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# Interest Rate Derivatives

## Lognormal reshuffle

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- The fronts / reds curve has reversed its late September steepening and is now more inverted than it was in late August. We continue to look for a dis-inversion of this curve, and recommend initiating box trades that are designed to benefit from a steepening of this curve: initiate 2Y forward 2s/10s swap curve flatteners paired with a weighted 3M forward 2s/30s swap curve steepener
- Implied volatility will likely remain elevated for a while longer given the rising sensitivity of US rates to global macro developments and given the seasonal outlook for weaker market depth into year-end. We turn tactically bullish on gamma, but given the elevated level of implieds we favor efficient ways of constructing a long gamma bias: buy 3Mx5Y straddles versus selling 3Mx15Y straddles
- The Lognormal shuffle raises its head, this time at higher yields: there is growing evidence that the swaptions market is pricing to lognormal rate distributions. This is seen in the cross-sectional correlation of implied normal vol with forward rates, the lack of a similar correlation when examining implied percent-yield vols, as well as the vol-rate correlation for specific structures over time. While it is likely too early to draw definitive conclusions, lognormality at sufficiently high yields has been observed previously in the historical data. One implication of such a distributional shift would be that implieds could persist at higher levels of normal implied basis point volatility
- With three of the four large banks having reported 3Q22 earnings this week, the aggregate AOCI drawdown appears to be tracking closer to ~\$14-\$15bn (versus our estimate of ~\$17-\$18bn). Our broader expectation of weak duration demand from banks remains unchanged. In addition, leverage constraints will likely continue to be significant for a while longer for large domestic banks

**US Rates Strategy**

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**See page 18 for analyst certification and important disclosures.**

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# Lognormal reshuffle

Much has happened in the Rates markets in the past two weeks. The employment report points to a labor market that remains on firm footing (with the unemployment rate dropping to 3.5%), and this week's CPI print surprised to the upside. Unsurprisingly, markets are pricing in a more aggressive Fed path - forwards are now pricing in near-certainty of a 75bp hike in November, and expectations of the terminal rate for the cycle have risen to nearly 5% by early 2Q23 (**Exhibit 1**).

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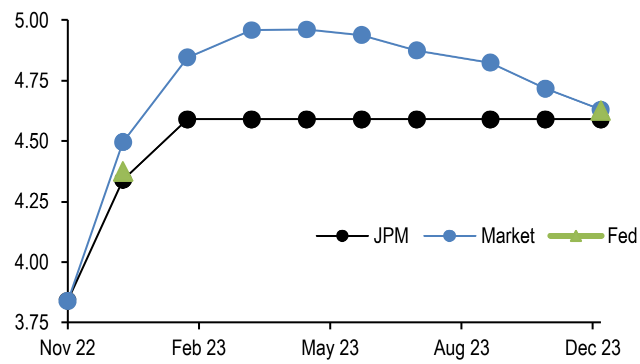
But markets have been impacted by more than just US economic data and Fed expectations. The drama around shifting fiscal policy in the UK has led to considerable volatility in the Gilt market, forcing temporary asset purchases by the Bank of England aimed at stabilizing the market and leading to considerably higher monetary policy uncertainty in the UK. Things remain unclear on this front and a full reconsideration of the UK tax plan now appears increasingly likely, especially after Chancellor Kwarteng's ouster on Friday, which would alleviate the extent to which the BoE might otherwise need to tighten monetary policy in order to contain inflation. Nevertheless, developments in the UK have had a spillover effect on volatility in the US. The sharp rise in UK swap rates in the past few weeks coincides with a pick-up in close-to-open volatility, suggesting that UK market developments are helping to support US rate volatility in the overnight hours (**Exhibit 2**). More broadly, this is consistent with the global nature of the inflation backdrop and the correspondingly global policy response, which has caused US rates to become more correlated with global rates, as noted by our Treasury strategists (see Exhibit 11 in U.S. Fixed Income Markets Weekly: *Treasuries*, 10/14/2022).

**Exhibit 1: OIS forwards are pricing in a virtual certainty of a 75bp hike in November**

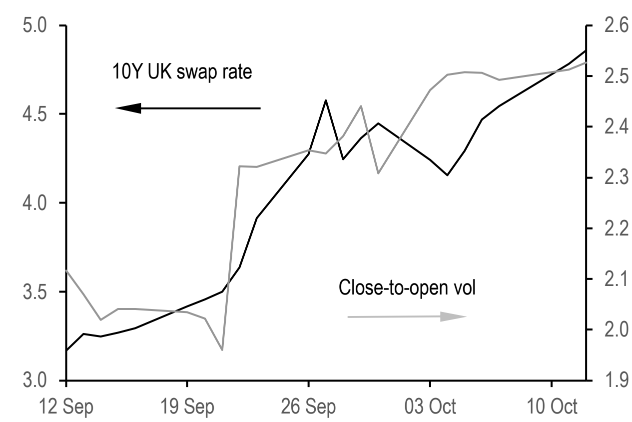
OIS forward rates at each FOMC meeting (10/14/2022) versus J.P. Morgan forecast and Fed YE '22 and '23 SEP dots; %




Source: JPMorgan, Bloomberg Finance, L.P.

**Exhibit 2: No sleep for the weary - recent developments in the UK are likely helping to support more volatility in US markets in the overnight hours**

UK 10Y swap yield (%, left), versus the close-to-open realized volatility in the FV sector* (bp/day, right)




* Close-to-open realized volatility calculated as the rolling 1M standard deviation of the yield change in the FV sector between open and the previous day's close

Source: JPMorgan

The global forces impacting US markets are broader than just the UK, however. The relative resilience of the US economy as well as the aggressive pace of rate hikes by the Fed have helped to push the dollar significantly higher relative to a basket of foreign currencies (**Exhibit 3**), increasing the risk of currency market interventions by foreign central banks. Indeed, Fed custody holdings of Treasuries (a proxy for foreign central bank holdings of USTs) fell sharply in late September as the dollar spiked higher, lending some support for such a view. To the extent that such flows persist or accelerate, it could worsen an already weak demand picture for US Treasuries and pressure swap spreads narrower. There is some evidence of such an impact - as seen in **Exhibit 4**, 10-year swap spreads (adjusted for its drivers) have turned sharply narrower as custody holdings fell in recent weeks.

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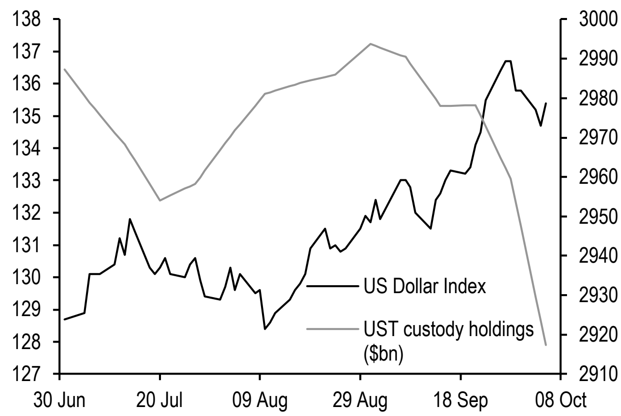
**Exhibit 3: Fed custody holdings of US Treasuries fell sharply in late September as the dollar rose, supporting the view that dollar strength might be prompting selling of US fixed income assets**

US dollar index* versus Fed custody holdings of US Treasuries ($bn, right)

