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CROSS-ASSET

Lessons from Taiwan

Go long USD rates vega

Given the glut in long-dated callable issuance in late 2014, some commentators see a high risk of upcoming calls, particularly with the rally in USD long ends. But there have now been only four calls out of the ten or so eligible bonds. We do not expect a deluge of calls or new callable issuance for several reasons: the calls themselves were non-economic; Taiwanese insurers are usually unmoved by higher US yields given the separation of TWD and USD investment teams; and TWD depreciation has little effect on investment decisions due to hedging requirements. Moreover, many insurers continue to expect USD hikes, while they are generally full up on exposure to financial issuers, delaying further large USD investment. Finally, rehedging of callables should boost demand for vega, while rehedging suboptimally-called bonds should have much less impact on vega than commonly expected. Consequently, even if there are calls, we believe the impact on vega will be relatively modest. Given the recent tapering in callable issuance, we think now is a good time to go long USD vega.

In this paper, we update our earlier note on Forward Volatility (see link) in its many forms, in which we recommended forward vol on the back of our (too) early view that callable issuance would taper. While tapering took several months longer than we expected, vega performed well. We now expect a renewed performance from vega.

The calls, are they a-coming? No, sir!

Some market participants believe that significant amounts of callable issuance, eligible to be called this month, *will* be called. This would potentially lead to more new issuance of callables, possibly pushing down long-dated, long-tail vega. Their arguments are:

- **Large glut of callables**: The callable issuance eligible to be called for the first time is of much higher volumes than average.
- **USD rally**: There was a rally in USD rates which could make calling attractive.
- **TWD depreciation**: The depreciation of TWD and lower yields in Taiwan make purchasing USD callables more attractive.

We address each of these and expand on the more technical arguments in a later section below. The gist of our reasoning is:

- **It is not optimal to call**. Although US rates have rallied since mid-July, many callables are still not optimal to call. Furthermore, credit spread widening has made issuers less likely to call back notes. A significant rally is required for a 30yNC1y1y to be optimally exercised in year 1. Many question the four calls we have seen as being economically suboptimal. If suboptimally exercised, calls do not change vega supply markedly.
- **USD-TWD relative value matters little.** US rates are the dominant factor for callable investment decisions. In Taiwanese lifers, TWD and USD investment teams are quite separate. Consequently, movements in TWD local rates matter little for USD callable investment decisions. With separate teams and a more top-down investment processes, relative value is just not that important.
- **USD issuance is hedged, making TWD depreciation less important.** The depreciation of TWD indeed benefits the dollar investment from a Taiwanese point-of-view, but regulation requires that all FX exposure is hedged.

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Expectation of a simple appreciation in USD does not make USD-denominated bonds much more attractive to local assets.

Moreover, there are two additional factors that could make any demand for new Formosas (both callable and vanilla) slow.

- **Taiwanese investors are expecting USD rate hikes and delaying investment decisions**. Many lifers still hold the view (or follow the increasingly stale market consensus view) that rate hiking is in sight. They would wait for better yield levels to enter. That has led to reticence in committing to both callable and vanilla placements.
- **Credit lines are full**. Many lifers have reportedly used their entire credit lines for financials, and would only be willing to invest more in callable bonds if either new issuers were available, or old financial issues are called or mature, in which case monies can be reinvested.

Given the fact that very few issues have been called, we see the expectation of a large onslaught of calls leading to great amounts of callable issuance as flawed.

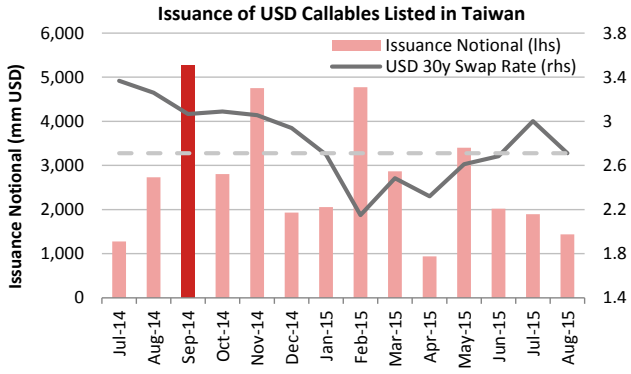
Callable Formosa bonds – the backdrop

The slew of callable issuance in Taiwan was due to a regulatory change which was meant to revive a moribund Formosa bond market. The unintended consequence of the changes was that Taiwanese insurance companies bought USD callable bonds in droves. When we investigated, (Forward Volatility Strategies: Long-dated USD volatility opportunities), we anticipated that Taiwanese regulators would quickly close this loophole and effectively stop the downward pressure on USD vega. Our own expectations were premature, and regulators have not closed any loopholes. Nonetheless, vega performed strongly towards year-end 2014, and in the past few months callable issuance has tapered abruptly as we can see in Figure 1.

