

US Rates Watch

Vol views – Grinding lower

Fading of near-term risks...

Some of the major risks around the near-term outlook (particularly the perception of systemic risk around the banking sector and debt limit uncertainty) have faded in recent weeks. That has helped fade some of the richness of gamma versus intermediates (Exhibit 12) and the left side of the grid versus the right side (Exhibit 11).

... versus macro data resilience

Macro data resilience, however, continues to feed into uncertainty about the Fed policy path (see Exhibit 1). While the timing of the first rate cut continues to get pushed out (now at a 7-month horizon – Exhibit 2), the range of outcomes around the Fed widens, and that supports a sticky richness of the left side of the grid versus the right side (1y10y versus 1y1y vol spread still c.-52bp inverted).

Conditions for lower vol and lower rates

As we have noted in recent publications, lower data dispersion and a recoupling of macro data to the downside in line with market expectations, along a higher degree of confidence in declining inflation, are necessary for (1) a collapse of the uncertainty around the policy trajectory; (2) a mean reversion of 10yT yields back to steady-state levels around c.3%; and (3) a normalization of the volatility grid.

Bifurcation of scenarios over 2H23

However, macro scenarios for the US outlook over 2H23 (abstracting from the potential for exogenous shocks) continue to bifurcate between the following:

- Soft landing scenarios or scenarios whereby the slowdown continues to be priced at c.6-month horizons on a rolling basis, which likely support a more credible on-hold stance for the Fed. These scenarios continue to support trading the 3.25-3.75% range for 10yT, with a bullish bias and a slow process of normalization for the volatility grid (1y1y vol towards c.120-130bp and a resteeptening of the 1m10y versus 1y10y vol spread into c.-5bp to 5bp levels).
- Re-acceleration scenarios whereby inflation stays sticky near term and the market prices a higher terminal rate for the Fed, which are likely to continue to support the recent distortions on the vol grid for longer.

Bias still towards slowdown?

Despite the recent data resilience, the dynamic of breakevens (Exhibit 3) continues reflect (1) a recoupling of growth and inflation fundamentals (i.e., higher frequency of moves that reflect positive correlations and causalities between growth and inflation account for c.80% of the recent dynamic – Exhibit 4) and (2) a higher likelihood of lower growth and lower inflation scenarios (50% frequency of bull tightening moves recently – Exhibit 5) versus re-acceleration scenarios (30% frequency of higher growth and higher inflation scenarios, which generally drive a bear widening of breakevens).

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 13 to 15.

12569490

Timestamp: 12 June 2023 02:40PM EDT

12 June 2023

Rates Research
United States

Bruno Braizinha, CFA
Rates Strategist
BofAS
bruno.braizinha@bofa.com

US Rates Research
BofAS
+1 646 855 8846

[See Team Page for List of Analysts](#)

10yT – 10-year Treasury
BE – Inflation breakevens
c. – circa
GFC – Great Financial crisis
ITM – In the money

LLC – Lower left corner
LRC – Lower right corner
OTM – Out of the money
ULC – Upper left corner
URC – Upper right corner

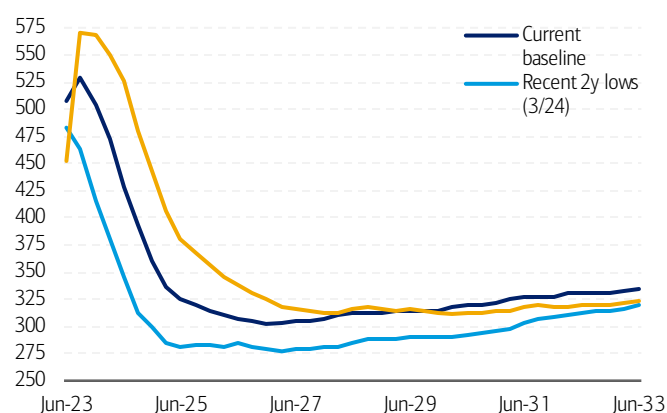
The market seems to therefore continue to show a bias towards softer landing scenarios or slowdown expectations at a c.6m horizon priced on a rolling basis. These scenarios support buying of duration on dips beyond c.3.75% for 10yT (levels above fair values that are consistent with both US macro fundamentals and global yield levels) and expectations for a slow process of normalization of the vol grid (selling peaks in vol on the left side of the grid and deep richness of gamma versus intermediates).

These scenarios also tend to support carry strategies (see our report, [Postcard from Europe](#)). However, (1) we are careful about expressing carry strategies (which are generally short gamma) in rates space and (2) see the current context as a meta-stable equilibrium state whereby the market dynamic may be shocked into relatively wide tail scenarios. These tail scenarios should be hedged on both sides of the distribution of outcomes:

- Higher probabilities of harder landing scenarios (with broader slowdown expectations) whereby risky assets reprice meaningfully lower despite deeper and faster Fed cuts, which may be hedged through bull steepeners on deep out-of-the-money (OTM) puts on risky assets.
- Re-acceleration scenarios noted above whereby growth and inflation expectations stay supported near term and drive a hawkish repricing of Fed expectations, which may be hedged through OTM payers or payer spreads at the front end of the curve.

