

## US Rates Viewpoint

## US Vol - Outlook for '24

**Macro drivers for the '24 vol dynamic**

Key drivers for the dynamic of volatility in '24 include: (1) a wide range of outcomes, with a potential 10yT range between c.3% and c.6%; (2) erosion in the utility of duration for portfolios given positive correlations between bonds and equity returns and still relatively high rates vol; (3) Fed policy and the dynamic of neutral rate expectations; and (4) the broader risk backdrop.

**Vol view for '24**

Our economist's outlook continues to be centered around soft-landing scenarios, with rate cuts expected by 2H24. This context supports broadly lower vol in '24, and the underperformance of the left side vs the right side of the grid. However, a wide spectrum of risks, a higher degree of freedom at the frontend of the curve, and limited utility for USTs in portfolios between soft landing and steady resilience scenarios (where rates generally act as a shock absorber for the broader dynamic of risk), likely cap the potential for vol to revisit the lows that are generally associated with a Fed on-hold.

**From a view to target levels**

We find the fair value for 1y10y in 1H24 c.100-115bp. As the Fed moves to on-hold, the left side of the grid generally trades fair to cheap vs the right. Rate cuts in 2H24 add further downward pressure on volatility, with 1y10y vols likely c.85-100bp and further underperformance of the left side. However, we don't expect 1y1y vol to break 80bp levels easily in '24 (around the average for 1y1y vol at the end of the '04/06 cycle with the Fed on hold). Steep levels for the term structure of volatility (>10bp levels for the spread of 1y10y to 1m10y) are likely to provide scope to short gamma opportunistically. We continue to like long vega exposures at levels mid-70bp or below.

**Trade recommendations**

Broadly, we favor a long bias in '24 (see [Long 5y outright or through proxies](#)), lower vol with underperformance of the left side, short gamma vs intermediates at levels >10bp for 1y10y vs 1m10y, and long vega positions at mid-70bp levels. A wide range of outcomes continues to justify hedging the tails (10yT > 5.5% in bearish scenarios, or < 4% in bullish ones), and higher vol of vol.

More specific trade recommendations around our 4 broad scenarios for rates include: (1) hard landing – 1y forward 2s10s curve cap spreads; (2) soft landing – 3y1y receiver spreads and short 1y1y vol vs 1y10y vol; (3) steady resilience – costless 6m10y payer ladders; and (4) re-acceleration – long 6m2y payer spreads vs 6m2y OTM receivers.

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BE – Inflation Breakevens

ITM – In the money

OTM – Out of the money

GFC – Great Financial crisis

ULC – Upper left corner

URC – Upper right corner

LLC – Lower left corner

LRC – Lower right corner

c. – circa (approximately)

CDF – Cumulative Distribution Function

PDF – Probability Density Function

RTP – Right to Pay (payer)

RTR – Right to Receive (receiver)

SPD – Spread

For a list of open trades and closed trades, please see our [Global Rates Weekly](#).

All levels as of November 3<sup>rd</sup>.

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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## Key drivers for the volatility dynamic in '24

Key drivers for the dynamic of volatility in '24 include: (1) a wide range of potential outcomes; (2) erosion of the utility for duration for portfolios; (3) Fed policy and the dynamic of neutral rate expectations; and (4) the broader risk backdrop.

### 1. Range of outcomes for 10yT yields between 3% to 6%

We see 4 broad scenarios for rates over '24 (see [Nibble at c.5%](#) from Oct 31<sup>st</sup>):

- **Hard landing** – Data recouples to the downside, cuts are frontloaded, the curve bull steepens (likely first in 5s30s and closer to the first cut in 2s10s), and 10yT yields reach 3.25% ( $\pm 25$ bp) which we view as closer to the steady state over the cycle.
- **Soft landing** – 10yT recouples to c.4-4.25% levels as monetary policy lags unfold. US growth converges to levels  $> 0$  but  $<$  potential (likely slightly higher than the 1.75% levels suggested by the Fed SEP). We favor receiving 3y1y rates in this context, as belly forwards start to feel the gravity from a lower neutral (c.3-3.25%).
- **Steady resilience** – US growth converges to the pre-GFC regime, but inflation expectations continue to be anchored. Fed stays on hold. Recent drivers for the bearish dynamic (term premium and neutral repricing, the latter mostly through its potential growth component) exhaust themselves at c.5-5.25% for 10yT yields. Significant levels of uncertainty (see Exhibit 1) continue to drive some pricing of Fed cuts at a 1y horizon (see Exhibit 2), and in that context 10yT yields trade at a slight premium to frontend yields (i.e., 10yT yields  $<$  c.5.25%)
- **Re-acceleration** – The economy either re-accelerates or stays resilient but sees a recoupling of growth and inflation fundamentals. These are likely to drive a full pricing out of Fed cuts from the curve, and potentially the pricing in of hike expectations. 10yT likely push beyond c.5.5% in this context.

It is difficult to estimate where yields peak in these scenarios. If neutral expectations revert fully to the pre-GFC regime (c.4-4.25%) and market stays in the post Volcker world where the Fed tightens by a maximum of 200bp vs. the neutral, then one can expect peak policy rates c. 6.25%. For the 10yT, whereas in steady resilience uncertainty drives the pricing of Fed cuts over the next 1-2y, in re-acceleration scenarios it is the conviction that the Fed must slowdown the economy. In practical terms, this means that it is also likely difficult for 10yT yields to trade at a discount to the frontend in this context (i.e., 10yT  $<$  c.6.25%).

#### Exhibit 1: Measure of market conviction

Conviction at the lowest levels since the '17 "Trump bump" selloff



Source: BofA Global Research

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#### Exhibit 2: Horizon pricing (y-axis in months) for the first Fed cut

Pricing of the first Fed cut at c.6-10m horizon on a rolling basis



Source: BofA Global Research

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Over the summer selloff, the market shifted expectations from soft landing to steady resilience. The repricing of term premium and neutral rate expectations pushed yields higher, bear steepened the curve, and drove vol higher on the right side of the grid despite lower left side vol on expectations for a Fed shift to on-hold (see Exhibit 3).

**Exhibit 3: Move on the vol grid since early July**

Lower left on Fed shift to on-hold, higher right side vol on terminal and neutral rate repricing

	1y	2y	3y	5y	7y	10y	30y
1m	-56	-43	-32	-11	2	17	33
3m	-31	-34	-25	-7	6	13	24
6m	-18	-19	-12	0	9	14	23
1y	-11	-5	0	6	10	12	19
2y	2	8	8	12	13	14	18
3y	8	10	11	13	14	14	17
4y	9	11	11	13	13	14	16
5y	11	11	12	12	13	14	15
10y	12	11	11	11	11	12	11
30y	10	10	9	9	9	10	9

Source: BofA Global Research

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Our economist's baseline is biased towards soft landing over '24, supporting broadly lower vol, and the underperformance of the left side vs the right side of the grid. However, a wide range of outcomes continues to justify hedging the tails (10yT > 5.5% in bearish scenarios, or < 4% in bullish ones), and higher vol of vol.