Over the past few weeks there have been issues from Mizuho (a 30yNC10y1y) for $538mn and from RBC (a 30yNC5y5Y) for $275mn, HSBC (a 25yNC1y1y) for $105mn, and Lloyds (a 30yNC5y2y) for $261mn, all settling in September. The non-financial issuer this month was Toyota (a 30yNCty1y) for $750mn. Thus far there has been nothing like a rush to issue.

Fig. 1: Issuance of USD callable Formosa bonds tapering

The glut at the turn of the year is not continuing



Source: Nomura Research, Bloomberg

Fig. 2: Callable outstanding notional (listed in Taiwan)

Outstanding notional peaks this month

Source: Nomura Research, Bloomberg

Figure 2 shows the callable outstanding notional by the first call date, from August onwards for two years, and as can be seen in grey, some issues have indeed been called or issuers have given notice of a call. This September marked the one year anniversary of the record issuance figures of September 2014, and the risk of looming calls. Nonetheless, the majority of issues have not been called.

Since the issuance of these bonds, 30y rates have rallied (looking at the rally from September 2014), while 5y investment grade financials spreads have widened a commensurate amount, as we can see in Figure 3.

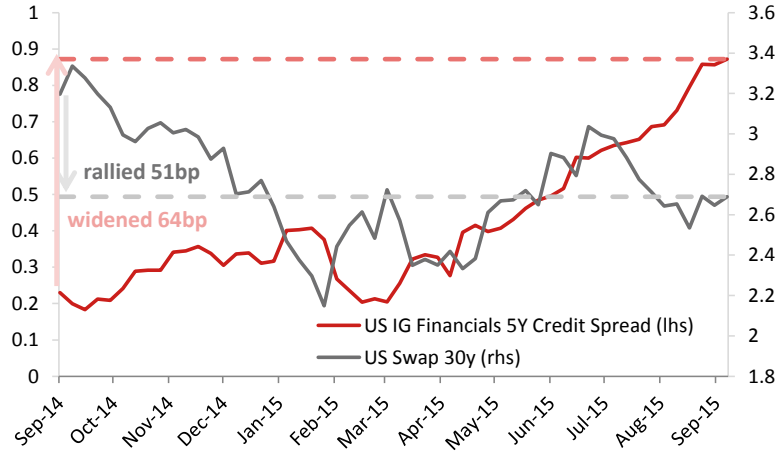
We recognise it is very naïve to consider only 30yr rates themselves in a call decision. For instance, if we were to consider optimality of a 30yNC10y (with a single call), at the call date, we would only look at 20y spot rates, rather than long-rates. A 30yNC1y1y call decision at the first call date (when it is a 29y bond with annual calls) depends on 29y spot rates, 28y rates 1y forward, 27y rates 2y forward, 26y rates 3y forward, etc.

Optimality of any call requires that the gains to be had from exercise outweigh the value of delaying, which clearly depends on the entire curve shape, with relations between spot rates (and their moneyness) balancing with relations between forwards and their respective moneyness.

In spite of the subtleties, for ease of explanation, we mention long rates in Figures 3 and 4, recognising their limitations.

Fig. 3: USD long end rates and financial credit spreads since issuance

Since Sep 2014, USD 30y swap rate has rallied 51bp while credit spreads of IG financials have widened 64bp.



Source: Bloomberg

In Figure 4, we focus on the move in US long ends and credit spreads of individual issuers of Formosa bonds which were eligible to call over the period of August through October 2015, and where we have filled in the 30y change for all but left the credit spread change empty for October. We note that the called bonds were far from the majority of these self-issued bonds.

Fig. 4: Trades eligible for calling since Aug 2015

Most Formosa bond issuers' individual spreads have widened.

Issuer	Structure	Issue Date	First Callable Date	Notional ($mm)	30y swap Chg from issue	5y CDS Chg from issue	Called?
Nomura	Callable Zero	12-Aug-14	12-Aug-15	325	-63	-16	No
Credit Agricole	Callable Fixed	13-Aug-14	13-Aug-15	135	-55	7	No
Credit Agricole	Callable Zero	15-Aug-14	17-Aug-15	135	-49	10	Called
Deutsche Bank	Callable Zero	21-Aug-14	21-Aug-15	415	-65	31	No
Morgan Stanley	Callable Fixed	21-Aug-14	21-Aug-15	950	-65	10	No
SocGen	Callable Zero	27-Aug-14	27-Aug-15	605	-39	14	Called
Goldman	Callable Zero	05-Sep-14	7-Sep-15	941	-54	15	No
Citigroup	Callable Zero	09-Sep-14	9-Sep-15	600	-49	17	No
Credit Suisse	Callable Fixed	10-Sep-14	10-Sep-15	400	-55	25	No
Barclays	Callable Zero	10-Sep-14	10-Sep-15	600	-55	13	Called
Standard Chartered	Callable Zero	19-Sep-14	21-Sep-15	200	-52	47	Called
UBS	Callable Zero	19-Sep-14	21-Sep-15	750	-52	22	
BNP Paribas	Callable Zero	26-Sep-14	28-Sep-15	300	-42	4	
DBS	Callable Zero	30-Sep-14	30-Sep-15	230	-39	-	
Lloyds Bank plc	Callable Zero	03-Oct-14	5-Oct-15	250	-36	-	
JP Morgan Chase & C	Callable Fixed	03-Oct-14	5-Oct-15	81	-36	-	
Credit Agricole CIB SA	Callable Fixed	14-Oct-14	14-Oct-15	100	-19	-	
Nomura	Callable Zero	24-Oct-14	26-Oct-15	408	-24	-	

Source: Bloomberg, Nomura Research.