Exhibit 1: Recent pricing of the policy path

Policy trough back at c.3% a fade, in our view



Source: BofA Global research

BofA GLOBAL RESEARCH

Exhibit 2: Horizon of first Fed cut

Market pricing one cut fully at a 7-month horizon currently

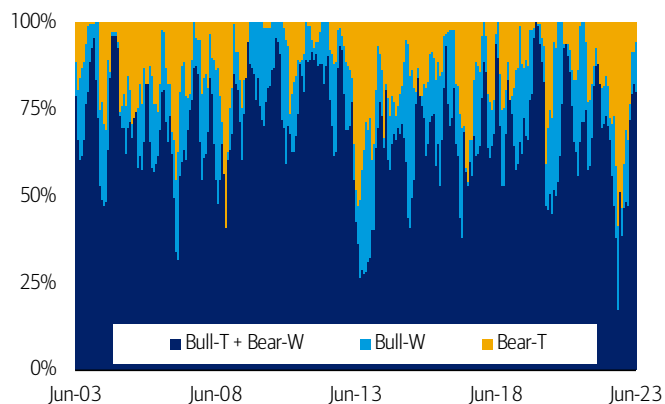


Source: BofA Global research

BofA GLOBAL RESEARCH

Exhibit 3: 10y breakeven dynamic

More orthodox dynamic in 2023 versus 2022

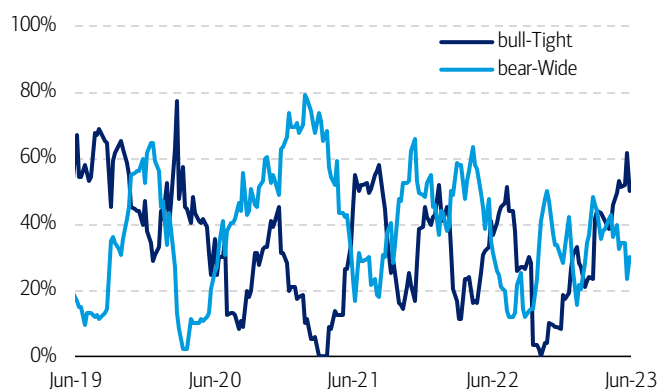


Source: BofA Global research

BofA GLOBAL RESEARCH

Exhibit 5: Frequencies of bull tightening (lower growth and lower inflation) and bear widening (higher growth and higher inflation) moves over time

Frequency of bull tightening moves on the rise since end of October 2022



Source: BofA Global research

BofA GLOBAL RESEARCH

Exhibit 4: Frequencies of different moves in the recent dynamic of 10y breakevens

Orthodox moves (that contain positive correlation and causality between growth and inflation) now account for 80% of the 10y BE dynamic; bull tightening frequencies (which reflect lower growth and lower inflation expectations) still dominate the 10y BE dynamic

	bull-Tight	bear-Wide	bull-Wide	bear-Tight
Current	50%	30%	14%	5%
1m	40%	34%	13%	13%
2m	27%	32%	13%	27%
3m	29%	33%	13%	25%

Source: BofA Global research

BofA GLOBAL RESEARCH

Levels and Recent Moves

Exhibit 6: ATM Normal Volatility Grid

104.7bp for 1y10y volatility

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	154.5	173.2	160.2	144.9	125.9	109.8	86.2
3M	146.9	162.3	152.6	137.2	121.8	108.9	86.0
6M	154.3	158.1	148.5	131.6	118.6	108.1	85.9
1Y	156.9	145.5	137.3	123.0	113.1	104.7	83.7
2Y	136.1	128.3	123.3	113.4	106.5	99.5	81.1
3Y	122.2	117.4	113.8	106.5	101.0	94.7	77.6
4Y	114.7	110.5	107.3	101.0	96.1	90.7	74.9
5Y	108.4	104.7	101.9	96.3	92.2	87.3	72.5
10Y	85.9	83.6	82.0	78.9	76.4	73.2	62.2
30Y	61.7	60.2	59.0	56.8	54.8	52.1	47.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 7: ATM Volatility Grid – 3m Z-Scores

Grid broadly cheap on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-0.9	-0.8	-0.7	-0.7	-0.8	-1.0	-0.7
3M	-1.1	-0.9	-1.0	-1.0	-1.2	-1.2	-1.0
6M	-1.0	-0.9	-1.0	-1.1	-1.3	-1.4	-1.2
1Y	-0.9	-1.0	-1.0	-1.0	-1.2	-1.3	-1.6
2Y	-0.8	-1.1	-1.0	-1.1	-1.3	-1.3	-1.5
3Y	-1.0	-1.1	-1.1	-1.2	-1.3	-1.3	-1.6
4Y	-0.9	-0.9	-0.9	-1.1	-1.2	-1.3	-1.5
5Y	-0.7	-0.8	-0.9	-1.1	-1.3	-1.3	-1.4
10Y	-0.8	-0.8	-0.9	-1.0	-1.1	-1.1	-1.1
30Y	-0.1	-0.1	-0.2	-0.4	-0.9	-0.8	0.0

Source: R BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 8: ATM Normal Volatility Grid – CoW

ULC underperformed on the grid over the last week

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-6.1	-9.2	-5.7	-2.3	-1.6	-0.9	6.5
3M	-12.5	-11.8	-8.7	-5.6	-4.4	-3.1	0.9
6M	-14.3	-10.3	-7.7	-5.1	-4.1	-3.0	-0.8
1Y	-7.9	-5.9	-4.8	-3.6	-3.4	-3.1	-2.5
2Y	-3.7	-2.8	-2.8	-2.6	-2.4	-2.3	-1.9
3Y	-2.6	-1.5	-1.8	-2.3	-2.0	-1.6	-1.3
4Y	-1.4	-1.6	-1.5	-1.2	-1.3	-1.3	-1.1
5Y	-0.8	-1.0	-1.0	-0.9	-1.0	-1.1	-0.9
10Y	-0.5	-0.5	-0.5	-0.5	-0.5	-0.4	-0.4
30Y	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 9: ATM Straddle Premiums (indicative only)

6.7% straddle premiums for 1y10y

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.3%	0.7%	1.0%	1.4%	1.7%	2.0%	3.6%
3M	0.6%	1.2%	1.7%	2.5%	3.0%	3.6%	6.5%
6M	0.8%	1.7%	2.3%	3.3%	4.0%	5.0%	9.2%
1Y	1.2%	2.1%	3.0%	4.3%	5.3%	6.7%	12.4%
2Y	1.4%	2.5%	3.6%	5.4%	6.8%	8.7%	16.4%
3Y	1.5%	2.8%	4.0%	6.0%	7.7%	9.8%	18.7%
4Y	1.5%	2.9%	4.2%	6.4%	8.2%	10.5%	20.3%
5Y	1.6%	3.0%	4.3%	6.6%	8.5%	11.0%	21.4%
10Y	1.5%	2.9%	4.2%	6.4%	8.5%	11.1%	22.8%
30Y	1.1%	2.0%	3.0%	4.6%	6.2%	8.2%	20.2%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 10: 1y10y vol dynamic since the COVID recession

Fair 1y10y vol versus c.100-120bp expected range for 2023



Source: BofA Global Research; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 11: 3m10y versus 3m2y normal volatility

Left side lost some richness versus right side over the last week

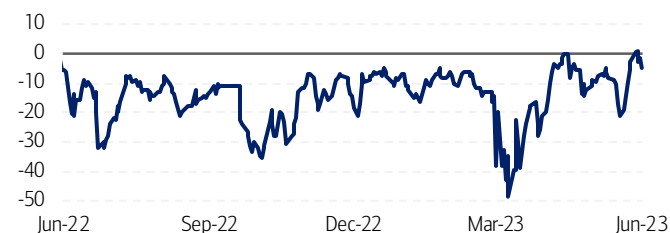


Source: BofA Global Research; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 12: 1y10y versus 1m10y normal volatility

