

Interest Rate Derivatives

2024 Mid-Year Outlook

- The year so far has brought wide trading ranges and a significant repricing of Fed expectations. Forward OIS rates at a YE24 horizon have risen by over 100bp and are now priced to much less easing, even as other central banks like the ECB and BoC have initiated rate cuts. Swap yield curves and even swap spreads have exhibited correspondingly wide trading ranges this year
- Looking ahead, we anticipate a continued steepening in yield curves going into year-end, but much of this is already priced into current forwards, except for curves anchored in longer maturities and forward curves. Thus, outright curve steepening positions premised upon upcoming Fed easing are unlikely to deliver much gratification in coming months
- Fed expectations are also coalescing around a path of moderate rate cuts and tails are thinning, which likely implies reduced jump risk in markets going forward. This, together with the fact that forwards are over-pricing rate cuts in coming months, makes yield curve carry trades attractive as a theme. We continue to advocate for well-hedged carry trades that mitigate directional curve exposure while enhancing carry-to-risk ratios
- Term funding premium will likely continue to drift higher by ~0.5-0.6bp/year over the course of 2H24, in large part because of QT, which we think can continue all year at the now-tapered pace. Growth in bond fund AUMs is a possible offsetting factor, but we see such growth as unlikely to emerge in coming months as it is typically back-loaded in an easing cycle. Rising term funding premium will thus likely pressure swap spread curves flatter
- At the same time, zero-duration spreads are likely biased wider from here, in part due to the upward drift in term funding premium. Taking this into account along with our outlook for term funding premium, we see maturity matched swap spreads as biased significantly wider in the front end of the curve by year-end, modestly wider in the belly and mostly flat at the long end
- The reduction of dispersion in Fed expectations brings reduced jump risk going forward, which implies broadly supportive conditions for short gamma strategies. That said, implied volatility levels are close to fair value and will likely stay stable in 2H24. This means outright short gamma exposure, although likely to be profitable on average, may not offer attractive risk-reward characteristics due to the lack of a convincing downward bias in implieds, and gamma strategies will likely need to be actively managed in coming months
- Alternatively, investors can consider finessing volatility exposure by selling the volatility of individual principal components that characterize yield curve moves. We describe a novel approach to designing such trades, which opens the door to a new class of relative value trades in the options market. In particular, selling the volatility of the second principal component appears likely to offer better returns relative to various metrics of risk

Waiting for someone or something to show you the way

The year so far has been one of wide trading ranges in US Rates markets. Forward OIS rates at a year-end 2024 horizon are sharply higher over the course of the first half, and are only recently exhibiting some stability after trading in a 100bp range in 1Q24. The dollar is ~5% higher, but in relatively steady fashion in part due to greatly lowered easing expectations in the US, even as other central banks such as the ECB and the BoC have delivered their first

rate cuts. Even swap spreads have exhibited wide trading ranges, with (for instance) 2-year spreads moving a band that was over 10bp wide in 1Q as well as 2Q. Amidst all this, credit markets have fared quite well, with the JULI index spread tighter as well as more stable (Figure 1).

The main driver of such wide ranges in US rates has been ever-shifting expectations surrounding the path of policy rates. Not only are year-end OIS rates higher, implying diminished easing expectations, but the dispersion surrounding such expectations is also now lower. Forward OIS rates are averages over a market-implied distribution, and the width of that distribution and the fatness of the tails is an important determinant of jump risk in markets. Our preferred way of characterizing this has been to decompose the implied distribution of YE24 OIS rates (inferred from the Dec 2024 SOFR futures options market) into a weighed sum of scenario specific Normal distributions, each of which can be associated with a certain policy outcome (e.g., 3 cuts by year end). Details of this approach can be found elsewhere (see [What's the rush?](#)), but what is noteworthy here is that expectations have steadily been coalescing around what one might call a shallow path - the weights associated with scenarios spanning zero to 3 cuts have risen in total, while the weights on other scenarios has fallen. Most important of all, the weight on a 1-hike-by-year-end scenario, which rose considerably in April and May, is back near zero thanks to soft inflation data as well as Chair Powell's comments signaling that additional hikes were not in anyone's base-line view (Figure 2).

Figure 1: The year so far has been one of wide trading ranges in US Rates markets

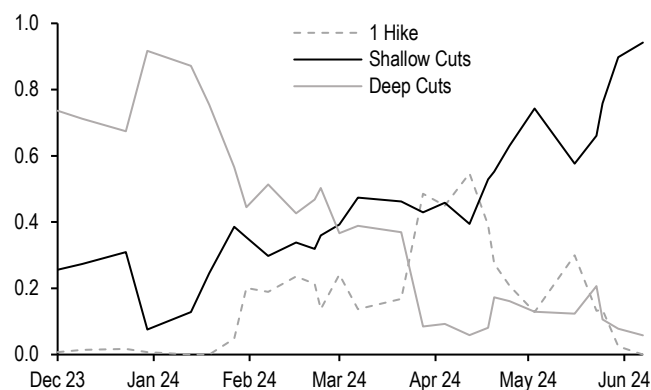
YE23, 1Q24, and current levels for selected US rates market variables, equity indices, and credit spreads; units as indicated, current values as of 6/26/2024

	Levels as of:			Trading range	
	YE23	1Q24	Cur	1Q24	2Q24
YE24 OIS (%)	3.74	4.61	4.90	1.00	0.46
2Y UST (%)	4.25	4.62	4.75	0.60	0.40
10Y UST (%)	3.86	4.19	4.31	0.48	0.49
2s/10s curve (bp)	-39	-43	-43	30	20
2Y swap spread (bp)	-18	-8	-14	11	10
10Y swap spread (bp)	-40	-37	-40	6	5
SPX (pts)	4770	5254	5478	566	520
JULI index spread (bp)	113	105	109	14	10
JULI BBB index spread (bp)	131	118	119	18	11
Trade weighted dollar	128.2	131.1	134.4	3.2	3.6
Crude oil (\$/bbl)	72	83	81	13	14
Mtg. cur. Cpn Tsy OAS (bp)	22	27	23	14	14
6Mx2Y implied vol (bp/day)	8.4	6.9	7.2	1.6	0.8
6Mx10Y implied vol (bp/day)	7.0	6.1	6.6	1.1	0.9
5Yx10Y implied vol (bp/day)	5.8	5.7	6.1	0.5	0.5

Source: J.P. Morgan.

Figure 2: Following softer inflation data as well as Chair Powell's post-meeting comments, market expectations have coalesced around a moderate easing path

Total weights on year-end policy rate scenarios representing 1 hike, Shallow Cuts*, and Deep Cuts*, as calculated from a decomposition of the implied probability distribution associated with Dec 2024 SOFR futures**, Dec 2023 - Current



Source: J.P. Morgan., CME

* Shallow Cuts correspond to the total weights on the 0 Cut, 1 Cut, 2 Cuts, and 3 Cuts scenarios. Deep Cuts correspond to the total weights on the >3 Cuts scenarios. Scenarios outlined in Figure 2 of [What's the rush?](#)

** We enumerate a list of scenario-specific Normal distributions with fixed standard deviations and means that are separated by 25bp, and then require the implied distribution to be a weighted combination of these individual distributions. The weights are then solved for, by fitting to the observed prices of calls and puts at various different strikes. For more details of our approach, see [What's the rush?](#)

In addition to policy rates, there is also quantitative tightening or Fed balance sheet reduction to consider, which has been ongoing and is likely to continue for the rest of the year. Our projections for the Fed's balance sheet size, as well as the major liability components, are shown in **Figure 3**. **We expect that QT can continue at the now-tapered pace for the remainder of the year before O/N RRP balances will decline to below \$300bn, at which point we expect balance sheet runoff to halt.** This is because a reasonably sized RRP facility is likely necessary as a buffer against stress in funding markets, given that the marginal propensity of RRP investors to lend in response to spikes in repo rates is higher than the marginal propensity of banks to do the same. Therefore, even though Reserves are projected to remain at over \$3Tn by year end, which would have been considered ample a few years ago, the Fed will likely need to halt QT around year end or thereabouts.

Figure 3: We estimate that Quantitative Tightening can continue over the remainder of the year at the now-tapered pace

Current* and projected** values for Fed balance sheet assets, RRP, TGA, Reserves, and Commercial bank deposits*** through 2024, \$bn

End-of-the month	Fed Assets	RRP			TGA	Reserves	Commercial Bank Deposits
		O/N RRP	Foreign RRP	Total RRP			
Current	7282	490	390	880	744	3269	17557
Jul-24	7224	400	375	775	775	3285	17619
Aug-24	7179	329	375	704	850	3236	17630
Sep-24	7134	355	375	730	775	3239	17683
Oct-24	7088	332	375	707	775	3217	17715
Nov-24	7045	311	375	686	775	3195	17748
Dec-24	6927	289	375	664	775	3099	17721

Source: J.P. Morgan, FRED, Federal Reserve H.4.1, Federal Reserve H.8

* Current as of 6/27/2024 Fed H.4. release

** July runoff accounts for the additional portion of Treasury runoff that will occur at June month end

*** Deposits as of 6/21/2024 Fed H.8. release

What does all this mean for our views on the markets going forward? We discuss this in the sections that follow in greater detail. But to summarize, our themes in the rates markets stem from four underlying observations. **First**, we do expect the Fed to begin easing in November (followed by additional cuts at a 25bp/quarter pace), but forwards are currently pricing in more cuts than will likely occur in the future. **Second**, markets will likely remain more stable and exhibit much less jump risk in the months ahead, in comparison with the first half of this year. Taken together, these two observations lead us to favor carry trades in coming months (see *Swap Yield Curve*). **Third**, our expectation for continuing QT over 2H24 is a driver of our view that term funding premium will likely be biased higher over 2H24. This, together with our outlook for a widening in zero-duration spreads, causes us to favor swap spread widenings at the front end and in the belly, while leaving us neutral over the medium term in the long end of the curve (see *The Outlook for Swap spreads in 2H24*). The upcoming US Presidential elections add some upside risk to term funding premium and an additional flattening bias to spread curves. This is because baseline expectations call for divided government (with the Senate likely in Republican control and the House in Democratic hands), but either a Blue or a Red sweep is likely to result in larger deficits (albeit of different magnitudes). While this is likely to become a growing risk, particularly to positions in longer maturity sectors, it is longer term in nature and unlikely to significantly influence swap spreads over the remainder of this year. **In the options market**, our expectations for benign conditions and low jump risk in the months ahead is supportive of short gamma carry strategies. But given that swaption market implied volatility levels are fairly close to fair