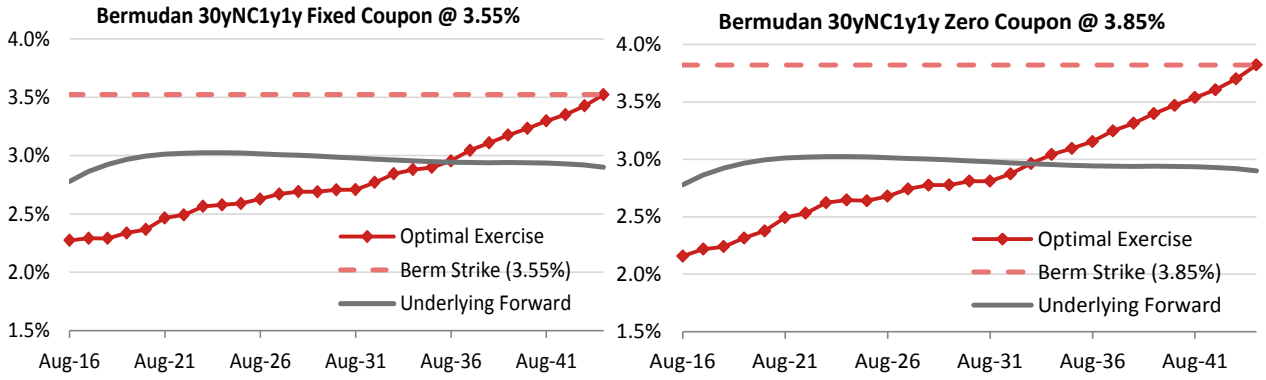
While rates have indeed rallied 40-59bp since issuance, most Formosa bond issuers' individual spreads have widened. In fact, what should be clear is that there is no clear pattern other than that *all* the calls were zero-coupon bonds, although not all zeros were called. We believe that the calls were not exercised optimally, which we explain below.

The exercise boundary is depicted for parallel shifts, and we have only explained moves in 30y rates in Figure 4. The call decisions are far more complex and depend on the entire curve shape and reissuance options.

Calling bonds is not optimal, is it?

In our previous paper on Forward Volatility, we highlighted the optimal exercise boundary for Bermudans/callable bonds. We give some examples of this in Figure 5, where we plot the optimal exercise boundary for two representative bonds, a 30yNC1y1y fixed coupon bond and a 30yNC1y1y zero coupon bond (with a slightly higher coupon as per market convention). Much like optimal exercise of American options, the required rally in rates for a Bermudan to be optimally exercised is quite substantial at the beginning of its lifetime, rising to the coupon rate at its last call date.

Fig. 5: Optimal exercise boundaries for Bermudan 30yNC1y1y fixed coupon and zero coupon
Rallies in funding costs must be large at the first call date.



Source: Nomura Research

In fact, for the 30yNC1y1y 3.55% bond we show on the left-hand chart, the required pick-up in year one is the rally in forwards of 2.78-2.27% or at least 51bp. For the zero coupon 30yNC1y1y 3.85% depicted on the right, the rally is even more significant, with forwards having to hit 2.16%, resulting in a rally of 62bp.

While rates have indeed rallied since issuance, the higher funding costs for virtually all the issuing financials has meant that exercising the calls would be **suboptimal**. Even though a suboptimal exercise may still lead to a net savings in funding costs, it does result in a reduction in time-value of the underlying option.

Why are any calls being made now?

There is a difference in how exercise is performed between third-party-issued bonds, and self-issued bonds, and then between those banks that consider FVA charges in the call decision and those that do not.

Third Party Issuer: If an investment bank's exotic desk has a swap on with a third party issuer (e.g., with Intel or World Bank or any other issuer who wants to hedge the callable exposure but is unable to do it itself), the call decision is likely always to be made optimally. In those instances, the desk making the call only cares about the revenue that could be made by calling the swap. The issuer of course could choose not to call the underlying bonds (DEPFA for instance was a noted example of an issuer who was unable to tap the market when the underlying swaps were called, and renegotiated the swaps with banks at higher spreads), but usually they call the bonds anyway. Given the rally in rates since September 2014, it is possible to consider calling third party issues (but even then, the rally may not truly be sufficient).

