

Interest Rate Derivatives

2023 Mid-Year Outlook

- Policy clarity remains elusive as all options remain on the table for the Fed, but this is likely to gradually change as we move through the remainder of the year and as it eventually becomes clear that additional hikes are unlikely
 - In addition to policy rates, 2H23 also brings large shifts in the Fed's balance sheet, thanks to the TGA rebuild as well as still-ongoing deposit-to-MMF migration. We now look for Reserves to decline to ~\$2.8tn by year end
 - Swap spreads are likely to be stable in the 5-year sector, driven by a stable outlook for the drivers as well as currently fair valuations. In the 10- and 30-year sectors as well, we look for stable spreads over 2H23, but this is more of a balancing act as the widening bias from rising bond fund AUMs offsets the narrowing pressure from other drivers
 - Front-end swap spreads are likely biased wider in the short run as T-bills richen back to pre-debt-ceiling levels and as front end swap spreads converge to fair value. However, as we get beyond that, 2Y spreads will likely face steady narrowing pressure from underlying drivers
 - The forward funds rate level is a significant source of risk to 2Y swap spreads - we recommend pairing front end spread wideners with a weighted long duration position to isolate exposure to the current cheapness of 2Y swap spreads, while hedging the risk of a material decline in forward OIS rates
 - On the swap yield curve, our outlook calls for a steepening in most forward curves as well as spot curves that are anchored in the belly and longer maturities. That said, yield curves are very sensitive to short rates and Fed expectations, which can be particularly volatile given the current macroeconomic backdrop. Thus, we favor hedged strategies that pair forward curve steepeners with front end hedges to isolate yield curve relative value and benefit from positive carry. At the front end of the spot curve, we recommend flatteners paired with front end longs for the same reason
 - Policy uncertainty remains high despite the June "skip" by the Fed, and markets remain in a state of heightened reactivity to new information, creating conditions for elevated jump risk and high delivered volatility in the near term. However, we expect this to eventually change as we move through the year and as the prospect of additional hikes becomes increasingly unlikely, at which time market liquidity could begin to improve as well. Thus, we retain a bullish gamma bias in the near term, but expect to turn that around as policy clarity emerges with time
 - Long-run vol-rate correlations remain strong across multiple tails and we continue to anchor our fair value framework in this long-term relationship. Our fair value model points to a bumpy ride for volatility - in most sectors, we look for implieds to rise in the near term, but eventually decline by year end
 - Our fair value model for implied volatility also allows us to assess the valuation of skews, given that vol-rate correlations are likely to be the main driver of skews in the foreseeable future. We find receiver swaption skews uniformly rich across tails (but more so in shorter expiries), while payer swaption skews are more mixed and appear cheap in short tails and rich in long tails. Skews also generally appear fair in longer expiries
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The Lady or the Tiger

It has been quite a year in markets so far, with a sudden-onset regional bank crisis in March that is potentially creating much tighter financial conditions currently, and the debt ceiling crisis (and its ultimate resolution) in May that brought about sharp swings in the Fed's balance sheet and in the money markets. In contemplating the outlook for markets going forward, we need to factor in the macroeconomic and policy uncertainty created by the as-yet-still-unfolding effects of banks' collective response to recent events, as well as the likely consequences of sharp swings in Fed balance sheet due to the sharp drawdown in the TGA (into early June) and its now-underway rebuilding. Among other effects, this rebuilding of the TGA is likely to bring significant T-bill issuance, and pressure Reserves higher in coming months (**Figure 1**)

Figure 1: With the TGA projected to rise to ~\$650bn, Reserves are projected to decline by ~\$400bn into YE2023 while RRP is expected to decline to just under ~\$2tn by year end

Projected evolution of total Fed assets, RRP balances, TGA, Reserves, and commercial bank deposits in 2023; \$bn

End-of-the-month	Fed Assets	RRP	TGA	Reserves	Commercial Bank Deposits
Current	8421	2343	277	3252	17203
Jul-23	8338	2253	550	2985	17077
Aug-23	8256	2216	500	2991	17095
Sep-23	8173	2135	600	2889	17067
Oct-23	8094	2068	600	2877	17091
Nov-23	8015	2000	600	2865	17115
Dec-23	7936	1924	650	2814	17119

Source: J.P. Morgan, FRED, Federal Reserve H.4.1.

With regards to policy rate uncertainty, a particularly confounding logic puzzle called the *Lady or the Tiger* comes to mind. The great logician and writer Raymond Smullyan has discussed numerous variations in his eponymous book, one of which is a rather apt analogy for markets. In this version, there are three closed doors, with tigers behind two of those doors and a lady behind the third. There is a King who forces a prisoner to choose to open a door. Upon opening the door, should it contain a tiger he gets devoured; but should it contain the lady, he gets set free. The variation here is that once the prisoner chooses a door at first, the King reveals that one of the other two doors definitely has a tiger, and offers the prisoner a chance to revise his choice. The essence of the puzzle is whether the prisoner should switch?

The Fed seems to confront a similar trilemma, having to choose between further hikes, a pause, or switching to rate cuts, with the prize of a soft landing and moderating inflation behind exactly one of those doors. Markets have to cope with the fact that any of the three doors might be opened at a given Fed meeting. Thus, although our own view is that the Fed will likely deliver one more hike and then pause, the trimodal nature of future policy paths is a reality in markets that we must incorporate in our views going forward. In particular, we believe this is likely to sustain jump risk and delivered volatility at elevated levels; thus, we see implied volatility as being biased higher in the near term, with sustained declines only likely later on as one or more doors are decisively ruled out (see Options).

In a similar vein, our recommended strategy around the yield curve recognizes the risks posed by the fact that many doors remain in play. Although our baseline outlook for the swap yield curve looks for steepening in forward curves and in spot curves anchored in the belly or longer maturities, we are also mindful of how sensitive yield curve slopes are to changes in Fed expectations. As a result, in addition to our year-end projections for various swap yield curve slopes, we also discuss strategies that involve hedging risk with respect to front end and constructing trades that seek to earn carry (see Swap Yield Curve).

In swap spreads, our outlook calls for stable spreads across the curve except for the front end, where we see spreads as biased wider. But there are nuances. In the long end, virtually every factor points to a narrowing, except for an expected rise in bond fund AUMs, which should provide sufficient widening potential to offset the other influences and keep spreads range-bound. The story is somewhat similar in the 10-year sector as well. In the 5-year sector, the case for a stable outlook is stronger still, as even the drivers appear unlikely to move by material amounts to pressure spreads in any direction. In the 2-year sector, we see wider spreads going forward, driven by a richening in T-bill valuations (which has some spillover impact in the 2-year sector) as well as residual convergence (see Spreads).

Spreads

As we approach the middle of a year marked by an unexpected banking crisis that came on top of large swings in the Fed's balance sheet driven by debt ceiling developments as well as an additional 75bp of rate hikes, swap spreads have been reasonably stable through it all. Across much of the curve, maturity matched swap spreads have traded in a 10-15bp range so far this year, and are currently close to the median level over this period. The exception is the front end, where 2Y spreads narrowed considerably in recent weeks, and are only recently beginning to rebound to more normal levels (**Figure 2**).

Figure 2: Swap spreads have largely remained stable across much of the curve so far this year and are currently near the middle of the range, except in the front end where they appear narrow

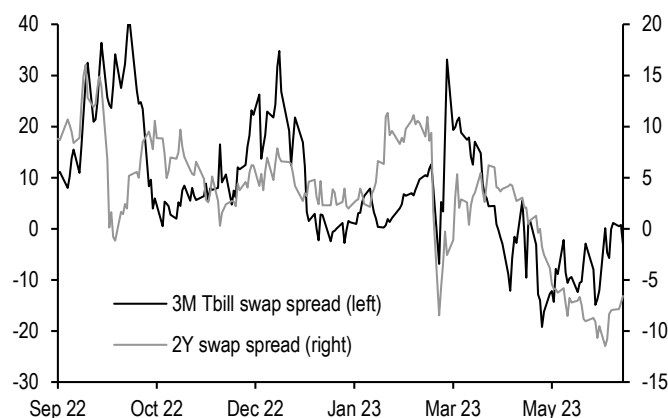
Current levels and YTD stats for SOFR maturity matched swap spreads (bp), as of 6/22/23

	Start	Chg	End	Min	Mean	Median	Max	Range
2Y	2.7	-9.4	-6.7	-11.5	0.8	2.4	11.3	22.8
3Y	-15.7	4.2	-11.6	-18.5	-11.2	-11.5	-3.5	14.9
5Y	-26.7	5.7	-21.1	-26.8	-21.2	-21.0	-17.0	9.8
7Y	-35.0	6.5	-28.4	-35.0	-29.3	-29.2	-23.9	11.1
10Y	-33.7	7.0	-26.7	-34.2	-28.5	-28.5	-22.6	11.6
20Y	-69.1	5.5	-63.5	-69.1	-63.4	-63.5	-55.5	13.6
30Y	-76.5	10.9	-65.6	-76.5	-69.4	-69.0	-62.5	14.0

Source: J.P. Morgan.

Figure 3: The cheapening in 3M T-bills leading up to the eventual resolution of the debt ceiling standoff has likely had a spillover effect on swap spreads in the 2-year sector

2-year OTR Treasury and 3M T-bill maturity matched swap spreads, bp; 09/2022 - 06/2023



Source: J.P. Morgan.

