.56%		
Progressive	8.14%	-2.5%		
Prudential	8.89%	0.93%		

Insurance Company MPD Statistics as of December 14, 2016

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	3235	490%	9135 0	68 3235 last 48 months 22718
AIG	8356	36%	44233 0	110 8356 last 48 months 69392
Allstate	220	-89%	3608 0	63 220 last 48 months 5708
Ameriprise	125	130%	1973 0	5 125 last 48 months 1973
Chubb	1149	30%	6138 0	3 1149 last 48 months 9027
Hartford Financial	1706	150%	2769 0	16 1706 last 48 months 14934
Lincoln National	1129	13%	4145 0	51 1129 last 48 months 8403
Met Life	5871	-1.9%	22250 0	319 5871 last 48 months 74100
Principal Financial	566	470%	1379 0	2 566 last 48 months 1379
Progressive	87	32%	1798 0	0 87 last 47 months 3415
Prudential	772	-36%	14512 0	222 772 last 48 months 17185