

## Global Rates Viewpoint

## Rates vol heading into 2021

**US vol - The only ways is... up?**

As the dust settles on the elections it seems likely that the next administration will be faced with Congressional gridlock. While this decreases expectations for fiscal stimulus and makes the rates view more contingent on vaccine scenarios, we maintain our bias for slightly higher yields (1.25-1.5% by end-2021) and steeper curves medium term.

In volatility space, the Fed is likely to continue to collapse volatility on the left side of the grid. On the right side of the grid, we expect some directionality between vol and rates medium term. FAIT, an asymmetry of outcomes in the rates tilted to the upside, and a change in the utility of rates as portfolios hedges all support volatility and payer over receiver skews for short and intermediate expiries on the right side of the grid.

While the baseline scenario supports right side volatility, the levels we are projecting here (1y10y vol centered at 70bp) are in the context of the volatility range for the last couple of years. We see medium-term rate volatility less as an asset class to be traded in itself and more as tool to express macro views on the direction of rates and curve.

A context of higher rates and steeper curves that may provide some support for delivered volatility, and implied volatility levels that likely to stay relatively contained, suggest a more tactical environment for short gamma in 2021.

The outlook for vega is likely more balanced and we see the current levels as relatively attractive to scale into long vega exposure with positive carry around the 5y30y tenor.

**EUR vol – support for gamma on short and long tails**

After surging in March, implied vols have normalized back to pre Covid levels on almost all points of the surface, bar the top left and 30y tails. We see several factors that should continue to support gamma on short tails (notably changes to TLTRO details and the ECB's framework review) and on long tails (with uncertainty around the timeline of structural changes due to the Dutch pension reform and insurers' Solvency II review). Vol on 5-10y tails could however stay depressed, as we settle in a tight trading range.

**Trade recommendations**

We favor expressing our view for higher yields and steeper curves medium-term through conditional bear steepeners or cap spreads in the 5s30s sector, with expiries around 1y. Because we expect the US rates momentum to be back-loaded in 2021, we favor calendar spreads in payers, selling the shorter expiry to finance longer expiries. Cross market, the recent convergence between the US and European vol grids and the higher yields expected in Treasuries vs Bunds supports payers in US vs Europe.

**Message from the skews**

As we update our [analysis from 2018](#), we still find that historically large 3M changes in skews are useful indicators of the potential for an outperformance / underperformance relative to the forwards in the following month. We could interpret this as showing that payer and receiver skew changes, in some sense, offer a good indication of positioning. In the long run, duration follow vol traders in the US and do the opposite in Europe.

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For a list of open recommendations and corresponding risks please see [here](#) and [here](#)

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# US rates vol: The only way is.... Up?

US rates volatility made historical lows in 2020, in a process of Europeanization of the volatility grid which we anticipated to some extent in [Rates volatility and the zero lower bound](#). To understand the volatility outlook medium term we should start by defining the broad view for the rates and curve.

As the dust settles on the elections it seems somewhat likely that whatever the outcome of the presidential race the next administration will be faced with Congressional gridlock, which decreases size expectations for US fiscal stimulus. We reflect these developments in our views for US rates and curve, and expand on the implications for rates volatility outlook medium term.

## Duration and curve view

A dovish Fed and enhanced forward guidance will keep the front end and belly pinned near zero. The back end of the rates curve will now likely be driven more by expectations for vaccine progress rather than large fiscal support. A change in the Fed response function toward FAIT continues to support a repricing of neutral rate expectations in 2021, 10yT in the 1.25-.5% range and a corresponding steepening of the curve.

From a fundamental perspective the move is likely to be back-loaded in 2021 (Table 1). Although faster than expected progress on vaccine distribution may risk front-loading some of this move, it is easy to argue also that case counts going into the winter may support persistent uncertainty around the outlook. This suggests expressing our duration and curve views at a longer horizon in 2021, to avoid near-term uncertainty.

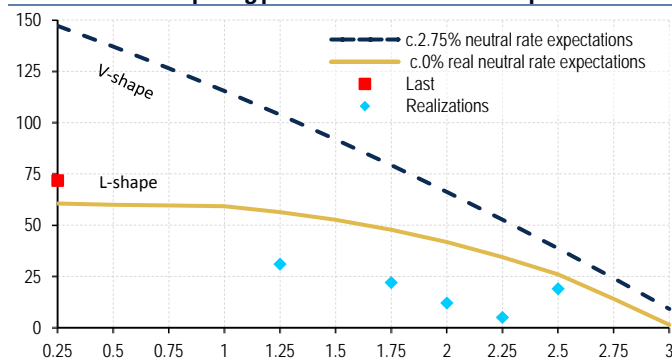
Moreover, we continue to think that a move beyond 1.5% and towards the 1.75-2% levels that are consistent with V-shape scenarios (see Chart 1) requires solid backing from fundamentals. We see a few arguments that suggest some consolidation on the 2s10s curve around 100-125bp, including the recovery of the hedging role for USTs and the potential for negative feedback loops between bond yields and risky assets around this range (see [here](#)).

**Table 1: Government bond yield forecasts**

	Q4 20	Q1 21	Q2 21	Q3 21
3mL	0.25%	0.20%	0.20%	0.20%
2yT	0.15%	0.20%	0.25%	0.25%
5yT	0.35%	0.40%	0.40%	0.45%
10yT	0.90%	1.00%	1.15%	1.35%
30yT	1.65%	1.75%	2.00%	2.25%
2s10s	75bp	80bp	90bp	110bp
5s30s	130bp	135bp	160bp	180bp

Source: BofA Global Research

**Chart 1: 2s10s steepening potential under L- and V-shape recoveries**



Source: BofA Global Research

## Implications for volatility.... left side vs. right side

We think the Fed is likely to continue to collapse volatility on the left side of the grid, particularly in scenarios of economic rebound in 2021, which constitute our baseline. The rationale for flows on the left side under these scenarios is likely to be concentrated on positioning (or hedging) for a sooner-than-expected hawkish repricing of Fed expectations through payer structures in tenors around 2y2y or 2y3y or forward vol.

