

US Rates Watch

Vol views – Vol and mixed signals

Vol is fair, in the context of persistent mixed signals...

In recent publications we have argued for 1y10y vol near-term fair value c.100-110bp, and the 135-140bp range for 1y1y vol. Current levels are in-line with these ranges, and we see vol as fair. There is scope for 1y1y vol to continue to move lower into relatively flat levels vs. the right side over the next couple of quarters, but that process is expected to be more gradual and contingent on the trajectory for inflation.

Significantly, volatility failed to respond in a meaningful way to the recent rate selloff, likely because this selloff has been less macro driven. Indeed, inflation fears, which have been the most significant macro driver for higher yields, have started to fade as the market converges to a past peak-inflation view - the view now held by 57% of the respondents to our FXRSS - Are we there yet?. The lack of directionality may have been helped also by mixed data (and a bias for macro data to eventually recouple on the downside under slowdown scenarios for the US economy) and a more realistic Fed policy trajectory currently priced in, with a lower envelope of uncertainty around it. Both push back against the view for a material scope for the rate selloff to extend further.

Positioning-wise, fair vol in the context of persistently mixed signals means that there is scope to use rates vol as a hedge for tail risks, as we have been arguing recently (see some of our recent recommendations in [When good news is bad news](#) report).

... some recent focus on the vega dynamic

The ULC of the grid has been the focus of attention for the market in recent quarters, as it reflects the distribution of probabilities around Fed scenarios and to a large extent drives (from a causality perspective) the dynamic of the other sectors of the grid. However, we have seen recently a pickup in interest from clients in discussing the dynamic of the LRC of the grid, particularly under the broader topic of macro hedges. Here we re-hash some of the views for the vega sector.

We continue to see long vega positions as attractive for portfolios... long vol, nice ramp up on the grid (10bp over 4y for 10y20y, roughly 20bp in 5y30y) and in our view the potential for a positive convex profile (vega may stay supported in selloffs that reflect sticky inflation and/or better macro fundamentals, and may also see a bid by Bermudan books on rallies). We think the convex profile argument seems to be slightly more attractive in 5y30y vs 10y20y, as Exhibit 1 and Exhibit 2 show.

Over the last year we have argued that clients should consider adding to long vega positions around the mid/low 60bp range (for 5y30y), which has proven to be quite resilient to issuance pressures. This view worked relatively well over recent quarters, and we think being a bit more tactical in the view for the entry point on long vega is likely to continue to help portfolios.

29 August 2022

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ULC – Upper left corner

URC – Upper right corner

LLC – Lower left corner

LRC – Lower right corner

ITM – In the money

OTM – Out of the money

GFC – Great Financial crisis

ATM – At the Money

PCA – Principal Component Analysis

CoW – Change on Week

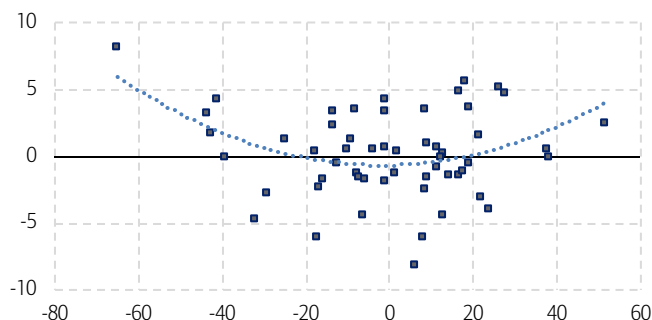
For a list of our open and closed trades over the past 12 months please see our most recent [Global Rates Weekly](#)

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Timestamp: 29 August 2022 02:07PM EDT

Exhibit 1: 5y30y vol vs 5y30y rates (mon changes since '17)

Quadratic spline fitted to data shows a relatively positive convex profile



Source: BofA Global Research, Bloomberg

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Much of the bounces we have seen from 60-handle levels over the last couple of quarters have been supported structurally by the view for a higher inflation risk premium and term premium on US rates. Indeed, this is one of the main reasons why we think these positions continue to make sense as a macro hedge in portfolios, because these tail risk scenarios (broadly a reset of neutral rate expectations higher) are likely to persist near/medium term.

We see potential for 5y30y to go back to levels around mid-60bp, and we would see these as the start of an attractive entry point again. There is a wide dispersion in macro data currently (which is natural at the late stages of the cycle when the outlook starts to turn, and in this cycle this dispersion is magnified by the breakdown of one of the most fundamental correlations in macro data, that between growth and inflation). This, in our mind, means that the ranges for rates and vols will likely continue to be relatively wide, and should continue to provide decent tactical entry points for positions.

Exhibit 3: 5y30y vol...

... levels around the mid/low 60bp resilient to recent issuance

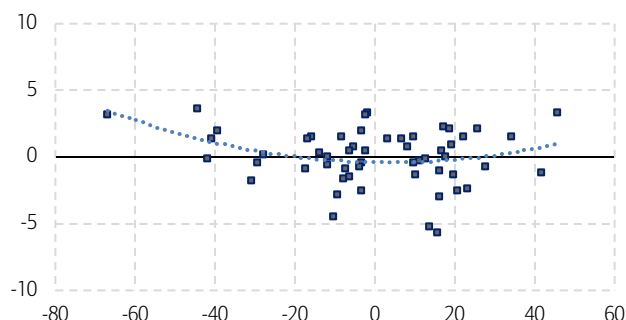


Source: Bloomberg

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Exhibit 2: 10y20y vol vs 10y20y rates (mon changes since '17)

Quadratic spline fitted to data shows a flatter convex profile



Source: BofA Global Research, Bloomberg

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Exhibit 4: Seasonal pickup in issuance early in the year

... and in some cases some residual issuance in Sep/Oct

	Jan/Feb	Sep/Oct	Full Year
2017	15.1	2.8	35.7
2018	11.8	0.8	19.5
2019	2.2	3.6	9.4
2020	13.5	6.1	41.9
2021	13.2	2.7	37.7
2022	10.9		

Source: BofA Global Research

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Supply as we noted above, is obviously one of the main risks to long vega positions, and recent years have seen strong issuance. However, issuance numbers since '20 have been driven more by the high call volumes from the peak issuance in '16/'17 and the corresponding replacement issuance (lockouts of 5y and the '20 rally means most of the '16/'17 issues were called over the last couple of years), and less about an increase of AUM for Taiwanese lifers or a more supportive regulatory context.

