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What's left ahead of QE? Sell Bund volatility

An analysis of the "Japanisation" of the EUR rates volatility surface

- ECJ's Advocate General's opinion on OMT gives a green light to sovereign QE; we expect the ECB to announce €500bn of sovereign QE on 22nd January
- We believe QE is bearish for EUR rates volatility
- The "Japanisation" of the EUR yield curve has taken place and we see room for further convergence between the EUR and the JPY swap curve, especially if the ECB extends the overall size of QE
- However, the "Japanisation" of the EUR volatility surface has been slower with implied volatility trading close to the highs of the past 6M, and anecdotally expensive vs. current level of yields, once compared with 5Y EUR vol and 10Y JPY vol when the respective yields were around current levels
- Overall, we are bearish gamma in the intermediate sector of the Euro curve and stay short Bund gamma
- We target 3Mx10Y swaption implieds around 2.5bp/day and Bund vol around 3bp/day by mid-year (vs current levels of 3.5bp/day and 3.9bp/day, respectively)
- We recommend selling Bund gamma which offer the highest positive gamma carry on the curve and is likely to benefit from rangebound intermediate yields

European Rates Strategy
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What's left ahead of QE? Sell Bund volatility

The opinion of the European Court of Justice's Advocate General on the OMT gave a green light on the implementation of sovereign QE;[1] we discuss the recent dynamic of the Euro swap curve and the implications on the rates volatility market.

Euro swap yields have declined significantly with a bull-flattening of the yield curve over the last few months. This move has been driven by expectations of: *a)* protracted easy monetary policy from the ECB on the back of forward guidance; *b)* ECB expanding balance sheet via a sovereign QE program; *c)* lower oil prices putting downward pressure on inflation reinforcing the ultra-easy monetary policy outlook.

This dynamic has taken the EUR swap curve close to the levels and shape of the JPY swap curve. A snapshot of the current swap curves in EUR and JPY vs. their levels of a year ago shows that current EUR swap yields are uniformly lower than the levels of the JPY swap curve a year ago and the two swap curves now look remarkably similar with the exception of the intermediate sector of the curve (10Y), which is trading about 25-30bp higher than in JPY (**Exhibit 1**). The 2s/10s EUR swap curve has flattened in excess of 100bp over the past year whereas the 10s/30s curve is broadly unchanged. On the JPY curve, on the other hand, 2s/10s and the 10s/30s flattened around 20bp over the past year, on the back of aggressive QQE.

The "Japanisation" of the EUR yield curve which we originally highlighted as a risk has taken place; however, we expect further convergence between the two curves, especially if further monetary easing takes place. An increase of sovereign QE beyond our baseline scenario of €500bn is likely to put downward pressure on intermediate yields, likely driven by lower oil prices and by an even more negative net supply of German government bonds. With that still not being our baseline scenario, **we stay neutral on duration, but we recommend holding 2s/10s/30s bull belly richeners on the EUR swap curve** as the 50:50 fly trades about 20bp cheap compared to the equivalent JPY swap fly (**Exhibit 2**).

What are the implications of QE on the volatility surface, and is QE fully priced in Euro rates volatility market? The

[1] See *Implications of the ECJ ruling for QE - first reaction*; G. Fuzesi 14 Jan 2015.

Exhibit 1: With the exception of the belly of the curve (the 10Y sector), European swap yields are within touching distance of their Japanese counterparts

EUR and JPY swap yield curve; 13 Jan 2015 and 1Y ago; %

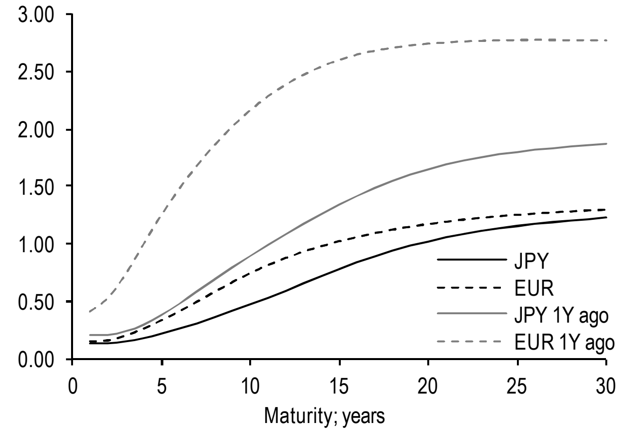


Exhibit 2: While the "Japanisation" of the European yield curve has been occurring, there is further room to go especially if further monetary easing takes place