Vol inversion faded over the last week to virtually flat levels

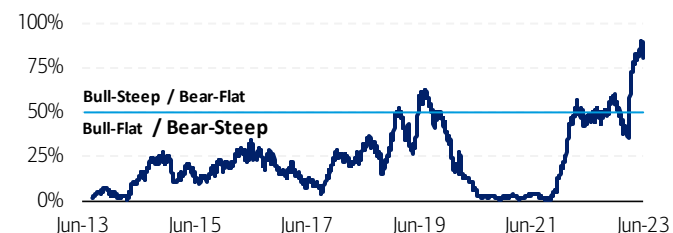


Source: BofA Global Research; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 13: 2s10s directionality 81% front end driven over last 3 months

... 54% over the last 2 weeks Fed on hold starting to anchor front end?



Source: BofA Global Research

BofA GLOBAL RESEARCH

Volatility Grid Relative Value

PCA Z-SCORES

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

Right side cheap 3m Z-Scores, left side show some richness

	1y	2y	3y	5y	7y	10y	30y
3m	-1.6	1.3	0.3	0.2	-0.4	-0.6	1.2
6m	-0.3	1.2	0.6	-0.3	-1.2	-1.4	-0.8
1y	0.5	0.0	0.1	0.1	-1.0	-1.4	-2.2
2y	0.7	-0.4	-0.3	-0.8	-1.3	-1.2	-1.8
5y	0.7	0.6	0.3	-0.3	-0.8	-0.9	-1.1
10y	0.2	0.2	0.1	-0.1	-0.4	-0.2	-0.3

Source: BofA Global Research

BofA GLOBAL RESEARCH

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

Left side richness on 6m Z-Scores, right side fair to cheap

	1y	2y	3y	5y	7y	10y	30y
3m	-1.0	1.0	-0.7	-0.2	-1.1	-1.2	-0.4
6m	0.7	1.1	-0.6	0.4	-0.4	-1.4	-0.7
1y	0.4	-0.7	-0.8	1.4	1.0	0.4	-1.6
2y	0.8	0.8	0.8	0.8	0.8	0.4	-1.8
5y	1.7	1.6	1.2	0.2	-0.2	-0.5	-1.2
10y	0.9	0.8	0.5	-0.1	-0.2	-0.2	-0.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

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

Grid broadly fair to rich on 1y Z-Scores, except URC

	1y	2y	3y	5y	7y	10y	30y
3m	-1.2	0.5	0.1	0.0	-0.9	-1.5	-1.1
6m	-0.3	1.8	0.9	0.7	-0.5	-1.3	-1.3
1y	-0.8	0.7	0.7	1.4	1.0	0.2	-1.4
2y	0.6	0.2	0.4	0.8	0.8	0.4	-0.9
5y	1.5	1.3	1.1	0.6	0.5	0.3	0.0
10y	1.1	1.1	1.0	0.8	0.7	0.7	0.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 20: 3m Z-Scores w/ modified PCA framework ...

Grid broadly fair to cheap except specific tenors (e.g., 1y3y or 3y10y)

	1y	2y	3y	5y	7y	10y	30y
1m	0.2	-0.4	0.0	0.4	-3.3	-1.7	-0.1
3m	1.0	0.2	-0.3	-1.1	-1.4	-1.9	0.9
6m	0.3	0.1	-0.3	0.1	-0.8	-1.0	-1.3
1y	-0.7	-0.7	1.6	-1.0	-2.0	-0.4	-1.4
2y	-0.3	-1.0	-1.0	-0.7	-1.2	-1.1	-1.5
3y	-1.0	1.0	-1.5	-0.6	-0.5	1.9	-0.1
4y	-0.5	-0.8	-1.4	-0.8	0.7	-0.7	-0.1
5y	0.1	-2.3	-1.4	-0.6	-0.4	-1.7	-1.6
10y	2.1	-0.4	-3.0	1.1	-0.4	-1.2	-1.0
15y	-2.0	-1.5	-0.7	2.1	-1.5	-1.2	0.3
30y	-0.4	0.0	0.6	1.5	1.1	-0.7	-0.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 15: 3m Z-Scores w/ PCA framework w/o rates directionality

Grid broadly cheap when directionality considered

	1y	2y	3y	5y	7y	10y	30y
3m	-0.5	-0.4	-0.8	-0.8	-1.0	-1.1	-1.0
6m	-0.5	-0.5	-0.8	-1.0	-1.2	-1.4	-1.3
1y	-0.7	-1.0	-1.0	-1.0	-1.3	-1.4	-1.7
2y	-0.9	-1.1	-1.1	-1.2	-1.4	-1.4	-1.5
5y	-0.9	-0.9	-1.0	-1.1	-1.3	-1.3	-1.4
10y	-1.0	-1.0	-1.1	-1.1	-1.2	-1.1	-1.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 17: 6m Z-Scores w/ PCA framework w/o rates directionality

ULC slightly rich vs right side cheap when directionality considered

	1y	2y	3y	5y	7y	10y	30y
3m	0.2	0.3	0.1	-0.1	-0.7	-1.3	-1.3
6m	0.4	0.4	0.1	-0.3	-0.8	-1.2	-1.4
1y	0.3	0.0	-0.3	-0.5	-0.8	-1.1	-1.5
2y	-0.3	-0.5	-0.6	-0.8	-1.0	-1.1	-1.5
5y	-0.7	-0.8	-0.8	-1.0	-1.2	-1.2	-1.4
10y	-0.9	-0.9	-1.0	-1.1	-1.2	-1.2	-1.2

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 19: 1y Z-Scores w/ PCA framework w/o rates directionality

ULC slightly rich vs right side cheap when directionality considered

	1y	2y	3y	5y	7y	10y	30y
3m	0.4	0.6	0.4	-0.3	-1.2	-1.8	-2.0
6m	0.6	0.7	0.4	-0.5	-1.3	-1.8	-2.1
1y	0.7	0.1	-0.3	-1.0	-1.4	-1.6	-2.1
2y	-0.5	-1.0	-1.1	-1.4	-1.5	-1.7	-2.0
5y	-1.2	-1.2	-1.3	-1.4	-1.5	-1.6	-1.7
10y	-1.1	-1.1	-1.1	-1.1	-1.1	-1.2	-0.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 21: ... and w/o directionality with rates