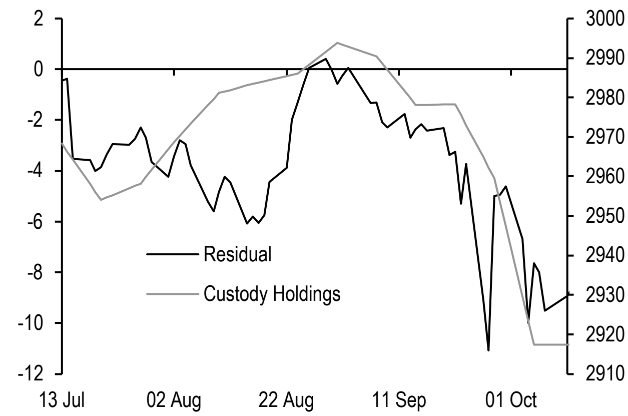



* USD NEER (trade-weighted nominal effective exchange rate; USD vs G10 and EM)

Source: JPMorgan, New York Fed

**Exhibit 4: The sharp narrowing in intermediate maturity swap spreads - adjusted for its drivers - has coincided with the equally sharp drop in custody holdings of US Treasuries, suggesting that dollar strength is now a risk to spread widening positions**

10-year maturity matched swap spread minus fair value* (bp, left), versus Fed custody holdings of US Treasuries ($bn, right)




* 10-year swap spread fair value defined as -34.03 plus 2.65 × 1M forward 1M OIS (%), plus 0.13 × Monthly Fed UST purchases ($bn 10Y equivalents), minus 0.063 × High Grade Issuance ($bn), plus 0.024 × Bank Demand ($bn 10Y equivalents), plus 1.17 × 7-20Y sector RMSE (bp)

Source: JPMorgan, New York Fed

Given this risk, **we turn tactically neutral on swap spreads across the curve** and recommend unwinding widening exposure. We would look for stabilization in Fed custody holdings of Treasuries and/or in the dollar before re-entering spread widening positions.

## Swap yield curve

Swap yields have had a volatile two-week period with yields declining into early October but rebounding higher on the back of a relatively strong payroll report and a higher-than-expected CPI print. All in all, swap yields are higher by almost 40bp in the 2-year sector, and the 2s/10s curve is almost 25bp flatter since our previous publication (**Exhibit 5**).

**Exhibit 5: At the end of a volatile 2-week period, swap yields are considerably higher led by the front end and the curve is mostly flatter**

Current levels and 2-week stats for SOFR swap yields and SOFR swap curve (%); 9/30/2022-10/14/2022

| | Start | Chg | End | Min | Max |
|---|---|---|---|---|---|
| 2Y | 4.19 | 0.39 | 4.58 | 4.11 | 4.58 |
| 5Y | 3.81 | 0.19 | 4.00 | 3.59 | 4.00 |
| 10Y | 3.57 | 0.14 | 3.72 | 3.33 | 3.72 |
| 30Y | 3.07 | 0.14 | 3.21 | 2.94 | 3.21 |
| 2s/5s | -0.38 | -0.20 | -0.58 | -0.58 | -0.45 |
| 2s/10s | -0.62 | -0.24 | -0.86 | -0.86 | -0.67 |
| 2s/30s | -1.12 | -0.24 | -1.37 | -1.37 | -1.11 |
| 5s/10s | -0.24 | -0.04 | -0.28 | -0.28 | -0.22 |
| 5s/30s | -0.74 | -0.05 | -0.79 | -0.79 | -0.65 |
| 10s/30s | -0.50 | 0.00 | -0.51 | -0.51 | -0.39 |

Source: JPMorgan

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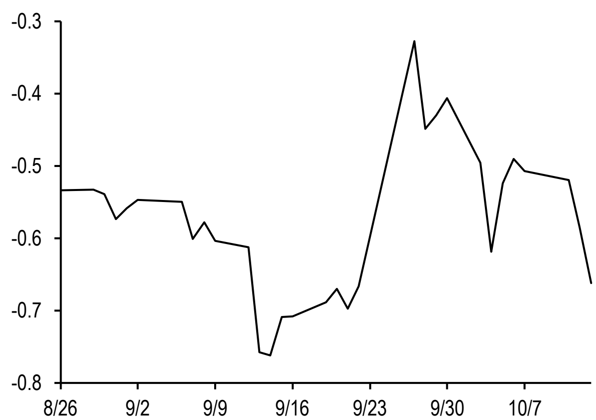
**Going forward, our main theme on the swap yield curve remains centered on positioning a steepening of the Eurodollar curve**. Just this week, Fed Vice Chair Brainard reiterated in her speech that "Monetary policy will be restrictive for some time to ensure that inflation moves back to target over time". This is largely consistent with recent messaging from Fed speakers, including most notably Chair Powell's speech at Jackson Hole in late August. But despite consistent Fed-speak cautioning against expecting premature monetary easing, forwards continue to price in a significantly inverted Fronts/Reds curve. Indeed, the 6Mx3M / 18Mx3M SOFR forward swap curve has erased its late-September steepening and is now more inverted than it was in late August (**Exhibit 6**).

**We continue to look for a dis-inversion of this curve, and we therefore continue to favor trades that offer attractive ways to initiate exposure to a steepening in this sector**. One such example that is currently attractive is **to initiate weighted 3M forward 2s/30s swap curve steepeners hedged with 2Y forward 2s/10s flatteners** (see Trade recommendations). As seen in **Exhibit 7**, the yield spread corresponding to this trade has been well correlated to the 6Mx3M/18Mx3M forward swap curve. Additionally, this curve currently appears too low relative to this relationship and should also benefit from any correction in the residual.

**Exhibit 6: The fronts/reds curve has reversed its late-September steepening and is now more inverted than it was in late August at the time of Chair Powell's Jackson Hole speech**

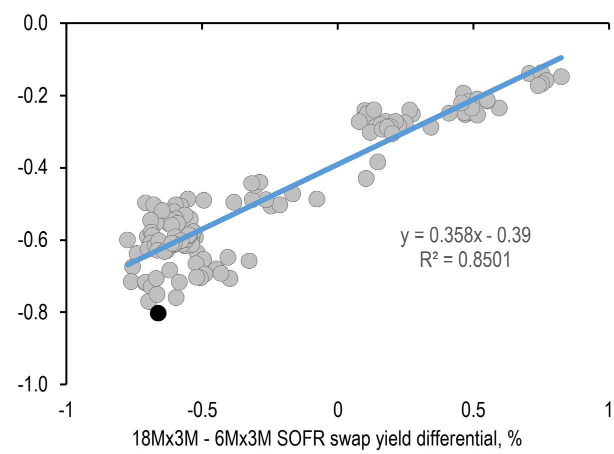
18Mx3M minus 6Mx3M forward SOFR swap yield differential; %




Source: JPMorgan

**Exhibit 7: Initiating 2Y forward 2s/10s swap curve flatteners paired with 3M forward 2s/30s swap curve steepeners is an attractive way to gain exposure to a steepening of the Fronts/Reds curve**

0.72 * (3Mx30Y minus 3Mx2Y) minus (2Yx10Y minus 2Yx2Y) swap yield spread (%), versus the 18Mx3M minus 6Mx3M SOFR forward swap yield differential; past 6 months




Source: JPMorgan

## Options

The story of implied volatility over the past two weeks is like the story of yields - implieds fell into early October before rebounding higher on the back of strong data and rising rates. All in all, implieds are mostly higher across the surface, with short expiries on 5-year tails higher by ~0.3bp/day, for instance. Two-year tails were the outlier, declining by ~0.2 bp/day over the past two weeks, with most of that decline occurring in early October (**Exhibit 8**).