There is also a strong seasonal component to issuance in Jan/Feb (annualizing the numbers on the first column of Exhibit 4 generally lead to an excess vs annual issuance figures), and sometimes some residual seasonality in Sep/Oct. While these seasonal patterns are likely to continue, we find it unlikely to see issuance numbers much beyond the c.2-3bn for Sep/Oct. Early '23 is more of a risk, given the high issuance volumes in Jan/Feb '18, but this is contingent on the evolution of rate levels over the next couple of quarters). We therefore see less of a risk from issuance over the next quarter, and perhaps some caution in early '23 (depending on the trajectory of rates at that point) which may be mitigated by adopting a more tactical view for the entry level on these positions.



Levels and Recent Moves

Exhibit 5: ATM Normal Volatility Grid

109bp for 1y10y volatility

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	128.9	141.7	142.3	143.5	136.5	126.9	102.8
3M	126.4	137.6	137.8	138.2	131.5	122.3	100.9
6M	130.6	137.2	135.2	131.6	125.2	116.5	97.8
1Y	137.4	135.5	131.9	123.8	116.0	109.0	91.6
2Y	135.3	130.7	125.9	116.9	109.1	102.1	85.8
3Y	127.5	121.5	117.1	108.9	102.4	96.0	80.1
4Y	117.3	111.8	108.3	101.8	96.6	90.7	75.3
5Y	107.1	102.5	100.0	95.5	91.5	86.5	71.8
10Y	83.4	81.0	79.1	75.7	73.5	70.7	60.5
30Y	59.4	57.6	56.3	53.9	52.3	50.3	43.0

Source: BofA Global Research

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Exhibit 6: ATM Volatility Grid - 3m Z-Scores

Grid fair to cheap on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-0.8	-0.8	-0.5	0.1	0.3	0.4	-0.3
3M	-1.1	-1.1	-0.8	0.1	0.3	0.4	-0.2
6M	-1.3	-1.2	-0.9	-0.1	0.2	0.2	-0.2
1Y	-1.2	-1.0	-0.8	-0.3	-0.1	0.1	-0.2
2Y	-0.6	-0.3	-0.2	0.0	0.0	0.1	-0.1
3Y	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.2
4Y	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3
5Y	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3	-0.4
10Y	-0.2	-0.2	-0.3	-0.5	-0.4	-0.4	0.0
30Y	-0.3	-0.3	-0.4	-0.5	-0.5	-0.5	0.0

Source: R BofA Global Research

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Exhibit 7: ATM Normal Volatility Grid - CoW

Left side underperformed on the grid over the last week

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-2.7	-4.8	-3.0	0.4	2.7	2.5	-2.9
3M	-10.3	-7.6	-5.0	-0.1	2.2	2.0	-2.0
6M	-12.9	-11.1	-7.6	-1.2	1.1	1.0	-0.9
1Y	-10.3	-8.2	-5.9	-0.6	0.2	0.9	-0.9
2Y	-2.3	-0.3	0.4	1.6	1.8	1.9	0.6
3Y	1.3	1.6	1.6	1.6	1.5	1.4	0.3
4Y	1.8	1.7	1.7	1.6	1.4	1.2	-0.3
5Y	1.2	1.1	1.3	1.5	1.3	1.0	-0.5
10Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15Y	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.4
30Y	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3

Source: BofA Global Research

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Exhibit 8: ATM Straddle Premiums (indicative only)

7.3% straddle premiums for 1y10y

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.3%	0.6%	0.9%	1.5%	1.9%	2.5%	4.8%
3M	0.5%	1.0%	1.5%	2.5%	3.3%	4.2%	8.2%
6M	0.7%	1.5%	2.1%	3.4%	4.4%	5.6%	11.2%
1Y	1.0%	2.0%	2.9%	4.4%	5.7%	7.3%	14.7%
2Y	1.4%	2.7%	3.8%	5.7%	7.3%	9.4%	19.0%
3Y	1.6%	3.0%	4.2%	6.4%	8.2%	10.5%	21.2%
4Y	1.6%	3.1%	4.4%	6.7%	8.7%	11.1%	22.5%
5Y	1.6%	3.1%	4.4%	6.8%	8.9%	11.5%	23.5%
10Y	1.6%	3.0%	4.3%	6.6%	8.8%	11.7%	25.2%
15Y	1.4%	2.7%	4.0%	6.1%	8.2%	10.9%	24.3%
30Y	1.2%	2.3%	3.3%	5.2%	7.0%	9.5%	22.7%

Source: BofA Global Research

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Exhibit 9: 1y10y normal vol

Vol > 85bp top end of the expected range in '22

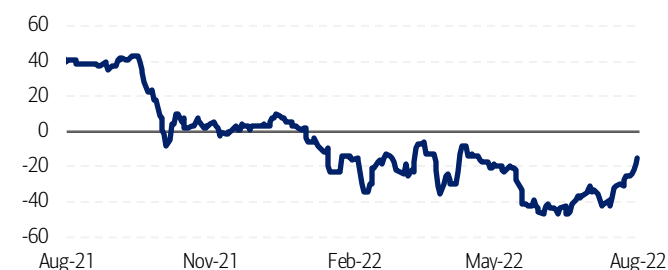


Source: BofA Global Research; Bloomberg

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Exhibit 10: 3m10y vs. 3m2y Normal Volatility