2s/10s/30s 50:50 swap fly; past 10Y

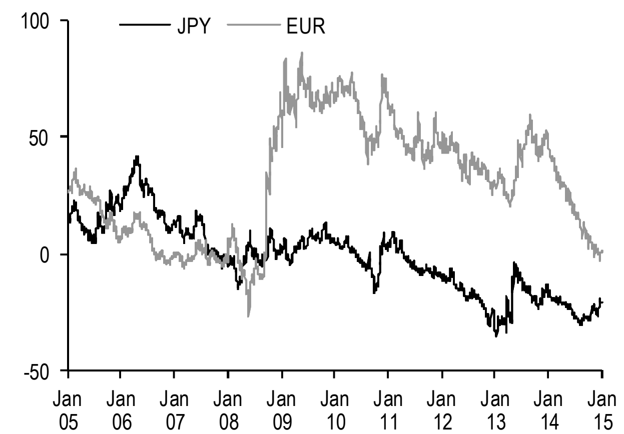
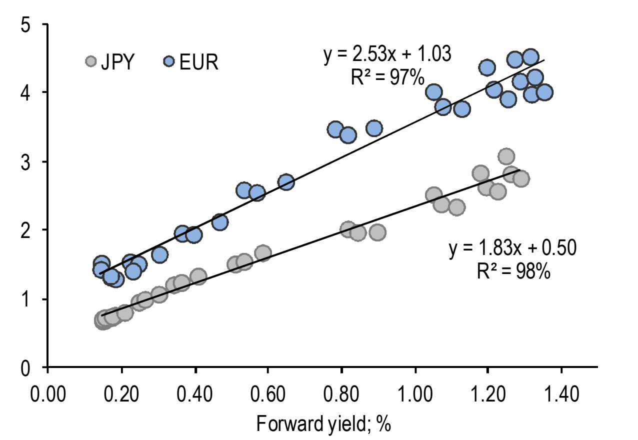


Exhibit 3: The European implied volatility surface, however, is significantly above the levels what a "full Japanisation" of the swap curve would imply

Cross sectional regression of JPY (grey dots) and EUR (blue dots) implied volatility versus corresponding forward yields; 13 Jan 2015; bp/day



This is a cross-sectional regression of implieds versus yields. We use 3M, 6M, and 1Y expiries on 1Y, 2Y, 3Y, 5Y, 7Y, 10Y, 15Y, 20Y, 25Y, and 30Y tails.

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EUR implied volatility surface has been more resilient and is significantly above the levels that an equivalent Japanese yield curve would imply (**Exhibit 3**). We discuss the implications of a potential ECB QE and the Japanisation of the Euro gamma surface.

From a macro point of view, we expect the ECB to initiate sovereign QE later this month with a size of €500bn to be purchased over one year, with details expected to be market friendly.[2] As we have discussed previously, **QE is generally bearish for volatility**[3] and **we continue to hold this view**. While keeping a neutral duration outlook we remain biased for further decline in volatility. We believe that QE is unlikely to drive a significant back up in rates over the short term, given still weak oil prices and negative net supply in Germany. Therefore, we believe that volatility is more likely to decline in a rally than increase in a sell off, on the back of a more pronounced log-normal shuffle. We anticipate only a muted back up in yields around the QE announcement and **we stay strategically short volatility in the intermediate sector**. Additionally, we believe that current levels of implieds are expensive even in an unchanged yield scenario, as they appear expensive relative to other sector of the yield curve (5Y EUR, for example) or the same sector in other currencies (10Y JPY) (see below for more discussion), when they were trading around current yield levels. Short term delivered volatility could be choppy around disappointment of the details of QE and Greek elections. However, we would see through these moves, **keeping also tactically short gamma on 10Y tails**.