Indeed, much of the action in swap spreads has been in the 2-year sector recently. After holding steady near +5bp for all of 4Q22 and most of 1Q23, 2-year maturity matched swap spreads have narrowed sharply in recent months, and are only recovering slowly. To a considerable extent, this reflects the impact of the (then ongoing) debt ceiling negotiations. As

the stalemate worsened, money market funds and other liquidity investors began to avoid T-bills with maturities near the X-date, and perhaps even more broadly began to prefer T-bill alternatives on the margin. As a result, T-bills in the 3-month maturity sector cheapened to trade at well-below-zero to swap spreads, which is rather atypical, and such cheapening has inevitably spilled over to impact 2-year swap spreads (**Figure 3**).

Looking ahead, a normalization in front end T-bill valuations towards richer levels (we look for 3M T-Bill swap spreads to widen towards +7.5bp) will serve to bias 2Y swap spread fair values wider still. This is likely to be the main source of widening pressure. As we move through the year, the dollar is expected to strengthen (see [The bullish dollar implications of the impending liquidity storm](#), Patrick Locke, 6/2/2023), and the RRP balance is likely to decline (albeit rather modestly), both of which should bias spreads narrower. Forward OIS rates - another important driver of front end swap spreads - are likely to hold steady.

In sum, **2-year maturity matched swap spreads are likely to be biased significantly wider in the short run**, based in large part on a convergence in the current residual (which is significantly negative) and helped along further by a richening in the T-bill sector. Beyond that, however, front end spreads are likely to face steady (but modest) narrowing pressure from the underlying drivers, as evident from **Figure 4**.

Figure 4: Front end spreads appear likely to widen in the near term based on cheapness to fair value and a likely richening in T-bills, with most other drivers accounting for steady - but modest - narrowing pressure

Statistics from regressing 2-year maturity matched SOFR swap spread versus its drivers*, current (6/2/23) and projected year-end 2023 values for the drivers**, and estimated fair value and impact of each factor at year-end (bp)

Factor	Model info		Factor info / projection		Factor Impact
	Coeff	T-stat	Cur. Value	YE23 proj.	
3M T-bill swap spread (bp)	0.26	19.8	-3.8	7.5	3.0
Monthly Fed purchases (\$bn 10s)	0.09	10.1	0	0	0.0
1Yx3M OIS (%)	-6.1	-11.9	4.5	4.5	0.0
1Yx3M OIS squared	1.8	22.9	20.4	20.4	0.0
RRP balance (\$bn)	0.007	27.0	2343	1924	-2.9
Trade weighted USD index	-0.78	-20.6	129	132	-2.6
Intercept	78.7	17.4			
R-squared	85%				
2Y swap spread					
	Model		3.1	0.6	-2.5
	Actual		-6.7		

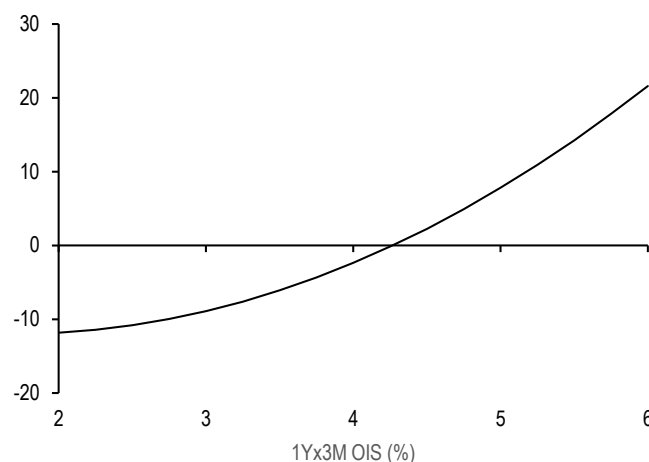
Source: J.P. Morgan.

* Regression period is 6/2019 - 6/2023

**Our projections assume T-bill / Sofr spread will normalize back to historical averages. We also assume front end rates will remain the same, RRP is likely to modestly decrease, and the dollar to modestly increase

Figure 5: Front end swap spreads exhibit significant - and nonlinear - exposure to forward OIS rates

Estimated fair value* of 2Y swap spreads at different 1Yx3M OIS rate levels; bp



Source: J.P. Morgan.

*Estimated using the fair value model in the previous exhibit

Last but not least, **it is worth noting that front end swap spreads will likely exhibit considerable sensitivity to forward OIS rates**. We have noted this before on several occasions, and have additionally noted the nonlinear nature of this dependence (see [Interest Rate Derivatives 2023 Outlook](#)). Going into 2H23, this can be a significant source of risk to front end swap spread positions. Although we expect forward OIS rates to remain reasonably stable as the Fed maintains nominal rates where they are, there is much uncertainty around

the path of monetary policy in the months ahead. In **Figure 5**, we highlight the sensitivity of 2Y swap spread fair values to 1Y forward 3M OIS rates. As can be seen, in the event that markets price in significant additional rate cuts into the forwards, front end spreads could narrow even further from here towards -10bp. In contrast, if the path of inflation were to pressure OIS forward rates higher, front end swap spreads have much additional room to widen. Thus, **we recommend pairing front end spread wideners with a weighted long duration position to isolate exposure to the current cheapness of 2Y swap spreads, while hedging the risk of a material decline in forward OIS rates.**

In the 5Y sector, swap spreads have been fairly stable for the past nine months or so, and we expect more of the same over the remainder of this year. Details of our fair value model are shown in **Figure 6**, and **Figure 7** shows how effective this model has been in tracking the ups and downs in swap spreads in recent years. **One notable change in this model, versus the versions we have discussed over the past year or so, is the introduction of Reserves net of RRP** (i.e., Reserves on the Fed's balance sheet minus RRP balances) as a new factor that replaces bank demand. Since our estimate of bank demand for USTs was ultimately derived from the growth in commercial bank deposits, which in turn is driven by Reserves (positively) and RRP balances (negatively, since growth in RRP detracts from bank deposits), we have made this change in order to make our fair value model more directly dependent on higher frequency observables.

Two points are worth making with regards to what this model tells us going forward. **First**, swap spreads are already rather close to fair value, and there is thus little scope for relative value convergence in this sector. **Second**, with the 2s/5s Treasury curve expected to be fairly close to current levels (see Treasuries), the only driver that is likely to trend in 2H23 is the dollar (which we expect to strengthen versus a trade weighted basket of currencies). Thus, **both these factors appear likely to pressure swap spreads narrower in coming months.**

Figure 6: Our 5-year swap spread fair value model points to a fairly stable outlook for spreads in 2H23

Statistics from regressing* 5-year maturity matched SOFR swap spread versus its drivers, current (6/22/23) and projected year-end 2023 values for the drivers**, and estimated fair value and impact of each factor at year-end (bp)

Factor	Model info		Factor info / projection		Factor Impact
	Coeff	T-stat	Cur. Value	YE23 proj.	
Monthly Fed purchases (\$bn 10s)	0.05	5.2	0	0	0.0
Monthly high grade issuance (\$bn)	-0.04	-10.6	98.1	98.1	0.0
Reserves minus RRP (\$Tn)	2.5	8.0	0.9	0.9	0.0
Trade weighted USD index	-0.28	-8.0	129	132	-1.0
2s/5s OTR Treasury curve (%)	-2.0	-5.8	-0.76	-0.7	-0.1
Intercept	15.6	3.4			
R-squared	80%				
5Y swap spread					
Model			-20.8	-21.9	-1.1
Actual			-21.1		

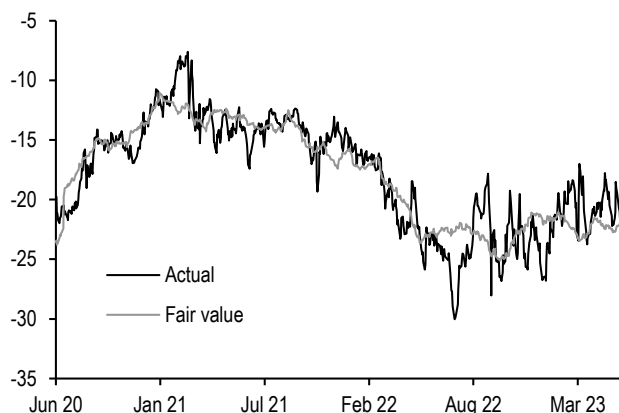
Source: J.P. Morgan.

* Regression from 6/2020 - 6/2023

**Our projections assume our Treasury strategists' curve forecast will be realized. We also assume a modest uptick in the dollar, Reserves net of RRP and high grade issuance to remain stable

Figure 7: Our 5-year fair value model has historically captured the twists and turns of swap spreads well

5-year maturity matched swap spread, actual versus fair value*; bp



Source: J.P. Morgan.

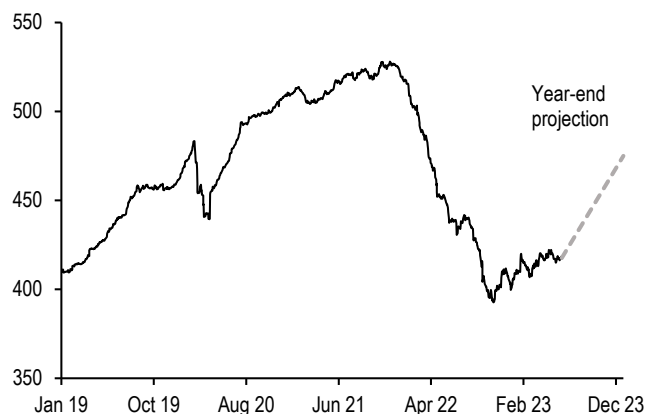
* Fair value for 5-year swap spread is calculated as per the model detailed in previous exhibit

Further out the curve, in the 10-year sector, spreads will likely be additionally pressured narrower by a steepening in the long end of the Treasury curve. Our Treasury strategists look for a steepening in the 5s/10s Treasury curve, towards -5bp by year end, which implies an additional 3bp of narrowing pressure. However, this could be offset by rising demand from bond funds. As seen in **Figure 8**, AUMs at the largest 20 bond funds took a beating in 2H22 thanks to rising yields, but our Treasury strategists look for demand in this sector to recover over the remainder of 2023 as markets adjust to a hiking cycle that is nearing its end. Swap spreads at the long end (10- and 30-year sectors) are especially sensitive to bond fund AUMs (since they are typically managed versus an aggregate bond index and thus represent a source of passive demand), and we estimate this to pressure 10-year swap spreads wider to the tune of 2bp.