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**Exhibit 8: Implied volatility is mostly higher over the past two weeks, with 2-year tails being the exception**

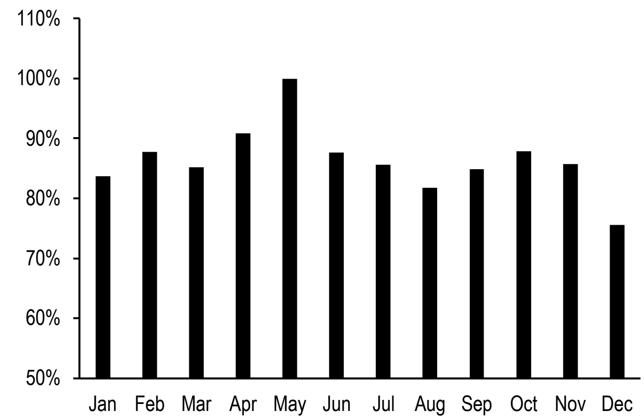
Statistics for selected swaption structures, 9/30/2022 - 10/14/2022; bp/day

| | Start | Chg | End | Min | Max |
|---|---|---|---|---|---|
| 3Mx2Y | 10.58 | -0.15 | 10.43 | 10.40 | 10.67 |
| 3Mx5Y | 9.84 | 0.34 | 10.18 | 9.61 | 10.20 |
| 3Mx10Y | 8.91 | 0.55 | 9.46 | 8.65 | 9.48 |
| 3Mx30Y | 7.23 | 0.30 | 7.54 | 7.01 | 7.56 |
| 6Mx2Y | 10.50 | -0.16 | 10.34 | 10.27 | 10.52 |
| 6Mx5Y | 9.58 | 0.27 | 9.86 | 9.33 | 9.86 |
| 6Mx10Y | 8.46 | 0.44 | 8.90 | 8.19 | 8.90 |
| 6Mx30Y | 6.87 | 0.25 | 7.12 | 6.63 | 7.14 |
| 3Yx2Y | 9.16 | -0.25 | 8.91 | 8.85 | 9.16 |
| 3Yx5Y | 8.06 | 0.05 | 8.11 | 7.84 | 8.12 |
| 3Yx10Y | 7.04 | 0.14 | 7.18 | 6.82 | 7.20 |
| 3Yx30Y | 5.75 | 0.03 | 5.78 | 5.54 | 5.81 |

Source: JPMorgan

**Exhibit 9: Look for market depth to decline going forward into year end**

Duration weighted market depth* averaged by month over the period from 01/2012 - 12/2021, and normalized to 100% in the peak month




*Market depth is the size of the top 3 bids and offers by queue position, averaged between 8:30 - 10:30am daily. Duration weighted market depth refers to the weighted sum of market depth in 2s, 5s, 10s, and 30s using weights of 0.25, 0.5, 1 and 2, respectively

Source: JPMorgan, BrokerTec

Looking ahead, **volatility is likely to remain elevated for a while longer**. As we noted earlier, the inflation backdrop is global in nature and US rates are becoming more sensitive to global developments. In the near term, this means that global developments (such as on the UK fiscal and monetary policy fronts) will likely drive US rates, helping to support US rate volatility at more elevated levels than would otherwise be the case. In addition, seasonal factors are likely to turn positive for long gamma positions. As seen in **Exhibit 9**, market depth historically tends to reach its 2H peak around October, and then decline going forward into year-end.

Lastly, as we discuss later in this piece, there are emerging signs that options markets are beginning to price to lognormal distributions at higher yield levels. To be sure, it is still early days in a higher rate regime, and it is too soon to draw strong conclusions. Nevertheless, such potentially emergent lognormal behavior appears likely to keep normal implied volatility elevated so long as yields themselves remain elevated (which we expect to remain the case in the near term). Therefore, **the balance of risks now appear to favor long gamma positions, and we turn tactically bullish on gamma**.

That said, with implied volatility at very elevated levels, we favor efficient ways of constructing a long gamma bias. One such way that is currently attractive is to overweight short expiries on 5-year tails versus 15-year tails. As seen in **Exhibit 10**, the 3Mx5Y minus 3Mx15Y implied volatility differential appears low in comparison to the 3M realized volatility differential between those tails (which has persisted at higher levels for much of this hiking regime). In addition, delta hedged returns on a gamma-neutral tail switch (long 3Mx5Y versus selling 33% notional weighted 3Mx15Y swaption straddles) has been well correlated to the delta hedged returns on an outright long 3Mx5Y straddle position (**Exhibit 11**). Thus, **we recommend selling 3Mx15Y swaption straddles versus buying 3Mx5Y straddles on a delta-hedged basis as an attractive way of constructing long gamma exposure in this environment** (see Trade recommendations).

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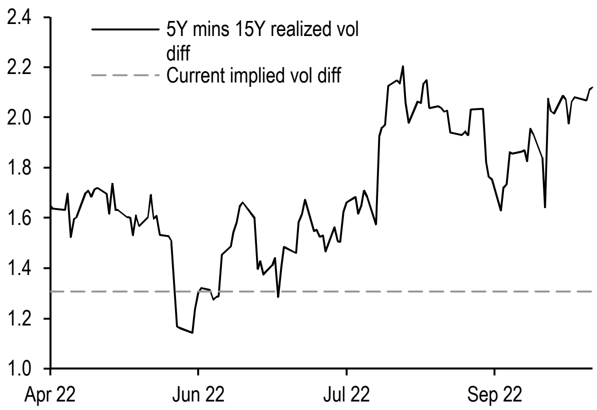
**Exhibit 10: The implied volatility differential between 5- and 15-year tails is currently low in comparison to the persistently higher realized volatility differential between those tails …**

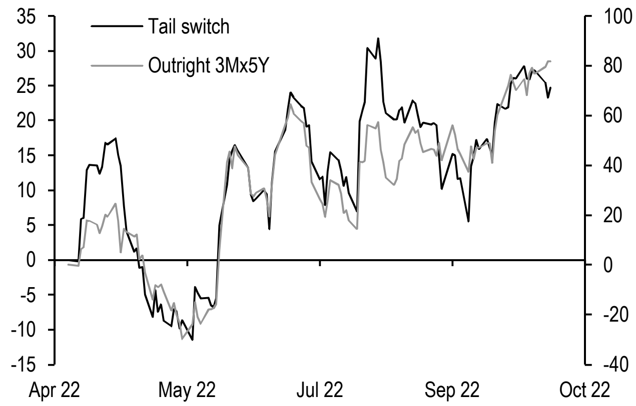
Rolling 3M realized volatility differential between 5- and 15-year tails, versus the current level of the 3Mx5Y - 3Mx15Y implied volatility differential; bp/day




Source: JPMorgan

**Exhibit 11: … thanks to which delta hedged returns on a gamma-neutral tail switch have closely tracked returns on outright long gamma positions on 5-year tails**

Cumulative delta hedged returns* on long 3Mx5Y / short 3Mx15Y swaption straddle switch (1.0 : -0.33 notional weighted, in basis points of notional on the 3Mx5Y leg), versus cumulative delta hedged returns on long 3Mx5Y swaption straddles (bp of notional, right)




* Assumes daily delta hedging and no transaction costs on all legs. Options assumed to be restruck at the start of each month

Source: JPMorgan

## The emergent lognormality (?) of rates

Rates have risen sharply this year, to levels not seen in 15 years. In the front end, for instance, 2-year rates are at levels only briefly seen during the 2004-06 tightening cycle. As we push steadily higher in yields, it behooves us to take stock of what the options markets might be telling us about the likely distribution of rates at these higher rate levels. Will yield changes remain (mostly) Normally distributed (making normal implied volatility the more stable gauge of volatility), or will distributions become more lognormal, in which case Normal basis point volatility might be expected to become strongly correlated to rate levels?

