

# Flow Exotics RV

**Higher returns through EUR and USD through vanilla and mild exotics**

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**Where are we?**

**Will carry be a thing of the past?**

# USD Forwards and Vols – the context

**USD ATM Forward Swap (with 3m z-score Heatmap:  
Blue z<0, rich, Red, z>0, cheap)**

Underlying											
Fwd	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
1M	0.24	0.25	0.3	0.59	1.03	1.85	2.41	2.92	3.37	3.55	3.67
3M	0.26	0.27	0.34	0.7	1.16	1.97	2.51	3	3.42	3.59	3.7
6M	0.28	0.31	0.44	0.88	1.36	2.14	2.65	3.11	3.5	3.65	3.75
1Y	0.48	0.57	0.81	1.33	1.8	2.5	2.93	3.33	3.66	3.78	3.84
2Y	1.45	1.58	1.86	2.3	2.67	3.16	3.45	3.73	3.94	4.01	4.02
3Y	2.41	2.54	2.79	3.09	3.34	3.64	3.84	4.03	4.15	4.17	4.14
5Y	3.63	3.7	3.88	3.96	4.05	4.18	4.28	4.36	4.37	4.33	4.26
7Y	4.1	4.13	4.27	4.28	4.34	4.43	4.47	4.47	4.43	4.38	4.28
10Y	4.44	4.48	4.61	4.58	4.58	4.58	4.55	4.49	4.41	4.35	4.24
15Y	4.42	4.44	4.53	4.46	4.44	4.39	4.35	4.3	4.23	4.17	4.06
20Y	4.19	4.21	4.3	4.24	4.22	4.18	4.16	4.12	4.06	4	3.88
30Y	3.89	3.9	3.99	3.93	3.92	3.89	3.86	3.81	3.74	3.66	3.53

**USD ATM Implied Vol (bp) (with 3m z-score Heatmap:  
Blue z<0, i.e., Cheap, Red, z>0, rich)**

Underlying											
Fwd	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
1M	10.5	10.5	17.9	33.4	50.5	67.0	68.7	66.5	63.1	62.7	61.0
3M	14.5	14.5	20.7	38.8	55.6	70.1	72.0	70.1	65.9	64.8	62.6
6M	14.2	14.2	29.7	49.8	64.8	75.2	75.6	74.6	70.2	68.9	66.2
1Y	32.5	32.5	50.8	70.8	81.7	84.9	84.0	81.6	76.0	73.6	70.7
2Y	75.5	75.5	89.4	96.2	96.5	93.8	90.7	86.2	79.2	76.5	73.0
3Y	106.2	106.2	104.5	104.0	101.6	96.4	93.0	88.2	80.8	77.4	73.6
5Y	106.0	106.0	105.9	103.3	100.6	95.4	92.6	88.7	80.7	76.8	73.4
7Y	100.7	100.7	99.6	97.5	95.1	90.4	88.1	84.8	77.0	73.3	70.1
10Y	87.7	87.7	89.5	87.8	86.4	84.0	81.7	78.4	70.8	67.4	64.7
15Y	74.4	74.4	74.4	71.9	70.9	69.4	68.4	66.9	60.4	58.0	55.4
20Y	65.3	65.3	64.9	62.3	61.3	59.9	59.5	58.8	53.3	51.8	48.6
30Y	56.0	56.0	55.8	55.4	55.6	55.9	55.6	55.0	51.0	51.0	48.2

- Forwards rallied, except shorter tenors and expiries (upper right). Fed Chair Janet Yellen changed some of that.
- Vols mostly fell except the lower left (15y1y and 20y1y in particular), which fell due to volta hedging of Berm books in a selloff. Berm books so far ITM so no further rehedging needed in a selloff.
- Some fast money buying of 30y20y, 30y30y, but otherwise no flow there.
- Rising correlations means caplet vols fall relative to swaption vol.
- Short gamma performs but the margin is thin. Resume short gamma?

**USD Imp/3M Realized Vol Ratio**

Underlying											
Fwd	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
1M	4.73	2.58	1.57	1.23	1.01	1.04	1.04	1.07	1.06	1.07	1.06
3M	1.92	1.88	1.43	1.12	0.98	1.02	1.04	1.08	1.08	1.08	1.07
6M	1.52	1.69	1.39	1.12	1.02	1.05	1.08	1.12	1.12	1.12	1.11
1Y	1.08	1.08	1.1	1.04	0.98	1.02	1.08	1.13	1.12	1.12	1.11
2Y	1.04	1	0.97	1	0.97	1.04	1.11	1.14	1.12	1.11	1.09
3Y	1.09	1.05	0.97	1.01	1.06	1.14	1.19	1.18	1.13	1.11	1.08
5Y	1.29	1.29	1.22	1.27	1.26	1.26	1.26	1.22	1.15	1.11	1.07
7Y	1.35	1.33	1.24	1.27	1.25	1.26	1.23	1.2	1.12	1.06	1.03
10Y	1.34	1.32	1.23	1.24	1.21	1.18	1.16	1.13	1.04	0.98	0.96
15Y	1.11	1.1	1.03	1.07	1.06	1.05	1.03	1	0.9	0.88	0.85
20Y	0.99	0.97	0.89	0.91	0.91	0.9	0.88	0.86	0.82	0.8	0.76
30Y	0.94	0.92	0.86	0.87	0.85	0.83	0.83	0.86	0.85	0.81	0.62

# EUR Forwards and Vols – the context

EUR ATM Forward Swap (with 3m z-score Heatmap:  
Blue z<0, rich, Red, z>0, cheap)

Underlying												
Fwd	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
1M	0.41	0.41	0.43	0.5	0.64	1.03	1.4	1.86	2.31	2.47	2.53	
3M	0.41	0.42	0.44	0.53	0.69	1.08	1.46	1.91	2.34	2.5	2.55	
6M	0.42	0.42	0.46	0.58	0.76	1.17	1.54	1.98	2.39	2.53	2.57	
1Y	0.46	0.48	0.56	0.72	0.93	1.35	1.72	2.13	2.49	2.61	2.62	
2Y	0.74	0.77	0.89	1.12	1.35	1.75	2.07	2.42	2.68	2.75	2.73	
3Y	1.16	1.22	1.36	1.58	1.79	2.14	2.41	2.68	2.85	2.87	2.82	
5Y	2.01	2.07	2.21	2.38	2.53	2.77	2.93	3.07	3.09	3.04	2.94	
7Y	2.68	2.72	2.85	2.95	3.05	3.18	3.26	3.27	3.19	3.1	2.99	
10Y	3.23	3.26	3.36	3.39	3.41	3.42	3.37	3.29	3.16	3.04	2.96	
15Y	3.23	3.23	3.28	3.24	3.21	3.14	3.08	2.99	2.88	2.84	2.82	
20Y	2.89	2.89	2.93	2.9	2.87	2.82	2.77	2.71	2.71	2.71	2.72	
30Y	2.57	2.59	2.65	2.66	2.67	2.69	2.71	2.72	2.73	2.73	2.74	

EUR ATM Implied Vol (bp) (with 3m z-score Heatmap:  
Blue z<0, cheap, Red z>0, Rich)

Underlying												
Fwd	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
1M	22.6	22.5	24.2	30.5	39.6	51.3	52.4	52.8	51	49.6	48.3	
3M	22.6	23.2	24.6	32.9	42.2	53.6	55.4	56.7	54.2	51.6	49.9	
6M	23.1	23.6	26.6	36.2	45.5	56.6	58.3	59.6	56.4	54.6	52.4	
1Y	27.4	29.5	33	45.8	54.5	63.5	65	66.1	62.5	59.6	57.1	
2Y	47.3	50.1	55.2	62	66.8	71.9	72.2	71.9	67.8	65.4	63.1	
3Y	69	68.7	69.6	72.2	73.7	76.2	75.7	74.5	70.3	68	65.5	
5Y	88.1	85.1	80.3	79.7	79.6	79.5	78.8	77.7	72.7	69.7	66.9	
7Y	88.4	84.3	78.7	77.8	77.4	76.7	76.4	75.9	70.3	66.9	62.8	
10Y	82.4	79.5	74.8	73.5	73.3	73.2	72.9	72.4	66.5	62.5	57.7	
15Y	75.4	73.1	67.8	66.6	66.4	66.3	65.9	65.1	58.4	54.2	49.4	
20Y	64.5	64	60.6	59.8	59.7	59.5	58.9	57.8	51.5	47.6	43.5	
30Y	52	52.3	50.8	50.2	50	49.6	48.9	47.7	42.4	38.8	35.7	

- Mostly bull-flattening pressure. Some pivoting with front ends in bearish mode.
- Vols have fallen across the board with lower right hit hardest in Q3 2013 (now making it back from outright buying or vs 5y5y/5y10y).
- Recent Berm flow could put LR under more pressure.
- Short gamma trades continue to perform comfortably, although Imp/Real is under a little pressure in short dates (i.e., trending down a bit).

EUR Imp/3M Realized Vol Ratio

Underlying												
Fwd	3M	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
1M	2.91	2.36	1.41	1.1	1.1	1.07	1.07	1.09	1.11	1.12	1.11	
3M	1.97	1.07	1.17	1.12	1.16	1.15	1.18	1.24	1.25	1.24	1.23	
6M	0.73	0.97	1	1.06	1.13	1.18	1.22	1.3	1.3	1.32	1.3	
1Y	1.08	1.01	0.96	1.09	1.15	1.23	1.31	1.4	1.42	1.42	1.42	
2Y	1.1	1.07	1.1	1.12	1.14	1.3	1.39	1.47	1.49	1.5	1.51	
3Y	1.21	1.13	1.06	1.09	1.2	1.36	1.43	1.52	1.54	1.55	1.55	
5Y	1.57	1.56	1.49	1.52	1.56	1.63	1.68	1.71	1.69	1.66	1.63	
7Y	1.83	1.72	1.58	1.64	1.64	1.7	1.72	1.77	1.7	1.64	1.55	
10Y	1.91	1.85	1.7	1.69	1.69	1.7	1.74	1.77	1.65	1.58	1.44	
15Y	1.94	1.87	1.7	1.7	1.7	1.7	1.69	1.67	1.53	1.41	1.25	
20Y	1.74	1.7	1.56	1.53	1.52	1.52	1.54	1.54	1.35	1.23	1.09	
30Y	1.43	1.42	1.34	1.3	1.28	1.22	1.19	1.14	0.99	0.9	0.86	

# **Curve Trades**

**Conditional, Conditional Midcurve and CMS Trades**

# USD Vanilla Conditional Steepeners

## Eyeballing value-

PV01 wtd, with 10y tails ATMF, all others with strikes adjusted to equalize premium

USD Yield Curve Carry (Spot - Fwd) (bp) (for Payers)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	-2	-5	-6	-6	-5	-4	-3	-2	-2	
3m	-6	-16	-19	-17	-14	-11	-9	-6	-5	
6m	-17	-35	-40	-34	-28	-22	-19	-12	-9	
1y	-53	-81	-83	-70	-56	-43	-37	-24	-18	
2y	-163	-179	-168	-135	-107	-82	-71	-46	-35	
3y	-249	-253	-232	-181	-143	-110	-95	-61	-46	
5y	-353	-338	-302	-233	-186	-141	-120	-76	-57	
7y	-390	-369	-329	-256	-203	-152	-128	-79	-59	
10y	-420	-396	-351	-269	-209	-153	-127	-76	-54	
12y	-422	-396	-349	-264	-203	-146	-120	-70	-47	
15y	-411	-382	-335	-250	-190	-133	-108	-59	-36	
20y	-389	-361	-314	-229	-170	-115	-92	-43	-20	
30y	-364	-338	-292	-208	-146	-89	-63	-13	6	

USD Yield Curve Carry (Fwd - Spot) (bp) (for Receivers)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	2	5	6	6	5	4	3	2	2	
3m	6	16	19	17	14	11	9	6	5	
6m	17	35	40	34	28	22	19	12	9	
1y	53	81	83	70	56	43	37	24	18	
2y	163	179	168	135	107	82	71	46	35	
3y	249	253	232	181	143	110	95	61	46	
5y	353	338	302	233	186	141	120	76	57	
7y	390	369	329	256	203	152	128	79	59	
10y	420	396	351	269	209	153	127	76	54	
12y	422	396	349	264	203	146	120	70	47	
15y	411	382	335	250	190	133	108	59	36	
20y	389	361	314	229	170	115	92	43	20	
30y	364	338	292	208	146	89	63	13	-6	

Payers Moneyness (Fwd - Strike) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	7.7	6.1	2.8	-1.3	-1.3	-	0.4	1.4	2.0	
3m	13.6	9.4	3.1	-2.9	-2.5	-	0.9	2.8	3.6	
6m	19.3	10.8	2.4	-2.9	-2.1	-	1.2	4.1	5.6	
1y	19.2	1.7	-7.2	-6.2	-3.8	-	2.0	6.8	8.9	
2y	-15.4	-22.6	-20.1	-11.8	-6.7	-	3.5	11.8	15.4	
3y	-35.9	-30.2	-24.1	-15.9	-8.9	-	4.4	15.1	19.6	
5y	-37.7	-30.6	-24.7	-14.3	-8.1	-	5.9	20.6	26.5	
7y	-37.8	-31.7	-25.4	-14.0	-7.9	-	6.9	23.9	29.7	
10y	-33.4	-27.7	-23.2	-15.6	-9.1	-	7.7	26.2	32.0	
12y	-31.7	-24.8	-20.5	-13.8	-8.1	-	7.9	25.5	32.6	
15y	-28.0	-19.0	-15.1	-9.8	-5.9	-	8.0	25.8	32.4	
20y	-24.4	-14.0	-10.2	-5.6	-3.4	-	8.0	24.3	33.8	
30y	-3.5	-0.8	-1.6	-3.9	-2.6	-	7.6	18.9	30.2	

Receivers Moneyness (Strike - Fwd) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	7.2	5.3	2.4	-1.1	-1.1	-	0.4	1.4	2.0	
3m	12.0	7.3	2.4	-2.3	-2.1	-	0.8	2.6	3.5	
6m	15.2	8.0	1.8	-2.4	-1.8	-	1.1	3.6	5.4	
1y	12.6	1.1	-5.0	-4.9	-3.2	-	1.7	6.3	8.6	
2y	-10.2	-15.7	-14.7	-9.2	-5.5	-	3.1	11.0	14.8	
3y	-24.7	-24.4	-20.9	-12.5	-7.9	-	3.9	14.0	18.9	
5y	-28.0	-23.5	-19.3	-11.6	-6.8	-	5.3	19.5	25.9	
7y	-28.8	-24.7	-20.3	-14.6	-6.9	-	6.3	22.9	29.2	
10y	-26.6	-22.6	-19.4	-13.6	-9.2	-	7.2	25.7	31.8	
12y	-26.0	-20.7	-17.6	-12.3	-7.4	-	7.5	26.3	32.8	
15y	-24.1	-16.6	-13.5	-10.2	-5.5	-	7.8	26.2	33.4	
20y	-22.5	-13.0	-9.8	-5.6	-3.3	-	7.8	24.9	35.6	
30y	-3.3	-0.8	-1.4	-3.6	-2.3	-	6.8	17.4	28.8	

Payers Total Pickup (Spot - Strike) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	5.6	0.7	-3.7	-6.9	-6.1	-3.6	-2.7	-0.6	0.5	
3m	7.2	-6.5	-16.4	-16.4	-16.4	-10.7	-8.4	-3.2	-1.0	
6m	2.4	-24.5	-37.2	-37.2	-30.0	-24.5	-17.4	-8.0	-3.6	
1y	-34.3	-79.9	-80.0	-76.0	-59.5	-43.0	-35.2	-17.4	-9.5	
2y	-178.1	-288.9	-288.3	-146.7	-113.2	-82.4	-67.9	-44.4	-26.9	
3y	-285.4	-286.9	-259.7	-197.0	-152.3	-110.4	-90.3	-45.9	-26.9	
5y	-390.9	-368.9	-326.2	-247.2	-194.0	-141.4	-114.1	-55.5	-30.9	
7y	-428.3	-400.6	-354.5	-270.3	-211.2	-151.9	-121.1	-55.4	-28.9	
10y	-453.8	-423.4	-373.9	-284.4	-218.1	-152.9	-119.3	-49.5	-21.5	
12y	-454.0	-420.6	-369.5	-277.5	-211.2	-146.2	-112.2	-43.2	-14.4	
15y	-439.1	-401.1	-350.5	-260.1	-195.6	-133.3	-99.9	-33.6	-3.7	
20y	-413.8	-374.9	-324.0	-235.1	-173.5	-115.4	-83.5	-18.2	14.0	
30y	-367.8	-338.4	-293.4	-211.7	-148.9	-88.9	-55.6	6.2	36.1	

Receivers Total Pickup (Strike - Spot) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	9.3	10.7	8.9	4.5	3.7	3.6	3.6	3.4	3.5	
3m	18.3	23.2	21.8	14.6	11.8	10.7	10.0	8.7	8.1	
6m	32.1	43.3	41.5	32.0	26.1	21.5	19.7	15.9	14.6	
1y	66.1	82.3	77.8	64.0	52.0	43.1	38.0	30.5	26.9	
2y	152.6	163.4	153.5	128.7	101.0	82.4	73.9	57.0	49.7	
3y	224.8	228.4	210.7	168.7	136.0	110.4	98.6	75.1	65.4	
5y	325.2	314.9	282.2	221.4	179.0	141.4	125.4	95.6	83.2	
7y	361.7	344.3	308.7	244.5	196.3	151.9	134.3	102.2	87.7	
10y	393.9	373.0	331.3	255.2	200.8	152.9	134.3	101.4	85.3	
12y	396.3	375.0	331.5	251.3	195.7	146.2	127.7	95.9	79.8	
15y	386.9	365.5	321.8	241.1	184.3	133.8	115.7	85.6	69.4	
20y	366.9	347.8	304.0	223.9	166.8	115.4	99.3	67.4	55.4	
30y	361.0	336.8	290.4	204.2	143.9	88.9	69.9	30.1	22.9	

Price given 10K notional at 10y tail

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	71.3	70.6	68.9	68.3	68.8	69.6	68.8	70.3	70.3	
3m	127.3	120.2	114.4	115.8	118.8	122.7	124.3	124.7		
6m	192.6	171.9	167.2	175.6	184.1	185.3	187.0	189.9	190.7	
1y	247.6	213.2	222.6	252.9	267.4	277.5	280.5	285.3	286.8	
2y	250.1	268.7	311.8	360.6	383.1	400.0	405.8	415.1	417.8	
3y	279.0	327.2	377.9	431.8	456.7	476.5	484.7	498.4	502.6	
5y	388.9	447.2	497.3	547.6	569.1	585.8	592.4	602.6	604.8	
7y	429.8	485.2	536.2	587.1	605.4	618.2	623.1	629.5	629.8	
10y	448.2	501.3	545.3	584.9	600.2	610.1	612.5	613.3	611.4	
12y	441.2	493.4	533.3	565.8	575.7	580.8	582.5	582.0	579.6	
15y	415.2	464.9	499.5	523.4	525.3	523.5	524.5	522.6	519.8	
20y	361.8	407.0	435.8	452.5	446.8	439.5	440.4	438.3	435.7	
30y	278.2	306.2	327.3	341.8	342.7	342.9	345.7	349.2	349.8	

Price given 10K notional at 10y tail

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	2.3	18.9	43.5	79.9	80.1	69.6	65.8	57.4	52.2	
3m	5.2	36.0	86.4	141.6	141.2	121.8	115.1	99.2	92.3	
6m	20.4	75.4	145.7	201.8	199.8	185.3	176.0	153.2	141.0	
1y	79.5	198.1	285.8	307.9	300.7	277.5	263.3	225.8	209.0	
2y	380.5	460.9	482.2	460.7	439.7	400.0	376.2	314.8	288.0	
3y	573.4	607.0	607.9	561.9	529.9	476.5	448.2	374.5	342.2	
5y	674.9	679.3	684.3	655.6	630.8	585.8	547.3	446.2	404.0	
7y	694.2	706.5	713.7	685.2	661.5	618.2	574.8	462.2	422.3	
10y	654.5	672.8	688.7	681.5	656.6	610.1	564.9	451.3	413.6	
12y	621.8	634.5	650.1	644.5	622.0	580.8	537.3	431.3	394.2	
15y	557.0	560.7	575.9	573.2	554.9	523.5	483.9	391.9	356.1	
20y	463.6	465.4	478.5	476.0	460.9	439.5	407.1	337.1	294.8	
30y	288.5	308.6	331.9	353.2	350.2	342.9	323.7	294.3	262.3	

As an alternative to a bear flattener, 1y 2y-10y-30y bear tightener – buy 1y2y payers + 1y30y pay

# EUR Vanilla Conditional Steepeners

## Eyeballing value -

PV01 wtd, with 10y tails ATMF, all others with strikes adjusted to equalize premium

