

US Rates Watch

Vol views – Gradually lower

Slowdown vs reacceleration

The market seems to continue to assign relatively split odds between slowdown and reacceleration scenarios. The recent dynamic of 10y breakevens (see Exhibit 1) shows a c.45-50% frequency of bull tightening moves (which reflect expectations for slower growth and inflation ahead) and c.40-45% of bear widening ones (which reflect reacceleration expectations).

Soft vs hard landing scenarios

Within slowdown scenarios, harder landing odds seem to be relatively small. One way to gauge these odds is to look at the options implied probability distribution function for 1y10y rates (see Exhibit 55). As we argued in recent publications, soft landing scenarios should drive a conversion of 10yT yields to their c.2.75-3% steady state (2.5-2.75% for 10y SOFR yields at constant spreads), and it is only in harder landing scenarios that we expect to see a more significant richening vs the steady state. Currently, less than 20% of the mass of the distribution for 1y10y rates lies below the steady, suggesting less than 20% probability assigned to harder landing scenarios.

Baseline expectations and duration view

Baseline market expectations therefore seem to continue to be slightly biased towards slowdown scenarios (c.45-50%) vs reacceleration (c.40-45%), with less than 20% odds of harder landing scenarios. Soft landing scenarios, or scenarios whereby the market continues to price slowdown expectations at a c.6-12m horizon on a rolling basis (see Exhibit 2 and Exhibit 3), support a carry context (see report [Postcard from Brazil](#)), buying dips in duration, and expectations for a further gradual normalization of the vol grid.

We see 10yT levels beyond fair values consistent with US macro fundamentals and the dynamic of global yields (c.3.8-3.85% – see report [Monthly rates models: July '23 edition](#)) as attractive to add to long duration exposures (see report [Enter 10yT duration longs](#)). Volatility looks fair to cheap on our RV metrics (see Exhibit 15), and the 1m10y vs 1y10y vol spread looks fair in the -5bp to the +5bp range (upper end of the range as the Fed moves to on hold – see Exhibit 9). The left side of the grid has scope to normalize further vs right side – 1y1y vs 1y10y looks fairer at c.30bp vs c.45bp currently as the Fed delivers the last hikes of the cycle (see report [Rates roadmap for a Fed on hold](#) and Exhibit 10).

Positioning

We continue to be biased towards exposures where investors pay a premium but limit the sensitivity to downside scenarios terminally beyond the upfront premium. Receiver spreads (which we recommend recently on a view to fade reacceleration expectations) and 2s10s curve caps, continue to make sense in this context. We close our long 6m10y payer costless ladder recommendation (see report [Where has all the value gone](#)) at c.+13bp currently.

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.

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Refer to important disclosures on page 12 to 13. Analyst Certification on page 11. 12582487

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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

c. – circa (approximately)

CDF – Cumulative Distribution Function

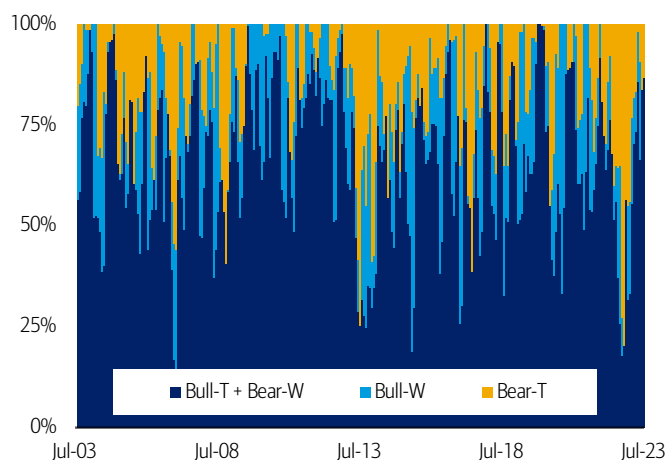
PDF – Probability Density Function

BE – Inflation Breakevens

For a list of recent recommendations please see our [Global Rates Weekly](#)

Exhibit 1: Decomposition of the 10y BE dynamic as a function of bull tightening + bear widening moves (the orthodox dynamic of breakevens) along with bull widening and bear tightening ones

Expectations for recoupling of growth and inflation fundamentals ahead reflected in higher frequencies of orthodox moves



Source: BofA Global Research

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Exhibit 2: Expectations for the timing of the first full rate cut

First full cut pricing pushed out from 3m to 10m horizon between March and early July and are now back at a c.8m horizon.

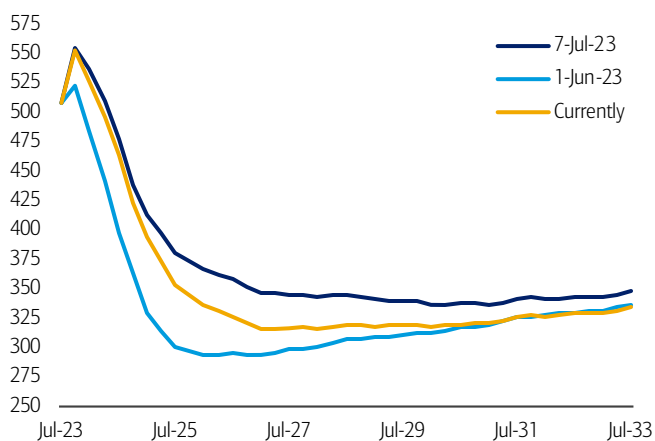


Source: BofA Global Research

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Exhibit 3: Policy expectations for the Fed