Self-Issued: For self-issued paper, (the majority of notes in Figure 4), there could be differences of behaviour based on whether or not FVA charges are taken into account.

- **FVA considered:** Some banks' trading desks take FVA charges into account, and thus the entire cost to the firm, including funding, matters for the exercise decision. For these banks, the hurdle to exercise is much higher, and it is unlikely that they would call given the significant widening.
- **FVA ignored**: For banks whose trading desks and financing desks are effectively independent or working at *cross-purposes*, the trading desk may

decide to call irrespective of the underlying widening. We suspect this is what happened in the case of the four called bonds.

- **Calling at a loss, issuing, and making a profit:** Given the possibility of upfront P&L which could be booked by a trading desk, it may be optimal in some sense to call bonds even if the models say otherwise. This would only be the case if the upfront P&L that could be booked by the trading desk for a new issue makes up for the losses due to a suboptimal call. Of course, if FVA charges are included, then the hurdle is higher.

The inclusion of FVA charges is, of course, a more sophisticated approach to the call decision, and we believe the majority of self-issuers do consider FVA (and even more are likely to do so over time).

Is the rally in rates sufficient? In spite of the possibility of banks' desks working at cross-purposes, we do not think the rally in rates is sufficient to warrant a call in and of itself. As we note in the charts in Figure 5, the rallies have to be quite substantial to make call optimal. Consequently, we believe the presumed revenue stream associated with a new issue, with both sales credits and other fees, is supposed to be larger than any lost time-value in the underlying Bermudan swap.

Rehedging in a rally – vega supportive

If rates rally but there is no call, Bermudans must be rehedged. In Figure 6, we see the vega hedges needed to fully hedge a 30yNC1y1y struck at 3.55% in the current market. All positive figures correspond to vega selling needs. As we see the 7y25y is the highest single number but there are large vol hedging needs on 20y tails, further out on 15y tails, and yet further out for shorter tenors. The hedging demand would form a diagonal if our expiries and tenors had the same scales.

On the right-hand side we show the hedging needs if rates fell by 200bp. Since the picture depicts a 30yNC1y1y, with the first call still one year away, the probability of a call has risen from around 55% to around 90%. What should be apparent is that the larger hedges are needed in shorter expiries.

In the lower two tables, we show the change in vega demand. In essence, to rehedge, a trader must buy back significant amounts of vega as we show in the left-hand side. We show the percentage of initial vega that needs to be bought back on the lower right. The hedging required is slightly less in the upper right, and negligible for 1y expiries. In essence, barring a call, rallies in rates are generally supportive of vega.

Fig. 6: Vega profile of 30yNC1y1y struck at 3.55% in current scenario and the scenario when yield curve shifts down 2%

Lots of selling pressure to rehedge the Bermudans

Vega profile in current scenario (USD/bp)

Vega	1Y	2Y	5Y	7Y	10Y	12Y	15Y	20Y	25Y	30Y
6M	0	0	0	0	0	0	0	0	0	0
1Y	0	0	0	0	0	0	0	0	354	1415
2Y	0	0	0	0	0	0	0	0	762	1143
5Y	0	0	0	0	0	0	0	0	1876	469
7Y	0	0	0	0	0	0	0	1347	2197	0
10Y	0	0	0	0	0	0	0	1298	0	0
12Y	0	0	0	0	0	0	713	777	0	0
15Y	0	0	0	0	0	488	877	120	0	0
20Y	0	0	39	351	522	486	100	0	0	0
25Y	20	30	283	368	1	0	0	0	0	0
30Y	82	20	0	0	0	0	0	0	0	0

Vega profile when yield curve shifts down 2% (USD/bp)

Vega	1Y	2Y	5Y	7Y	10Y	12Y	15Y	20Y	25Y	30Y
6M	0	0	0	0	0	0	0	0	0	0
1Y	0	0	0	0	0	0	0	0	331	1324
2Y	0	0	0	0	0	0	0	0	309	464
5Y	0	0	0	0	0	0	0	0	687	172
7Y	0	0	0	0	0	0	0	1423	1476	0
10Y	0	0	0	0	0	0	0	936	0	0
12Y	0	0	0	0	0	0	350	395	0	0
15Y	0	0	0	0	0	180	374	54	0	0
20Y	0	0	8	88	157	171	40	0	0	0
25Y	5	10	65	84	0	0	0	0	0	0
30Y	19	5	9	0	0	0	0	0	0	0

Change in vega profile (USD/bp)

Vega	1Y	2Y	5Y	7Y	10Y	12Y	15Y	20Y	25Y	30Y
6M	0	0	0	0	0	0	0	0	0	0
1Y	0	0	0	0	0	0	0	0	-23	-90
2Y	0	0	0	0	0	0	0	0	-453	-679
5Y	0	0	0	0	0	0	0	0	-1189	-297
7Y	0	0	0	0	0	0	0	76	-721	0
10Y	0	0	0	0	0	0	0	-362	0	0
12Y	0	0	0	0	0	0	-362	-382	0	0
15Y	0	0	0	0	0	-308	-503	-66	0	0
20Y	0	0	-31	-263	-366	-315	-60	0	0	0
25Y	-16	-144	-342	-284	-1	0	0	0	0	0
30Y	-63	-46	-22	0	0	0	0	0	0	0