Market pays better for short expiry bear flatteners

EUR Yield Curve Carry (Spot - Fwd) (bp) (for Payers)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	-1	-2	-2	-3	-3	-2	-2	-1	-1	
3m	-3	-5	-7	-8	-8	-7	-6	-4	-3	
6m	-6	-11	-15	-17	-17	-14	-12	-7	-5	
1y	-16	-26	-33	-36	-34	-29	-25	-14	-10	
2y	-52	-68	-76	-75	-69	-57	-49	-28	-20	
3y	-100	-113	-118	-113	-101	-82	-70	-40	-28	
5y	-182	-190	-189	-173	-152	-120	-100	-55	-40	
7y	-242	-244	-239	-213	-183	-138	-114	-60	-45	
10y	-293	-288	-275	-236	-194	-141	-113	-55	-42	
12y	-301	-294	-277	-231	-186	-132	-103	-47	-37	
15y	-284	-273	-255	-209	-165	-111	-83	-35	-28	
20y	-250	-239	-221	-176	-133	-83	-60	-23	-19	
30y	-221	-215	-202	-165	-129	-85	-63	-26	-21	

EUR Yield Curve Carry (Fwd - Spot) (bp) (for Receivers)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	1	2	2	3	3	2	2	1	1	
3m	3	5	7	8	8	7	6	4	3	
6m	6	11	15	17	17	14	12	7	5	
1y	16	26	33	36	34	29	25	14	10	
2y	52	68	76	75	69	57	49	28	20	
3y	100	113	118	113	101	82	70	40	28	
5y	182	190	189	173	152	120	100	55	40	
7y	242	244	239	213	183	138	114	60	45	
10y	293	288	275	236	194	141	113	55	42	
12y	301	294	277	231	186	132	103	47	37	
15y	284	273	255	209	165	111	83	35	28	
20y	250	239	221	176	133	83	60	23	19	
30y	221	215	202	165	129	85	63	26	21	

Payers Moneyiness (Fwd - Strike) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	3.0	4.3	2.7	0.1	-0.1	-	0.2	0.9	1.4	
3m	10.0	8.3	5.4	1.1	0.4	-	0.5	2.3	3.2	
6m	15.3	12.4	8.2	1.8	0.7	-	0.9	3.3	4.7	
1y	22.9	16.5	10.2	2.7	1.2	-	1.3	5.4	7.4	
2y	20.6	12.0	5.9	-0.3	-0.6	-	2.0	7.7	10.2	
3y	7.4	2.7	0.4	-2.8	-1.9	-	2.4	9.3	12.8	
5y	-8.0	-6.1	-5.5	-4.7	-3.0	-	3.4	14.2	18.7	
7y	-8.9	-6.1	-4.8	-2.7	-1.9	-	4.5	19.2	26.8	
10y	-9.8	-5.0	-4.0	-3.1	-2.3	-	5.4	24.3	35.1	
12y	-10.8	-5.8	-4.7	-3.8	-2.8	-	6.4	28.0	39.4	
15y	-12.4	-7.4	-6.2	-5.1	-3.7	-	8.0	33.4	45.4	
20y	-15.3	-11.3	-9.9	-8.2	-5.6	-	8.7	35.8	47.3	
30y	-21.6	-17.4	-15.2	-11.5	-7.5	-	9.0	37.7	47.7	

Receivers Moneyiness (Strike - Fwd) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	4.6	3.9	2.4	0.1	-0.1	-	0.5	0.9	1.4	
3m	8.7	6.9	4.4	0.9	0.4	-	0.4	2.2	3.2	
6m	12.9	9.9	6.3	1.4	0.6	-	0.8	3.1	4.7	
1y	18.4	12.4	7.5	2.4	0.9	-	1.1	5.0	7.4	
2y	13.9	8.1	4.1	-0.2	-0.4	-	1.7	7.0	9.9	
3y	4.8	1.8	0.3	-2.1	-1.5	-	2.0	8.2	11.7	
5y	-5.1	-4.1	-3.8	-3.5	-2.3	-	2.8	12.0	16.8	
7y	-6.0	-4.3	-3.4	-2.0	-1.4	-	3.0	15.8	22.3	
10y	-7.1	-3.7	-3.0	-2.3	-1.6	-	4.3	19.5	28.4	
12y	-7.8	-4.4	-3.5	-2.8	-2.1	-	4.9	22.4	32.3	
15y	-8.8	-5.4	-4.6	-3.7	-2.7	-	6.0	26.9	38.0	
20y	-10.3	-7.6	-6.8	-5.7	-4.0	-	6.6	29.6	40.3	
30y	-13.5	-11.1	-9.8	-7.8	-5.2	-	6.9	31.5	41.1	

Payers Total Pickup (Spot - Strike) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	3.8	2.6	0.3	-2.7	-3.0	-2.4	-1.9	-0.3	0.6	
3m	7.4	3.4	-1.8	-7.4	-7.9	-7.1	-5.8	-1.4	0.7	
6m	9.8	1.9	-6.9	-15.4	-16.0	-14.3	-11.6	-3.9	0.3	
1y	6.9	-9.6	-23.1	-33.2	-32.8	-28.7	-23.6	-8.9	-2.7	
2y	-31.7	-55.9	-69.6	-75.4	-69.5	-57.0	-43.0	-20.3	-9.6	
3y	-92.3	-110.7	-118.0	-115.6	-103.3	-82.3	-68.1	-30.4	-15.5	
5y	-189.6	-195.6	-194.6	-177.7	-154.7	-119.5	-96.3	-40.8	-21.2	
7y	-250.6	-250.6	-243.5	-215.4	-184.4	-138.2	-109.3	-41.2	-17.7	
10y	-302.3	-292.7	-278.6	-239.3	-196.5	-141.0	-107.8	-30.7	-7.0	
12y	-311.7	-299.8	-281.7	-234.4	-189.3	-131.6	-97.0	-19.3	2.6	
15y	-296.8	-280.0	-260.9	-214.0	-168.9	-111.0	-75.3	-1.4	17.8	
20y	-265.4	-249.9	-230.5	-184.4	-139.0	-82.6	-51.0	13.0	28.8	
30y	-242.9	-232.3	-216.7	-176.4	-136.6	-85.1	-54.3	12.0	26.6	

Receivers Total Pickup (Strike - Spot) (bp)

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	5.8	5.6	4.9	2.9	2.8	2.4	2.3	2.1	2.3	
3m	11.3	11.8	11.7	9.3	8.6	7.1	6.7	5.8	5.7	
6m	18.4	20.5	21.4	18.7	17.3	14.3	13.3	10.3	9.7	
1y	34.4	38.6	40.8	37.9	34.9	28.7	26.1	19.3	17.2	
2y	66.1	76.0	79.6	74.9	68.5	57.0	51.0	34.9	29.3	
3y	104.4	115.2	118.7	110.7	99.9	82.3	72.5	47.9	40.0	
5y	176.5	185.5	185.4	169.5	149.4	119.5	102.5	67.0	55.6	
7y	235.8	240.2	235.3	210.7	181.1	138.2	117.4	75.1	66.8	
10y	285.5	283.9	271.7	233.9	192.5	141.0	117.5	74.5	70.5	
12y	293.1	289.6	273.5	227.8	184.3	131.6	108.3	69.6	69.0	
15y	275.5	267.2	250.1	205.2	162.4	111.0	88.4	61.8	65.7	
20y	239.7	231.0	213.8	170.6	129.4	82.6	56.4	52.3	59.0	
30y	207.8	203.8	191.7	157.3	123.9	85.7	70.1	57.2	62.0	

Price given 10K notional at 10y tail

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	53.5	53.3	52.6	51.7	51.8	52.0	52.2	52.5	52.5	
3m	103.5	102.3	99.8	97.6	97.9	98.7	99.4	100.6	100.7	
6m	156.0	153.0	147.8	144.0	145.3	147.5	148.9	151.5	151.9	
1y	239.4	228.9	219.5	216.5	221.1	227.2	229.7	234.6	235.7	
2y	322.9	302.9	298.2	309.6	322.9	337.6	341.9	350.8	353.4	
3y	349.5	346.5	353.7	377.5	397.7	419.0	424.6	436.6	440.6	
5y	397.7	413.4	434.7	479.3	504.0	530.2	537.4	555.9	562.0	
7y	447.8	471.2	494.2	537.0	558.6	590.7	613.2	621.0		
10y	507.5	535.9	551.5	575.7	590.5	611.0	619.2	645.9	654.4	
12y	507.2	531.7	545.7	568.1	606.6	616.0	644.1	651.5		
15y	485.2	502.2	515.2	538.9	557.9	584.0	595.1	622.9	628.1	
20y	417.2	431.7	446.2	475.6	501.1	531.7	541.0	560.9	563.6	
30y	325.1	336.0	347.7	370.6	389.8	412.7	419.8	434.9	436.5	

Price given 10K notional at 10y tail

Option Expiry	Swap Tenor									
	1y	2y	3y	5y	7y	10y	12y	20Y	30Y	
1m	8.1	14.3	27.9	50.8	52.5	52.0	50.4	44.1	55.6	
3m	13.6	28.0	50.9	87.8	94.2	94.2	95.1	80.2	72.1	
6m	18.8	41.5	74.2	127.6	138.7	147.5	141.0	122.0	110.2	
1y	35.7	82.0	128.8	192.8	210.8	227.2	218.1	186.9	170.3	
2y	143.3	198.2	246.4	312.3	327.8	337.6	324.4	283.4	264.0	
3y	286.1	323.7	350.0	401.7	414.0	419.0	404.0	356.7	330.5	
5y	463.1	463.2	479.6	517.7	528.4	530.2	509.6	439.1	408.6	
7y	516.8	519.0	531.5	558.0	573.1	582.8	555.4	463.6	411.7	
10y	577.6	571.7	579.9	597.7	607.0	611.0	580.2	471.5	403.2	
12y	580.3	571.1	577.7	593.9	603.2	606.6	572.7	455.2	385.6	
15y	562.1	548.2	553.8	570.3	580.9	584.0	545.6	416.2	347.0	
20y	499.9	492.5	499.8	519.7	531.3	531.7	493.9	367.8	308.3	
30y	414.9	408.4	410.7	418.1	420.7	412.7	382.4	278.7	238.7	

Benchmark 6m 2s10s  
bull steepener at  
9.9bp pickup to  
forwards, 20.5-  
14.3=6.2bp flatter than  
spot, with 41.5-  
147.6=-106ct  
expected payoff.

6m 5s30s bull  
steepeners at 1.

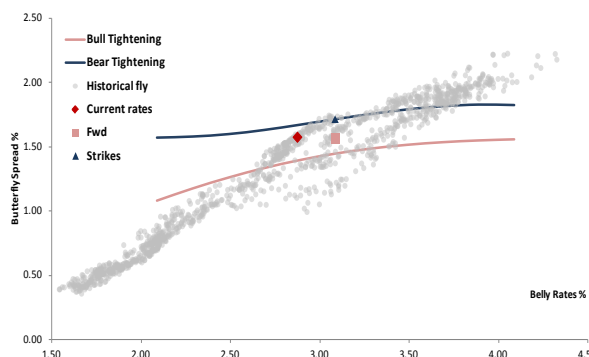
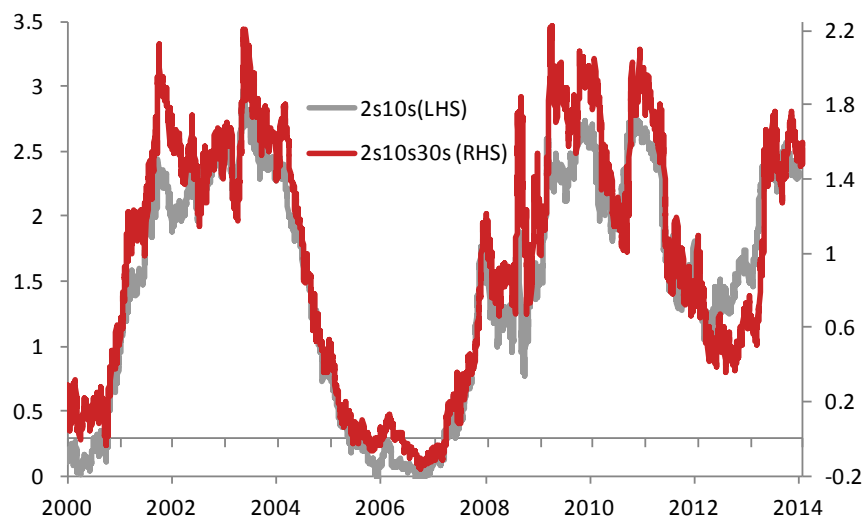
# USD Conditional Bear flies (Bear tighteners)

Short-dated bear flies (tighteners) offer upside to conventional flatteners.

	2s10s30s	3s10s30s	2s10s	2s10s30s	3s10s30s	2s10s	2s10s30s	3s10s30s	2s10s
	Vol Pickup	Vol Pickup	Vol Pickup	Total Pickup	Total Pickup	Total Pickup	Value (ct)	Value (ct)	Value (ct)
1m	8.1	4.8	6.1	8.4	4.0	4.3	1.7	0.0	1.0
3m	13.0	6.7	9.4	14.0	4.1	4.2	1.2	-4.7	-1.6
6m	16.4	8.0	10.8	14.9	2.2	-3.0	-7.9	-12.6	-13.4
1y	10.6	1.7	1.7	-2.8	-13.4	-36.4	-55.0	-45.7	-64.3
2y	-7.3	-4.8	-22.6	-56.7	-43.3	-119.4	-113.6	-70.9	-131.3
3y	-14.6	-8.5	-34.2	-92.9	-65.7	-176.5	-123.1	-72.4	-149.2

As an alternative to a **bear flattener**, 6m 2y-10y-30y **bear tightener** – buy 6m2y payers + 6m30y payers, sell 6m10y payers has pickup of 16.4bp to forwards and is 14.9bp wider than spot.

Vol-adjusted value compares favourably with that of 6m 2s10s





# USD Midcurve Conditional Steepeners (6M expiries)

6m10y struck ATMF, find bp pickup of all other legs. Searching for better curve trades.

Currency: USD Expiry: 6m																	
Payers									Receivers								
Fwd Pickup (Spot-Fwd, bp)									Fwd Pickup (Fwd-Spot, bp)								
Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y	Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	-13	-29	-35	-34	-28	-22	-12	-9	Spot	13	29	35	34	28	22	12	9
1y	-44	-47		-35				-9	1y	44	47		35				9
18m	-48	-46	-41	-32				-8	18m	48	46	41	32				8
2y	-49	-43	-38	-28				-7	2y	49	43	38	28				7
30m	-44								30m	44							
3y	-38	-33		-20				-5	3y	38	33		20				5
4y	-27								4y	27							
5y				-9			-2	-1	5y				9			2	1
7y							0		7y							0	
10y				1		1	1		10y				-1		-1	-1	
Vol Pickup (Fwd-Strike, bp)									Vol Pickup (Strike-Fwd, bp)								
Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y	Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	21	17	7	0	0	0	4	5	Spot	18	12	5	0	0	0	4	5
1y	0	-8		-7				4	1y	0	-8		-7				4
18m	-16								18m	-12							
2y	-18	-21	-12	-9				3	2y	-14	-17	-12	-9				3
30m	-27								30m	-21							
3y	-23	-20		-8				3	3y	-19	-17		-8				3
4y	-11								4y	-11							
5y				-5			4	4	5y				-5			4	4
7y							3		7y							3	
10y				3		0	2		10y				3		0	2	
Total Pickup (Spot-Strike, bp)									Total Pickup (Strike-Spot, bp)								
Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y	Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	8	-11	-29	-34	-28	-22	-8	-4	Spot	31	40	40	34	28	22	16	14
1y	-44	-54		-42				-5	1y	44	39		28				13
18m	-64								18m	36							
2y	-66	-64	-50	-38				-4	2y	35	27	25	19				10
30m	-71								30m	22							
3y	-61	-53		-28				-2	3y	19	16		12				7
4y	-38								4y	17							
5y				-15			1	3	5y				4			6	5
7y							3		7y							3	
10y				3		1	4		10y				2		-1	1	

6m2y-6m3y2y looks attractive relative to the standard 6m 2s10s bear flattener.










6m2y1y-6m5y5y has lower negative carry than standard 6m 2s10s bear steepener.

# Trade Idea: USD 6m2y-6m3y2y Bear Flatteners

Of bear flatteners, this has a higher pickup than many at 36bp compared with 2s10s, which has only 10bp to forwards. Spread is highly correlated with 2s10s at 99%.

USD Bear Flatteners 6m2y vs 6m3y2y, \$10k/bp			
	Long Payer 6m2y	Midcurve 6m3y2y	Spread (bp)
Spot	0.57%	3.08%	251.4
Forward	0.92%	3.35%	243.7
Strike	0.92%	3.71%	279.8
	ATMF	ATMF+36	ATMF+36
Pickup (bp)			
Fwd-Spot	-35	-27	-8
Vol	0	-36	36
Total	-35	-63	28
Z-Scores: Spot Vol-Normalized Pickup (no units)			
Fwd-Spot	-1.04	-0.37	
Vol	0.00	-0.50	
Total	-1.04	-0.87	
Prob(Fwd(T)>Strike)	15.0%	19.1%	
Conditional Valuation and Premia (USD)			
PV	165,706	165,706	0
Expected Value	133,588	143,400	-9,813
Premium	-19.4%	-13.5%	

USD Bear Flatteners 6m2y vs 6m10y, \$10k/bp			
	Long Payer 6m2y	Short Payer 6m10y	Spread (bp)
Spot	0.57%	2.87%	230.6
Forward	0.92%	3.09%	217.1
Strike	0.92%	3.19%	227.5
	ATMF	ATMF+10	ATMF+10
Pickup (bp)			
Fwd-Spot	-35	-21	-13
Vol	0	-10	10
Total	-35	-32	-3
Z-Scores: Spot Vol-Normalized Pickup (no units)			
Fwd-Spot	-1.04	-0.42	
Vol	0.00	-0.20	
Total	-1.04	-0.62	
Prob(Fwd(T)>Strike)	15.0%	26.7%	
Conditional Valuation and Premia (USD)			
PV	165,706	165,706	0
Expected Value	133,588	155,645	-22,058
Premium	-19.4%	-6.1%	

1y History	Spread	Current	High	Low	Mean	Volatility	Z-Score	Correlation to Spread
	0y2y	0.48	0.66	0.34	0.46	6.3	0.39	
	3y2y	2.89	3.37	1.40	2.59	55.3	0.53	
	3y2y-0y2y	240.3	273.7	105.6	213.5	51.1	0.52	1.00
	2s10s	231.0	258.0	147.3	219.0	33.1	0.36	0.99
	5s10s	114.8	138.5	98.8	118.6	9.4	-0.40	0.81
	2s5s	116.2	132.2	47.5	100.4	25.2	0.63	1.00
	10s30s	80.6	100.5	70.2	87.0	6.9	-0.92	-0.73
	2s30s	311.7	344.3	240.3	306.0	29.1	0.19	0.95
	2s5s10s	1.3	14.7	-53.4	-18.2	18.8	1.04	0.93

# Trade Idea: USD 6m2y1y-6m5y5y Bear Steepeners

Amongst bear steepeners, this has one of the strongest likelihoods of ending ITM. Spread is highly correlated with 5s10s in particular.

USD Bear Steepener 6m2y1y vs 6m5y5y, \$10k/bp			
	Midcurve 6m2y1y	Midcurve 6m5y5y	Spread (bp)
Spot	1.93%	4.11%	218.3
Forward	2.41%	4.18%	177.4
Strike	2.41%	4.05%	164.6
	ATMF	ATMF-13	ATMF-13
Pickup (bp)			
Fwd-Spot	-48	-7	41
Vol	0	13	13
Total	-48	5	54
Z-Scores: Spot Vol-Normalized Pickup (no units)			
Fwd-Spot	-0.72	-0.13	
Vol	0.00	0.22	
Total	-0.72	0.10	
Prob(Fwd(T)>Strike)	23.6%	53.8%	
Conditional Valuation and Premia (USD)			
PV	296,853	296,853	0
Expected Value	267,735	298,107	30,372
Premium	-9.8%	0.4%	

USD Bear Steepener 6m5y vs 6m10y, \$10k/bp			
	Short Payer 6m5y	Long Payer 6m10y	Spread (bp)
Spot	1.81%	2.87%	106.0
Forward	2.16%	3.09%	93.2
Strike	2.16%	3.06%	90.7
	ATMF	ATMF-2	ATMF-2
Pickup (bp)			
Fwd-Spot	-34	-21	13
Vol	0	2	2
Total	-34	-19	15
Z-Scores: Spot Vol-Normalized Pickup (no units)			
Fwd-Spot	-0.66	-0.42	
Vol	0.00	0.05	
Total	-0.66	-0.37	
Prob(Fwd(T)>Strike)	25.4%	35.6%	
Conditional Valuation and Premia (USD)			
PV	221,917	221,917	0
Expected Value	206,133	216,069	9,936
Premium	-7.1%	-2.6%	

1y History	Spread	Current	High	Low	Mean	Volatility	Z-Score	Correlation to Spread
	2y1y	1.63	2.04	0.64	1.33	34.0	0.89	
	5y5y	4.14	4.61	2.91	4.03	49.4	0.23	
	5y5y-2y1y	251.2	330.4	224.8	270.3	24.6	-0.78	1.00
	2s10s	231.0	258.0	147.3	219.0	33.1	0.36	0.77
	5s10s	114.8	138.5	98.8	118.6	9.4	-0.40	0.98
	2s5s	116.2	132.2	47.5	100.4	25.2	0.63	0.64
	10s30s	80.6	100.5	70.2	87.0	6.9	-0.92	-0.08
	2s30s	311.7	344.3	240.3	306.0	29.1	0.19	0.85
	2s5s10s	1.3	14.7	-53.4	-18.2	18.8	1.04	0.37

# Trade Idea: Reds-Blues Bear Flattener

Front-end bear flatteners. Picking the right contracts. Sep Reds-Blues bear flatteners are the only expiry with positive carry.