On balance, we look for swap spreads in the 10-year sector to be stable, but with a slight widening bias early on followed by a narrowing bias over the remainder of the year as the Treasury curve drifts steeper and as bond fund AUMs drift higher. Details of our fair value model and our assumptions underlying these projections can be found in **Figure 9**.

Figure 8: AUMs at the largest bond funds plummeted in 2022 thanks to sharp rises in yields, but this has been reversing so far this year, and we expect the trend to continue

Assets under management at the top 20 actively-managed bond funds* and JPM estimate at year end; \$bn



Source: Bloomberg Finance L.P., J.P. Morgan.

* The core bond fund index is comprised of the 20 largest (by AUM) actively-managed US core bond funds

Figure 9: Swap spreads in the 10-year sector are likely to remain stable, albeit with a slight widening bias early on followed by a drift narrower over the remainder of the year

Statistics from regressing* 10-year maturity matched SOFR swap spread versus its drivers, current (6/22/23) and projected year-end 2023 values for the drivers**, and estimated fair value and impact of each factor at year-end (bp)

Factor	Model info		Factor info / projection		Factor Impact
	Coeff	T-stat	Cur. Value	YE23 proj.	
5Y swap spread (bp)	0.95	34.3	-21.1	-21.9	-0.8
5s/10s OTR Treasury curve (%)	-19.0	-29.8	-0.24	-0.05	-3.7
Top 20 bond fund AUM (\$bn)	0.03	6.6	419	475	1.8
3Mx3M OIS (%)	-1.2	-10.0	5.36	5.36	0.0
Intercept	-16.0	-5.7			
R-squared	70%				
10Y swap spread					
Model			-24.5	-27.3	-2.7
Actual			-26.7		

Source: J.P. Morgan., Bloomberg Finance L.P.

* Regression from 6/2019 - 6/2023

** Our projections assume our previously projected fair value for 5Y spreads and our Treasury strategists' curve forecast will be realized. We also assume an uptick in bond fund AUM and that front end rates will remain stable.

The impact of a recovery in bond fund AUMs will likely be even more pronounced in the 30-year sector. As seen in **Figure 10**, the estimated widening pressure from this rise in AUMs is projected to offset the narrowing bias exerted by every other factor collectively. Thus, **we look for stable spreads in the long end of the curve, but this view is reliant to a greater extent on the anticipated rebound in bond fund AUMs. Without such a rise in bond fund AUMs, swap spreads would be biased significantly narrower.**

One other comment is worth making with regards to the 30-year sector. As readers may recall, we have traditionally included the aggregate surplus of the top 100 US pension funds as a factor in this model, since pension fund allocations into fixed income tended to rise as

deficits became smaller. However, as we noted recently (see [On the brink](#)), as yields have risen and as deficits have given way to surpluses, the behavioral correlation between pension fund reallocations into fixed income and market variables and/or surplus levels has diminished. Therefore, we drop this factor going forward.

Figure 10: We look for stable swap spreads in the 30-year sector, as the widening impact of rising bond fund AUMs offsets the narrowing influence of every other factor

Statistics from regressing* 30-year maturity matched SOFR swap spread versus its drivers, current (6/22/23) and projected year-end 2023 values for the drivers**, and estimated fair value and impact of each factor at current and year-end (bp)

Factor	Model info		Factor info / projection		Factor Impact
	Coeff	T-stat	Cur. Value	YE23 proj.	
10Y swap spread (bp)	1.1	36.1	-26.7	-27.3	-0.7
10s/30s Treasury curve (%)	-15.3	-16.5	0.07	0.25	-2.7
VA aggregate duration (est., \$bn 20s)	-0.07	-11.8	67	70	-0.2
Trade weighted USD index	-0.9	-15.5	129	132	-3.0
Top 20 bond fund AUM (\$bn)	0.11	17.5	419	475	6.3
Intercept	38.6	3.9			
R-squared	92%				
30Y swap spread					
	Model		-63.6	-63.8	-0.2
	Actual		-65.6		

Source: J.P. Morgan., Bloomberg Finance L.P.

* Regression from 6/2020 - 6/2023

**Our projections assume our previously projected fair value for 10Y spreads and our Treasury strategists' curve forecast will be realized. VA duration are estimated at year end 2023 horizon using our projections for equity prices and yields. We also assume a modest appreciation in the dollar index and uptick in bond fund AUM. VA Duration refers to our estimate of duration needs of VA hedgers - for a detailed discussion of our methodology, see Interest Rate Risk in Variable Annuities, JPMorgan Research Note, Sep 2011 (available upon request)

Swap Yield Curve

Yield curves have been considerably volatile year-to-date even as they largely remain close to levels at which they started the year. For instance, the spot 2s/10s curve has traded in a 85bp range this year, but remains within 20bp of where it started the year (**Figure 11**). Such volatility in the curve is atypical for a late-stage hiking cycle, but is unsurprising given the events of this year. Indeed, as seen in **Figure 12**, short rates (which have always been a key driver of yield curve slopes) have been a significant factor driving large moves in the yield curve, along with medium term Fed expectations as captured by the Fronts/Reds curve.

Figure 11: Yield curves have traded in wide ranges so far this year, but are currently fairly close to levels at the start of the year

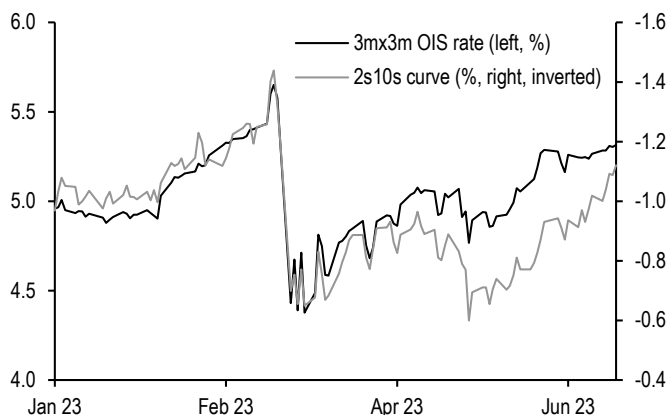
Current levels and summary year-to-date statistics for selected SOFR swap yield curves (bp), as of 6/22/23

	Start	Change	End	Min	Mean	Median	Max	Range
1s/2s	-47	-13	-60	-82	-63	-65	-37	44
2s/5s	-75	-12	-87	-101	-76	-76	-50	51
2s/10s	-97	-19	-116	-144	-96	-94	-61	83
5s/10s	-22	-7	-29	-42	-19	-18	0	42
10s/30s	-33	2	-32	-51	-25	-24	-6	45
2Y fwd 1s2s	-3	-7	-10	-16	-5	-4	3	19
2Y fwd 2s5s	0	-8	-7	-17	1	2	17	34
2Y fwd 2s10s	7	-9	-2	-20	11	14	39	59
2Y fwd 5s10s	6	-1	5	-3	10	11	22	25
2Y fwd 10s30s	-27	6	-21	-36	-19	-18	-7	29

Source: J.P. Morgan.

Figure 12: Short rates have been a significant factor driving moves in the yield curve

3Mx3M OIS rate (left, %) vs 2s/10s SOFR swap curve (% right, inverted); last 6-months



Source: J.P. Morgan.

Although **short term rates** (the 3Mx3M OIS rate) and **Fed expectations** (proxied by the 3Mx3M / 15Mx3M curve) are the factors exhibiting the greatest movement in the current environment, our empirical fair value model for yield curve slopes also incorporates **longer term inflation expectations** (proxied by 5Yx5Y inflation swap yield) and the **size of the Fed's balance sheet** (to account for QE's impact on the curve). These factors in combination have helped to explain a high degree of the variation in various spot as well as forward swap yield curve slopes, and with each factor having the intuitively expected sign in virtually all cases. Using these model coefficients, as well as our YE23 projections for the drivers, we can project fair values for various yield curve slopes over a 3- to 6-month horizon.

These details are shown in **Figure 13**. As can be seen, we see **most yield curve slopes (with the exception of front end curves such as the 1s/2s) as being biased somewhat steeper by year end**. But perhaps even more importantly, **the outlook for the curve is very sensitive to assumed future levels of Fed expectations and short rates**. For instance, should the 3Mx3M / 15Mx3M curve finish the year near -100bp instead of the -150bp that we assume in our projections, our YE forecast for the 5s/10s curve would point to a 3bp flattening instead of a 9bp steepening as we currently have it. In a similar vein, the sensitivity to the 3Mx3M OIS rate is also significant for many of these yield curve slopes.