Change in vega profile (as % of initial vega)

Vega	1Y	2Y	5Y	7Y	10Y	12Y	15Y	20Y	25Y	30Y
6M										
1Y									-6%	-6%
2Y									-59%	-59%
5Y									-63%	-63%
7Y								6%	-33%	
10Y								-28%		
12Y							-51%	-49%		
15Y						-63%	-57%	-55%		
20Y			-79%	-75%	-70%	-65%	-60%			
25Y	-77%	-94%	-84%	-77%	-70%					
30Y	-77%	-90%	-71%							

Source: Nomura Research

Callable zeros have much more complex hedging profiles, requiring the buying of vol in each expiry above the diagonal (i.e., in the upper left table in Figure 6, all the zeros in the upper left of the matrix – above the "diagonal", would be negative numbers). Rehedging is also much more complex but would move hedging demand towards shorter expiries as well.

Suboptimal calls– less impact on vega

We recognise that optimal calls and subsequent reissue will impact vega significantly. If a bond has already been rehedged (so the hedge is mostly gamma and little vega) then calling it and issuing another bond would lead to a large supply of vega.

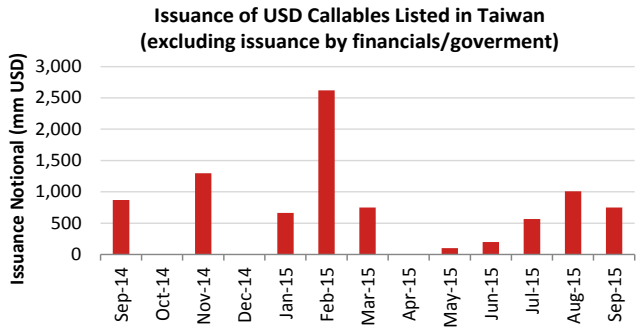
One may ask how hedges would change when an issue is suboptimally called. If rates have not rallied sufficiently to warrant a call from a model-based economic perspective, the original (or slightly altered) hedges would still be on the traders' books, effectively, and a call would mean a total unwind. This should initially be quite supportive of vega in the short run but reissue would essentially reverse this process. On balance, the move would be more or less vega-neutral.

What could change the outlook?

With the current state of affairs, the only change to outlook could be new issuers, presumably non-financials. Many bankers have understood this dilemma and approached non-financials to issue. While some of the largest single issuances were from non-financials, (e.g., Intel in February 2015), the issuance has remained relatively small in total terms as we can see in Figure 7. More tellingly, it is hard to find any trend at all in the data given that, for each month charted, there has been exactly one non-financial issuer. While we monitor this evolving situation, it appears that issuance from non-financials is not a major source of concern to our outlook.

Fig. 7: Issuance of third party (ex-financials/government)

One issue a month does not form a trend



Source: Bloomberg, Nomura Research. Data as of 24-Aug-2015.

Trade Idea: Long USD 5y5y20y Forward Vol

Given our positive outlook on USD vega, we resume our recommendations of long-dated USD forward volatility. Looking in more detail, long tail forward vol shows high vol pick-up.

Fig. 8: USD 20y and 30y tail forward vol carry is high and relatively high by historical standards over the past year

High carry and high carry percentiles over the past year.

Spot-Fwd Vol Spread

1y Fwd	1y	2y	3y	5y	10y	20y	30y
1y	-11.6	-4.1	-0.8	4.3	5.1		9.2
2y	-5.1	-1.2	0.4	2.7	3.8		6.6
3y	1.4	3.6		3.8			6.2
5y		4.5		4.3	4.3	5.9	6.1
10y				3.3	3.5	4.2	

1 Year Percentile

1y Fwd	1y	2y	3y	5y	10y	20y	30y
1y	75%	86%	73%	91%	93%		95%
2y	64%	39%	48%	55%	88%		75%
3y	57%	57%		95%			88%
5y		91%		95%	86%	98%	96%
10y				71%	70%	71%	

Spot-Fwd Vol Spread

2y Fwd	1y	2y	3y	5y	10y	20y	30y
1y	-23.4	-10.2	-3.8	2.3	5.8		12.6
2y	-5.5	0.1	-0.1	4.2	6.0		10.8
3y	3.4	4.6		5.8			10.5
5y		8.9		8.8	7.7	10.8	11.4
10y				5.9	6.5	7.7	

