Systematic vol selling – Part 2

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Rates Research
Global

Global Rates Research
MLI (UK)

Sphia Salim
Rates Strategist
MLI (UK)
+44 20 7996 2227
sphia.salim@baml.com

Carol Zhang
Rates Strategist
MLPF&S
+1 646 855 8311
carol.zhang@baml.com

Sell low…it still works in Vol

3m10y vol in EUR just reached a new record low. Still, a look at the 1m trading range for 10s last week (Chart 1) suggests selling low vol is a trade that can indeed perform.

In August, we had an initial look at these strategies in US rates and their sensitivity to hedging parameters across tails. We focused on the last 3 years (through tapering, a Fed on-hold, and the start of the hiking cycle). We now expand the analysis to: (1) Include 2013, which saw the US taper tantrum unfold, and (2) EUR rates, from the start of ECB QE in Mar-15. Additionally, we now account for costs (bid/offers for options, and delta hedges) and consider the results with different delta thresholds for hedging.

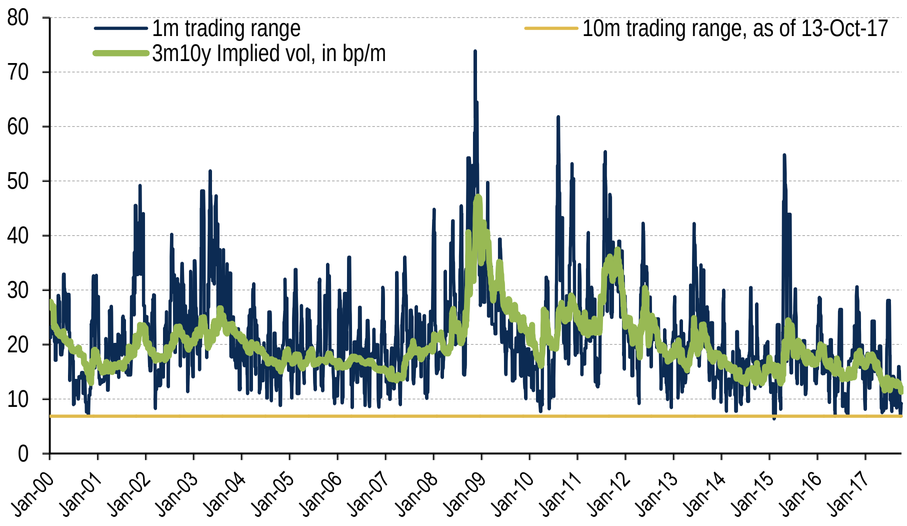
EUR: Lessons from the US, ahead of the ECB's QE taper

An analysis of the results in the US, in combination with those obtained in EUR since the start of QE provides us with key takeaways for the choice of short EUR rates vol strategies heading into 2018, when we expect the ECB to taper its QE program. While past performance has showed that 2y and 10y tails would have generally been good choices on a risk-adjusted basis, our analysis of the US results indicate that what should be key to the choice of optimal sector to short EUR rates vol is whether the ECB decides to focus on a formally stronger forward guidance or instead on a longer QE tapering.

US: at a juncture of a changing Fed

Our updated analysis continues to show that in this hiking cycle again, selling vol in the front end (2y and 5y) would have done better on a risk-adjusted basis than in the longer tails. However, as experienced during the taper tantrum episode, a potential change in Fed communication could dampen the performance of such a strategy in the 5y tail.

Chart 1: Implied vol may be low, but realized is even lower, helping systematic short vol strategies



Source: BofA Merrill Lynch Global Research.

From theoretical to more practical

In August, we compared the results of a strategy selling 1m straddles every month across different tenors, using different hedge ratios and hedge frequencies. We also broke down the results based on the three Fed monetary policy transition phases (i.e. tapering, on hold, hiking). The takeaway was that short straddle strategies over our analysis period would have been profitable during the hiking cycle, and, counterintuitively, this appeared to be especially the case in short tails for fully delta-hedged positions.

In this piece, we build on on our stylized analysis, incorporating bid/offer costs in options and delta-hedges, and add delta-hedging thresholds. In addition, we compare this strategy in the US markets vs the EUR rates market and draw some lessons.

