Derivative Focus

CROSS-ASSET

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The buzz about bear flies

USD bearish butterflies have significant pickups to bear flatteners

We highlight a few USD bearish conditional curve trades, in particular a 6m 3s10s30s and a 6m 3s7s30s bear tightener. These have considerable pickup to forwards, a decent pickup to other conditional flatteners (e.g., 2s10s or 3s10s conditional bear flatteners), and have a positive pickup to spot. Unlike butterflies with a 2y short leg, these trades benefit from both positive gamma (8x and 4x that of the underlying butterfly, respectively) and very positive vega, both desirable attributes when positioning for a sell-off. We strike the flies based on performance over the past five years, noting that using OTM payers significantly improves the trades' performance. The resulting 6m 3s10s30s and 6m 3s7s30s conditional bear tighteners have historical gains of 203cts and 111cts to term respectively, over the past five years for trades putting on $10k/bp of spread risk.

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Trade recommendations: bear flies

6m 3s10s30s Bear Tightener: Buy $16.8mn 6m3y 1.01%, sell $11.1mn 6m10y 3.42% and buy $2.6mn 6m30y 4.09% payers for $10,000/bp of risk to the 3s10s30s butterfly spread at zero initial cost.

6m 3s7s30s Bear Tightener: Buy $16.8mn 6m3y 1.15%, sell $15.1mn 6m7y 3.04% and buy $2.6mn 6m30y 4.23% payers for $10,000/bp of risk to the 3s7s10s butterfly spread at zero initial cost.

Bearish trades in USD

While many US-based investors are only now coming around to the notion that USD rates can still sell off even with Janet Yellen at the helm of the Fed, European-based investors have had this view for some time. The market gave a huge sigh of relief to President Obama's choice of Janet Yellen for Fed Chairman and to her more recent Senate confirmation, but the data continue to (albeit hesitantly) back up former Fed Chairman Ben Bernanke's initial plans to taper although with a delay. Meanwhile, the relative complacency of US investors and the crowded USD carry trade could give any bearish move real legs.

It is with this in mind that we present a few bear flies, particularly because of their pickups to other correspondingly bearish trades (bear flatteners) as well as their overall pickup to forwards.

For confirmation of our data, we refer to Conditional curve trades: Eyeballing relative value, which gives a simple methodology for finding pickups of any given conditional curve trade. In particular, we note in Figure 1 that (although this may shift for changes in strikes), bearish tighteners (e.g., short payers on the belly 6m 2s10s30s, 6m 3s7s30s, 6m 2s7s30s, etc) have a significant gain to corresponding steepeners in terms of pickups to forwards and to spot. Meanwhile, the tighteners have all the benefits of a flattener and the butterfly spread is essentially the same thing as the corresponding slope which we can see from their high correlation.

Fig. 1: Pretty bearish – 6m expiry conditional bear trades

All express the same view but some with larger pickups

	Bear Flattener			Bear Tightener			
	2s10s	3s10s	3s7s	2s7s10s	2s10s30s	3s10s30s	3s7s30s
Pickup to Forwards	23.6	18.9	17.8	21.4	29.3	24.6	22.4
Pickup to Spot	28.2	13.1	18.5	39.0	46.9	31.8	42.6
Correlations to 2s10s (1y)	100.0%	99.6%	93.6%	99.2%	99.3%	99.5%	97.0%

Source: Bloomberg, Nomura Research

In Figure 1 we see the pickup to forwards and to spot (i.e., strike spread – forward spread and strike spread – spot spread, respectively) for a number of competing trades. We note that the correlations to slope over the past year were sufficiently high that the trades all express the same view. The bear tighteners generally have a more sizeable pickup than the corresponding bear flatteners. Bearish flies have the greatest pickups when they involve selling the belly in the 7y and the10y tails.

Our US economics team expects tapering to begin some time in Q1 2014, most likely in January. They also expect forward guidance to be strengthened during this time and to be in place for some time thereafter. We concentrate on 6m expiries as being of adequate length to buffer a delay in tapering.

We note that although butterfly and flattener trades with a 2y short leg may offer attractive pickups, they are mostly short vega. In Figure 2, we give the risk profile for each of the trades in a 6m horizon, normalised at $10,000/bp of spread, where we have chosen to strike the belly ATMF+20bp. The short vega could prove painful in a sell-off given the strong directionality of volatility. Consequently, we would recommend avoiding trading the 2y as the short wing. Meanwhile, as we would expect, quite a lot of butterflies are long gamma, which could benefit them in a large move.