On the right side of the grid, we expect some directionality between volatility and rates medium term. Indeed, we have argued recently that FAIT, an asymmetry of outcomes in rates space tilted to the upside given the impact of the zero lower bound (ZLB), and a change in the utility of rates as portfolios hedge all support volatility and payer over receiver skews for short and intermediate expiries on the right side of the grid.



To gauge the potential move in normal vol we focus on the 1y10y point and note how implied vols have changed meaningfully as a percentage of the forwards (Chart 2), from c.20% in early 2019, to c.45% as the trade war news flow impacted the rates market in mid/late-2019, and to c.100% between February and August 2020 at the peak of the coronavirus market turmoil. Since then the ratio has decayed toward c.60% and it is likely that in our baseline scenario this ratio continues to decrease to around the 45-55% range (the top half of the 2019 range).

**Chart 2: 1y10y implied volatility ratio to 1y10y forward**



Source BofA Global Research

**Chart 3: 1y10y normal volatility range expected 2021**



Source: BofA Global Research

Our scenario for 1.25-1.5% for 10yT by mid/late-2021 implies a similar range in swaps (at constant spreads) and with the 45-55% range in lognormal vols implies 1y10y normal vol around 70bp (around the top end of the recent range – see Chart 3), roughly in the c.55-80bp range.

While we do expect the baseline scenario to support higher volatility, the levels we are projecting here for 1y10y, centered at 70bp, are at or just marginally higher than the top end of the volatility range for the last couple of years. What this means in our view is that rate volatility medium term, and particularly intermediate expiries on the right side of the grid, are less of an asset class to be traded in itself and more a tool to express macro views on the direction of rates and curve.

### More challenging environment for short gamma

The dynamic of gamma in 2020 can be separated in two periods: (1) the COVID repricing phase, where short gamma performed very poorly (see Chart 4) as delivered outperformed; and (2) the period after the repricing where the short gamma bias performed rather well as rates were floored by the Fed's ZLB (which meant that it was difficult for nominal rates to deliver) and a significant uncertainty around the outlook from COVID and elections supported a relatively wide spread of implied to delivered (which is what short gamma strategies are expected to harvest).

**Chart 4: 1m10y implied vol vs. forward looking delivered**



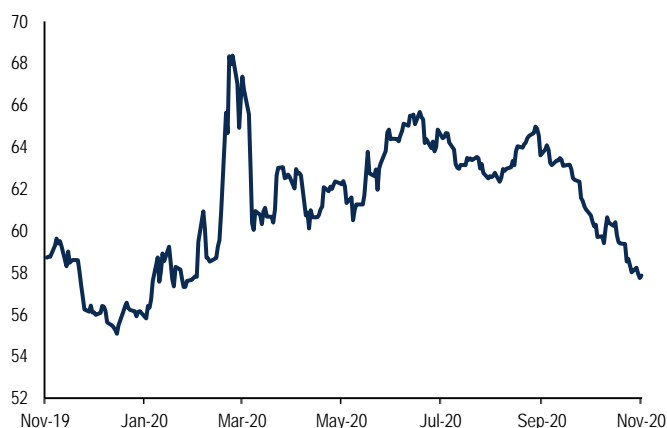
Source: BofA Global Research

Going forward we expect a more challenging environment for short gamma as: (1) the context of higher rates and steeper curves described above is likely to provide some support for delivered volatility; and (2) implied volatility is likely to stay relatively contained (with expectations for 1y10y centered at c.70bp). Indeed, there no calendar risk overhang like the elections to support wider spreads of implied to delivered, and COVID premium is likely to dissipate as clarity on the vaccine timeline increases. All this suggests a more tactical environment for short gamma in 2021.

## Vega

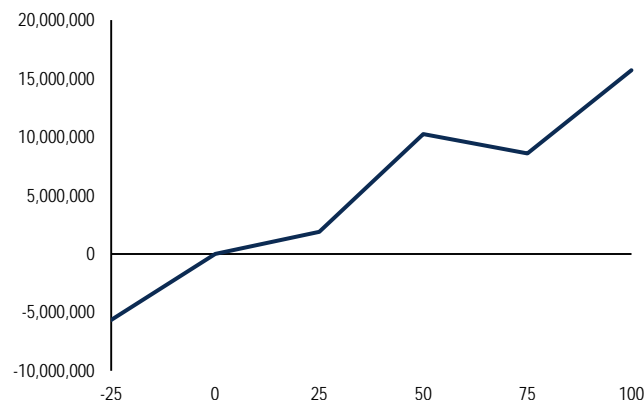
Similarly to the gamma sector, the dynamic of the LRC of the grid in 2020 also had two distinct periods. The rally in the first part implied meaningful buying needs in vega space from Bermudan books as they rebalanced their exposure, and that along with demand for forward vol positions was more than enough to offset the vega supply from replacement issues and Formosa issues got called in the lower rate environment. In the latter part of the year, however, with rates squarely in a range and continuing supply of vega from replacement issues pushed vega to the recent lows (see Chart 5).