Expiry Month	Type	Contract Name	BBG Code (Call)	Expiry	Futures	Future Price	3m Libor	ATM Strike	Option P/x		Carry till expiry		3m carry (i.e. Jun rolls down to Mar)						
									Call	Put	Call	Put	Contract	Expiry	Futures	Call (Bull)	Put (Bear)		
Jun	Reg	Jun 2014	EDM4C 99.75	Mon, 16-Jun	Jun 2014	99.743	0.26	99.750	0.7	0.9	-0.7	-0.9							
	1y	Jun 2014 x Jun 201	0EM4C 99.25	Fri, 13-Jun	Jun 2015	99.293	0.71	99.250	3.1	2.0	-3.0	-2.2							
	2y	Jun 2014 x Jun 201	2EM4C 98.125	Fri, 13-Jun	Jun 2016	98.168	1.83	98.125	5.1	4.1	-4.7	-4.5							
	3y	Jun 2014 x Jun 201	3EM4C 97.125	Fri, 13-Jun	Jun 2017	97.173	2.83	97.125	5.5	4.3	-4.8	-5.0							
	4y	Jun 2014 x Jun 201	4EM4C 96.5	Fri, 13-Jun	Jun 2018	96.518	3.48	96.500	4.7	4.2	-3.8	-5.0							
Sep	Reg	Sep 2014	EDU4C 99.75	Mon, 15-Sep	Sep 2014	99.713	0.29	99.750	0.8	1.7	-0.8	-1.7	Jun 2014	Mon, 16-Jun	Jun 2014	0.7	-0.1	0.9	-0.8
	1y	Sep 2014 x Sep 201	0EU4C 99	Fri, 12-Sep	Sep 2015	99.053	0.95	99.000	5.7	4.4	-5.5	-4.6	Jun 2014 x Jun 2015	Fri, 13-Jun	Jun 2015	8.0	2.3	0.7	-3.7
	2y	Sep 2014 x Sep 201	2EU4C 97.875	Fri, 12-Sep	Sep 2016	97.883	2.12	97.875	7.2	7.0	-6.7	-7.5	Jun 2014 x Jun 2016	Fri, 13-Jun	Jun 2016	9.5	2.3	2.2	-4.8
	3y	Sep 2014 x Sep 201	3EU4C 97	Fri, 12-Sep	Sep 2017	96.990	3.01	97.000	7.1	7.4	-6.4	-8.1	Jun 2014 x Jun 2017	Fri, 13-Jun	Jun 2017	7.5	0.4	3.2	-4.2
	4y	Sep 2014 x Sep 201	4EU4C 96.375	Fri, 12-Sep	Sep 2018	96.388	3.61	96.375	7.0	6.7	-6.1	-7.5	Jun 2014 x Jun 2018	Fri, 13-Jun	Jun 2018	6.6	-0.4	3.1	-4.6
Dec	Reg	Dec 2014	EDZ4C 99.625	Mon, 15-Dec	Dec 2014	99.638	0.36	99.625	2.6	2.3	-2.5	-2.3	Sep 2014	Mon, 15-Sep	Sep 2014	2.9	0.3	0.7	-1.6
	1y	Dec 2014 x Dec 201	0EZ4C 98.75	Fri, 12-Dec	Dec 2015	98.773	1.23	98.750	7.5	7.0	-7.3	-7.2	Sep 2014 x Sep 2015	Fri, 12-Sep	Sep 2015	10.3	2.8	2.7	-4.2
	2y	Dec 2014 x Dec 201	2EZ4C 97.625	Fri, 12-Dec	Dec 2016	97.613	2.39	97.625	9.1	9.4	-8.6	-9.9	Sep 2014 x Sep 2016	Fri, 12-Sep	Sep 2016	11.4	2.3	4.9	-4.5
	3y	Dec 2014 x Dec 201	3EZ4C 96.875	Fri, 12-Dec	Dec 2017	96.813	3.19	96.875	8.2	9.8	-7.5	-10.5	Sep 2014 x Sep 2017	Fri, 12-Sep	Sep 2017	9.1	0.8	6.2	-3.6
	4y	Dec 2014 x Dec 201	4EZ4C 96.25	Fri, 12-Dec	Dec 2018	96.263	3.74	96.250	8.7	8.4	-7.8	-9.2	Sep 2014 x Sep 2018	Fri, 12-Sep	Sep 2018	8.9	0.3	5.5	-2.9
Mar	Reg	Mar 2015	EDH5C 99.5	Mon, 16-Mar	Mar 2015	99.498	0.50	99.500	4.0	4.1	-4.0	-4.2	Dec 2014	Mon, 15-Dec	Dec 2014	4.8	0.6	1.4	-2.7
	1y	Mar 2015 x Mar 201	0EH5C 98.5	Fri, 13-Mar	Mar 2016	98.473	1.53	98.500	9.2	9.9	-8.9	-10.2	Dec 2014 x Dec 2015	Fri, 12-Dec	Dec 2015	12.0	2.7	5.1	-4.8
	2y	Mar 2015 x Mar 201	2EH5C 97.375	Fri, 13-Mar	Mar 2017	97.388	2.61	97.375	11.4	11.1	-10.8	-11.7	Dec 2014 x Dec 2016	Fri, 12-Dec	Dec 2016	13.3	1.9	7.3	-3.8
	3y	Mar 2015 x Mar 201	3EH5C 96.625	Fri, 13-Mar	Mar 2018	96.660	3.34	96.625	11.3	10.4	-10.5	-11.2	Dec 2014 x Dec 2017	Fri, 12-Dec	Dec 2017	12.2	0.9	7.5	-2.9
	4y	Mar 2015 x Mar 201	4EH5C 96.125	Fri, 13-Mar	Mar 2019	96.153	3.85	96.125	10.2	9.5	-9.3	-10.4	Dec 2014 x Dec 2018	Fri, 12-Dec	Dec 2018	10.7	0.4	7.2	-2.3

•Carry (in cts) for buying Sep (close to ATM) red put and selling blue put is -3.7+4.2=0.5

# Trade Idea: CMS Spread options and cap spreads

**Better carry through cap spreads of spread caps (call spread on slope)**

**Maximizing carry via cap spreads**

*Looking for highest carry on SL trades by expiry. Cap Spreads (of spread caps) mostly do better.*

## Maximum 1y carry achievable for SL CMS spread cap by index

Expiry	1y	2y	3y	4y	5y	6y	7y	8y	9y	10y
USD 5s30s	111%	95%	72%	28%	12%	11%	7%	4%	2%	0%
USD 2s30s	54%	87%	80%	55%	26%	20%	14%	13%	11%	7%
USD 10s30s	73%	53%	28%	17%	9%	6%	5%	12%	13%	13%
USD 2s10s	18%	53%	57%	43%	23%	10%	7%	11%	11%	10%
USD 5s10s	138%	68%	22%	12%	4%	6%	5%	3%	3%	2%
EUR 5s30s	37%	34%	37%	30%	33%	19%	26%	15%	14%	13%
EUR 2s30s	11%	28%	33%	35%	49%	32%	31%	18%	13%	6%
EUR 10s30s	42%	23%	19%	18%	28%	24%	35%	3%	8%	23%
EUR 2s10s	-4%	10%	17%	18%	23%	12%	9%	9%	7%	3%
EUR 5s10s	11%	14%	14%	12%	14%	19%	24%	13%	12%	7%

- USD 5s10s and 5s30s have the most attractive carry over 1y horizons.
- Longer-dated SL 5s30s and 10s30s in EUR continue to have carry over 1y horizons.

## Maximum 1y carry achievable for a spread of SL CMS spread caps

Expiry	1y	2y	3y	4y	5y
USD 5s30s	210%	109%	75%	33%	15%
USD 2s30s	65%	95%	85%	61%	30%
USD 10s30s	142%	65%	34%	20%	12%
USD 2s10s	54%	68%	74%	52%	28%
USD 5s10s	254%	89%	32%	17%	12%
EUR 5s30s	90%	44%	43%	35%	37%
EUR 2s30s	47%	37%	41%	41%	53%
EUR 10s30s	96%	35%	25%	20%	30%
EUR 2s10s	10%	16%	23%	21%	26%
EUR 5s10s	54%	23%	18%	15%	16%

- Doing call spreads on USD 5s30s and 5s10s and 10s30s can significantly improve carry.
- Doing cap spreads on EUR 5s10s and 10s30s leads to noticeable gains.

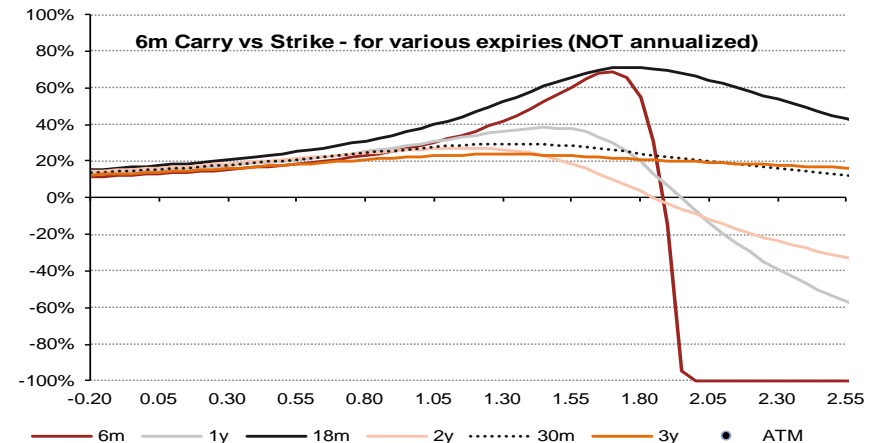
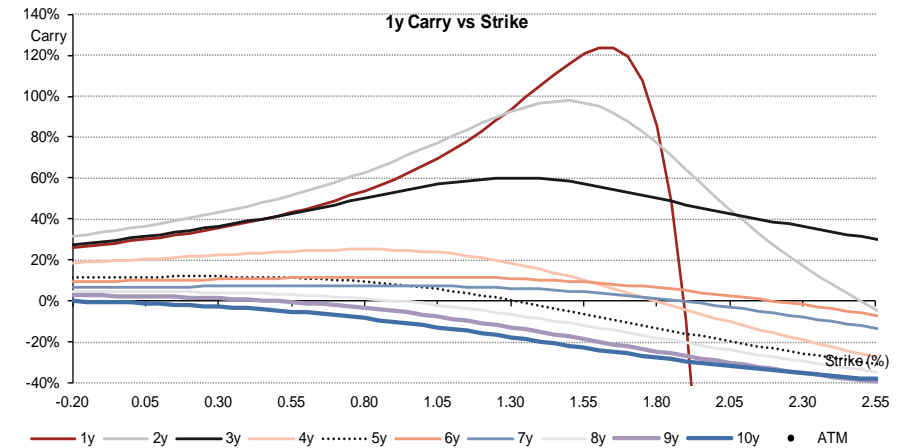
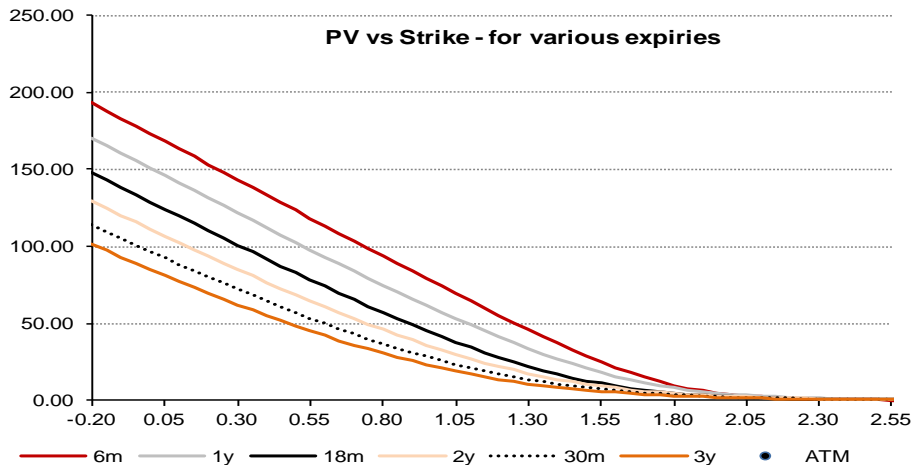
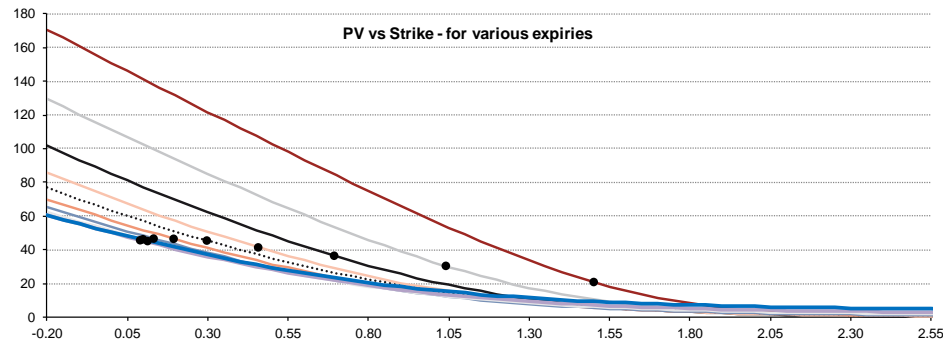
# Trade Idea: USD 5s30s CMS Spread options

## Maximizing Carry vs Strike

Annual expiries out to 10y (and 1y carry) and shorter expiries (with 6m carry)

*Higher strikes than ATMF (pictured by dots) tend to have higher carry. Of the short dates, 18m expiries stand out.*

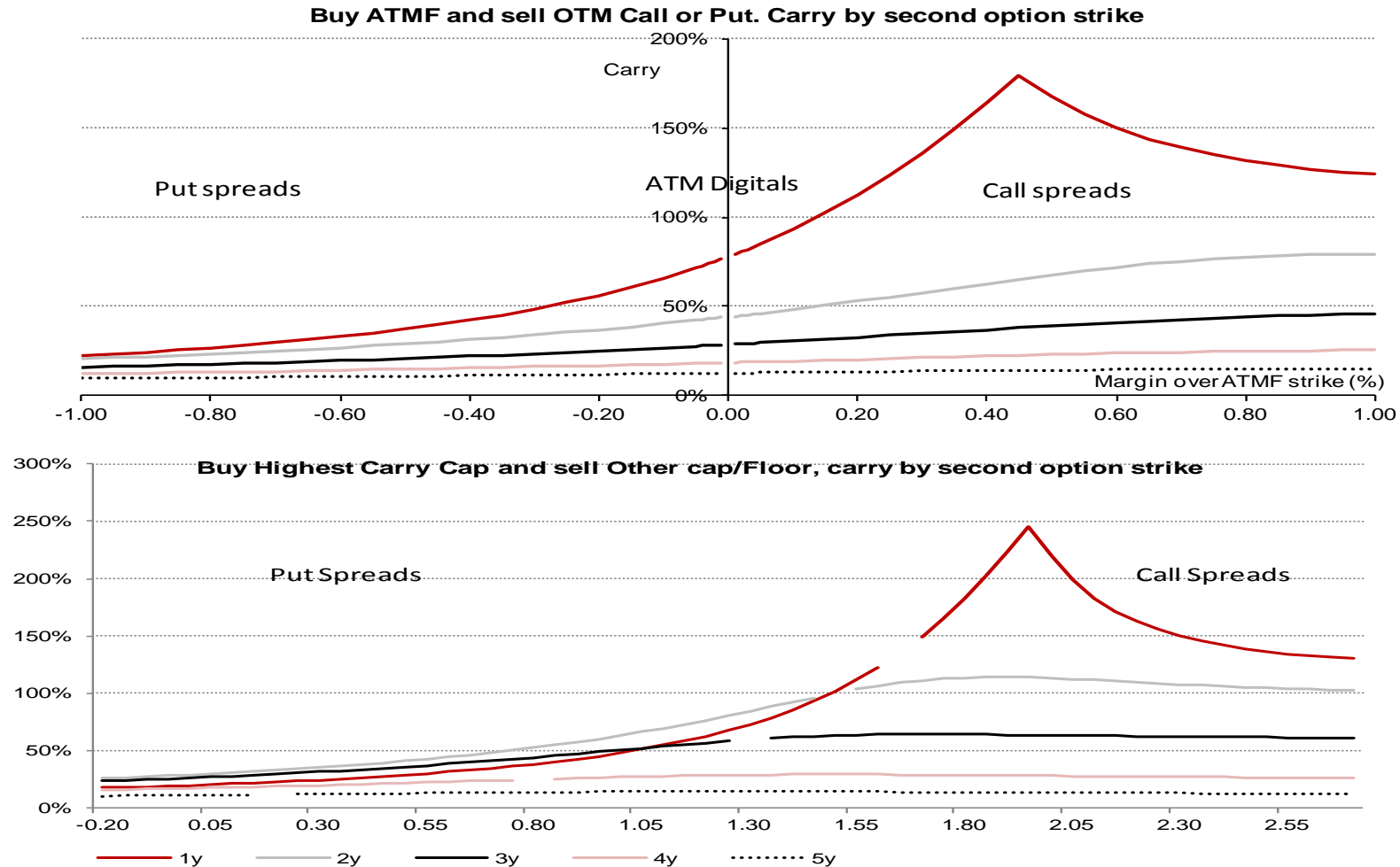
### USD 5s30s caps, pricing by strike



# Trade Idea: USD 5s30s CMS Spread options

## Enhancing carry with spreads of cap spreads (i.e., call spreads on the slope)

*ATMF vs ATMF+Xbp trades enhance carry. Highest Strike vs Higher strike cap spread do even better.*

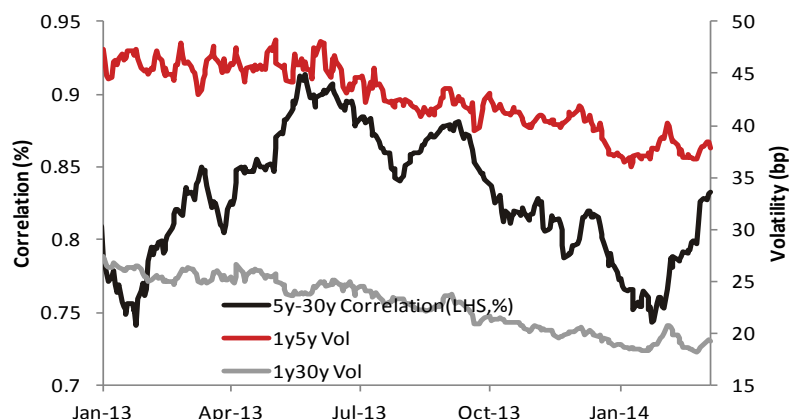


# Trade Idea: USD 5s30s CMS Spread options

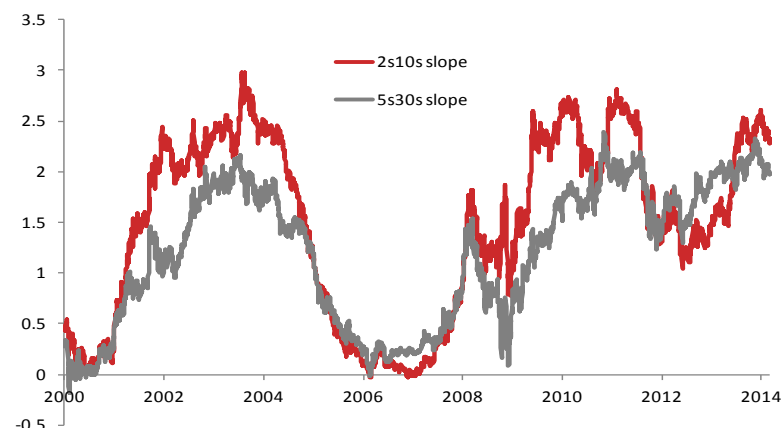
## Entry levels and outlook

Entry levels are decent. Spread caps have lower risk than outright spread trades. And flattening pressure unlikely to be as severe on 5s30s as on 2s10s

**Drivers of the cheapening:** Correlation has risen while vols have fallen, leading to cheaper 5s30s options



Slope without 5s30s is not as overpriced as 2s10s, modestly less volatile



Cap spreads have considerably lower risk than outright caps (Risks as of 7 March)