As a quick refresher, **when markets are pricing in a normal distribution, normal bpvol is by definition the better measure of volatility and ought to exhibit low correlation to rates. In contrast, when markets are pricing in a lognormal distribution, normal bpvol starts to exhibit a high degree of correlation with rates, while lognormal "percent-yield" vol becomes less correlated yield levels**. We can use this property to examine whether markets are pricing to a normal distribution (like over much of recent history) or a lognormal distribution.

The past two decades of experience in the options market teaches us two things. **First, implied volatility becomes strongly lognormal when rates are below 1% or so assuming zero is seen as a lower bound on rates**. This is seen in the fact that implied Normal basis point volatility becomes strongly correlated to rates in such regimes, while implied lognormal yield volatility is relatively uncorrelated to rates. Second, in the 1.0 - 5.0% yield range in yields that has characterized most swaption structures in recent decades, yields appear to be closer to Normally distributed. Both of these observations can be inferred from **Exhibit 12**, which tabulates the correlation between implied volatility (both Normal bp vol and Lognormal percent-yield volatility) versus rates on a cross section of structures over the past 20 years.

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But there has also been some historical experience (limited though it may be in duration) with higher yield regimes over this period, and this suggests that swaptions could begin to price to lognormal distributions at high enough rates. This is seen in the lower beta (in magnitude) and lower R-squared of lognormal yield volatility versus the underlying ATMF rates.

**Exhibit 12: The lognormal reshuffle at high rates: options markets appear to price to a lognormal distribution at low yields, a normal distribution over the middle ground, and show signs of a shift back towards lognormality at high enough yields**

Statistics from regressing Normal bpvol and lognormal yield vol for 1-, 2- and 3-year tails and 3M and 6M expiries against the underlying at-the-money forward (ATMF) rate for different rate regimes*, 2001 - 2021

| | Normal BP Vol vs ATMF | | | Lognormal Yield Vol vs ATMF | | | |
|---|---|---|---|---|---|---|---|
| **Regime** | **Intercept** | **Beta** | **Rsq** | **Intercept** | **Beta** | **Rsq** | **Comment** |
| Below 1% | 0.4 | 3.6 | 71.3 | 92.4 | -34.4 | 15.3 | Lognormal |
| Between 1 and 5% | 3.9 | 0.7 | 13.3 | 65.2 | -9.8 | 39.7 | Normal |
| Above 5% | 9.9 | -1.0 | 4.1 | 43.6 | -5.7 | 12.4 | Shifting back towards lognormal? |

* Calculated using LIBOR swaptions and LIBOR swap rates. Data over the 20-year period ending in Dec 2021 is bucketed into three yield regimes described above.

Source: JPMorgan

**Such lognormal behavior may be emerging now in the swaptions market, as rates have risen above 4%**. To be sure, it is too early to know for sure. But a **cross-sectional look at "traditional" implied normal basis point volatility versus the underlying ATMF rates suggests that they exhibit a strong correlation to the underlying forward rates** (**Exhibit 13**), in a manner reminiscent of low-yield regimes of the past when yields were widely recognized to exhibit lognormal behavior. In contrast, the same cross-sectional plot of implied lognormal yield volatility shows little correlation to the underlying forwards (**Exhibit 14**). Moreover, this is clearly a new development, manifesting itself at higher yield levels. At the start of the year, for instance, quite the opposite was true and normal implied vol was uncorrelated to forward yields across structures, while implied lognormal volatility was in fact almost perfectly correlated to yields (**Exhibits 15** and **16**).

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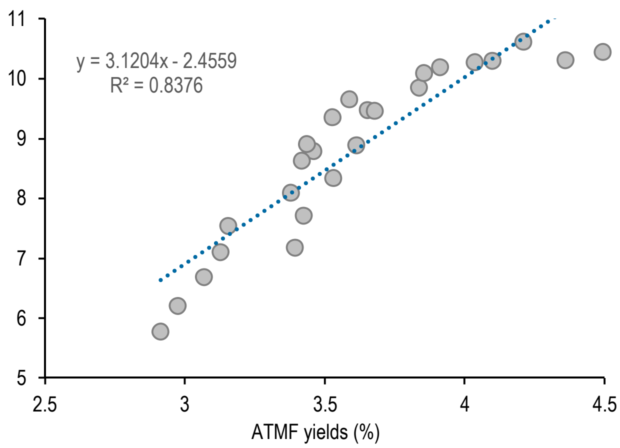
**Exhibit 13: A cross-sectional examination of implied normal bp vol versus the underlying forward rates for a range of structures shows a strong correlation ...**

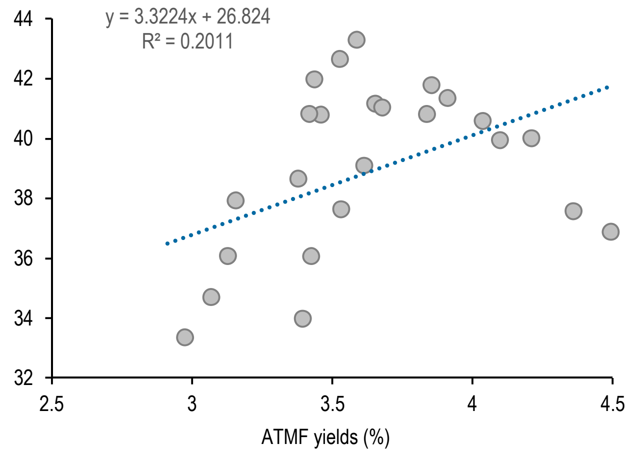
Swaption Normal bp vol for 2-,3-,5-,10-,30-year tails and 3M, 6M, 1Y, 2Y and 3Y expiries versus the corresponding at-the-money forward (ATMF) yield, cross-sectional data as of 10/13/2022; bp/day




Source: JPMorgan

**Exhibit 14: ... while lognormal yield vol exhibits much weaker correlation ...**

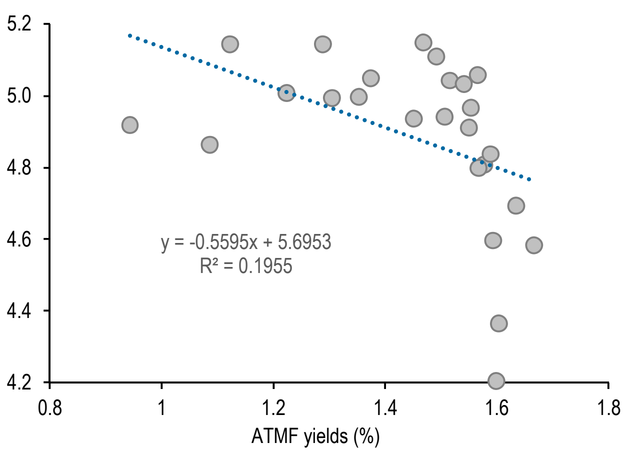
Swaption lognormal yield vol for 2-,3-,5-,10-,30-year tails for 3M, 6M, 1Y, 2Y and 3Y expiries versus the corresponding at-the-money forward (ATMF) yield, cross-sectional data as of 10/13/2022; %