3-5y sector exposed to a repricing of medium term policy rates back to steady state (i.e., neutral rate) expectations



Source: BofA Global Research

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Levels and Recent Moves

Exhibit 4: ATM Normal Volatility Grid

104bp for 1y10y volatility on Friday's close

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	106	144	141	128	112	99	70
3M	110	145	143	131	117	103	77
6M	130	148	142	129	117	105	82
1Y	149	143	135	122	112	104	83
2Y	133	128	123	114	107	100	80
3Y	122	118	114	107	102	96	78
4Y	114	111	107	101	97	91	75
5Y	108	105	102	97	93	88	72
10Y	85	83	81	78	76	72	62
30Y	61	59	58	56	54	52	47

Source: BofA Global Research

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Exhibit 5: ATM Volatility Grid - 3m Z-Scores

Grid broadly cheap on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-1.7	-1.4	-1.1	-1.1	-1.2	-1.2	-1.9
3M	-1.9	-1.5	-1.2	-1.0	-1.0	-1.3	-1.9
6M	-1.9	-1.4	-1.2	-0.9	-0.8	-1.1	-1.5
1Y	-1.4	-0.9	-1.0	-0.8	-0.8	-0.9	-1.2
2Y	-1.2	-0.6	-0.6	-0.6	-0.6	-0.6	-1.0
3Y	-0.6	-0.4	-0.4	-0.3	-0.3	-0.4	-0.8
4Y	-0.6	-0.5	-0.5	-0.4	-0.5	-0.5	-0.9
5Y	-0.5	-0.3	-0.4	-0.4	-0.5	-0.5	-1.0
10Y	-1.1	-0.9	-1.0	-1.2	-1.3	-1.3	-1.4
30Y	-1.5	-1.5	-1.5	-1.4	-1.3	-1.4	-1.3

Source: R BofA Global Research

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Exhibit 6: ATM Normal Volatility Grid - CoW

Upper left side and gamma underperformed over the last week

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-8.3	-5.9	-4.1	-2.2	-2.7	-3.3	-5.4
3M	-8.2	-3.7	-2.9	-0.1	-1.3	-2.6	-2.4
6M	-7.2	-1.3	-1.2	0.8	0.3	-0.2	-0.4
1Y	-2.3	1.7	1.0	0.3	-0.7	0.2	0.7
2Y	-1.2	0.7	0.7	0.7	0.6	0.4	0.8
3Y	1.4	1.5	1.6	1.7	1.4	1.1	1.4
4Y	1.0	1.0	1.0	0.9	0.8	0.6	1.0
5Y	1.6	1.5	1.4	1.0	0.8	0.7	0.6
10Y	0.4	0.4	0.2	-0.2	-0.2	-0.2	0.0
30Y	-0.5	-0.5	-0.5	-0.5	-0.5	-0.4	-0.3

Source: BofA Global Research

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Exhibit 7: ATM Straddle Premiums (indicative only)

6.6% straddle premiums for 1y10y

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.2%	0.6%	0.9%	1.3%	1.6%	1.9%	3.1%
3M	0.4%	1.1%	1.6%	2.4%	2.9%	3.4%	5.9%
6M	0.7%	1.5%	2.2%	3.2%	4.0%	4.9%	8.6%
1Y	1.1%	2.1%	2.9%	4.2%	5.3%	6.6%	12.1%
2Y	1.3%	2.5%	3.6%	5.4%	6.8%	8.7%	16.1%
3Y	1.5%	2.8%	4.0%	6.0%	7.7%	9.8%	18.5%
4Y	1.5%	2.9%	4.2%	6.3%	8.2%	10.5%	20.0%
5Y	1.6%	3.0%	4.3%	6.5%	8.5%	10.9%	21.1%
10Y	1.5%	2.8%	4.1%	6.3%	8.3%	10.9%	22.3%
30Y	1.0%	2.0%	2.9%	4.6%	6.1%	8.0%	19.7%

Source: BofA Global Research

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Exhibit 8: 1y10y vol dynamic since the COVID recession

Rich 1y10y vol vs. c. 100-120bp expected range for 2023

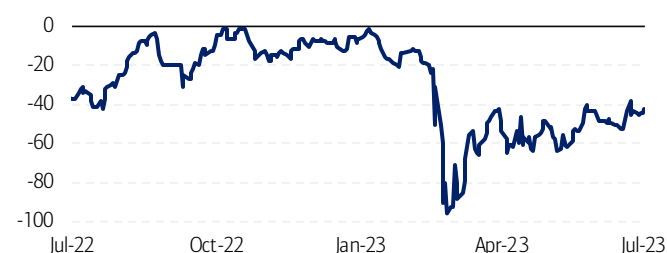


Source: BofA Global Research; Bloomberg

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Exhibit 9: 3m10y vs. 3m2y Normal Volatility

Left side cheapened slightly vs right side over the last week

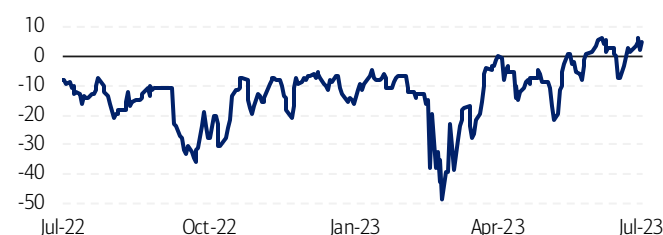


Source: BofA Global Research; Bloomberg

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Exhibit 10: 1y10y vs. 1m10y Normal Volatility