**2. Portfolios accrue fewer benefits from duration**

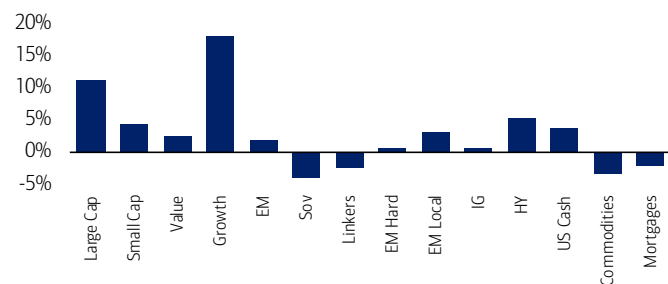
In a recent note (see [Allocations & Duration Demand](#) from Oct 19<sup>th</sup>) we argued for some support for UST allocations over the next quarters. The view likely extends to '24 more broadly as the risk backdrop deteriorates and the Fed cuts rates later in the year.

However, portfolios may accrue fewer benefits from duration in the current context, at least up until the point where the market enters a risk-off dynamic. In soft-landing and steady resilience scenarios, scope for earnings downgrades is limited. The discounting component of valuations continues to be a significant driver of the broader risk dynamic. This caps the potential for negative bond/equity correlations (see Exhibit 4) and limits the diversification and hedging benefits of duration. Also, duration is likely to remain the main shock absorber in these scenarios, and volatility in rates space may stay relatively elevated suggesting less of a role for duration as a dampener for volatility in portfolios.

On the other hand, valuations are compelling vs fundamentals and the global yield dynamic. Furthermore, on a relative basis sovereign bonds were the worst performing asset in the first three quarters of the year (see Exhibit 5), not surprisingly perhaps with the Fed tightening policy and the market pricing a higher neutral and term premium on the curve. As Fed policy shifts to on-hold, and neutral and term premium repricing exhaust themselves as bearish drivers, it is likely that on a relative basis sovereigns will perform better over the next quarters. Also on a relative basis, risky assets seem to be trading historically tight vs bond yields (see Exhibit 6), which creates scope for negative feedback loops between further bond selloffs and risk.

**Exhibit 5: Asset class performance over the first 3 quarters of '23**

Sovereign debt the worst performing asset

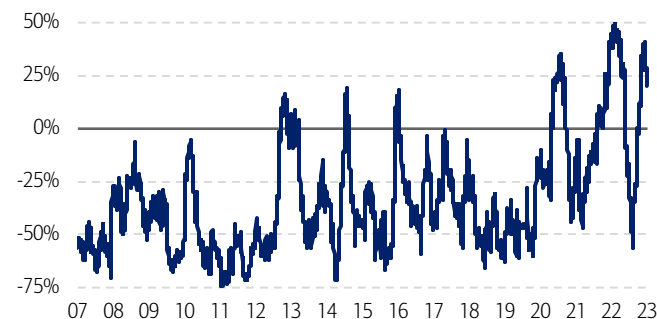


Source: BofA Global Research; Bloomberg

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**Exhibit 4: Bond / equity (3m) correlations**

Correlations more persistently positive since the covid crisis

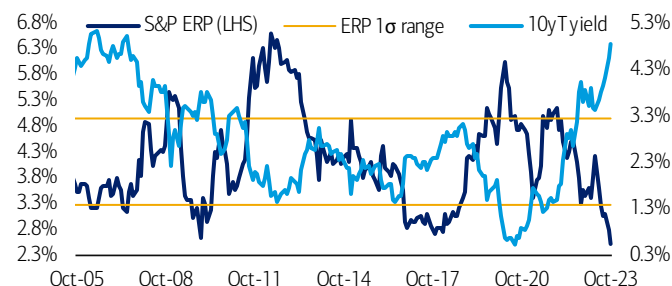


Source: BofA Global Research

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**Exhibit 6: S&P equity risk premium (ERP) vs 10yT yields**

ERP at the tightest levels since the '08 and early '17



Source: BofA Global Research; Bloomberg

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The macro backdrop (the baseline for most of '24 is in between scenarios of soft landing and steady resilience) and the relative dynamic of bonds and risky assets in this context (where rates generally act as a shock absorber) suggests that while the bias for '24 may be for lower yields and lower vol, we may see some breakdown in the relative directionality, with the steady state for vol holding slightly higher than would otherwise be expected under a more directional dynamic.

### 3. Fed policy and the dynamic of neutral rate expectations

In our estimation (see [Nibble at c.5%](#) from Oct 31<sup>st</sup>), the market may have repriced the neutral to up to c.3.75% over the summer as it pushed expectations towards steady resilience. This move supported a bear steepening of the curve and right side vol outright, but also implied a higher degree of freedom for the frontend of the curve (see Exhibit 7). Together these capped: (1) the potential for left side vol to revisit the lows of the last cycle as the market priced the Fed shift to on-hold, and (2) for lower left side vol to propagate out the grid.

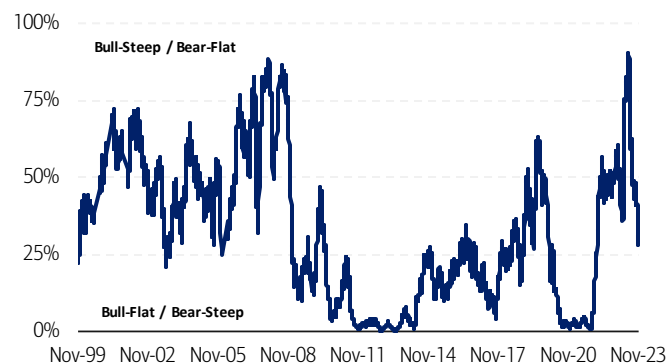
Soft landing scenarios where the Fed stays on hold and potential cuts rates later in '24 drive the left side vol lower (although likely not to the last cycle lows), but also support the view for a recoupling of belly forwards to a lower neutral view (closer to c.3-3.25%).

The 3y1y UST fwd is often seen as a proxy for the neutral (see Exhibit 8). In the late cycle the underlying assumption is that Fed tightening will slow the economy, and policy rates will therefore need to be back to neutral medium term. However, when the market starts to price higher odds of no-landing scenarios, as it was the case over the summer, the 3y1y decouples from the neutral. In our view, therefore, the c.4.85% levels reached by the 3y1y are not a reflection of where the market sees the neutral. The recent 3y1y dynamic reflects not only the recent neutral repricing but also higher no-landing odds.

In soft landing scenarios belly forwards are therefore exposed to both a recoupling to the neutral and a potentially downgrade of neutral rate expectations. The dynamic of price discovery in the belly may support gamma and belly vol as the market converges to a lower neutral view, even if ultimately a lower neutral rate implies a lower vol regime.

#### Exhibit 7: Indicator for the directionality of the 2s10s dynamic

Our curve directionality index suggests an increase in degrees of freedom at the frontend of the curve, potentially back to the pre-GFC regime

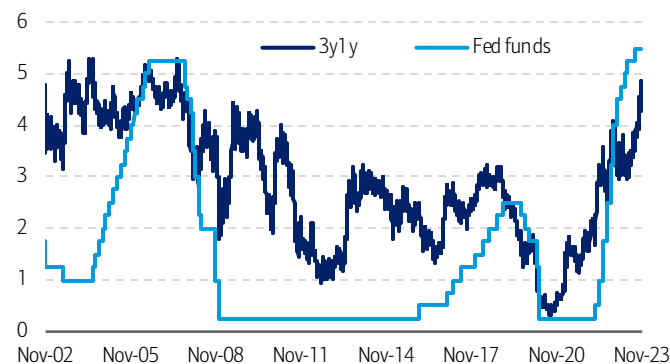


Source: BofA Global Research

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#### Exhibit 8: Fed funds target vs 3y1y UST forwards

3y1y forwards overestimate neutral expectations when the market prices higher no-landing probabilities. 3y1y now c.4.3%.