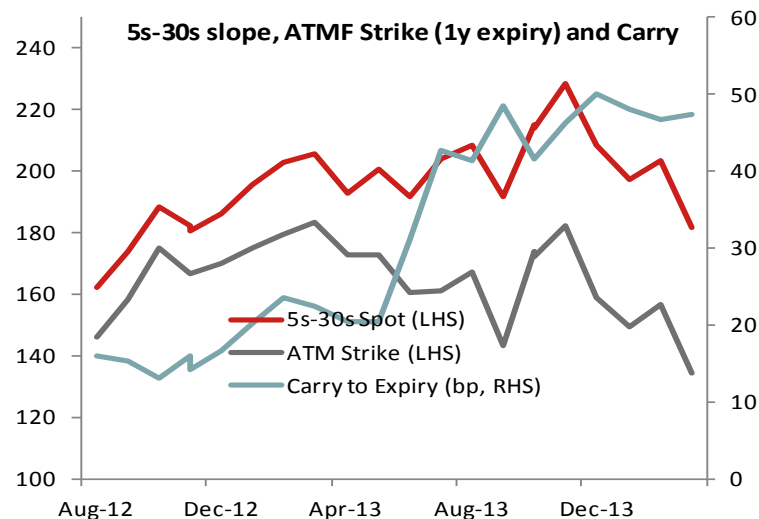
USD CMS 5s30s SL Caps \$100mn/leg	Strike	ATMF (%)	Premium (\$)	Theta (\$/day)	Delta (\$/bp)	Vega (\$/bp)	Correl Risk (\$/%)
1y Cap	1.7	1.470	13,250	-286	-497	3000	-4813
1y Cap Spread	1.70-1.95	1.470	18,000	-92	-268	998	-1360
6m Cap	1.65	1.724	6,750	-396	-276	2292	-3218
6m Cap Spread	1.70-2.00	1.724	17,000	-124	-184	763	-220
18m Cap	1.8	1.208	7,250	-137	-370	2109	-4704



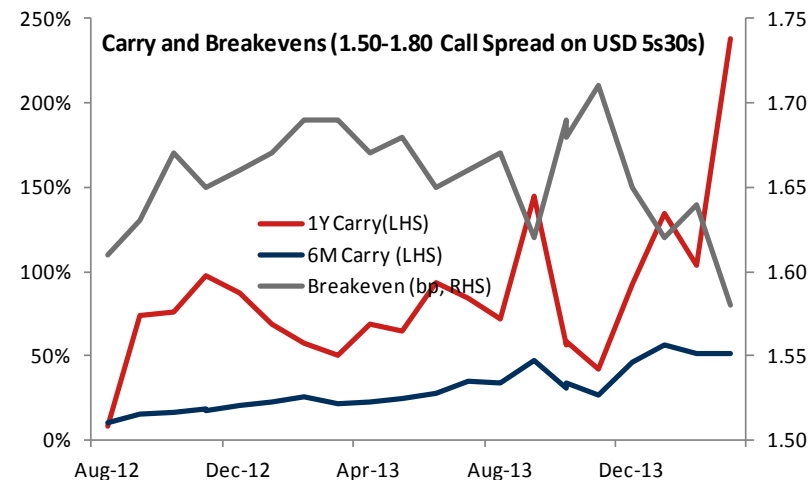
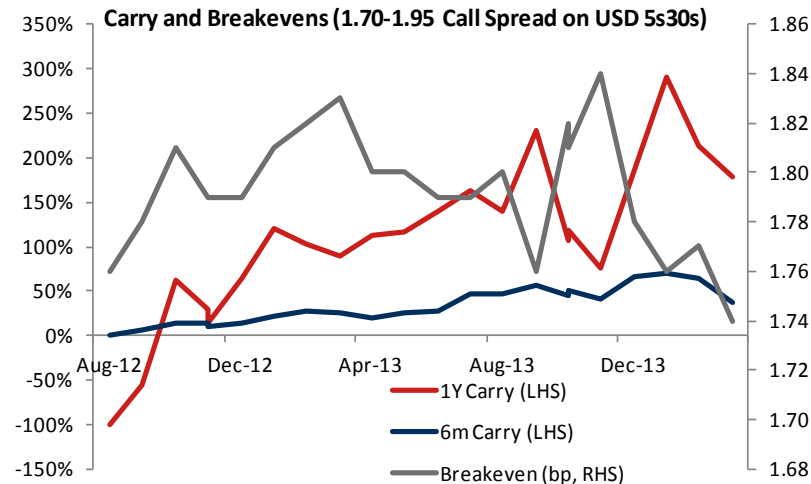
# Trade Idea: USD 5s30s CMS Spread options

## Maximizing carry alone is worthless - Historical entry levels, carry, and breakevens

*Carry is not only very high, but the trades are less risky (breakevens are lower)*



- Call Spread 1.70-1.95 was recommended on 7 March.
- We adjust the strikes to 1.50-1.80 for better performance given the current conditions.
- With current breakevens of 1.58% and 1y carry of 238% (6M: 51%, 3m: 19%).



## **Flow Exotics RV Trade Ideas**

**Short gamma, Long vega (and forward vol) and often long curve carry**

# USD Vol Surface - Forward

USD Spot									
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
3M	21	39	56	70	72	70	66	65	63
6M	30	50	65	75	76	75	70	69	66
1Y	51	71	82	85	84	82	76	74	71
2Y	89	96	96	94	91	86	79	76	73
3Y	104	104	102	96	93	88	81	77	74
5Y	106	103	101	95	93	89	81	77	73
7Y	100	97	95	90	88	85	77	73	70
10Y	89	88	86	84	82	78	71	67	65
20Y	65	62	61	60	59	59	53	52	49
30Y	56	55	56	56	56	55	51	51	48

The context: forward vol largely below spot in longer expiries across all tenors. The vol roll is only one component of forward vol type strategies.

1y Forward									
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	25Y	30Y
3M	56	72	72	84	85	83	75	73	71
6M	61	75	78	85	85	83	76	73	71
1Y	87	92	93	93	91	87	80	75	73
2Y	103	105	104	99	95	90	82	76	74
3Y	108	107	105	99	96	91	83	76	75
5Y	105	103	100	96	93	89	80	74	72
7Y	98	96	94	90	87	84	75	70	68
10Y	86	85	83	81	79	76	68	64	62
20Y	64	62	61	60	59	58	52	49	47
30Y	55	55	55	55	55	54	50		

Differences: 1y Forward									
	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
3M	35	33	16	14	13	13	9	8	8
6M	31	25	13	10	9	8	6	4	5
1Y	36	21	11	8	7	5	4	1	2
2Y	14	9	8	5	4	4	3	0	1
3Y	4	3	3	3	3	3	2	-1	1
5Y	-1	0	-1	1	0	0	-1	-3	-1
7Y	-2	-1	-1	0	-1	-1	-2	-3	-2
10Y	-3	-3	-3	-3	-3	-2	-3	-3	-3
20Y	-1	0	0	0	0	-1	-1	-3	-2
30Y	-1	0	-1	-1	-1	-1	-1		

UL has most negative carry, LR has best vol roll.

2y Forward									
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	25Y	30Y
3M	79	93	97	94	92	88	80	75	73
6M	78	95	99	95	93	89	81	75	73
1Y	107	111	110	102	99	93	84	77	75
2Y	111	111	108	101	98	93	84	76	75
3Y	112	109	106	101	97	93	84	77	75
5Y	103	101	99	93	91	88	78	72	70
7Y	95	92	90	87	85	82	73	67	66
10Y	84	82	81	80	78	75	67	61	60
20Y	63	61	60	59	58	58	52	48	46
30Y	54	54	54	55	54	54	49		

Differences: 2y Forward									
	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
3M	58	54	41	24	20	18	14	10	10
6M	48	45	34	20	17	14	11	6	7
1Y	56	40	28	17	15	11	8	3	4
2Y	22	15	12	7	7	7	5	0	2
3Y	8	5	4	5	4	5	3	0	1
5Y	-3	-2	-2	-2	-2	-1	-3	-5	-3
7Y	-5	-5	-5	-3	-3	-3	-4	-6	-4
10Y	-5	-6	-5	-4	-4	-3	-4	-6	-5
20Y	-2	-1	-1	-1	-1	-1	-1	-4	-3
30Y	-2	-1	-2	-1	-2	-1	-2		

5y Forward									
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	25Y	30Y
3M	110	106	104	97	94	92	81	73	70
6M	115	109	106	98	94	93	81	73	70
1Y	109	107	105	97	94	92	81	72	69
2Y	105	105	103	93	91	90	78	70	67
3Y	104	102	98	92	89	88	76	69	66
5Y	90	89	87	85	85	83	71	64	61
7Y	84	82	81	80	80	77	66	60	57
10Y	76	74	73	73	71	69	59	53	50
20Y	59	57	57	56	56	56	49	44	42
30Y	52	51	52	52	52	51	46		

Differences: 5y Forward									
	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
3M	89	67	48	27	22	22	15	8	7
6M	85	59	41	23	18	18	11	4	4
1Y	58	36	23	12	10	10	5	-2	-2
2Y	16	9	7	-1	0	4	-1	-6	-6
3Y	0	-2	-4	-4	-4	0	-5	-8	-8
5Y	-16	-14	-14	-10	-8	-6	-10	-13	-12
7Y	-16	-15	-14	-10	-8	-8	-11	-13	-13
10Y	-13	-14	-13	-11	-11	-9	-12	-14	-15
20Y	-6	-5	-4	-4	-3	-3	-4	-8	-7
30Y	-4	-4	-4	-4	-4	-4	-5		

Highest Carry 5y triangles.

# EUR Vol Surface - Forward

EUR Spot										
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	25	33	42	54	55	57	54	52	50	
6M	27	36	46	57	58	60	56	55	52	
1Y	33	46	55	63	65	66	62	60	57	
2Y	55	62	67	72	72	72	68	65	63	
3Y	70	72	74	76	76	75	70	68	65	
5Y	80	80	80	80	79	78	73	70	67	
7Y	79	78	77	77	76	76	70	67	63	
10Y	75	74	73	73	73	72	67	62	58	
20Y	61	60	60	59	59	58	52	48	44	
30Y	51	50	50	50	49	48	42	39	36	

The context: forward vol largely below spot in longer expiries across all tenors. The vol roll is only one component of forward vol type strategies.

1y Forward										
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	36	45	54	63	67	70	66	64	62	
6M	43	49	56	65	68	70	65	64	63	
1Y	50	58	64	71	72	73	70	68	66	
2Y	67	71	71	76	76	76	72	70	68	
3Y	78	76	78	79	78	78	74	71	69	
5Y	80	80	79	79	79	79	73	70	67	
7Y	78	77	76	76	77	76	71	67	62	
10Y	75	73	73	73	73	72	66	62	57	
20Y	60	59	59	59	58	57	51	46	42	
30Y	51	50	50	49	48	47	41	38	35	

Differences: 1y Forward										
	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	11	12	12	9	12	13	12	12	12	
6M	16	13	10	8	10	10	9	9	11	
1Y	17	12	9	8	7	7	8	8	9	
2Y	12	9	4	4	4	4	4	5	5	
3Y	8	4	4	3	2	3	4	3	4	
5Y	0	0	-1	-1	0	1	0	0	0	
7Y	-1	-1	-1	-1	1	0	1	0	-1	
10Y	0	-1	0	0	0	0	-1	0	-1	
20Y	-1	-1	-1	0	-1	-1	-1	-2	-2	
30Y	0	0	0	-1	-1	-1	-1	-1	-1	

2y Forward										
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	56	57	60	67	69	71	69	67	65	
6M	60	61	64	70	71	72	70	68	66	
1Y	66	67	69	73	74	75	72	70	68	
2Y	76	76	75	78	78	78	74	71	69	
3Y	80	77	78	79	79	80	75	72	69	
5Y	79	77	77	77	78	79	72	68	64	
7Y	77	75	75	75	76	76	69	65	60	
10Y	72	72	71	72	72	71	64	60	54	
20Y	59	58	58	57	56	55	49	44	40	
30Y	49	49	48	47	47	46	40	36	33	

Differences: 2y Forward										
	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	31	24	18	13	14	14	15	15	15	
6M	33	25	18	13	13	12	14	13	14	
1Y	33	21	14	10	9	9	10	10	11	
2Y	21	14	8	6	6	6	6	6	6	
3Y	10	5	4	3	3	5	5	4	4	
5Y	-1	-3	-3	-3	-1	1	-1	-2	-3	
7Y	-2	-3	-2	-2	0	0	-1	-2	-3	
10Y	-3	-2	-2	-1	-1	-1	-3	-2	-4	
20Y	-2	-2	-2	-2	-3	-3	-3	-4	-4	
30Y	-2	-1	-2	-3	-2	-2	-2	-3	-3	

LR has best vol roll, although 5y and 7y expiries on short tails are decent.

5y Forward										
Fwd	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	116	95	86	79	78	81	72	66	59	
6M	106	89	82	78	77	80	71	65	58	
1Y	80	74	71	71	72	77	70	64	55	
2Y	76	71	69	70	71	77	69	62	54	
3Y	72	68	69	69	71	76	68	61	53	
5Y	72	69	69	69	72	74	66	59	50	
7Y	68	66	66	69	70	71	61	55	49	
10Y	67	66	66	67	67	66	55	49	42	
20Y	53	51	50	50	49	49	42	35	30	
30Y	48	49	48	47	46	43	35	31	25	

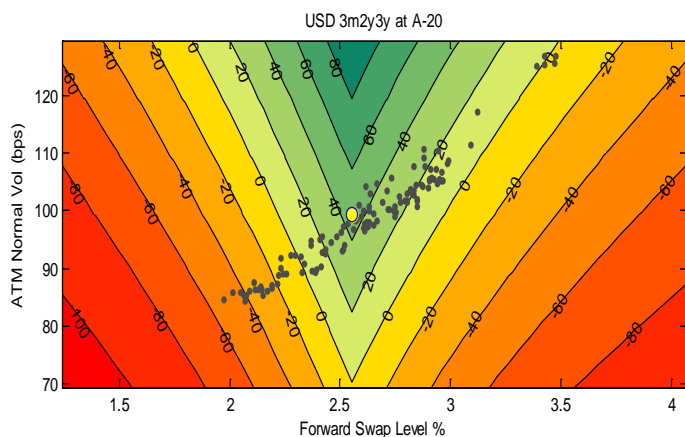
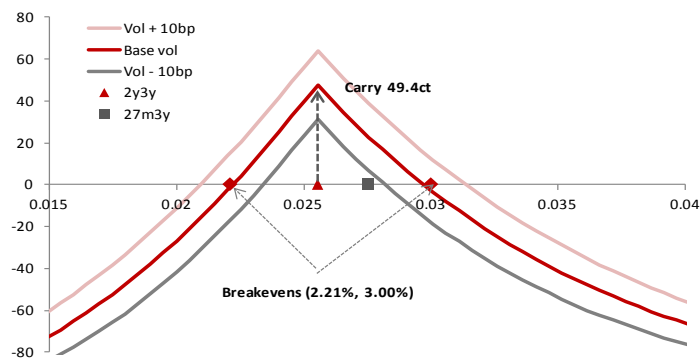
Differences: 5y Forward										
	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y	
3M	91	62	44	25	23	24	18	14	9	
6M	79	53	36	21	19	20	15	10	6	
1Y	47	28	16	8	7	11	8	4	-2	
2Y	21	9	2	-2	-1	5	1	-3	-9	
3Y	2	-4	-5	-7	-5	1	-2	-7	-12	
5Y	-8	-11	-11	-11	-7	-4	-7	-11	-17	
7Y	-11	-12	-11	-8	-6	-5	-9	-12	-14	
10Y	-8	-8	-7	-6	-6	-6	-12	-13	-16	
20Y	-8	-9	-10	-9	-10	-9	-10	-13	-14	
30Y	-3	-1	-2	-3	-3	-5	-7	-8	-11	

Highest Carry 5y triangles.

# Short Gamma Trade Idea: USD 3m2y3y A-20bp Turbo Carry

**Sell 3m2y3y ATMF-20bp Midcurve Payers, Buy 27m3y ATMF-20bp Payers for a premium of 114ct (39.6bp) and roll of 49.4ct (17.1bp) or 173% annualised carry**

Spot at 2.56% (ATMF-20bp), fwds at 2.75%. B/E range is 2.21%-3.00% or 79bp wide. Trade has bearish skew owing to highly positive realised volat.



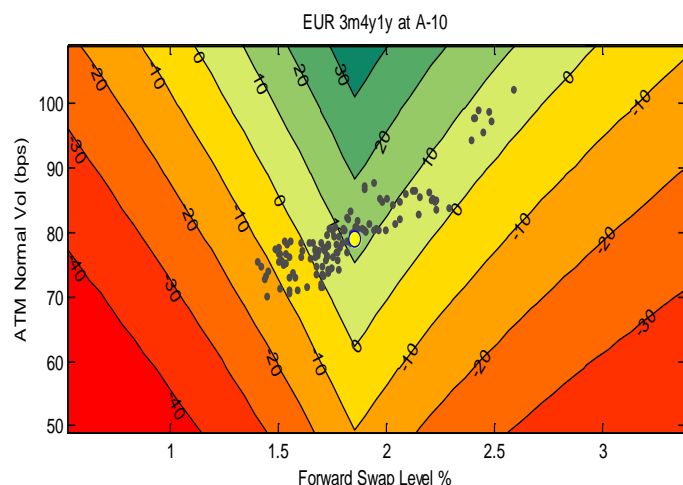
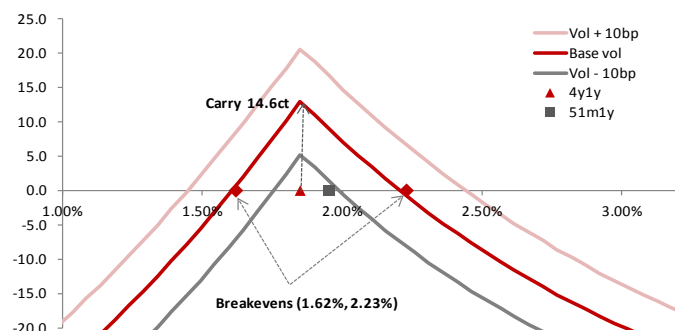
Strike (bp)	Premium (ct)	Rolldown (ct)	Premium (bp)	Rolldown (bp)	Carry (%)	Implied Vol (bp)	Forward %	Forward %	B/E Width (bp)	Adj Ann Carry
-20	114.0	49.4	39.6	17.1	173%	92.6	2.21	3.00	79.17	296%
-10	117.0	35.1	40.6	12.2	120%	95.0	2.31	3.11	80.06	202%
0	118.3	22.7	41.1	7.9	77%	97.6	2.39	3.23	84.09	132%
10	118.0	12.6	41.0	4.4	43%	100.2	2.46	3.37	91.16	78%
20	116.4	4.6	40.4	1.6	16%	103.0	2.52	3.53	100.79	31%

Package Name	Fwd (%)	Spot (%)	Relative Strike (bp)	Delta (ct/bp)	Gamma (ct/bp2)	Vega (ct/bp)	Theta (ct/day)
USD 3m2y3y ATMF-20	2.75	2.56	-20	-0.43	-0.16	1.04	0.23

# Short Gamma Trade Idea: EUR 3m4y1y A-10bp Turbo Carry

**Sell 3m4y1y ATMF-10bp Midcurve Payers, Buy 51m1y ATMF-10bp Payers for a premium of 48ct (49.6bp) and roll of 14.6ct (15.1bp). With an annualised carry of 121%.**

Spot at 1.85% (ATMF-10bp), Fwds at 1.95%. B/E range is 1.62%-2.23% or 62bp wide. Trade has bearish skew owing to highly positive realised vol



Relative Strike (bp)	Upfront Premium (ct)	Rolldown (ct)	Premium (bp)	Rolldown (bp)	Ann Carry (%)	ImpliedVo l (bp)	Low B/E Forward %	High B/E Forward %	B/E Width (bp)	Adj Ann Carry
-20	46.2	10.8	47.8	11.2	94%	78.4	1.52	2.12	60.4	145%
<b>-10</b>	<b>48.0</b>	<b>14.6</b>	<b>49.6</b>	<b>15.1</b>	<b>121%</b>	<b>80.2</b>	<b>1.62</b>	<b>2.23</b>	<b>61.7</b>	<b>187%</b>
0	49.0	9.9	50.7	10.3	81%	82.3	1.70	2.37	67.3	132%
10	49.3	6.3	50.9	6.5	51%	84.8	1.76	2.53	76.8	92%
20	48.8	3.5	50.5	3.6	29%	87.5	1.81	2.71	89.6	58%

Package Name	Fwd (%)	Spot (%)	Relative Strike (bp)	Delta (ct/bp)	Gamma (ct/bp2)	Vega (ct/bp)	Theta (ct/day)
<b>EUR 3m4y1y ATMF-10</b>	1.95	1.85	-10	-0.17	-0.08	0.55	0.09

# Top Long-dated Midcurve Calendar Spread (“turbo-carry”)

Sorted on (vol) Adjusted Annualised Carry over 1y horizon. Only for 5y expiries.