Short tails continue to perform

The short vol position in the 2y still would have outperformed those in other tails during the hiking cycle, even after accounting for the higher cost incurred on 1m2y straddles relative to longer tails (in $ bid/offer paid for the same amount of PV01 risk). In addition, the results of the fully hedged positions in short tails would have been better than those with high delta thresholds, despite the higher delta hedging costs.

Table 1: Typical short volatility strategies variations

Monthly returns are expressed in $ K, for €100mln 10y equivalent notional; risk adjusted returns are calculated as annualized monthly returns divided by standard deviation per annum

	1m2y straddle				1m5y straddle				1m10y straddle				1m30y straddle			
Delta hedge	Daily	20K threshold	50K threshold	None	Daily	20K threshold	50K threshold	None	Daily	20K threshold	50K threshold	None	Daily	20K threshold	50K threshold	None
US																
Tantrums (Dec '12-Dec '13)																
Avg monthly return (K $)	5	(3)	(43)	(30)	(30)	(96)	(174)	(220)	67	65	(117)	(137)	58	47	98	(20)
Annualized return (%, *)	0.1%	0.0%	-0.5%	-0.4%	-0.4%	-1.1%	-2.1%	-2.6%	0.8%	0.8%	-1.4%	-1.6%	0.7%	0.6%	1.2%	-0.2%
Risk adj. return	0.12	(0.07)	(0.50)	(0.30)	(0.36)	(0.85)	(1.21)	(0.61)	0.97	0.69	(0.79)	(0.32)	0.96	0.58	0.58	(0.06)
Taper (Jan '14 - Oct '14)																
Avg monthly return (K $)	49	58	102	38	49	131	147	73	65	63	174	11	5	(52)	165	(54)
Annualized return (%, *)	0.6%	0.7%	1.2%	0.5%	0.6%	1.6%	1.8%	0.9%	0.8%	0.8%	2.1%	0.1%	0.1%	-0.6%	2.0%	-0.6%
Risk adj. return	0.97	0.94	1.33	0.25	0.44	1.48	0.95	0.27	1.44	1.12	1.68	0.05	0.09	(1.10)	1.33	(0.26)
On hold (Nov '14-Nov '15)																
Avg monthly return (K $)	66	70	151	119	23	87	152	237	(44)	(16)	154	168	(125)	(169)	(151)	10
Annualized return (%, *)	0.8%	0.8%	1.8%	1.4%	0.3%	1.0%	1.8%	2.8%	-0.5%	-0.2%	1.8%	2.0%	-1.5%	-2.0%	-1.8%	0.1%
Risk adj. return	0.98	0.97	1.58	0.73	0.24	1.04	1.39	0.80	(0.33)	(0.09)	0.93	0.52	(1.03)	(1.29)	(0.83)	0.03
Hiking (Dec'15-Oct'17)																
Avg monthly return (K $)	155	162	153	213	154	77	107	268	48	19	155	275	8	39	78	280
Annualized return (%, *)	1.9%	1.9%	1.8%	2.6%	1.8%	0.9%	1.3%	3.2%	0.6%	0.2%	1.9%	3.3%	0.1%	0.5%	0.9%	3.4%
Risk adj. return	1.83	1.82	1.10	1.00	1.76	0.72	0.58	0.83	0.41	0.12	0.81	0.84	0.06	0.23	0.38	0.90
EUR																
QE but Bund tantrum, ECB cutting rates (Mar '15 - Feb'16)																
Avg monthly return (K €)	111	101	83	(9)	(79)	(119)	(105)	(259)	(98)	(100)	(55)	(236)	(61)	(42)	30	(115)
Annualized return (%, *)	1.3%	1.2%	1.0%	-0.1%	-1.0%	-1.4%	-1.3%	-3.1%	-1.2%	-1.2%	-0.7%	-2.8%	-0.7%	-0.5%	0.4%	-1.4%
Risk adj. return	1.70	1.53	1.08	(0.08)	(0.94)	(1.47)	(1.06)	(1.39)	(0.80)	(0.86)	(0.31)	(0.78)	(0.46)	(0.25)	0.11	(0.28)
QE expanded and rates on hold (Mar '16 - Oct'17)																
Avg monthly return (K €)	81	91	87	90	53	75	112	101	80	107	250	219	189	214	270	321
Annualized return (%, *)	1.0%	1.1%	1.0%	1.1%	0.6%	0.9%	1.3%	1.2%	1.0%	1.3%	3.0%	2.6%	2.3%	2.6%	3.2%	3.9%
Risk adj. return	2.10	2.32	1.82	1.33	0.83	1.27	1.23	0.70	1.00	1.15	2.35	1.27	1.62	1.69	2.21	1.22

