Volatility Watch

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Lars Peter Lilleøre
Chief Analyst, IR products
Global Strategy
+45 3333 3611
lars.peter.lilleore@nordea.com

At a glance	
Gamma	Cheap
	Cheap
1y10y (fwd prm)	393 (421)
Vega	Rich/Neutral
	Rich/Neutral
10y10y (fwd prm)	1419 (1471)
PCA (rich/cheap)	2Y30Y/20Y30Y

So that's what a freefall looks like. The entire grid is down post-ECB and it was already down post the May meeting. The move is far from symmetric however, with especially gamma and expiry+tail amounting to about 5 years down the most. This is in line with a renewed bout of *low for even longer* following the ECB's package last Thursday. The result of the drops is that some quotes, e.g. 3m1y and 3m5y now trades at all-time low levels as does early vega quotes like 2y2y: The 2Y roll on a 2Y2Y straddle is now higher than the cost of the straddle itself – extreme ways indeed. Overall, we see gamma as cheap, and continue to see vega as rich/neutral.

Taking into account that there are huge question markets surrounding the efficacy of the negative deposit rate and the new TLRTO as well as the coming prints on HICP inflation, the chance lies there for the ECB needing to do more in time. Conversely, spill-over from the US side can still – at least potentially – pull rates upwards, at least over a longer horizon. Against this the massive drops and the divergence in vols on 5Y and 10Y tails (chart 4) looks aggressive. This can be played in different ways, *but one instance is a tactical 5s10s flattener, 3M forward which now gives you 20bps up front.*

On vega, with 2y2y plummeting, the spread to 4y2y is massive at 23.5 bpVols – just now besting the levels in August 2012 and at an all-time high. *1:1 is approximately delta-neutral and gives and upfront of 92bps with a 3M roll of just -5bp while being long gamma.* The richest segment on the grid lies with early vega on long swap tails whereas very long dated vol looks markedly cheap in a relative sense (chart 8). Vega payer skews are at year lows, i.e. we need to look to before the May sell-off of 2013 for lower values. Similarly, e.g. 6m5y collars now trade at around 7bps for 100 wide (receiver strike of 28bps!), the lowest since Q1 2012 and such structures are attractive for taking on positive delta. Indeed, in general, the vol market now looks beneficial for such positions, especially on 5Y tails.

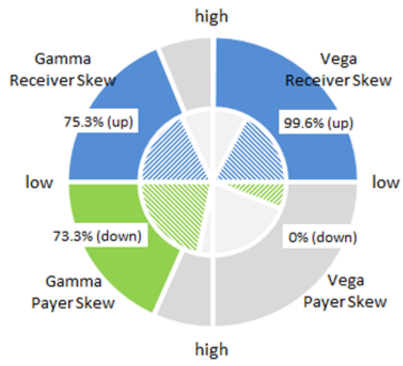
1. Vol surface – bpVol change, z.scores in brackets

	1Y	2Y	5Y	7Y	10Y	20Y	30Y
1M	-11.7 (-3.7)	-14.8 (-3.6)	-15 (-3.5)	-11.4 (-2.7)	-5.7 (-1.2)	-5.3 (-0.9)	-4.2 (-0.5)
3M	-9.9 (-4.1)	-11.5 (-4)	-9.7 (-3.1)	-7.1 (-2.7)	-3 (-1.9)	-0.8 (-1.3)	0.6 (-0.7)
6M	-8.9 (-3.6)	-11.6 (-3.4)	-9.3 (-2.9)	-6.5 (-2.5)	-2.3 (-1.9)	-1.5 (-1.7)	-0.1 (-1.3)
1Y	-9.8 (-3.1)	-13.3 (-3.2)	-9.4 (-2.7)	-6.4 (-2.5)	-2.3 (-2)	-1.7 (-1.9)	-0.7 (-1.7)
2Y	-17.9 (-3.4)	-13.4 (-2.9)	-8.7 (-2.6)	-6.5 (-2.5)	-3.2 (-2.1)	-2.9 (-2)	-2.4 (-2)
3Y	-12.4 (-2.9)	-9.6 (-2.6)	-6.2 (-2.4)	-4.8 (-2.3)	-3.3 (-2.1)	-2.9 (-2.1)	-2.9 (-2.1)
5Y	-6.6 (-2.6)	-6.2 (-2.6)	-3.5 (-2.3)	-3.1 (-2.3)	-3.1 (-2.3)	-3 (-2.1)	-3 (-2.3)
7Y	-4.4 (-2.7)	-3.6 (-2.6)	-2.4 (-2.2)	-2.3 (-2.1)	-2.1 (-2.1)	-2.1 (-2.1)	-1.9 (-2.2)
10Y	-3.9 (-2.6)	-3.4 (-2.7)	-2.2 (-2.2)	-2.1 (-2.3)	-1.8 (-2.4)	-2.2 (-2.6)	-2 (-2.7)
20Y	-2.4 (-2.7)	-1.8 (-2.7)	-1.7 (-2.6)	-1.9 (-3)	-2.2 (-3.2)	-2.4 (-3.2)	-2 (-2.6)
30Y	-2.1 (-2.6)	-2 (-2.6)	-1.6 (-2.6)	-1.7 (-2.9)	-2.1 (-3.1)	-1.8 (-2.9)	-1.2 (-2.3)