**Chart 5: 5y30 vol dynamic in 2020**



Source: BofA Global Research; Bloomberg

**Chart 6: Bermudan vega exposure (LRC of the grid only) under different rate scenarios (parallel shifts on the curve between -25bp and +100bp)**



Source: BofA Global Research

The outlook for vega in 2021 is likely more balanced:

1. The macro backdrop and our view for rates and curve medium term are supportive for right side volatility, particularly for intermediate expiries but that may extend out to intermediate vega;
2. Rollup on the grid for long intermediate vega positions is likely to persist;
3. Some offsetting of vega exposure between older vintages and new issuance (see [LRC and Bermudan exposure in a selloff](#) and Chart 6 where we update the exposure estimates by increasing the granularity on the grid and carve out corporate issuers);
4. Formosa issuance is likely to be more subdued as we estimate roughly \$15bn worth of issuance to be called in 2021, versus almost \$40bn in 2020. There is some uncertainty on the latter estimate, including: the pace of growth of Taiwanese life insurance industry asset base, diversification into other products and currency exposure, view for the dollar.

However, as we argued recently, broadly we see the current levels as relatively attractive to scale into long vega exposure with positive carry around the 5y30y tenor.



# EUR vol: support in short and long tails

## Like in USD, 2020 was a roller-coaster year for EUR rates vol

As in other markets, EUR implied vols surged in March as the Covid crisis hit, the impact was most significant in long tails as the 10s30s curve recorded a substantial flattening, to the point of inversion. Table 2 shows the changes from pre-covid (Jan 21<sup>st</sup>) to peak vol levels on Mar 23<sup>rd</sup>.

What is most striking is the extent to which vol levels have normalized since. Table 3 highlights that we are back to pre-covid levels across expiries in the 5-10y tails. It is only in the top left and in the 30y tail that volatility remains somewhat higher. In the top left, this is consistent with our call from April, where we argued that the many changes the ECB was going to make to its instruments should be supportive of higher delivered volatility in the front-end (see [Long top left EUR vol vs top right US vol](#)).

**Table 2: Covid induced surge in imp vol –21-Jan to 23-Mar (bp/annum) ...**

expiry/tail	1Y	2Y	5Y	7Y	10Y	30Y
3M	25.2	23.8	27.4	35.3	45.1	86.5
6M	20.0	18.7	20.9	27.5	35.6	66.2
1Y	16.2	15.7	17.6	22.3	28.9	48.2
2Y	10.4	10.1	15.8	19.8	25.0	35.2
3Y	10.1	10.5	14.2	17.0	21.0	27.6
5Y	9.8	9.8	11.4	12.9	14.9	18.3
10Y	5.7	5.8	7.1	7.4	7.8	7.6

Source: BofA Global Research

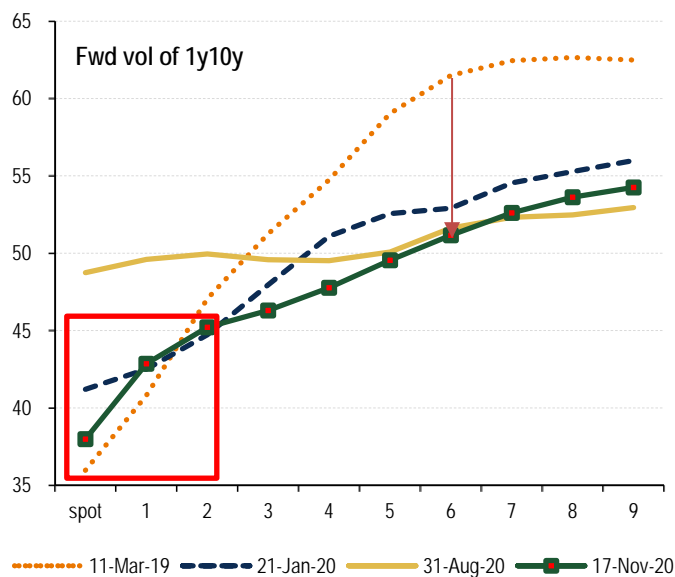
**Table 3: ... has more than reversed. Most vols now sub Jan 21<sup>st</sup> levels**

expiry/tail	1Y	2Y	5Y	7Y	10Y	30Y
3M	2.5	0.6	-5.9	-5.5	-5.0	1.8
6M	2.8	1.0	-5.3	-5.0	-4.5	1.3
1Y	2.5	0.3	-4.4	-3.4	-3.2	1.1
2Y	-0.9	-2.1	-3.6	-2.9	-1.6	0.9
3Y	-3.3	-3.3	-3.5	-2.3	-0.9	0.7
5Y	-3.8	-3.0	-3.4	-2.6	-1.1	0.1
10Y	-1.2	-1.1	-0.9	-0.8	-0.6	-0.4

Source: BofA Global Research

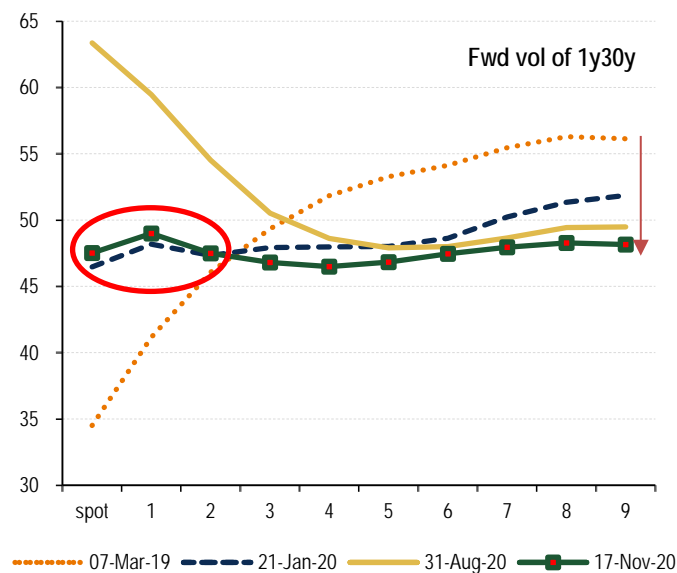
The below charts of the term structures of 1y10y and 1y30y implied volatility present another great summary of what happened since March, and where we are now. They also highlight the importance of EUR callable flows this year, which drove a larger correction in long dated forward vol (with the 4y+ forwards sitting below January levels).