Exhibit 4 shows the evolution of 3Mx10Y Japanese implied volatility versus 10Y JPY yields since January 2000. Yields have ranged between 0.40% to around 2.25% during this period while implieds have ranged between 1.3bp/day – 8bp/day (with a peak of around 8bp/day during the VAR shock episode in 2003). Interestingly, since the US subprime crisis, spikes in JPY implied volatility, in general, have been more muted (peak of around 4.5bp/day seen during the post Fed QE2 sell-off and taper tantrum) and have largely come from external shocks with implieds returning to their prior lows within a few months. **This decline in implied volatility has largely been driven by the persistent low level of yields which has pushed implieds lower on the back of "lognormal shuffle"**;

Exhibit 4: JPY implieds have broadly followed yields over the last few years highlighting the "log normal shuffle" effect
3Mx10Y JPY implied volatility (lhs) and 10Y JPY yield (rhs); past 15Y; bp/day %

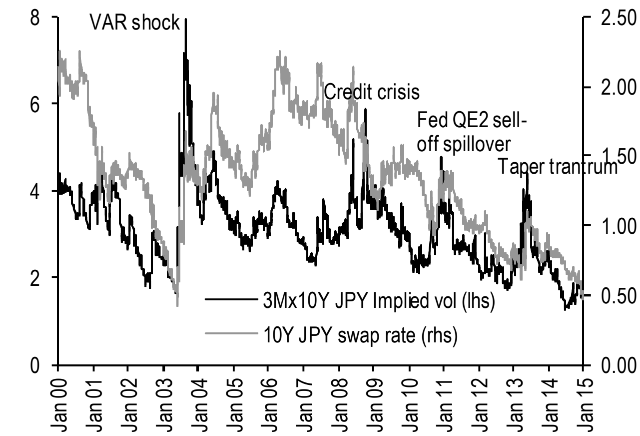
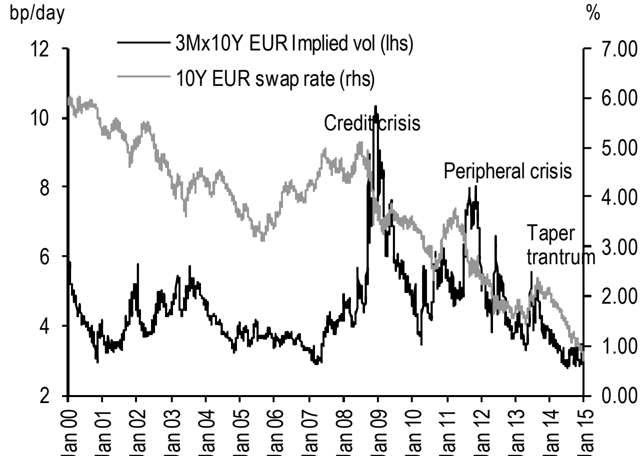


Exhibit 5: Similarly, EUR implieds have also demonstrated the "log normal shuffle" effect over the past few years
3Mx10Y JPY implied volatility (lhs) and 10Y JPY yield (rhs); past 15Y; bp/day %



implieds have broadly followed yields exhibiting strong local directionality. We see a similar relationship between implieds and yields in the Euro area as well again reflecting the impact of "lognormal shuffle" (**Exhibit 5**).

We believe that current levels of implied volatility are expensive, especially given current yield levels. To make this point, **we analyse the distribution of JPY implied volatility at various yield levels over the past 15Y**. Specifically, we split JPY yields into "buckets" and analyse the distribution of implied volatility for each bucket via various statistics (**Exhibit 6**). We also show the current levels of yields and implied volatility (3M expiry options) for JPY and EUR. Our analysis shows that EUR swaption implieds are much higher compared to historical averages

[2] ECB is expected to be pari passu with private sector and share credit risks within the Eurosystem for investment grade bonds; credit risks associated with sub-investment grade bonds is expected to be retained at the level of the national central banks.
3 See *ECB to launch QE: Implications for rates/FX trades and forecasts*, by Bassi et al., 11 December 2014.