Grid broadly fair to cheap except specific tenors

	1y	2y	3y	5y	7y	10y	30y
1m	1.1	-0.2	-0.3	0.5	-3.2	-1.9	-0.4
3m	0.5	-0.4	-0.2	-0.9	-1.2	-1.9	1.0
6m	0.1	0.1	0.1	-0.4	-1.0	-0.7	-1.7
1y	-1.0	-0.7	1.4	-0.8	-1.5	-0.3	-1.3
2y	-0.5	-1.3	-0.9	-1.0	-1.2	-0.8	-1.3
3y	-1.0	1.1	-1.2	-1.8	-0.6	0.5	-0.8
4y	-0.8	-0.7	-1.2	-1.2	0.7	-1.2	-0.4
5y	0.2	-1.0	-1.0	-0.6	-1.2	-1.8	-1.7
10y	1.9	-0.5	-2.0	1.0	-0.6	-0.8	-1.2
15y	-3.2	-1.4	-1.2	2.3	-1.5	-0.9	0.5
30y	-0.2	-0.5	0.6	1.4	0.0	-0.8	0.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Skew Relative Value

Exhibit 22: Skew 25% delta

Receiver skew rich on ULC (3m Z-Scores)

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	14.8	14.0	10.5	3.9	1.8	0.4	0.3
3M	18.2	16.5	12.4	5.4	3.1	1.3	1.4
6M	19.6	16.1	12.0	5.2	3.2	1.1	1.5
1Y	11.2	8.3	6.2	1.8	-0.1	-0.6	0.5
2Y	-5.4	-4.7	-4.0	-3.4	-3.3	-2.9	-0.5
3Y	-9.8	-8.6	-7.5	-6.2	-5.2	-4.0	-1.0
4Y	-10.2	-8.8	-7.6	-6.1	-5.3	-4.0	-1.3
5Y	-9.3	-8.2	-7.4	-5.9	-5.2	-3.9	-1.0
10Y	-3.9	-3.4	-2.4	-3.3	-3.4	-3.7	-1.5
15Y	-1.7	-1.5	-0.9	-1.6	-1.8	-2.4	-0.9
30Y	0.1	0.4	0.9	0.5	-0.2	-0.6	-0.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 23: Skew 75% delta

Payer skew rich on longer date expiries and gamma on the right side (on 3m Z-Scores)

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-14.6	-12.7	-8.4	-1.1	0.8	1.9	1.4
3M	-17.2	-13.5	-8.2	-0.3	1.6	2.8	1.9
6M	-16.1	-10.6	-5.4	1.7	3.2	4.7	3.2
1Y	-4.6	-1.4	1.1	5.1	6.5	6.5	4.4
2Y	10.9	10.3	9.9	9.0	8.6	8.2	5.0
3Y	14.9	14.1	13.4	12.1	11.4	10.0	6.2
4Y	15.6	14.6	13.9	12.4	12.0	11.0	6.9
5Y	15.2	14.5	14.1	12.7	11.9	11.1	7.1
10Y	13.6	13.3	12.7	13.0	12.8	12.6	8.4
15Y	12.8	12.6	12.3	12.4	12.2	11.4	7.7
30Y	12.2	12.0	11.8	11.7	10.7	10.5	7.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 24: Breakeven Widths for Costless Receiver Ladders

103bp breakeven width for 1y10y receiver ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	52	56	51	42	36	31	24
3M	96	101	91	75	65	57	45
6M	143	139	124	101	90	79	64
1Y	182	164	151	127	113	103	86
2Y	182	172	166	153	144	133	113
5Y	212	207	203	195	188	181	158
10Y	250	244	244	230	221	210	188

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 25: Breakeven Widths for Costless Payer Ladders

119bp breakeven width for 1y10y payer ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	38	44	41	40	36	32	25
3M	62	72	71	70	64	58	46
6M	94	102	100	97	90	85	67
1Y	150	144	140	134	127	119	92
2Y	225	212	204	188	177	167	131
5Y	328	316	307	286	272	256	197
10Y	386	376	365	361	352	342	263

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 26: 3m Z-Score Receiver Skew (w/o fwds & ATM direction)

Receiver skew fair to cheap broadly across the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-1.0	-1.2	-0.5	-1.0	-0.9	-0.8	-1.4
3M	-1.3	-0.8	-0.1	-0.8	-0.8	-1.3	-1.3
6M	-0.5	0.0	-0.1	-1.2	-0.7	-2.5	-2.3
1Y	-0.4	-0.1	-0.2	-0.3	-0.5	-1.0	-1.4
2Y	-1.0	-0.8	-0.8	-1.3	-1.4	-2.1	0.0
5Y	-0.3	0.1	0.2	-1.3	-1.6	-2.1	-1.1
10Y	-1.6	-1.8	-0.6	-3.8	-3.9	-3.9	-3.2

Source: BofA Global Research. Fwds = forwards.

BofA GLOBAL RESEARCH

Exhibit 27: 3m Z-Score Payer Skew (w/o direction w/ fwds & ATM)

... payer skew fair to rich broadly across the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.3	0.2	-0.5	0.2	0.1	0.3	0.6
3M	1.1	0.6	0.0	1.1	1.0	1.7	1.7
6M	0.7	-0.1	0.1	1.3	1.1	1.9	2.0
1Y	0.0	0.3	0.5	0.0	0.1	1.3	1.0
2Y	0.9	0.9	0.8	1.1	1.1	1.3	1.4
5Y	0.2	0.0	0.0	0.9	0.8	1.0	1.1
10Y	1.6	1.6	1.7	2.0	2.1	2.1	2.2

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 28: Ratio of Payer/Receiver BE widths for Costless Ladders

Ratios of breakeven widths < 100% on the ULC and belly

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	73%	77%	82%	95%	99%	102%	103%
3M	65%	72%	78%	93%	98%	103%	101%
6M	66%	73%	81%	95%	99%	107%	104%
1Y	83%	88%	93%	106%	112%	115%	108%
2Y	124%	124%	123%	123%	123%	125%	115%
5Y	155%	153%	152%	147%	145%	142%	125%
10Y	155%	154%	150%	157%	159%	163%	140%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 29: 3m Z-Score Ratio of Payer/Receiver Skew