**Chart 7: Term structure of 1y10y EUR implied vol, at diff point in time**



Source: BofA Global Research

**Chart 8: Term structure of 1y30y EUR implied vol, at diff point in time**



Source: BofA Global Research

## Still distinguish 5-10y tails from shorter and longer tails

### Top left to remain supported by ECB communication & actions

There are several reasons why we would not position for a normalization in the top left, as happened with 5-10y tails:

- We expect changes to TLTRO III terms that would have the potential to drive lower Euribor forwards up to Jun 2022, and support volatility in the top-left. Our [economists](#) forecast at least a lengthening of the period over which banks benefit from the lowest possible TLTRO borrowing rate of Depo-50bp, beyond Jun21 and possibly up to Jun22. There could also be an improvement in that rate, for e.g. if some governments do not fully extend their bank loan guarantee schemes.
- Our economists project that the ECB will raise the tiering multiplier in December from 6x to 8-9x. While such an increase should be modest enough not to move front-end fixings, a larger increase in December or later could put upward pressure on rates (see note [on ECB policy choices & the front-end](#)).
- There is still the tail risk of a deterioration in the health of European banks' balance sheets, which would push longer-dated Euribor rates higher.
- Last but not least, as we had argued at the end of last year, the ECB's framework review, which has been pushed from 2020 to mid-2021, can create a lot of noise around the outlook for the front-end. Communication ahead of the conclusion of the review could be confusing and generate volatility. Indeed, the ECB will have to balance the need to remain dovish and convince markets it can achieve its (new) inflation target with the need to review the tools (notably negative rates) and their sustainability in light of the pressure they put on the banking system.

### More upside for gamma in the 30y tail given Pension & Insurance reforms

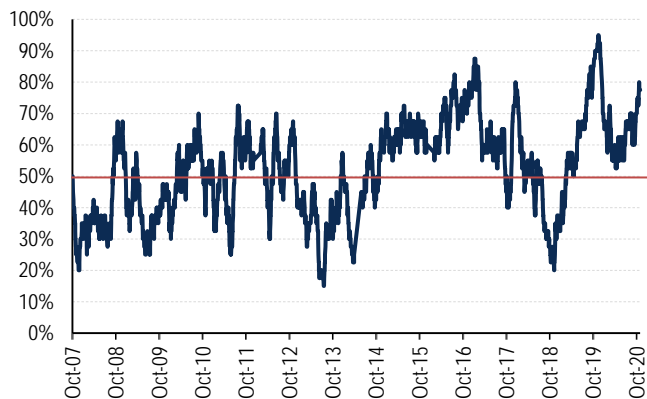
Between now and mid-2021, some factors could drive further bull flattening of the curve, notably that some Dutch pension funds, that have not done so already, will have to adjust to the change in the discount curve on Jan 1<sup>st</sup> – for them this will result in the need to receive rates beyond the 20y point. Also, on the insurers' side, we are still waiting for EIOPA's recommendations on the Solvency II review (now due in December 2020). These may also include a change in the Solvency discount curve that would result in some demand from insurers to receive long-end rates (see [here](#)).

We recognize that two points should limit the scope for large bull flattening moves from mid-2021 onwards:

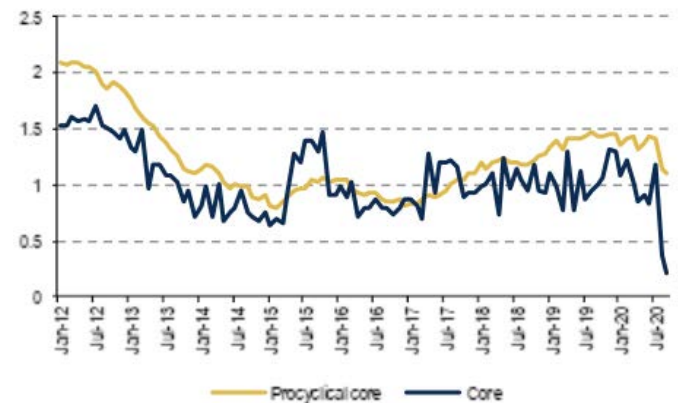
- (1) When the ECB concludes its framework review, we expect it will be clear that it will not want to rely on additional rate cuts. This limits the probability of a repeat of the sharp August 2019 bull flattening, when the market had to reassess the level of the low bound, triggering large bank ALM receiving needs in the long-end, followed by receiving from Pension and Insurers.
- (2) The Dutch Pension Reform, which is due to be voted in parliament mid 2021 should make Dutch pension funds less keen on receiving (ultra) long-end rates in a rally. If anything, it could make funds start to think about unwinding some of their long-end receive positions, depending on the regulatory framework that will be put in place during the transition period to the new Defined Contribution system. The draft regulation for the new system as well as the transition framework could inform us on the potential for this dynamic to unfold from next year. It is due to be presented for consultation anytime now (see [here](#)).

With such uncertainty around regulatory reforms for pensions and insurers, and taking into account that, so far, the curve continues to be driven by the long-end (Chart 9), our bias is to be long gamma on the 30y tail, even if it hasn't corrected as much as gamma on intermediate tails.