Source: Bloomberg

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### 4. Broader risk backdrop

There is a relative wide spectrum of risks in '24: US elections, potential for middle east conflict to extend; potential for further escalation around the Russian invasion of Ukraine, risks around the energy complex around these two conflicts, bearish scenarios for the Chinese economy, and the wide range of scenarios noted above for the US economy. Most of these risks are not calendar driven and constitute a more diffused level of risk that is likely to continue to support volatility into '24.

## From views to target levels

To estimate the steady state for 1y10y vol over '24 we define assumptions for the lognormal vol regime and the steady state for 10y yields.

- To define the lognormal vol regime we look back at the vol ranges at the end of the last two tightening cycles, with the Fed already on hold: c.20-30% at the end of the '15/18 tightening cycle; and 10-15% at the end of the '04/06 tightening cycle. As we argued above, lower directionality with rates along with higher uncertainty and risk are likely to imply a slightly higher regime for vol over '24. We take the lower half of the '15/18 cycle range as our baseline assumption, i.e., c.20-25%.
- In our note [Nibble at c.5%](#) from Oct 31<sup>st</sup>, we assigned odds to the different scenarios above. Historical quarter ahead transition probabilities suggest 20% odds of hard landing, 25% of soft landing, 45% of steady resilience and 10-15% of re-acceleration. If we extend these odds over '24 and probability-weight our 10yT view under these scenarios, we obtain a steady state for the 10yT c.4.5%. A more conservative set of probabilities, which is also more in line with our economist soft landing baseline (roughly 20-25% for hard landing, 35% soft landing, 30% for steady resilience, and 10-15% re-acceleration) implies a steady state c.4.3%.

A 20-25% lognormal vol assumption and a 4.3-4.5% assumption for the 10y steady state imply c.85-115bp steady state for 1y10y vol, centered around 100bp (see Exhibit 9). We find in the top end of the range more likely in 1H24 (100-115bp), and levels in the bottom end of the range more likely in 2H24 (85-100bp).

### Exhibit 9: 1y10y vol and the expected range for '24

100-115bp more likely in 1H24, and 85-100bp more likely in 2H24



Source: BofA Global Research; Bloomberg

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### Exhibit 10: Spread if 1y1y to 1y10y vols

Left side still trades above right, we expect flat levels in 1H



Source: BofA Global Research; Bloomberg

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## Dynamic of the left vs right side of the grid

As the Fed moves to on-hold, the left side of the grid generally trades fair to cheap vs the right. We expect 1y10y vol to reach flat levels vs 1y10y in 1H24, around c.100-115bp (see Exhibit 10). Rate cuts in 2H24 add further downward pressure on left side vol. However, as we noted above, given the support from a higher degree of freedom at the curve frontend, and we don't expect 1y1y vol to break 80bp levels easily in '24 (around the average for 1y1y vol at the end of the '04/06 cycle with the Fed on hold).

## Dynamic of gamma vs intermediate expiries

The expected dynamic of bond yields and risk in the context of our macro baseline (in between soft landing and steady resilience) along with a relatively wide spectrum of risks is likely to prevent a significant steepening of the term structure of volatility (i.e., >10bp levels for the spread of 1y10y to 1m10y are likely to provide scope to short gamma opportunistically over '24 – see Exhibit 11).

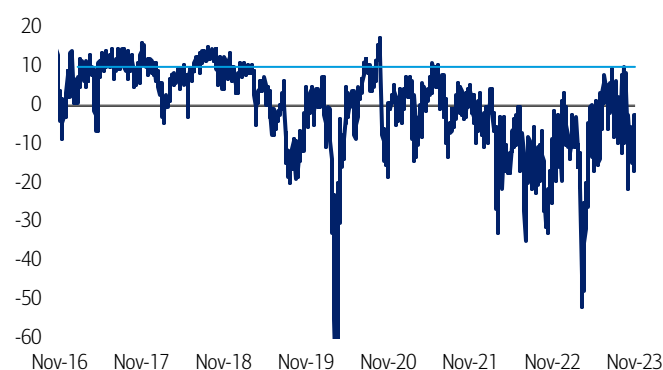
## Long dated vega

Formosa issuance is likely to continue to stay relatively subdued in '24 (following a very slow '23 – see Exhibit 67). There's still the risk of substitution issuance from a heavy early '18 vintage, but that implies a more significant rally from current levels (in the context of the hard landing scenarios above where 10yT yields push into low-3% levels). Outside of that scenario, we see issuance for '24 closer to a c.1.5-2bn quarterly run rate, rather than the c.3.5bn run rate seen in '22 (see Exhibit 67).

Long vega exposures performed well as a positive vol carry macro hedge over '23. Rollup on the grid continues to be attractive (see Exhibit 13), and we don't see significant headwinds from issuance as we noted above. However, the empirical dvega/dr profile seems less positively convex currently (see Exhibit 12) which exposes these positions to a range of outcomes for yields that seems relatively asymmetric to the downside. We continue to like the exposure but recommend clients should be more tactical in the way they add to the position and target levels mid-70bp or below.

### Exhibit 11: Spread if 1m10y vs 1y10y

Steepening of term structure of volatility likely capped at c.10bp over '24

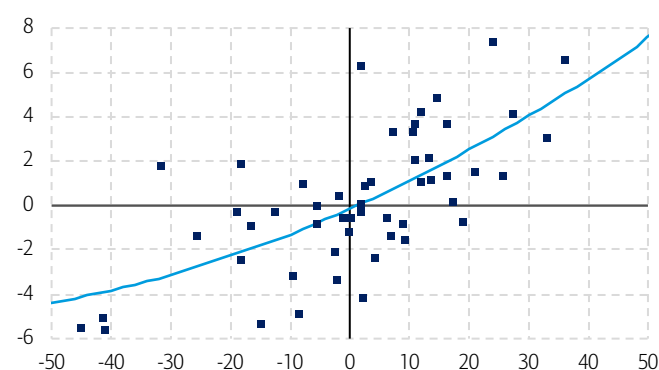


Source: BofA Global Research

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### Exhibit 12: changes in 5y30y vol (y-axis) vs 5y30y forwards (x-axis)

Marginally positive convex profile of weekly changes over the last year



Source: BofA Global research

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## Trade recommendations

Broadly, we favor a long bias in '24 (see [Long 5y outright or through proxies](#)), lower vol with underperformance of the left side, short gamma vs intermediates at levels >10bp for 1y10y vs 1m10y, and long vega positions at mid-70bp levels. A wide range of outcomes continues to justify hedging the tails (10yT > 5.5% in bearish scenarios, or < 4% in bullish ones), and higher vol of vol. More specific trade recommendations around the scenarios above include:

- Hard landing: 1y fwd 2s10s curve caps spreads ATM/ATM+50bp, indicative cost of 16.5bp. Downside capped to the upfront premium.
- Soft landing: 3y1y receiver spreads atm/-50bp, with a cost of 23bp of delta (indicative) and 27bp max upside. The downside is capped to the upfront premium.
- Soft landing: Sell 1y1y vol vs 1y10y vol, vega weighted, receive 30bp indicative on the position. Risk is outperformance of the left side of the grid vs right side with potentially unlimited downside.
- Steady resilience: 6m10y payer ladders atm/+32bp/ +64bp (costless indicative) with max upside c.4.52-4.84% for 10y SOFR (4.87-5.19% for 10yT at constant spreads), and downside breakeven at c.5.16% (5.51% for 10yT at constant spreads). Risk is a selloff beyond the downside breakeven with potentially unlimited downside.
- Re-acceleration: Buy 6m2y payer spreads atm/+100bp financed with 6m2y receivers atm-48bp (indicative). Risk on the position is a frontloaded hard landing scenario where the Fed cuts rates in 1H, with potentially unlimited downside.