Note: The table reports performance on short 1m straddle trade in 2-, 5-, 10-, and 30y tails. We assumed the sale of 1m straddles struck at ATMF on a monthly basis and held until expiry before entering a new trade. Option bid/offer costs are assumed to be: in US: 0.5ct, 1ct, 1ct and 3ct for 2y, 5y, 10y and 30y resp. and in EUR: 0.75ct, 1ct, 2cts and 7cts for 2y, 5y, 10y and 30y resp. Delta hedging costs are assumed to be 0.1bp for swaps bid/offer across tails in US and EUR. (*) in % of $100mln 10y equivalent notional. The average monthly returns are expressed in K$, based on $100mln 10y equiv. notionals ($450mln in 1m2y for USD and €500mln in 1m2y for EUR, 200mln in 1m5y, 100mln in 1m10y & 40mln in 1m30y). Source: BofA Merrill Lynch Global Research.

We note that back-testing is hypothetical in nature and reflects application of the strategy prior to its introduction. It is not actual performance and it is not intended to be indicative of future performance.

A tale of the tails

To see a better picture of how changes in the Fed's communication may have affected performance, we added the one year period before the start of Fed's QE tapering in 2014, which was marked by changes in forward guidance and a taper tantrum. We summarise below what appear to have been the best and worst environments in this cycle for selling vol systematically in each tail (Chart 2 and Chart 3).

Chart 2: Cumulative short 1m straddle performance in the US for different tails. Rebased on diff phases of Fed policy - daily hedged ($mm)

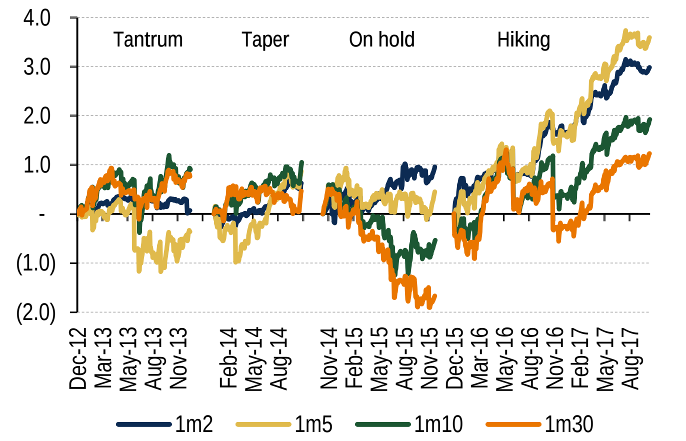


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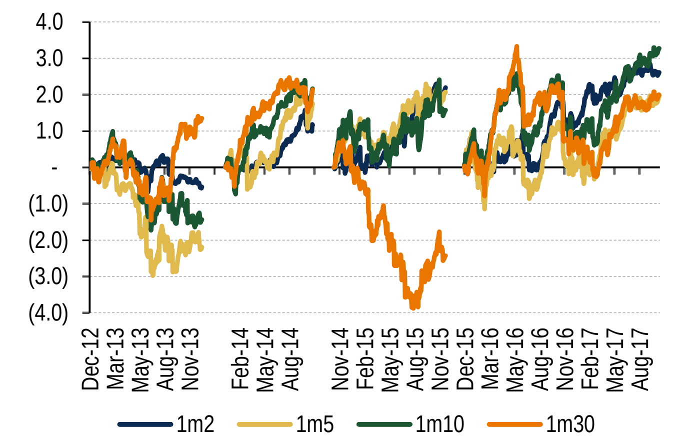
Chart 3: Cumulative short 1m straddle performance in US for different tails. Rebased for diff phases of Fed policy –hedge above 50K threshold