**Chart 9: Percentage of daily 10s30s moves that are long-end driven\***

Source: BofA Global Research. (\*) Based on daily changes on a 2-month rolling window.

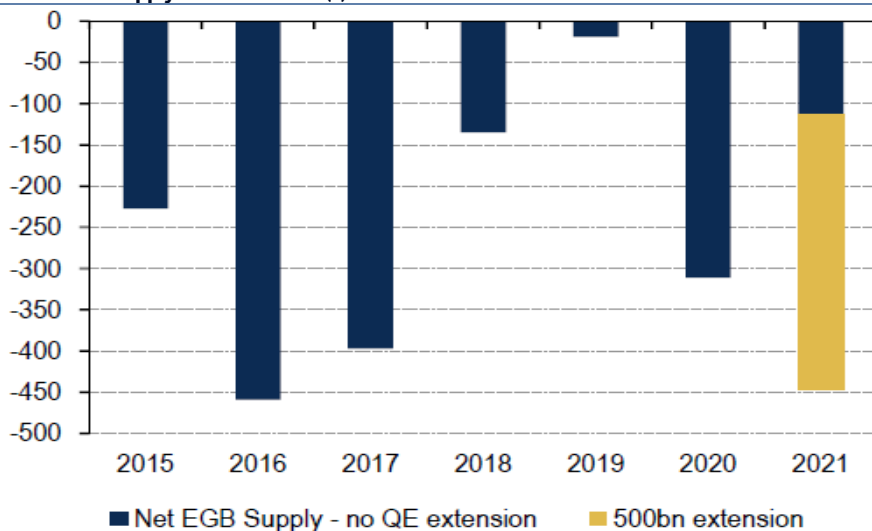
**Chart 10: Procyclical core inflation back to 2017 levels**

Source: BofA Global Research

### Neutral to bearish gamma on 10y tail

If we were to pick a tail where to be short vol, it would be the 10y, as we believe the extent of any selloff there is likely to be limited by ECB action. The richening of the receiver skew in 3m10y does suggest potential for a selloff in the very near term (see Appendix 1 below), but thinking about the months to come in general, we believe that many macro factors point to a tight trading range in the belly of the EUR curve, and an outperformance vs US rates, in particular:

- The outlook for inflation is likely to be very weak, and necessitate a dovish central bank, even under the scenario where European growth rebounds by more than expected next year. Indeed, Eurozone inflation expectations were already de-anchoring to the downside before the Covid crisis. And even if the crisis resolves itself with an earlier than expected vaccine deployment, the ECB will have to account for the fact that the shock has wiped out two and a half years of progress on the inflation front in the space of six months (see [here](#) and Chart 10 for our economists' preferred measure of inflation).
- Net supply will remain negative in Euro government bond space, even if the ECB delivers only a limited increase in its Pandemic Emergency Purchase Programme – see Chart 11 below, and full analysis in [Euro debt in 2021: big deficits, bigger QE](#)

**Chart 11: EGB supply net of all flows (\*) on different PEPP scenarios**

Source: BofA Global Research, ECB, Bloomberg. Numbers in EUR billions. (\*) Net supply means gross EGB issuance (top 10 markets) minus buybacks, coupon repayments, redemptions and net QE flows.



## Trade recommendations

We continue to like expressing our view for higher US yields and steeper curves through:

- Buying US 1y30y payer spreads (atm+10bp/atm+50bp) financed by selling 1y5y atm+10bp payers. The trade is costless (indicative) and locks in a flat entry level on the curve relative to the forwards (roughly 75bp). The main risk on the position is a bear-flattening scenario for the 5s30s curve, with potentially unlimited downside.
- A 1y expiry US 5s30s cap spread atm/atm+45bp with an indicative price of 12.5bp and a breakeven on the trade at 87.5bp. The risk is limited to the upfront premium.

Imbedded in these trades is the view for likely consolidation in a selloff around the 1.25-1.5% range for 10yT and 2-2.25% range for 30yT (or 1.65-1.9% for 30y swaps at constant spreads). These trades also bridge the near-term uncertainty and more clarity around the view in 2H21. Indeed, as we noted above, the path towards higher yields and steeper curves may be somewhat turbulent near-term, which is expressed in our forecasts by a shallower path for rates in 1H21 vs. 2H21. Consistent with this view it also makes sense to:

- Buying 1y10y payer spreads atm+15bp/atm+50bp partially financed by selling 3m10y atm+15bp, with an indicative cost of 1.5bp of delta. The main risk on the position is a faster than expected selloff near-term which eventually fades medium term, with potentially unlimited downside.

Cross market, we have seen over the last year a convergence between the US and European vol grids (the Europeanization theme we mentioned earlier). The right side has been more resilient to this convergence, and we expect that resilience to persist in 2021, which together with higher yields expected in Treasuries vs Bunds (roughly 50bp selloff expected in 10yT into 4Q21 vs 10bp in Bunds) supports payers in US vs Europe:

- We recommend buying a \$100m 1y10y 1%/1.30% payer spread in USD, financed with the sale of €85m (beta and FX weighted) 1y10y -0.05% payer in EUR (see [here](#)). The risks to the trade are an ECB disappointment, or a scenario of a substantial selloff in both currencies with potentially unlimited downside.