Left side stayed under pressure vs right over the last week

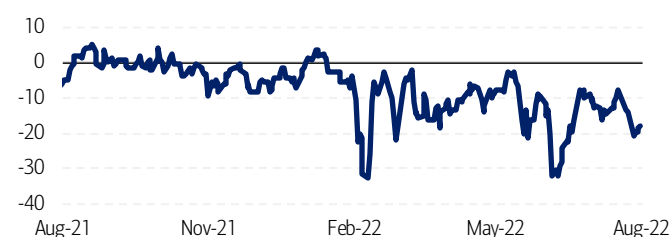


Source: BofA Global Research; Bloomberg

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Exhibit 11: 1y10y vs. 1m10y Normal Volatility

Vol inversion persisted over the last week



Source: BofA Global Research; Bloomberg

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Exhibit 12: 2s10s curve directionality 50% dictated by frontend

Un-anchoring of frontend since Oct-'21



Source: BofA Global Research

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Volatility Grid Relative Value

PCA Z-SCORES

Exhibit 13: 3m Z-Scores w/ PCA framework

Some richness in gamma on 3m Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	0.0	-0.6	1.4	-3.6	3.8	3.2	0.4
6m	-2.0	-2.4	-1.7	2.3	4.0	3.4	0.0
1y	-1.2	-1.2	-1.6	1.2	1.3	2.3	-1.4
2y	-0.8	0.4	0.0	1.2	0.2	1.1	-1.3
5y	-0.7	-0.7	-0.7	-0.4	-0.5	-0.6	-1.5
10y	-0.7	-0.8	-1.0	-1.2	-1.2	0.2	0.7

Source: BofA Global Research

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Exhibit 15: 6m Z-Scores w/ PCA framework

Some richness in gamma and left side on 6m Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-0.9	-1.2	0.5	3.4	3.6	2.4	-0.3
6m	-2.2	-0.9	-0.2	3.0	3.9	2.3	-0.1
1y	-3.0	-1.2	-1.1	0.9	1.4	1.0	-1.0
2y	-0.5	-0.2	-0.1	0.5	0.1	-0.1	-1.0
5y	-2.0	-2.1	-2.1	-1.7	-1.8	-1.7	-1.7
10y	-1.3	-1.4	-1.6	-1.9	-1.7	-1.5	-0.8

Source: BofA Global Research

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Exhibit 17: 1y Z-Scores w/ PCA framework

Some richness in gamma and left side on 1y Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-0.3	-1.2	0.9	2.9	2.9	2.3	-0.4
6m	-2.5	-0.3	0.2	2.7	3.0	2.2	-0.2
1y	-1.1	-1.2	-1.3	1.0	1.3	1.0	-1.1
2y	-0.6	-0.3	-0.3	0.4	0.1	-0.2	-1.1
5y	-2.2	-2.4	-2.4	-2.0	-2.0	-1.9	-1.9
10y	-1.4	-1.6	-1.8	-2.1	-2.0	-1.7	-1.0

Source: BofA Global Research

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Exhibit 14: 3m Z-Scores w/ PCA framework w/o rates directionality

Grid fair to cheap when directionality taken into account

	1y	2y	3y	5y	7y	10y	30y
3m	-1.8	-1.9	-1.6	-1.0	-0.5	-0.4	-1.2
6m	-2.1	-2.2	-2.0	-1.1	-0.8	-0.7	-1.3
1y	-2.1	-2.1	-2.1	-1.4	-1.2	-0.9	-1.6
2y	-1.7	-1.4	-1.4	-1.1	-1.1	-1.0	-1.5
5y	-1.5	-1.5	-1.5	-1.3	-1.3	-1.4	-1.9
10y	-1.4	-1.4	-1.5	-1.6	-1.6	-1.3	-0.9

Source: BofA Global Research

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Exhibit 16: 6m Z-Scores w/ PCA framework w/o rates directionality

Grid fair to cheap when directionality taken into account

	1y	2y	3y	5y	7y	10y	30y
3m	-1.9	-2.0	-1.7	-0.8	-0.5	-0.3	-1.0
6m	-2.3	-2.2	-2.0	-1.1	-0.6	-0.4	-0.8
1y	-3.0	-2.3	-2.1	-1.2	-1.0	-0.6	-0.9
2y	-1.6	-1.2	-1.2	-0.8	-0.7	-0.7	-0.8
5y	-1.2	-1.2	-1.2	-1.0	-1.1	-1.1	-1.1
10y	-1.0	-0.9	-1.0	-1.2	-1.2	-1.1	-0.6

Source: BofA Global Research

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Exhibit 18: 1y Z-Scores w/ PCA framework w/o rates directionality

Grid fair to cheap when directionality taken into account

	1y	2y	3y	5y	7y	10y	30y
3m	-3.0	-3.0	-2.6	-1.2	-0.6	-0.4	-1.2
6m	-3.6	-3.3	-3.0	-1.6	-0.9	-0.6	-1.1
1y	-3.8	-3.4	-3.1	-1.9	-1.5	-1.1	-1.4
2y	-2.6	-2.2	-2.0	-1.5	-1.3	-1.2	-1.3
5y	-1.9	-1.9	-1.8	-1.7	-1.7	-1.7	-1.8
10y	-1.7	-1.6	-1.7	-2.0	-1.9	-1.8	-1.2