## USD Trades

Expiry	Forward Tenor	Swap Tenor	Sector	Mid-curve Name	Fwd-Swap Name	Strike	Forward%	Spot%	RateRateCorr	Upfront Premium (ct)	Rolldown (ct)	Premium (bp)	Rolldown (bp)	Ann Carry %	ImpliedVol (bp)	Low B/E Forward	High B/E Forward	Adjusted Ann Carry
5y	6y	1y	LL	5y6y1y	6y1y	-50	4.50	4.03	1.00	22.8	62.5	26.3	72.1	55%	88.5	2.12	7.58	151%
5y	5y	1y	LL	5y5y1y	5y1y	-50	4.46	3.80	1.00	21.0	57.4	23.3	63.9	55%	90.9	2.07	7.51	147%
5y	6y	1y	LL	5y6y1y	6y1y	-40	4.50	4.03	1.00	23.2	60.9	26.7	70.2	53%	88.7	2.19	7.71	146%
5y	5y	2y	LL	5y5y2y	5y2y	-50	4.48	3.91	0.99	40.5	116.6	22.9	66.0	58%	89.5	2.13	7.17	145%
5y	6y	2y	LL	5y6y2y	6y2y	-40	4.49	4.09	1.00	45.2	121.3	26.6	71.3	54%	86.6	2.23	7.33	141%
5y	5y	3y	LL	5y5y3y	5y3y	-50	4.48	3.99	0.99	59.7	171.8	22.9	66.0	58%	87.8	2.20	6.87	137%
5y	6y	1y	LL	5y6y1y	6y1y	-30	4.50	4.03	1.00	23.5	57.0	27.1	65.7	49%	88.9	2.26	7.87	137%
5y	5y	1y	LL	5y5y1y	5y1y	-40	4.46	3.80	1.00	21.3	53.6	23.7	59.6	50%	91.2	2.14	7.60	135%
5y	5y	2y	LL	5y5y2y	5y2y	-40	4.48	3.91	0.99	41.1	108.6	23.3	61.5	53%	89.7	2.21	7.31	134%
5y	7y	1y	LL	5y7y1y	7y1y	-30	4.48	4.15	1.00	25.8	60.9	30.9	72.9	47%	84.7	2.32	7.69	134%
5y	6y	2y	LL	5y6y2y	6y2y	-50	4.49	4.09	1.00	44.5	112.7	26.2	66.2	51%	86.5	2.15	7.20	132%
5y	6y	2y	LL	5y6y2y	6y2y	-30	4.49	4.09	1.00	45.8	113.6	26.9	66.7	50%	86.7	2.30	7.46	132%
5y	7y	1y	LL	5y7y1y	7y1y	-40	4.48	4.15	1.00	25.5	58.6	30.5	70.1	46%	84.6	2.24	7.56	129%
5y	5y	3y	LL	5y5y3y	5y3y	-40	4.48	3.99	0.99	60.6	162.4	23.3	62.4	54%	87.9	2.28	7.00	129%
5y	6y	1y	LL	5y6y1y	6y1y	-20	4.50	4.03	1.00	23.8	53.3	27.4	61.4	45%	89.1	2.34	8.02	128%
5y	7y	2y	LL	5y7y2y	7y2y	-30	4.48	4.20	1.00	49.7	116.1	30.3	70.9	47%	82.8	2.34	7.40	128%
5y	7y	1y	LL	5y7y1y	7y1y	-20	4.48	4.15	1.00	26.1	57.1	31.2	68.3	44%	84.8	2.39	7.86	126%
5y	5y	2y	LL	5y5y2y	5y2y	-30	4.48	3.91	0.99	41.7	101.0	23.6	57.2	48%	89.9	2.28	7.45	125%
5y	6y	3y	LL	5y6y3y	6y3y	-30	4.48	4.14	0.99	67.7	167.4	27.0	66.7	49%	84.8	2.36	7.14	124%
5y	7y	2y	LL	5y7y2y	7y2y	-20	4.48	4.20	1.00	50.2	112.6	30.7	68.7	45%	82.9	2.41	7.54	124%

Highlighting two highest carry, highest expected return midcurve calendar spreads with 5y.

## EUR Trades

Expiry	Forward Tenor	Swap Tenor	Sector	Mid-curve Name	Fwd-Swap Name	Strike	Forward%	Spot%	RateRateCorr	Upfront Premium (ct)	Rolldown (ct)	Premium (bp)	Rolldown (bp)	Ann Carry %	ImpliedVol (bp)	Low B/E Forward	High B/E Forward	Adjusted Ann Carry
5y	6y	4y	LL	5y6y4y	6y4y	-50	3.41	2.91	0.98	60.9	213.6	17.1	60.0	70%	80.7	1.37	5.68	168%
5y	7y	2y	LL	5y7y2y	7y2y	-50	3.43	2.93	1.00	34.3	113.3	19.3	63.5	66%	81.1	1.38	5.87	163%
5y	5y	5y	Mid	5y5y5y	5y5y	-50	3.39	2.77	0.97	66.5	230.4	14.8	51.1	69%	80.8	1.34	5.53	161%
5y	6y	3y	LL	5y6y3y	6y3y	-50	3.42	2.81	0.99	45.6	152.1	16.8	56.0	67%	81.4	1.35	5.61	156%
5y	6y	4y	LL	5y6y4y	6y4y	-40	3.41	2.91	0.98	62.6	197.5	17.6	55.4	63%	81.0	1.45	5.81	152%
5y	7y	3y	LL	5y7y3y	7y3y	-40	3.41	3.03	0.99	52.5	161.3	19.9	61.1	62%	80.6	1.47	5.84	149%
5y	7y	2y	LL	5y7y2y	7y2y	-40	3.43	2.93	1.00	35.3	105.4	19.8	59.1	60%	81.4	1.45	5.87	145%
5y	4y	6y	Mid	5y4y6y	4y6y	-50	3.37	2.61	0.94	65.8	221.8	12.0	40.5	67%	80.6	1.37	5.21	144%
5y	5y	4y	LL	5y5y4y	5y4y	-50	3.40	2.66	0.97	53.0	173.4	14.5	47.4	65%	81.4	1.32	5.32	144%
5y	8y	1y	LL	5y8y1y	8y1y	-40	3.44	3.04	1.00	20.1	57.5	22.9	65.4	57%	81.2	1.49	6.04	143%
5y	7y	3y	LL	5y7y3y	7y3y	-30	3.41	3.03	0.99	53.8	154.9	20.4	58.7	58%	80.9	1.54	5.97	141%
5y	5y	5y	Mid	5y5y5y	5y5y	-40	3.39	2.77	0.97	68.4	211.1	15.2	46.8	62%	81.1	1.42	5.53	140%
5y	6y	2y	LL	5y6y2y	6y2y	-50	3.41	2.69	0.99	30.6	96.5	16.7	52.7	63%	82.0	1.31	5.38	140%
5y	7y	3y	LL	5y7y3y	7y3y	-50	3.41	3.03	0.99	51.0	147.8	19.3	56.0	58%	80.4	1.39	5.71	139%
5y	7y	1y	LL	5y7y1y	7y1y	-50	3.42	2.83	1.00	18.3	54.1	20.2	59.9	59%	81.6	1.38	5.65	139%
5y	6y	3y	LL	5y6y3y	6y3y	-40	3.42	2.81	0.99	46.8	140.5	17.2	51.8	60%	81.7	1.42	5.61	138%
5y	8y	1y	LL	5y8y1y	8y1y	-50	3.44	3.04	1.00	19.6	53.0	22.3	60.3	54%	81.0	1.42	5.92	135%
5y	6y	4y	LL	5y6y4y	6y4y	-30	3.41	2.91	0.98	64.2	182.0	18.0	51.1	57%	81.3	1.52	5.82	134%
5y	8y	2y	LL	5y8y2y	8y2y	-30	3.40	3.14	1.00	39.4	106.4	22.7	62.4	55%	80.5	1.55	5.93	134%
5y	8y	2y	LL	5y8y2y	8y2y	-20	3.40	3.14	1.00	40.3	106.3	23.2	61.2	53%	80.7	1.62	6.07	130%

# Long Vega Trade Idea: Midcurve Calendar Spread – EUR 5y6y4y A-50

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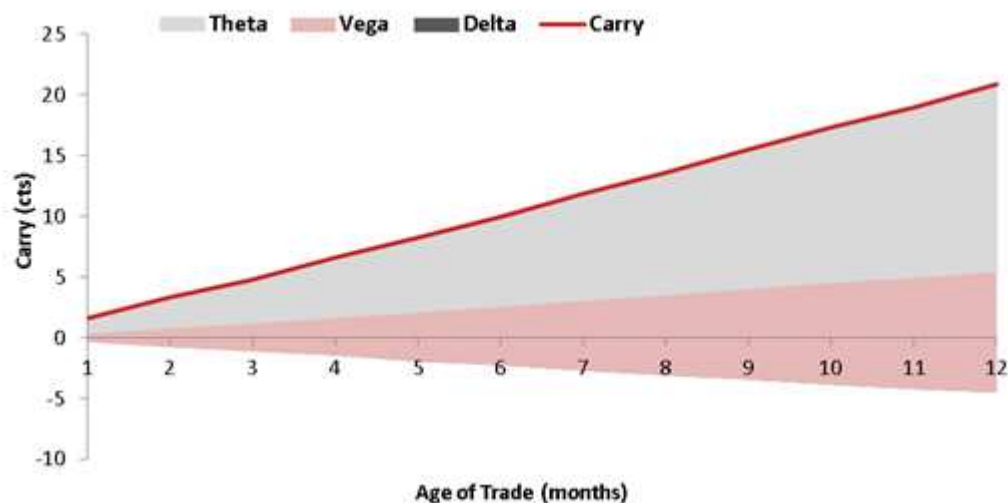
EUR Midcurve 5y6y4y A-50 for 60.9cts premium 70% total carry.

Trade Idea: *long* 11y4y A-50 payer and short 5y6y4y A-50bp payers. The package costs 60.9cts.

70% annualized carry (20.9 ct) for 1y, approx ½ is vega, 2/3rds is time decay, and it trades a little short.

Carry breakdown in the first year

	Carry	Delta	Vega	Theta	Unexp
Total	20.9	-4.5	10.1	15.4	0.0





# Long Vega Trade Idea: Midcurve Calendar Spread– USD 5y6y1y A-50

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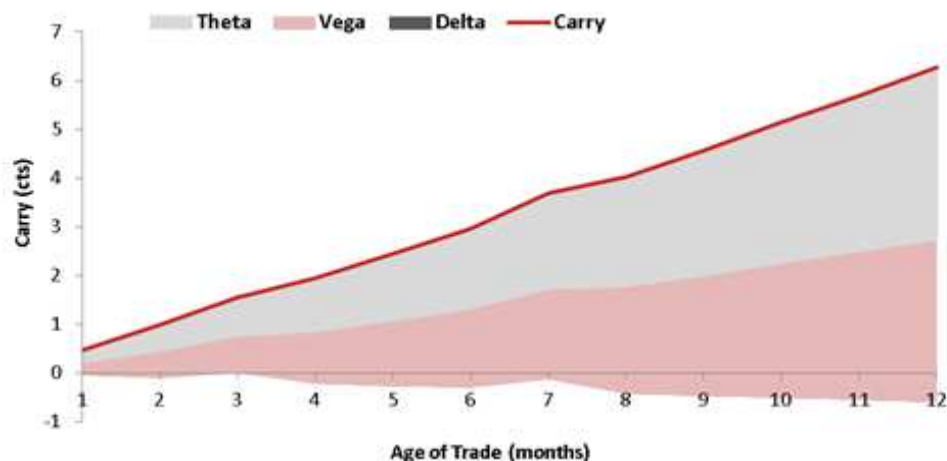
USD Midcurve 5y6y1y A-50 for 60.9cts premium 70% total carry.

Trade Idea: *long* 11y4y A-50 payer and short 5y6y4y A-50bp payers. The package costs 22cts.

55% annualized carry (6.3 ct) for 1y, approx ½ is vega, and ½ is time decay. Small negative curve contribution.

Carry breakdown in the first year

	Carry	Delta	Vega	Theta	Unexp
Total	6.3	-0.6	3.3	3.5	0.0



# USD Top Triangles (6m horizon)

Sorted on Vega Roll ("Quality" carry)

Forward Vol	Triangle	6m Carry/Premium			
		Total Carry	Delta Carry	Vega Carry	Theta
10y1y4y	10y1y + 11y4y - 10y5y	18.8%	-0.3%	13.0%	6.1%
5y1y20y	5y1y + 6y20y - 5y21y	18.2%	-1.2%	12.6%	7.1%
5y1y21y	5y1y + 6y21y - 5y22y	18.2%	-1.2%	12.5%	7.1%
5y1y22y	5y1y + 6y22y - 5y23y	18.1%	-1.2%	12.5%	7.0%
5y1y23y	5y1y + 6y23y - 5y24y	18.0%	-1.2%	12.4%	7.0%
5y1y24y	5y1y + 6y24y - 5y25y	17.9%	-1.2%	12.3%	7.0%
10y1y5y	10y1y + 11y5y - 10y6y	18.1%	-0.3%	12.2%	6.2%
5y1y25y	5y1y + 6y25y - 5y26y	17.6%	-1.3%	12.0%	7.1%
5y1y26y	5y1y + 6y26y - 5y27y	17.4%	-1.3%	11.7%	7.2%
10y2y3y	10y2y + 12y3y - 10y5y	18.2%	0.5%	11.7%	5.8%
5y1y19y	5y1y + 6y19y - 5y20y	17.0%	-1.2%	11.7%	6.7%
5y1y18y	5y1y + 6y18y - 5y19y	16.9%	-1.2%	11.5%	6.7%
5y1y17y	5y1y + 6y17y - 5y18y	16.7%	-1.2%	11.4%	6.6%
5y1y27y	5y1y + 6y27y - 5y28y	17.1%	-1.3%	11.4%	7.2%
5y1y16y	5y1y + 6y16y - 5y17y	16.6%	-1.1%	11.3%	6.6%
5y1y30y	5y1y + 6y30y - 5y31y	17.4%	-1.4%	11.3%	7.7%
5y1y15y	5y1y + 6y15y - 5y16y	16.4%	-1.1%	11.2%	6.5%
5y1y28y	5y1y + 6y28y - 5y29y	16.8%	-1.3%	11.1%	7.2%
5y1y29y	5y1y + 6y29y - 5y30y	16.6%	-1.3%	10.8%	7.2%
10y1y6y	10y1y + 11y6y - 10y7y	16.6%	-0.3%	10.8%	6.1%

Sorted on Total Carry

Forward Vol	Triangle	6m Carry/Premium			
		Total Carry	Delta Carry	Vega Carry	Theta
1y1y30y	1y1y + 2y30y - 1y31y	31.0%	1.8%	8.7%	20.7%
1y1y29y	1y1y + 2y29y - 1y30y	30.4%	1.8%	8.6%	20.2%
1y1y28y	1y1y + 2y28y - 1y29y	30.3%	1.8%	8.6%	20.2%
1y1y27y	1y1y + 2y27y - 1y28y	30.3%	1.8%	8.6%	20.2%
1y1y26y	1y1y + 2y26y - 1y27y	30.2%	1.8%	8.5%	20.1%
1y1y25y	1y1y + 2y25y - 1y26y	30.1%	1.7%	8.5%	20.1%
1y1y24y	1y1y + 2y24y - 1y25y	30.1%	1.7%	8.5%	20.1%
1y1y23y	1y1y + 2y23y - 1y24y	30.0%	1.7%	8.4%	20.1%
1y1y22y	1y1y + 2y22y - 1y23y	29.9%	1.7%	8.4%	20.1%
1y1y21y	1y1y + 2y21y - 1y22y	29.9%	1.6%	8.4%	20.1%
1y1y20y	1y1y + 2y20y - 1y21y	29.7%	1.6%	8.3%	20.1%
1y1y19y	1y1y + 2y19y - 1y20y	28.9%	1.5%	7.9%	19.8%
1y1y18y	1y1y + 2y18y - 1y19y	28.7%	1.4%	7.7%	19.8%
1y1y17y	1y1y + 2y17y - 1y18y	28.5%	1.3%	7.6%	19.8%
1y1y16y	1y1y + 2y16y - 1y17y	28.2%	1.2%	7.5%	19.8%
1y1y15y	1y1y + 2y15y - 1y16y	28.0%	1.1%	7.3%	19.8%
1y1y14y	1y1y + 2y14y - 1y15y	26.4%	0.9%	6.9%	18.8%
1y1y13y	1y1y + 2y13y - 1y14y	26.1%	0.8%	6.7%	18.8%
1y1y12y	1y1y + 2y12y - 1y13y	25.6%	0.5%	6.5%	18.8%
1y2y30y	1y2y + 3y30y - 1y32y	25.2%	2.0%	6.7%	16.6%

# EUR Top Triangles (6m horizon)

Sorted on Vega Roll ("Quality" carry)

Forward Vol	Triangle	6m Carry/Premium			
		Total Carry	Delta Carry	Vega Carry	Theta
5y1y29y	5y1y + 6y29y - 5y30y	26.6%	-0.8%	19.5%	8.1%
5y1y30y	5y1y + 6y30y - 5y31y	26.0%	-0.8%	19.0%	8.0%
5y1y28y	5y1y + 6y28y - 5y29y	25.7%	-0.8%	18.7%	8.0%
5y1y27y	5y1y + 6y27y - 5y28y	24.8%	-0.8%	17.9%	7.9%
5y1y8y	5y1y + 6y8y - 5y9y	19.6%	-0.7%	13.8%	6.6%
5y1y26y	5y1y + 6y26y - 5y27y	23.9%	-0.8%	17.1%	7.7%
5y1y7y	5y1y + 6y7y - 5y8y	19.6%	-0.8%	13.7%	6.9%
5y1y9y	5y1y + 6y9y - 5y10y	19.0%	-0.6%	13.4%	6.3%
5y1y6y	5y1y + 6y6y - 5y7y	19.6%	-0.9%	13.6%	7.1%
5y1y25y	5y1y + 6y25y - 5y26y	23.1%	-0.7%	16.4%	7.6%
5y1y24y	5y1y + 6y24y - 5y25y	22.2%	-0.7%	15.6%	7.5%
5y1y5y	5y1y + 6y5y - 5y6y	19.1%	-1.1%	13.1%	7.3%
5y1y23y	5y1y + 6y23y - 5y24y	21.4%	-0.7%	15.0%	7.3%
5y1y22y	5y1y + 6y22y - 5y23y	20.7%	-0.7%	14.3%	7.2%
5y1y21y	5y1y + 6y21y - 5y22y	19.9%	-0.7%	13.7%	7.1%
5y1y2y	5y1y + 6y2y - 5y3y	17.5%	-1.5%	12.2%	7.0%
5y1y1y	5y1y + 6y1y - 5y2y	15.6%	-1.6%	11.0%	6.3%
5y1y20y	5y1y + 6y20y - 5y21y	19.2%	-0.6%	13.1%	7.0%
5y1y3y	5y1y + 6y3y - 5y4y	17.5%	-1.4%	11.8%	7.2%
5y1y15y	5y1y + 6y15y - 5y16y	17.7%	-0.5%	12.2%	6.1%

Sorted on Total Carry

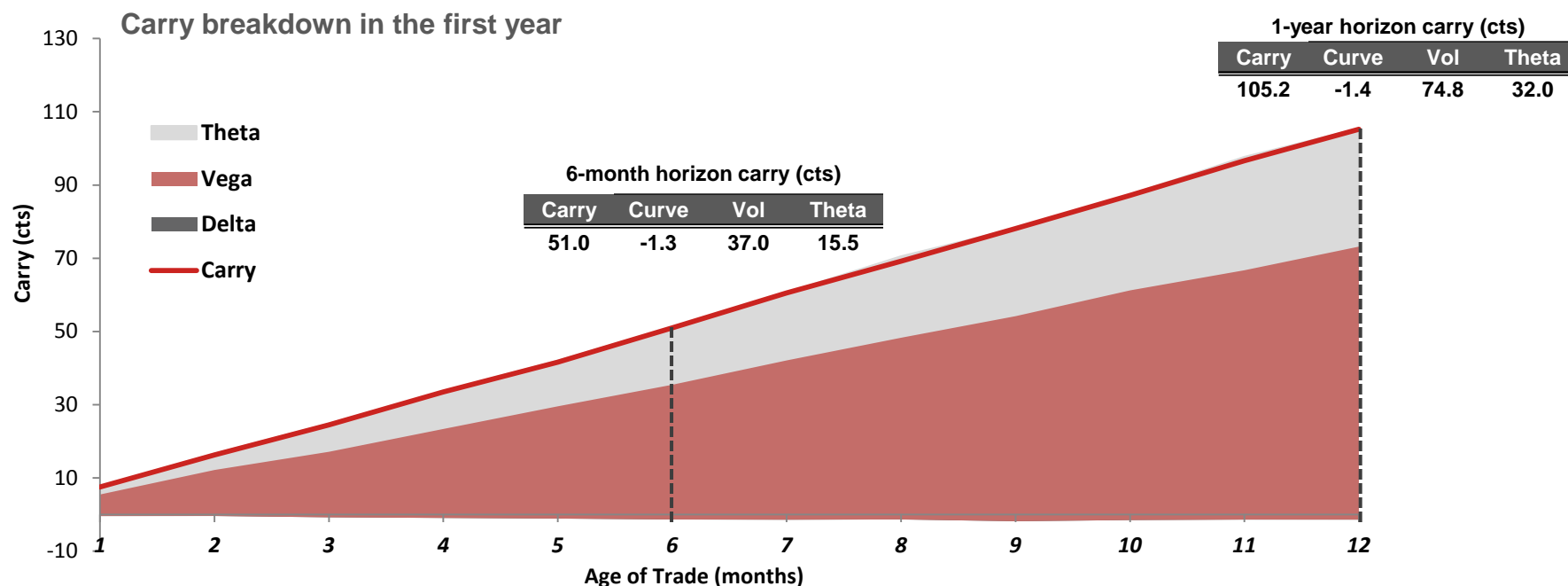
Forward Vol	Triangle	6m Carry/Premium			
		Total Carry	Delta Carry	Vega Carry	Theta
5y1y29y	5y1y + 6y29y - 5y30y	26.6%	-0.8%	19.5%	8.1%
5y1y30y	5y1y + 6y30y - 5y31y	26.0%	-0.8%	19.0%	8.0%
5y1y28y	5y1y + 6y28y - 5y29y	25.7%	-0.8%	18.7%	8.0%
5y1y27y	5y1y + 6y27y - 5y28y	24.8%	-0.8%	17.9%	7.9%
5y1y26y	5y1y + 6y26y - 5y27y	23.9%	-0.8%	17.1%	7.7%
5y1y25y	5y1y + 6y25y - 5y26y	23.1%	-0.7%	16.4%	7.6%
1y1y9y	1y1y + 2y9y - 1y10y	22.5%	-1.8%	6.4%	18.1%
5y1y24y	5y1y + 6y24y - 5y25y	22.2%	-0.7%	15.6%	7.5%
1y1y10y	1y1y + 2y10y - 1y11y	22.2%	-1.4%	7.2%	16.6%
1y1y11y	1y1y + 2y11y - 1y12y	21.6%	-1.1%	6.7%	16.2%
5y1y23y	5y1y + 6y23y - 5y24y	21.4%	-0.7%	15.0%	7.3%
1y1y12y	1y1y + 2y12y - 1y13y	21.1%	-0.9%	6.3%	15.9%
1y1y13y	1y1y + 2y13y - 1y14y	20.7%	-0.6%	6.0%	15.6%
5y1y22y	5y1y + 6y22y - 5y23y	20.7%	-0.7%	14.3%	7.2%
1y1y8y	1y1y + 2y8y - 1y9y	20.6%	-2.2%	4.9%	18.2%
1y1y14y	1y1y + 2y14y - 1y15y	20.3%	-0.4%	5.6%	15.4%
5y2y28y	5y2y + 7y28y - 5y30y	20.1%	-0.9%	12.9%	8.4%
1y1y15y	1y1y + 2y15y - 1y16y	20.1%	-0.3%	5.0%	15.6%
5y2y29y	5y2y + 7y29y - 5y31y	20.0%	-0.9%	12.8%	8.4%
5y1y21y	5y1y + 6y21y - 5y22y	19.9%	-0.7%	13.7%	7.1%
5y2y30y	5y2y + 7y30y - 5y32y	19.9%	-0.9%	12.7%	8.4%

# Long Vega Trade Idea: Swaption Triangle – EUR 5y1y29y

EUR Swaption Triangle 5y1y29y – 105cts (55%) “quality” carry in one-year’s time.

