14 July 2020

JPM FX - Derivatives Chartpack Notes

Smiling at vol curves

- We introduce a systematic assessment of a FX vol strategy which leverages on both smile convexity and vol curve premia. We implement the smile-adjusted calendar strategy by selling front-end strangles and buying longer-end straddles, in Vega-neutral format. Future pieces of research will investigate other "hybrid" combinations allowing more flexibility as far as directional sensitivities / portfolio Vegas are concerned.

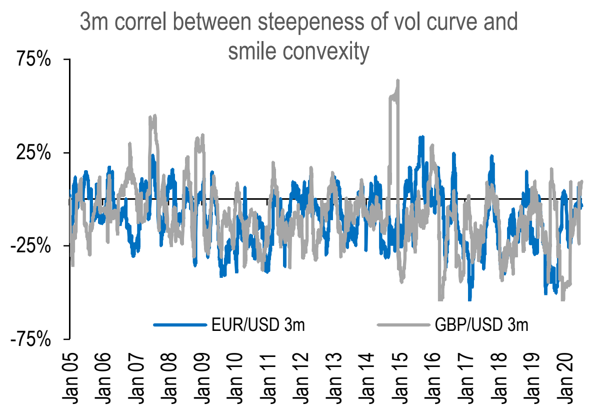
- EUR/USD and USD/JPY are two cases that, on the back of flattish front-end curves and elevated smile convexity, favor the implementation of the delta-hedged calendar straddle vs. strangle strategy.

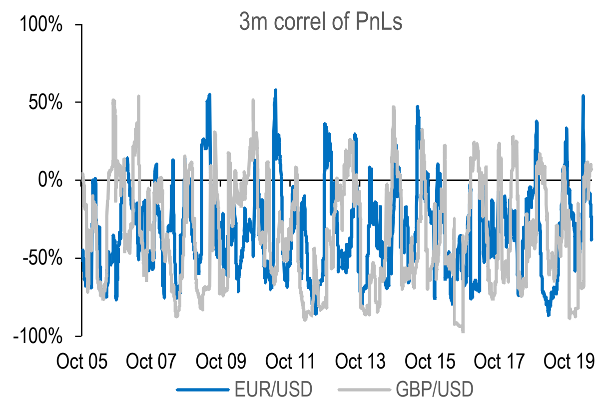
The cross-asset strategy team maintains a bullish stance on markets (*Global Asset Allocation – Staying pro-risk, adding back to equity OW*, Kolanovic et al, 10 July), given relative cheapness of Equities over bonds, policy support and rebound in growth, unlikely to be put at risk by new lockdowns. In the FX vol space, the picture above is fully consistent with the rather steady decline of vol levels since late March, and the output of our tactical filter keeping a short-Gamma bias since May, after flashing the most extreme risk-off signals on record throughout March and into April (see for instance here). Yet, low valuations from a historical standpoint and a macro agenda that could trigger vols in the second half of the year made us support a slightly more defensive positioning, favoring RVs over outright short vol (*RVs and vol ratio spreads still the game*, Jankovic, 2 July).

In this short note, we aim at shedding some light on the interplay between vol smile and term structure dynamics, for alpha generation purposes via RV structures. The two topics have been the subject of earlier research notes. Rich FX smile convexity generally supports the implementation of short-dated short-strangle / long straddle constructs, although some attention on the relative scaling of the two Vega notionals is required for allowing the strategy to stand the impact of costs (*Softer than shadow and quicker than flies – A first glance at FX vol of vol strategies*, Ravagli, 2 June). Similarly, short front-end, long long-end vol steepeners, traded for instance via delta-hedged straddles typically obtain smoother performances than the short-Gamma trade outright (*How does the correlation between spot and rates differentials impact FX vol curves*, Ravagli et al, 28 April). It hence appears natural to consider the combination of the two effects by twisting the calendar straddle vs. straddle trade with a smile component.

Exhibit 1. Proxies of smile and vol curve premia exhibit modest correlation over time. Correlation of the corresponding premia strategies is also contained in the long-run.

(LHS) 3m 25delta fly/ATM vs (1M vol-3M vol)/3M vol. (RHS) daily P/Ls of Vega-neutral -1m/+3m straddles vs 1m +straddle/-25D strangle.