Source: JPMorgan

**Exhibit 15: ... which is quite a reversal from the start of the year, when Normal bp vol exhibited low cross-sectional correlation to rates ...**

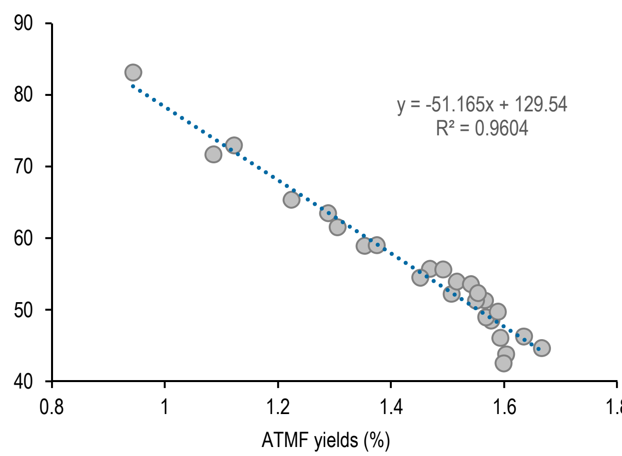
Swaption Normal bp vol for 2-,3-,5-,10-,30-year tails for 3M, 6M, 1Y, 2Y and 3Y expiries versus the corresponding at-the-money forward (ATMF) yield; cross-sectional data as of 1/3/2022; bp/day




Source: JPMorgan

**Exhibit 16: ... and lognormal yield vol was highly correlated**

Swaption lognormal yield vol for 2-,3-,5-,10-,30-year tails for 3M, 6M, 1Y, 2Y and 3Y expiries versus the corresponding at-the-money forward yield (ATMF); cross-sectional data as of 1/3/2022; %




Source: JPMorgan

What does all this mean going forward? **We begin by reiterating that it is too soon to assert that yields are likely to exhibit lognormal behavior at higher yield levels**, in a manner consistent with what is being priced into options. But **what we do know is that options markets appear to be pricing in lognormal distributions**, indicated by the cross-sectional relationships described earlier and also by the correlation between implied volatility changes and yield changes over time for a given structure (**Exhibit 17**). In turn, **this could mean that Normal implied volatility** (which has the nice intuitive property of being proportional to option premia) **could stay well supported at elevated levels if yields remain high. It also**

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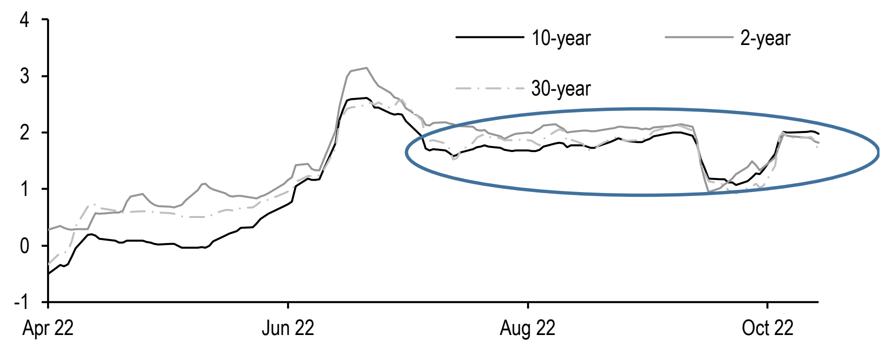
**means that straddles that are hedged using Normal deltas could produce returns that exhibit systematic correlation to rates, while hedging to lognormal deltas would mitigate that directional exposure**. The coming months and more experience in higher yield regimes will help to clarify if yields will behave lognormally or revert to a more normal regime (pun intended) as the hiking cycle ages.

**Exhibit 17: In addition to evidence from cross-sectional data, vol-rate betas for specific structures over time have risen and appear to have stabilized**

Rolling 3-month beta of weekly changes in the 3M expiry implied normal bp vol on 2-, 10- and 30-year tails against weekly changes in the underlying at-the-money forward yield, 4/1/2022 - 10/13/2022




Source: JPMorgan

## 3Q22 bank earnings update

We provide an update on the 3Q22 earnings as 3 out of the 4 GSIB banks that we track in aggregate reported their quarterly earnings today. In our last publication (see Globally convergent inflation confronts diverging policy), we had estimated that these banks would likely report an aggregate AOCI drawdown of ~$17-$18bn due to the rise in rates in 3Q22. After the reports today, **it appears that the quarterly AOCI drawdown is tracking closer to ~$14-$15bn,** which is in line with the AOCI loss prior quarter. This suggests that **banks have mitigated a slightly larger fraction of their duration extension last quarter than we had estimated**, via some combination of paying fixed in swaps, shrinking AFS books and shifting securities into HTM portfolios.

On the balance sheet front, deposit balances declined quarter over quarter and supplementary leverage ratios (SLR) improved slightly across the banks. Despite these positive trends, changes in SLR ratios remain small and system wide **leverage constraints will likely continue to play a significant role for a while longer**.

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## Trading recommendations

- **Initiate 2Y forward 2s/10s swap curve flatteners paired with 3M forward 2s/30s swap curve steepeners is an attractive way to gain exposure to a steepening of the Fronts/Reds curve**
  We continue to look for a dis-inversion of the Eurodollar curve, and we therefore continue to favor trades that offer attractive ways to initiate exposure to a steepening in this sector
  - Receive-fixed in $66.9mn notional of a 01/14/23x2Y SOFR swap at a yield of 4.578% (PVBP: $195.8/bp per mn notional). Pay-fixed in $7.1mn notional of a 01/14/23x30Y SOFR swap at a yield of 3.193% (PVBP: $1844.1/bp per mn notional). Pay-fixed in $100.0mn notional of a 10/14/24x2Y SOFR swap at a yield of 3.640% (PVBP: $181.8/bp per mn notional). Receive-fixed in $24.1mn notional of a 10/14/24x10Y SOFR swap at a yield of 3.463% (PVBP: $753.1/bp per mn notional). This trade uses risk weights of 0.72/-0.72/-1.0/1.0 on the 3Mx2Y/3Mx30Y/2Yx2Y/2Yx10Y swaps respectively. This trade is being initiated at a yield spread of -82bp.

- **Overweight 5-year tails vs 15-year tails in 3M expiries**
  Selling 3Mx15Y swaption straddles versus buying 3Mx5Y straddles on a delta-hedged basis provides an attractive way of constructing long gamma exposure in this environment characterized by high implied volatility
  - Buy $100mn notional 3Mx5Y ATMF swaption straddles. (Notification date: 2023-01-17, swap tenor: 5Y, ATMF: 3.9682%, strike: 3.9682%, spot premium: 283.8bp per notional, forward premium at inception: 286.6bp per notional, bpvol at inception: 10.2bp/day). This trade assumes active delta hedging every business day on this leg.
  - Sell $33mn notional 3Mx15Y ATMF swaption straddles. (Notification date: 2023-01-17, swap tenor: 15Y, ATMF: 3.6329%, strike: 3.6329%, spot premium: 626.7bp per notional, forward premium at inception: 633.0bp per notional, bpvol at inception: 8.8bp/day). This trade assumes active delta hedging every business day on this leg.