# Levels and Recent Moves

## Exhibit 13: ATM Normal Volatility Grid

119bp for 1y10y volatility on Friday's close

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	75	118	123	129	127	125	118
3M	105	128	130	132	129	125	114
6M	130	138	134	132	128	123	110
1Y	150	146	140	132	125	119	105
2Y	142	139	134	127	121	115	101
3Y	133	130	127	120	115	110	96
4Y	125	122	120	115	111	105	92
5Y	120	117	115	110	106	102	89
10Y	97	95	93	90	88	84	74
30Y	70	69	68	66	64	61	56

Source: BofA Global Research

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## Exhibit 14: ATM Volatility Grid - 3m Z-Scores

Grid broadly rich on 3m Z-Scores except for the ULC

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-0.6	-0.1	0.2	0.3	0.4	0.4	0.6
3M	0.9	0.5	0.5	0.5	0.5	0.4	0.4
6M	1.1	0.5	0.3	0.3	0.3	0.3	0.3
1Y	1.2	0.7	0.3	0.2	0.1	0.1	0.2
2Y	0.5	0.3	0.0	0.0	0.1	0.1	0.2
3Y	-0.1	-0.1	0.0	0.0	0.0	0.1	0.1
4Y	-0.4	-0.2	-0.1	0.0	0.1	0.2	0.2
5Y	0.1	0.0	0.1	0.2	0.2	0.2	0.2
10Y	0.4	0.3	0.3	0.3	0.4	0.4	0.3
30Y	0.6	0.7	0.7	0.7	0.7	0.7	0.8

Source: R BofA Global Research

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## Exhibit 15: ATM Normal Volatility Grid - CoW

Underperformance led by the right-side last week

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-1.7	-2.4	-3.9	-5.4	-7.3	-9.1	-9.9
3M	-3.7	-1.2	-2.1	-3.0	-4.8	-6.6	-9.3
6M	-0.7	-2.1	-3.0	-3.9	-4.9	-5.8	-8.4
1Y	3.6	-0.8	-3.2	-5.4	-6.1	-6.9	-8.0
2Y	0.5	-2.2	-4.4	-6.4	-6.4	-6.3	-5.9
3Y	-2.9	-4.3	-5.0	-6.3	-6.1	-6.0	-6.1
4Y	-4.7	-5.2	-5.4	-5.8	-5.7	-5.5	-5.9
5Y	-3.6	-5.0	-5.0	-5.2	-5.3	-5.5	-6.2
10Y	-2.9	-3.8	-3.8	-3.8	-3.9	-4.0	-4.4
30Y	-2.5	-2.5	-2.5	-2.4	-2.3	-2.2	-2.4

Source: BofA Global Research

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## Exhibit 16: ATM Straddle Premiums (indicative only)

7.0% straddle premiums for 1y10y

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.2%	0.5%	0.8%	1.3%	1.7%	2.3%	4.6%
3M	0.4%	1.0%	1.4%	2.3%	3.0%	4.0%	7.7%
6M	0.7%	1.4%	2.0%	3.2%	4.2%	5.5%	10.5%
1Y	1.1%	2.1%	3.0%	4.5%	5.7%	7.3%	13.9%
2Y	1.4%	2.7%	3.9%	5.8%	7.5%	9.6%	18.1%
3Y	1.6%	3.0%	4.3%	6.5%	8.4%	10.7%	20.3%
4Y	1.6%	3.1%	4.5%	6.9%	9.0%	11.5%	21.8%
5Y	1.7%	3.2%	4.6%	7.1%	9.2%	11.8%	22.6%
10Y	1.6%	3.0%	4.3%	6.6%	8.7%	11.3%	22.6%
30Y	0.9%	1.8%	2.6%	4.1%	5.5%	7.2%	17.6%

Source: BofA Global Research

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## Exhibit 17: 2s10s curve directionality only 34% frontend-driven

Frontend continues to fade as a driver for the curve dynamic

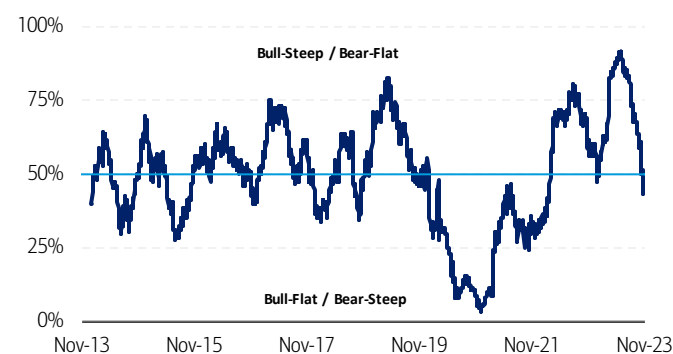


Source: BofA Global Research

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## Exhibit 18: 5s30s curve directionality only 50% belly-driven

Belly to stay relevant as market recouples to the soft landing



Source: BofA Global Research

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# Volatility Grid Relative Value

## PCA Z-SCORES

### Exhibit 19: 3m Z-Scores w/ PCA framework

Intermediate expiries in the belly look fair/cheap on 3m Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-1.0	0.1	0.2	-0.1	0.4	0.9	1.2
6m	1.6	0.3	-1.6	-1.6	-1.0	0.1	0.4
1y	2.2	0.6	-1.1	-1.4	-2.3	-2.5	-0.6
2y	0.3	-0.1	-1.1	-1.5	-1.7	-1.9	-0.1
5y	-0.6	-1.2	-1.0	-0.2	-0.2	0.1	0.4
10y	1.8	1.2	1.3	1.5	1.4	1.2	1.4

Source: BofA Global Research

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### Exhibit 21: 6m Z-Scores w/ PCA framework

Belly looks cheap on 6m Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	-0.4	-0.4	-0.7	-0.1	0.4	0.8	0.9
6m	1.1	-0.3	-1.0	-0.7	-0.4	0.1	0.1
1y	1.9	0.6	-0.3	-0.7	-1.3	-2.4	-0.5
2y	0.4	0.1	-0.5	-1.3	-1.4	-1.1	-0.3
5y	-0.7	-1.4	-1.2	-0.5	-0.5	0.1	0.0
10y	1.6	0.7	1.1	1.1	1.1	1.0	0.8

Source: BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 23: 1y Z-Scores w/ PCA framework

Belly looks fair/cheap on 1y Z-Scores

	1y	2y	3y	5y	7y	10y	30y
3m	0.5	-1.0	-0.9	-0.5	-0.6	-0.6	0.5
6m	1.6	-0.2	-1.4	-0.8	-0.9	-0.8	0.3
1y	2.2	1.4	-1.5	-1.5	-1.6	-1.4	-0.1
2y	-0.2	-0.5	-1.5	-1.7	-0.5	-0.5	1.1
5y	-0.3	-0.1	0.2	0.8	0.9	1.0	1.2
10y	1.6	1.4	1.4	1.5	1.5	1.5	1.5