Fig. 2: Risk profile for ATMF+20bp bearish flatteners and tighteners

Generally short vega could hurt trades in a sell-off

$10k bp/spd	Delta ($/bp)	Gamma ($/bp^2)	Vega ($/bp)	Swap Spd Gamma ($/bp^2)
6m 2s10s	3908	178	-767	-8
6m 3s10s	1542	80	-11	-7
6m 2s7s	3933	180	-748	-5
6m3s7s	1582	79	-15	-4
6m 2s10s30s	2355	95	-358	4
6m 3s10s30s	1172	46	20	5
6m 2s7s10s	1999	90	-385	-1
6m 3s7s30s	1225	45	8	8

Source: Nomura Research

To put the gamma in context, in Figure 2 we also show the gamma of the underlying unconditional flatteners or tighteners (where the unconditional flatteners and butterflies are scaled to have $10,000/bp of risk to their underlying spreads). We note that the gamma for the conditional flies is typically 6x to 20x that of the underlying butterfly, while the flatteners do benefit from positive gamma (but very negative vega). The trades that do stand out are the 6m 3s10s30s and 6m 3s7s30s (highlighted and boxed in Figure 2) for their positive gamma and positive to flat vega.

We have chosen conditional flies so that the two wings have the same premium while they are dv01 weighted notionals and scaled to have exposure of $10,000 per bp of spread. In Figure 2, we have chosen the strike of the belly to be ATMF+20bp for uniformity, although we vary this assumption later.

Based on Figure 2, we look at the 3s10s30s and 3s7s30s in more detail because they are both positive vega and positive gamma, desirable properties for a large move.

6m 3s10s30s bear tighteners

Fig. 3: 6m 3s10s30s bear tighteners: optimising strike for past performance (five years)

Belly ATMF+40bp gives attractive entry of 174bp and highest historical returns

6m 3s10s30s	
Spot	121.74
Forward	128.94
High (5 Jun 2009)	152.9

Belly Strike	Fraction P&L>0	Fraction P&L=0	Fraction P&L<0	Average P&L	Strike Spread
100	33.49%	66.51%	0.00%	115.11	209.9
80	37.73%	62.27%	0.00%	161.48	198.0
60	42.21%	57.79%	0.00%	191.35	186.1
40	45.88%	54.12%	0.00%	203.14	174.4
20	54.28%	45.72%	0.00%	201.34	163.4
ATMF	66.35%	33.17%	0.48%	196.72	153.3

Source: Add source here

We now concentrate on looking for appropriate strikes. Our plan is to ensure first that the butterfly spread is higher (wider) than the peaks over the past five years. In Figure 3 we look at spot spreads, forward spreads and the highs. We then choose the strikes to maximise performance over the past five years.

Fig. 4: 6m 3s10s30s bear tightener[1]

Strikes vs spot and forward, 30y and 10y most likely to be expire ITM

6m Expiry	3y	10y	30y	Bfly (bp)
Spot	0.65	2.80	3.74	121.10
Fwd	0.93	3.03	3.83	128.83
Strikes	1.02	3.43	4.09	174.48
Realized Vol (1m)	0.34	0.71	0.69	54.17
Realized Vol (3m)	0.46	0.75	0.70	52.30
Realized Vol (6m)	0.53	0.90	0.79	63.83
Realized Vol (1y)	0.41	0.76	0.71	52.93
Strike Z-score (1m)	1.07	0.88	0.51	0.99
Strike Z-score (3m)	0.79	0.83	0.50	1.02
Strike Z-score (6m)	0.69	0.69	0.45	0.84
Strike Z-Score (1y)	0.89	0.82	0.49	1.01