Trade Idea: *long* 5y1y AMTF straddle and 6y29y ATMF straddle vs *short* 5y30y ATMF straddle. The package costs 191.2cts.

5y1y29y offers 105cts carry (with 75cts from vol) in a 1-year horizon, the highest among 4000+ EUR swaption triangle packages, with very little curve dependence on the expected return (i.e., primarily vega slide).



Forward rate reference: 5y1y=2.25%, 6y29y=2.98% and 5y30y=2.94%

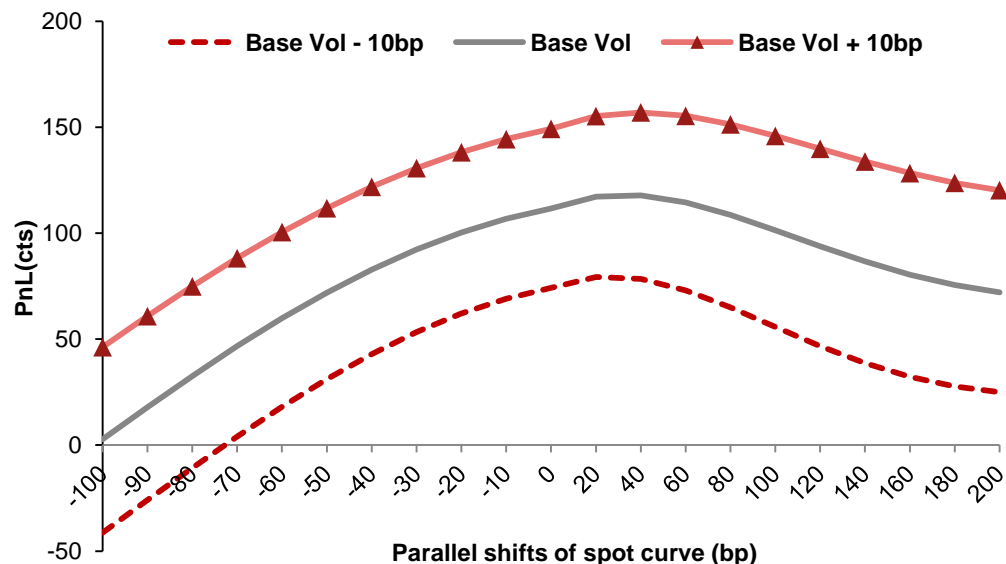
# Long Vega Trade Idea: Swaption Triangle – EUR 5y1y29y

## EUR Swaption Triangle 5y1y29y – risks and scenarios.

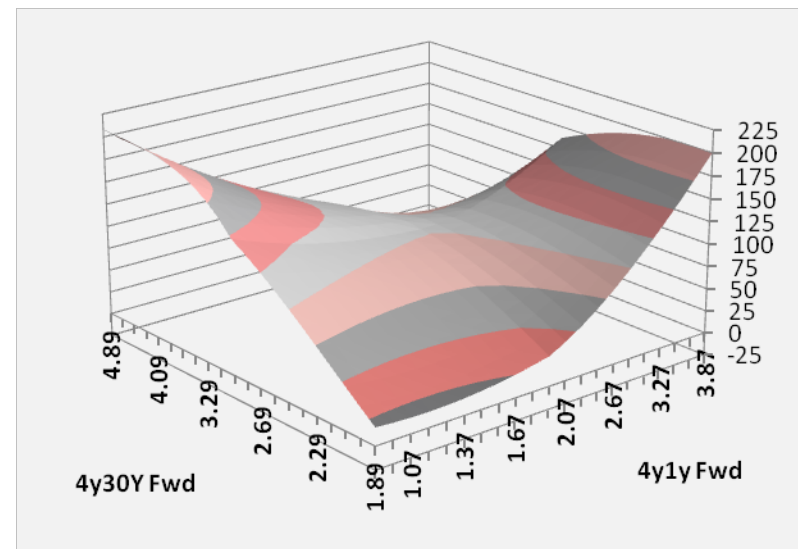
Synthetic forward vol exposure and a wide range of breakevens. Mostly vega risk with far lower breakevens.

	Name	Forward (%)	Strike (%)	Vol (bps)	Premium (cts)	Delta (/1bp)	Gamma (/1bp2)	Vega (/1bp)	Theta (/1day)
Buy	5y1y ATMF Straddle	2.25	2.25	81.2	137	0	0	2	0
Buy	6y29y ATMF Straddle	2.98	2.98	66.2	2,332	-6	0	36	-1
Sell	5y30y ATMF Straddle	2.94	2.94	67.7	-2,278	6	0	-34	1
					191.2	-0.6	0.0	3.3	0.1

Package P&L at the 1-year horizon vs curve parallel shift



Package P&L at the 1-year horizon vs curve shape



# **Esoteric Vanilla trades**

**Being aware of Vol Roll**



# USD Vol Surface Carry / Vega Slide and Time Decay

Total carry by risk, curve carry, vega slide, and time decay.

*What to expect from holding straddles. Looking for sweet spots when curves might not perform.*

*Carry in cts / Initial Premium*

USD (Straddle) Total Carry (1y horizon) as % of Premium							
	1y	2y	5y	10y	15y	20y	30y
1m	-57.8%	-41.9%	-66.9%	-77.4%	-82.7%	-85.8%	-88.8%
3m	-38.9%	-15.2%	-44.6%	-62.7%	-71.2%	-76.5%	-81.5%
6m	-22.6%	4.3%	-24.8%	-50.1%	-62.0%	-69.1%	-75.5%
9m	-8.5%	14.1%	-11.2%	-41.0%	-55.0%	-63.3%	-70.8%
1y	8.2%	23.2%	0.2%	-33.1%	-48.8%	-57.9%	-66.6%
18m	16.3%	11.0%	-9.5%	-27.5%	-34.0%	-37.2%	-40.1%
2y	9.2%	3.5%	-9.5%	-20.0%	-23.3%	-25.0%	-26.2%
3y	-1.0%	-2.0%	-8.8%	-13.3%	-14.6%	-14.9%	-15.3%
5y	-0.7%	-1.4%	-3.9%	-5.9%	-6.1%	-6.1%	-6.6%
7y	0.1%	0.3%	-0.2%	-0.9%	-0.9%	-1.0%	-1.1%
10y	2.6%	3.1%	1.9%	1.7%	1.7%	1.6%	1.4%
15y	4.3%	4.3%	4.4%	3.8%	3.8%	3.6%	3.3%
20y	4.2%	4.6%	4.4%	3.9%	3.8%	3.5%	3.8%
30y	3.7%	2.8%	2.7%	2.4%	2.1%	1.8%	1.6%

Vega (Vol) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	-0.5%	0.4%	-1.7%	-2.4%	-2.7%	-2.8%	-3.0%
3m	-9.9%	-5.5%	-2.4%	-5.1%	-5.8%	-5.9%	-7.1%
6m	-19.6%	-8.9%	-1.7%	-6.6%	-8.7%	-9.7%	-10.6%
9m	-19.4%	-10.4%	-1.4%	-6.9%	-9.4%	-10.6%	-11.8%
1y	-14.7%	-9.7%	-0.7%	-6.2%	-8.8%	-9.8%	-11.7%
18m	-5.4%	-1.0%	1.5%	-2.2%	-3.4%	-4.1%	-5.2%
2y	-4.7%	1.4%	2.4%	-0.5%	-1.1%	-1.4%	-1.6%
3y	1.8%	4.5%	2.3%	-0.3%	-0.8%	-0.7%	-0.8%
5y	5.5%	4.9%	2.9%	0.9%	0.7%	0.8%	0.4%
7y	3.9%	4.1%	3.4%	2.7%	2.7%	2.7%	2.7%
10y	4.3%	4.1%	3.0%	2.9%	3.0%	3.0%	2.8%
15y	3.6%	3.9%	3.8%	3.3%	3.4%	3.2%	3.3%
20y	2.8%	3.0%	3.1%	2.7%	2.6%	2.4%	2.8%
30y	1.7%	1.3%	0.7%	0.6%	0.4%	0.1%	0.0%

Best Vega Roll, doesn't always have good carry

Delta (Curve) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	7.1%	12.8%	5.3%	2.6%	1.6%	1.1%	0.8%
3m	19.2%	32.2%	16.4%	8.6%	5.5%	3.9%	2.8%
6m	31.8%	48.6%	28.7%	15.5%	10.2%	7.4%	5.3%
9m	41.2%	57.0%	38.4%	21.1%	14.2%	10.4%	7.6%
1y	51.6%	64.7%	46.8%	26.3%	17.9%	13.4%	9.8%
18m	49.8%	44.0%	26.2%	13.8%	9.5%	7.3%	5.7%
2y	36.7%	27.7%	15.8%	8.8%	6.4%	5.3%	4.3%
3y	13.3%	10.2%	5.8%	3.9%	3.1%	2.8%	2.5%
5y	1.7%	1.6%	1.1%	1.0%	0.9%	0.9%	0.8%
7y	0.2%	0.3%	0.4%	0.4%	0.4%	0.3%	0.2%
10y	-0.4%	0.3%	0.1%	0.0%	0.0%	-0.1%	-0.2%
15y	0.0%	-0.3%	-0.1%	-0.2%	-0.3%	-0.3%	-0.5%
20y	0.0%	0.2%	-0.1%	-0.1%	-0.2%	-0.3%	-0.4%
30y	0.0%	-0.6%	-0.1%	-0.2%	-0.3%	-0.3%	-0.4%

Theta %							
	1y	2y	5y	10y	15y	20y	30y
1m	-66.7%	-53.0%	-74.0%	-83.4%	-88.2%	-91.2%	-94.0%
3m	-42.8%	-37.1%	-53.3%	-63.6%	-70.4%	-75.2%	-78.8%
6m	-34.1%	-34.9%	-50.6%	-56.4%	-60.9%	-64.7%	-69.1%
9m	-30.1%	-32.5%	-48.2%	-54.7%	-58.4%	-61.3%	-64.8%
1y	-28.7%	-31.9%	-46.0%	-53.3%	-57.5%	-60.7%	-63.5%
18m	-27.9%	-31.9%	-37.0%	-39.0%	-40.0%	-40.3%	-40.5%
2y	-22.9%	-25.6%	-27.7%	-28.3%	-28.6%	-28.8%	-28.9%
3y	-16.1%	-16.7%	-16.9%	-16.9%	-16.9%	-17.0%	-17.0%
5y	-7.9%	-7.9%	-7.8%	-7.8%	-7.8%	-7.8%	-7.8%
7y	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%
10y	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
15y	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
20y	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
30y	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

# USD Vol Surface Carry

Carry attributed for pv01 neutral payer trades.

Carry in cts / Initial pv01 (i.e., carry per cts/bp spread exposure).

To construct carry/risk, numbers can be subtracted (to form a pv01 neutral trade).

USD (Payer) Total Carry (1y horizon) as % of PV01							
	1y	2y	5y	10y	15y	20y	30y
1m	-2.18	-3.92	-7.97	-7.88	-7.47	-7.42	-7.27
3m	-4.21	-7.60	-13.93	-13.83	-12.94	-12.66	-12.21
6m	-8.65	-14.33	-21.53	-21.13	-19.87	-19.48	-18.67
9m	-14.43	-21.61	-28.20	-27.25	-25.57	-24.96	-23.95
1y	-20.73	-28.54	-33.97	-32.40	-30.23	-29.29	-28.13
18m	-34.65	-39.95	-39.28	-33.35	-28.56	-26.13	-23.63
2y	-46.40	-46.14	-38.80	-30.68	-25.32	-22.67	-19.92
3y	-47.03	-42.49	-32.05	-24.06	-19.36	-16.76	-14.47
5y	-25.77	-21.25	-15.86	-11.87	-9.12	-7.71	-6.70
7y	-8.24	-7.37	-5.70	-3.09	-1.75	-1.25	-0.87
10y	-0.90	0.02	1.19	2.20	2.48	2.40	2.41
15y	7.63	7.66	7.14	6.19	5.55	5.17	5.10
20y	7.69	7.51	6.83	5.83	5.37	5.11	5.05
30y	5.47	4.16	5.01	5.02	4.37	3.62	3.19

Vega (Vol) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	0.25	0.48	0.84	0.77	0.71	0.70	0.68
3m	-0.11	-0.05	0.44	0.18	0.23	0.36	0.46
6m	-1.60	-1.65	-0.39	-0.95	-1.06	-1.01	-0.83
9m	-3.17	-2.91	-0.97	-1.79	-2.08	-2.05	-1.96
1y	-3.94	-3.28	-1.05	-2.17	-2.57	-2.49	-2.57
18m	-4.19	-1.58	0.11	-1.19	-1.50	-1.66	-1.92
2y	-4.92	-0.97	0.82	-0.53	-0.77	-0.90	-0.93
3y	0.87	2.40	1.33	-0.12	-0.42	-0.35	-0.39
5y	4.51	4.00	2.20	0.59	0.42	0.46	0.25
7y	4.07	3.90	3.35	2.46	2.30	2.23	2.00
10y	5.05	4.49	2.99	2.66	2.53	2.41	2.21
15y	4.09	4.45	4.15	3.44	3.17	2.88	2.86
20y	3.45	3.32	3.35	2.82	2.51	2.19	2.46
30y	1.93	1.53	0.89	0.69	0.41	0.09	0.02

Bear Steepener: Long 15y30y, Short 3y10y

Bear Flattener: Long 10y2y, Short 5y30y

Delta (Curve) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	-0.54	-1.38	-1.98	-1.37	-1.00	-0.80	-0.62
3m	-1.54	-3.57	-5.36	-3.87	-2.91	-2.36	-1.84
6m	-3.70	-7.18	-9.74	-7.14	-5.43	-4.47	-3.51
9m	-6.77	-11.29	-13.77	-10.12	-7.73	-6.41	-5.06
1y	-10.95	-15.88	-17.62	-12.93	-9.90	-8.23	-6.52
18m	-21.14	-25.48	-23.33	-16.11	-11.85	-9.55	-7.35
2y	-29.98	-31.48	-25.01	-16.30	-11.69	-9.28	-7.03
3y	-35.91	-32.58	-21.79	-13.37	-9.25	-7.11	-5.24
5y	-22.48	-17.62	-11.06	-6.07	-3.74	-2.65	-1.71
7y	-7.91	-6.98	-5.08	-1.91	-0.76	-0.36	0.11
10y	-4.52	-3.11	-0.54	0.68	0.98	0.98	1.13
15y	2.60	2.30	2.12	1.91	1.63	1.56	1.55
20y	2.49	2.51	1.86	1.44	1.44	1.54	1.29
30y	1.01	0.14	1.60	1.84	1.66	1.24	1.01

Theta %							
	1y	2y	5y	10y	15y	20y	30y
1m	-2.01	-3.08	-7.31	-7.95	-7.88	-8.05	-8.06
3m	-2.37	-3.50	-8.36	-10.02	-10.46	-11.05	-11.36
6m	-3.19	-5.28	-10.80	-12.28	-12.83	-13.70	-14.34
9m	-4.39	-7.28	-13.20	-14.83	-15.13	-15.91	-16.54
1y	-5.83	-9.38	-15.23	-17.13	-17.43	-18.11	-18.58
18m	-9.21	-12.81	-15.99	-16.02	-15.20	-14.92	-14.37
2y	-11.45	-13.64	-14.54	-13.78	-12.79	-12.43	-11.90
3y	-11.92	-12.24	-11.53	-10.52	-9.64	-9.26	-8.81
5y	-7.74	-7.56	-6.95	-6.35	-5.77	-5.49	-5.21
7y	-4.34	-4.23	-3.91	-3.60	-3.25	-3.09	-2.94
10y	-1.39	-1.33	-1.23	-1.13	-1.01	-0.96	-0.92
15y	0.94	0.91	0.87	0.83	0.75	0.72	0.69
20y	1.73	1.66	1.60	1.55	1.41	1.37	1.29
30y	2.52	2.48	2.52	2.48	2.30	2.29	2.16



# USD Vol Surface Carry

Carry attributed for vega neutral straddle trades.

Carry in cts / Initial Vega (i.e., carry per cts/bp-vol exposure)

To construct carry/risk, numbers can be subtracted (to form a vega neutral trade).