Source: BofA Global Research

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Skew Relative Value

Exhibit 19: Skew 25% delta

Receiver skew RV fair on 3m Z-Scores across the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-1.0	-2.1	-2.6	-4.3	-3.9	-3.1	-1.8
3M	0.3	-1.4	-2.4	-2.4	-1.7	-0.6	0.6
6M	0.9	-2.4	-3.1	-2.9	-2.1	-0.9	0.7
1Y	-1.2	-4.4	-5.4	-4.8	-3.8	-2.5	0.0
2Y	-6.9	-8.2	-7.1	-5.8	-4.7	-3.4	-0.2
5Y	-7.8	-6.6	-5.7	-3.4	-2.8	-2.1	0.9
10Y	-3.1	-2.0	-1.1	-0.1	-0.1	-0.1	1.5
30Y	-0.6	0.3	0.7	1.5	1.5	1.5	2.8

Source: BofA Global Research

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Exhibit 20: Skew 75% delta

Payer skew RV fair on 3m Z-Scores across the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.7	1.5	2.1	3.8	3.4	2.9	2.1
3M	4.3	6.2	7.0	6.9	6.0	4.8	3.0
6M	6.3	9.4	9.8	9.3	8.3	6.8	4.4
1Y	8.9	11.4	11.9	11.0	9.7	8.4	5.2
2Y	13.5	14.1	12.9	11.5	10.3	9.0	5.3
5Y	13.8	12.8	12.0	10.2	9.6	8.8	4.9
10Y	11.4	10.3	9.4	8.4	8.2	7.9	5.0
30Y	10.6	9.7	9.1	8.0	7.8	7.5	4.8

Source: BofA Global Research

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Exhibit 21: Breakeven Widths for Costless Receiver Ladders

105bp breakeven width for 1y10y receiver ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	37	40	40	40	38	35	29
3M	64	68	68	68	65	61	51
6M	94	94	92	89	86	81	71
1Y	136	128	123	116	110	105	92
2Y	177	168	164	153	145	137	122
5Y	214	207	204	202	195	186	165
10Y	247	245	244	238	231	223	200

Source: BofA Global Research

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Exhibit 22: Breakeven Widths for Costless Payer Ladders

128bp breakeven width for 1y10y payer ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	38	42	43	44	42	39	31
3M	68	76	77	77	73	67	54
6M	101	111	110	107	101	92	76
1Y	156	162	160	149	139	128	103
2Y	236	232	221	204	187	173	138
5Y	315	299	289	267	254	239	184
10Y	354	336	322	302	293	282	226

Source: BofA Global Research

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Exhibit 23: 3m Z-Score Receiver Skew (w/o fwds & ATM direction)

Receiver skew shows some cheapness on the right side of the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-0.2	0.6	1.0	-0.2	-0.6	-0.7	-0.9
3M	0.4	0.3	-0.5	-0.4	-0.5	-0.6	-1.5
6M	0.4	-0.4	-0.6	-0.3	-0.1	0.0	-0.5
1Y	0.1	0.0	-0.2	0.1	0.1	-0.3	-1.5
2Y	-1.6	-1.5	1.0	0.7	-0.7	-1.0	-1.9
5Y	-0.5	-1.7	1.3	0.1	-1.6	-1.6	-1.3
10Y	0.2	0.2	0.2	-1.9	-2.0	-1.7	-2.0

Source: BofA Global Research

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Exhibit 24: 3m Z-Score Payer Skew (w/o direction w/ fwds & ATM)

Payer skew shows some richness on the LRC

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-0.9	-0.4	-0.1	0.4	0.3	0.3	1.0
3M	-1.4	-0.9	-0.9	-1.7	-1.6	-1.4	-1.1
6M	-0.1	-0.2	-0.1	-1.0	-1.0	-0.8	0.1
1Y	-0.8	-0.1	-0.1	-0.4	-0.4	-0.1	0.7
2Y	1.3	1.3	-1.0	-0.3	-1.0	0.5	1.1
5Y	0.7	1.7	-1.3	-0.2	1.6	1.6	1.6
10Y	0.2	0.1	0.1	1.9	1.9	1.6	2.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 25: Ratio of Payer/Receiver BE widths for Costless Ladders

Ratios of breakeven widths above 100% across the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	103%	105%	106%	111%	110%	110%	108%
3M	108%	112%	113%	114%	112%	109%	105%
6M	108%	117%	120%	119%	117%	114%	107%
1Y	115%	126%	130%	129%	126%	122%	112%
2Y	133%	138%	135%	133%	129%	126%	113%
5Y	147%	144%	141%	132%	131%	128%	112%
10Y	143%	137%	132%	127%	127%	127%	113%

Source: BofA Global Research

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Exhibit 26: 3m Z-Score Ratio of Payer/Receiver Skew

Z-Scores cheap payer vs receiver skew on the left side, rich on the right

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-1.0	-0.7	-0.7	0.7	0.8	1.1	1.7
3M	-0.7	-0.5	-0.5	-0.1	-0.1	-0.1	0.4
6M	-0.9	-0.7	-0.5	-0.4	-0.3	0.0	0.3
1Y	-1.1	-0.6	-0.4	-0.2	-0.1	0.5	0.7
2Y	0.1	0.4	-1.0	-0.3	-0.3	0.7	1.3
5Y	0.4	1.2	-1.0	0.1	0.7	0.9	0.5
10Y	0.1	0.0	-0.1	1.1	1.1	1.0	1.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Conditional Curve Trades

Exhibit 27: Bull Flatteners (pickup to forwards for ATM)