Vol term structure desinvested

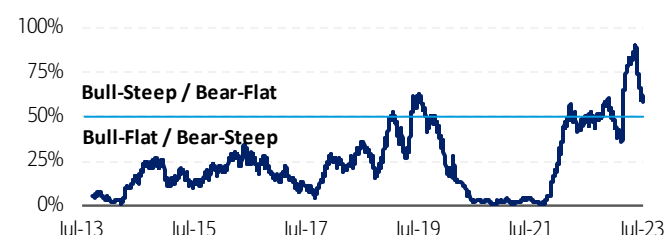


Source: BofA Global Research; Bloomberg

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Exhibit 11: 2s10s curve directionality only 40% frontend driven

Frontend lost some degree of freedom in recent weeks



Source: BofA Global Research

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Volatility Grid Relative Value

PCA Z-SCORES

Exhibit 12: 3m Z-Scores w/ PCA framework

Grid broadly cheap except for short expiries in belly on 3m Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-0.5	-0.1	1.6	1.2	0.4	-1.1	-1.0
6m	-1.0	0.2	1.9	1.3	0.9	-0.5	1.7
1y	-0.6	0.8	0.7	-1.5	-1.6	-1.2	-1.0
2y	-1.6	0.7	0.4	-0.1	-0.4	-0.8	-0.5
5y	-0.4	-0.2	-0.2	-0.2	-0.2	-0.5	-1.1
10y	-1.2	-1.1	-1.4	-2.0	-2.1	-2.6	-2.4

Source: BofA Global Research

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Exhibit 14: 6m Z-Scores w/ PCA framework

Some richness in the belly vs wings on 6m Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-2.2	2.1	0.9	2.5	0.4	-1.5	-2.6
6m	-1.8	0.6	0.1	2.2	1.7	-0.8	-2.3
1y	-1.7	-0.3	-1.0	-0.6	1.0	0.7	-1.4
2y	-1.5	-0.1	0.0	1.6	1.2	0.7	-1.1
5y	1.6	1.9	1.8	1.2	0.8	0.5	-1.1
10y	-0.1	0.1	-0.4	-1.2	-1.6	-1.7	-1.4

Source: BofA Global Research

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Exhibit 16: 1y Z-Scores w/ PCA framework

Rich belly vs wings on 1y Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-2.7	1.0	1.8	0.9	-0.7	-2.2	-2.8
6m	-1.6	2.4	2.1	2.3	0.9	-2.0	-2.4
1y	-2.3	1.9	1.7	1.8	1.1	-0.4	-2.0
2y	0.9	1.6	1.9	1.8	1.4	0.6	-1.5
5y	1.6	1.6	1.3	1.0	0.8	0.6	-0.2
10y	0.5	0.6	0.5	0.2	0.2	0.1	-0.1

Source: BofA Global Research

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Exhibit 18: 3m Z-Scores w/ modified PCA framework ...

Grid broadly cheap

	1y	2y	3y	5y	7y	10y	30y
1m	0.7	-0.3	-0.7	0.3	-1.2	-1.7	-1.8
3m	0.2	0.5	-1.2	-0.3	-1.7	-1.5	0.9
6m	-1.0	-0.8	0.1	-0.6	-0.9	-0.7	-1.6
1y	-0.7	-0.8	0.9	-1.1	-0.9	-0.4	-1.1
2y	-0.6	-0.9	-0.5	-0.9	-0.2	-1.7	-1.2
3y	-0.3	0.9	-0.8	-0.8	-0.5	0.8	0.5
4y	-0.1	0.3	-0.7	-1.2	1.5	-1.4	-2.7
5y	0.0	0.2	-1.5	-0.2	-1.5	-1.2	-1.1
10y	1.7	-1.3	-0.7	1.1	-0.3	-0.4	-1.0
15y	-1.3	-0.9	0.1	-3.1	-0.1	0.6	-1.1
30y	-0.9	0.0	0.6	-1.4	0.7	0.6	1.0

Source: BofA Global Research

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

Grid fair to cheap broadly when directionality is considered

	1y	2y	3y	5y	7y	10y	30y
3m	-2.0	-1.2	-0.8	-0.6	-0.7	-1.2	-2.0
6m	-1.9	-1.0	-0.8	-0.5	-0.5	-0.9	-1.4
1y	-1.1	-0.5	-0.6	-0.6	-0.7	-0.7	-1.0
2y	-0.9	-0.3	-0.3	-0.3	-0.4	-0.5	-0.7
5y	-0.3	-0.2	-0.2	-0.2	-0.3	-0.3	-0.7
10y	-0.9	-0.8	-0.9	-1.1	-1.2	-1.2	-1.3

Source: BofA Global Research

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

... but grid fair to cheap broadly when directionality is considered

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

Source: BofA Global Research

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

... but grid fair to cheap broadly when directionality is considered

	1y	2y	3y	5y	7y	10y	30y
3m	-0.6	0.0	0.1	-0.4	-1.2	-1.8	-2.2
6m	-0.2	0.2	0.1	-0.4	-1.0	-1.5	-1.9
1y	0.2	0.1	-0.2	-0.7	-1.0	-1.3	-1.7
2y	-0.5	-0.6	-0.7	-0.9	-1.0	-1.1	-1.5
5y	-0.8	-0.7	-0.8	-0.9	-0.9	-1.0	-1.3
10y	-1.0	-0.9	-0.9	-1.0	-1.1	-1.1	-1.0