- **Unwind trades that position for widening in swap spreads**
  Given risks of a strengthening dollar that might be prompting selling of US fixed income assets, we turn tactically neutral on swap spreads across the curve, and recommend unwinding widening exposure.
  - Unwind pay-fixed in 0.25% Oct 31 2025 maturity matched SOFR swap spreads. Unwind long $100mn notional of the 0.25% Oct 31 2025, versus paying fixed in $89.4mn notional of a maturity matched SOFR swap at a profit of 2bp (for original trade write up, see Fixed Income Markets Weekly 2022-09-23)
  - Unwind pay-fixed in 1.375% Nov 15 2031 maturity matched SOFR swap spreads. Unwind long $100mn notional of the 1.375% Nov 15 2031, versus paying fixed in $89.0mn notional of a maturity matched SOFR swap at a loss of 3.2bp (for original trade write up, see Fixed Income Markets Weekly 2022-09-23).
  - Unwind pay-fixed in 2.875% May 15 2052 maturity matched SOFR swap spreads. Unwind long $50mn notional of the 2.875% May 15 2052, versus paying fixed in $46.1mn notional of a maturity matched SOFR swap originally initiated at a swap spread of -54.7bp. Unwind short 30 E-mini SP futures (ESU2) at 4133.25. This trade is unwound at a loss of 11.7bp (for original trade write up, see Fixed Income Markets Weekly 2022-07-29).

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- **Unwind shorts in the belly of the H3/U3/H4 3M SOFR futures butterfly (32:82.5 weighted risk)**
  This trade has mean reverted, and no longer looks attractive to maintain
  – Unwind longs in 320 contracts of SFRH3 and 825 contracts of SFRH4, versus short 1000 SFRU3, initiated at a weighted yield differential (defined as yield on belly minus weighted sum of wings) of -44bp. This trade is being unwound at a profit of 4.0bp (for original trade write up, see Fixed Income Markets Weekly 2022-09-30).

- **Unwind longs in 5-year tails versus 3-year tails in 3M expiries**
  Realized vol differential and implied vol differential have begun to converge and trade no longer looks attractive to maintain
  – Unwind shorts in $161mn notional 3Mx3Y ATMF swaption straddles (strike at inception: 4.0832%, implied vol at inception: 10.01bp/day). Unwind longs in $100mn notional 3Mx5Y ATMF swaption straddles (strike at inception: 3.7541%, implied vol at inception: 9.37bp/day). This trade assumes active delta hedging every business day. This trade is being unwound at a profit of 9.9abp since inception (for original trade write up, see Fixed Income Markets Weekly 2022-09-23).

- **Continue to position for a steeper 3M forward 7s/30s curve, paired with 2Y forward 2s/15s swap curve flatteners, as an efficient way to position for a steepening Eurodollar curve**
  – Continue receiving-fixed in $100.0mn notional of a 12/30/22x7Y SOFR swap. Continue paying-fixed in $32.2mn notional of a 12/30/22x30Y SOFR swap. Continue paying-fixed in $331.6mn notional of a 09/30/24x2Y SOFR swap. Continue receiving-fixed in $57.0mn notional of a 09/30/24x15Y SOFR swap. This trade uses risk weights of 1.0/-1.0/-1.0/1.0 on the 3Mx7Y/3Mx30Y/2Yx2Y/2Yx15Y swaps respectively. This trade was initiated on 2022-09-30 at a yield spread of -37.8bp. The current P/L on this trade is -3.4bp (for original trade write up, see Fixed Income Markets Weekly 2022-09-30).

- **Maintain 2Y forward 2s/7s curve flatteners paired with 3M forward 5s/15s swap curve steepeners (80% risk weighted)**
  – Continue paying-fixed in $306.7mn notional of a 09/23/24x2Y SOFR swap while receiving-fixed in $100.0mn notional of a 09/23/24x7Y SOFR swap. Continue receiving-fixed in $103.0mn notional of a 12/23/22x5Y SOFR swap while paying-fixed in $38.8mn notional of a 12/23/22x15Y SOFR swap. This trade uses risk weights of -1.0/1.0/0.8/-0.8 on the 2Yx2Y/2Yx7Y/3Mx5Y/3Mx15Y swaps respectively. This trade was initiated on 2022-09-23 at a yield spread of -7.3bp. The current P/L on this trade is -3.6bp (for original trade write up, see Fixed Income Markets Weekly 2022-09-23).

- **Maintain belly cheapening of the M3/Z3/M4 3M SOFR futures butterfly (-0.55:1:-0.55 risk weighted)**
  – Maintain long 550 contracts of SFRM3 at 96.31. Maintain short 1000 contracts of SFRZ3 at 96.625. Maintain long 550 contracts of SFRM4 at 96.94. P/L on this trade since inception: -2.5bp (for original trade write up, see Fixed Income Markets Weekly 2022-08-26).

- **Maintain longs in 3M/6M expiry swaption calendar spread on 10 year tails**
  – Maintain longs in $100mn notional 3Mx10Y swaption straddles (strike at inception: 2.61%, implied vol at inception: 7.4bp/day). Maintain shorts in $85mn notional 6Mx10Y swaption straddles (strike at inception: 2.59%, implied vol at

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inception: 7.0bp/day). This trade assumes active delta hedging every business day. P/L on this trade since inception: -12.6abp, as of 2022-08-18 (for original trade write up, see Fixed Income Markets Weekly 2022-08-05).

- **Maintain bearish vega exposure in the 3Yx10Y sector**
  – Maintain shorts in $100mn notional 3Yx10Y swaption straddles (strike at inception: 2.8141%, implied vol at inception: 5.56bp/day). This trade assumes active delta hedging every business day. P/L on this trade since inception: -29.4abp (for original trade write up, see Fixed Income Markets Weekly 2022-06-03).

### Closed trades over the past 12 months

P/L reported in bp of yield for swap spread, yield curve and misc. trades, and in annualized bp of volatility for option trades, unless otherwise specified

*Note: trades reflect Thursday COB levels, and unwinds reflect Friday COB levels*