Buy longer maturity receiver, sell shorter maturity receiver

ATM	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-0.3	5.8	13.0	6.0	13.2	7.9
6M	2.8	10.4	19.2	7.7	16.7	9.7
1Y	8.5	18.5	29.6	10.6	22.4	12.6
1.5Y	11.4	23.9	37.0	13.4	27.1	14.9
2Y	13.8	27.8	42.3	14.7	30.4	16.7

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 29: Bull Steepener (pickup to forwards for ATM)

Sell longer maturity receiver, buy shorter maturity receiver

ATM	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	0.3	-5.8	-13.0	-6.0	-13.2	-7.9
6M	-2.8	-10.4	-19.2	-7.7	-16.7	-9.7
1Y	-8.5	-18.5	-29.6	-10.6	-22.4	-12.6
1.5Y	-11.4	-23.9	-37.0	-13.4	-27.1	-14.9
2Y	-13.8	-27.8	-42.3	-14.7	-30.4	-16.7

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 31: Bear Flatteners (pickup to forwards for ATM)

Sell longer maturity payer, buy shorter maturity payer

ATM	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	0.3	-6.0	-13.2	-6.2	-13.4	-8.1
6M	-3.2	-11.2	-19.8	-8.3	-17.3	-10.1
1Y	-9.7	-20.6	-31.2	-11.8	-23.7	-13.4
1.5Y	-13.6	-27.1	-39.2	-15.1	-28.8	-15.9
2Y	-16.3	-31.3	-44.8	-17.1	-32.3	-17.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 33: Bear Steepener (pickup to forwards for ATM)

Buy longer maturity payer, sell shorter maturity payer

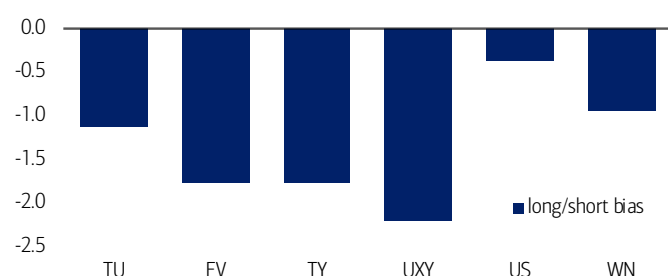
ATM	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-0.3	6.0	13.2	6.2	13.4	8.1
6M	3.2	11.2	19.8	8.3	17.3	10.1
1Y	9.7	20.6	31.2	11.8	23.7	13.4
1.5Y	13.6	27.1	39.2	15.1	28.8	15.9
2Y	16.3	31.3	44.8	17.1	32.3	17.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 35: Analysis of proxies for futures positioning

... suggests short bias across the curve



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 28: Bull Flatteners (pickup to forwards for -25bp OTM)

Buy longer maturity receiver, sell shorter maturity receiver

-25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-0.1	7.5	17.3	7.5	17.3	10.6
6M	3.8	12.8	23.5	9.3	20.4	12.0
1Y	10.1	21.6	34.5	12.2	25.9	14.7
1.5Y	13.0	27.1	41.7	14.9	30.6	16.9
2Y	15.1	30.6	46.8	16.5	33.9	18.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 30: Bull Steepener (pickup to forwards for -25bp OTM)

Sell longer maturity receiver, buy shorter maturity receiver

-25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	0.1	-7.5	-17.3	-7.5	-17.3	-10.6
6M	-3.8	-12.8	-23.5	-9.3	-20.4	-12.0
1Y	-10.1	-21.6	-34.5	-12.2	-25.9	-14.7
1.5Y	-13.0	-27.1	-41.7	-14.9	-30.6	-16.9
2Y	-15.1	-30.6	-46.8	-16.5	-33.9	-18.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 32: Bear Flatteners (pickup to forwards for +25bp OTM)

Sell longer maturity payer, buy shorter maturity payer

+25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	0.7	-8.3	-18.8	-8.9	-19.2	-11.8
6M	-4.0	-14.7	-26.1	-11.2	-23.1	-13.6
1Y	-11.4	-24.9	-38.4	-14.7	-29.8	-17.5
1.5Y	-15.7	-31.9	-46.8	-18.3	-35.3	-20.0
2Y	-19.0	-36.6	-52.8	-20.2	-38.8	-22.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 34: Bear Steepener (pickup to forwards for +25bp OTM)

Buy longer maturity payer, sell shorter maturity payer

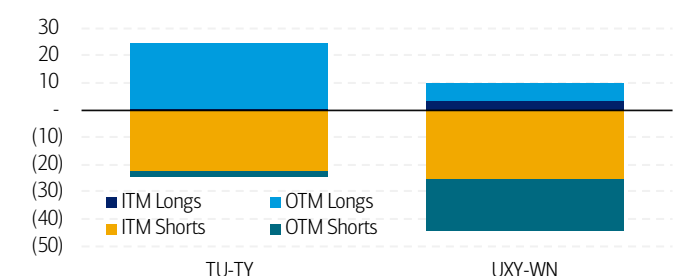
+25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-0.7	8.3	18.8	8.9	19.2	11.8
6M	4.0	14.7	26.1	11.2	23.1	13.6
1Y	11.4	24.9	38.4	14.7	29.8	17.5
1.5Y	15.7	31.9	46.8	18.3	35.3	20.0
2Y	19.0	36.6	52.8	20.2	38.8	22.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 36: Proxies for futures positioning across the curve

OTM frontend longs still expose curve to bear flattening



Source: BofA Global Research

BofA GLOBAL RESEARCH



Forward Volatility

Exhibit 37: 6m Forward Volatility

98.9bp for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	127.7	125.6	115.0	102.1	87.6
3m	132.7	128.5	114.4	100.4	85.3
6m	136.0	131.1	114.8	99.6	83.7
1y	133.7	132.6	115.9	98.9	82.9
2y	133.0	125.4	109.3	93.6	78.3
5y	101.5	97.0	90.3	81.3	67.2
10y	78.7	76.4	71.9	67.0	57.7