Source: BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 20: 3m Z-Scores w/ PCA framework w/o rates directionality

Grid broadly cheap when directionality is considered

	1y	2y	3y	5y	7y	10y	30y
3m	-1.6	-1.3	-1.3	-1.3	-1.3	-1.2	-0.7
6m	-0.9	-1.2	-1.5	-1.6	-1.5	-1.3	-1.2
1y	-0.3	-1.0	-1.5	-1.6	-1.7	-1.7	-1.5
2y	-0.8	-1.0	-1.5	-1.7	-1.7	-1.7	-1.4
5y	-1.4	-1.7	-1.7	-1.5	-1.5	-1.4	-1.3
10y	-0.4	-0.8	-0.7	-0.5	-0.5	-0.5	-0.2

Source: BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 22: 6m Z-Scores w/ PCA framework w/o rates directionality

Grid broadly cheap when directionality is considered

	1y	2y	3y	5y	7y	10y	30y
3m	-0.8	-0.5	-0.7	-0.7	-0.7	-0.8	-0.6
6m	-0.4	-0.6	-0.9	-1.0	-1.0	-1.0	-1.1
1y	0.1	-0.3	-0.8	-1.1	-1.3	-1.5	-1.5
2y	-0.4	-0.6	-1.1	-1.4	-1.5	-1.5	-1.6
5y	-1.3	-1.7	-1.7	-1.5	-1.6	-1.4	-1.7
10y	-0.4	-1.1	-0.6	-0.5	-0.5	-0.5	-0.7

Source: BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 24: 1y Z-Scores w/ PCA framework w/o rates directionality

Grid broadly fair/cheap when directionality is considered except for LRC

	1y	2y	3y	5y	7y	10y	30y
3m	-0.7	-0.7	-0.7	-0.7	-0.8	-0.7	-0.2
6m	-0.3	-0.5	-0.7	-0.8	-0.8	-0.6	-0.3
1y	0.0	-0.2	-0.5	-0.6	-0.6	-0.7	-0.4
2y	-0.4	-0.4	-0.6	-0.6	-0.6	-0.5	-0.1
5y	-0.5	-0.4	-0.3	-0.1	-0.1	0.0	0.5
10y	0.6	0.6	0.7	0.7	0.8	0.8	1.3

Source: BofA Global Research

BofA GLOBAL RESEARCH



# Skew Relative Value

## Exhibit 25: Skew 25% delta

Receivers rich on intermediates on the left/belly on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	7.3	7.8	6.4	3.1	0.4	-2.1	-2.8
3M	14.7	13.6	10.9	5.8	2.5	-1.3	-2.3
6M	21.3	17.2	13.7	6.7	3.2	-1.6	-2.1
1Y	20.6	15.6	12.0	4.5	0.6	-3.1	-2.7
2Y	8.9	5.9	3.8	-1.1	-3.1	-4.8	-3.5
5Y	-3.2	-3.9	-3.9	-5.4	-5.6	-6.6	-4.3
10Y	-3.8	-3.8	-3.9	-4.7	-5.0	-6.0	-4.1
30Y	-5.6	-5.5	-4.7	-5.3	-5.2	-5.9	-6.9

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 26: Skew 75% delta

Payers Cheap on intermediates on the left/belly on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-6.5	-7.3	-5.7	-2.1	0.2	2.5	3.0
3M	-14.4	-11.6	-7.6	-1.3	2.0	5.6	6.1
6M	-20.2	-13.5	-8.2	0.3	3.8	8.1	7.8
1Y	-16.2	-9.5	-4.5	3.7	7.1	9.8	8.6
2Y	3.1	4.7	6.2	9.0	10.4	11.1	8.9
5Y	15.0	14.3	14.4	14.8	14.6	14.4	11.1
10Y	16.0	16.1	16.1	15.6	15.3	15.0	11.7
30Y	17.2	17.3	17.1	17.1	17.0	15.4	12.8

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 27: Breakeven Widths for Costless Receiver Ladders

115bp breakeven width for 1y10y receiver ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	26	39	39	39	37	36	33
3M	71	80	77	72	67	62	56
6M	132	128	117	103	95	86	76
1Y	203	184	168	141	127	115	101
2Y	229	215	201	178	163	151	135
5Y	255	247	241	226	217	203	183
10Y	284	277	271	257	249	234	213

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 28: Breakeven Widths for Costless Payer Ladders

141bp breakeven width for 1y10y payer ladders

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	19	31	33	36	37	38	36
3M	43	56	59	66	67	69	64
6M	74	85	87	95	97	100	91
1Y	128	132	133	140	141	141	126
2Y	209	210	208	207	204	198	173
5Y	350	339	335	329	320	306	257
10Y	445	441	437	423	412	400	334

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 29: 3m Z-Score Receiver Skew (w/o fwds & ATM direction)

Receiver skew rich, particularly on intermediates on left

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	0.9	0.5	0.1	0.9	0.2	-0.3	0.1
3M	2.2	2.1	1.2	2.9	2.4	0.6	1.8
6M	2.9	3.2	3.1	2.5	2.4	0.8	1.7
1Y	2.7	3.0	3.1	2.9	2.1	0.8	1.2
2Y	2.4	2.7	2.7	2.8	2.4	1.6	0.9
5Y	2.4	2.4	2.3	2.0	1.4	0.5	-0.1
10Y	1.5	1.4	1.3	1.2	1.1	0.9	0.4

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 30: 3m Z-Score Payer Skew (w/o direction w/ fwds & ATM)

Payer skew cheap broadly across the grid

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-0.1	-0.2	-0.8	-1.8	-1.5	-1.1	-1.6
3M	-3.1	-3.7	-3.2	-3.3	-3.2	-1.9	-2.0
6M	-3.3	-3.7	-3.5	-3.0	-2.9	-1.5	-2.0
1Y	-2.5	-2.9	-3.4	-2.9	-2.1	-0.4	-0.3
2Y	-1.3	-1.5	-1.3	-1.3	-1.4	-0.5	-0.4
5Y	-1.0	-1.6	-1.4	-0.6	0.9	0.0	1.5
10Y	-1.0	-0.8	-0.7	-0.9	-0.9	-1.0	1.2

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 31: Ratio of Payer/Receiver BE widths for Costless Ladders

Ratios of breakeven widths > 100% except on the ULC

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	72%	79%	84%	93%	99%	106%	110%
3M	60%	70%	77%	91%	99%	111%	115%
6M	56%	66%	74%	92%	101%	116%	120%
1Y	63%	72%	79%	99%	111%	123%	124%
2Y	92%	98%	103%	117%	125%	131%	128%
5Y	137%	137%	139%	146%	147%	151%	141%
10Y	157%	159%	161%	164%	166%	171%	157%

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

## Exhibit 32: 3m Z-Score Ratio of Payer/Receiver Skew

Cheap payer vs receiver skew virtually across the grid on 3m Z-Scores

	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1M	-1.8	-0.4	-1.4	-2.8	-2.8	-0.9	-1.0
3M	-3.4	-3.4	-3.0	-2.8	-2.6	-0.6	-0.8
6M	-2.8	-3.0	-2.6	-2.7	-2.3	-0.6	-0.7
1Y	-1.9	-2.2	-2.6	-2.5	-1.9	-0.5	0.1
2Y	-1.6	-1.8	-1.8	-2.3	-1.0	-0.4	0.2
5Y	-2.3	-2.6	-2.9	-1.2	0.2	0.3	0.9
10Y	-2.3	-1.2	-0.8	-0.5	-0.3	-0.1	0.7