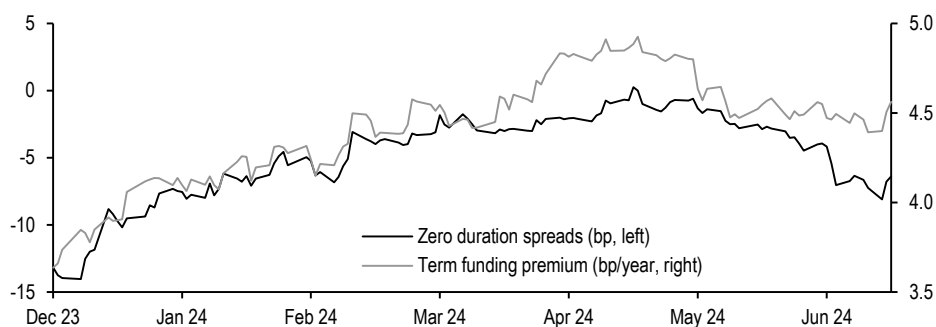
value and will likely remain rangebound in 2H24 around our year-end projections, active two-sided management of volatility risk will likely be necessary over the remainder of the year (see *Options*). **Finally**, we discuss a new approach to improving upon the performance of outright short gamma strategies by trading the volatility of individual principal components that describe moves in yields across the curve. While Principal Component Analysis has been used for a variety of purposes in the markets, to our knowledge it has never been used to unbundle the total volatility of yields into volatility of principal components and trade them individually. This widens the relative value opportunity set by opening up a new class of trades; we discuss how to construct such trades, as well as why options market investors should consider such strategies (see *Trading Principal Component Volatility*).

The Outlook for Swap spreads in 2H24

As we noted earlier, the first half has seen yields trade in a considerably wide range, thanks to dramatic shifts in Fed expectations. At the start of the year, expectations for policy rates over the course of the year were pretty much concentrated in scenarios involving deep cuts (5 or more by year end). As inflation data proved stickier than expected early on, these expectations reversed course, to the extent where a not-insignificant weighting was put on scenarios involving additional hikes in April and May. But a softer inflation print in June, followed by Fed Chair Powell's comments all helped to mitigate the tail risk of further hikes. More recently, market expectations have coalesced around a moderate easing path that involves somewhere between zero and three cuts by year end (Figure 2). Through it all, the range in yields has been significant, with front end yields trading in a ~100bp range and long end yields trading in a ~75bp range. The range in maturity matched swap spreads has also been significant, at about 10% of the range in yields (Figure 1). **But the wide ranges in swap spreads are not because of correlation with yield levels** - indeed, the beta between 5-year maturity matched swap spreads and 5-year Treasury yields has been essentially zero over the past three months. Rather, it reflects the swings in macro factors that impact the entire term structure of swap spreads.

Figure 4: Over the course of 1H24, zero-duration spreads and term funding premium have traded in especially wide ranges

Zero duration spreads* (bp, left) and Term funding premium* (bp/year, right), 12/27/2023 - 6/26/2024



Source: J.P. Morgan.

* For details on our methodology for calculating Term funding premium and Zero-duration swap spreads, see [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#)

As we described in detail a few months ago, **the term structure of swap spreads is best understood by examining the slope, which is the negative of a measure of term funding premium, and the intercept, which we call zero duration swap spreads because it can be interpreted as the swap spread of a near-zero duration UST**. Over the course of 1H24, zero-duration spreads have traded in an especially wide range, varying from -15bp at the

start of the year to near zero in late April - it now stands near -7bp. **Term funding premium**, which can be defined as the incremental compensation demanded by Treasury investors for each additional year of modified duration after hedging interest rate risk, **has also varied from as low as 3.5bp/year to a high of nearly 5bp/year** - this now stands near 4.5bp/year (Figure 4).

To contemplate the outlook for swap spreads over the remainder of the year, we begin by first projecting the outlook for term funding premium and zero-duration spreads (i.e., the parameters used in our parametric representation of the spread curve). We have discussed our model for these market variables elsewhere in detail (see [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#)). But **Figure 5** contains a brief statistical description of our model for term funding premium (with recently refreshed coefficients), and shows a factor-based attribution of the change seen in 1H24, as well as our projections for term funding premium over 2H24. We make two observations from this exhibit. **First**, the 1H24 rise in term funding premium was largely due to a reduction in the Fed's balance sheet, partially offset by the decline in RRP balances. **Second**, supply side effects were smaller - the increase in UST duration supply accounted for a ~0.2bp/year increase in term funding premium. Looking ahead to 2H24, these are the same factors likely to be at play. QT is expected to continue over the remainder of the year albeit at a tapered pace, and is likely to produce a ~\$350bn reduction in the size of the Fed's balance sheet (Figure 3). Even with a small offset from the expected ~\$150bn reduction in RRP balances, **we see term funding premium rising by ~0.5-0.6bp/year from current levels by year-end**.

Figure 5: We look for term funding premium to rise in 2H24, largely on the back of continuing QT

Statistics from regressing* term funding premium (TFP)** versus its drivers (units as indicated), and YE23, current (6/26/2024, except RRP as of 6/19), and YE24 projected values for drivers of term funding premium, factor level attribution of change in 1H24 ***, and 2H24 projections

Factor	Regression stats		Values as of:			Factor Impacts	
	Coeff	T-stat	YE23	Current	YE24 (proj.)	1H24	2H24
Fed B/S (\$Tn)	-1.42	-21.3	7.8	7.3	6.9	0.7	0.5
Top 20 bond fund AUM (\$bn)	-0.015	-20.0	431	428	425	0.0	0.0
Monthly UST duration supply (\$bn 10s)	0.008	7.7	204	233	235	0.2	0.0
RRP balance (\$Tn)	0.83	15.8	1.1	0.8	0.7	-0.3	-0.1
Intercept	18.9	58.2					
Actual			3.7	4.6		0.8	
Fair value			4.0	4.7	5.2	0.7	0.5
Model R-sq	89%						
Std. error	0.3						

Source: J.P. Morgan.

* Regression period from Apr 2021 - Jun 2024

** Term Funding Premium is defined in Figure 2 of [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#)

*** Factor impact is defined as the change in each driver multiplied by the drivers coefficient.

There is one possible offsetting factor that could emerge over the course of the remainder of the year, and that is a revival of AUM growth at bond funds. Rising AUM at bond funds tends to produce passive demand for USTs across the curve (because these funds typically manage to an index), which therefore results in a decrease in term funding premium. Based on the coefficients shown in Figure 5, we can see that a ~10% increase in AUMs would suffice to fully offset the projected increase in term funding premium stemming from the other drivers. But how likely is such an increase in AUMs? Bond fund AUM growth has been lackluster, in part because of the inverted yield curve, and any pickup in AUM growth will likely be backloaded and only occur when easing is underway. Therefore, **in a practical sense, we think much of the next half is likely to be characterized by an upward drift**

in term funding premium. All else equal, this implies a flattening bias on spread curves going forward.

There is likely additional upside risk to term funding premium from the upcoming US Presidential elections in November. Our baseline projections for the remainder of the year assume current consensus election outcomes, which call for divided government with a Republican Senate and a Democratic House. In such an event, any significant fiscal expansion is unlikely. But a potential Blue or Red sweep would make deficit expansion more likely (see *Treasuries*). Finally, any market impacts stemming from such fiscal expansion would depend on not just budget deficits but also shifts in the growth outlook. **Given the uncertainties involved, and also given that the modal outcome appears to be divided government, we expect election concerns to not materially influence swap spreads over 2H24.** That said, this certainly bears watching, especially as the political landscape becomes clearer closer to the election.

What about zero-duration spreads? All else equal, this factor points to a widening bias.

A brief summary of our model for zero duration spreads, a factor-level attribution of changes seen in 1H24, and our projected change over 2H24 are all shown in **Figure 6**. As can be seen, a likely increase in term funding premium as well as our outlook for lower short rates by year end both point to a widening in zero-duration spreads by year end. In particular, we see zero-duration spreads going from their current level of ~minus 6bp to ~plus 2bp by year's end.

Figure 6: Zero-duration spreads are likely biased wider in 2H24, mainly because of an anticipated rise in term funding premium

Statistics from regressing* zero duration swap spreads** versus its drivers (units as indicated), YE23, current (6/26/2024, except RRP as of 6/19), and YE24 projected values for drivers of zero duration swap spreads, factor level attribution of change in 1H24 *** , and 2H24 projected value for zero duration spreads

Factor	Regression stats		Values as of:			Factor Impacts	
	Coeff	T-stat	YE23	Current	YE24 (proj.)	1H24	2H24
Term Funding Premium (bp/year)	8.20	39.6	3.7	4.6	5.2	6.8	5.0
RRP (\$tn)	4.14	33.2	1.1	0.8	0.7	-1.5	-0.5
3Mx3M OIS (%)	-3.35	-37.7	4.9	5.1	4.8	-0.9	1.2
Intercept	-27.5	-47.8					
Actual			-14.0	-6.4		7.6	
Fair value			-8.4	-4.0	1.8	4.4	5.8
Model R-sq	73%						
Std. error	2.2						

Source: J.P. Morgan.

* Regression period from Apr 2021 - Jun 2024

** Zero-duration swap spread is defined in Figure 6 of [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#)

*** Factor impact is defined as the change in each driver multiplied by the drivers partial beta from the regression in the previous figure.