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 38: 6m Fwd vol as % ATM

91% of ATM for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	99%	89%	80%	80%	85%
3m	105%	93%	83%	82%	85%
6m	104%	96%	87%	86%	86%
1y	97%	98%	94%	91%	91%
2y	98%	96%	94%	92%	91%
5y	95%	95%	95%	94%	94%
10y	94%	94%	95%	95%	95%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 39: 3m Z-Score 6m Fwd vol % ATM

-1.3 Z-Score for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	-0.2	-0.1	-0.9	-0.9	-0.1
3m	0.3	0.4	-1.0	-1.1	-0.4
6m	0.9	0.8	-0.9	-1.1	-0.6
1y	2.1	2.0	-0.2	-1.3	-0.2
2y	1.9	0.8	-1.1	-1.5	-0.5
5y	-0.4	-1.0	-1.0	-0.7	-0.5
10y	0.5	0.1	-0.5	-0.6	0.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 40: 1y Forward Volatility

95.4bp for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	136.7	134.3	119.8	100.7	84.1
3m	136.4	135.5	120.2	100.0	83.4
6m	137.0	135.4	119.3	98.8	82.3
1y	137.4	131.5	114.6	95.4	79.4
2y	126.9	119.0	105.8	89.3	73.9
5y	98.1	94.5	87.4	78.5	64.4
10y	76.4	74.1	70.0	64.9	55.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 41: 1y Fwd vol as % ATM

87% of ATM for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	106%	95%	84%	79%	82%
3m	108%	98%	87%	82%	83%
6m	105%	99%	91%	85%	84%
1y	100%	97%	93%	87%	87%
2y	94%	91%	90%	87%	86%
5y	92%	92%	91%	91%	90%
10y	92%	92%	92%	92%	92%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 42: 3m Z-Score 1y Fwd vol % ATM

-1.1 Z-Score for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	0.5	0.7	-0.5	-0.8	0.1
3m	0.9	1.4	-0.4	-1.1	0.0
6m	1.6	2.2	0.2	-1.2	-0.1
1y	2.1	2.4	0.8	-1.1	0.5
2y	2.1	0.7	-0.9	-1.4	-0.5
5y	-0.5	-0.5	-1.1	-0.6	-0.3
10y	0.0	-0.2	-0.6	-0.6	0.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 43: 2y Forward Volatility

85.7bp for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	129.2	121.3	108.0	90.1	73.5
3m	128.9	119.5	107.0	89.2	72.7
6m	127.8	116.3	105.3	88.0	71.3
1y	122.3	110.3	102.5	85.7	69.0
2y	107.6	104.5	98.1	82.2	65.3
5y	92.7	90.4	83.2	74.4	59.6
10y	72.7	70.3	66.8	61.6	52.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 44: 2y Fwd vol as % ATM

79% of ATM for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	100%	86%	75%	71%	72%
3m	102%	87%	77%	73%	72%
6m	98%	85%	80%	76%	73%
1y	89%	81%	83%	79%	75%
2y	79%	80%	84%	80%	76%
5y	87%	88%	87%	86%	83%
10y	87%	87%	88%	87%	87%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 45: 3m Z-Score 2y Fwd vol % ATM

-1.3 Z-Score for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.0	1.0	-0.4	-1.0	-0.1
3m	1.5	1.4	-0.4	-1.2	-0.2
6m	2.0	1.5	-0.3	-1.2	-0.6
1y	1.6	0.7	-0.4	-1.3	-0.6
2y	0.2	-0.6	-1.0	-1.4	-1.0
5y	-0.2	0.1	-0.9	-0.6	-0.5
10y	-0.8	-0.8	-1.1	-1.1	-0.6

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 46: 3y Forward Volatility

82.6bp for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	91.5	89.8	95.7	82.1	63.9
3m	93.4	93.3	96.7	82.5	64.0
6m	99.9	98.4	98.0	82.8	63.7
1y	113.5	104.8	98.4	82.6	62.9
2y	100.6	95.0	92.6	79.2	61.6
5y	88.0	86.2	79.4	71.2	56.8
10y	70.1	67.8	64.7	59.5	50.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 47: 3y Fwd vol as % ATM

76% of ATM for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	71%	63%	67%	65%	62%
3m	74%	68%	70%	67%	63%
6m	77%	72%	74%	71%	65%
1y	83%	77%	80%	76%	69%
2y	74%	73%	79%	78%	72%
5y	82%	84%	83%	82%	79%
10y	84%	84%	86%	84%	83%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 48: 3m Z-Score 3y Fwd vol % ATM

-1.2 Z-Score for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	0.6	0.1	-0.8	-1.4	-0.9
3m	0.8	0.4	-0.7	-1.5	-1.0
6m	1.0	0.4	-0.5	-1.5	-1.0
1y	1.2	0.5	-0.2	-1.2	-0.8
2y	-0.1	-0.8	-0.5	-0.8	-0.9
5y	0.0	0.2	-0.9	-0.6	-0.3
10y	-1.0	-1.0	-1.4	-1.3	-0.6

Source: BofA Global Research

BofA GLOBAL RESEARCH

Ratios implied/delivered

Exhibit 49: Implied vs. Delivered (21d) Ratio

Ratios of Implied to 21d delivered still >100% in short gamma

	1y	2y	3y	5y	7y	10y	30y
1m	132%	118%	109%	112%	109%	105%	103%
3m	110%	105%	101%	106%	103%	100%	100%
6m	99%	97%	95%	98%	97%	94%	97%
1y	94%	90%	91%	91%	89%	88%	90%
2y	86%	88%	89%	87%	84%	83%	84%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 50: Implied vs. Delivered (63d) Ratio