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2y tails: helped by a predictable Fed

The rate hike period has been beneficial for short vol. In fact, for the strategy in 2y tails, it has been the best one out of the 4 Fed phases we considered. As we previously argued, this may be due to the fact that markets believe the front end will be volatile as rates rise on upcoming hikes, while ultimately rates delivered very little as the Fed moved in a very predictable manner (for example, by only hiking when the market already prices it with more than a 60% probability). The importance of Fed predictability and communication is also apparent in that the worst performance for short 2y vol would have been in 2013, during the period of changing Fed communication & fwd guidance.

5y tails: best during active hiking, worst in CB changes & tantrums –> 2y better

While selling 1m5y straddles would have led to the highest overall return in the hiking cycle, the differential versus a position in 1m2y is very limited. In fact, on a risk-adjusted basis, the 2y tail appears to have been better (Table 1). Further, a look at the 2013 period in Chart 2 clearly highlights that our hypothetical short 5y vol strategy wasn't able to recover as quickly as the 2y one from the taper tantrum episode. Changes in Fed communication during that year meant realised vol in the 5y remained unexpectedly elevated, more so than in the 2y.

10y tails: best in steady taper, worst in no-QE & rates on-hold

Surprisingly, the weakest performance for the fully delta hedged short position in 1m10y vol wasn't recorded during the 2013 "tantrums" period but instead when QE had ended and the Fed was on hold (Nov14-Nov15). Setting a high threshold for delta hedging helped however mitigate the performance in that period (Chart 3).

The high threshold would have also improved performance in the steady taper period, which was in fact the best one for shorting vol in the 10y. The Fed indeed tapered very regularly and predictably. Also, instead of selling-off as purchases slowed (which could have justified a high level of implied vols), treasury yields trended lower and a limited number of sharp 1-day 10y rate moves were recorded.

30y tails: best in steady taper, worst in rates on-hold -> 10y a better option

Like in the 10y, the short vol position in 30y tail also stands out as having performed poorly during the on hold period. However, the 30y underperformed the 10y in both the taper and hiking periods. The higher cost of 1m30y options and higher delta hedging costs in $ terms in long tails could partly explain this differential. However, a more limited structural demand for 30y vol on the one hand, and large swings in 30s independent from the Fed, on the other, are likely to be the main difference vs the 10y.

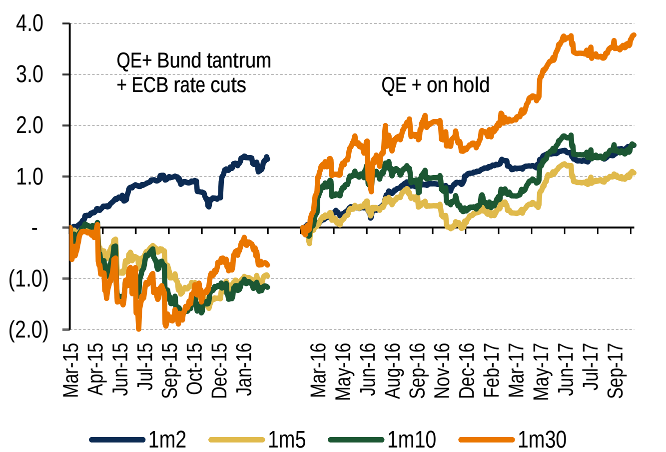
How does EUR performance compare to the US?

The "Mar15-Feb16" period in the Eurozone is very comparable to 2013 in US: A central bank conducting QE, dampening implied vols in long tails, with the market then facing a bond tantrum (a Bund tantrum, albeit not due ECB communication, happened in Apr-Jun15). The results in 5-30y tails in our backtest were thus similar, with 5y again underperforming.