Source: BofA Global Research

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Exhibit 19: ... and w/o directionality with rates

Grid broadly cheap when directionality is considered

	1y	2y	3y	5y	7y	10y	30y
1m	0.3	0.0	-0.6	0.3	-1.1	-1.5	-2.1
3m	-0.2	-0.8	-1.0	-0.1	-1.0	-1.6	0.6
6m	-1.0	-0.7	0.0	-0.5	-1.1	-0.8	-1.7
1y	-0.3	-0.8	1.0	-1.0	-1.2	-0.4	-1.4
2y	-0.4	-0.8	-0.7	-1.0	-0.2	-2.0	-1.2
3y	-0.3	1.0	-1.2	-0.9	-0.7	2.1	-0.8
4y	-0.7	1.0	-0.4	-1.1	1.6	-0.9	-2.7
5y	-0.1	-0.5	-0.9	-0.4	-0.8	-1.2	-1.3
10y	1.8	-1.0	-1.3	1.1	-0.7	-0.6	-1.0
15y	-0.6	-0.9	0.3	-2.6	-1.6	0.8	-1.2
30y	-0.1	0.3	0.6	-1.0	0.6	-0.6	1.3

Source: BofA Global Research

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Skew Relative Value

Exhibit 20: Skew 25% delta

Receiver skew rich on 3m Z-Scores for intermediates on the left side

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	8.3	8.8	6.7	2.1	0.7	-0.1	0.3
3M	14.0	15.1	11.9	4.5	2.2	0.5	0.3
6M	17.6	15.9	12.3	5.2	2.8	0.4	0.6
1Y	12.8	9.8	7.4	2.3	0.1	-1.1	0.2
2Y	-3.8	-3.8	-3.2	-3.5	-3.4	-3.0	-0.7
5Y	-8.5	-7.6	-6.2	-5.9	-5.3	-4.5	-1.8
10Y	-5.2	-4.8	-4.2	-4.2	-4.0	-4.0	-2.3
30Y	-0.7	-0.4	0.1	-0.1	-0.7	-0.9	-0.4

Source: BofA Global Research

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Exhibit 21: Skew 75% delta

Payer skew on ULC cheap on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-10.6	-11.4	-8.0	-1.2	0.2	1.2	1.6
3M	-14.0	-13.2	-8.6	-0.1	1.9	3.2	2.5
6M	-15.0	-11.5	-6.6	1.2	3.2	5.1	3.8
1Y	-6.9	-3.5	-0.5	4.4	6.1	6.8	4.6
2Y	9.4	9.3	9.0	8.9	8.5	8.2	5.0
5Y	14.7	14.1	13.3	12.7	11.8	11.1	7.0
10Y	13.7	13.5	13.2	12.8	12.4	12.1	7.4
30Y	12.8	12.6	12.3	12.1	11.1	10.7	7.4

Source: BofA Global Research

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Exhibit 22: Breakeven Widths for Costless Receiver Ladders

102bp breakeven width for 1y10y receiver ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	38	49	47	39	34	29	21
3M	74	93	87	72	62	53	40
6M	124	131	121	101	88	76	59
1Y	179	166	152	127	113	102	84
2Y	181	174	168	154	144	134	112
5Y	214	209	207	196	189	180	155
10Y	242	237	234	223	217	206	183

Source: BofA Global Research

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Exhibit 23: Breakeven Widths for Costless Payer Ladders

118bp breakeven width for 1y10y payer ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	27	38	38	38	33	30	21
3M	46	64	66	68	62	56	42
6M	77	93	94	95	89	83	64
1Y	138	138	135	131	125	118	94
2Y	216	210	202	189	178	167	130
5Y	324	313	302	287	272	258	196
10Y	386	377	370	357	346	333	251

Source: BofA Global Research

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

Receiver skew rich in short gamma and left side

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

Source: BofA Global Research

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Exhibit 25: 3m Z-Score Payer Skew (w/o direction w/ fwds & ATM)

Payer skew cheap fair to cheap, particularly on the left side

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.1	0.4	0.7	0.5	0.6	0.4	0.1
3M	-0.3	-0.4	-0.1	0.1	0.0	-0.5	-0.7
6M	-0.7	-0.4	-0.5	-0.2	0.0	-0.2	-0.1
1Y	-0.6	-0.5	-0.4	-0.2	-0.1	0.4	-0.4
2Y	-0.9	-0.4	-0.4	0.3	0.3	0.4	1.0
5Y	-1.3	-1.5	-1.4	0.6	0.4	0.9	0.1
10Y	0.6	0.7	0.8	0.5	0.3	0.2	-0.5

Source: BofA Global Research

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Exhibit 26: Ratio of Payer/Receiver BE widths for Costless Ladders

Ratios of breakeven widths > 100% on the right side and intermediates

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	71%	77%	81%	95%	99%	102%	104%
3M	63%	69%	76%	94%	101%	105%	105%
6M	63%	71%	78%	94%	101%	109%	109%
1Y	77%	83%	89%	104%	111%	116%	111%
2Y	120%	120%	120%	123%	123%	125%	116%
5Y	152%	150%	146%	147%	144%	143%	126%
10Y	159%	159%	158%	160%	160%	162%	137%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 27: 3m Z-Score Ratio of Payer/Receiver Skew