Source: BoFA Global Research

BoFA GLOBAL RESEARCH

# Conditional Curve Trades

## Exhibit 33: 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	-1.5	1.1	5.2	2.4	6.3	4.2
6M	3.6	7.7	13.8	4.6	10.8	6.5
1Y	11.2	19.2	27.6	9.5	18.5	9.9
1.5Y	12.8	22.4	32.9	10.8	22.2	12.0
2Y	13.0	23.7	36.4	12.0	25.3	14.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 35: 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	1.5	-1.1	-5.2	-2.4	-6.3	-4.2
6M	-3.6	-7.7	-13.8	-4.6	-10.8	-6.5
1Y	-11.2	-19.2	-27.6	-9.5	-18.5	-9.9
1.5Y	-12.8	-22.4	-32.9	-10.8	-22.2	-12.0
2Y	-13.0	-23.7	-36.4	-12.0	-25.3	-14.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 37: 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	1.5	-1.1	-5.6	-2.4	-6.9	-4.6
6M	-3.4	-8.5	-15.1	-5.0	-12.0	-7.3
1Y	-11.0	-21.6	-30.8	-10.6	-20.8	-11.0
1.5Y	-13.4	-25.7	-37.0	-12.8	-25.3	-13.8
2Y	-14.2	-27.6	-40.9	-14.2	-28.8	-16.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 39: Bear Steepener (pickup to forwards for ATM)

Buy longer maturity payer, sell shorter maturity payer

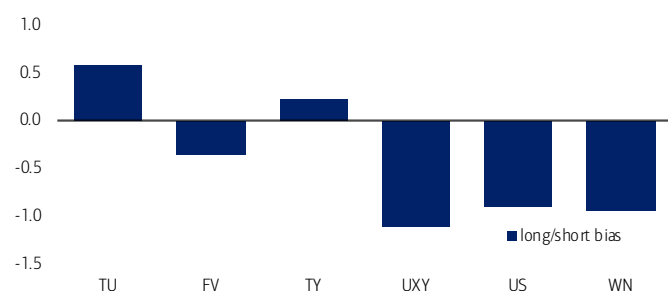
ATM	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-1.5	1.1	5.6	2.4	6.9	4.6
6M	3.4	8.5	15.1	5.0	12.0	7.3
1Y	11.0	21.6	30.8	10.6	20.8	11.0
1.5Y	13.4	25.7	37.0	12.8	25.3	13.8
2Y	14.2	27.6	40.9	14.2	28.8	16.1

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 41: Analysis of proxies for futures positioning

Short bias persisting at the backend, but faded significantly over the week



Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 34: 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	0.9	6.0	11.6	5.4	10.8	6.2
6M	7.5	14.4	21.8	7.9	15.9	8.7
1Y	15.7	26.5	36.0	13.0	23.7	11.6
1.5Y	16.9	28.8	40.5	14.0	26.7	13.8
2Y	15.9	28.8	42.7	14.6	29.2	15.7

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 36: Bull Steepener (pickup to forwards for -25bp OTM)

Sell longer maturity receiver, buy shorter maturity receiver

-25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-0.9	-6.0	-11.6	-5.4	-10.8	-6.2
6M	-7.5	-14.4	-21.8	-7.9	-15.9	-8.7
1Y	-15.7	-26.5	-36.0	-13.0	-23.7	-11.6
1.5Y	-16.9	-28.8	-40.5	-14.0	-26.7	-13.8
2Y	-15.9	-28.8	-42.7	-14.6	-29.2	-15.7

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 38: 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	5.2	4.4	-1.9	-1.1	-6.9	-6.0
6M	-0.9	-4.8	-13.8	-3.8	-12.8	-9.3
1Y	-9.9	-20.6	-32.1	-10.6	-23.1	-13.6
1.5Y	-12.8	-25.9	-39.6	-13.2	-28.2	-16.7
2Y	-14.4	-29.0	-44.8	-15.1	-32.5	-19.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 40: Bear Steepener (pickup to forwards for +25bp OTM)

Buy longer maturity payer, sell shorter maturity payer

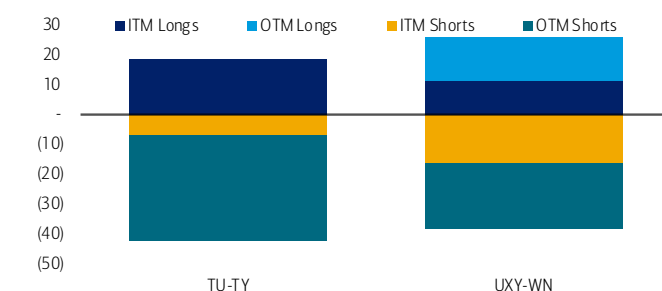
+25bp	2/5s	2/10s	2/30s	5/10s	5/30s	10/30s
3M	-5.2	-4.4	1.9	1.1	6.9	6.0
6M	0.9	4.8	13.8	3.8	12.8	9.3
1Y	9.9	20.6	32.1	10.6	23.1	13.6
1.5Y	12.8	25.9	39.6	13.2	28.2	16.7
2Y	14.4	29.0	44.8	15.1	32.5	19.0

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 42: Proxies for futures positioning across the curve

Frontend OTM shorts may drive bull steepening of the curve



Source: BofA Global Research

BofA GLOBAL RESEARCH

# Forward Volatility

## Exhibit 43: 6m Forward Volatility

112.3bp for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	137.1	134.2	122.1	110.1	98.4
3m	148.2	145.5	130.6	115.5	102.3
6m	156.1	149.7	130.5	113.1	99.7
1y	144.4	143.8	127.2	112.3	99.1
2y	138.7	133.5	120.4	107.3	94.6
5y	113.7	110.9	104.0	95.2	85.6
10y	92.1	90.3	85.1	80.0	74.9

Source: BofA Global Research

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## Exhibit 44: 6m Fwd vol as % ATM

94% of ATM for 6m fwd 1y10y

	1y	2y	5y	10y	30y
1m	182%	114%	95%	88%	84%
3m	141%	114%	99%	92%	90%
6m	120%	108%	99%	92%	90%
1y	96%	98%	96%	94%	94%
2y	98%	96%	95%	94%	94%
5y	95%	95%	94%	94%	97%
10y	95%	95%	95%	95%	101%

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 45: 3m Z-Score 6m Fwd vol % ATM

-1.1 Z-Score for 6m fwd 1y10y

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

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 46: 1y Forward Volatility

109.2bp for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	146.8	141.9	125.5	110.6	97.7
3m	143.1	141.7	126.0	112.1	98.8
6m	142.5	140.4	125.1	111.1	97.9
1y	137.8	137.9	123.1	109.2	95.8
2y	131.8	126.4	116.8	103.8	91.1
5y	109.7	107.7	101.0	92.4	83.1
10y	89.8	88.0	83.0	78.2	73.4