The key difference, however, is in the 2y tail, where the short vol strategy in EUR recorded strong risk-adjusted returns, while that in the US over 2013 remained barely flat. We think this can be explained by a differential in the CBs' policy stance on rates:

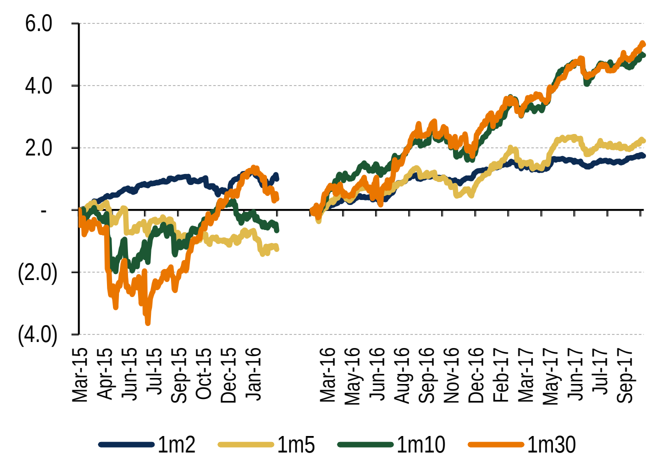
- In EUR, Mar15-Mar16 is a period where the ECB was still cutting rates, and the market no longer believed in the presence of a low-bound for the Depo rate. This kept implied vol elevated relative to what was ultimately delivered over the period.
- In the US, the market had already lived through over a year of strong rates forward guidance by the Fed, anchoring delivered and implied vols at low levels. In Dec-12, the first rate hike was envisaged to be as much as 30 months away. The surprising QE tapering talk in Jun13, in the context of fwd guidance that had been changed to a more data dependent version, resulted in an unexpected sharp repricing in the front-end (by end of summer 2013, the first hike was seen as close as 12m ahead).

Chart 4: Cumulative short 1m straddle performance in EUR since start of QE, rebased at last rate cut in Mar16 – daily delta hedge (€mm)



We note that back-testing is hypothetical in nature and reflects application of the strategy prior to its introduction. It is not actual performance and it is not intended to be indicative of future performance. Source: BofA Merrill Lynch Global Research

Chart 5: Cumulative short 1m straddle performance in EUR since start of QE, rebased at last rate cut in Mar16 - 50K delta hedge threshold (€mm)



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The "Mar16-Oct17" period appears similar to the taper episode in the US, i.e. a period of somewhat short term monetary policy predictability. While delivered vol has been very low and declining, implied continued to retain some premium. This could be explained by the fact that the maximum QE length the ECB truly committed to since Mar16 has been of 12 months. In addition, the ECB's forward guidance had linked the first rate hike to the end of QE, but without providing a specific timeframe, ie only stating that rates are expected to "remain at their current levels (or lower) for an extended period of time, and well past the horizon of our net asset purchases".

Interestingly, however, selling of 30y rates vol in EUR would have performed very well, especially compared to any period in the US, despite us using in fact higher 1m30y bid/offers in EUR than in USD. The strong performance can be attributed in our view to the very low realised volatility in 30y swap rates (see Chart 6 and Chart 7) LDI receiving flows appear to have supported rates when approaching key levels (1.50% and then 1.60%). Furthermore, any substantial rally could have been met by increased programme paying, such as from the ESM (as part of the short term Greek Debt Measures).