Source: J.P. Morgan

Before showing actual backtests, we investigate the correlation between smile and term structure dynamics for FX vol surfaces, in order to assess the possible diversification benefit offered by these "hybrid" smile/curve strategies. During risk-off times, one could intuitively expect curves to invert and smiles becoming more convex, thus triggering a positive correlation between the two strategies and a doubling-up of risk when mixing them together. We start by computing the rolling correlation of ex-ante proxies of smile (3m 25delta fly/ATM) and curve premia ((1M vol-3M vol)/3M vol), for EUR/USD and GBP/USD (Exhibit 1, LHS). For both cases considered, the correlation of proxy premia is not significant over time. The ex-post measure, based on the daily PnLs of the actual strategies (Exhibit 1, RHS - Vega-neutral -1m/+3m straddles and 1m +straddle/-25delta strangle), similarly does not highlight a structurally positive correlation, strengthening the added value of combining the two risk premia together.

We then investigate actual backtests for the calendar strangle/straddle strategies. We start from the term structure benchmark and twist the short vol leg from straddle to strangle. In this introductory note, we do not address the topic of different Vega scaling, which was important for managing the impact of costs in the earlier note on smile strategies – for this purpose, we assume zero costs to start with and we'll dig more on costs / relative scaling of Vega notionals in future publications. Backtests refer to 15-yr periods (except for USD/CNH, since January 2011), implementations are in a Vega-neutral short 25delta strangle / long straddle with -1m/+3m and -3m+1y tenors.

We start by presenting results for USD/G10 pairs (Exhibit 2). In the charts we display Sharpe ratios for three cases: a) short front-end straddle; b) straddle vs. straddle calendar steepener; c) short strangle vs. long straddle calendar steepener. As discussed, under the strong assumption of zero trading costs, results look very appealing, in that calendars typically outperform plain short-Gamma in terms of higher Sharpe ratios [1], and so do the smile-twisted calendars over the straddle vs. straddle ones. Under the zero-cost limit, playing very much at the front of the curves outperforms longer-tenor trades (although the impact of costs might prove more onerous). Also, when taking into account costs, the Vega-neutrality constraint might prove too tight, and possibly realistic implementations would require relaxing the condition in favor of more aggressive Theta-harvesting structures. With these caveats in mind, EUR/USD and USD/JPY are the two cases associated with more promising output. One thing to keep in mind is that currently depressed Sharpe ratios come on the heels of the dramatic March vol episode that slammed the recent short vol performance. The bulk of the USD pairs is still undergoing the recovery. Results for USD/CHF suffer from the January 2015 de-pegging by SNB, which severely impacted short-Gamma trades.

[1] We take the opportunity of amending an earlier calculation typo that was featured in the earlier piece on calendar strategies

Exhibit 2. USD/G10: -1m/+3m, -3m/+1y backtests produce very promising results assuming zero trading costs.
Traded daily, each calendar held until expiry of short-leg. 15 yrs-data for all currencies.

	Sharpes 1m3m case				Sharpes 3m1y case		
ccy pair	Straddle	Calendar	Calendar + smile	ccy pair	Straddle	Calendar	Calendar + smile
EUR-USD	0.81	0.80	1.37	EUR-USD	0.65	0.83	1.06
GBP-USD	-0.13	-0.33	0.35	GBP-USD	0.04	0.12	0.50
USD-JPY	0.51	0.80	1.23	USD-JPY	0.36	0.53	0.74
USD-CHF	-0.11	-0.16	0.11	USD-CHF	-0.06	-0.10	0.01
USD-CAD	0.18	0.16	0.83	USD-CAD	0.48	0.49	0.82
USD-NOK	0.05	0.08	0.29	USD-NOK	0.14	0.13	0.42
USD-SEK	0.09	0.07	0.48	USD-SEK	0.21	0.16	0.48
AUD-USD	0.00	0.04	0.21	AUD-USD	0.13	0.23	0.35
NZD-USD	-0.14	-0.11	0.06	NZD-USD	-0.02	0.05	0.24

Source: J.P. Morgan

A similar picture emerges when looking at the USD/EM space (Exhibit 3). We stress how the results here presented are just meant to display an indicative pattern, but that the elevated Sharpe ratios discount the lack of trading costs that for EM options typically play a significant role. Nonetheless, the general conclusion of the appeal of these structures appears intact, although the added value of the smile-adjustment appears more contained with respect to the G10 case. If ever, more work will be required for guiding towards the choice of optimal tenors and Vega scaling combinations for being able to absorb the impact of costs.

Exhibit 3. USD/EM: -1m/+3m, -3m/+1y backtests produce very promising results assuming zero trading costs.
Traded daily, each calendar held until expiry of short-leg. 15 yrs-data for all currencies.