Z-Scores show broadly rich payer vs receiver skew

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	1.3	1.7	0.8	1.9	1.9	2.0	2.4
3M	0.5	0.7	0.4	1.7	2.0	2.4	2.1
6M	0.2	0.0	0.3	1.3	1.0	1.8	1.3
1Y	0.0	-0.2	-0.2	-0.1	-0.2	-0.2	-0.6
2Y	0.7	0.7	0.5	0.2	0.0	0.6	0.0
5Y	1.0	0.7	0.7	1.4	1.2	1.2	0.5
10Y	1.8	1.9	1.9	2.3	2.3	2.2	2.3

Source: BofA Global Research

BofA GLOBAL RESEARCH

Conditional Curve Trades

Exhibit 30: Bull Flattener (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	9.7	18.5	24.5	10.4	17.3	8.3
6M	14.2	24.3	32.7	12.2	22.0	11.4
1Y	16.5	28.0	39.7	13.2	26.7	14.9
1.5Y	16.7	29.2	43.3	14.0	29.8	17.1
2Y	14.9	27.8	43.8	14.0	31.2	18.5

Source: BofA Global Research. ATM = at the money.

BofA GLOBAL RESEARCH

Exhibit 32: Bull Steeper (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	-9.7	-18.5	-24.5	-10.4	-17.3	-8.3
6M	-14.2	-24.3	-32.7	-12.2	-22.0	-11.4
1Y	-16.5	-28.0	-39.7	-13.2	-26.7	-14.9
1.5Y	-16.7	-29.2	-43.3	-14.0	-29.8	-17.1
2Y	-14.9	-27.8	-43.8	-14.0	-31.2	-18.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 34: Bear Flattener (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	-9.3	-18.7	-24.7	-10.4	-17.5	-8.5
6M	-13.8	-25.1	-33.3	-12.6	-22.4	-11.6
1Y	-17.1	-29.8	-41.1	-14.4	-27.8	-15.7
1.5Y	-18.3	-32.1	-45.6	-15.7	-31.3	-18.3
2Y	-16.9	-31.2	-46.4	-15.9	-33.3	-19.8

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 36: Bear Steeper (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	9.3	18.7	24.7	10.4	17.5	8.5
6M	13.8	25.1	33.3	12.6	22.4	11.6
1Y	17.1	29.8	41.1	14.4	27.8	15.7
1.5Y	18.3	32.1	45.6	15.7	31.3	18.3
2Y	16.9	31.2	46.4	15.9	33.3	19.8

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 38: Analysis of proxies for futures positioning

... short bias across the curve, particularly at the front end



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 31: Bull Flattener (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	14.9	27.1	35.3	15.1	24.9	12.2
6M	19.6	32.7	43.1	16.3	29.0	14.9
1Y	20.8	34.7	48.5	16.5	32.5	18.3
1.5Y	19.8	34.5	50.5	16.7	34.7	20.0
2Y	16.7	31.5	49.3	16.1	35.4	21.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 33: Bull Steeper (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	-14.9	-27.1	-35.3	-15.1	-24.9	-12.2
6M	-19.6	-32.7	-43.1	-16.3	-29.0	-14.9
1Y	-20.8	-34.7	-48.5	-16.5	-32.5	-18.3
1.5Y	-19.8	-34.5	-50.5	-16.7	-34.7	-20.0
2Y	-16.7	-31.5	-49.3	-16.1	-35.4	-21.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 35: Bear Flattener (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	-9.5	-21.8	-30.6	-13.4	-23.7	-12.6
6M	-14.4	-28.0	-39.2	-14.9	-28.2	-15.9
1Y	-18.5	-33.3	-47.8	-16.5	-33.7	-20.0
1.5Y	-20.2	-36.4	-52.8	-18.3	-37.6	-22.8
2Y	-19.4	-35.8	-54.0	-18.5	-39.4	-24.3

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 37: Bear Steeper (pickup to forwards for +25bp OTM)

Buy longer maturity payer, sell shorter maturity payer

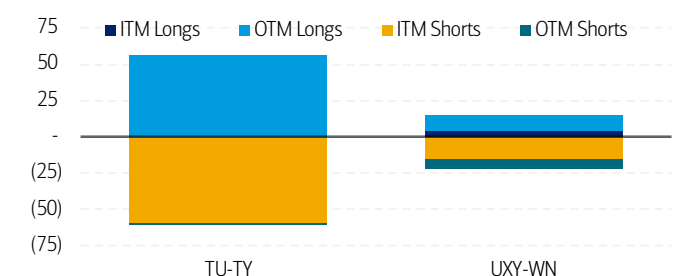
+25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	9.5	21.8	30.6	13.4	23.7	12.6
6M	14.4	28.0	39.2	14.9	28.2	15.9
1Y	18.5	33.3	47.8	16.5	33.7	20.0
1.5Y	20.2	36.4	52.8	18.3	37.6	22.8
2Y	19.4	35.8	54.0	18.5	39.4	24.3

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 39: Proxies for futures positioning across the curve

OTM longs in belly/front-end expose curve to bear flattening



Source: BofA Global Research

BofA GLOBAL RESEARCH

Forward Volatility

Exhibit 40: 6m Forward Volatility

104.0bp for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	152.5	147.1	131.6	110.4	86.0
3m	149.0	139.8	125.7	107.1	83.7
6m	154.5	137.6	123.0	105.9	82.8
1y	145.5	138.2	121.5	104.0	82.1
2y	135.3	129.1	113.6	98.0	78.5
5y	107.4	103.8	94.5	84.9	70.2
10y	83.3	80.8	76.4	71.5	61.2

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 41: 6m Fwd vol as % ATM

99% of ATM for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	99%	85%	91%	101%	100%
3m	101%	86%	92%	98%	97%
6m	100%	87%	94%	98%	96%
1y	93%	95%	99%	99%	98%
2y	99%	101%	100%	98%	97%
5y	99%	99%	98%	97%	97%
10y	97%	97%	97%	98%	98%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 42: 3m Z-Score 6m Fwd vol % ATM

3.0 Z-Score for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	0.6	0.5	0.8	1.2	0.6
3m	1.0	0.7	1.5	1.8	1.1
6m	0.9	0.7	2.0	2.2	1.2
1y	1.5	2.4	2.6	3.0	2.4
2y	2.7	3.0	3.1	3.2	2.4
5y	2.9	2.9	3.1	3.1	2.7
10y	3.5	3.5	3.0	2.6	2.6