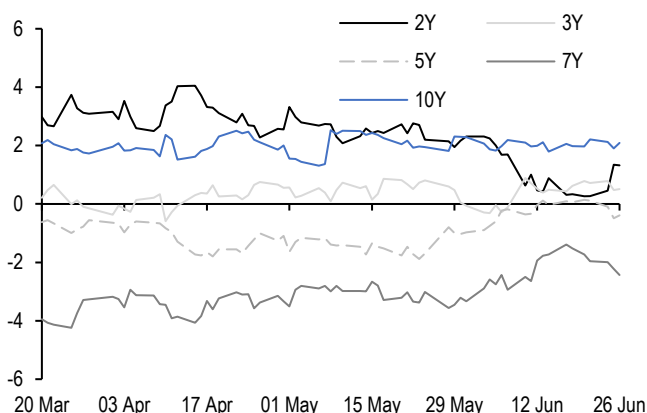
Mechanically, our widening bias on zero-duration spreads implies wider spreads in all sectors of the curve, all else equal. But of course, these impacts must be netted against the impact of rising term funding premium, which pressures swap spreads narrower and spread curves flatter. **The combined effect is likely to be a pronounced widening bias at the front end, more modest widening pressure further out the curve, and a spread curve flattening bias overall.**

Before synthesizing all of this into our swap spread forecasts for YE24, it must be said that there are of course additional sector specific drivers of swap spreads in each sector, as we also noted in our recent note on this topic. While those drivers can all be tactically important,

they are unlikely to drift significantly over the medium term and are thus unlikely to materially alter our spread outlook. Indeed, swap spread deviations from the term structure baseline in the 2- to 10-year maturity sectors have been steadily converging towards zero, and have mostly been noisy in recent months (**Figure 7**). Even in the 20-year sector, they have been mostly stable and mean-reverting around levels cheaper than the baseline would imply, but they experienced a brief episode of richening in late May which has since retraced (**Figure 8**).

Figure 7: Swap spread deviations from the term structure baseline in the 2- to 10-year maturity sectors have been mostly converging towards zero

2Y, 3Y, 5Y, 7Y, and 10Y swap spread deviations* relative to the term structure of swap spreads, 3/20/2024 - 6/26/2024; bp

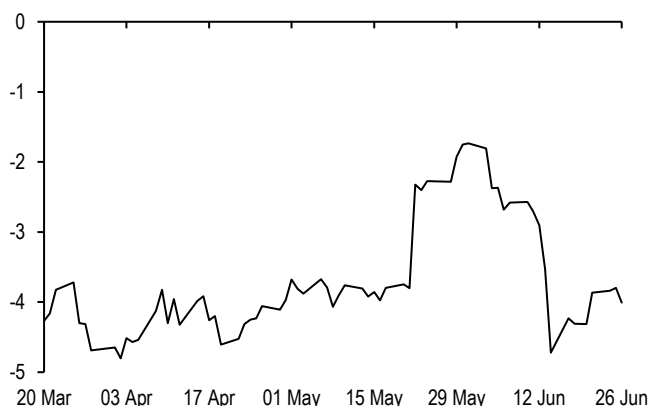


Source: J.P. Morgan.

* For each tenor, a baseline value is calculated as $TFP \times -1 \times \text{modified duration}$, plus zero-duration swap spread, where TFP refers to term funding premium as of that date. Deviation is calculated as actual maturity matched swap spread minus the baseline value for that tenor. For more details, see [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#)

Figure 8: In the 20-year sector, deviations have been mostly stable and mean-reverting around levels cheaper than the baseline would imply, aside from a brief episode of richening in late May which has since retraced

20Y swap spread deviation* relative to the term structure of swap spreads, 3/20/2024 - 6/26/2024; bp



Source: J.P. Morgan.

* For each tenor, a baseline value is calculated as $TFP \times -1 \times \text{modified duration}$, plus zero-duration swap spread, where TFP refers to term funding premium as of that date. Deviation is calculated as actual maturity matched swap spread minus the baseline value for that tenor. For more details, see [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#)

Thus, we really do not see deviations from the term structure becoming significant drivers of spreads in coming months, and instead we simply assume that recent average deviations will continue to persist in coming months. The one exception is the 30-year sector, where swap spread deviations from the term structure baseline have exhibited a systematic correlation to the Fed's balance sheet size - this is likely because the 30-year sector is even more sensitive to the Fed's balance sheet size than is captured through term funding premium. Here, we expect the Fed's balance sheet reduction over 2H24 to contribute modest additional narrowing pressure on 30-year swap spreads. Putting all these together, our swap spread forecasts for year-end are shown in **Figure 9**. As we noted, we expect the widening pressure to be felt mostly in the front end and in the belly of the curve, with 2-year swap spreads ending the year nearly 10bp wider than current levels. We expect the 20-year and 30-year sector to remain mostly flat through year-end, and the spread curve to flatten.

Figure 9: Our forecast for maturity matched swap spreads at various tenors

Current (6/26/2024) maturity matched swap spread and YE24 projection* of maturity matched swap spreads in various sectors; bp

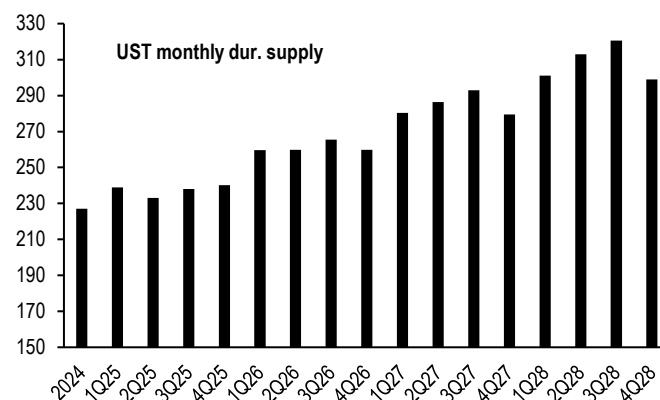
Sector	Current	Proj. (YE24)
2Y	-14	-6
3Y	-18	-12
5Y	-27	-22
7Y	-36	-32
10Y	-40	-37
20Y	-69	-69
30Y	-78	-79

Source: J.P. Morgan.

* Fair value model forecast methodology is detailed in [Term Funding Premium and the Term Structure of SOFR Swap Spreads](#). Projections are calculated using the projections for Term Funding Premium and Zero Duration Spreads as detailed in the above figures and assuming deviation from term structure in each sector is the near-term average

Figure 10: Long term considerations - monthly UST duration supply could increase from its current level of ~230bn 10s to over 300bn 10s in 2028

Monthly UST duration supply, current 2024 levels and quarterly projections through 2028, \$bn of 10Y equivalents



Source: J.P. Morgan.

Lastly, even though the natural horizon for this mid-year outlook piece is the second half of the year, it is worth contemplating the factors that may be at play over an even longer horizon that includes 2025 and beyond, for instance. **Over such a long term horizon, one key factor that will be at play is of course Treasury supply.** As our UST strategists have noted recently (see [Wait till next year](#), J. Barry, 5/24/2024), current auction sizes are likely insufficient to meeting Treasury's financing needs in the future, and coupon auction sizes will likely need to rise beginning in 2H25 and beyond. Should those future auction size projections come to fruition, monthly UST duration supply will likely increase from its current level of ~\$230bn 10s to over \$300bn 10s in 2028 (**Figure 10**). All else equal, this would translate into a term funding premium increase of about 0.65bp/year. In turn, this could narrow 10- and 30-year spreads by 5bp and 11bp, respectively, all else equal. As with the upcoming elections, we see this more as a source of long term risk to spreads rather than as a factor that might play a significant role in 2H24.

Swap Yield Curve

As with yield levels, swap yield curves have traded in fairly wide ranges so far this year despite a Fed that has been on hold. For instance, the 2s/30s and 5s/30s swap curves have traded in 40-50bp ranges this year, while even the 1s/2s curve has traded in a nearly 40bp range (**Figure 11**). These changes of course reflect the policy uncertainty that has characterized the first half - as we noted earlier, markets began the year pricing in expectations of considerable rate cuts this year, but erased nearly all of that until recently, before softer data more recently has helped policy expectations converge around expectations for moderate cuts (3-4 cuts by year end).

Figure 11: Swap yield curves have traded in fairly wide ranges in 1H24 despite a Fed that has been on hold all year

Selected statistics for benchmark swap yield curves, 1/2/2024 - 6/26/2024; bp

curve	start	chg	end	min	mean	median	max	range
1s/2s	-68.6	23.2	-45.4	-68.6	-48.7	-48.8	-31.1	37.5
2s/5s	-55.1	0.2	-55.0	-58.3	-50.6	-51.0	-39.8	18.5
2s/10s	-60.3	-9.9	-70.2	-73.5	-62.1	-64.5	-38.7	34.8
2s/30s	-75.3	-18.9	-94.3	-99.9	-82.9	-88.2	-47.2	52.7
5s/10s	-5.1	-10.0	-15.2	-18.5	-11.5	-13.4	1.1	19.5
5s/30s	-20.2	-19.1	-39.3	-48.8	-32.3	-36.0	-6.5	42.3
10s/30s	-15.0	-9.1	-24.1	-30.4	-20.7	-22.3	-7.5	22.8

Source: J.P. Morgan.

Reassuringly, through it all, our empirical fair value model for various spot and forward swap curves has held up nicely in terms of accounting for moves. As readers may recall, we use a common set of five factors to explain spot and forward swap curves. These are the **level of the short rates** (3Mx3M forward OIS), **Fed expectations** (the 3Mx3M / 15Mx3M OIS curve), **the size of the Fed's balance sheet** (to account for QE / QT), **short term inflation** (2Y inflation swap yield) and **long term inflation expectations** (5Yx5Y inflation swap yield). Because we estimate the model over relatively long history (10-years), we include a control variable to account for the Fed's policy rate guidance, which it has used as a tool in the past. But as we look ahead over the remainder of the year, we make one minor tweak to this fair value model, to account for the observation that yield curves appear to have steeper equilibrium levels when the Fed is on hold, after accounting for all these factors. In other words, the experience of the past nine months since the last hike suggests that the intercept has likely been shifted up in each sector. To incorporate this, we re-estimate our model over ten years of history, but allowing for an intercept shift after November 2023. Details of this model are shown in **Figure 12**.