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Exhibit 6: A "bucket analysis" of JPY implieds and yields shows that EUR implieds are significantly higher compared to yields as far as Japanisation of the curve scenario is concerned

Distribution of various JPY swaption implied volatility under various yield buckets. We also show current levels of yield and volatility for EUR and JPY; bp/day

	Yield buckets								
	(0.00,0.25)	(0.25,0.50)	(0.50,0.75)	(0.75,1.00)	(1.00,1.25)	(1.25,1.50)	(1.50,1.75)	(1.75,2.00)	>2.00
3Mx2Y									
Average	0.8	1.3	2.2	2.6	2.7	2.7	4.2		
Min	0.3	0.5	0.7	1.9	1.8	2.1	4.2		
25 %ile	0.6	0.8	1.4	2.3	2.1	2.1	4.2		
75 %ile	1.0	1.7	2.8	3.1	3.0	3.3	4.3		
Max	1.8	3.5	3.3	3.8	4.2	4.1	4.3		
SD	0.3	0.6	0.8	0.5	0.6	0.6	0.1		
3Mx5Y									
Average	0.8	1.3	2.1	3.0	3.5	3.4	3.8	4.0	
Min	0.6	0.7	1.2	1.6	2.3	2.4	2.5	3.1	
25 %ile	0.7	1.1	1.6	2.3	3.1	3.1	3.5	3.2	
75 %ile	1.0	1.4	2.5	3.4	3.6	3.7	4.2	4.3	
Max	1.2	3.0	4.7	6.4	7.0	5.6	5.3	5.6	
SD	0.2	0.4	0.6	0.9	0.7	0.5	0.5	0.8	
3Mx10Y									
Average		1.7	1.8	2.3	2.8	3.3	3.7	3.3	3.7
Min		1.5	1.3	1.3	1.8	1.8	2.3	2.3	2.6
25 %ile		1.6	1.5	2.1	2.4	2.8	3.1	2.8	3.4
75 %ile		1.8	2.0	2.5	3.0	3.7	3.8	3.7	4.0
Max		1.8	3.3	4.8	6.1	7.1	7.9	4.9	5.2
SD		0.1	0.4	0.5	0.6	0.8	0.9	0.6	0.5

Current levels

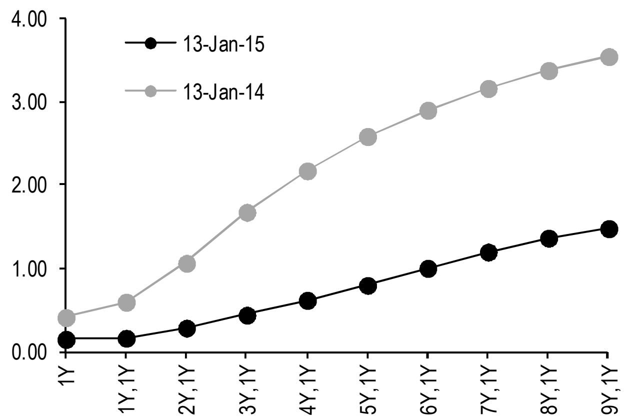
	2Y		5Y		10Y	
	JPY	EUR	JPY	EUR	JPY	EUR
Yield	0.15	0.16	0.23	0.34	0.49	0.75
Imp vol	0.7	1.3	1.0	2.0	1.5	3.5

of JPY swaption volatility surface, for a given range of underlying yield. In fact, given current and projected levels of EUR yields, EUR implieds are above the 75th percentile of the corresponding JPY implieds (2.5bp/day on 3Mx10Y). Acknowledging the fundamental differences between the EUR and the JPY yield curve, given the imminent policy response from the ECB, we believe the level of yields will be a drag on volatility, especially if rates are likely to stay rangebound in the intermediate sector during QE. Thus, if yields continue to hover around current levels and a Japanisation is fully entrenched, **we expect implieds to decline around 0.75-1bp/day from current levels, with 3Mx10Y reaching 2.5bp/day**, which is our mid-year target.