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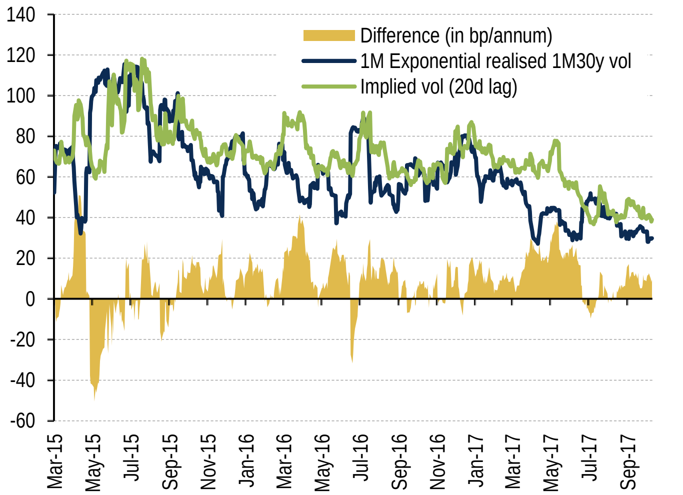
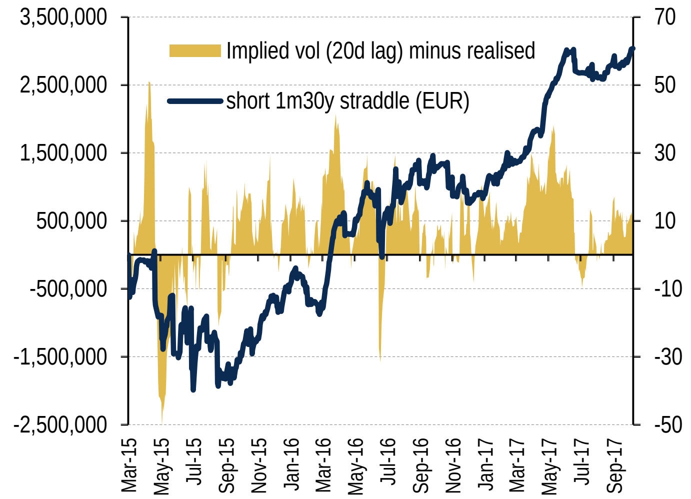
Chart 6: Comparing delivered vol in 1m30y EUR vs what was implied…



Note: Back-testing is hypothetical in nature and reflects application of the strategy prior to its introduction. It is not actual performance and it is not intended to be indicative of future performance. Source: BofA Merrill Lynch Global Research

Chart 7: …helps visualise the strong 2017 results in short 1m30y EUR vol



Note: Back-testing is hypothetical in nature and reflects application of the strategy prior to its introduction. It is not actual performance and it is not intended to be indicative of future performance. Source: BofA Merrill Lynch Global Research

Looking ahead

October ECB: a potential dividing line

The above analysis suggests 2y and 10y tails are both favourable sectors to be short vol in a systematic strategy. However, as we head into ECB QE tapering next year, the nature of next week's ECB announcement will likely be what should guide the choice of tails. Specifically, we believe the focus should be on the balance between (1) the extent to which the ECB strengthens its forward guidance and (2) the clarity and length of its QE commitment.

- **If forward guidance is strengthened in a very concrete way**, such as by the provision of an earliest possible date for the first hike, like the Fed did in 2012, this would have the potential to quickly dampen both realised and implied vols. However, it would then put the short 2y vol position at the constant risk of a 180 degree change in the language. A data dependent forward guidance, ie still a stronger one than is in place at the moment, should also initially lower volatility but should then open the door to sizeable realised moves in the front-end, again impacting negatively a systematic short vol position in short tails.
  - ⇨ In this situation, short 2y vol could be attractive in the near term, but ultimately a position in the 10y may then record better results in the longer-run (see the US case in 2013, where short 10y vol, fully delta hedged, outperformed despite the chg in guidance. In the 10y, implied volatility may have adjusted more fairly /quickly. In 2014, the 10y tail again recorded the best risk adjusted returns).
- **On the other hand, the more dovish the ECB is in terms of QE next year**, with no change to the nature of the rates forward guidance, the more likely we are to see a continuation of the Mar16-Oct17 trading environment.
  - ⇨ Here a position in 2y tails would appear as best from a risk-reward basis. We would however caution about shorting vol in 5y and 30y tails. The 5y, in case of a tantrum led by other regions for example, and the 30y because we do see potential for the recent low delivered volatility to come to an end (see for example our discussion on EUR 10s30s in EU rates here).

In the US, avoid systematic short vol in 5y tails as Fed communication uncertain

While shorting vol in the 5y tail would have done well in the last two years, the tide may be turning soon, as a new Fed chair is about to be nominated. This is mainly based on our view that changes in the Fed communication in 2013 were likely responsible for the weak performances in systematic short vol positions, especially in the 5y tail. That is not all however. In fact, at this stage, we find that the 5y point may be prone to a sharp correction higher, trading rich relative to the Fed hikes priced in the very front-end.

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