Figure 12: Our empirical fair value model uses a handful of market factors to explain a variety of different spot and forward yield curves ...

Statistics from regressing* various spot and forward curves against 7 drivers**, model T-stats, R-squared, Standard error, current yield curve level, and current fair value/residual; current value as of 6/26/2024

Curve	Coefficients								T-stats								Model stats		Curve actuals / FV		
	Intercept	Guidance	3Mx3M OIS	Fed Expec. Crv	Fed B/S	5Yx5Y Infl. swap	2Y Infl. swap	Intercept shift	Const	Guidance	3Mx3M OIS	Fed Expec. Crv	Fed B/S	5Yx5Y Infl. swap	2Y Infl. swap	Intercept shift	Rsq	Std. Err.	Cur. Curve	Fair Value	Residual
3M fwd 2s/5s	-1.11	-0.04	-0.29	-0.08	-0.03	0.96	-0.13	0.17	-43.9	-11.4	-84.2	-9.8	-17.7	73.4	-26.3	17.0	0.94	0.10	-0.45	-0.43	-0.02
3M fwd 2s/10s	-1.61	-0.07	-0.51	-0.31	-0.04	1.53	-0.21	0.24	-39.3	-12.8	-91.3	-22.8	-14.0	72.5	-26.1	14.7	0.94	0.17	-0.56	-0.53	-0.03
3M fwd 2s/30s	-1.58	-0.10	-0.73	-0.58	-0.08	1.87	-0.24	0.29	-30.7	-15.5	-104.6	-34.4	-20.5	70.6	-23.7	14.3	0.95	0.21	-0.80	-0.76	-0.03
3M fwd 5s/10s	-0.50	-0.03	-0.22	-0.23	-0.01	0.58	-0.08	0.07	-25.9	-12.2	-83.4	-35.4	-6.6	57.8	-21.1	8.8	0.90	0.08	-0.11	-0.10	0.00
3M fwd 5s/30s	-0.47	-0.06	-0.44	-0.50	-0.04	0.92	-0.11	0.12	-14.2	-15.2	-97.4	-45.5	-18.2	53.2	-16.6	9.2	0.93	0.14	-0.34	-0.33	-0.01
3M fwd 10s/30s	0.03	-0.03	-0.22	-0.28	-0.03	0.34	-0.03	0.05	1.8	-16.6	-100.0	-50.9	-29.2	40.2	-9.0	8.2	0.93	0.07	-0.23	-0.23	-0.01
2Y fwd 2s/5s	-0.45	-0.02	-0.17	-0.24	0.00	0.45	-0.07	0.02	-23.2	-9.9	-64.0	-38.0	1.8	45.8	-18.7	3.2	0.80	0.08	-0.02	-0.01	-0.01
2Y fwd 2s/10s	-0.52	-0.04	-0.28	-0.43	0.00	0.68	-0.10	0.02	-16.3	-10.8	-65.0	-41.5	0.5	41.8	-16.1	1.9	0.80	0.13	0.04	0.04	-0.01
2Y fwd 2s/30s	-0.23	-0.06	-0.42	-0.65	-0.03	0.77	-0.10	0.04	-5.7	-12.9	-78.1	-49.4	-11.7	37.7	-12.1	2.4	0.87	0.16	-0.18	-0.17	-0.01
2Y fwd 5s/10s	-0.07	-0.02	-0.11	-0.19	0.00	0.23	-0.03	0.00	-5.1	-10.8	-59.1	-41.7	-1.2	31.7	-10.7	-0.1	0.75	0.06	0.06	0.06	0.00
2Y fwd 5s/30s	0.22	-0.04	-0.26	-0.41	-0.04	0.32	-0.02	0.01	8.7	-12.9	-75.4	-49.5	-20.0	25.0	-5.0	1.4	0.87	0.10	-0.16	-0.16	0.00
2Y fwd 10s/30s	0.29	-0.02	-0.14	-0.21	-0.04	0.09	0.01	0.01	22.7	-13.3	-82.0	-50.7	-37.7	13.7	2.0	2.9	0.92	0.05	-0.22	-0.22	0.00

Source: J.P. Morgan., Federal Reserve H.4.

* Regression from June 2014 to June 2024

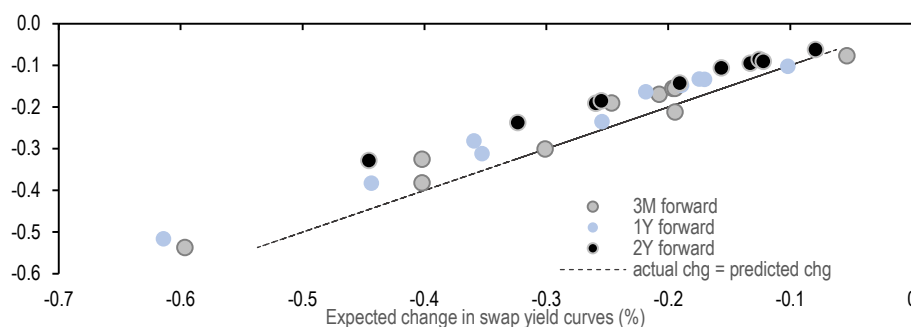
** Underlying drivers are: Forward Guidance (number of years of forward policy commitment by the Fed), 3Mx3M OIS rate (%), Fed expectations curve (15Mx3M - 3Mx3M OIS curve as a proxy), size of the Fed balance sheet (\$tn), 5Yx5Y inflation swap yield (%), 2Y inflation swap yield (%), intercept shift (0s before 11/1/2023, 1s after)

Before looking ahead to 2H24, we first use our fair value model to understand the relative impacts of the various factors so far this year. When one examines the moves in each driver together with the coefficients shown above, it becomes clear that the **bulk of the move in**

swap yield curves is really due to the move in short rates and Fed expectations, and the impact of each of the other factors has been fairly minor in comparison. Moreover, the actual change in curves has been pretty much in line with expected moves that one might calculate given the move in the underlying drivers, as seen in **Figure 13**.

Figure 13: ... and such a model has worked well in 1H24, as indicated by the fact that the actual change in numerous curves has been mostly in line with model expectations

Actual change in swap yield curves (Y-axis) versus expected change in swap yield curves due to underlying drivers* (X-axis) over the period 1/12/2024 - 6/18/2024; %



Source: J.P. Morgan.

* Fair value model drivers are shown in the above Figure, and expected change is calculated as the change in the underlying drivers times the coefficients from our fair value framework

As we look ahead to the remainder of the year, we begin by projecting the likely YE24 levels of the drivers in our empirical yield curve model. Given our economists' Fed funds forecasts, we estimate that 3Mx3M OIS rates would likely trade near ~4.75% by year end, or about 40bp lower from current levels. This in turn is consistent with a minus 100bp value for the 3Mx3M / 15Mx3M curve, based on recent empirical relationships between the two. Using these, as well as our inflation strategists' forecasts for short term and long term inflation swap yields, we arrive at our projections for the various spot and forward yield curves, at a YE24 horizon. This is shown in **Figure 14**, along with the values for these curves as priced into current forwards. From this, we can make several observations. **First**, all these curves are likely to steepen by year end; the 2s/10s and 5s/30s curves, for instance, are likely to end the year 15-20bp steeper than current levels. But of course, this alone is not enough to argue for steepeners, and we must examine how much of this is already priced into current forwards. In this regard, as Figure 14 also shows, for yield curves anchored in the front end much of the anticipated steepening is already priced into current forwards. As can be seen, over 100% of the anticipated steepening in the 2s/5s and 2s/10s swap yield curves is already priced into spot and near-spot yield curve forwards. This means a flattening bias remains attractive in these sectors for now. This is less true for 2Y forward curves and/or yield curves anchored in the back end. For instance, **spot 5s/30s and 10s/30s yield curve steepeners, as well as yield curve steepeners constructed using 2Y forward starting swaps are all likely to be profitable, over the remainder of the year.** But given the relatively moderate nature of anticipated easing, and given how much is priced into forwards, the best yield curve strategies in 2H24 will likely involve less outright directional trades and more valuation-dependent and nuanced trade constructions.

Beyond outright macro curve trades, we expect positive carry trades on the yield curve to be profitable going forward. With the Fed likely to remain on hold for several more months and begin easing only at a moderate pace late this year, the environment should remain favorable for yield curve carry trades. Indeed, **such positive carry yield curve trades have indeed become profitable since the Fed went on hold last year.** One way

to see this is to examine a measure we refer to as the "carry beta". This is calculated by assuming the construction of a cross section of swap curve butterfly trades each day that will be unwound in a month, and calculating the beta between the realized P/L on those trades versus the *ex-ante* carry on those trades. We associate this carry beta with the date on which the hypothetical trades are initiated. As seen in **Figure 15**, carry trades were already profitable during the later stages of the hiking cycle, but have become more so since the last hike in July of last year. We expect this to remain the case in coming months. Thus, **we expect that our yield curve trading strategy in coming months will continue to revolve around positive carry**. But, given the earlier discussion about curve trades needing to be less directional and more nuanced, **we continue to advocate for the construction of well hedged carry trades that mitigate directional risk while enhancing carry-to-risk ratios**. While this sounds repetitive, given the many times in recent months that we have advocated such a theme, it also remains the case that such trades do work, and we view this as the appropriate way to approach yield curve trading in the current regime.