Ratios of Implied to 63d delivered <100% virtually across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	99%	97%	94%	98%	97%	96%	101%
3m	86%	88%	87%	92%	92%	92%	98%
6m	79%	82%	83%	86%	86%	87%	95%
1y	78%	79%	81%	81%	81%	82%	89%
2y	79%	81%	81%	80%	79%	80%	85%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 51: 3m Z-Scores for Implied vs. Delivered (21d) Ratio

Ratios of implied/21d delivered still fair to rich across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	1.3	0.9	0.8	1.5	1.5	1.3	0.2
3m	0.9	0.7	0.7	1.5	1.4	1.2	0.3
6m	0.7	0.7	0.7	1.3	1.3	1.0	0.3
1y	0.8	0.7	0.7	1.0	0.9	0.8	0.2
2y	0.4	0.5	0.8	0.8	0.6	0.4	0.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 52: 3m Z-Scores for Implied vs. Delivered (63d) Ratio

Ratios of implied/63d delivered cheap on the left side, rich on the right

	1y	2y	3y	5y	7y	10y	30y
1m	-0.6	-0.6	-0.3	0.5	0.8	1.0	1.1
3m	-1.0	-1.0	-0.6	0.5	0.9	1.1	1.4
6m	-1.3	-1.1	-0.8	0.3	0.7	1.0	1.5
1y	-1.0	-0.9	-0.6	0.2	0.5	1.0	1.5
2y	-0.6	-0.2	0.1	0.6	0.8	1.2	1.6

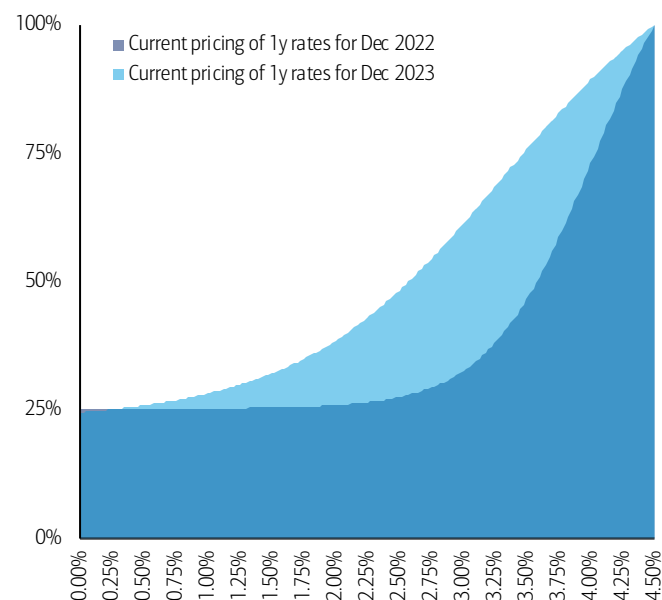
Source: BofA Global Research

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Rates probability distributions

Exhibit 53: CDF for 10y rates at end-2022 and end-2023

1y rate cumulative distribution functions

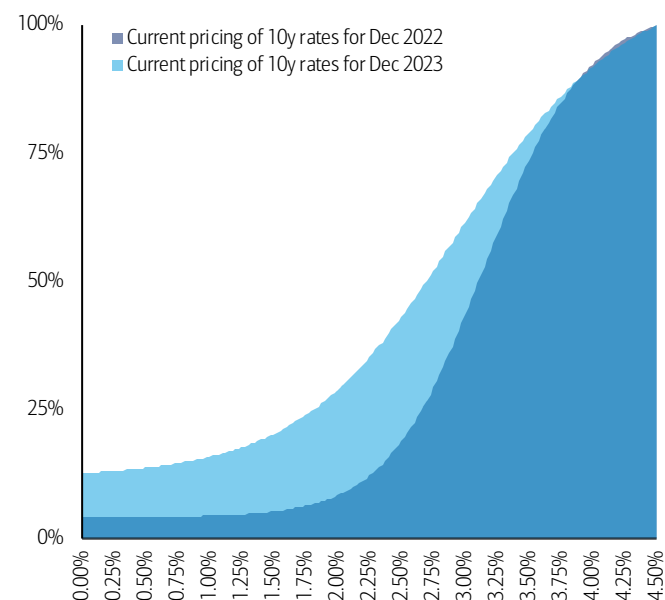


Source: BofA Global Research

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Exhibit 54: CDF for 10y rates at end-2022 and end-2023

10y rate cumulative distribution functions



Source: BofA Global Research

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Trade activity

Exhibit 55: Payer volumes over the last week (\$m notional)

Demand for payers over the last week

Payers	1y	2y	3Y	4Y	5Y	7Y	10Y	20Y	30Y	
<1m	1100	10		100	240	25	1970			3445
1m		1990	1220	100	2248		4016	730	2230	12534
3m	5400	2985			539	25	1158	285	1760	12352
6m	4820	6595			430		1173	48	660	13744
1y	4830	900	82		3240	100	3309	25	47	12533
2y	3300	380			878		730			13688
3Y		690	1580		480		320		196	3266
4Y	430				1		230		76	737
5Y		280			430		621		80	1411
7Y			240							240
10Y								15	225	240
20Y										
30Y										
	19880	13830	3122	200	8486	150	13527	1103	5274	74191

Source: BofA Global Research; SDR; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 56: Receiver volumes over the last week (\$m notional)