Cheap payer vs receiver skew for intermediates on left side

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.3	0.8	0.5	0.9	0.8	0.9	1.1
3M	-0.1	-0.3	-0.3	0.8	0.9	0.9	1.0
6M	-0.5	-0.3	-0.4	0.3	0.7	0.9	1.2
1Y	-1.3	-1.1	-1.0	-0.5	-0.3	0.5	1.0
2Y	-1.6	-1.3	-1.2	0.0	0.0	0.7	1.1
5Y	-1.3	-1.6	-1.5	0.7	0.6	1.1	1.0
10Y	1.0	1.0	1.1	0.9	0.8	0.6	0.3

Source: BofA Global Research

BofA GLOBAL RESEARCH

Conditional Curve Trades

Exhibit 28: 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	5.4	14.9	21.8	10.4	18.1	9.3
6M	10.1	20.8	30.0	12.4	22.6	12.0
1Y	16.1	27.2	39.2	13.0	26.5	14.9
1.5Y	16.1	28.6	43.1	14.2	30.0	17.5
2Y	14.4	27.6	44.2	14.4	32.3	19.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 30: 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	-5.4	-14.9	-21.8	-10.4	-18.1	-9.3
6M	-10.1	-20.8	-30.0	-12.4	-22.6	-12.0
1Y	-16.1	-27.2	-39.2	-13.0	-26.5	-14.9
1.5Y	-16.1	-28.6	-43.1	-14.2	-30.0	-17.5
2Y	-14.4	-27.6	-44.2	-14.4	-32.3	-19.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 32: 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	-5.2	-15.3	-22.4	-10.8	-18.5	-9.5
6M	-9.7	-21.8	-30.8	-13.0	-23.3	-12.4
1Y	-16.5	-29.2	-40.7	-14.2	-27.8	-15.7
1.5Y	-17.5	-31.7	-45.4	-15.7	-31.9	-18.8
2Y	-16.3	-31.0	-47.0	-16.1	-34.5	-21.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 34: Bear Steepener (pickup to forwards for ATM)

Buy longer maturity payer, sell shorter maturity payer

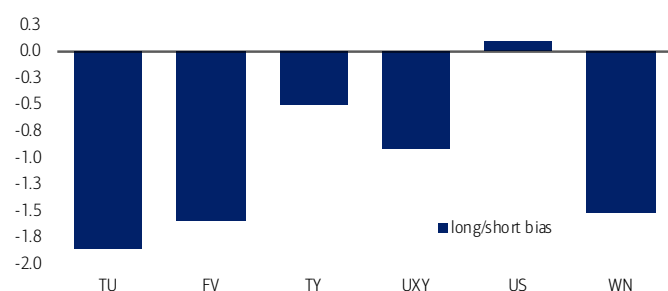
ATM	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	5.2	15.3	22.4	10.8	18.5	9.5
6M	9.7	21.8	30.8	13.0	23.3	12.4
1Y	16.5	29.2	40.7	14.2	27.8	15.7
1.5Y	17.5	31.7	45.4	15.7	31.9	18.8
2Y	16.3	31.0	47.0	16.1	34.5	21.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 36: Analysis of proxies for futures positioning

Despite recent rally futures positioning proxies continue to be biased short



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 29: 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	10.1	23.3	32.9	15.5	26.3	14.0
6M	15.1	29.2	40.5	16.9	30.2	15.9
1Y	20.6	34.3	48.1	16.5	32.5	18.3
1.5Y	19.4	34.1	50.7	16.9	35.3	20.4
2Y	16.3	31.3	50.1	16.3	36.8	22.2

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 31: 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	-10.1	-23.3	-32.9	-15.5	-26.3	-14.0
6M	-15.1	-29.2	-40.5	-16.9	-30.2	-15.9
1Y	-20.6	-34.3	-48.1	-16.5	-32.5	-18.3
1.5Y	-19.4	-34.1	-50.7	-16.9	-35.3	-20.4
2Y	-16.3	-31.3	-50.1	-16.3	-36.8	-22.2

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 33: 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	-3.6	-17.1	-27.8	-13.8	-25.3	-14.4
6M	-9.3	-23.7	-36.2	-15.3	-29.4	-16.9
1Y	-17.5	-32.1	-46.8	-16.1	-33.5	-20.2
1.5Y	-19.0	-35.4	-52.4	-18.3	-38.2	-23.3
2Y	-18.5	-35.3	-54.6	-18.7	-40.7	-25.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 35: Bear Steepener (pickup to forwards for +25bp OTM)

Buy longer maturity payer, sell shorter maturity payer

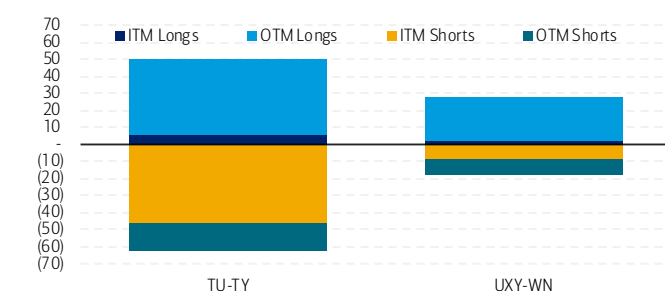
+25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	3.6	17.1	27.8	13.8	25.3	14.4
6M	9.3	23.7	36.2	15.3	29.4	16.9
1Y	17.5	32.1	46.8	16.1	33.5	20.2
1.5Y	19.0	35.4	52.4	18.3	38.2	23.3
2Y	18.5	35.3	54.6	18.7	40.7	25.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 37: Proxies for futures positioning across the curve