Figure 14: Swap yield curves are likely to steepen in 2H24, but this is fully priced in except for spot and forward curves anchored in the belly and longer tenors

Current and YE24 projected curve levels, projected change in curves*, YE24 forward curve levels, projected YE24 curve level minus YE24 forward curve levels, and % steepening priced into current forwards**, current as of 6/26/2024; %

	Curve	Current	YE24 Proj.	Proj. Chg.	YE24, priced into cur. Fwds.	Proj. YE24 minus fwd	% of steepening priced into cur. Fwds.
Near spot (3M fwd)	2s/5s	-0.45	-0.34	0.11	-0.26	-0.08	173%
	2s/10s	-0.56	-0.38	0.18	-0.28	-0.10	155%
	2s/30s	-0.80	-0.53	0.26	-0.48	-0.05	119%
	5s/10s	-0.11	-0.04	0.07	-0.03	-0.02	124%
	5s/30s	-0.34	-0.19	0.15	-0.23	0.03	77%
	10s/30s	-0.23	-0.15	0.08	-0.20	0.05	40%
2Y forward	2s/5s	-0.02	0.03	0.05	0.02	0.01	90%
	2s/10s	0.04	0.12	0.08	0.10	0.02	75%
	2s/30s	-0.18	-0.04	0.14	-0.14	0.09	34%
	5s/10s	0.06	0.09	0.03	0.07	0.01	50%
	5s/30s	-0.16	-0.07	0.09	-0.16	0.09	3%
	10s/30s	-0.22	-0.16	0.06	-0.23	0.07	-20%

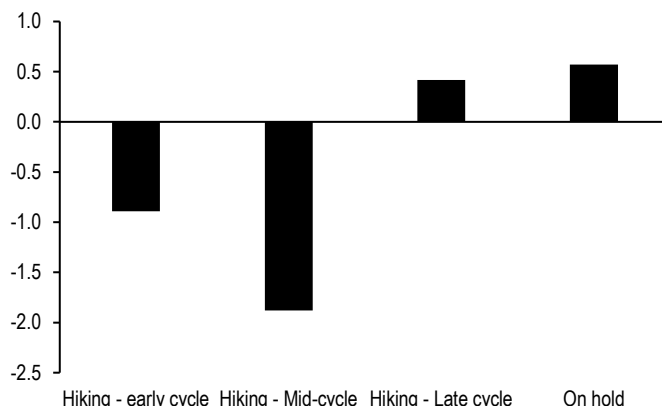
Source: J.P. Morgan.

* Projected change is calculated as the sum of the projected change in each variable times the partial beta of each variable from our Fair Value model

** Calculated as the difference between the forward and the current swap yield curve divided by the projected change

Figure 15: Carry trades were already profitable during the later stages of the hiking cycle, but have become more so since the last hike in September of last year

Average carry beta* over each of the specified periods in the current hiking cycle, 3/1/2022 - 5/20/2024; unit-less



Source: J.P. Morgan.

* Carry beta calculated for each date, between 01/2003 – 05/2024. Beta defined as the regression beta between P/L on 11 different butterflies initiated on that date, and the carry on the trades as of that date. Trades are assumed to be held for 1M. Butterflies included are 2/3/5, 3/5/7, 5/7/10, 10/20/30, 2/5/10, 3/7/10, 5/10/20, 5/10/30, 7/10/20, 7/20/30, and 10/20/30.

Options

As with swap yield curves, implied volatility itself has traded within a wide range year-to-date, ultimately declining across much of the surface. Short expiry and short tail structures have declined the most, with 6Mx2Y implied volatility lower by ~1.2 bp/day while 2Yx30Y implied volatility is higher by ~0.2bp/day (**Figure 16**).

Figure 16: Implied volatility has traded within a wide range year-to-date, ultimately declining across much of the surface

Selected statistics for various SOFR swaption structures, 1/2/2024 - 6/26/2024; bp/day

	Start	Chg	End	Min	Max	Median	Range
6Mx2Y	8.44	-1.24	7.20	6.88	8.50	7.55	1.62
6Mx5Y	7.86	-0.78	7.08	6.66	7.93	7.28	1.27
6Mx10Y	7.01	-0.43	6.58	6.06	7.14	6.58	1.07
6Mx30Y	5.99	-0.10	5.89	5.37	6.28	5.76	0.91
2Yx2Y	7.70	-0.33	7.37	7.04	7.84	7.41	0.81
2Yx5Y	7.15	-0.18	6.97	6.55	7.35	6.98	0.80
2Yx10Y	6.56	-0.03	6.53	6.12	6.89	6.51	0.77
2Yx30Y	5.61	0.24	5.85	5.47	6.15	5.72	0.67

Source: J.P. Morgan.

Looking ahead, **there are reasons to be bearish on gamma in the near term**. After many months of significant policy uncertainty where the future cone of possible policy paths was wide enough to span deep cuts as well as further hikes, softer data is finally helping market expectations to coalesce around moderate cuts by year end (see Figure 2). This is also broadly in line with our own expectations - we look for the Fed to be patient in the near term, waiting for several months of corroboration in the data before eventually easing. **The tightening of implied distributions and the thinning of the tails will likely be helpful in moderating jump risk and delivered volatility in the markets. In other words, 2H24 is shaping up to be favorable for short gamma carry strategies.**

Of course, entry levels matter and we need a suitable model to decide whether entry levels are favorable or not. In addition, we also need a way to assess value across the entire vol surface including longer expiries. We have utilized an empirical fair value framework for implied volatility for this purpose. But we now make minor tweaks to our framework to adapt it slightly for use in a Fed-on-hold environment.

As readers may recall, our fair value framework is a two-step process, where we first start by modeling the percent-yield-vol versus rate relationship assuming the form $yvol = a * \exp(-by) + c$, where y denotes the ATMF yield level and $yvol$ denotes implied percent yield vol. We then estimate the parameters of this model using a cross-sectional fit, using 10-years of historical data on percent-yield vols on ATMF swaptions with several different tails and expiries. We translate our yield vol backbone to a bp vol backbone, which forms the foundation of our empirical fair value model.

We then model the deviations from this fitted curve, since implied volatility is not determined purely by yield levels. To account for the various other influences on volatility, we use a common set of variables (**yield levels, market depth, real rates and monetary policy variables**) to model the deviations for each structure. Details of our original model can be found in our [Interest Rate Derivatives 2024 Outlook](#). But we make a few minor changes here, chiefly so that we can better capture the structural down-shift in equilibrium implied vol levels that can come about when the Fed is on hold. The tweaks to our fair value model are as follows. **One**, we remove the magnitude of Fed expectations as a variable, as it has become less significant. **Two**, we expand the historical window of our regression fit to go back to June 2018, to capture the behavior in the late stages of that hiking cycle. **Three**, as noted above, we recognize that a Fed-on-hold regime can bring different vol equilibrium levels and therefore allow for a shift in the intercept after Nov 2023 (which marked the second meeting where the Fed kept rates unchanged). This is very similar to the tweak we

described earlier to our empirical model for the yield curve. Our updated empirical model for implied vol differentials from the backbone based on these factors is shown in **Figure 17**.

Figure 17: Our empirical model for modeling deviations of normal bp volatility from the fitted backbone

Statistics from regressing* deviations of normal bp volatility from reference** volatility against yields (%), natural log of duration weighted market depth*** (\$mn), 2Y real rates (2Y swap rates minus 2Y inflation swap) (%), Fed balance sheet size (\$tn), and forward guidance (in # of months), current residual (bp/day) as of 6/26/2024

Structure	Coefficients							T-stats							R-squared	Standard Error	Current residual
	Intercept	ATMF	Market depth (log)	2Y real rates	Intercept Shift	Fed B/S	Fwd Guid.	Intercept	ATMF	Market depth (log)	2Y real rates	Intercept Shift	Fed B/S	Fwd Guid.			
6Mx2Y	-1.17	-0.61	-2.45	0.21	-0.50	0.12	-0.05	-7.2	-11.1	-49.4	7.1	-7.6	7.2	-15.0	86%	0.7	-0.2
6Mx5Y	-2.00	-0.20	-1.76	0.08	-0.44	0.17	-0.02	-20.4	-5.9	-59.2	5.4	-10.8	16.5	-10.7	92%	0.4	0.0
6Mx10Y	-2.39	-0.14	-1.24	0.04	-0.37	0.21	0.00	-28.6	-5.1	-47.4	3.3	-10.3	24.1	0.3	90%	0.4	0.1
6Mx30Y	-1.96	-0.42	-0.77	0.07	-0.10	0.26	0.01	-19.6	-12.7	-25.5	5.1	-2.6	26.2	4.6	83%	0.4	0.2
1Yx2Y	-1.55	-0.33	-2.00	0.18	-0.37	0.17	-0.04	-12.2	-8.3	-53.5	9.5	-7.3	13.8	-16.1	91%	0.5	-0.2
1Yx5Y	-2.23	-0.02	-1.46	0.06	-0.41	0.18	-0.01	-26.4	-0.8	-56.6	4.6	-11.3	21.0	-9.5	93%	0.4	0.0
1Yx10Y	-2.30	-0.08	-1.01	0.04	-0.27	0.21	0.00	-32.1	-3.5	-44.6	4.3	-8.6	27.9	-0.7	91%	0.3	0.1
1Yx30Y	-1.85	-0.38	-0.59	0.08	0.00	0.25	0.00	-22.2	-14.0	-23.4	7.1	0.1	30.8	3.2	85%	0.3	0.2
2Yx2Y	-1.67	-0.07	-1.45	0.09	-0.50	0.19	-0.03	-17.4	-2.4	-50.0	6.7	-12.4	19.7	-17.1	92%	0.4	0.0
2Yx5Y	-2.15	0.11	-1.18	0.00	-0.44	0.16	-0.01	-30.3	4.6	-51.1	0.4	-13.9	21.3	-10.7	92%	0.3	0.1
2Yx10Y	-1.94	-0.07	-0.80	0.02	-0.21	0.18	0.00	-32.7	-3.8	-41.3	2.6	-8.0	28.1	-4.8	90%	0.3	0.2
2Yx30Y	-1.50	-0.38	-0.42	0.07	0.11	0.22	0.00	-21.4	-16.9	-19.6	7.4	3.8	31.4	-1.0	84%	0.3	0.2
10Yx2Y	-0.43	-0.31	-0.30	-0.03	0.04	0.05	-0.01	-12.0	-26.8	-25.2	-6.5	2.5	13.2	-23.8	80%	0.2	0.3
10Yx5Y	-0.26	-0.38	-0.24	-0.03	0.00	0.04	-0.01	-7.7	-34.6	-21.5	-6.7	0.2	10.3	-21.7	81%	0.1	0.3
10Yx10Y	-0.22	-0.48	-0.19	0.00	0.08	0.05	-0.01	-7.0	-46.5	-19.0	0.2	5.8	13.6	-16.6	86%	0.1	0.3
10Yx30Y	-0.60	-0.52	-0.04	0.07	0.32	0.07	0.00	-14.7	-40.8	-3.4	14.9	20.7	20.4	-2.9	81%	0.2	0.4

Source: J.P. Morgan., BrokerTec, Federal Reserve H.4.