Figure 13: Our empirical fair value model uses a handful of market factors to explain a variety of different spot and forward yield curve slopes and shows most yield curve slopes biased steeper by year end

Statistics from regressing* various spot and forward curves against 4 drivers**, model T-stats / R-squared, current yield curve level, and current/YE23 projected fair value; current value as of 6/22/2023

Curve	Coefficients					T-stats					R-sq	Cur. curve	Fair value	
	3Mx3M OIS (%)	3Mx3M / 15Mx3M crv (%)	5Yx5Y infl swap (%)	Fed B/S (\$tn)	Intercept	3Mx3M OIS (%)	3Mx3M / 15Mx3M crv (%)	5Yx5Y infl swap (%)	Fed B/S (\$tn)	Intercept			Cur	YE23
1s2s	-0.017	0.421	0.034	0.002	-0.072	-23.2	238.7	7.4	4.5	-8.9	99%	-0.60	-0.58	-0.69
2s5s	-0.253	-0.003	0.604	-0.029	-0.770	-75.5	-0.4	27.9	-12.1	-20.7	93%	-0.87	-0.80	-0.84
2s10s	-0.464	-0.233	1.097	-0.044	-1.299	-93.5	-19.3	34.2	-12.4	-23.6	94%	-1.16	-1.02	-1.04
5s10s	-0.211	-0.230	0.493	-0.015	-0.530	-90.2	-40.4	32.6	-9.0	-20.4	91%	-0.29	-0.22	-0.20
10s30s	-0.202	-0.240	0.410	-0.041	-0.242	-124.5	-60.8	39.2	-34.8	-13.5	96%	-0.32	-0.30	-0.26
2y fwd 1s2s	-0.088	-0.144	0.227	-0.006	-0.312	-58.2	-39.3	23.3	-5.3	-18.7	78%	-0.10	-0.06	-0.04
2y fwd 2s5s	-0.156	-0.271	0.376	-0.005	-0.447	-62.4	-44.5	23.3	-2.8	-16.1	80%	-0.07	-0.01	0.02
2y fwd 2s10s	-0.251	-0.455	0.603	-0.012	-0.606	-64.1	-47.8	23.9	-4.2	-14.0	81%	-0.02	0.09	0.15
2y fwd 5s10s	-0.095	-0.184	0.227	-0.007	-0.159	-55.6	-44.3	20.7	-5.6	-8.4	76%	0.05	0.10	0.12
2y fwd 10s30s	-0.123	-0.181	0.206	-0.040	0.003	-78.4	-47.1	20.3	-35.5	0.2	92%	-0.21	-0.23	-0.19
Drivers														
Cur.	5.36	-1.26	2.59	8.36										
Proj. YE23	5.36	-1.50	2.5	7.9										

Source: J.P. Morgan, Federal Reserve H.4.1.

* Regression since Jan 2019, as of 6/16/2023

** Underlying drivers are: 3Mx3M OIS rate (%), Fronts / Reds curve (15Mx3M - 3Mx3M OIS curve as a proxy), 5Yx5Y inflation swap yield (%), size of the Fed balance sheet (\$tn)

This sensitivity, while a risk to any fixed forecast for yield curve slopes, also opens up curve trading opportunities on a hedged basis. For instance, given the model coefficients for the 2s/10s swap curve (-0.46 and -0.23 with respect to the 3Mx3M rate and the 3Mx3M / 15Mx3M curve, respectively), we can conclude that a 2s/10s swap curve steepener (say) can be paired with 23% risk in a 3Mx3M / 15Mx3M curve steepener and a 46% risk weighted short in the 3Mx3M sector to mitigate those risks. The net of these is simply (in this case) a 23% risk weighted short in the 3Mx3M and a 23% risk weighted short in the 15Mx3M sector, which can easily be implemented using the 1st and 5th 3M SOFR futures contracts. Such a package offers exposure to a relative value correction (since most curves are currently too flat to fair value), since the other factors (inflation expectations and the size of the Fed's balance sheet) are more stable and/or predictable. In addition, in many sectors, especially in forward curves, such hedged packages also offer attractive carry / slide characteristics. As seen in **Figure 14**, most forward swap curves and spot curves anchored in the belly or longer maturities offer attractive carry & slide on such a hedged basis. Spot curves anchored in the front end, in contrast, have negative carry and slide. As we move into a stage of the cycle where the Fed is likely to be on hold, carry is likely to be attractive as a theme and we would aim to construct exposure to positions that offer attractive carry and slide relative to risk.

All of this points to three different yield curve trading strategies that we will seek to utilize over the course of 2H23. **First**, all else equal, **we would seek to maintain steepening exposure, especially in forward swap curves**, where current valuations as well as the likely impact of underlying drivers over the medium term all point to a steepening bias. **Second**, **forward swap curve steepeners paired with weighted front end hedges are likely to be attractive as a source of carry**, while also being poised to benefit from a continued runoff in the Fed's balance sheet. **Third**, **at the front end of the curve, flatteners paired with front end longs** (such as a 2s/5s flattener paired with a 25% risk weighted long, which represents the negative of the second row in Figure 14) **are likely to offer attractive carry**.

Figure 14: Most forward swap curves and spot curves anchored in the belly or longer maturities offer attractive carry slide on such a hedged basis while those anchored in the front end have negative carry and slide

Risk weights for the hedges 3Mx3M OIS (%) and 15Mx3M OIS (%) for swap curve steepener positions, the carry/slide* on each leg of the position (bp) as well combined net carry on the position (bp); 6/22/2023

Curve	Risk weight on		3M carry/slide (bp) on:			Net Carry
	3Mx3M	15Mx3M	Crv Stp.	3Mx3M	15Mx3M	
1s2s	-0.437	0.421	5.1	4.9	-13.6	-3.6
2s5s	-0.250	-0.003	-11.7	2.8	0.1	-8.8
2s10s	-0.231	-0.233	-17.5	2.6	7.5	-7.4
5s10s	0.019	-0.230	-5.8	-0.2	7.4	1.4
10s30s	0.038	-0.240	-2.5	-0.4	7.7	4.8
2y fwd 1s2s	0.056	-0.144	-2.3	-0.6	4.6	1.7
2y fwd 2s5s	0.115	-0.271	-3.2	-1.3	8.8	4.3
2y fwd 2s10s	0.204	-0.455	-4.5	-2.3	14.7	7.9
2y fwd 5s10s	0.089	-0.184	-1.3	-1.0	5.9	3.6
2y fwd 10s30s	0.057	-0.181	0.7	-0.6	5.8	5.9

Source: J.P. Morgan.

*3M carry /slide on 3Mx3M and 15Mx3M is approximated as 6Mx3M minus 3Mx3M and 18Mx3M minus 15Mx3M respectively.

Options

This year has been quite eventful so far, with the sudden onset of a regional bank crisis in March interrupting the hitherto steady (if slowing) pace of rate hikes. The Fed delivered what might be called a "hawkish skip" in June, holding rates steady but reminding markets that further hikes could be forthcoming if they proved necessary. In effect, the Fed confronts a balancing act between inflation that remains uncomfortably elevated (albeit with promising signs of slowing beneath the headline prints) versus the likely significant pullback in lending that might be unfolding now as banks respond to recent events by boosting liquidity and capital ratios.

Amidst all this, implieds have traded over a broad range, especially in the upper left. Fueled by banking system stresses, implied volatility reached a peak in March, and has been retracing since then, although implieds remain elevated thanks to continued policy uncertainty. For example, 3Mx2Y peaked at 14.5bp/day in March, and is now 5bp/day below its peak (**Figure 15**). Thanks to such large swings in implied volatility, returns from long volatility positions have been mixed despite elevated delivered volatility. Delta hedged long straddle positions in shorter expiry and shorter tails have been profitable, benefiting from elevated delivered volatility, while long volatility positions in longer expiries and tails have not fared as well (**Figure 16**).

Figure 15: Implied volatility across the vol surface has traded in a wide range this year, but most of all in the upper left

Current levels (6/22/2023) and year-to-date statistics for selected swaption structures; bp/day

Structure	Start	Chg	End	Min	Mean	Median	Max	Range
3Mx2Y	8.5	1.0	9.6	6.6	9.9	10.2	14.5	7.9
3Mx5Y	8.4	-0.3	8.1	7.0	8.7	8.6	11.5	4.5
3Mx10Y	8.0	-1.6	6.4	6.4	7.3	7.3	9.4	3.0
3Mx30Y	7.1	-1.9	5.2	5.1	5.9	5.8	7.4	2.4
6Mx2Y	8.7	0.5	9.2	6.9	9.4	9.7	12.7	5.8
6Mx5Y	8.4	-0.5	8.0	6.8	8.3	8.3	10.3	3.5
6Mx10Y	7.9	-1.4	6.5	6.2	7.1	7.1	8.6	2.4
6Mx30Y	6.9	-1.7	5.3	5.2	5.8	5.7	7.0	1.9
3Yx2Y	8.4	-1.3	7.1	6.6	7.5	7.5	8.9	2.3
3Yx5Y	7.7	-1.2	6.5	6.1	6.9	6.8	7.8	1.7
3Yx10Y	6.8	-1.0	5.8	5.6	6.1	6.1	6.8	1.2
3Yx30Y	5.7	-0.9	4.8	4.7	5.1	5.1	5.7	1.1

Source: J.P. Morgan.