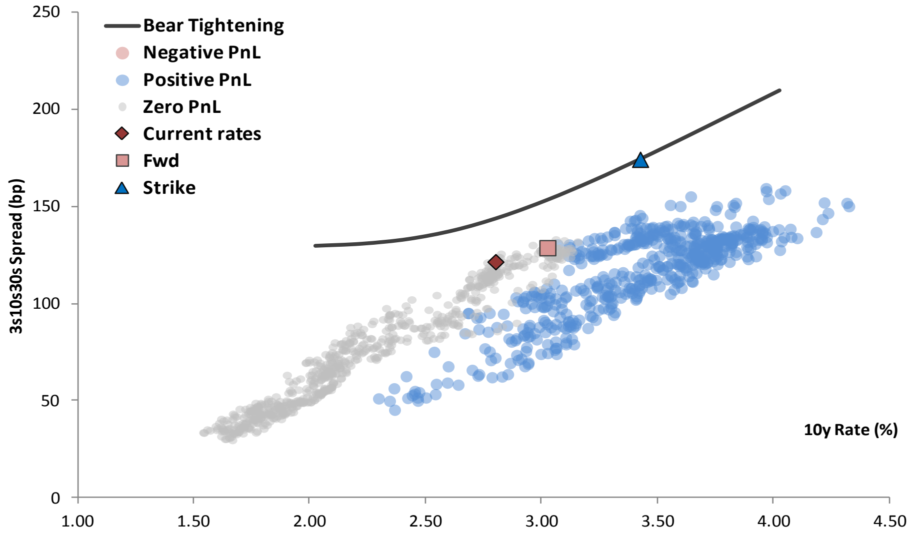
Source: Nomura Research

Based on this methodology, the belly strike of ATMF+40bp gives peak performance over the past year. In Figure 4, we show the strikes of this specific trade relative to spot and realised vols. It should be clear that there is far greater likelihood of making money on the 30y leg, although the 10y and 3y legs are not far behind in terms of the z-score of the strikes, this gives some sense of the likelihood of the moves over the next six months being severe enough for the bear butterfly to expire ITM.

1 Strike Z-Score (1m) = (Strike – Spot)/Realised Vol(1m). The corresponding 3m, 6m, and 1y entries have similar definitions.

Fig. 5: Five-year historical performance of 6m3y 1.02% / 6m10y 3.43% / 6m30y 4.09% bear tightener

Over past five years, 203.14cts average gains and strike spreads close to historical highs



Source: Nomura Research

Finally, in Figure 5 we plot the past five years of data as a back-test together with all the zero-cost bear tightener strikes (typically struck far wider than the data), highlighting our chosen strike, spot and forward. The x-axis is the belly rates (i.e., 10y rate) and the y-axis is the 3s10s30s spread. We note that there have been many instances when the butterfly would have expired worthless (54% of the five years of data), while no data would have resulted in an actual loss over this period. We see that the strike spread is well above the historical spot spreads in Figure 5. Although it is not entirely clear how to depict regions where the P&L would be positive, negative and zero, given the three dimensions of the P&L it is clear that the 10y would have to expire ITM (so we would look only at rates to the left of the strike) and spreads would generally have to be above the strike spread, leaving little room for history to guide us on likely losses.

During this past five years, the gain was an average of 203.14cts. Conditional on the P&L being non-zero, the gain was in fact 440cts. We consequently believe that, in the event that it does not expire worthless, the trade could prove to be very profitable.

6m 3s7s30s bear tighteners

Fig. 6: 6m 3s7s30s ATMF+60bp bear tighteners: optimised for past performance (five years)

Belly ATMF+60bp gives entry of 77.8bp and average gains of 111.37cts

6m 3s7s30s	
Spot	-8.54
Forward	11.51
High (21 Nov 2008)	77.95

Belly Strike	Fraction P&L>0	Fraction P&L=0	Fraction P&L<0	Average P&L	Strike Spread
100	33.97%	66.03%	0.00%	83.05	103.9
80	38.05%	61.95%	0.00%	105.55	90.8
60	41.73%	57.79%	0.48%	111.37	77.8
40	44.36%	54.12%	1.52%	104.18	65.2
20	49.00%	45.16%	5.84%	85.16	53.4
ATMF	54.32%	34.21%	11.47%	66.32	42.7

Source: Nomura Research

The next alternative, favoured by some due to its not being short the 10y outright (although the behaviour of the 7y should not be significantly different from that of the 10y), is the 6m 3s7s30s bear tightener. As was true of the previous trade, we want to consider optimal strikes. Unlike the 3s10s30s trade, we have to consider strikes far closer to the highs, perhaps even slightly below them. In Figure 6, we look at the average P&L over the past five years as our guide. We see that the optimal belly strike is ATMF+60bp, with an average gain of 111.37cts. During that same period 41.73% of history resulted in positive P&L, while 57.19% in zero P&L and a mere 0.48% (6 days out of 1352) resulted in a loss.

We note that this optimal strike is actually slightly below the historical highs (i.e., the resulting strike spread of 77.8bp is near the 77.95bp high of 21 November 2008), making this appear more risky than the 3s10s30s tightener which had a large buffer.

In Figure 7, we inspect the strikes and the moves needed for them to expire ITM. We note that the 30y is more likely to expire ITM based on historical moves of the past one month to one year, while the 3y and 7y are approximately equally likely to expire ITM. Meanwhile, the butterfly spread itself is relatively far from the strike spread, making it far less likely that the trade will lose money even if all three swaptions expire ITM.