* Regression from June 2018 - June 2024, excluding March - June 2020

** Reference volatility calculated as yield vol times yields divided by square root of 251. Yield vol is modeled as 24.6 plus 124.9 times exponential of minus 1.1 times yields. The fit is done over 10 years using 3M, 6M, 9M, 1Y, 2Y, 3Y, 5Y, 10Y expiry and 2Y, 3Y, 5Y, 7Y, 10Y and 30Y tails.

*** 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.

Armed with this adapted empirical fair value framework, we can turn to projecting our outlook for implieds across the vol surface. But first we need to project the drivers themselves. We project the ATMF yields in each sector by leveraging empirical relationships between those ATMF yield levels and Treasury rates, and applying that to our UST strategists' rate forecasts. In a similar vein, we additionally use our inflation strategists' forecasts to project real yields in coming months. **These forecasts call for roughly unchanged nominal yield levels and slightly higher real yields in coming months.** In addition, we assume that the Fed balance sheet will continue to decline throughout 2024, as we noted earlier.

Finally, we also assume residuals will converge by year end, although the fact that current residuals are small means this impact is relatively minor. All in all, **we expect implieds to decline rather modestly from current levels by YE24 (Exhibit 18).** For instance, we look for 6Mx10Y swaption implied volatility to end the year near 6.4 bp/day which is 0.2 bp/day lower, and 2Yx10Y swaption implied volatility to end the year near 6.4 bp/day, which is modestly lower from current levels. We also look for the expiry curve (defined as 1Yx1Y minus 10Yx1Y implied vol differential) and the tail curve (defined as the 1Yx1Y minus 1Yx10Y implied vol differential) to go towards 1.5bp/day and 0.9bp/day respectively (versus current levels of 1.6bp/day and 1bp/day). These are all modest changes, meaning that much like with the swap yield curve, **simple directional long or short vol trades are unlikely to be the best risk-reward trades in the options market in 2H24. Rather, 2-sided trading strategies that actively rely on notions of fair value are likely to prove to be important in the months ahead.**

Figure 18: The outlook for implied volatility in 2H24 is one of stability

Current swaption implied volatility and YE24 projected fair value* of implied volatilities for various swaption structures, current as of 6/26; bp/day

	6M expy		1Y expy		2Y expy		10Y expy	
	YE-2024		YE-2024		YE-2024		YE-2024	
Tail	Actual	FV	Actual	FV	Actual	FV	Actual	FV
2Y	7.2	7.1	7.5	7.5	7.4	7.3	5.8	5.7
5Y	7.1	6.9	7.1	7.0	7.0	6.8	5.6	5.4
10Y	6.6	6.4	6.6	6.5	6.5	6.4	5.3	5.1
30Y	5.9	5.6	5.9	5.7	5.8	5.6	4.8	4.5

Source: J.P. Morgan.

* Projected fair value is calculated using the fair value framework from the previous exhibit and by projecting ATM/ATM yields using 2Y, 5Y, 10Y, and 30Y USTs and our UST Strategists projections, assuming market depth improves modestly, 2Y real rates increase in line with our inflation strategists projections, and that the Fed balance sheet declines to \$6.9tn. 100% residual convergence is assumed in the projection for YE24.

Trading Principal Component Volatility

As we noted earlier, **we think the backdrop is broadly supportive for short gamma carry strategies, but the fact that implieds are both close-to-fair and likely to be stable means that more nuanced volatility trading strategies are called for.** Simply maintaining an outright short gamma bias is likely to produce positive returns on average in our view, but may not be attractive relative to risk, given the lack of a compelling downward bias in implieds.

One way to enhance performance in such an environment is to fine-tune fair value assessments and actively manage volatility positions from the long as well as short side, based on deviations from fair value. Other approaches involve trading volatility of one tail versus another (e.g., 6Mx2Y volatility versus 6Mx10Y) or even broader implied volatility differentials by taking fair-value views on those spreads. Indeed, in our research publications, we routinely strive to find trades of all of these types, as and when opportunities present themselves.

But it is worth asking - is there yet another way that hasn't yet been fully explored?

In this section, **we open the door to an entirely new class of relative value trades, that is based on a decomposition of volatility in any given forward rate into portions that stem from the volatility of each principal component driving rate moves.**

Principal component analysis is widely understood and used in financial markets. For instance, it is common to express changes in yield levels across different tenors as the sum of (i) changes stemming from moves in a "level" factor or the first principal component, (ii) additional changes stemming from a "curve" factor or the second principal component, and (iii) so on. This is illustrated in **Figure 19**. The benefit of such a decomposition is that moves in each factor are designed to be uncorrelated to moves in other factors. PCA can be very useful in understanding the relative movements of highly correlated market variables, in constructing hedge ratios, and more. It is of course widely used for all of these purposes. Also, while PCA is typically computed using historical data, which makes it backward looking, **we have described a way to calculate forward-looking or implied principal components** by using data from the options market and the yield curve spread options market (see [i-PCA: Implied Principal Component Analysis](#)).

component. More generally, **by combining volatility positions on different tails using carefully constructed hedge ratios, we can isolate long or short exposure to the volatility of any desired principal component.**

There is one more technical detail to mention here. As one can guess from the above discussion, the calculation of the appropriate hedge ratio to isolate exposure to the volatility of principal components will depend on the estimation of the principal components and their loadings on each tenor. But how should one estimate the principal components? Should one use implied PCA or historical PCA estimates, in which case there is the follow-on question of how much history to use. In our analysis, **we use implied principal components.** By choosing this, **we are effectively constructing trades at entry levels that may be thought of as representing implied principal component volatility, with the P/L on such trades ultimately depending on what the realized principal component volatility is in the future.**

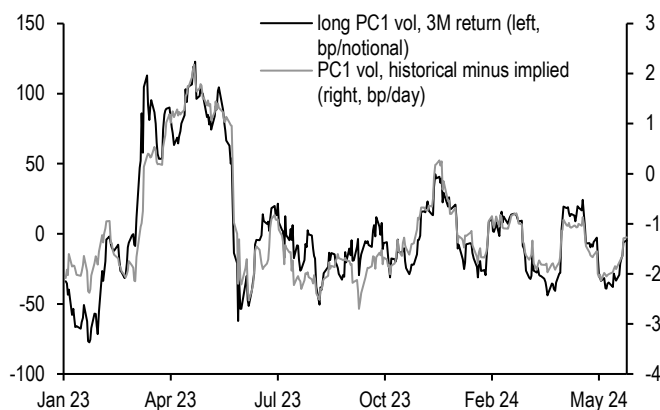
Does this work? In other words, are the returns from such a strategy in fact correlated to *ex-post* realized factor volatility minus the *ex-ante* implied factor volatility? **Figure 20** demonstrates that this is indeed the case. **Rolling 3M returns on such a strategy** that used 6Mx5Y and 6Mx30Y swaption volatility to isolate long exposure to volatility of the first principal component **has indeed closely tracked the differential between realized PC1 volatility and implied PC1 volatility at inception.**

But why might an investor want to do this? Ultimately, the hope in trading unbundled components of volatility is that there is an edge to be had in buying / selling principal component volatility *vis a vis* outright straddles. There is some evidence that this is in fact the case. **Figure 21** shows statistics regarding rolling 3M returns from 5 different delta hedged short volatility strategies over the past three years - (i) selling PC1 volatility using 6Mx5Y and 6Mx30Y as the two legs, (ii) selling PC2 volatility using the same two legs, (iii) selling 6Mx5Y straddles, (iv) selling 6Mx10Y swaption straddles, and (v) selling 6Mx30Y swaption straddles. All returns have been scaled by their respective standard deviations, so as to make them directly comparable across strategies. As can be seen, selling component vol can be a worthwhile endeavor. For instance, **a strategy of selling PC2 volatility over the past three years has produced rolling quarterly returns that are (a) better on average, (b) have a smaller 10th percentile loss, and (c) have a better 90th percentile profit.** This suggests that there may be a systematic edge to be had in focusing on the volatility of principal components, as one more avenue to generate outperformance in the options markets.

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Figure 20: Returns from a strategy designed to isolate long exposure to PC1 volatility are indeed explained by the differential between ex-post PC1 realized volatility and the ex ante implied PC1 volatility

Rolling 3M returns from a long PC1 volatility position constructed using 6Mx5Y and 6Mx30Y swaption straddles* (left, bp/notional), versus the difference between historical and ex-ante implied PC1 volatility (right, bp/day)



Source: J.P. Morgan.

* Weights on 6Mx5Y and 6Mx30Y straddles are chosen to isolate exposure to PC1 while hedging exposure to PC2.