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 47: 1y Fwd vol as % ATM

92% of ATM for 1y fwd 1y10y

	1y	2y	5y	10y	30y
1m	195%	121%	97%	88%	83%
3m	136%	111%	96%	89%	87%
6m	110%	102%	95%	90%	89%
1y	92%	94%	93%	92%	91%
2y	93%	91%	92%	91%	91%
5y	92%	92%	92%	91%	94%
10y	93%	93%	92%	93%	99%

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 48: 3m Z-Score 1y Fwd vol % ATM

-0.6 Z-Score for 1y fwd 1y10y

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

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 49: 2y Forward Volatility

100.3bp for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	116.7	118.8	111.8	98.9	86.0
3m	117.1	119.2	112.1	99.0	85.9
6m	118.3	120.2	112.5	99.3	86.2
1y	121.3	123.0	114.0	100.3	86.9
2y	119.3	115.0	110.5	98.1	85.8
5y	105.2	103.8	96.8	88.4	79.7
10y	86.6	84.7	80.0	75.4	71.6

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 50: 2y Fwd vol as % ATM

84% of ATM for 2y fwd 1y10y

	1y	2y	5y	10y	30y
1m	155%	101%	87%	79%	73%
3m	112%	93%	85%	79%	75%
6m	91%	87%	85%	81%	78%
1y	81%	84%	86%	84%	83%
2y	84%	83%	87%	86%	85%
5y	88%	89%	88%	87%	90%
10y	89%	89%	89%	90%	96%

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 51: 3m Z-Score 2y Fwd vol % ATM

-0.4 Z-Score for 2y fwd 1y10y

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

Source: BofA Global Research

BofA GLOBAL RESEARCH

## Exhibit 52: 3y Forward Volatility

99.1bp for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	102.1	107.4	107.5	97.8	85.2
3m	103.8	108.3	107.9	97.9	85.1
6m	107.5	110.3	108.7	98.4	85.5
1y	113.6	113.5	109.9	99.1	86.0
2y	114.4	110.9	107.1	95.8	83.6
5y	100.8	99.1	92.8	84.5	76.2
10y	84.2	82.5	78.4	73.5	70.5

Source: BofA Global Research

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## Exhibit 53: 3y Fwd vol as % ATM

83% of ATM for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	136%	91%	83%	78%	72%
3m	99%	85%	82%	78%	75%
6m	83%	80%	82%	80%	77%
1y	76%	78%	83%	83%	82%
2y	80%	80%	85%	84%	83%
5y	84%	85%	84%	83%	86%
10y	87%	87%	87%	87%	95%

Source: BofA Global Research

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## Exhibit 54: 3m Z-Score 3y Fwd vol % ATM

0.5 Z-Score for 3y fwd 1y10y

	1y	2y	5y	10y	30y
1m	-0.1	-0.4	-0.3	-0.3	-0.5
3m	-1.5	-1.0	-0.6	-0.3	-0.2
6m	-1.7	-1.1	-0.4	-0.1	0.1
1y	-1.8	-1.3	-0.3	0.5	0.6
2y	-0.3	-0.5	0.7	0.6	0.6
5y	1.3	0.9	0.5	1.1	1.6
10y	1.7	1.4	1.6	1.1	1.5

Source: BofA Global Research

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## Ratios implied/delivered

### Exhibit 55: Implied vs. Delivered (21d) Ratio

Ratios of Implied to 21d delivered still <100% virtually across the grid, richness only significant on left

	1y	2y	3y	5y	7y	10y	30y
1m	99%	101%	93%	92%	91%	90%	87%
3m	110%	99%	92%	91%	90%	89%	84%
6m	107%	96%	89%	88%	87%	85%	80%
1y	95%	90%	87%	85%	82%	80%	75%
2y	82%	83%	82%	80%	78%	76%	71%

Source: BofA Global Research

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### Exhibit 56: Implied vs. Delivered (63d) Ratio

Ratios of Implied to 63d delivered >100% for gamma and left side, but LRC looks cheap

	1y	2y	3y	5y	7y	10y	30y
1m	118%	124%	116%	112%	108%	106%	104%
3m	129%	121%	114%	110%	107%	104%	100%
6m	127%	118%	110%	106%	103%	101%	96%
1y	117%	111%	106%	101%	97%	94%	90%
2y	102%	100%	97%	94%	91%	89%	85%

Source: BofA Global Research

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### Exhibit 57: 3m Z-Scores for Implied vs. Delivered (21d) Ratio

Ratios of implied/21d delivered Cheap across the grid

	1y	2y	3y	5y	7y	10y	30y
1m	-1.3	-1.6	-1.4	-1.2	-1.0	-1.0	-1.1
3m	-1.1	-1.6	-1.4	-1.1	-1.0	-1.0	-1.3
6m	-1.2	-1.6	-1.4	-1.1	-1.1	-1.1	-1.4
1y	-1.6	-1.4	-1.3	-1.1	-1.1	-1.1	-1.4
2y	-1.2	-1.1	-1.0	-1.0	-1.1	-1.1	-1.4

Source: BofA Global Research

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### Exhibit 58: 3m Z-Scores for Implied vs. Delivered (63d) Ratio

Ratios of implied/63d delivered rich on the left vs right

	1y	2y	3y	5y	7y	10y	30y
1m	-0.4	0.4	0.4	0.2	0.1	-0.4	-1.1
3m	0.7	0.7	0.6	0.4	-0.1	-0.8	-1.8
6m	0.9	0.7	0.5	0.1	-0.4	-1.2	-2.1
1y	1.0	0.7	0.4	-0.3	-1.1	-2.1	-2.3
2y	0.4	0.0	-0.8	-2.0	-2.5	-2.6	-2.2

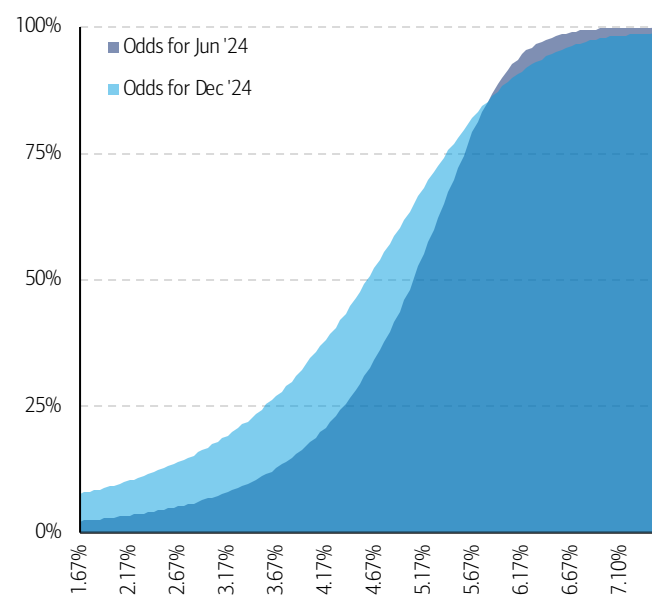
Source: BofA Global Research

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## Rates probability distributions