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 43: 1y Forward Volatility

100.3bp for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	149.1	139.1	124.5	105.5	82.5
3m	144.4	139.7	124.3	104.8	82.2
6m	146.0	138.5	122.3	103.4	81.5
1y	142.9	132.3	117.4	100.3	80.0
2y	126.1	122.0	109.6	93.9	75.6
5y	102.5	99.4	90.8	81.8	67.6
10y	80.8	78.1	74.3	69.6	59.3

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 44: 1y Fwd vol as % ATM

96% of ATM for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	96%	80%	86%	96%	96%
3m	98%	86%	91%	96%	96%
6m	95%	88%	93%	96%	95%
1y	91%	91%	95%	96%	95%
2y	93%	95%	97%	94%	93%
5y	95%	95%	94%	94%	93%
10y	94%	93%	94%	95%	95%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 45: 3m Z-Score 1y Fwd vol % ATM

3.0 Z-Score for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.5	1.6	1.6	1.9	1.2
3m	2.2	2.1	2.4	2.6	1.9
6m	2.5	2.6	2.9	3.4	2.4
1y	3.1	2.6	2.5	3.0	2.6
2y	1.7	2.1	2.7	2.8	2.0
5y	2.8	2.6	2.8	2.9	2.4
10y	3.6	3.3	2.9	2.1	2.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 46: 2y Forward Volatility

90.0bp for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	109.6	112.0	105.9	90.7	71.6
3m	110.9	111.3	105.3	90.1	71.1
6m	115.8	112.3	105.6	90.1	71.3
1y	122.6	113.9	105.9	90.0	71.4
2y	111.7	109.1	100.1	85.6	69.1
5y	94.8	92.2	85.0	76.5	63.7
10y	77.5	74.1	70.7	67.0	56.8

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 47: 2y Fwd vol as % ATM

86% of ATM for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	71%	65%	73%	83%	83%
3m	75%	69%	77%	83%	83%
6m	75%	71%	80%	83%	83%
1y	78%	78%	86%	86%	85%
2y	82%	85%	88%	86%	85%
5y	87%	88%	88%	88%	88%
10y	90%	89%	90%	91%	91%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 48: 3m Z-Score 2y Fwd vol % ATM

1.2 Z-Score for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.7	1.3	0.9	1.4	0.7
3m	2.1	1.4	1.4	1.9	0.9
6m	1.9	1.2	1.4	2.0	0.9
1y	1.2	0.8	0.8	1.2	0.7
2y	0.8	0.0	0.9	1.3	0.9
5y	0.7	0.7	1.1	1.2	1.7
10y	2.5	1.7	0.5	1.5	1.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 49: 3y Forward Volatility

83.8bp for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	97.4	100.1	96.2	83.8	67.1
3m	98.9	100.6	95.6	83.1	66.6
6m	104.8	104.3	96.6	83.5	66.9
1y	115.7	109.1	97.5	83.8	67.2
2y	106.6	101.3	92.3	79.9	65.4
5y	89.2	86.7	80.6	73.0	60.2
10y	74.5	71.4	69.3	65.0	55.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 50: 3y Fwd vol as % ATM

80% of ATM for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	63%	58%	66%	76%	78%
3m	67%	62%	70%	76%	77%
6m	68%	66%	73%	77%	78%
1y	74%	75%	79%	80%	80%
2y	78%	79%	81%	80%	81%
5y	82%	83%	84%	84%	83%
10y	87%	85%	88%	89%	88%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 51: 3m Z-Score 3y Fwd vol % ATM

1.2 Z-Score for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.4	1.1	0.5	0.9	0.5
3m	2.0	1.3	0.8	1.2	0.6
6m	1.7	1.4	0.8	1.2	1.0
1y	1.2	1.5	0.6	1.2	1.5
2y	1.8	0.4	0.5	0.4	0.9
5y	0.6	0.5	1.1	1.7	1.8
10y	1.2	0.5	1.2	1.1	1.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Ratios implied/delivered

Exhibit 52: Implied vs. Delivered (21d) Ratio

Ratios of Implied to 21d delivered >100% broadly across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	155%	136%	126%	123%	119%	118%	136%
3m	125%	120%	116%	116%	115%	116%	135%
6m	106%	110%	109%	109%	111%	115%	135%
1y	96%	99%	102%	105%	109%	115%	133%
2y	103%	105%	107%	112%	115%	120%	132%

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

Exhibit 53: Implied versus Delivered (63d) Ratio

Ratios of Implied to 63d delivered <100% except right side

	1y	2y	3y	5y	7y	10y	30y
1m	87%	94%	93%	96%	95%	97%	111%
3m	72%	84%	87%	90%	92%	96%	110%
6m	72%	82%	85%	87%	91%	97%	111%
1y	77%	81%	84%	88%	93%	100%	111%
2y	87%	89%	92%	98%	103%	108%	113%

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

Exhibit 54: 3m Z-Scores for Implied versus Delivered (21d) Ratio

Ratios of implied/21d delivered rich across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	1.9	1.8	1.8	1.5	1.3	1.0	1.3
3m	1.7	1.7	1.5	1.4	1.2	1.0	1.1
6m	1.6	1.7	1.5	1.3	1.1	1.0	1.1
1y	1.5	1.4	1.3	1.1	0.9	0.8	1.0
2y	1.3	1.0	0.8	0.7	0.7	0.7	0.9

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

Exhibit 55: 3m Z-Scores for Implied versus Delivered (63d) Ratio

Ratios of implied/63d delivered fair to rich across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	1.1	1.0	0.2	0.0	-0.1	-0.1	1.9
3m	1.2	0.9	0.2	-0.1	-0.1	0.2	2.7
6m	1.5	0.9	0.2	-0.1	0.2	1.0	3.6
1y	1.2	0.1	-0.1	0.2	1.2	2.5	4.2
2y	0.3	0.2	0.4	1.9	3.0	3.9	4.4