Fig. 7: 6m 3s7s30s bear tightener[2]

30y most likely to expire ITM while 3y just slightly more likely than 7y

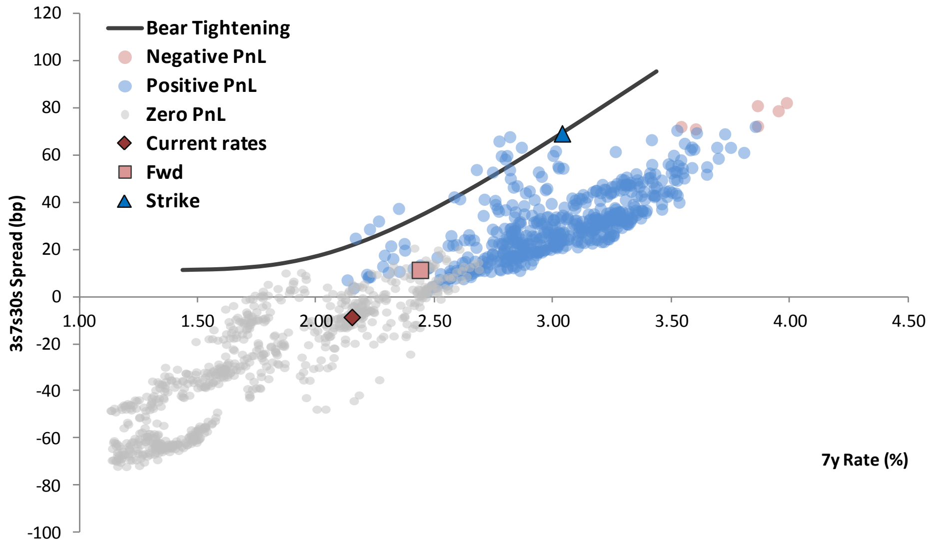
6m Expiry	3y	10y	30y	Bfly (bp)
Spot	0.65	2.80	3.74	121.10
Fwd	0.93	3.03	3.83	128.83
Strikes	1.02	3.43	4.09	174.48
Realized Vol (1m)	0.34	0.71	0.69	54.17
Realized Vol (3m)	0.46	0.75	0.70	52.30
Realized Vol (6m)	0.53	0.90	0.79	63.83
Realized Vol (1y)	0.41	0.76	0.71	52.93
Strike Z-score (1m)	1.07	0.88	0.51	0.99
Strike Z-score (3m)	0.79	0.83	0.50	1.02
Strike Z-score (6m)	0.69	0.69	0.45	0.84
Strike Z-Score (1y)	0.89	0.82	0.49	1.01

Source: Nomura Research

[2] Strike Z-Score (1m) = (Strike – Spot)/Realised Vol(1m). The corresponding 3m, 6m, and 1y entries have similar definitions.

Fig. 8: Historical performance of 6m3y 1.15% / 6m7y 3.04% / 6m30y 4.23% bear tightener

Over past five years, 111.37cts average gains and strike spreads close to historical highs



Source: Nomura Research

In Figure 8, we plot the historical performance together with the zero-cost bear tightener strikes, highlighting our chosen strike, forwards and spot. We note that while our chosen strikes are not above the historical highs, they are very close to them. As we should expect, the region where the trade loses money has butterfly spreads above the strike spread (i.e., above 78bp) and 7y rates above the 7y strike (i.e., 3.04%), although we caution that the trade cannot be adequately represented in two dimensions. Care should be taken if viewing this chart in black and white as some of the lighter blue dots (with positive P&L) may be mistaken for the (only six) pink dots which have negative P&L.

While the average P&L is 111.67cts, we note that, conditional on the trade expiring with positive P&L, the conditional average gain is 267cts. The gain conditional on there being a loss is -27cts (as we said, occurring on just 0.48% of history, i.e., 6 out of 1352 days). Given its historical performance and what we consider to be adequate buffers, we believe this trade is a particularly good means of taking a bearish view.

Are we being paid to take the risk and is now a good time?

One of the other reasons why these bearish trades are particularly attractive is the relative richness of the 7y to 10y sector of the vol surface. While popular belief is that this richness of vols is entirely justified because of the higher delivered vol in that sector, we think this is not quite true – implied/realised vol ratios are at their highs in the 1y and shorter tenors (e.g., through 1y swaps, 6m and 3m caps), but these ratios are higher in the 7y to 15y sectors than any other tenors longer than 2y (see Figure 9 for the past month). Some of this pattern repeats when we look over longer historical periods, with 7y to 10y implied/realised ratios generally above those of the 2y to 3y tails.