Figure 16: Despite elevated realized volatility, YTD returns from long delta hedged straddles have been mixed because of large swings in implied volatility

Cumulative* pnl for delta hedged long straddles**, and their pnl attribution by risk factor, 1/3/2023 - 6/20/2023; bp of notional

		Attribution				
		Actual pnl	Vega pnl	Gamma pnl	Theta pnl	Gamma + Theta pnl
6Mx2Y	93.2	14.6	176.2	-71.2	105.0	119.6
6Mx5Y	80.6	-1.1	240.8	-147.7	93.1	92.0
6Mx10Y	-21.2	-84.9	330.2	-246.4	83.8	-1.1
6Mx30Y	-302.6	-264.9	473.4	-479.3	-5.9	-270.8
1Yx10Y	-61.5	-114.7	212.1	-153.1	59.0	-55.6
3Yx10Y	-133.3	-158.2	88.0	-51.5	36.5	-121.7

Source: J.P. Morgan.

* Cumulative pnl is calculated from 1/3/2023 to 6/20/2023

** Delta hedged daily, options are rolled each month, assumes no transaction costs

As we contemplate the outlook for volatility over the remainder of the year, **we begin by noting that policy uncertainty remains high despite the June skip by the Fed.** The Fed's own continuing hawkish tone, and policy actions from other central banks such as the BoE's 50bp hike this week, serve as a reminder that further hikes remain a possibility. But so too are rate cuts - as we have estimated elsewhere (see [Fear is now the first principal component](#)), the banking system is likely to retrench from lending as it shores up liquidity in response to recent events, which we think could deliver the equivalent of 100-150bp in rate hikes in terms of macroeconomic effects. If and when this becomes evident in the data, rate cuts could become more likely. Thus, the range of policy rate paths remains extraordinarily wide. One can see evidence of this in implied probability distributions that one can infer from the pricing of calls and puts at various strikes on (say) Dec '23 SOFR futures. More specifically, by computing a best-fit decomposition of the implied distribution into a weighted sum of conditional Normal distributions, we can characterize these implied distributions in a more intuitive and interpretable manner.

We show this in **Figure 17**, for two dates - the date of the May and June FOMC meetings. Two points are worth noting from this. **First**, the means of the conditional distributions after the May meeting were generally biased lower, meaning markets were mostly pricing in rate

cuts of varying extent, and sustained hikes wasn't seen as a significant prospect at that time. This has changed after the June meeting, with the component distributions pointing to hikes as well as eases as possibilities. **Second**, the combination weights remain as dispersed as ever, showing no convergence to any one distribution. This is indicative of the fact that despite the first "skip" of this hiking cycle, the June meeting has not meaningfully led to an improvement in policy rate clarity. In turn, this suggests that markets will remain in a state of heightened reactivity to new information, creating conditions for elevated jump risk and high delivered volatility in the near term. However, **this is eventually likely to change as we move through the remainder of this year, as it becomes clearer at some point that additional hikes are less likely, and policy expectations converge towards pause/easing scenarios**. With respect to liquidity conditions, market depth is unlikely to rebound higher in the near term, but we would indeed look for a rebound if and when such policy clarity emerges.

Figure 17: Where do we go from here? Implied distributions have shifted significantly between two FOMC meetings

Weights and parameters for three different conditional Normal distributions, that can be combined to create a composite distribution that recovers the prices of SFRZ3 calls and puts at various strikes*, 5/3/2023 and 6/14/2023

	3-May			14-Jun		
	Mean	Std. Dev	Weight	Mean	Std. Dev	Weight
Distribution 1	5.17	0.07	32%	5.72	0.21	30%
Distribution 2	4.46	0.21	21%	5.34	0.23	27%
Distribution 3	3.76	1.69	47%	4.84	1.16	43%

Source: J.P. Morgan, CME

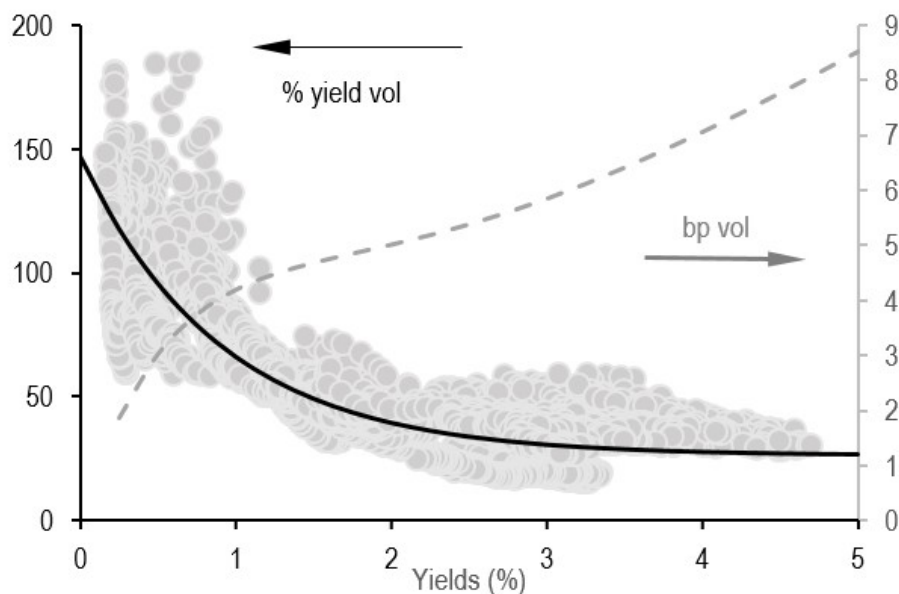
* Implied distribution is assumed to take the form of a weighted sum of many individual Gaussian density functions with various different means and standard deviations. The weights are solved for by calibrating to the prices of 3M SOFR ATM and OTM calls and puts, while also recovering the underlying futures price

A recap of our empirical fair value model for implied volatility

In short, our outlook for swaption implied volatility needs to incorporate the outlook for monetary policy (rates as well as balance sheet), yield levels, liquidity conditions and inflation expectations into a unified framework for estimating fair values for implieds across a range of expiries and tenors. To do this, we begin with a long-standing empirical relationship between swaption **percent-yield-vol and yield levels, which has generally held up well historically as well as cross-sectionally** (for different structures). **Figure 18** shows this relationship for a wide range of swaption structures spanning a range of tails and expiries. It also shows our parametrized cross-sectional yield vol fit which takes the form $yvol = a * \exp(-by) + c$, where y denotes the ATMF yield and $yvol$ denotes the percent yield vol. We do this over 5 years of history to capture the impact of different rate regimes, and vol-rate correlations. **This parametrized fit will serve as the anchor for our fair value framework**. Lastly, from such a fitted relationship for yield vols, we can calculate a fitted "back-bone" relationship for Normal basis point volatility versus ATMF yield levels - this is also shown (on the right axis) in Figure 18.

Figure 18: Long-term percent yield vol and yield relationship has remained stable despite a volatile 1H23

6Mx2Y, 6Mx5Y, 6Mx10Y, 6Mx30Y percent yield vol (left, %), a parametrized* yield vol fitted curve (left, %) and the equivalent fitted bpvol curve* (right, bp/day) versus ATMF yields (x-axis, %), past 5 years



Source: J.P. Morgan.

*Yield vol is modeled as 26.5 plus 120.7 times exponential of minus 1.1 times yields. The fit is done over 5 years using 3M, 6M, 1Y, 2Y, 3Y, 5Y expiry and 2Y, 3Y, 5Y, 7Y, 10Y and 30Y tails. Bp vol is calculated from this fitted yield vol as yield vol times yields divided by square root of 251

The fitted Normal backbone can be thought of as a first-pass model for swaption implied vols that depends only on the ATMF yield. Of course, implieds depend on more than just yield levels, and there are also differences in the yield-dependence across different structures. Therefore, it is important to account for other factors that may result in implieds deviating from this baseline relationship. This is what the second step of our framework attempts to do - specifically, **we build statistical models for each swaption structure where we model deviations from this baseline using the following common set of factors:**

- **Forward OIS** (1Yx1M OIS rate) to capture current state of policy
- **Squared deviation of inflation from 2%** (we use 5Y inflation swap) to capture the impetus for further policy action
- **Market depth** to capture the impact of liquidity conditions
- **Fed Balance Sheet size**, which seems to have an empirical impact and which we think may be a proxy for the private financial system's deviation from an equilibrium state
- **ATMF yields**, as different sectors can exhibit more or less directionality than what is captured in our parametrized fit

Figure 19: Our model uses a common set of intuitive factors to model deviations of normal bp volatility from our parametrized fit

Current bp volatility (6/22/2023) and statistics from regressing* deviations of normal bp volatility from reference** volatility against yields (%), Fed balance sheet size (\$tn), 1Yx1M OIS (%), squared deviation of 5Y inflation swap from 2%, and duration weighted market depth*** (\$mn)