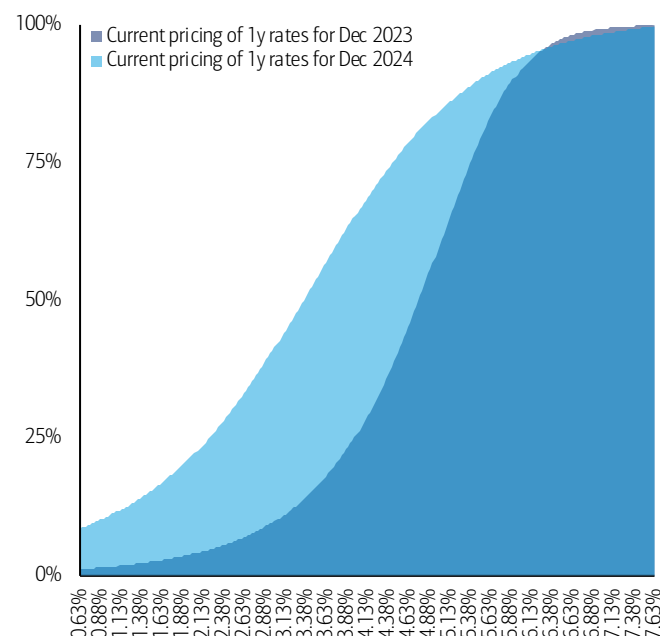
Source: BoFA Global Research

BoFA GLOBAL RESEARCH

Rates probability distributions

Exhibit 56: CDF for 1y SOFR rates at end-2023 and end-2024

1y rate cumulative distribution functions

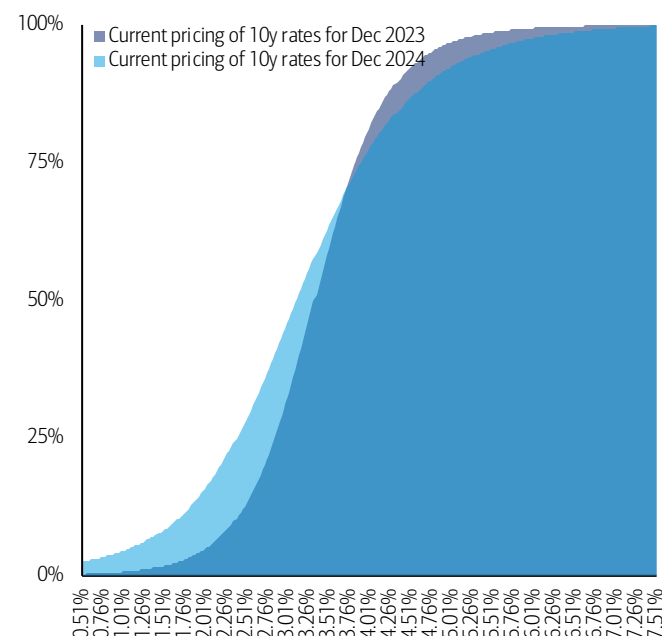


Source: BoFA Global Research

BoFA GLOBAL RESEARCH

Exhibit 57: CDF for 10y SOFR rates at end-2023 and end-2024

10y rate cumulative distribution functions



Source: BoFA Global Research

BoFA GLOBAL RESEARCH

Trade activity

Exhibit 58: 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	250	240			920		653		495	2963
1m	960	1160	240		850		3439	260	1028	9360
3m	2630	2950			500		1590	36	527	8833
6m	4166	700	200		500		1717	87	595	11825
1y	6750	2810	640		871	126	1148	358	379	13082
2y	1750	678			440		1015	50	61	3994
3Y	2300	195	12		1119		1061	270	155	5112
4Y		100			190		540	138	80	1048
5Y	1930				150		210	100	30	2420
7Y	430	150					120		254	954
10Y							1200	47	400	1647
20Y							25		120	145
30Y										
	21166	8983	1092		5540	126	12718	1346	4124	61383

Source: BofA Global Research; SDR; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 59: 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	3010	240			540		737	305	70	5211
1m	960	240	240		880	196	2772	260	1108	7529
3m	2630	2710			610		1540	310	784	9059
6m	2855	980	215		400		1921	137	605	7333
1y	7000	3060	640		826	126	1488	358	329	14007
2y	1750	678	110		440		1015	50	50	4093
3Y	2300	150	12		1119	12	1141	270	155	5159
4Y		100			190		540	138	80	1048
5Y	1930				150		210	100	30	2420
7Y	430	150					120		254	954
10Y							1116	47	400	1563
20Y							185		120	305
30Y										
	22865	8308	1217		5155	334	12785	1975	3985	58681

Source: BofA Global Research; SDR; Bloomberg

BofA GLOBAL RESEARCH

Exhibit 60: 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		480								480
1m	1000	150					65		60	1283
3m	920						6		25	951
6m							50			50
1y	1000						135			1135
2y		200		240		300	50			790
3Y										
4Y							270			270
5Y					45					45
7Y							90			90
10Y							200			200
20Y										
30Y										
	2920	830		240	45	300	866		85	5294

Source: BofA Global Research; SDR; Bloomberg

BofA GLOBAL RESEARCH

Formosa issuance

Exhibit 61: 2022 Formosa issuance (\$m)

14.8bn total issuance for the year '22

	2	5	7	10	15	20	25	30
1			75	513	20			
2		40		640				
3				110	20			125
4		15		179	50			
5				20	45	220	80	10,226
7			30					
10				2,000				363
15								
20								
25								
30								

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 62: 2023 Formosa issuance YTD (\$m)

Limited issuance YTD

	2	5	7	10	15	20	25	30
1								
2				340				
3		40						
4		182		160				
5				135			15	
7								
10								25
15								
20								
25								
30								1000

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 63: Formosa issuance (\$m) since 2014

Peak issuance concentrated on the 5y30y tenor

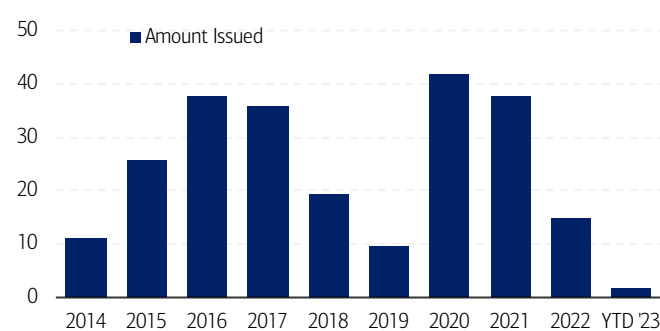
	2	5	7	10	15	20	25	30
1		205	75	1033	462	840		18054
2		40		1134		1485		22177
3		40		110	20	240	225	15536
4		197		339	50	25	275	2441
5				155	445	1497	368	111658
7			30					5624
10				2000				4489
15								
20								
25								
30								6500

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 64: Total issuance per year since 2014 (\$bn)