Frontend OTM longs may put bear flattening pressure on the curve



Source: BofA Global Research

BofA GLOBAL RESEARCH

Forward Volatility

Exhibit 38: 6m Forward Volatility

103.5bp for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	139.5	138.7	125.0	106.9	84.5
3m	142.1	137.1	122.4	105.7	83.9
6m	152.1	138.2	119.8	105.3	84.5
1y	133.9	134.7	119.4	103.5	82.4
2y	133.0	128.9	114.2	99.1	79.2
5y	108.0	104.8	95.9	86.1	70.8
10y	83.2	80.7	76.0	71.2	61.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 39: 6m Fwd vol as % ATM

100% of ATM for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	132%	96%	97%	108%	121%
3m	129%	95%	93%	103%	109%
6m	117%	93%	93%	100%	104%
1y	90%	94%	98%	100%	100%
2y	100%	101%	100%	99%	99%
5y	100%	100%	99%	98%	98%
10y	98%	97%	97%	98%	99%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 40: 3m Z-Score 6m Fwd vol % ATM

1.0 Z-Score for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	2.0	1.6	1.1	1.4	2.5
3m	2.2	1.5	0.7	1.4	2.2
6m	1.9	1.3	0.5	1.1	1.8
1y	-0.7	0.6	0.7	1.0	1.5
2y	1.0	0.9	1.0	1.2	1.5
5y	0.9	0.9	1.0	1.1	1.2
10y	1.0	0.9	1.1	1.1	1.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 41: 1y Forward Volatility

100.6bp for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	144.7	139.1	123.4	105.1	82.1
3m	135.8	137.5	123.2	104.0	80.8
6m	135.6	136.2	121.7	103.0	80.3
1y	132.2	131.3	117.7	100.6	79.0
2y	127.9	123.8	111.5	95.6	76.2
5y	103.2	100.5	91.8	82.7	67.8
10y	80.7	77.9	73.8	69.2	58.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 42: 1y Fwd vol as % ATM

97% of ATM for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	136%	97%	96%	107%	117%
3m	123%	95%	94%	101%	105%
6m	104%	92%	94%	98%	98%
1y	89%	92%	97%	97%	96%
2y	96%	97%	98%	96%	95%
5y	95%	96%	95%	94%	94%
10y	95%	94%	94%	95%	96%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 43: 3m Z-Score 1y Fwd vol % ATM

1.2 Z-Score for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.7	1.4	1.1	1.3	2.3
3m	1.8	1.4	1.0	1.4	2.1
6m	1.4	1.2	1.0	1.2	1.7
1y	0.6	1.0	1.1	1.2	1.4
2y	1.5	1.2	1.4	1.3	1.5
5y	0.9	0.9	0.8	1.0	1.0
10y	1.0	0.8	0.9	0.9	0.8

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 44: 2y Forward Volatility

91.5bp for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	103.5	104.7	103.3	89.7	71.5
3m	107.9	107.9	104.7	90.7	72.3
6m	111.7	110.2	105.7	91.2	72.6
1y	116.7	112.9	106.5	91.5	72.9
2y	111.6	108.7	100.7	86.5	69.4
5y	95.7	93.6	85.9	77.2	63.7
10y	77.5	73.7	69.8	66.4	55.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 45: 2y Fwd vol as % ATM

88% of ATM for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	98%	73%	81%	91%	102%
3m	98%	75%	80%	88%	94%
6m	86%	75%	82%	87%	89%
1y	78%	79%	87%	88%	88%
2y	84%	85%	88%	87%	87%
5y	88%	89%	89%	88%	88%
10y	91%	89%	89%	92%	91%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 46: 3m Z-Score 2y Fwd vol % ATM

1.5 Z-Score for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.6	1.1	1.1	1.4	2.3
3m	1.9	1.4	1.2	1.7	2.3
6m	1.5	1.2	1.2	1.5	1.9
1y	0.4	0.7	1.3	1.5	1.6
2y	1.2	0.3	0.8	1.0	0.9
5y	0.6	0.6	0.3	0.4	0.5
10y	0.8	0.2	-0.4	0.5	-0.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 47: 3y Forward Volatility

83.2bp for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	94.1	96.4	91.6	81.8	63.4
3m	99.1	100.0	93.6	81.7	64.7
6m	104.0	102.9	95.0	82.5	65.4
1y	111.5	106.1	96.2	83.2	66.0
2y	105.1	101.2	93.5	81.1	65.4
5y	89.8	87.7	80.8	73.3	59.6
10y	74.3	70.6	68.4	64.3	53.6

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 48: 3y Fwd vol as % ATM

80% of ATM for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	89%	67%	71%	83%	90%
3m	90%	69%	71%	80%	84%
6m	80%	70%	73%	78%	80%
1y	75%	74%	79%	80%	80%
2y	79%	79%	82%	81%	82%
5y	83%	83%	83%	83%	82%
10y	87%	85%	88%	89%	87%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 49: 3m Z-Score 3y Fwd vol % ATM

0.6 Z-Score for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	1.5	1.0	0.5	1.1	1.7
3m	1.7	1.1	0.5	1.2	1.7
6m	1.4	0.9	0.3	0.8	1.1
1y	0.5	0.3	0.3	0.6	0.6
2y	1.1	0.4	0.6	0.6	0.4
5y	0.2	0.2	-0.2	0.0	-0.1
10y	0.2	-0.9	-0.5	0.1	-0.9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Ratios implied/delivered