Figure 21: Selling principal component volatility can be a worthwhile endeavor, as return characteristics suggest

Selected statistics* regarding rolling 3M returns from 5 different delta hedged short volatility strategies**, 6/15/2021 - 6/14/2024; bp/notional

		Normalized 3M rolling return stats from selling:				
		PC1 vol	PC2 vol	6Mx5Y	6Mx10Y	6Mx30Y
Normalized Stats	Min	-3.3	-3.5	-3.3	-3.1	-3.0
	10th %ile	-1.9	-0.9	-1.8	-1.9	-1.7
	Median	-0.3	0.2	-0.3	-0.4	-0.3
	Average	-0.5	0.2	-0.5	-0.5	-0.3
	90th %ile	0.6	1.4	0.6	0.8	0.9
	Max	1.5	3.1	1.6	1.8	2.3
	Std. dev	1	1	1	1	1
Std. dev		50	57	51	79	152

Source: J.P. Morgan.

* Values shown have been normalized by dividing by each strategy's rolling returns by its standard deviation over the past three years, so as to facilitate comparison across strategies. The standard deviation is shown separately for completeness

** Strategies designed to isolate exposure to PC1 and PC2 volatility use 6Mx5Y and 6Mx30Y swaption straddles as the two legs. All strategies assume daily delta hedging and monthly rolling of the options.

Trading Recommendations

- **Stay short 6Mx10Y swaption straddles on a delta hedged basis, paired with a short position in Greens**
P/L on this trade is currently 1.4bp. For original trade write up, see Fixed Income Markets Weekly 2024-06-14.
- **Continue to receive in 3Mx3Y and 3Mx5Y swaps versus paying in 3Yx1Y and 12Mx3M swaps**
P/L on this trade is currently -0.8bp. For original trade write up, see Fixed Income Markets Weekly 2024-06-14.
- **Continue to pay in Feb 2037 maturity matched swap spreads versus receiving in USU4 invoice spreads**
P/L on this trade is currently -0.2bp. For original trade write up, see Fixed Income Markets Weekly 2024-06-14.
- **Stay long Feb 37s versus selling USU4 Futures**
P/L on this trade is currently 2.9bp. For original trade write up, see Fixed Income Markets Weekly 2024-06-14.
- **Maintain 3M forward 10s/30s steepeners (1:1.5 risk weighted) paired with M5/Z5 3M SOFR futures flatteners**
P/L on this trade is currently -5.8bp. For original trade write up, see Fixed Income Markets Weekly 2024-06-07.
- **Maintain TU/TY invoice spread curve flatteners (1:0.35 weighted)**
P/L on this trade is currently -4.4bp. For original trade write up, see Fixed Income Markets Weekly 2024-06-07.
- **Continue to Pay-fixed in 4.625% Feb '26 maturity matched swap spreads**
P/L on this trade is currently -3.2bp. For original trade write up, see Fixed Income Markets Weekly 2024-05-31.
- **Maintain 1:0.75 risk weighted 7s/10s maturity matched swap spread curve steepeners**
P/L on this trade is currently -0.8bp. For original trade write up, see Fixed Income Markets Weekly 2024-05-31.
- **Continue to Pay-fixed in 4.375% Aug '28 maturity matched swap spreads**
P/L on this trade is currently -1.5bp. For original trade write up, see Fixed Income Markets Weekly 2024-05-31.
- **Continue to pay-fixed in 4% Feb 2034 maturity matched swap spreads**
P/L on this trade is currently -3.2bp. For original trade write up, see Fixed Income Markets Weekly 2024-05-17.
- **Maintain 15Mx3M / 1Yx1Y forward swap curve flatteners, paired with 20% of the risk in a long in 18Mx3M and a 24% risk weighted short in 3Mx5Y forward swaps**
P/L on this trade is currently -2.1bp. For original trade write up, see Fixed Income Markets Weekly 2024-05-03.
- **Maintain 5s/30s spread curve flatteners**
P/L on this trade is currently -0.2bp. For original trade write up, see Fixed Income Markets Weekly 2024-05-03.
- **Continue to overweight 1Yx10Y straddles versus a gamma-neutral amount of 1Yx15Y straddles**
P/L on this trade is currently -1.1bp. For original trade write up, see Fixed Income Mar-

kets Weekly 2024-05-03.

- **Maintain 3M forward 10s/15s swap curve steepeners paired with 25% risk in 3M forward 3s/7s flatteners**
P/L on this trade is currently 1.3bp. For original trade write up, see Fixed Income Markets Weekly 2024-04-26.
- **Continue to pay in 1.875% Feb 2027 maturity matched swap spreads**
P/L on this trade is currently -4.7bp. For original trade write up, see Fixed Income Markets Weekly 2024-04-26.
- **Stay long A+100 1Yx5Y payer swaptions versus selling A-100 1Yx5Y receiver swaptions, delta-hedged daily, to position for a correction in skew**
P/L on this trade is currently -3.7abp. For original trade write up, see Fixed Income Markets Weekly 2024-04-19.
- **Maintain long 65% risk weighted 1Yx10Y swaption volatility versus selling 1Y forward 2Yx10Y swaption volatility, synthetically constructed via suitably weighted 1Yx10Y and 3Yx10Y swaptions**
P/L on this trade is currently -3abp. For original trade write up, see Fixed Income Markets Weekly 2024-04-12.
- **Continue to overweight 6Mx5Y and 6Mx30Y swaption volatility (vega weights of 0.32 and 0.76, respectively) versus selling 6Mx10Y swaption volatility**
P/L on this trade is currently -3.9abp. For original trade write up, see Fixed Income Markets Weekly 2024-04-05.
- **Maintain 7s/10s swap spread curve steepeners paired with 25% risk in a 7s/10s UST curve steepener**
P/L on this trade is currently -0.2bp. For original trade write up, see Fixed Income Markets Weekly 2024-03-22.
- **Maintain conditional exposure to a steeper 10s/20s swap yield curve in a selloff using 9M expiry payer swaptions**
P/L on this trade is currently 1.1bp. For original trade write up, see Fixed Income Markets Weekly 2024-03-15.
- **Stay long 1Yx30Y volatility versus 1Y forward 1Yx30Y volatility, synthetically constructed via suitably weighted 2Yx30Y and 1Yx30Y swaptions**
P/L on this trade is currently -2.8abp. For original trade write up, see Fixed Income Markets Weekly 2024-03-15.
- **Maintain 5s/10s off-the-run swap spread curve steepeners (100:60 weighted)**
P/L on this trade is currently -1.8bp. For original trade write up, see Fixed Income Markets Weekly 2024-03-08.
- **Maintain shorts in 3Yx30Y straddles with less frequent delta hedging**
P/L on this trade is currently -4.5abp. For original trade write up, see Fixed Income Markets Weekly 2024-03-08.
- **Maintain Z5/U6 SOFR futures flatteners paired with H6/Z6 SOFR futures steepeners (0.85:1 risk weighted)**
P/L on this trade is currently 0bp. For original trade write up, see Fixed Income Markets Weekly 2024-03-01.

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

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North America Fixed Income
Strategy
Interest Rate Derivatives
28 June 2024

J.P.Morgan

Note: trades reflect Wednesday COB levels

Trade	Entry	Exit	P/L
Spreads and basis			
4s/5s swap spread curve flatteners	6/2/2023	7/14/2023	4.0
Initiate 0.45:1 risk weighted 2s/3s swap spread curve flatteners paired with a 20% beta-weighted M5/M6 SOFR futures steepener	5/19/2023	7/28/2023	(8.2)
10Y spread widener	7/14/2023	7/28/2023	0.7
2Y spread widener	6/2/2023	8/18/2023	1.6
10Y spread narrower	7/28/2023	8/18/2023	1.1
10Y spread narrower	8/25/2023	9/8/2023	1.6
3Y spread widener	8/18/2023	9/22/2023	(0.2)
FV invoice spread wideners by buying FVZ3 and paying fixed in a forward starting swap	9/8/2023	9/29/2023	(2.2)
Initiate 10s/30s swap spread curve flatteners	9/15/2023	10/13/2023	0.3
2Y spread narrowers	10/13/2023	10/27/2023	1.2
5s/10s swap spread curve flatteners, paired with a 10% risk-weighted 5s/10s Treasury curve flattener	10/13/2023	12/8/2023	1.2
FV/UXY invoice spread curve flatteners, paired with a 10% risk-weighted FV/UXY Treasury futures curve flattener	10/13/2023	12/8/2023	1.7
Initiate swap spread narrowers in the 2Y sector	11/3/2023	12/8/2023	3.9
Initiate swap spread wideners in the 5Y sector	11/3/2023	12/8/2023	(3.2)
Initiate 20s/30s swap spread curve flatteners hedged with a 35% risk-weighted 20s/30s Treasury curve flattener	9/29/2023	1/5/2024	0.2
Initiate 3s/5s swap spread curve flatteners	12/8/2023	1/5/2024	0.9
Initiate swap spread wideners in the 5Y sector	1/5/2024	1/19/2024	4.2
Pay in 1.375% Nov '31 maturity matched swap spreads paired with 5% risk in 5s/10s OTR Treasury curve steepeners	1/10/2024	1/26/2024	2.4
Initiate 5s/30s swap spread curve flatteners	12/15/2023	2/2/2024	3.8
Initiate swap spread narrowers in the 30Y sector	1/5/2024	2/2/2024	0.2
Maintain a widening bias on swap spreads in the belly but switch to the 2.625% Feb 2029 issue	1/19/2024	2/23/2024	2.4
Maintain a widening bias on swap spreads in the belly using the 2.625% Feb 2029 issue, but hedge the narrowing risk from higher implied volatility with a long in 2Yx2Y swaption straddles	1/19/2024	2/23/2024	2.7
Initiate 2s/5s (100:60 weighted) maturity matched swap spread curve steepeners	1/26/2024	2/23/2024	(3.3)
Pay-fixed in 2.125% May '26 maturity matched swap spreads	3/15/2024	3/22/2024	3.6
Pay-fixed in 1.875% Jul '26 maturity matched swap spreads	3/22/2024	4/5/2024	3.4
Initiate 20s/30s 1.33:1 wtd maturity matched spread curve steepeners hedged with a 30% risk weighted 20s/30s steepener, but use an equi-notional blend of the Nov 53s and Aug 53s to create a synthetic approximate par bond in the 30Y leg	2/23/2024	4/12/2024	(2.5)
Initiate 30Y swap spread wideners	3/15/2024	4/12/2024	(0.1)
Pay in 4% Jan '27 maturity matched swap spreads	4/5/2024	4/26/2024	2.2
Initiate 10Y swap spread wideners using the Nov '33 issue	3/8/2024	5/17/2024	0.9
Initiate exposure to a steeper 7s/10s 1:0.75 weighted swap spread curve, and we recommend implementing the 7Y narrower leg with TYM4 invoice spreads	5/10/2024	5/28/2024	0.3
Initiate 1:0.9 risk weighted 20s/30s maturity matched swap spread curve steepeners	5/31/2024	6/14/2024	3.9