1 Year Percentile

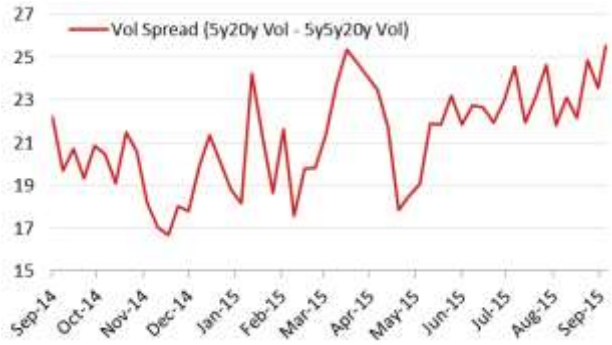
2y Fwd	1y	2y	3y	5y	10y	20y	30y
1y	50%	46%	43%	54%	88%		71%
2y	38%	29%	45%	55%	91%		68%
3y	41%	48%		80%			84%
5y		82%		100%	98%	96%	96%
10y				80%	82%	89%	

Spot-Fwd Vol Spread

5y Fwd	1y	2y	3y	5y	10y	20y	30y
1y	-11.6	3.5	11.5	18.0	19.4		30.7
2y	13.2	17.2	18.0	21.2	19.9		29.2
3y	23.3	23.5		22.7			27.8
5y		24.8		22.7	18.3	25.5	25.7
10y				15.4	15.3	18.2	

1 Year Percentile

5y Fwd	1y	2y	3y	5y	10y	20y	30y
1y	91%	64%	79%	95%	100%		96%
2y	84%	52%	64%	93%	98%		96%
3y	80%	68%		88%			96%
5y		88%		77%	96%	100%	95%
10y				30%	57%	79%	



Source: Nomura Research. Data as of 9-Sep-2015.

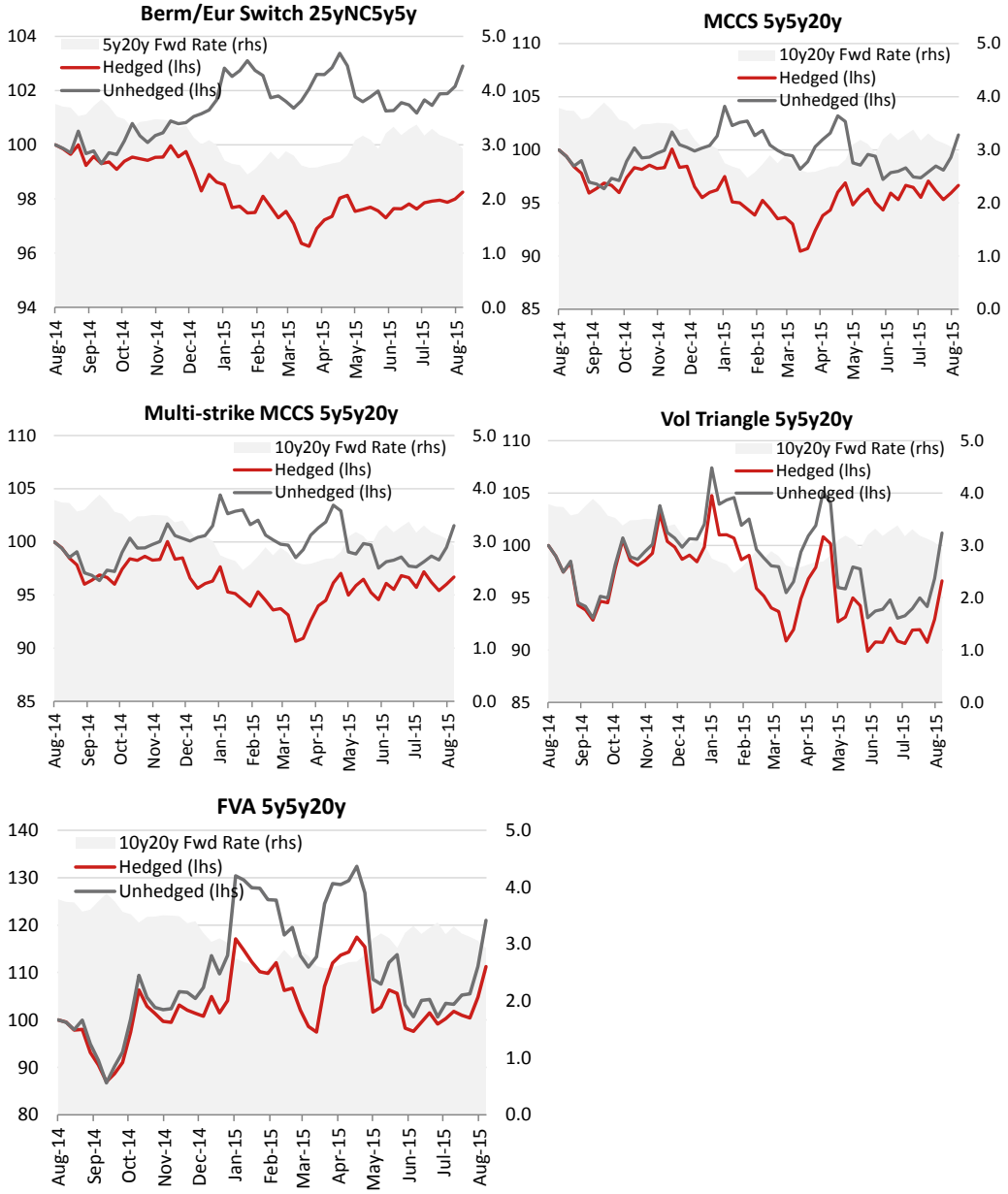
We show 1y forward, 2y and 5y forward volatilities for the entire surface in Figure 8, with pick-ups (spot-forward vol) on the left, and their one-year percentiles (similar to z-scores) on the right. The longer tails, 10y-30y, have historically high pick-ups, but 2y5y5y with an 8.8bp pick-up and 5y5y20y with a 25.5bp vol pick-up are also 1-year record highs. We plot the pick-up for the 5y5y20y in Figure 6.