Despite our bullish economic bias for 2021, we acknowledge that there are downside risks to the outlook, including the potential for vaccine scenarios to disappoint, and for political uncertainty and gridlock to continue to weigh on the outlook. To hedge these scenarios we favor buying 6m30y receiver ladders (atm-20bp/atm-45bp/atm-70bp) financed by selling 6m5y receivers atm-20bp. The trade is costless (indicative) and positions for a rally in 30y rates into the 75-100bp range on a risk-off. The main risk on the trade is a bull steepening scenario for the 5s30s curve, with potentially unlimited downside. Because the position is short the low strikes it is also exposed to rallies in 30y beyond these strikes, even in bull flattening scenarios.

Even in the context of downside risks to the outlook, the likelihood of negative rates scenarios remains remote. Yet, we continue to think it is worth hedging for this risk and favor buying receiver spreads on the left side of the grid financed by selling payers: 2y2y receiver spreads atm-10bp/atm-40bp financed by selling 2y2y payers atm+25 (80bp currently - Chart 12) which is costless indicative. Carry on the position is 3bp/y, and the main risk on the trade is a selloff in the frontend of the US curve, likely driven by a hawkish repricing of Fed expectations, with potentially unlimited downside (see [here](#)).



**Chart 12: Spread of the 2y swap vs IOER and the short payer leg on the NIRP trade**

Source: BofA Global Research

## Appendix (1) – Messages from the skews

While implied volatilities are declining back to historical lows in many tenors across EUR and USD rates, moves in receivers and payer skews are proving interesting, consistent with the fact that low implied vol levels make swaptions an attractive instrument for hedging or expressing duration views.

As we update our [analysis from 2018](#), we still find that historically large 3M changes in skews are useful indicators of the potential for an outperformance / underperformance relative to the forwards in the following month. We could interpret this as showing that payer and receiver skew changes, in some sense, offer a good indication of positioning.

### In the long run, follow vol traders in the US and do the opposite in Europe

Interestingly, and consistent with earlier results, we find that in general investors should position in line with vol traders in the US and do the opposite in Europe.

**A richening in payers tend to precede a duration sell-off in the US (relative to the forwards), while, in EUR rates, it's a richening in receivers that would indicate risks of a sell-off.** It is as though positioning in EUR swaptions was moving in synch with that in cash (i.e. options being used to express views), while US swaptions may be more used to hedge positions or can adjust more correctly to macro drivers.

Based on monthly data since 2014 (when QE started being priced in EUR, and inflation dynamics in the US changed), we find that the message from 3m changes in skews is clearest for receivers in EUR, and for both receivers and payers in long tails in the US. Using a longer history provides even clearer results across the board, but we limit ourselves to data since 2014 given rates and vol dynamics could be thought as different.

Table 4 and 2 present the frequency of times where it would have been beneficial to pay the 1m forward rate (i.e. where the spot rate ended up above the 1m forward rate in the month that followed each observation), depending on the percentile move in the skew (3m expiry). It notably shows that 10y US rates have underperformed the 1m forwards about 64% of the time after 3m10y payers richened (as measured by 3m change in the payer skew being in the >0.66 percentile), against just 49% of the time on average over all the whole period (see unconditioned column). On the other hand, it is a richening in 3m10y EUR receiver skews that had a tendency to be followed by an underperformance in rates (52% of happening versus 43% in unconditional case). Table 3 and 4 present the median returns on a receive 1m forward position, supporting this message.

**Table 4: % of times that EUR swap rates rise beyond the forwards in the month that follows the move in skew, classified by percentile skew move**

		Skew Percentiles		
	unconditioned	<0.33	0.33-0.66	>0.66
2y rec	38%	27%	39%	44%
5y rec	41%	36%	33%	52%
10y rec	43%	32%	46%	52%
30y rec	47%	52%	33%	56%
	unconditioned	<0.33	0.33-0.66	>0.66
2y pay	38%	40%	46%	28%
5y pay	41%	40%	42%	40%
10y pay	43%	44%	46%	40%
30y pay	47%	48%	46%	48%

Source: BofA Global Research. Using monthly data from Sep-14 to Oct-20. Skew: 25bp OTM-ATM vol. We color the boxes in green (red) when the percentage of sell-offs is more than 5ppt lower (higher) than in both the unconditioned and 33-66 percentile cases.

The boxes that are bordered correspond to where the skews currently sit, percentile wise, on Nov 16<sup>th</sup>

**Table 5: % of times that US swap rates rise beyond the forwards in the month that follows the move in skew, classified by percentile skew move**

		Skew Percentiles		
	unconditioned	<0.33	0.33-0.66	>0.66
2y rec	47%	48%	58%	36%
5y rec	51%	52%	54%	48%
10y rec	49%	64%	42%	40%
30y rec	50%	64%	38%	48%
	unconditioned	<0.33	0.33-0.66	>0.66
2y pay	47%	32%	63%	48%
5y pay	51%	52%	50%	52%
10y pay	49%	44%	38%	64%
30y pay	50%	44%	46%	60%

Source: BofA Global Research. Using monthly data from Sep-14 to Oct-20. Skew: 25bp OTM-ATM vol. We color the boxes in green (red) when the percentage of sell-offs is more than 5ppt lower (higher) than in both the unconditioned and 33-66 percentile cases.

The boxes that are bordered correspond to where the skews currently sit, percentile wise, on Nov 16<sup>th</sup>

The change in the utility of US rates as portfolios hedge, away from buying duration to hedge risk off, and towards buying payers to hedge the likely impact of higher rates on risky asset valuations, could reinforce the bearish rates signal of richer US payers.