Structure	Current BP vol	Coefficients						T-stats						Rsq		Std. Err.
		Intercept	ATMF	Fed B/S	1Yx1M OIS	Sqd dev. infl swap	Mkt depth	Intercept	ATMF	Fed B/S	1Yx1M OIS	Sqd dev. infl swap	Mkt depth			
6Mx2Y	9.27	-0.26	-0.63	0.23	0.88	0.14	-0.0039	-1.7	-2.9	13.9	4.7	2.6	-24.3	81%	0.80	
1Yx2Y	8.88	-0.62	-0.69	0.23	0.97	0.27	-0.0030	-6.1	-7.3	20.8	12.8	6.3	-23.5	87%	0.61	
3Yx2Y	7.16	-1.22	-0.05	0.22	0.38	0.25	-0.0017	-19.9	-1.3	33.1	18.0	11.2	-23.5	90%	0.37	
6Mx5Y	7.89	-0.10	-0.50	0.21	0.61	0.20	-0.0032	-1.3	-7.5	23.9	12.8	7.0	-32.9	89%	0.48	
1Yx5Y	7.50	-0.57	-0.37	0.22	0.51	0.18	-0.0025	-8.6	-7.6	30.9	16.3	7.7	-31.4	91%	0.40	
3Yx5Y	6.53	-0.99	-0.10	0.18	0.27	0.21	-0.0016	-20.5	-3.7	34.1	18.3	12.5	-27.9	91%	0.29	
6Mx10Y	6.48	0.12	-0.61	0.20	0.38	0.21	-0.0025	1.6	-11.4	24.8	12.3	8.4	-28.4	87%	0.44	
1Yx10Y	6.43	-0.33	-0.51	0.21	0.33	0.17	-0.0019	-5.4	-12.4	31.2	14.6	8.1	-26.8	89%	0.36	
3Yx10Y	5.85	-0.63	-0.41	0.16	0.22	0.17	-0.0010	-14.5	-16.8	35.1	17.9	11.9	-21.7	89%	0.25	
6Mx30Y	5.26	0.79	-1.24	0.19	0.38	0.26	-0.0013	8.9	-23.0	22.0	15.2	9.2	-13.8	83%	0.47	
1Yx30Y	5.24	0.23	-1.09	0.20	0.33	0.19	-0.0009	3.3	-26.3	29.1	17.8	8.6	-12.0	86%	0.37	
3Yx30Y	4.83	-0.27	-0.89	0.16	0.24	0.13	-0.0003	-5.7	-34.4	34.3	21.5	8.9	-5.5	88%	0.25	

Source: J.P. Morgan., BrokerTec, Federal Reserve H.4.1.

* Regression over 5 years of history, fit as of 6/14/2023

** Reference volatility as described in the previous exhibit

*** 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

Figure 19 shows our model variables and statistics, which are mostly significant and have consistent and intuitive signs. We can also use this model, coupled with current as well as projected YE23 values of the drivers, to calculate near term and medium term fair value estimates for implied volatility. To do the latter, we assume that market depth will be slow to rebound, forward rates will be realized, the Fed's balance sheet reduction will continue in line with our forecasts, and any existing model residuals will persist instead of converging to zero.

Based on this framework, **we think the second half of the year may be bumpy for implieds, as suggested by the trends shown in Figure 20. First, we note that implieds will likely be biased higher in the near-term.** But as Figure 20 also shows, **we think implieds are likely biased lower across the surface as we move towards year end.** Another consequence of such a model is that we project that the **expiry curve** (defined as 1Yx1Y minus 10Yx1Y) **is biased lower by 1-1.5bp/day and the tail curve** (defined as 1Yx1Y minus 1Yx10Y) **is biased lower by ~1bp/day by YE23.**

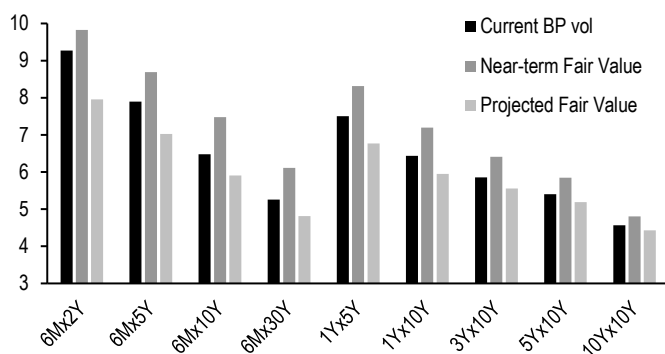
We can also use our fair value model for implieds in a different way, to assess payer and receiver skew fair values. To a significant extent, payer and receiver swaption implied vol skews are determined by the vol-versus-rate beta. A well-known approximation is that the fair value for the A+100 minus A+0 payer skew (for instance) is one half of the projected rise in ATMF implied vol in a +100bp rate move. Thus, the fair value for the payer skew is simply one half of the vol-rate beta (assuming implied vol is measured in bp/day and rates are measured in percentage points). Of course, other factors (such as option demand/supply dynamics at different rate levels) can also play a role, but we are likely in a period where such effects are likely to be small.

We can therefore use our empirical fair value models to calculate the likely change in implied vol in +100/-100bp rate moves, and thereby calculate fair values for payer and receiver swaption skews. **Figure 21** shows the results of such an exercise. There are a few things of note. **One**, the negative vol-rate correlation since the regional banking crisis has resulted in receiver skews in shorter expiries to trade rich compared to our fair value frame-

work (which captures the long-run relationship). Thus, **we see receiver skews as rich to fair value**. Although they could persist near these levels in the near term, they are likely to cheapen closer to fair value in the medium term as the effects of the banking crisis abate. **Two**, again in shorter expiries, payer skews in short tails appear cheap while payer skews in longer tails appear rich versus fair value. **Three**, in longer expiry swaptions, both payer and receiver skew appear fairly priced. Thus, as we look towards the medium term, **most of the movement in skews is likely to involve a cheapening of receiver skews in shorter expiries as well as a cheapening in payer skews on long tails versus short tails. Longer expiry skews (both payer and receiver skews) appear fair and are likely to remain stable.**

Figure 20: Bumpy road for implieds: first higher, then lower by YE23

Current (6/22/2023) normal bp vol, near-term fair value* and six-month ahead projected fair value** ;bp/day



Source: J.P. Morgan.

*Near-term fair value is calculated using the values for drivers as of 6/22/2023

** Projected fair value is calculated using the fair value framework from the previous exhibit and by assuming that forwards are realized for the ATMf yields, OIS rate and inflation swap, market depth improves to \$200mn and that the Fed balance sheet declines to \$7.9tn. No residual convergence is assumed in the projection

Figure 21: Receiver skews appear mispriced in the shorter expiry swaptions, while payer skews are mixed

Current (6/22/2023) implied vol, payer and receiver skew*, skew implied by the fair value framework** ; bp/day

Structure	Current			Implied	
	Bp vol	Payer Skew	Rec Skew	Payer Skew	Rec Skew
6Mx2Y	9.27	-0.72	1.27	0.43	-0.32
6Mx5Y	7.89	0.15	0.67	0.44	-0.28
6Mx10Y	6.48	0.48	0.66	0.36	-0.19
6Mx30Y	5.26	0.64	0.81	0.01	0.18
1Yx2Y	8.88	-0.16	0.50	0.36	-0.21
1Yx5Y	7.50	0.30	0.28	0.48	-0.31
1Yx10Y	6.43	0.55	0.09	0.40	-0.22
1Yx30Y	5.24	0.57	0.27	0.08	0.11
3Yx2Y	7.16	0.53	-0.28	0.60	-0.41
3Yx5Y	6.53	0.55	-0.28	0.57	-0.39
3Yx10Y	5.85	0.54	-0.23	0.43	-0.25
3Yx30Y	4.83	0.41	-0.08	0.16	0.03

Source: J.P. Morgan.

*Payer skew is calculated as A+100 minus A+0 implied volatility. Receiver skew is calculated as A-100 minus A+0 implied volatility

** Calculated by calculating a yield vol and bp vol at the A+100 and A-100 yield levels and accounting for the beta to yields from the fair value framework. Implied skew is then defined as A+100 (or A-100) volatility minus A+0 volatility divided by two

Forecasts

Figure 22: Our consolidated forecasts for near term and YE23 across swap spreads, swap yield curves and swaption implied volatility

		Current Value	Near term forecast	YE23 forecast
Swap spreads (bp)	2Y	-7	3	1
	5Y	-21	-21	-22
	10Y	-27	-25	-27
	30Y	-66	-64	-64
Swap yield curve (%)	1s2s	-0.60	-0.60	-0.70
	2s5s	-0.87	-0.80	-0.85
	2s10s	-1.16	-1.00	-1.05
	5s10s	-0.29	-0.20	-0.20
	10s30s	-0.32	-0.30	-0.25
	2y fwd 1s2s	-0.10	-0.05	-0.05
	2y fwd 2s5s	-0.07	0.00	0.00
	2y fwd 2s10s	-0.02	0.10	0.15
	2y fwd 5s10s	0.05	0.10	0.10
	2y fwd 10s30s	-0.21	-0.25	-0.20
Implied volatility (bp/day)	6Mx2Y	9.3	9.8	8.0
	6Mx10Y	6.5	7.5	5.9
	3Yx10Y	5.8	6.4	5.6
	5Yx10Y	5.3	5.8	5.2
	10Yx10Y	4.4	4.8	4.4

Source: J.P. Morgan.