| Trade | Entry | Exit | P/L |
|---|---|---|---|
| **Spreads and basis** | | | |
| Receive 7-year matched maturity SOFR spreads | 8/20/2021 | 10/15/2021 | 2.6 |
| Long 2Yx3Y 6s/FF-OIS | 10/23/2020 | 10/22/2021 | (6.0) |
| Position for wider swap spreads in the 7-year sector | 10/29/2021 | 11/5/2021 | 3.9 |
| Position for a flattening of the TY / US invoice spread curve | 10/29/2021 | 11/5/2021 | 1.6 |
| Buy Dec Ultralong bond contracts versus paying fixed in a forward starting swap | 9/17/2021 | 11/12/2021 | 4.0 |
| Position for wider swap spreads in a selloff via TYZ puts and matched expiry payer swaptions | 10/15/2021 | 12/10/2021 | 2.3 |
| Short Dec Ultra-long bond contract CTD basis positions ahead of contract expiry | 9/17/2021 | 12/10/2021 | (3.5) |
| Sell USZ1 versus a forward starting swap as an efficient way of positioning for long end yield curve steepening | 10/1/2021 | 12/17/2021 | (5.0) |
| Stay positioned for narrower swap spreads in the intermediate sector | 11/5/2021 | 12/17/2021 | 2.0 |
| Position for narrower front-end maturity SOFR swap spreads | 12/17/2021 | 1/7/2022 | 3.0 |
| Front end SOFR swap spread narrowers | 1/8/2022 | 1/28/2022 | 0.5 |
| Intermediate SOFR swap spread narrowers | 12/10/2021 | 1/28/2022 | 1.0 |
| Long 1Yx2Y 1s/3s basis | 8/20/2021 | 2/25/2022 | 1.5 |
| Tactical exposure to wider long end swap spreads | 2/11/2022 | 3/4/2022 | (7.2) |
| Short 30s versus 20s on ASW | 1/8/2021 | 9/10/2021 | (5.4) |
| Front end SOFR swap spread wideners | 3/25/2022 | 4/8/2022 | 3.5 |
| Tactical exposure to SOFR swap spread narrowers in the belly | 3/25/2022 | 4/22/2022 | 3.4 |
| SOFR swap spread wideners in the long end | 4/22/2022 | 5/20/2022 | (7.0) |
| 2s/5s sofr swap spread steepener | 5/20/2022 | 6/3/2022 | (16.6) |
| 2Y spread wideners, hedged with 10% risk weighted long duration | 7/8/2022 | 7/29/2022 | 0.2 |
| 2Y spread wideners outright | 7/29/2022 | 8/11/2022 | 7.8 |
| Conditional bull 5Y spread wideners | 7/8/2022 | 8/26/2022 | 0.0 |
| Swap spread wideners in the 10Y sector | 7/15/2022 | 8/26/2022 | 1.0 |
| Conditional bull spread wideners via TYU2 calls | 7/15/2022 | 8/26/2022 | 0.0 |
| 3Y spread wideners | 6/10/2022 | 9/1/2022 | 7.7 |
| 3Y spread wideners using 2.625% Apr 2025 | 8/19/2022 | 9/9/2022 | 3.1 |
| TUZ2 invoice spread narrowers | 8/19/2022 | 9/16/2022 | (5.0) |

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|---|---|---|---|
| 3Y spread wideners, via old 5-year notes in the Jul 2025 sector | 9/9/2022 | 9/16/2022 | 7.2 |
| Spread wideners in the 30Y sector, hedged with a weighted short in S&P500 E-mini futures | 7/29/2022 | 10/14/2022 | (11.7) |
| Position for wider spreads in the 3Y sector | 9/23/2022 | 10/14/2022 | 2.0 |
| Position for wider spreads in the belly | 9/23/2022 | 10/14/2022 | (3.2) |
| **Duration and curve** | **Entry** | **Exit** | **P/L** |
| Sell FFG2 | 08/06/21 | 10/15/21 | 0.0 |
| Sell EDZ1 | 06/18/21 | 10/29/21 | 1.5 |
| Initiate 35Yx5Y vs 25Yx5Y swap curve steepeners | 01/08/21 | 01/07/22 | (12.1) |
| Position for a cheapening of the belly of a 2s/7s/15s weighted swap butterfly in a selloff via payer swaptions | 10/22/21 | 01/28/22 | (4.5) |
| Position for a steeper 5s/30s curve in a rally | 11/15/21 | 02/25/22 | 0.0 |
| 1Y forward 5s/20s steepener hedged with 1Yx2Y pay-fixed swaps | 02/04/22 | 03/04/22 | 4.0 |
| Position for a steeper 10s/30s maturity matched swap spread curve | 01/21/22 | 03/04/22 | (13.2) |
| Forward 2s/10s SOFR swap curve steepeners versus paying fixed in 25% of the risk in 1Yx1Y SOFR rates, as an asymmetric way to position for further upside in front end forward yields | 01/28/22 | 03/04/22 | 8.5 |
| Position for a steeper 5s/10s curve paired with a short in Reds | 02/25/22 | 03/04/22 | (0.8) |
| 1Y forward 3s/5s steepener hedged with 2Yx1Y pay-fixed swaps | 03/04/22 | 03/11/22 | 7.1 |
| Outright 30M forward 2s5s steepeners | 03/18/22 | 03/25/22 | (11.0) |
| 18M forward 2s/10s SOFR swap curve steepener, paired with 25% risk in pay fixed 18Mx1Y forward swap | 03/18/22 | 03/25/22 | (4.6) |
| 2Y forward 10s/30s steepener paired with 10% risk in 2Yx1Y pay-fixed swaps | 03/11/22 | 03/25/22 | (2.5) |
| 1Y forward 3s/10s curve steepeners versus 25% risk in 2Yx1Y | 03/04/22 | 03/25/22 | (3.4) |
| 6M forward 2s/5s SOFR swap curve steepener | 04/08/22 | 05/06/22 | 16.2 |
| 6M forward 3s/7s SOFR swap curve steepener | 04/22/22 | 05/06/22 | 15.0 |
| 3M forward 3s/5s SOFR swap curve steepener | 04/29/22 | 05/06/22 | 8.2 |
| 6M forward 1s/5s SOFR swap curve steepener | 05/13/22 | 05/20/22 | (15.3) |
| 9M fwd 2s/3s steepeners | 05/06/22 | 07/15/22 | (8.6) |
| Receive in the belly of a 1Yx1Y / 3Mx3Y / 3Yx1Y 70:25 weighted swap yield butterfly | 04/29/22 | 07/29/22 | (14.1) |
| Belly cheapening 2s/5s/10s | 06/03/22 | 07/29/22 | (9.8) |
| 3M forward 5s/10s swap curve flatteners, coupled with 3Y forward 5s/10s swap curve steepeners on a 0.5:1 risk weighted basis | 07/15/22 | 08/05/22 | 4.3 |
| 3Y fwd 5s/10s steepener hedged with 0.25 risk in 3M fwd 5s/30s flatteners | 07/29/22 | 08/05/22 | 3.2 |
| 6M expiry 5s/30s conditional bull steepeners, coupled with selling 6Mx2Y receiver swaptions | 02/11/22 | 08/11/22 | 0.0 |
| Conditional 2s/7s bear steepener | 05/20/22 | 08/26/22 | (36.1) |
| conditional bear belly cheapening 5s/10s/30s | 08/05/22 | 09/09/22 | 6.1 |
| 2Y forward 2s/15s flatteners, paired with a 100% risk weighted 3M forward 2s/30s swap curve steepener and a 20% risk-weighted short in the 6Mx3M sector | 08/26/22 | 09/09/22 | 3.5 |
| 2Y forward 7s/15s steepener vs 3M forward 7s/30s flattener | 08/05/22 | 09/23/22 | 0.9 |
| 2Y forward 10s/15s steepener vs 3M fwd 10s/30s flattener | 08/05/22 | 09/23/22 | (1.4) |
| 2Y forward 3s/10s flatteners paired with 3M forward 7s/15s steepeners (80% risk weighted) | 09/09/22 | 09/23/22 | 8.2 |
| shorts in the belly of the H3/U3/H4 3M SOFR futures butterfly (32:82.5 weighted risk) | 09/30/22 | 10/14/22 | 4.0 |
| **Options** | **Entry** | **Exit** | **P/L** |
| Overweight gamma on 5-year tails versus 2-year tails | 10/29/21 | 11/05/21 | 5.2 |