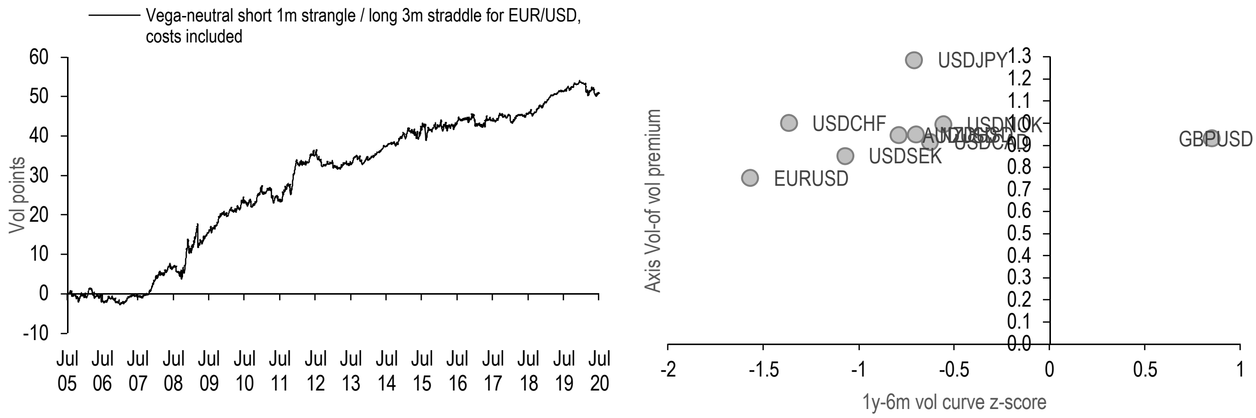
	Sharpes 1m3m case				Sharpes 3m1y case		
ccy pair	Straddle	Calendar	Calendar + smile	ccy pair	Straddle	Calendar	Calendar + smile
USD-BRL	1.23	1.82	1.81	USD-BRL	0.90	0.91	0.98
USD-MXN	1.09	1.69	2.12	USD-MXN	0.75	1.06	0.95
USD-TRY	1.55	2.13	2.05	USD-TRY	1.08	1.39	1.30
USD-ZAR	0.76	0.91	0.36	USD-ZAR	0.74	0.90	1.17
USD-PLN	0.71	0.85	1.13	USD-PLN	0.81	0.78	0.88
USD-HUF	0.31	0.29	0.89	USD-HUF	0.53	0.46	0.80
USD-KRW	1.44	2.01	1.96	USD-KRW	0.97	1.27	0.99
USD-SGD	1.62	1.66	2.35	USD-SGD	1.40	1.58	1.85
USD-CNH	1.65	2.17	0.36	USD-CNH	0.91	0.85	1.13
USD-INR	2.92	3.89	3.90	USD-INR	1.89	2.19	2.10
USD-TWD	1.85	2.46	1.20	USD-TWD	1.13	1.24	1.17
USD-IDR	2.92	4.91	3.33	USD-IDR	1.58	2.04	1.61

Source: J.P. Morgan

Accounting for transaction costs, the Vega-neutral, smile-adjusted -1m/+3m calendar still delivers good results on EUR/USD (Exhibit 4, LHS), scooping an average of 3 vol points per year. More generally, one could think of coming up with a RV summarizing a measure of smile convexity premium with one on vol curve dislocation. Within the G10 space, a brute force comparison of implied-realized 3m vol-of-vol (former, from SABR-model calibration; latter, from 3m vol of 3m ATM vol) with 6m z-score of 1y-6m segment of vol curves (Exhibit 4, RHS), as discussed in the earlier note, points to the generalized added value of selling front-end smile convexity. GBP/USD stands out as the case offering the best added value from a vol curve perspective, with the 6m-1y segment of the vol curve made "artificially" flattish by the ~6m Brexit risk premium. One could think of taking advantage of the flatter front-end curve by selling front-end vols, without taking too much of an exposure to Brexit risk.

Exhibit 4. Long term performance proves to be attractive for the EUR/USD smile-adjusted delta-hedged calendar strategy even after accounting for costs. Current pricing of wings and shape of the vol curve favors looking at GBP/USD too.

Traded daily, each calendar held until expiry of short-leg. Transaction costs corresponding to internal J.P. Morgan pricing platform.



Source: J.P. Morgan

Consider:

- Sell 1m 25delta strangle @ 7.2 change / buy 3m straddle @ 6.65/6.85 indic. on EUR/USD, Vega-adjusted notionals, keep delta-hedged

- Sell 1m 25delta strangle @ 8.4 change / buy 3m straddle @ 8.4/8.7 indic. on GBP/USD, Vega-adjusted notionals, keep delta-hedged

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