Demand for payers over the last week

Receivers	1y	2y	3Y	4Y	5Y	7Y	10Y	20Y	30Y	
<1m					100		490			590
1m		620	240		2395		1790	2340	623	8008
3m	1000	850				170	982	120	130	4252
6m	4400	3680			490		906	405	1205	11086
1y	963	936	39	25	835		3739		42	6579
2y	4400	380			2320		932		10	10142
3Y			100		2480		320		164	3064
4Y							230		81	311
5Y		280			434		711	70	80	1575
7Y			240							240
10Y							200		175	375
20Y										
30Y										
	10763	6746	619	25	9054	170	10300	2935	2510	46222

Source: BofA Global Research; SDR; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 57: Straddle volumes over the last week (\$m notional)

Demand for payers over the last week

Straddles	1y	2y	3Y	4Y	5Y	7Y	10Y	20Y	30Y	
<1m										
1m					250		952	700	270	2172
3m	250				1100		971	670	20	3011
6m		1020			525		275		25	1845
1y	8240	1140			680		2180		50	12290
2y	2900	250	180		550		778	100		4758
3Y	420	1590			190		970	109	94	3373
4Y					200		21	100	21	342
5Y							425	121		546
7Y		400					200	88		688
10Y							275	31		306
20Y										
30Y										
	11810	4400	180		3495		7047	1919	480	29331

Source: BofA Global Research; SDR; Bloomberg

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Formosa issuance

Exhibit 58: 2021 Formosa issuance (\$m)

37.7bn total issuance for the year '21

	2	5	7	10	15	20	25	30
1				958	30			220
2				284	45			
3					130			125
4					90			
5						50		19855
7								
10								920
15								
20								
25								
30								15000

Source: BofA Global Research, Bloomberg

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Exhibit 59: 2022 Formosa issuance YTD (\$m)

12.4bn issuance YTD

	2	5	7	10	15	20	25	30
1			75	513	20			
2		40		435				
3				70	20			125
4		15		75	50			
5				20	45	140	80	10226
7			30					
10								363
15								
20								
25								
30								

Source: BofA Global Research, Bloomberg

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Exhibit 60: Formosa issuance (\$m) since 2014

Peak issuance concentrated on the 5y30y tenor

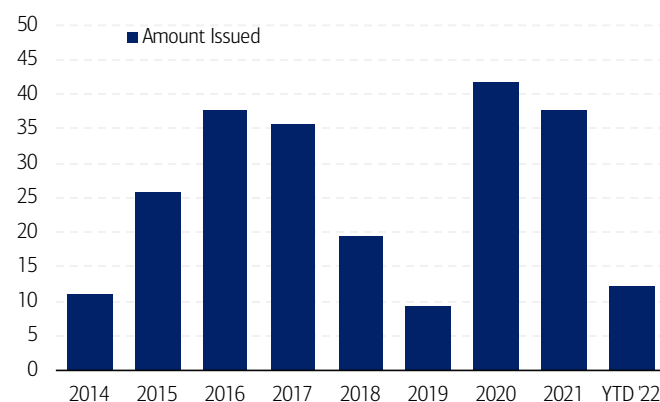
	2	5	7	10	15	20	25	30
1		205	75	1991	492	840		18274
2		40		873	45	1485		22177
3				70	150	240	225	15661
4		15		75	140	25	275	2441
5				20	445	1467	353	131513
7			30					5624
10								5384
15								
20								
25								
30								20500

Source: BofA Global Research, Bloomberg

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Exhibit 61: Total issuance per year since 2014 (\$bn)

0.2bn issuance 2H22 (vs. 1.4bn same period '21)



Source: BofA Global Research, Bloomberg

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Notes

Exhibit 12: We classify the moves on the 2s10s or 5s30s curve every day in either one of these: bear flattening & bull steepening (where the 2y or 5y leg leads) or bear steepening & bull flattening (where the 10y or 30y leg leads). We sum each one of those columns over the last 2 or 3 months and divide by the absolute value of the curve moves to get a % index for each of the 4 different curve dynamics. We sum up the bear flattening + bull steepening indices into a new index - when this index = 0 the entire dynamic of the 2s10s or 5s30s curve is driven by the longer leg (10y or 30y leg respectively - corresponds to periods of forward guidance for example).

Exhibit 13/15/17: We calculate the principal components of the vol grid (the Eigen vectors of the covariance matrix) and take only the first 2/3 that represent around 90% of the variance in the data. We transpose the PCA transformation to recover vols from only these 2/3 components and obtain models for the vols. We calculate the residual of these models to the original series, and the Z-Score of these residuals.

Exhibit 14/16/18: Instead of taking the first 2/3 principal components of the vol grid and apply the transpose of the PCA transformation to them, we first regress each of these vol PCs on the principal components of rates, and apply the transpose of the vol PCA transformation to these models for the vol PCs. This way we remove the directionality between vol and rates from the vol dynamic, and obtain a purer Z-Score RV signal on vol.

Exhibit 21/22: In a payer/receiver ladder one buys the ATM strike and then you sell $ATM \pm x$ and $ATM \pm 2x$. In the terminal payoff diagram the position starts losing money when the forwards move past $ATM \pm 3x$, which we call the downside breakeven on the payer/receiver ladder.

We calculate the x (gap between strikes) daily such that the premium one has to pay for the payer/receiver ladder is zero (any vol structure that has unlimited downside can always be structured to be costless). These breakeven widths are therefore costless downside breakeven widths. When payer/receiver skew richens, this width increases - one needs to sell higher strikes $ATM \pm (x + \Delta)$ and $ATM \pm 2(x + \Delta)$ to pay for the ATM strike bought. By looking at how these costless downside breakeven widths change over time one can measure how payer/receiver skew has richen/cheapen over time.

Exhibit 23/24: Skew is directional with forwards and with the level of vol. We regress the costless downside breakeven widths (for receivers and payers) on the forwards and ATM vol, and look at the residuals of that regression to get a purer skew RV signal.

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