Evidence on the impact of Japanisation on the European surface can be also seen by analysing the evolution of midcurve volatility (volatility corresponding to the various 1Y forwards). In yield space, the forward curve has flattened uniformly across all tails over the past year (**Exhibit 7**). For instance, the 9Yx1Y swap forward has declined a whopping 200bp as the 10Y yield has 125bp. Midcurve volatility has moved in sync during this period, although the decline has not been monotonic in nature as

Exhibit 7: In yield space, the forward curve has flattened significantly and uniformly across all tails over the past year

Snapshot of various 1Y forward rates; current and 1Y ago levels; %



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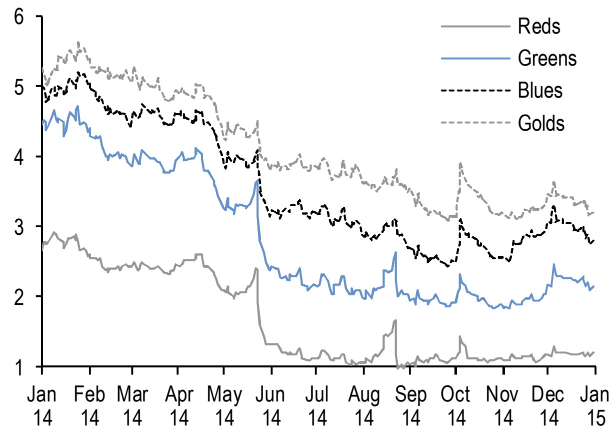
escalation of geopolitical risk during the summer, the mid-October "flash-crash", and more recently uncertainty around Greek parliamentary elections and the details of ECB sovereign QE put upward pressure to volatility locally (**Exhibit 8**). **We believe that the "Japanisation" of the EUR yield curve will likely lead to a "Japanisation" of the volatility surface**, especially under our view that yields are expected to remain rangebound as the ECB implements QE. Also, with ECJ's ruling removing potential obstacles to QE announcement we believe current richness of volatility is overpricing the risks around Greek parliamentary elections. Repeating the above "bucket analysis" for 3Mx10Y swaptions but using the greens/golds swap curve as the filter (as opposed to 10Y yields), we find that for current level of EUR greens/golds forward curve (33bp), average 3Mx10Y JPY swaption implied is around 2.6bp/day and the 75th percentile is at 3bp/day; 3Mx10Y implieds are at 3.5bp/day (**Exhibit 9**). This average level of 2.6bp/day is in line with out our mid-year target of 2.5bp/day for 3Mx10Y EUR swaption.

In terms of trade, **we prefer expressing our short gamma view via selling Bund straddles**. Bund implieds are currently around 3.9bp/day with Bund yields around 45bp. In a simple linear comparison between swap yields and swaption vol from the analysis above, a 45bp yield would be consistent with volatility around 1.8-2.0bp/day in the 10Y sector. Taking into account the typical negative directionality of swap spreads to yield levels (up to -25%), that should be consistent with Bund volatility at 2.5bp/day. Overall, **we expect a similar decline in Bund vol** (0.75-1bp/day) **and we target 3bp/day by mid year**.

Exhibit 8: Midcurve volatility has also declined along with yields further demonstrating the Japanisation of the volatility surface
3Mx(1Yx1Y), 3Mx(2Yx1Y), 3Mx(3Yx1Y), and 3Mx(4Yx1Y) midcurve implied volatility; past 1Y; bp/day



The current implieds in 10Y sector (Bund and swaption vol) appear expensive versus the volatility in the 5Y sector when 5Y yields were around current levels of 10Y. **Exhibit 10** shows the regression of Bobl implied volatility versus 5Y German benchmark yields. The highlighted area shows that implied volatility was around 3 – 3.5bp/day when 5Y yields were in the 40 – 60bp range. Thus, from a historical perspective and a single-currency comparison, Bund implieds appear relatively expensive.