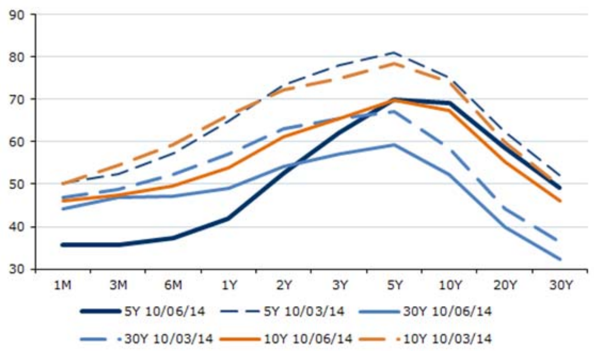
Z-Score value significant if absolute value > 1.96

2. Implied bpVol development over the past year

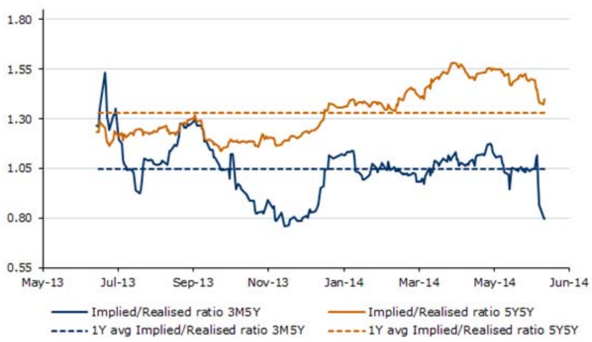
3. Skew overview (current skew vs. last year)



4. bpVol term structures – Current & 3Ms ago



5. Implied/Realized bpVol ratios



6. Vol surface (bpVol)

	1Y	2Y	5Y	7Y	10Y	20Y	30Y
1M	11.7	18.8	35.8	40.8	46.1	44.6	44.2
3M	13.1	17.7	35.7	41.0	47.3	46.4	46.8
6M	14.2	18.6	37.3	43.1	49.6	46.9	47.0
1Y	17.5	22.9	41.8	47.5	54.0	50.4	49.2
2Y	30.4	40.0	52.6	56.3	61.2	56.3	54.1
3Y	51.1	56.1	62.0	63.6	65.4	59.5	57.1
5Y	66.8	67.6	69.9	70.2	69.7	62.6	59.2
7Y	70.2	69.5	70.5	70.4	69.7	60.9	56.8
10Y	70.5	69.5	69.2	68.5	67.3	57.0	52.2
20Y	60.1	59.0	58.5	57.4	55.4	43.9	39.8
30Y	52.6	50.4	49.1	48.1	46.2	36.2	32.4

7. Implied/Realised values

	2Y	5Y	10Y	30Y
	Implied (daily bp)			
1m	1.18	2.25	2.91	2.78
3m	1.12	2.25	2.98	2.95
6m	1.17	2.35	3.13	2.96
	Past 6M realised (daily bp)			
spot	1.26	4.08	2.68	2.33
1m	1.44	2.71	2.72	2.35
3m	1.61	2.81	2.75	2.37
6m	1.84	2.97	2.83	2.40
	Implied/Realised			
1m	0.82	0.83	1.07	1.19
3m	0.69	0.80	1.09	1.25
6m	0.64	0.79	1.11	1.23

8. PCA – Relative Value (Vega grid only)

	2Y	5Y	7Y	10Y	20Y	30Y
2Y	0.08	1.30	1.62	2.54	2.77	2.81
3Y	1.63	2.10	2.01	1.89	2.03	1.69
5Y	0.32	0.98	0.89	0.49	1.21	0.41
7Y	-0.15	0.96	0.77	0.65	0.88	0.39
10Y	-0.58	0.41	-0.16	-0.62	-1.24	-1.84
20Y	-0.66	-0.83	-1.68	-2.87	-3.24	-3.51
30Y	-0.43	-0.78	-1.46	-2.71	-2.82	-3.04

Appendix: Calculation details and model description

General:

Calculations are based on data from Nordea Markets. All quotes are end of day quotes, sampled on the trading day preceding the publication date. Volatilities are always normalized volatilities (bp vols).

1. Vol surface

The vol surface on page 1 contains changes in bpVol since last report (2 weeks). The Z-scores in parentheses are based on levels of bpVol over the past 6 months. Current bpVol grid is given in chart 6.

3. Skew overview

The pie chart illustrates the current magnitude of the skews (outer circle) and the magnitude two weeks ago (inner circle) relative to the magnitudes over the previous year. The values given are percentiles. Thus, a value of say 75% for a given skew indicates that 75% of the previous year's skews are below the current skew. The skews are calculated as (impvol(atm-50bp) - impvol(atm)) for the receiver skew and (impvol(atm+50bp) - impvol(atm)) for the payer skew. Here again, "impvol" is understood to be in terms of bp vol. The movement in the skew, relative to 2 weeks ago, is shown as "up", "down" or "unchanged". The gamma option is 6M5Y and the vega option is 5Y5Y.

4. Vol term structures

Current atm vol term structures along with those 3 months ago for 5Y, 10Y, and 30Y tails are shown. Increasing forward periods on the x-axis.

5 & 7. Implied vs. Realised vol

Implied is given as the product of the Black implied volatility and the atmf rate. Realized volatilities are estimated on daily differences of the underlying, based on data from the past six months.

8. PCA – Relative Value

The PCA Relative Value model is designed to detect temporary correlative patterns that differ from historical correlative patterns. It is applied to the historical correlation matrix of the bpVol of all swaptions, using a large data sample window spanning from 2005 to 2014. Each swaption in the grid is evaluated relative to all other swaptions. This is done by comparing each swaption movements with the movements of the market as a whole, with the latter being represented as the movements in the principal components. This gives an expression of value relative to the rest of the volatility grid. Those values, in bpVol terms, are shown in the table. A swaption that has endured movements that are relatively less (more) than what the PCA prescribes will be cheap (rich). This evaluation is based on the last 6 months of bpVol data.