USD (Straddle) Total Carry (1y horizon) as % of Vega							
	1y	2y	5y	10y	15y	20y	30y
1m	-10.75	-12.57	-40.17	-48.21	-49.57	-51.72	-52.73
3m	-8.69	-4.90	-26.59	-40.87	-44.36	-47.18	-48.71
6m	-7.50	0.89	-15.24	-35.24	-42.02	-46.46	-48.94
9m	-5.17	6.41	-6.18	-30.36	-39.45	-44.86	-48.48
1y	1.29	14.53	2.90	-25.15	-35.99	-41.97	-46.63
18m	5.52	7.10	-7.31	-22.73	-26.26	-27.95	-28.85
2y	2.21	2.31	-7.97	-17.09	-18.57	-19.34	-19.42
3y	0.38	-1.05	-7.71	-11.31	-11.55	-11.39	-11.19
5y	-1.15	-1.56	-3.77	-5.28	-5.03	-4.79	-4.83
7y	0.14	0.12	-0.01	-0.68	-0.58	-0.59	-0.74
10y	3.05	2.64	1.47	1.22	1.15	1.06	0.86
15y	3.19	3.40	3.15	2.60	2.36	2.12	2.02
20y	2.87	2.93	2.70	2.35	2.07	1.83	1.88
30y	2.00	1.51	1.49	1.33	1.07	0.88	0.77

Vega (Vol) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	2.03	3.95	6.87	6.34	5.86	5.75	5.55
3m	-0.55	-0.26	2.18	0.89	1.14	1.76	2.26
6m	-5.61	-5.76	-1.35	-3.31	-3.72	-3.53	-2.89
9m	-9.12	-8.35	-2.79	-5.15	-5.98	-5.88	-5.64
1y	-9.89	-8.22	-2.63	-5.43	-6.43	-6.24	-6.44
18m	-8.54	-3.21	0.22	-2.43	-3.06	-3.38	-3.91
2y	-8.70	-1.71	1.46	-0.94	-1.36	-1.59	-1.65
3y	1.26	3.47	1.93	-0.17	-0.61	-0.51	-0.57
5y	5.05	4.48	2.47	0.66	0.47	0.51	0.28
7y	3.86	3.70	3.17	2.33	2.18	2.11	1.89
10y	4.00	3.56	2.37	2.11	2.00	1.91	1.75
15y	2.64	2.88	2.68	2.22	2.05	1.87	1.85
20y	1.93	1.86	1.88	1.58	1.41	1.23	1.38
30y	0.88	0.70	0.41	0.32	0.19	0.04	0.01

Vega Neutral Trade: Long 10y1y, Short 5y10y (a momentum trade)

Delta (Curve) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	1.11	4.04	3.69	1.72	0.99	0.68	0.46
3m	3.57	12.36	12.47	6.11	3.58	2.43	1.61
6m	9.15	24.09	23.61	12.13	7.37	5.12	3.44
9m	16.28	34.59	33.27	17.48	10.84	7.67	5.26
1y	25.30	44.97	42.07	22.42	14.08	10.11	7.04
18m	32.88	36.42	24.98	12.22	7.65	5.69	4.21
2y	31.04	28.01	16.23	8.21	5.43	4.27	3.32
3y	15.99	12.86	6.85	3.98	2.95	2.47	2.10
5y	2.14	2.18	1.40	1.11	0.93	0.84	0.72
7y	0.31	0.35	0.47	0.40	0.34	0.24	0.18
10y	0.11	0.11	0.09	0.04	-0.02	-0.05	-0.13
15y	-0.02	-0.04	-0.07	-0.13	-0.15	-0.19	-0.25
20y	-0.01	0.15	-0.06	-0.09	-0.12	-0.15	-0.21
30y	-0.02	-0.32	-0.05	-0.10	-0.15	-0.19	-0.21

Theta %							
	1y	2y	5y	10y	15y	20y	30y
1m	-14.98	-20.96	-54.73	-61.77	-62.17	-64.12	-64.76
3m	-10.76	-14.69	-38.06	-47.34	-50.11	-53.33	-55.19
6m	-10.50	-16.69	-35.47	-41.45	-43.78	-47.07	-49.53
9m	-12.07	-19.47	-36.02	-41.35	-42.58	-45.01	-47.04
1y	-14.12	-22.26	-36.50	-41.82	-42.89	-44.76	-46.13
18m	-18.68	-26.00	-32.51	-32.58	-30.92	-30.35	-29.24
2y	-20.12	-24.00	-25.65	-24.33	-22.60	-21.97	-21.04
3y	-16.89	-17.40	-16.49	-15.11	-13.86	-13.34	-12.69
5y	-8.34	-8.22	-7.62	-7.02	-6.40	-6.11	-5.82
7y	-3.99	-3.89	-3.62	-3.37	-3.06	-2.92	-2.78
10y	-1.04	-1.02	-0.97	-0.90	-0.82	-0.78	-0.75
15y	0.58	0.56	0.54	0.51	0.46	0.44	0.42
20y	0.94	0.91	0.88	0.85	0.77	0.75	0.70
30y	1.14	1.13	1.14	1.12	1.04	1.03	0.98

# EUR Vol Surface Carry / Vega Slide and Time Decay

Total carry by risk, curve carry, vega slide, and time decay.

*What to expect from holding straddles. Looking for sweet spots when curves might not perform.*

## Carry in cts / Initial Premium

EUR (Straddle) Total Carry (1y horizon) as % of Premium							
	1y	2y	5y	10y	15y	20y	30y
1m	-89.5%	-78.0%	-73.1%	-77.0%	-83.4%	-87.6%	-91.0%
3m	-84.8%	-69.5%	-59.7%	-66.8%	-75.8%	-81.6%	-86.6%
6m	-73.6%	-55.1%	-46.5%	-56.6%	-68.2%	-76.1%	-82.4%
9m	-60.7%	-44.2%	-37.1%	-49.8%	-63.4%	-72.3%	-79.7%
1y	-48.8%	-35.1%	-29.0%	-44.3%	-59.7%	-69.3%	-77.4%
18m	-35.2%	-26.4%	-24.3%	-34.4%	-41.0%	-44.5%	-47.7%
2y	-30.6%	-21.2%	-18.6%	-24.6%	-29.1%	-31.7%	-33.8%
3y	-13.6%	-10.8%	-10.7%	-15.2%	-17.9%	-19.1%	-19.5%
5y	-3.3%	-3.3%	-4.5%	-8.1%	-8.8%	-8.7%	-8.6%
7y	0.7%	0.1%	-1.1%	-3.3%	-3.2%	-3.1%	-2.0%
10y	0.5%	0.4%	-0.3%	-0.8%	-0.8%	-0.5%	0.1%
15y	1.1%	1.1%	1.2%	1.2%	1.8%	2.3%	2.6%
20y	2.1%	2.0%	2.0%	2.4%	2.7%	2.8%	2.8%
30y	3.2%	3.1%	3.1%	3.1%	3.2%	3.2%	3.1%

Vega (Vol) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	-8.0%	-7.4%	-7.4%	-7.8%	-8.2%	-8.4%	-8.6%
3m	-9.1%	-12.3%	-7.9%	-11.4%	-11.8%	-11.2%	-11.1%
6m	-7.1%	-9.1%	-5.5%	-9.3%	-10.1%	-11.6%	-12.2%
9m	-7.4%	-10.3%	-4.8%	-9.0%	-10.9%	-12.7%	-14.1%
1y	-9.6%	-12.0%	-4.3%	-9.3%	-12.0%	-13.6%	-15.7%
18m	-18.6%	-10.8%	-1.2%	-5.0%	-7.0%	-8.7%	-11.0%
2y	-20.2%	-9.7%	-1.3%	-2.7%	-4.6%	-6.2%	-7.7%
3y	-6.2%	-1.8%	1.2%	-0.9%	-2.3%	-3.0%	-3.1%
5y	3.2%	3.3%	2.6%	-0.2%	-0.4%	-0.1%	0.0%
7y	4.9%	4.4%	3.5%	1.7%	2.0%	2.2%	3.3%
10y	2.5%	2.5%	1.8%	1.6%	1.7%	2.0%	2.6%
15y	1.3%	1.4%	1.6%	1.7%	2.4%	2.8%	3.1%
20y	1.8%	1.7%	1.8%	2.2%	2.5%	2.7%	2.6%
30y	2.3%	2.2%	2.2%	2.2%	2.2%	2.3%	2.2%

Delta (Curve) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	0.5%	2.2%	3.4%	2.5%	1.4%	0.8%	0.5%
3m	1.5%	5.8%	9.3%	7.0%	4.0%	2.4%	1.4%
6m	4.2%	11.7%	16.1%	11.9%	7.2%	4.5%	2.7%
9m	8.4%	17.4%	21.8%	15.8%	9.6%	6.1%	3.8%
1y	13.6%	22.8%	26.9%	19.2%	11.7%	7.6%	4.8%
18m	14.5%	18.2%	15.2%	9.6%	5.6%	3.7%	2.5%
2y	12.9%	13.9%	10.4%	6.3%	3.7%	2.6%	1.9%
3y	9.2%	8.2%	5.9%	3.6%	2.2%	1.6%	1.4%
5y	2.9%	2.8%	2.2%	1.3%	0.9%	0.7%	0.7%
7y	1.3%	1.2%	0.9%	0.5%	0.3%	0.2%	0.2%
10y	0.2%	0.2%	0.1%	-0.1%	-0.2%	-0.3%	-0.2%
15y	0.0%	-0.1%	-0.2%	-0.3%	-0.4%	-0.3%	-0.4%
20y	0.0%	-0.1%	-0.1%	-0.2%	-0.2%	-0.2%	-0.2%
30y	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%

Theta %							
	1y	2y	5y	10y	15y	20y	30y
1m	-93.5%	-82.6%	-77.8%	-81.2%	-87.1%	-91.0%	-94.3%
3m	-81.6%	-63.2%	-59.5%	-61.8%	-69.8%	-76.2%	-81.3%
6m	-69.6%	-55.7%	-55.3%	-56.9%	-63.0%	-67.7%	-73.1%
9m	-60.1%	-51.0%	-53.8%	-55.8%	-60.2%	-63.6%	-67.8%
1y	-53.1%	-46.2%	-52.1%	-54.6%	-59.0%	-62.2%	-65.2%
18m	-31.3%	-34.0%	-38.5%	-39.1%	-39.8%	-39.7%	-39.4%
2y	-23.3%	-25.4%	-27.7%	-28.3%	-28.2%	-28.1%	-28.0%
3y	-16.5%	-17.0%	-17.6%	-17.7%	-17.6%	-17.6%	-17.6%
5y	-9.3%	-9.4%	-9.4%	-9.3%	-9.3%	-9.3%	-9.3%
7y	-5.5%	-5.5%	-5.5%	-5.4%	-5.4%	-5.4%	-5.5%
10y	-2.3%	-2.3%	-2.3%	-2.3%	-2.3%	-2.3%	-2.3%
15y	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
20y	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
30y	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%

Best Vega Roll generally has decent total carry.

# EUR Vol Surface Carry

Carry attributed for pv01 neutral payer trades.

Carry in cts / Initial pv01 (i.e., carry per cts/bp spread exposure)

EUR (Payer) Total Carry (1y horizon) as % of PV01							
	1y	2y	5y	10y	15y	20y	30y
1m	-2.66	-3.26	-5.59	-5.72	-5.52	-5.34	-5.12
3m	-4.88	-6.42	-10.40	-10.98	-10.47	-9.95	-9.44
6m	-7.41	-10.01	-15.87	-16.74	-15.77	-15.19	-14.37
9m	-9.96	-13.87	-20.72	-21.77	-20.50	-19.71	-18.70
1y	-12.88	-17.95	-25.06	-26.31	-24.79	-23.65	-22.51
18m	-19.18	-23.44	-27.11	-26.28	-22.72	-20.65	-18.95
2y	-26.17	-27.55	-27.44	-24.39	-20.61	-18.58	-16.89
3y	-30.10	-28.48	-25.21	-20.94	-17.12	-15.06	-13.19
5y	-22.32	-21.02	-17.90	-14.14	-10.66	-8.79	-7.67
7y	-14.25	-13.03	-9.86	-6.50	-4.21	-3.04	-2.14
10y	-4.99	-3.80	-1.88	0.23	0.87	1.05	0.98
15y	6.73	5.94	5.15	4.71	4.44	3.88	3.42
20y	5.68	5.50	5.06	4.52	3.59	3.28	2.80
30y	1.55	1.70	2.12	2.57	2.38	2.31	2.11

Vega (Vol) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	-0.21	-0.24	-0.41	-0.45	-0.45	-0.45	-0.44
3m	-0.44	-0.79	-0.82	-1.25	-1.23	-1.11	-1.05
6m	-0.52	-0.91	-0.87	-1.56	-1.59	-1.76	-1.75
9m	-0.74	-1.43	-0.99	-1.97	-2.24	-2.51	-2.64
1y	-1.24	-2.15	-1.06	-2.44	-2.98	-3.22	-3.54
18m	-3.99	-2.81	-0.38	-1.69	-2.20	-2.62	-3.20
2y	-6.30	-3.41	-0.53	-1.07	-1.75	-2.24	-2.70
3y	-3.00	-0.92	0.63	-0.45	-1.11	-1.41	-1.39
5y	2.27	2.35	1.88	-0.12	-0.23	-0.04	0.02
7y	4.12	3.63	2.83	1.37	1.46	1.56	2.20
10y	2.42	2.36	1.70	1.41	1.41	1.57	1.87
15y	1.35	1.44	1.59	1.74	2.14	2.34	2.38
20y	1.97	1.84	1.95	2.29	2.32	2.25	2.03
30y	2.58	2.46	2.41	2.32	2.07	1.97	1.73

To construct carry/risk, numbers can be subtracted (to form a pv01 neutral trade).

Delta (Curve) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	-0.20	-0.49	-1.00	-0.89	-0.65	-0.48	-0.34
3m	-0.61	-1.43	-2.90	-2.60	-1.92	-1.44	-1.04
6m	-1.58	-3.16	-5.60	-4.97	-3.68	-2.81	-2.04
9m	-3.00	-5.16	-8.18	-7.18	-5.33	-4.09	-2.99
1y	-4.77	-7.38	-10.70	-9.27	-6.88	-5.31	-3.90
18m	-8.51	-11.78	-14.15	-11.45	-8.07	-6.06	-4.36
2y	-12.61	-15.21	-15.69	-11.87	-8.13	-6.04	-4.33
3y	-19.02	-18.89	-16.42	-11.28	-7.36	-5.33	-3.82
5y	-17.75	-16.59	-13.02	-7.55	-4.39	-2.97	-2.14
7y	-13.63	-12.00	-8.15	-3.48	-1.61	-0.75	-0.70
10y	-5.17	-3.99	-1.46	0.87	1.35	1.26	0.77
15y	5.48	4.61	3.69	3.11	2.44	1.67	1.17
20y	3.30	3.26	2.73	1.86	0.95	0.73	0.50
30y	-1.97	-1.69	-1.21	-0.64	-0.47	-0.38	-0.29

Theta %							
	1y	2y	5y	10y	15y	20y	30y
1m	-2.55	-2.85	-4.67	-4.92	-5.01	-5.01	-4.92
3m	-4.05	-4.22	-6.50	-7.07	-7.50	-7.72	-7.76
6m	-5.22	-5.73	-9.09	-9.80	-10.14	-10.43	-10.60
9m	-6.05	-7.23	-11.48	-12.43	-12.55	-12.69	-12.78
1y	-6.90	-8.46	-13.38	-14.66	-14.84	-14.87	-14.78
18m	-6.71	-8.89	-12.62	-13.20	-12.50	-12.02	-11.44
2y	-7.26	-8.92	-11.21	-11.43	-10.72	-10.29	-9.86
3y	-7.98	-8.57	-9.30	-9.10	-8.55	-8.23	-7.90
5y	-6.83	-6.77	-6.73	-6.46	-6.03	-5.78	-5.54
7y	-4.69	-4.61	-4.50	-4.37	-4.03	-3.83	-3.62
10y	-2.25	-2.18	-2.13	-2.07	-1.90	-1.79	-1.66
15y	-0.14	-0.14	-0.15	-0.16	-0.15	-0.15	-0.14
20y	0.42	0.41	0.40	0.38	0.33	0.30	0.28
30y	0.93	0.92	0.91	0.88	0.78	0.71	0.66

# EUR Vol Surface Carry

Carry attributed to vega neutral straddle trades

Carry in cts / Initial Vega (i.e., carry per cts/bp-vol exposure)

To construct carry/risk, numbers can be subtracted (to form a vega neutral trade).

EUR (Straddle) Total Carry (1y horizon) as % of Vega							
	1y	2y	5y	10y	15y	20y	30y
1m	-20.54	-21.90	-35.21	-37.93	-39.66	-40.28	-40.11
3m	-20.85	-22.46	-31.24	-36.92	-39.97	-40.88	-41.15
6m	-19.26	-19.48	-26.03	-33.45	-37.96	-40.77	-41.78
9m	-17.41	-17.65	-22.11	-31.19	-37.41	-41.03	-42.85
1y	-15.77	-15.83	-18.21	-29.27	-37.14	-41.11	-43.73
18m	-15.42	-14.09	-16.24	-23.68	-26.33	-27.54	-28.31
2y	-16.84	-13.15	-13.31	-17.62	-19.56	-20.52	-21.03
3y	-9.47	-7.80	-8.12	-11.27	-12.53	-12.94	-12.63
5y	-2.62	-2.61	-3.59	-6.30	-6.37	-6.03	-5.74
7y	0.58	0.08	-0.85	-2.49	-2.25	-2.05	-1.23
10y	0.35	0.32	-0.25	-0.59	-0.52	-0.33	0.04
15y	0.73	0.76	0.79	0.81	1.07	1.24	1.28
20y	1.28	1.19	1.20	1.36	1.39	1.35	1.22
30y	1.64	1.58	1.56	1.50	1.33	1.26	1.12

Vega (Vol) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	-1.84	-2.08	-3.56	-3.85	-3.90	-3.86	-3.78
3m	-2.23	-3.96	-4.12	-6.31	-6.21	-5.60	-5.29
6m	-1.85	-3.21	-3.06	-5.49	-5.61	-6.22	-6.17
9m	-2.12	-4.12	-2.85	-5.66	-6.43	-7.22	-7.59
1y	-3.11	-5.39	-2.68	-6.12	-7.49	-8.08	-8.88
18m	-8.15	-5.74	-0.78	-3.46	-4.51	-5.37	-6.55
2y	-11.15	-6.04	-0.94	-1.91	-3.11	-3.99	-4.80
3y	-4.34	-1.32	0.90	-0.67	-1.62	-2.06	-2.03
5y	2.55	2.64	2.09	-0.16	-0.28	-0.07	-0.01
7y	3.90	3.44	2.68	1.29	1.38	1.47	2.07
10y	1.92	1.87	1.34	1.12	1.12	1.25	1.49
15y	0.88	0.93	1.03	1.14	1.40	1.53	1.55
20y	1.10	1.03	1.09	1.29	1.30	1.27	1.15
30y	1.18	1.13	1.10	1.06	0.94	0.90	0.79

Delta (Curve) Carry %							
	1y	2y	5y	10y	15y	20y	30y
1m	0.12	0.62	1.62	1.26	0.66	0.38	0.22
3m	0.36	1.88	4.88	3.85	2.10	1.21	0.69
6m	1.10	4.15	9.03	7.04	3.99	2.41	1.39
9m	2.42	6.93	12.99	9.92	5.65	3.48	2.06
1y	4.41	10.25	16.95	12.70	7.26	4.52	2.72
18m	6.36	9.72	10.18	6.60	3.59	2.27	1.49
2y	7.12	8.64	7.42	4.50	2.51	1.68	1.21
3y	6.44	5.96	4.49	2.65	1.55	1.11	0.91
5y	2.34	2.21	1.76	1.03	0.64	0.49	0.46
7y	1.01	0.91	0.68	0.35	0.20	0.11	0.14
10y	0.15	0.13	0.07	-0.07	-0.14	-0.16	-0.14
15y	-0.01	-0.05	-0.11	-0.20	-0.22	-0.19	-0.18
20y	-0.02	-0.04	-0.08	-0.12	-0.08	-0.08	-0.07
30y	0.02	0.02	0.03	0.03	0.03	0.03	0.03

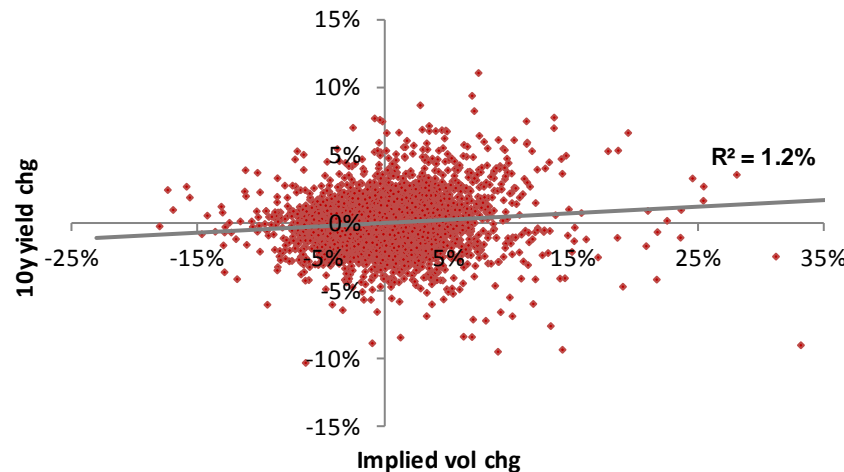
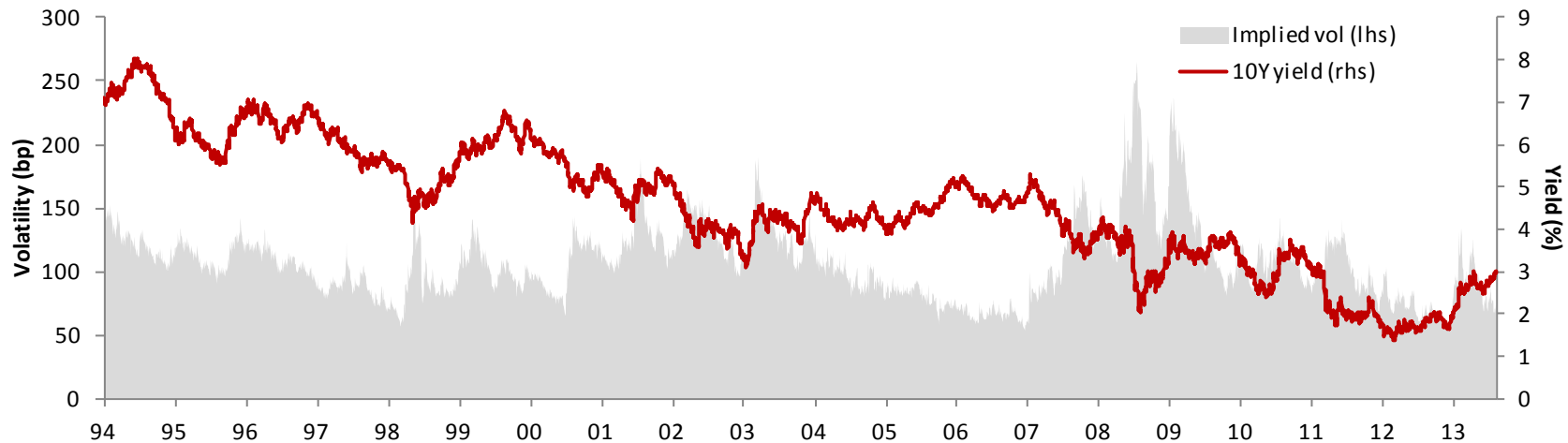
Theta %							
	1y	2y	5y	10y	15y	20y	30y
1m	-21.44	-23.20	-37.48	-39.99	-41.43	-41.89	-41.55
3m	-20.05	-20.44	-31.15	-34.17	-36.78	-38.14	-38.62
6m	-18.19	-19.67	-30.95	-33.59	-35.07	-36.29	-37.08
9m	-17.23	-20.33	-32.08	-34.94	-35.53	-36.09	-36.49
1y	-17.15	-20.82	-32.74	-36.05	-36.72	-36.94	-36.85
18m	-13.71	-18.16	-25.78	-26.96	-25.54	-24.57	-23.38
2y	-12.83	-15.77	-19.81	-20.22	-18.97	-18.22	-17.44
3y	-11.46	-12.32	-13.38	-13.11	-12.33	-11.87	-11.40
5y	-7.52	-7.47	-7.45	-7.18	-6.73	-6.45	-6.20
7y	-4.31	-4.26	-4.19	-4.10	-3.81	-3.62	-3.42
10y	-1.73	-1.70	-1.68	-1.65	-1.52	-1.43	-1.33
15y	-0.14	-0.14	-0.14	-0.13	-0.12	-0.11	-0.10
20y	0.21	0.21	0.20	0.20	0.18	0.16	0.15
30y	0.43	0.43	0.42	0.40	0.36	0.33	0.30

## **Appendix: Does Short Gamma make sense now?**

**Is a hiking environment a good one to short gamma?**

# What is the impact of rising yield on Short Gamma

No strong evidence shows that a rising 10y yield will imply a significant volatility increase.