Forward volatility, performance update

Hedged forward vol strategies generally underperformed over the past year, while unhedged indices did well, benefitting from the directionality of underlying rates. In terms of pure forward vol exposure (hedged indices), FVA and vol triangles were the best performers. We recall that in the given indices we put on trades monthly, hedging any exposure weekly, and rolled annually.

Fig. 9: Performance of hedged/unhedged forward volatility strategies

In terms of pure forward vol exposure (hedged indices), FVA and volatility triangles were the best performers.



Source: Nomura Research. Sample period: Aug 2014 – Aug 2015.

Each of the strategies has underlying rates exposure, typically being short gamma. We hedge all three of the underlying forwards in the triangle and only the underlying forward for the others (or first forward for a Bermudan). The FVA has rates dependence only since it is a standard forward swaption contract where, at maturity, premium is exchanged for an ATM straddle. Were the straddle forward settle, there would be less such dependence, and if it were a constant vega contract, there would be no rates dependence (see Forward Volatility Strategies for more detail). We opted for the FVA for computational ease. The structures are chosen to be as comparable as possible.

The results contrast somewhat with those of our previous paper on forward volatility strategies, but FVA was the best performer over the past year.

Fig. 10: One year performance statistics

Among pure forward vol strategies. FVA was the best performer over the past year.

	Unhedged Strategies				
	B/E Switch 25yNC5y5y	MCCS 5y5y20y	Multi MCCS 5y5y20y	Triangle 5y5y20y	FVA 5y5y20y
Return (p.a.)	2.9%	1.7%	1.8%	2.6%	24.7%
Std Dev (p.a.)	3.1%	8.4%	8.3%	16.8%	35.0%
Sharpe Ratio	**0.92**	**0.20**	**0.22**	**0.15**	**0.71**
Max Drawdown	2.1%	6.6%	6.6%	13.4%	24.0%
Calmar Ratio	**1.34**	**0.26**	**0.28**	**0.19**	**1.03**
	Hedged Strategies				
	B/E Switch 25yNC5y5y	MCCS 5y5y20y	Multi MCCS 5y5y20y	Triangle 5y5y20y	FVA 5y5y20y
Return (p.a.)	-1.7%	-3.0%	-2.5%	-2.0%	14.8%
Std Dev (p.a.)	2.7%	8.5%	8.5%	16.7%	29.9%
Sharpe Ratio	**-0.63**	**-0.35**	**-0.30**	**-0.12**	**0.49**
Max Drawdown	3.8%	9.6%	9.3%	14.2%	16.9%
Calmar Ratio	**-0.45**	**-0.31**	**-0.27**	**-0.14**	**0.88**

Source: Nomura Research. Sample period: Aug 2014 – Aug 2015.

Based on our performance analysis and that previously, we still believe midcurve calendar spreads and FVAs are particularly good ways to achieve a forward vol exposure, although there are sometimes differences in performance.

Trade Idea: Go long USD rates vega

To look at performance of vega, we construct a set of vega indices to measure the performance of USD vega. Each index rolls into a new swaption straddle trade on a weekly basis and holds the option for one year. Over the past year, USD long-dated long-tail vega indices performed very well, and in particular, shortly after our last paper, long vega has done well as we can see in Figure 11. In particular, 20y30y vega stands out.

Fig. 11: Performance of USD vega indices

Over the past year, USD long-dated long-tail vega performed well.

Sharpe	2y	5y	10y	20y	30y
1y	-0.13	0.25	0.48	0.68	0.73
2y	-0.18	0.17	0.46	0.68	0.74
5y	0.26	0.42	0.58	0.78	0.81
10y	0.54	0.70	0.72	0.82	0.81
20y	0.82	0.84	0.83	0.82	0.90
30y	0.65	0.64	0.64	0.65	0.71

Source: Nomura Research. Sharpe ratio is calculated over the sample period 10-Sep-2014 to 10-Sep-2015.

What is not obvious is that the largest share of this performance was between Sept-14 and Jan-15, with indices effectively moving sideways since year-end except for a modest upwards drift from mid-July as we see in Figure 12.