**Table 6: EUR swaps: median one month basis point P&L on a receive position in the 1m forward rate, classified by percentile skew move**

	unconditioned	<33	33-66	>66
2y rec	1.4	2.1	1.0	0.8
5y rec	3.8	4.2	5.7	-0.5
10y rec	3.9	8.4	3.1	-0.4
30y rec	1.2	-1.2	6.0	-2.3

	unconditioned	<33	33-66	>66
2y pay	1.4	1.0	0.9	2.2
5y pay	3.8	4.7	4.5	3.1
10y pay	3.9	4.0	3.3	2.7
30y pay	1.2	1.0	1.1	2.2

Source: BofA Global Research. Using monthly data from Sep-14 to Oct-20. Skew: 25bp OTM-ATM vol. We color the boxes in green (red) when the percentage of sell-offs is more than 5ppt lower (higher) than in both the unconditioned and 33-66 percentile cases.

The boxes that are bordered correspond to where the skews currently sit, percentile wise, on Nov 16<sup>th</sup>

**Table 7: USD swaps: median one month basis point P&L on a receive position in the 1m forward rate, classified by percentile skew move**

	unconditioned	<33	33-66	>66
2y rec	0.5	1.9	-3.1	2.6
5y rec	-1.2	-1.0	-2.9	4.7
10y rec	0.3	-2.1	1.6	6.6
30y rec	0.6	-6.8	4.3	3.7

	unconditioned	<33	33-66	>66
2y pay	0.5	3.6	-4.2	0.1
5y pay	-1.2	-1.5	-1.3	-1.0
10y pay	0.3	2.8	7.3	-2.1
30y pay	0.6	5.7	2.9	-3.9

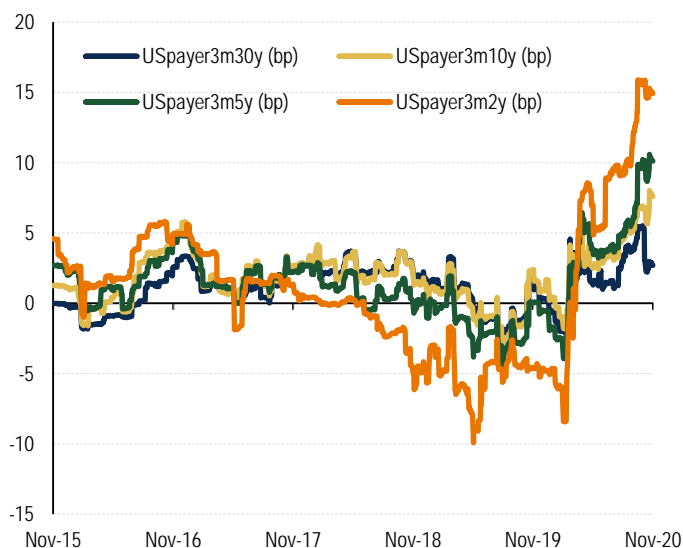
Source: BofA Global Research. Using monthly data from Sep-14 to Oct-20. Skew: 25bp OTM-ATM vol. We color the boxes in green (red) when the percentage of sell-offs is more than 5ppt lower (higher) than in both the unconditioned and 33-66 percentile cases.

The boxes that are bordered correspond to where the skews currently sit, percentile wise, on Nov 16<sup>th</sup>

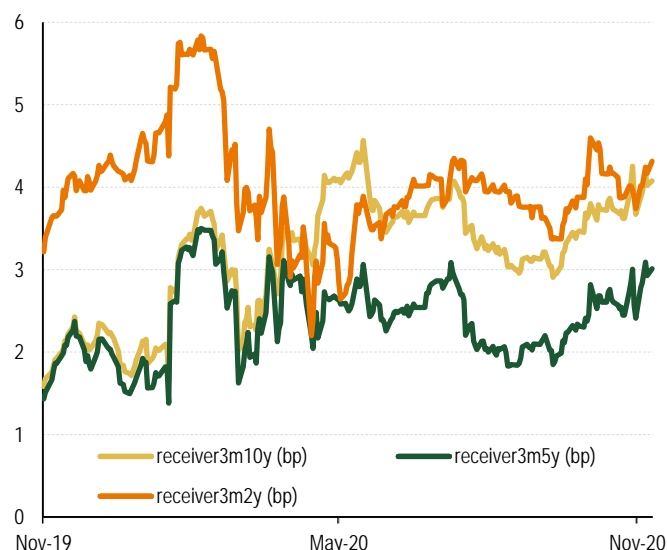
## Today's skew message: selloff in EUR 10s, US 10s & 30s

In the US, the last few months have seen a clear richening in payer skews (Chart 13) and cheapening in receiver skews, which currently puts the 3M changes in 3m receiver skews in the lowest third percentile across tails, and the 3M changes in 3m payers skews in the highest percentile for 2y, 5y and 10y tails (see bordered boxes in Table 5 and Table 7).

Here, the message from the analysis is clear: **we have potential for US 10y and 30y swap rates to underperform the forwards in the coming month.**

**Chart 13: Significant richening of US payer skews\***

Source: BofA Global Research. (\*) skew here = 25bp OTM implied vol – ATM implied vol (bp/annum).

**Chart 14: Some richening in EUR receiver skews\* since September**

Source: BofA Global Research. (\*) skew here = 25bp OTM implied vol – ATM implied vol (bp/annum).

In EUR, only the 3m30y payer skew has richened significantly in the past 3 months, but for that point of the surface, the implication on rate performance hasn't historically been clear. It's receivers that have been richening meaningfully in 2-10y tails (Chart 14).

The message from this analysis is also supporting an underperformance of EUR 10y swaps relative to the forwards in the coming month. However, unlike in the US case, it is only coming from the 3m10y receiver skew at this stage (not payers, nor other tails).