Finally, **shorts in Bund gamma offer the highest positive gamma carry across the entire volatility surface** (**Exhibit 11**). Mar15 Bund implieds are around 3.9bp/day whereas Bund futures have delivered around 2.7bp/day over a 3M

Exhibit 9: Repeating the above "bucket analysis" for 3Mx10Y swaptions but using the greens/golds swap curve as the filter, we find that for current level of EUR greens/golds forward curve (33bp), average 3Mx10Y JPY swaption implied is around 2.6bp/day
Distribution of various JPY swaption implied volatility under various greens/golds curve buckets. We also show current levels of greens/golds curve and 3Mx10Y implied volatility for EUR and JPY; bp/day

	Greens/golds swap curve buckets							
	(< 0.20)	(0.20,0.40)	(0.40,0.60)	(0.60,0.80)	(0.80,1.00)	(1.00,1.20)	(1.20,1.40)	(> 1.40)
Average	2.1	2.6	3.1	3.5	3.8	4.2	4.3	0.0
Min	1.5	1.3	1.8	1.9	3.0	3.4	4.2	0.0
25 %ile	1.6	2.1	2.7	3.0	3.4	4.0	4.3	0.0
75 %ile	2.2	3.0	3.4	3.8	4.0	4.2	4.4	0.0
Max	5.1	5.6	7.9	7.9	6.3	4.9	4.4	0.0
SD	0.7	0.7	0.7	0.9	0.5	0.3	0.1	0.0

Current levels

	2Y		5Y		10Y	
	JPY	EUR	JPY	EUR	JPY	EUR
Curve	0.04	0.14	0.04	0.14	0.19	0.33
Imp vol	0.7	1.3	1.0	2.0	1.5	3.5

look-back period – a positive gamma carry of 1.2bp/day. Although the decline in delivered around year end could be due to the typical lack of activity around the holiday period, we believe the "vol carry" remains attractive given our rates and ECB policy outlook.

Overall, we believe that although EUR rates market has broadly priced in an ECB QE, the volatility surface in the intermediate sector does not fully price it. In other words, the volatility market appears to be overpricing the risks around Greek parliamentary elections and **we keep our recommendation of being short Mar15 Bund gamma**.

Exhibit 10: Current level of Bund implieds appear expensive versus Bobl implieds when Bobl yields were current level of Bund yields

Front Bobl implieds regressed against 5Y German b/m yield; dot shows current front Bund implieds and 10Y German b/m yield; past 1Y; bp/day

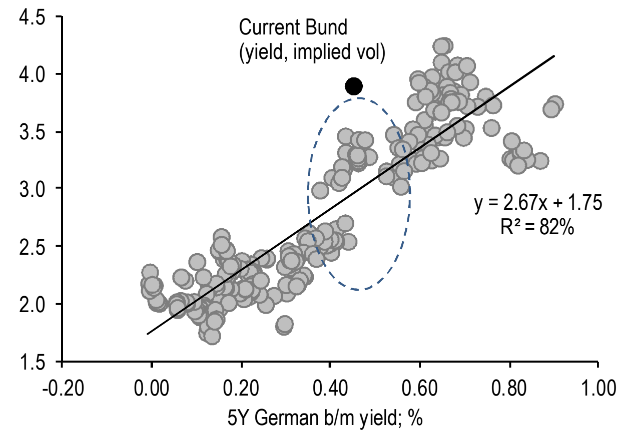
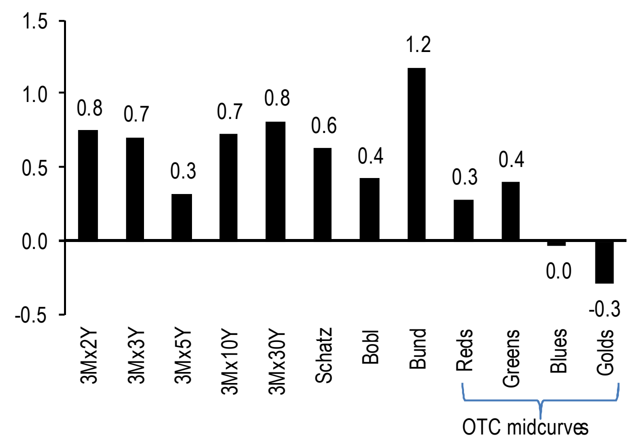


Exhibit 11: Selling Bund gamma offers attractive gamma carry – one of the highest along the curve

Implied volatility (front futures and 3M expiry swaptions) – 3M delivered volatility of the underlying swap rates/futures; bp/day



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