### Exhibit 59: CDF for 1y SOFR rates at mid-24 and end-24

1y rate cumulative distribution functions

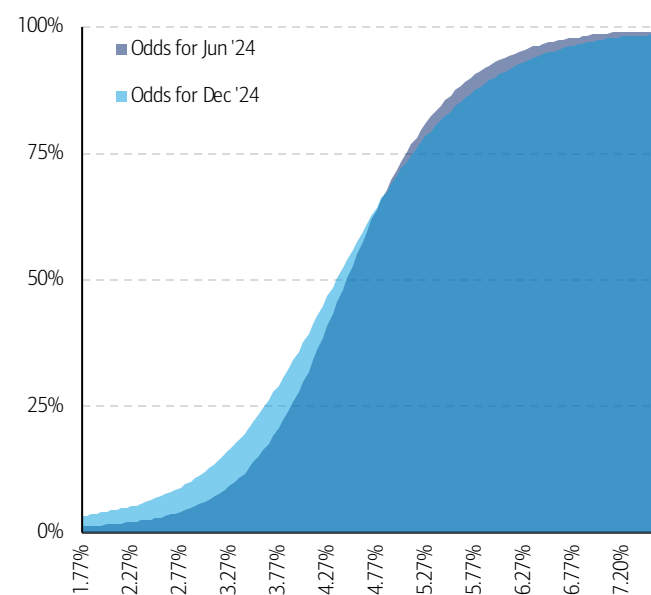


Source: BofA Global Research

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### Exhibit 60: CDF for 10y SOFR rates at mid-24 and end-24

10y rate cumulative distribution functions



Source: BofA Global Research

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# Trade activity

## Exhibit 61: 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		178			1040		150			1368
1m	4470	3990	100		1565	25	1944		540	18834
3m	5600	1275	170		876		1645	245	73	11734
6m	2270	1520	51		670		1325	230	165	7101
1y	7938	5984	100	450	1000	510	2250	111	379	18722
2y	3440	2750		960		100	1095	262	95	8702
3Y		150		480		129	413		503	1675
4Y		100			390		120	35	75	720
5Y	150	550			340		1022	365	50	2477
7Y						225	140	34		399
10Y	150						1200	293	88	1731
20Y										
30Y										
	24018	16497	421	1890	5881	989	11304	1575	1968	73463

Source: BofA Global Research; SDR, Bloomberg

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## Exhibit 62: 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		420			1040		570			2043
1m	5154	3080	100		1525	370	2345		436	15860
3m	3780	775	170		706	85	1536	245	103	8095
6m	1810	1520	291		2484	255	1520	213	190	8403
1y	11560	6010	100		760	200	1808	111	450	20999
2y	5440	2050	1680	240		100	1100	418	75	11103
3Y	2000	150	480	1920		138	541		473	5702
4Y		100			390		383	35	75	983
5Y	150	550			340		922	325	50	2337
7Y							220	186	75	581
10Y	150						1082	418	88	1738
20Y										
30Y										
	30044	14655	2821	2160	7245	1148	12027	1951	2015	77844

Source: BofA Global Research; SDR, Bloomberg

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## Exhibit 63: 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							332			332
1m	460	200					43		110	813
3m		300					150		100	550
6m		460	240							700
1y	750		58						50	858
2y							105		40	145
3Y						35				35
4Y										
5Y							370			370
7Y							40			40
10Y								40		40
20Y										
30Y										
	1210	960	298			35	1040	40	300	3883

Source: BofA Global Research; SDR, Bloomberg

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## Formosa issuance

### Exhibit 64: 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 65: 2023 Formosa issuance YTD (\$m)

Very limited issuance YTD

	2	5	7	10	15	20	25	30
1	29	17						
2				370				
3		40		60				
4		205		485				
5				135		30	15	
7								
10								25
15								
20								
25								
30								1000

Source: BofA Global Research, Bloomberg

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### Exhibit 66: Formosa issuance (\$m) since 2014

Peak issuance concentrated on the 5y30y tenor

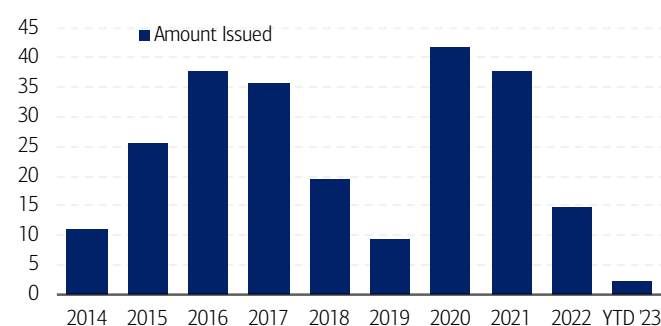
	2	5	7	10	15	20	25	30
1	29	222	75	1033	462	840		18054
2		40		1164		1485		22177
3		40		170	20	240	225	15536
4		220		664	50	25	275	2441
5				155	445	1527	368	111658
7			30					5624
10				2000				4489
15								
20								
25								
30								6500

Source: BofA Global Research, Bloomberg

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### Exhibit 67: Total issuance per year since 2014 (\$bn)

Very limited Formosa issuance YTD (c.\$2.44bn)



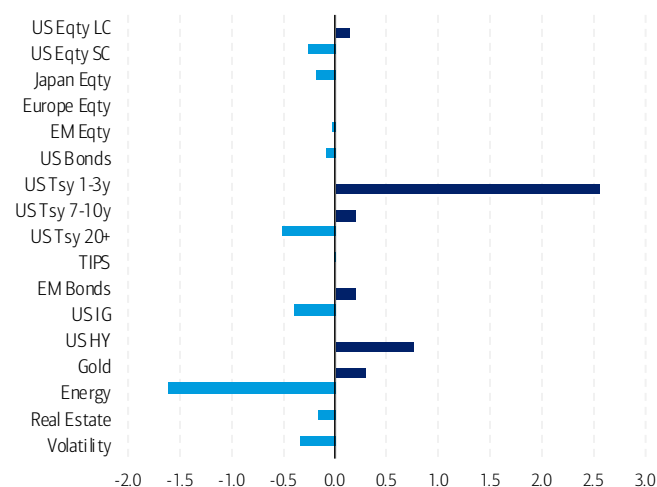
Source: BofA Global Research, Bloomberg

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## Allocation bias from ETF flows

### Exhibit 68: Allocation bias from ETF flows – week ending 11/3

Slight upgrade of risk, as UST shifting less short (or longer)

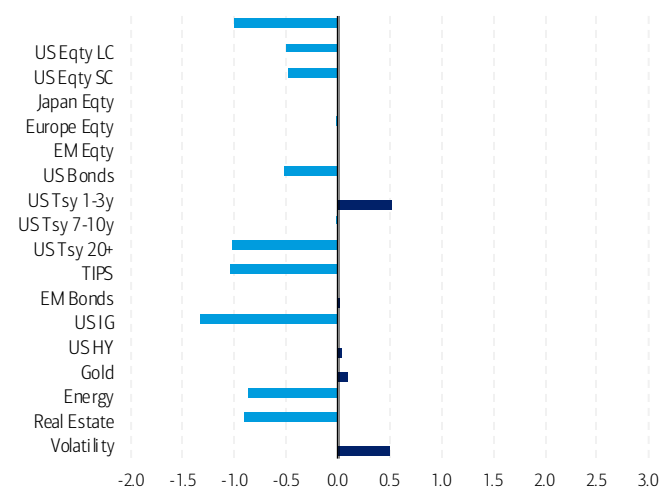


Source: BofA Global Research

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### Exhibit 69: Allocation bias from ETF flows – week ending 10/27

Broad risk off in ETF flows, low utility of USTs



Source: BofA Global Research

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# Notes

**Exhibit 17:** 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 19/20/22:** 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 20/21/23:** 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 27/30:** 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 29/32:** 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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