Exhibit 50: Implied vs. Delivered (21d) Ratio

Ratios of Implied to 21d delivered still <100% virtually across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	129%	111%	100%	94%	89%	88%	95%
3m	101%	101%	95%	94%	92%	91%	104%
6m	90%	92%	89%	90%	91%	93%	110%
1y	83%	82%	83%	85%	88%	93%	113%
2y	76%	80%	83%	88%	91%	97%	115%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 51: Implied vs. Delivered (63d) Ratio

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

	1y	2y	3y	5y	7y	10y	30y
1m	95%	102%	100%	98%	95%	95%	95%
3m	81%	96%	97%	99%	98%	98%	104%
6m	79%	91%	93%	96%	98%	100%	110%
1y	83%	88%	90%	93%	97%	101%	113%
2y	88%	92%	95%	100%	102%	107%	113%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 52: 3m Z-Scores for Implied vs. Delivered (21d) Ratio

Ratios of implied/21d delivered cheap across 5-10y tails

	1y	2y	3y	5y	7y	10y	30y
1m	-0.2	-0.4	-0.7	-1.3	-1.7	-1.8	-1.6
3m	-0.5	-0.4	-0.8	-1.2	-1.5	-1.8	-1.2
6m	-0.4	-0.5	-0.9	-1.2	-1.5	-1.6	-0.8
1y	-0.5	-0.9	-1.3	-1.5	-1.7	-1.6	-0.5
2y	-2.0	-2.1	-2.1	-2.1	-1.9	-1.6	-0.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 53: 3m Z-Scores for Implied vs. Delivered (63d) Ratio

Ratios of implied/63d delivered fair to rich, particularly on the left side

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

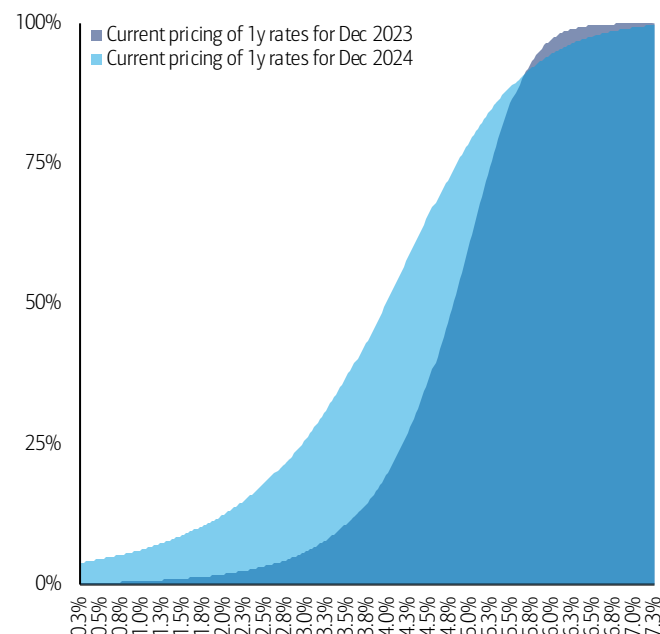
Source: BofA Global Research

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Rates probability distributions

Exhibit 54: CDF for 1y SOFR rates at end-2023 and end-2024

1y rate cumulative distribution functions

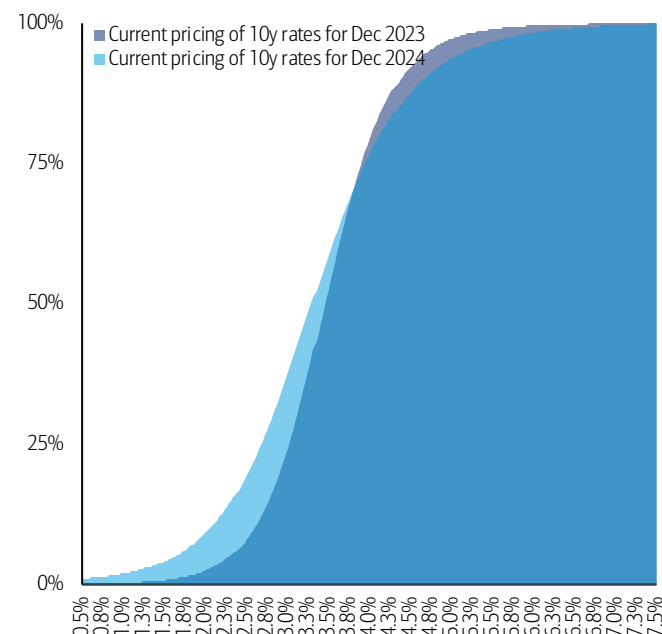


Source: BofA Global Research

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Exhibit 55: CDF for 10y SOFR rates at end-2023 and end-2024

10y rate cumulative distribution functions



Source: BofA Global Research

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Trade activity

Exhibit 56: 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						75	582		100	757
1m	2090	2950	1440		1060	170	2186	80	1332	14654
3m	9240	3940	940		923		1390		978	17615
6m	3974	1423	920	480	1065		1839	25	1374	13183
1y	8358	4690	520	140	1360	350	1999	100	95	18612
2y	5550	2108	2102	220	110		958	50	665	11763
3Y	2540	630			500	170	762	27		4629
4Y						680	38	50		768
5Y	390	500			486		545	28	87	2036
7Y							125	25	38	188
10Y		1140			50		262	245	106	1803
20Y							400			400
30Y										
	32142	17381	5922	840	5554	1445	11086	630	4775	86408