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|---|---|---|---|
| Position for a rise in longer expiry implied volatility versus shorter expiry implieds | 10/01/21 | 01/07/22 | (10.8) |
| Outright short gamma exposure via selling 6Mx5Y swaption straddles | 12/10/21 | 01/28/22 | (4.5) |
| Underweight gamma on 2-year tails versus longer tails | 12/17/21 | 02/04/22 | (15.1) |
| Long gamma exposure via buying 6Mx5Y swaption straddles | 02/04/22 | 02/11/22 | 8.5 |
| Re-enter long vega positions to position for a rise in longer expiry swaption volatility as markets reprice to revised Fed hiking expectations | 01/28/22 | 03/04/22 | 8.4 |
| Overweight gamma in 30-year tails versus 2-year tails | 02/25/22 | 03/04/22 | (19.7) |
| Overweight gamma on 10-year tails versus 2-year tails | 11/12/21 | 03/04/22 | 2.2 |
| Long gamma, short vega exposure in the upper left | 02/11/22 | 03/04/22 | 2.5 |
| Enter into long gamma positions in the 6Mx10Y sector | 04/01/22 | 04/22/22 | 8.3 |
| Overweight 5Yx5Y swaption volatility versus 2Yx2Y | 03/11/22 | 07/08/22 | (2.7) |
| Sell 1yx3y straddles versus 3yx10y straddles | 04/08/22 | 07/08/22 | (19.3) |
| Sell 1Yx1Y straddles versus buy 5Yx10Y straddles vega risk weighted 80:100 | 05/06/22 | 07/08/22 | (22.6) |
| sell 6Mx2Y swaption straddles | 05/06/22 | 07/08/22 | (39.2) |
| Buy 3mx2y swaption straddles, delta hedged every 10 days | 07/29/22 | 08/05/22 | 31.0 |
| Long gamma in 10Y tails | 07/15/22 | 08/26/22 | 6.8 |
| Buy 6Mx2Y A+25 payer swaptions hedged with a receive fixed swap | 08/19/22 | 09/01/22 | (18.8) |
| Long 3Mx10Y straddles vs 3Mx30Y straddles | 08/19/22 | 09/09/22 | 3.4 |
| Short $1b 6M expiry one-look straddles on the 2s/10s curve vs long 6Mx2Y swaption straddles | 08/26/22 | 09/30/22 | (16.5) |
| Overweight 5Y tails vs 3Y tails in 3M expiries | 09/23/22 | 10/14/22 | 9.9 |
| **Others** | **Entry** | **Exit** | **P/L** |
| Short 959 UXY calendar spreads and unwind short 41 UXYZ1 contracts | 11/12/2021 | 11/29/2021 | 2.5 |
| Short ultra-long bond contract calendar spread | 11/12/2021 | 11/29/2021 | 3.0 |
| WN calendar spreads narrowers | 5/13/2022 | 5/25/2022 | (7.5) |
| UXY calendar spread narrowers | 5/13/2022 | 5/25/2022 | 3.0 |
| FV calendar spread narrowers | 5/13/2022 | 5/25/2022 | 0.0 |
| WN calendar spreads narrowers | 8/19/2022 | 8/26/2022 | (0.5) |
| TN calendar spreads narrowers | 8/19/2022 | 8/26/2022 | (0.3) |
| TU calendar spread wideners | 8/19/2022 | 8/26/2022 | (2.3) |
| **Total number of trades** | | | **90** |
| **Number of winners** | | | **52** |
| **Hit rate** | | | **58%** |

| Recent Weeklies | |
|---|---|
| 30-Sep-22 | Globally convergent inflation confronts diverging policy |
| 23-Sep-22 | Central banks and the frumious inflation bandersnatch |
| 16-Sep-22 | Zugzwang |
| 09-Sep-22 | Perpetual Deuce |
| 01-Sep-22 | US Treasury Market Daily: De-risking |
| 26-Aug-22 | Seeking Rational Inattention |
| 19-Aug-22 | Hiking in Yellowstone |
| 5-Aug-22 | Schrodinger's recession |
| 29-Jul-22 | Can two negatives make a positive? |

| | |
|---|---|
| 15-Jul-22 | Obscured by clouds |
| 9-Jul-22 | Term - yes, structure - maybe not? |
| 24-Jun-22 | Interest Rate Derivatives 2022 Mid-Year Outlook |
| 15-Jun-22 | US Treasury Market Daily: Everyone's got a plan until... |
| 10-Jun-22 | Inflation permeates the cosmic background |
| 3-Jun-22 | Weekly: QTer than a June bug |
| 25-May-22 | US Treasury Market Daily: 7-year auction preview; Treasury Futures Calendar Spreads Update |
| 20-May-22 | Weekly: Interest Rate Derivatives: The TLDR - Technicals, Liquidity & economic Downturn Risk |
| 13-May-22 | Weekly: Stable Algorithms, Unstable Coins |
| 6-May-22 | Weekly: Expeditiarmus |
| 29-Apr-22 | Weekly: May the Fourth not catch you by surprise |
| 22-Apr-22 | Weekly: April showers, Flowers bloom, Hikes loom |
| 7-Apr-22 | Weekly: Keep your eyes on me |
| 1-Apr-22 | Weekly: March Madness comes to a close? |
| 25-Mar-22 | Weekly: What I tell you three times is true |
| 18-Mar-22 | Weekly: Higher rates, wider tails |
| 11-Mar-22 | Weekly: Vollelujah |
| 04-Mar-22 | Weekly: Vol-halla |
| 02-Mar-22 | US Treasury Market Daily: Staying the course, at least pro tempore |
| 25-Feb-22 | Weekly: War and peace talks |
| 18-Feb-22 | Weekly: Wot's… uh the deal? |
| 4-Feb-22 | Weekly: Measured Theory |
| 28-Jan-22 | Weekly: Steady – yes; slow – no |
| 21-Jan-22 | Weekly: Frozen |
| 8-Jan-22 | Weekly: Wingardium Leviosa |
| 17-Dec-21 | Weekly: Touching the corona |
| 10-Dec-21 | Weekly: FOMiCron |
| 29-Nov-21 | US Treasury Market Daily: Omicron omnishambles |
| 12-Nov-21 | Weekly: Bond auction tail wags the dog |
| 5-Nov-21 | Weekly: November rain |
| 29-Oct-21 | Weekly: Illiquidity – Trick no Treat |
| 22-Oct-21 | Weekly: Pumpkin Spice |
| 15-Oct-21 | Weekly: Action Replay |
| 1-Oct-21 | Weekly: Waiting for a raise |
| 24-Sep-21 | Weekly: Taper - yes, tantrum - no |
| 17-Sep-21 | Weekly: The (dot) plot thickens |
| **Annual Outlooks** | |
| 23-Nov-21 | Interest Rate Derivatives 2022 Outlook: Skating away on the thin ice of a new year |
| **Recent Special Topic Pieces** | |
| 15-Aug-22 | US bond futures rollover outlook: September 2022 / December 2022 |
| 21-Jun-22 | WN-dow Dressing |
| 2-Jun-22 | The Fed's New Undoing Project |
| 1-Jun-22 | Cross currency basis 3Q22 Outlook: Relative monetary policy and Fed's QT support wider FX OIS basis |
| 25-May-22 | Cross Asset Strategy: What if the mean reverts? |
| 12-May-22 | US bond futures rollover outlook |
| 27-Apr-22 | Curve, Volatility and Curve Volatility |
| 16-Feb-22 | US bond futures rollover outlook: March 2022/June 2022 |

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| 3-Feb-22 | The Front-End Edition: The nexus between the Fed and funding markets |
| 14-Jan-22 | Cross currency basis 1Q22 Outlook |
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