Trading Recommendations

- **Maintain exposure to conditional 10s/30s flattener in a selloff constructed with 3M expiry payer swaptions, financed by selling 17% of the forward DV01 risk in 3Mx3Y payer swaptions to make the package premium neutral**
-Maintain longs in \$100mn notional 3Mx10Y payer swaptions (strike at inception: 3.422%, implied vol at inception: 6.79bp/day). P/L on this trade since inception: -30.3abp (for original trade write up, see Fixed Income Markets Weekly 2023-06-09). Maintain shorts in \$44mn notional 3Mx30Y payer swaptions (strike at inception: 3.172%, implied vol at inception: 5.22bp/day). P/L on this trade since inception: 63.1abp (for original trade write up, see Fixed Income Markets Weekly 2023-06-09). Maintain shorts in \$46mn notional 3Mx3Y payer swaptions (strike at inception: 3.884%, implied vol at inception: 9.89bp/day). P/L on this trade since inception: -0.5bp (for original trade write up, see Fixed Income Markets Weekly 2023-06-09).-This package was constructed to be approximately premium neutral at inception.
- **Maintain exposure to 10s/15s swap curve flatteners hedged with a 15% risk-weighted long in the 7Y sector**
-Continue paying-fixed in \$100mn notional of a 09/09/23x10Y SOFR swap. Continue receiving-fixed in \$72.0mn notional of a 09/09/23x15Y SOFR swap. Continue receiving-fixed in \$20.5mn notional of a 09/09/23x7Y SOFR swap. This trade uses risk weights of -1.0/1.0/0.15 on the 3Mx10Y/3Mx15Y/3Mx7Y swaps respectively. This trade was initiated at a yield spread of -51.3bp. TP/L on this trade since inception: 0.5bp (for original trade write up, see Fixed Income Markets Weekly 2023-06-09).
- **Maintain exposure to UXY / US treasury futures curve flatteners hedged with a 15% risk-weighted long in the TY sector**
-Stay short 1000 contracts of UXYU3 at 119-10.5 (PVBP: \$98.0/bp per contract). Stay long 662 contracts of USU3 at 127-19 (PVBP: \$148/bp per contract). Also maintain long 211 contracts of TYU3 at 113-14.5 (PVBP: \$69.8/bp per contract). This trade used risk weights of -1.0/1.0/0.15 on the UXY/US/TY sectors respectively. P/L on this trade since inception: 2 ticks (for original trade write up, see Fixed Income Markets Weekly 2023-06-09).
- **Maintain longs in 6Mx5Y swaption straddles, versus weighted longs in S&P futures**
-Maintain longs in \$100mn notional 6Mx5Y ATM swaption straddles (strike at inception: 3.457%, implied vol at inception: 8.3bp/day). This trade assumes active delta hedging every business day.
-Also maintain longs in 31 contracts of S&P 500 E-Mini Sep futures at 4349. P/L on this trade since inception: -2.2 abp (for original trade write up, see Fixed Income Markets Weekly 2023-06-09).
- **Maintain exposure to wider spreads in the 2Y sector**
-Continue paying-fixed in 4.25% May 31 2025 maturity matched SOFR swap spreads. Stay long \$100mn notional of the 4.25% May 31 2025, versus paying fixed in \$95.8mn notional of a maturity matched SOFR swap initiated at a swap spread of -9.2bp. P/L on this trade since inception: 2.3bp (for original trade write up, see Fixed Income Markets Weekly 2023-06-02).
- **Maintain exposure to 4s/5s swap spread curve flatteners**
-Continue paying-fixed in 2.75% Jul 31 2027 maturity matched SOFR swap spreads. Stay long \$100mn notional of the 2.75% Jul 31 2027, versus paying fixed in \$93.4mn notional of a maturity matched SOFR swap originally initiated at a swap spread of -24.6bp. Continue receiving-fixed in 3.625% May 31 2028 maturity matched SOFR

swap spreads. Stay short \$83mn notional of the 3.625% May 31 2028, versus receiving fixed in \$82.2mn notional of a maturity matched SOFR swap originally initiated at a swap spread of -20.8bp. The swap spread curve was initiated at a spread of 3.8bp. P/L on this trade since inception: 2.6bp (for original trade write up, see Fixed Income Markets Weekly 2023-06-02).

- **Maintain longs in 6Mx30Y swaption straddles versus vega-neutral amount of shorts in 1Yx30Y swaption straddles**
-Maintain longs in \$100mn notional 6Mx30Y ATMF swaption straddles (strike at inception: 3.146%, implied vol at inception: 5.48bp/day). Maintain shorts in \$72mn notional 1Yx30Y ATMF swaption straddles (strike at inception: 3.092%, implied vol at inception: 5.45bp/day). This trade assumes active delta hedging every business day. P/L on this trade since inception: -1 abp (for original trade write up, see Fixed Income Markets Weekly 2023-06-02).
- **Stay short 9M expiry single-look YCSO straddles on the 5s/30s curve, versus 35% vega-weighted longs in 9Mx2Y swaption straddles**
-Maintain shorts in \$1bn notional 9M expiry one-look straddles on the 5s/30s curve (CMS adjusted ATMF and strike at inception: -13.7bp, implied curve vol at inception: 5.65bp/day). Maintain longs in \$175mn notional 9Mx2Y ATMF swaption straddles (strike at inception: 3.585%, implied vol at inception: 9.95bp/day). This trade assumes active delta hedging every business day on both legs of the trade. P/L on this trade since inception: 0.4abp (for original trade write up, see Fixed Income Markets Weekly 2023-06-02).
- **Maintain exposure to 0.45:1 risk weighted 2s/3s swap spread curve flatteners paired with a 20% beta-weighted M5/M6 SOFR futures steepener**
-Continue paying-fixed in 3.875% Apr 30 2025 maturity matched SOFR swap spreads. Stay long \$45mn notional of the 3.875% Apr 30 2025, versus paying fixed in \$43.1mn notional of a maturity matched SOFR swap.
-Continue receiving-fixed in 3.625% May 15 2026 maturity matched SOFR swap spreads. Stay short \$67mn notional of the 3.625% May 15 2026, versus receiving fixed in \$64.0mn notional of a maturity matched SOFR swap.
-Maintain longs in 147 contracts of SFRM5 initiated at 96.91 and shorts in 147 contracts of SFRM6 initiated 96.91. P/L on this trade since inception: -6.4bp (for original trade write up, see Fixed Income Markets Weekly 2023-05-19).
- **Maintain exposure to a cheaper 47:55 weighted 7s/10s/20s swap butterfly in a sell-off**
-Maintain shorts in \$63mn notional 3Mx7Y payer swaptions (strike at inception: 3.352%, implied vol at inception: 8.41bp/day). Maintain longs in \$100mn notional 3Mx10Y payer swaptions (strike at inception: 3.352%, implied vol at inception: 7.48bp/day). Maintain shorts in \$32mn notional 3Mx20Y payer swaptions (strike at inception: 3.376%, implied vol at inception: 6.58bp/day). P/L on this trade since inception: 0.2bp (for original trade write up, see Fixed Income Markets Weekly 2023-05-19).
-This package was approximately premium neutral at inception.
- **Maintain 6M forward 10s/30s flatteners, paired with 25% longs in 6Mx2Y swaps**
-Continue paying-fixed in \$100mn notional of a 11/12/23x10Y SOFR swap. Continue receiving-fixed in \$44mn notional of a 11/12/23x30Y SOFR swap. Continue receiving-fixed in \$107.1mn notional of a 11/12/23x2Y SOFR swap. This trade uses risk weights of -1.0/1.0/0.25 on the 6Mx10Y/6Mx30Y/6Mx2Y swaps respectively. This trade was initiated at a yield spread of -75.4bp. P/L on this trade since inception is -4.1bp (for original trade write up, see Fixed Income Markets Weekly 2023-05-12).
- **Maintain shorts in 1Yx10Y 50bp OTM receiver swaptions versus longs in 50bp**

OTM payer swaptions, and continue receiving fixed in the underlying swap to hedge the delta

-Maintain longs in \$100mn notional 1Yx10Y 50bp OTM payer swaptions (strike at inception: 3.598%, implied vol at inception: 7.3bp/day). Maintain shorts in \$100mn notional 1Yx10Y 50bp OTM receiver swaptions. (strike at inception: 2.598%, implied vol at inception: 6.92bp/day). Continue receiving-fixed in \$61.7mn notional of a 04/22/24x10Y SOFR swap. This trade is assumed to be delta hedged frequently. P/L on this trade since inception is -7.7abp (for original trade write up, see Fixed Income Markets Weekly 2023-04-21).

- **Maintain bullish vega exposure in the 10Yx10Y sector**

- Maintain longs in \$100mn notional 10Yx10Y ATMF swaption straddles (strike at inception: 3.041%, implied vol at inception: 4.94bp/day). This trade assumes active delta hedging every business day. P/L on this trade since inception: -5.5 abp (for original trade write up, see Fixed Income Markets Weekly 2023-03-17).

- **Maintain exposure to conditional richening of the belly of a 1s/5s/20s swap butterfly in a rally using 6M expiry receiver swaptions**

- Maintain shorts in \$255.4mn notional of 6Mx1Y receiver swaptions (strike at inception: 4.352%, implied vol at inception: 6.51bp/day). Maintain longs in \$100mn notional of 6Mx5Y receiver swaptions (strike at inception: 3.122%, implied vol at inception: 7.6bp/day). Maintain shorts in \$19.7mn notional of 6Mx20Y receiver swaptions (strike at inception: 3.098%, implied vol at inception: 6.42bp/day). P/L on this trade since inception: -0.2bp (for original trade write up, see Fixed Income Markets Weekly 2023-01-20).

- This package was approximately premium neutral at inception, constructed based on risk weights of 0.58 and 0.65 on the wings.