Fig. 12: USD vega has performed well, though mostly year-end 2014/early 2015

USD unhedged vega Indices.

Source: Nomura Research, Bloomberg.

As to the exact point to go long, we can see that performance can be relatively similar across the vega part of the surface.

Fig. 13: 6m total carry not attractive, but long tenor vega carry is relatively decent

5y25y, 5y30y, 7y25y, 7y30y all have high vol percentiles.

6m total carry / PV01

USD	1y	2y	5y	10y	15y	20y	25y	30y
1y	-10.68	-14.72	-17.80	-19.59	-19.04	-18.80	-18.61	-18.39
2y	-15.57	-13.68	-12.40	-12.59	-11.48	-10.80	-10.46	-10.09
5y	-5.68	-5.08	-6.06	-5.15	-4.33	-3.87	-3.71	-3.56
7y	-1.86	-2.80	-2.19	-1.80	-1.32	-1.12	-1.04	-0.95
10y	-0.80	0.11	0.24	0.29	0.54	0.68	0.54	0.35
15y	3.22	3.28	2.72	2.14	1.93	1.69	1.60	1.52
20y	2.75	2.59	3.01	2.79	2.37	1.95	1.84	1.76
25y	2.72	2.85	2.22	1.70	1.43	1.19	1.10	1.04
30y	3.11	3.28	2.60	2.09	1.73	1.51	1.38	1.34

2-year percentile

USD	1y	2y	5y	10y	15y	20y	25y	30y
1y	0%	8%	16%	13%	14%	18%	19%	17%
2y	18%	25%	37%	25%	45%	60%	65%	68%
5y	28%	39%	20%	30%	28%	34%	45%	45%
7y	37%	15%	22%	25%	37%	40%	45%	57%
10y	11%	17%	13%	14%	21%	30%	23%	17%
15y	9%	19%	6%	13%	12%	13%	14%	12%
20y	8%	4%	3%	6%	7%	9%	4%	2%
25y	34%	54%	55%	44%	47%	46%	48%	51%
30y	26%	66%	58%	54%	54%	54%	53%	59%

6m vol carry / PV01

USD	1y	2y	5y	10y	15y	20y	25y	30y
1y	-3.94	-3.10	-0.64	-0.35	0.15	0.71	0.87	1.02
2y	-5.57	-2.80	-0.70	-0.50	0.14	0.84	1.10	1.35
5y	1.08	1.09	0.41	1.02	1.35	1.68	1.76	1.83
7y	2.79	2.21	2.05	2.26	2.43	2.59	2.63	2.66
10y	2.89	2.89	2.67	2.61	2.68	2.75	2.59	2.43
15y	3.93	3.68	3.43	2.86	2.61	2.35	2.29	2.23
20y	2.56	2.41	2.86	2.66	2.28	1.89	1.83	1.79
25y	1.95	2.09	1.50	1.05	0.87	0.69	0.65	0.62
30y	2.01	2.21	1.56	1.05	0.86	0.69	0.67	0.62

2-year percentile

USD	1y	2y	5y	10y	15y	20y	25y	30y
1y	77%	58%	53%	71%	74%	79%	81%	83%
2y	67%	63%	57%	64%	75%	83%	91%	95%
5y	31%	33%	27%	76%	81%	86%	91%	92%
7y	42%	18%	27%	65%	74%	79%	88%	90%
10y	12%	28%	29%	43%	62%	70%	64%	57%
15y	38%	18%	17%	26%	35%	31%	23%	26%
20y	12%	0%	32%	53%	52%	35%	23%	13%
25y	88%	99%	97%	88%	90%	83%	92%	94%
30y	71%	92%	97%	89%	90%	87%	95%	95%

Source: Nomura Research. Data as of 10-Sep-2015.

In Figure 13, we can see vol carry is high, in the 90th percentile or higher in the 25y and 30y tails, and we focus on 7y10y as being in the 90th percentile, with 2.66bp running vol carry over 6m. At the same time, the time-decay of the straddles makes them less attractive to hold outright, and balanced as straddles vs strangles (i.e., buy $100mn 7y30y ATM straddles and sell $100mn 7y30y ATM+100bp payers, and sell $100mn 7y30y ATM-100bp receivers) would have better time decay properties.

Conclusions: vega positive

In spite of many warnings about a deluge of new callable issuance and calls of existing issue, our analysis suggests there is little reason for alarm. In fact, new issues appear to continue at the usual pace, far slower than the heady days of last year. While we would monitor the calls, we believe most of those that have been made either ignored the FVA costs of the firms (benefitting the trading desks but to the detriment of their own treasury operations), and/or did so because of the hope for upfront P&L from new issue in spite of any funding loss. Irrespective, the

- rehedging in a modest rally should be **vega supportive**; or
- rehedging of the recent suboptimal calls should have **little impact on vega**.

We consequently remain very **constructive on USD rates vega**.

Appendix A-1

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