## Appendix (2) – US Grid dynamic

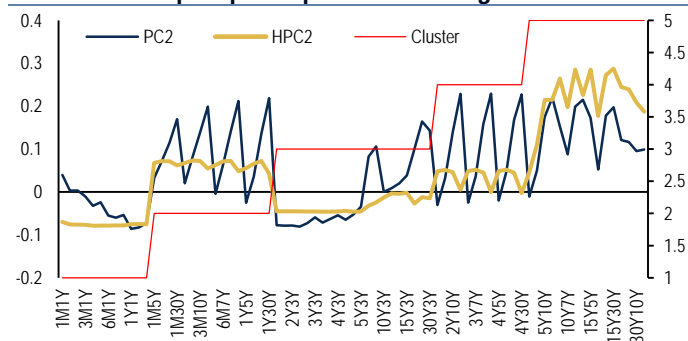
We isolate the main rotation modes of the volatility grid over the last year using both PCA and HPCA approaches (see [Understanding principal components](#)) and segregating the grid as in Table 8. The first PC is less relevant here as it is generally a parallel move on the grid, but Chart 15 shows that the second PC of the volatility grid (the most significant grid rotation over the last year) was a left vs. right side rotation. This makes sense in a context where the Fed anchored the left side of the grid with rates around the ZLB and forward guidance, and it is likely to continue to be the case in 2021 supporting the steepness of the grid across underlyings (see Chart 16)

**Table 8: Grid segregation**

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	1	1	1	2	2	2	2
3M	1	1	1	2	2	2	2
6M	1	1	1	2	2	2	2
1Y	1	1	1	2	2	2	2
2Y	3	3	3	4	4	4	4
3Y	3	3	3	4	4	4	4
4Y	3	3	3	4	4	4	4
5Y	3	3	3	5	5	5	5
10Y	3	3	3	5	5	5	5
15Y	3	3	3	5	5	5	5
30Y	3	3	3	5	5	5	5

Source: BofA Global Research

**Chart 15: Second principal components of the vol grid**



Source: BofA Global Research

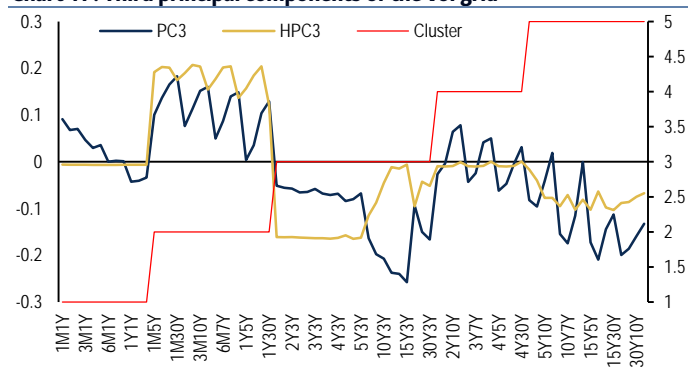
The second most important rotation mode for the grid (PC3 and HPC3) over the last year was a gamma vs. intermediate and long dated expiries as we illustrate in Chart 17. There rotations were quite striking in 2020, with deep inversions of the 1y10y vs. 1m10y vol spread in the March/April turmoil, and more recently as the election event risk feel in the 1m expiries. Our expectation is that this type of rotation will continue to be significant and intermediate expiries on the right side stay supported and gamma moves in line with event risk, however, we do not expect the type of inversions we have seen in 2021 which are generally associated with extreme market turmoil or significant calendar event risk (like a US presidential election).

**Chart 16: 1y10y vs 1y2y volatility spread**



Source: BofA Global Research, Bloomberg

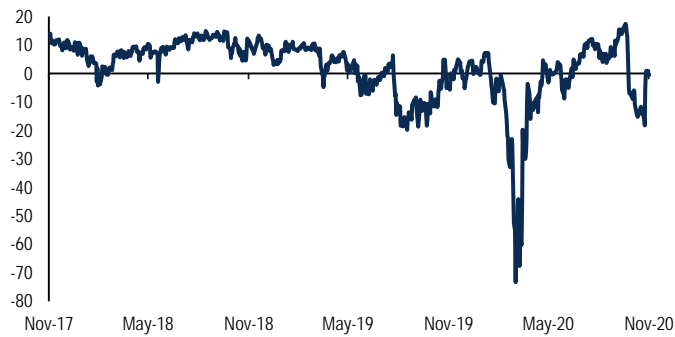
**Chart 17: Third principal components of the vol grid**



Source: BofA Global Research

Interestingly, and despite the intense Bermudan hedging and Formosa issuance activity in 2020, the thirteenth most significant rotation is between intermediates and longer dated expiries on the right side of the grid (see Table 9) as investors reflect expectations for the start of the tightening cycle (see above). Our view for higher yields and steeper curves in 2021, reflecting a scenario of economic rebound, are likely to continue to support activity in the LLC of the grid as investors reflect changing expectations for Fed liftoff.



**Chart 18: 1y10y vs. 1m10y volatility spread**

Source: BofA Global Research, Bloomberg

**Table 9: Loading for the 4<sup>th</sup> HPCA of the vol grid**

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3M	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6M	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1Y	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2Y	0.10	0.09	0.09	0.00	0.00	0.00	0.00
3Y	0.08	0.08	0.08	0.00	0.00	0.00	0.00
4Y	0.07	0.06	0.05	0.00	0.00	0.00	0.00
5Y	0.04	0.04	0.04	0.00	0.00	0.00	0.00
10Y	-0.24	-0.33	-0.27	0.00	0.00	0.00	0.00
15Y	-0.37	-0.38	-0.39	0.00	0.00	0.00	0.00
30Y	-0.19	-0.35	-0.33	0.00	0.00	0.00	0.00

Source: BofA Global Research

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