Fig. 9: USD implied/realised normal vol ratio (1M history)

Over the past month, 7y to 10y are among the richest implieds.

	1y	2y	3y	5y	7y	10y	15y	20y	30y
1m	1.99	1.25	1.01	1.03	1.03	1.02	1.00	0.99	0.98
3m	1.64	1.08	1.03	1.06	1.07	1.07	1.04	1.02	1.01
6m	1.72	1.05	1.02	1.08	1.11	1.13	1.10	1.08	1.06
1y	1.29	0.99	1.03	1.09	1.11	1.13	1.09	1.07	1.05

Source: Nomura Research

We find as well that, in terms of relative value, ATM vols in the 3y to 7y tails remain some of the richest compared with recent history, while 30y vols (and front-end vols) have some of the best entry levels. Relatively speaking, 7y to 10y tails are rich and 3y (and shorter) and 20y and longer are cheap.

Fig. 10: 5y and 7y vols are among the highest historically, while front and long ends are relatively depressed

Sell the belly and buy the wings

ATM Vol Z-Score (1y history)

Exp/Tenor	1y	2y	3y	5y	7y	10y	20Y	30Y
1m	-1.12	-0.58	0.06	0.12	0.00	-0.18	-0.44	-0.61
3m	-1.10	-0.55	0.00	0.21	0.14	-0.05	-0.34	-0.66
6m	-0.50	-0.21	0.17	0.38	0.35	0.19	-0.21	-0.61
9m	-0.42	-0.05	0.27	0.48	0.46	0.29	-0.25	-0.64
1y	-0.24	0.08	0.43	0.56	0.53	0.37	-0.34	-0.74
2y	0.45	0.67	0.73	0.75	0.55	0.42	-0.27	-0.77

Source: Nomura Research

To look at entry timing, we show the Z-scores of volatilities given one year of data in Figure 10. We note that the upper right corner and the upper left corner are among the cheapest on this metric, while 5y to 7y vols are generally much higher than their past history, making them a good sell. While 2y is obviously cheap and 3y far less so, we judge the negative vega of 2y flies to be reason enough to avoid them.

The trades:

In Figures 11 and 12 we reiterate the trade idea in more detail, noting that risk numbers in Figure 2 were for ATMF+20bp so there may be a slight difference given the differing strikes (and in fact our delta has decreased markedly while our vega has increased significantly):

Fig. 11: The 6m 3s10s30s (10y ATMF+40bp) bear tightener

Trade	Notional (MM)	Spot %	Forward %	Strike %	Delta	Gamma	Vega	Swap Gamma
6m3y Payer	16.8	0.65	0.92	1.01	1,510	51	1,408	2
6m10y Payer	-11.1	2.80	3.02	3.42	-2,089	-42	-2,425	-12
6m30y Payer	2.6	3.74	3.83	4.09	1,426	30	1,276	14
				6m 3s10s30s	**847**	**40**	**259**	**5**

Source: Nomura Research

Fig. 12: The 6m 3s7s10s (10y ATMF+60bp) conditional bear tightener

Trade	Notional (MM)	Spot %	Forward %	Strike %	Delta	Gamma	Vega	Swap Gamma
6m3y Payer	16.8	0.65	0.93	1.16	970	35	1,313	2
6m7y Payer	-15.1	2.15	2.44	3.04	-1,352	-28	-2,107	-9
6m30y Payer	2.6	3.74	3.83	4.23	1,038	25	1,117	14
				6m 3s7s30s	**656**	**32**	**323**	**8**

Source: Nomura Research

While our goal was not to increase vega, we have found trades that are very long vega in the process of optimising to historical performance.

Trade recommendations: bear flies

- **6m 3s10s30s Bear Tightener:** Buy $16.8mn 6m3y 1.01%, sell $11.1mn 6m10y 3.42% and buy $2.6mn 6m30y 4.09% payers for $10,000/bp of risk to the 3s10s30s butterfly spread at zero initial cost.
- **6m 3s7s30s Bear Tightener:** Buy $16.8mn 6m3y 1.15%, sell $15.1mn 6m7y 3.04% and buy $2.6mn 6m30y 4.23% payers for $10,000/bp of risk to the 3s7s10s butterfly spread at zero initial cost.

Appendix A-1

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