Rough 1.94bn issuance YTD



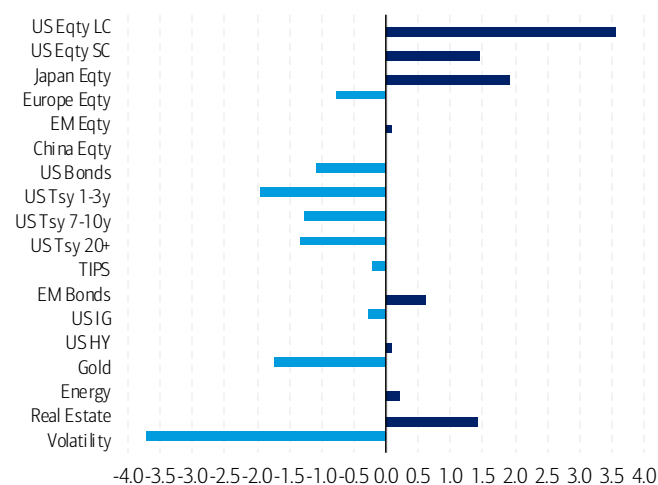
Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Allocation bias from ETF flows

Exhibit 65: Allocation bias from ETF flows – week ending 6/9

Short equity vol bias persists as short duration bias decreases slightly

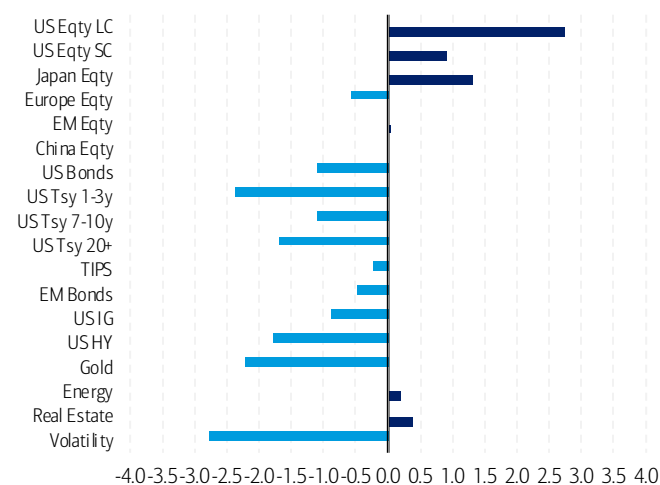


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 66: Allocation bias from ETF flows – week ending 6/2

Risk on bias suggested by proxies of position obtained from ETFs



Source: BofA Global Research

BofA GLOBAL RESEARCH

Notes

Exhibit 13: 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 14/15/17: 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 15/16/18: 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 24/24: In a payer/receiver ladder, one buys the ATM strike and then sells ATM+/-x and ATM+/-2x. In the terminal payoff diagram, the position starts losing money when the forwards move past ATM+/-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+/- (x+delta) and ATM+/-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 26/26: 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.

Disclosures

Important Disclosures

BoFA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible. BoFA Securities fixed income analysts regularly interact with sales and trading desk personnel in connection with their research, including to ascertain pricing and liquidity in the fixed income markets.

Other Important Disclosures

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BoFA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

This report may refer to fixed income securities or other financial instruments that may not be offered or sold in one or more states or jurisdictions, or to certain categories of investors, including retail investors. Readers of this report are advised that any discussion, recommendation or other mention of such instruments is not a solicitation or offer to transact in such instruments. Investors should contact their BoFA Securities representative or Merrill Global Wealth Management financial advisor for information relating to such instruments.

Rule 144A securities may be offered or sold only to persons in the U.S. who are Qualified Institutional Buyers within the meaning of Rule 144A under the Securities Act of 1933, as amended. SECURITIES OR OTHER FINANCIAL INSTRUMENTS DISCUSSED HEREIN MAY BE RATED BELOW INVESTMENT GRADE AND SHOULD THEREFORE ONLY BE CONSIDERED FOR INCLUSION IN ACCOUNTS QUALIFIED FOR SPECULATIVE INVESTMENT.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

The securities or other financial instruments discussed in this report may be traded over-the-counter. Retail sales and/or distribution of this report may be made only in states where these instruments are exempt from registration or have been qualified for sale.

Officers of BoFA or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

This report, and the securities or other financial instruments discussed herein, may not be eligible for distribution or sale in all countries or to certain categories of investors, including retail investors.

Refer to [BoFA Global Research policies relating to conflicts of interest](#).

"BoFA Securities" includes BoFA Securities, Inc. ("BoFA") and its affiliates. Investors should contact their BoFA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BoFA Securities" is a global brand for BoFA Global Research.

Information relating to Non-US affiliates of BoFA Securities and Distribution of Affiliate Research Reports:

BoFA and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BoFASE (France): BoFA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BoFA Securities Europe SA ("BoFASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no. 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BoFASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BoFASE's share capital can be found at www.bofam.com/BoFASEdisclaimer; BoFA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BoFA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BoFA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Investment Industry Regulatory Organization of Canada; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BoFA Japan: BoFA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BoFA India: BoFA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BoFASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BoFA Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BoFA India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BoFA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BoFA Securities entities, including BoFA Europe and BoFASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BoFA Securities group. You may be contacted by a different BoFA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclaimers](#) for further information.

This information has been prepared and issued by BoFA and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BoFA and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BoFA and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security

discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

This report may contain a trading idea or recommendation which highlights a specific identified near-term catalyst or event impacting a security, issuer, industry sector or the market generally that presents a transaction opportunity, but does not have any impact on the analyst's particular "Overweight" or "Underweight" rating (which is based on a three month trade horizon). Trading ideas and recommendations may differ directionally from the analyst's rating on a security or issuer because they reflect the impact of a near-term catalyst or event.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright and General Information:

Copyright 2023 Bank of America Corporation. All rights reserved. iQDatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS or any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.

Research Analysts

Ralph Axel

Rates Strategist
BofAS
ralph.axel@bofa.com

Bruno Braizinha, CFA

Rates Strategist
BofAS
bruno.braizinha@bofa.com

Mark Cabana, CFA

Rates Strategist
BofAS
mark.cabana@bofa.com

Katie Craig

Rates Strategist
BofAS
katie.craig@bofa.com

Meghan Swiber, CFA

Rates Strategist
BofAS
meghan.swiber@bofa.com

Anna (Caiyi) Zhang

Rates Strategist
BofAS
cai yi.zhang@bofa.com

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