Source: BofA Global Research; SDR, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 57: 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	750	860			200		115		84	2509
1m	250	1090	780		380	170	1772	80	1375	8146
3m	3920	1280	720		893	130	1470		660	10706
6m	3682	1223	200		1325		999	25	1124	10423
1y	6438	4690	480	140	1360	350	1176	100	145	14879
2y	5550	1657		220	350		1258	50	157	9242
3Y	2540	630			500	170	762	193	75	4870
4Y							38	30		68
5Y	390	500			486		520	28	87	2011
7Y							125	25	38	188
10Y		1140			50		435	245	390	2260
20Y							400			400
30Y										
	23520	13070	2180	360	5544	820	9070	776	4135	65702

Source: BofA Global Research; SDR, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 58: 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							49		25	74
1m	300						67		175	542
3m	460	560			100				92	1212
6m			240		300		170		150	860
1y	300	450					150		75	1475
2y		460	480		580		460		100	2080
3Y					340		120		225	685
4Y									190	190
5Y									75	75
7Y		50					200			250
10Y										
20Y										
30Y										
	1060	1520	720		1320		1216		1107	7443

Source: BofA Global Research; SDR, Bloomberg

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Formosa issuance

Exhibit 59: 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

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Exhibit 60: 2023 Formosa issuance YTD (\$m)

Very limited issuance YTD

	2	5	7	10	15	20	25	30
1								
2				340				
3		40						
4		205		160				
5				135		15	15	
7								
10								25
15								
20								
25								
30								1000

Source: BofA Global Research, Bloomberg

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Exhibit 61: Formosa issuance (\$m) since 2014

Peak issuance concentrated on the 5y30y tenor

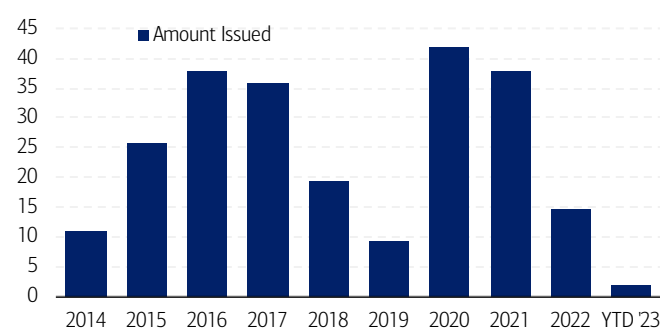
	2	5	7	10	15	20	25	30
1		205	75	1033	462	840		18054
2		40		1134		1485		22177
3		40		110	20	240	225	15536
4		220		339	50	25	275	2441
5				155	445	1512	368	111658
7			30					5624
10				2000				4489
15								
20								
25								
30								6500

Source: BofA Global Research, Bloomberg

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Exhibit 62: Total issuance per year since 2014 (\$bn)

Very limited Formosa issuance YTD (c.\$1.94bn)



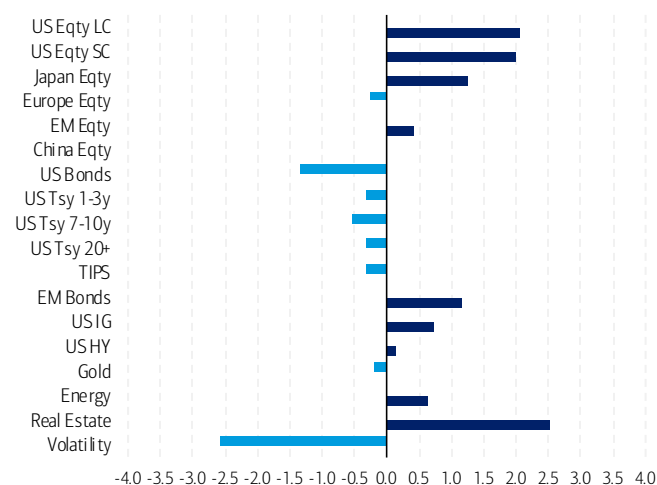
Source: BofA Global Research, Bloomberg

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Allocation bias from ETF flows

Exhibit 63: Allocation bias from ETF flows – week ending 7/21

Short equity vol bias persists as short duration bias decreases slightly

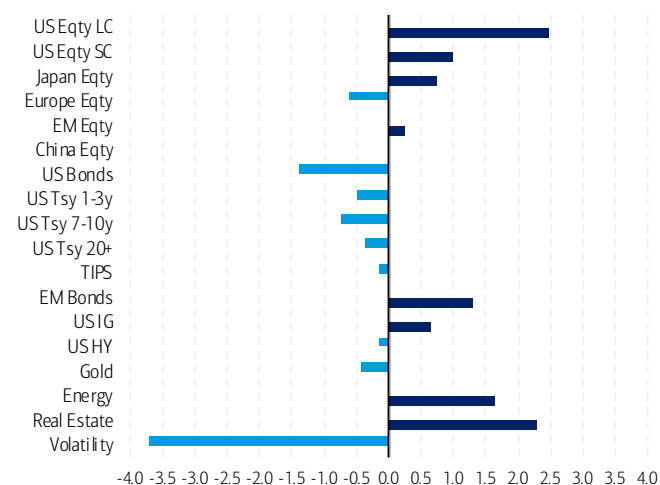


Source: BofA Global Research

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Exhibit 64: Allocation bias from ETF flows – week ending 7/7

Risk on bias suggested by proxies of position obtained from ETFs



Source: BofA Global Research

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Notes

Exhibit 11: 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 12/14/16: 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 13/15/17: 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 22/23: 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 24/25: 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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