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			
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
TUZZ invoice spread narrowers	8/19/2022	9/16/2022	(5.0)
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)
Position for wider spreads in the 3Y sector, using 0.5% Feb 28 2026	10/28/2022	11/4/2022	3.3
5Y wideners	1/6/2023	1/20/2023	3.6
5Y invoice spread wideners	1/6/2023	1/20/2023	4.3
3Y swap wideners	12/16/2022	2/3/2023	3.5
3Y wideners, using old 5's bonds	2/3/2023	2/24/2023	7.2
100:70 weighted 20s/30s swap spread curve steepeners	1/27/2023	2/24/2023	1.2
30-year swap spread wideners paired with a short in Yen futures	2/24/2023	3/10/2023	(5.3)
Swap spread narrowers in the 5Y sector	3/3/2023	3/10/2023	3.7
Initiate FV / US Invoice spread curve steepeners via FVM3 and USM3, paired with a 20% risk-weighted short in USM3	3/3/2023	3/10/2023	0.2
2s/3s swap spread curve flatteners coupled with a 10% risk-weighted 2s/3s Treasury curve flattener	1/20/2023	4/14/2023	(7.0)
USM3 invoice spread wideners, paired with 10% short in the USM3	3/17/2023	4/28/2023	2.0
2Y swap spread wideners, paired with buying 7% risk in SFRM3	3/31/2023	5/5/2023	(7.5)
2s/5s swap spread curve flattener	4/14/2023	5/5/2023	(10.0)
USM3 invoice spread wideners in a rally	3/17/2023	5/5/2023	1.2
7Y spread narrowers	4/21/2023	6/2/2023	(1.4)
TY invoice spread narrowers by selling TYM3 and receiving fixed in a forward starting swap	4/21/2023	6/2/2023	(0.4)
10Y spread narrower	5/12/2023	6/2/2023	(5.7)

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North America Fixed Income Strategy

23 June 2023

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Duration and curve	Entry	Exit	P/L
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
Position for a steeper 3M forward 7s/30s curve, paired with 2Y forward 2s/15s swap curve flatteners	09/30/22	10/21/22	(7.5)
3M 2s/30s steepener vs 2Y 2s/10s flattener (72:100 risk weighted)	10/14/22	10/21/22	7.8
Position for a flatter 2Y forward 2s/7s curve, paired with a 3M forward 5s/15s swap curve steepener	09/23/22	11/04/22	(4.4)
Sell the belly of the M3/Z3/M4 3M SOFR futures butterfly (-0.55:1:-0.55 risk weighted)	08/26/22	11/28/22	8.3
2Y forward 2s/5s swap curve flatteners, paired with equal risk 3M forward 2s/5s swap curve steepeners	11/10/22	11/28/22	(28.2)
Weighted 10s/30s flattener in a selloff	11/10/22	11/28/22	5.6
1Yx1Y / 3Mx7Y flatteners paired with 0.7 risk in 3M forward 2s/10s steepeners	11/10/22	02/03/23	4.0
5Yx5Y / 1Yx15Y forward swap curve steepeners	01/27/23	02/10/23	3.7
Sell the belly of the Z3/M4/Z4 3M SOFR futures butterfly 24:80 weight	01/27/23	02/10/23	5.4
1Yx2Y / 2Yx3Y flatteners, paired with 15% risk in receive-fixed 1Yx1Y	02/03/23	02/15/23	8.5
1Yx2Y / 2Yx3Y flatteners, paired with 15% risk in receive-fixed 1Yx1Y, using SOFR futures	02/03/23	02/15/23	10.5
1Yx1Y / 3Mx3Y swap curve flatteners paired with 20% risk in 3Mx18M / 1Yx2Y swap curve flatteners	02/15/23	02/24/23	10.2
27Mx3M / 18Mx1Y steepeners, paired with 10% risk in receive-fixed 1Yx1Y	02/15/23	03/13/23	(12.7)
Sell the belly of the U3/M4/H5 3M SOFR futures butterfly (-0.33:1:-0.77 risk weighted)	02/24/23	03/13/23	(29.4)
Conditional exposure to a steeper 1s/5s swap yield curve in a rally using 3M expiry receiver swaptions	02/24/23	03/13/23	59.3
2Y6Mx10Y / 2Y6Mx30Y swap curve steepeners with a 10% risk-weighted long in the 9Mx3M sector and a 25% risk-weighted short in the 21Mx3M sector	03/03/23	03/13/23	6.0
U3/Z3 SOFR futures steepeners (90:100 risk weighted) hedged with a 20% risk-weighted long in U5 SOFR futures	03/10/23	03/13/23	(2.3)
15Mx3M / 2Yx1Y swap curve flatteners paired with 30% risk longs in 3Mx2Y rates	04/14/23	04/28/23	5.2
3Mx7Y receive fixed swaps, paired with 42% risk in 1Yx1Y and 42% risk in 3Mx5Y payer swaps	03/31/23	05/05/23	(10.6)
Pay in the belly of a 35:55 weighted 3Yx1Y / 5Yx5Y / 3Mx15Y swap yield butterfly	04/14/23	05/05/23	(13.0)
2Yx5Y / 2Yx10Y swap curve steepeners paired with 3Mx2Y/3Mx10Y swap curve flatteners (1:1 risk weighted)	04/14/23	05/05/23	(10.3)
6M forward 5s/10s flattener, hedged with long in rates	05/05/23	06/02/23	4.5
Position for a flatter 70:100 weighted 5s/20s swap curve in a selloff	05/19/23	06/02/23	6.2
Sell the belly of a H4/M4/U4 SOFR futures butterfly	04/28/23	06/09/23	0.7
Initiate 3M forward 3s/7s flatteners, paired with 35% long in 3Mx5Y to hedge against further steepening in a rally	06/02/23	06/09/23	3.4
Initiate conditional 3s/7s flatteners in a selloff constructed with 3M expiry payer swaptions and financed by selling 20% of the forward DV01 risk in 3Mx5Y payer swaptions	06/02/23	06/09/23	2.7

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North America Fixed Income
Strategy
Interest Rate Derivatives
23 June 2023

J.P.Morgan

Options	Entry	Exit	P/L
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
Short 3yx10y straddles	06/03/22	10/21/22	(34.9)
Buy the 3M/6M expiry swaption calendar spread on 10 year tails	08/05/22	10/21/22	(15.8)
Overweight 3Mx5Y vs 3Mx15Y	10/14/22	12/09/22	(6.8)
Long 6mx2y straddles, delta hedging lognormal deltas	12/16/22	01/06/23	(8.3)
Sell 1Y expiry single look straddles on the 2s/10s swap curve	01/06/23	01/20/23	10.2
Long 6mx2y straddles	01/06/23	02/03/23	(8.0)
Sell 1Yx10Y straddles, paired with pay-fixed swap hedge	02/03/23	03/10/23	(18.5)
Overweight 6Mx30Y straddles with a long duration overlay	02/24/23	03/10/23	18.7
Long 6Mx30Y straddles versus selling vega-neutral 1Yx30Y straddles	04/14/23	05/05/23	3.2
Sell 6Mx30Y swaption straddles on a delta hedged basis coupled with a weighted short in S&P 500 futures	04/28/23	06/02/23	(1.0)
Buy 6Mx10Y swaption straddles versus selling 6Mx30Y straddles (using a notional weighting of 2:1)	04/28/23	06/02/23	2.3
Long 6Mx30Y swaption straddles versus selling a theta-neutral amount of 6Mx5Y swaption straddles	05/19/23	06/02/23	(9.9)
Buy 3Yx5Y swaption straddles versus selling a vega-neutral amount of 1Yx5Y swaption straddles	05/12/23	06/09/23	1.6
Sell 1Yx1Y swaption straddles versus buying a vega-neutral amount of 3Yx2Y swaption straddles	05/19/23	06/09/23	0.7
Others	Entry	Exit	P/L
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)
WN calendar spreads narrowers	2/10/2023	2/22/2023	0.0
US calendar spread wideners	2/10/2023	2/22/2023	1.0
Long USM3 basis	3/17/2023	5/19/2023	0.7
Long UXYM3 basis	3/31/2023	5/19/2023	0.7
Total number of trades			99
Number of winners			58
Hit rate			59%

Recent Weeklies	
9-Jun-23	Smoke on the water, fire in the sky
2-Jun-23	Hike, skip and jump
19-May-23	Zeno's paradox
17-May-23	US Treasury Market Daily: So you're saying there's a chance?
12-May-23	On the brink
5-May-23	Treasury's Tax Extension Denied
28-Apr-23	Treasury Gets a Tax Extension
21-Apr-23	Debt and Taxes
14-Apr-23	Banking on Earnings
31-Mar-23	The central bank is more central and more bank
24-Mar-23	Fear is now the first principal component
17-Mar-23	Clear Air Turbulence
13-Mar-23	Crossing the Rubicon
10-Mar-23	Powell springs forward, banks fall back
03-Mar-23	Blasts from the distant past
24-Feb-23	Through the looking glass
22-Feb-23	US Treasury Market Daily: Unwind inflation swap longs and calendar spread positions
15-Feb-23	US Treasury Market Daily: 30-year TIPS auction preview, roll estimates, November TIC update
10-Feb-23	Return of Vol-demort
03-Feb-23	Irresistible force meets immovable object
27-Jan-23	War and PCE
20-Jan-23	DISP-pleasure
6-Jan-23	An atmospheric river runs through it
16-Dec-22	Don't fight the Fed
9-Dec-22	It's the most illiquid time of the year
10-Nov-22	One swallow does not a summer make
04-Nov-22	Symmetric rate hikes on both sides of the pond
14-Oct-22	DEC-elation - coming soon from a central bank near you
21-Oct-22	Bear Attack
14-Oct-22	Lognormal reshuffle
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

Annual Outlooks	
22-Nov-22	Interest Rate Derivatives 2023 Outlook: From tiger's roar to rabbit's foot
Recent Special Topic Pieces	
1-Jun-23	Open the floodgates
11-May-23	US bond futures rollover outlook: June 2023 / September 2023
09-Feb-23	US bond futures rollover outlook March 2023 / June 2023
06-Dec-22	i-PCA: Implied Principal Component Analysis
09-Nov-22	US bond futures rollover outlook: December 2022 / March 2023
15-Aug-22	US bond futures rollover outlook: September 2022 / December 2022

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