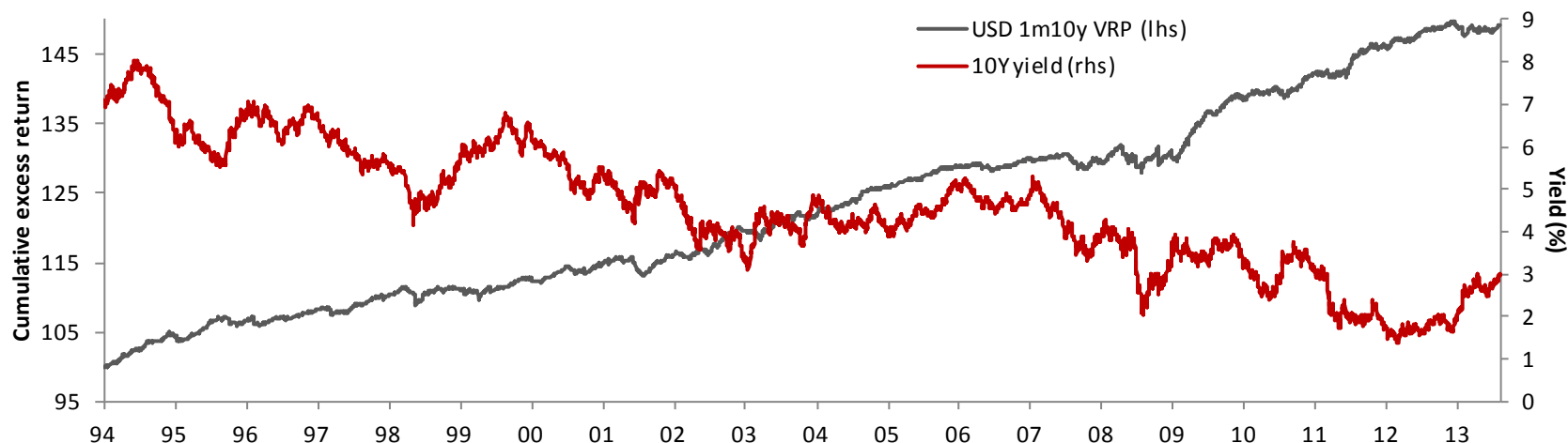


The correlation between the change in the 10y yield and the change in implied volatility is only 10.8%. The linear relationship is even weaker ( $R$ -squared = 1.2%).

# What is the impact of rising yield on Short Gamma

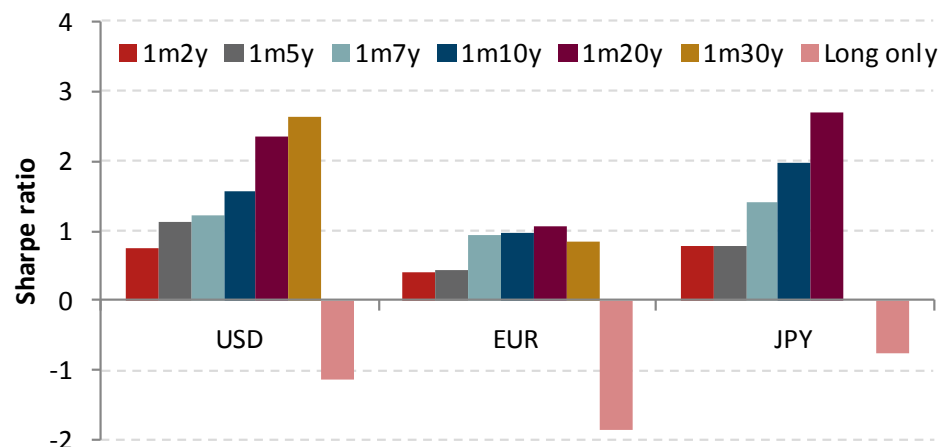
iVRP performs well even when the Fed hikes rates

**iVRP = Short 1m10y ATMF straddles (same notional) daily, delta hedged daily.**



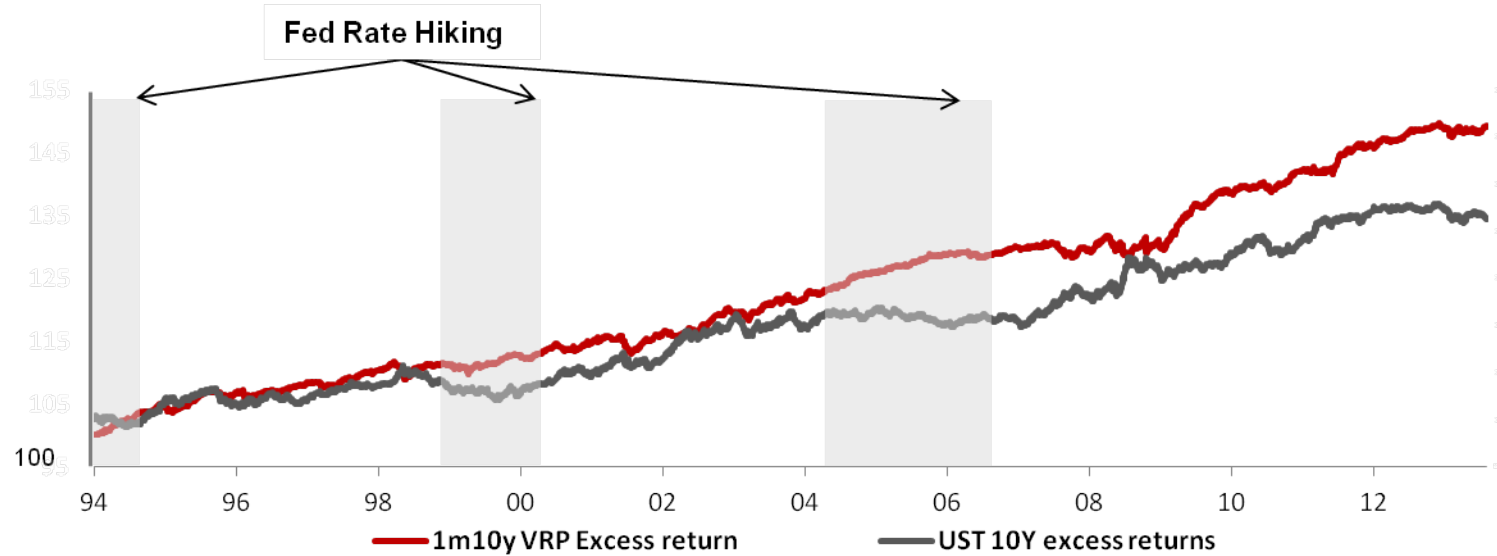
iVRP (USD 1m10y) even outperforms when yields rise. For EUR and JPY, iVRP also performs well during yield hiking periods.

USD 1m10y VRP	Yield rises	Yield falls
Ret (ann.)	2.56%	1.57%
Std (ann.)	1.62%	1.42%
Sharpe ratio	1.58	1.11



# iVRP outperforms in hiking rate environments

During the Fed rate hiking periods of 1994, 1999 and 2004, interest rate VRP outperformed long-only bond positions

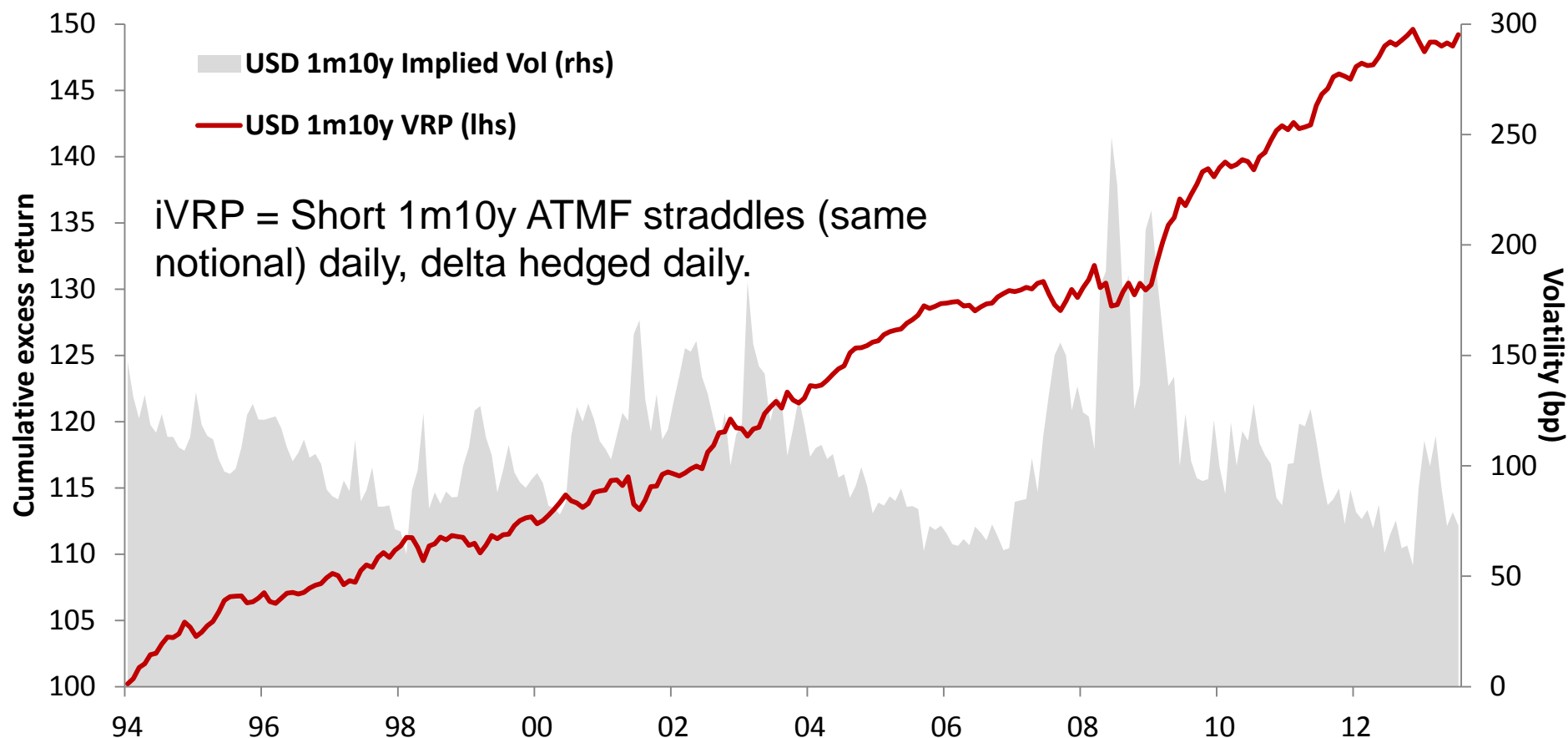


Period	Description	Sharpe ratio
Jun 1994 – Mar 1995	Hiking from low rate	4.91
Dec 2001 – Mar 2004	Low rate	1.69
Mar 2004 – June 2006	Hiking from low rate	2.49
Dec 2008 - present	Low rate	1.89



# Short Gamma (Nomura iVRP) v.s. 1-month implied volatility

NOMURA



# VRP underperforms in a rising vol environment

- The average annual return is generally lower when volatility is rising. This is particularly true when the absolute level of volatility is relatively high. We are currently in the 1st bucket according to the volatility level (less than 85.58bp).

		falling vol		rising vol	
		1st bucket	2nd bucket	3rd bucket	4th bucket
low vol ↑ high vol ↓	1st bucket	4.48%	2.91%	1.87%	-1.61%
	2nd bucket	4.57%	3.92%	0.40%	-2.32%
	3rd bucket	5.06%	4.01%	0.83%	-4.49%
	4th bucket	7.58%	5.17%	0.61%	-3.56%

Note: The level and the change of implied vol are divided into four buckets respectively. The average return of VRP is then calculated for each conditional bucket. The quartiles of the vol level are 85.58bp, 104.32bp and 121.55bp, and the quartiles of the change of vol are -8.67%, -1.31% and 8.55%. All the data are calculated on a monthly basis.

- Given the current level of volatility (1<sup>st</sup> bucket), there is roughly a 73% chance that VRP will end up in positive returns (if the change in volatility falls into the first three buckets, less than 8.55%).

		falling vol		rising vol	
		1st bucket	2nd bucket	3rd bucket	4th bucket
low vol ↑ high vol ↓	1st bucket	3.42%	5.56%	9.40%	6.84%
	2nd bucket	5.56%	5.56%	5.56%	8.12%
	3rd bucket	4.70%	7.69%	5.13%	7.26%
	4th bucket	11.54%	5.98%	4.70%	2.99%

# ... but the recovery is generally fast

- Since 1994, there have been several major drawdowns for USD 1m10y VRP index (summarized as follows). The average time of recovery to previous B/E level is 4.7 months.

Trough date	Recovery to B/E date	Drawdown	Event	Recovery time (months)
Oct 1998	Jan 1999	-1.58%	Russian default	3
Dec 2001	Apr 2002	-2.21%	Enron scandal	4
Jul 2003	Oct 2003	-1.08%	Fed's unconventional monetary policy	3
Feb 2008	Jul 2008	-1.71%	Subprime crisis	5
Nov 2008	Jul 2009	-2.38%	Lehman collapse	7
Jun 2013	Dec 2013	-1.14%	Tapering concern	6

- For the same period, it takes S&P 500 (excess returns) roughly 10 years to recover from its trough in Mar 2003



# **Appendix: Technical details**

**Details of calculations and tables**

## Expected Value – How should we construct it?

**We don't want to maximize carry without being aware of break-evens.**

*How do we construct a single (optimizable) value?*

### 1. Construct candidate Physical measures:

1. Historical performance in changes: Calculate physical measure using change data, centre at spot.
2. Historical performance in levels: Calculate physical measure using level data.
3. Centre at spot. Assume carry is realised in an expected sense.  
For ease assume  $\text{Spot}(T) \sim N(\text{Spot}(0), \text{Spot-Vol}(0,T)*T^{1/2})$  (We call this the **Expected payoff**.)

### 2. Calculate expectation under these, i.e., backtested performance for Historical P-measure, or Expected payoff for the Spot-vol case.

### 3. Effectively, we have adjusted breakevens by spot-vol.

**We can optimize over each of these. We have chosen Expected Payoff. This penalizes narrow break-evens even when carry is high.**

**To do:**

- **Compare Expiries:** vol-adjusted breakevens do help to make comparisons across strikes and tenors, but we do not compare across expiries well.
- **Calculate ex-ante Sharpe Ratios.** Maximize Sharpe Ratio rather than expectation.
- **Directional:** Consider conditioning on views other than carry (i.e., more than 'spot is realised').
- **Historical:** Construct historical (kernel) densities. Calculate entry points, historic returns, etc.

# Conditional Curve Trades Pickup Reports

## Example: 6m10y and other 6m expiry vanilla swaptions

Fix 10y notional, Calculate 6m10y ATMF premium.

Scale all others by Notionals by Pv01 ratio. Shift Strikes to have same premium as 6m10y ATMF.

Total Pickup = Vol Pickup + Yield Curve Carry

Can subtract various pickup numbers to get (approx) vol pickup or total pickup for alternative curve trades.

6m Expiry		1y	2y	3y	5y	7y	10y	20Y	30Y
Spot		0.27	0.38	0.64	1.45	2.15	2.80	3.57	3.74
Fwd		0.34	0.56	0.93	1.79	2.44	3.03	3.69	3.84
Swap PV01		1.0	2.0	3.0	4.9	6.6	9.0	15.0	19.0
Notional traded		90,414,841	45,234,884	30,305,079	18,529,281	13,604,458	10,000,000	6,000,245	4,753,810
<b>Payers</b>	Strike	<b>0.10</b>	<b>0.32</b>	<b>0.74</b>	<b>1.74</b>	<b>2.43</b>	<b>ATMF</b>	<b>3.65</b>	<b>3.78</b>
	PV	219,394	219,394	219,394	219,394	219,394	219,394	219,394	219,394
	Moneyiness	24.3	23.6	18.9	5.2	1.1	0.0	4.1	5.7
	Yield Curve Carry (Fwd - Spot)	7.2	18.0	28.4	34.2	29.1	22.6	12.6	9.6
	Total pickup	17.1	5.6	-9.4	-29.0	-28.0	-22.6	-8.5	-3.9
<b>Receivers</b>	Strike	<b>0.56</b>	<b>0.76</b>	<b>1.07</b>	<b>1.83</b>	<b>2.45</b>	<b>ATMF</b>	<b>3.73</b>	<b>3.89</b>
	PV	219,394	219,394	219,394	219,394	219,394	219,394	219,394	219,394
	Moneyiness	22.2	20.0	14.5	3.8	0.8	0.0	3.6	5.4
	Yield Curve Carry (Fwd - Spot)	7.2	18.0	28.4	34.2	29.1	22.6	12.6	9.6
	Total pickup	29.4	38.0	42.9	38.1	29.9	22.6	16.2	15.0

# Decomposing Total Carry

$$\text{Swaption} = \text{Annuity} \times \text{Option Premium} = A * C$$

$$C = \text{BlackScholes}(F, K, \sigma, t)$$

$$dC \simeq \Delta dF + \nu d\sigma + \Theta dt + \frac{1}{2} \gamma d^2 F + \dots$$

$$A \simeq \text{DiscFactor}(r, t) \times \text{CashPV01}(F)$$

$$\begin{aligned} dA &\approx \text{CashPV01} \times d\text{DiscFactor} + \text{DiscFactor} \times d\text{CashPV01} \\ &\approx \text{CashPV01} \times \frac{\partial \text{DiscFactor}(r, t)}{\partial t} dt + \text{DiscFactor} \times \frac{\partial \text{CashPV01}}{\partial F} dF \end{aligned}$$

First term is a sort of theta term, and second term is a sort of delta term.

$$\begin{aligned} d\text{SwaptionPV} &= C dA + A dC + dA dC \\ &\approx C dA + A dC \\ &\approx C \times (\text{CashPV01} \times d\text{DiscFactor} + \text{DiscFactor} \times d\text{CashPV01}) + A \times (\Delta dF + \nu d\sigma + \Theta dt + \frac{1}{2} \gamma d^2 F) \\ &= \underbrace{(C \times \text{DiscFactor} \times d\text{CashPV01} + A \times \Delta dF + \frac{1}{2} \gamma d^2 F)}_{\text{1st term}} + \underbrace{A \times \nu d\sigma + (C \times \text{CashPV01} \times d\text{DiscFactor} + A \times \Theta dt)}_{\text{2nd term}} \end{aligned}$$

1<sup>st</sup> term is a curve carry (delta + gamma etc), 2<sup>nd</sup> term is vol carry, 3<sup>rd</sup> term is theta carry.



# Appendix A1 - I

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**Options:** Options involve risk and are not suitable for all investors. Please ensure that you have read and understood the current options risk disclosure document provided by the Options Clearing Corporation before entering into any options transactions. The Options Clearing Corporation's publication, "Characteristics and Risks of Standardized Options", is available at: <http://www.theocc.com/about/publications/character-risks.jsp>

The risks of options trading should be weighed against the potential rewards.