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North America Fixed Income
Strategy

28 June 2024

J.P.Morgan

Duration and curve	Entry	Exit	P/L
Initiate 6M forward 10s/30s flatteners, paired with 25% long in 6Mx2Y	05/12/23	07/07/23	1.5
Position for a cheaper 47.55 weighted 7s/10s/20s swap butterfly in a selfoff	05/19/23	07/07/23	2.6
Initiate conditional 10s/30s flattener in a selfoff constructed with 3M expiry payer swaptions, financed by selling 17% of the forward DV01 risk in 3Mx2Y payer swaptions to make the package premium neutral	06/02/23	07/07/23	5.7
Conditional ratcheting of the belly of a 1s/5s/20s swap butterfly in a rally using 6M expiry receiver swaptions	01/20/23	07/14/23	0.1
Initiate 2Y forward 5s/30s steepeners hedged with a 15% weighted long in U3 3M SOFR futures and a 35% weighted short in U4 3M SOFR futures	07/07/23	07/14/23	12.2
Initiate 10s/15s swap curve flatteners hedged with a 15% risk-weighted long in the 7Y sector	06/09/23	08/04/23	(6.8)
Initiate UKY / US treasury futures curve flatteners hedged with a 15% risk-weighted long in the 7Y sector	06/09/23	08/04/23	(28.0)
2Yx1Y / 3Mx15Y flattener, plus 58% long in 2Yx1Y and 8% short in 6MxM	07/14/23	08/18/23	(26.3)
Initiate 6M fwd 1s/20s flatteners paired with 20% risk weighted longs in 3Mx6M and 65% risk-weighted long in Reds	07/28/23	08/18/23	(35.7)
Initiate conditional exposure to a flatter 1s/10s swap yield curve in a selfoff using 3M expiry receiver swaptions	07/28/23	08/18/23	(6.2)
Initiate 3M forward 2s/7s swap curve flatteners hedged with a 35% risk weighted long in the 1Yx1Y sector	08/04/23	08/18/23	(13.9)
Initiate 3M forward 3s/5s flattener hedged with a 15% risk weighted long in the 5s 3M SOFR futures contract	08/04/23	08/18/23	(7.7)
Initiate 2Y forward 1s/10s swap curve steepeners paired with equal risk in a 3M forward 3s/15s swap curve flattener	08/18/23	08/25/23	4.7
Sell the belly of the UKH5U5 3M SOFR futures butterfly (-0.43:1-0.64 risk weighted)	09/08/23	09/22/23	2.3
Initiate 3M forward 2s/10s swap curve steepeners paired with 110% of the risk in Reds/Greens flatteners	09/15/23	09/22/23	4.9
Initiate 3Y forward 2s/10s swap curve steepeners, paired with 1Y forward 1s/5s swap curve flatteners (33% risk weighted)	09/22/23	09/29/23	5.0
Initiate 2Y forward 2s/30s swap curve steepeners paired with equal risk in a 3M forward 2s/30s swap curve flattener	08/25/23	10/20/23	(32.1)
Initiate 3Y forward 3s/30s swap curve steepeners paired with 63% risk in a 3M forward 5s/30s swap curve flattener	09/08/23	10/20/23	(18.3)
Initiate M4Z4 SOFR futures curve steepeners paired with 55% of the risk in H4Z5 3M SOFR futures curve flatteners	09/22/23	10/20/23	(9.8)
Initiate conditional exposure to a flatter 2s/10s swap yield curve in a rally using 6M expiry receiver swaptions	09/29/23	11/03/23	(9.2)
Initiate 3M fwd 5s/10s swap curve flatteners paired with 2Y fwd 5s/10s swap curve steepeners (50:100 risk weighted)	10/27/23	11/03/23	4.6
Initiate conditional exposure to a flatter 5s/10s swap yield curve in a rally using 3M expiry receiver swaptions	10/27/23	11/03/23	0.8
Initiate 2Y fwd 2s/5s swap curve flatteners paired with 25% risk in a 1st5th SOFR futures curve flattener	11/03/23	11/22/23	5.8
Initiate 6M fwd 5s/15s swap curve flatteners paired with equal risk in 3Y fwd 2s/15s steepeners	11/03/23	11/22/23	4.6
Buy the belly of a 40:65 weighted 2s/25/25 3M SOFR futures butterfly	11/03/23	11/22/23	5.8
Initiate 9M fwd 1s/10s flatteners paired with a 50% risk weighted long in March 2025 3M SOFR futures	11/09/23	11/22/23	15.8
Initiate 3Mx1Y / Greens weighted flattener (10.8 weighted) paired with 80% risk in a 3M forward 2s/10s swap curve steepener	01/05/24	01/26/24	2.9
Initiate USM6 SOFR futures curve flatteners paired with 110% of the risk in Z5U6 3M SOFR futures curve steepeners	12/15/23	02/02/24	1.6
Buy the belly of a 35:65 weighted H5H6Z5 3M SOFR futures butterfly	12/15/23	02/02/24	1.9
Initiate 1Yx2Y / 3Mx20Y swap yield curve steepeners paired with 65% risk in a Reds / 10Yx5Y swap yield curve flattener	01/19/24	02/02/24	1.1
Receive fixed in the belly of a 6M forward 2s/7s/30s swap butterfly (40.69 weighted)	01/19/24	02/02/24	0.1
Initiate conditional exposure to a composite flattener in a selfoff by buying 3Mx2Y payer swaptions (100% risk) versus selling 3Mx5Y and 3Mx30Y payer swaptions (24% and 100% risk respectively)	02/02/24	02/23/24	14.3
Buy H5 and Z5 3M SOFR futures contracts (30:100 weighted) versus selling U4 3M SOFR futures contracts (100% risk weight) and pay-fixed in 6M forward 10Y swaps (60% risk weight)	02/09/24	02/23/24	5.8
Initiate exposure to rising term premium by selling the belly of a 35:65 weighted 3M forward 5s/10s/15s butterfly	12/08/23	03/08/24	(1.5)
Initiate SFRM5 / Blues flatteners paired with a 110% risk weighted 3M forward 2s/10s steepener	03/01/24	03/22/24	3.3
Initiate 3M forward 3s/20s swap curve steepeners, paired with 65% of the risk in a SFRM5 / 3Mx10Y curve flattener	03/06/24	04/05/24	3.2
Initiate 2Y forward 2s/5s swap curve steepeners paired with 40% risk in 3M forward 2s/5s flatteners	01/26/24	04/12/24	(11.4)
Initiate conditional exposure to a flatter 2s/5s swap yield curve in a selfoff using 3M expiry payer swaptions	03/22/24	04/12/24	5.2
Initiate conditional exposure to a flatter 18MxY swap yield curve in a selfoff using 6M expiry payer swaptions	04/05/24	04/12/24	3.1
Initiate conditional exposure to a flatter 1s/5s swap yield curve in a selfoff using 3M expiry payer swaptions	02/23/24	04/26/24	(9.4)
Initiate 1Y forward 2s/5s swap curve flatteners, paired with weighted longs in H5 and H6 3M SOFR futures (20% and 10% respectively)	03/22/24	04/26/24	(9.5)
Initiate SFRM5 / 3Mx2Y flattener, hedged with a 20% risk weighted long in Reds	04/05/24	04/26/24	(5.0)
Initiate 5h0h SOFR futures curve flatteners hedged with a risk weighted amount 2Y forward 2s/5s swap curve steepeners	04/12/24	05/03/24	3.0
Receive in the belly of a 0.625x1.00:375 weighted 3M forward 2s/7s/20s swap butterfly, with an additional 15% risk weighted long in June 2024 3M SOFR futures	02/23/24	05/17/24	2.7
Initiate 3M forward 2s/3s swap curve flatteners hedged with a 14% risk weighted long in the M4 3M SOFR futures	02/23/24	05/17/24	0.4
Initiate 3M forward 5s/15s swap curve flatteners paired with 70% risk in a 2Y forward 2s/20s swap curve steepener	03/22/24	05/17/24	2.8
Buy the belly of a 2s/5s/15s weighted swap butterfly (50:50 weighted)	04/12/24	05/17/24	2.4
Initiate 3M forward 1s/3s swap curve flatteners, hedged with a 65% risk weighted long in the 3Mx3M sector and a 25% risk weighted short in the 15Mx3M sector	05/03/24	05/17/24	2.1
Buy the belly of a USM6H7 SOFR Futures butterfly (-0.37:1-0.63 risk weighted)	03/01/24	05/31/24	(0.7)
Initiate a Greens/Blues steepener paired with 55% of the risk in a SFRM5 / 3Mx5Y swap curve flattener	03/15/24	05/31/24	2.2
Buy the belly of a Z5U6H7 3M SOFR futures butterfly (-0.33:1.0-0.67 risk weighted)	04/19/24	05/31/24	1.8
Initiate 12Mx3M / 3Mx10Y flatteners, paired with 33% risk in a 3Mx2Y receive fixed swap	05/17/24	06/06/24	5.7
Initiate 3M fwd 3s/15s flatteners paired with 85% risk in 2Y fwd 3s/30s steepeners	05/17/24	06/06/24	4.5
Initiate 3Mx1Y / 2Yx1Y forward swap curve flatteners as a bullish proxy	05/31/24	06/06/24	11.5
Initiate 3Mx1Y / 2Yx1Y swap curve flatteners paired with 45% risk-weighted pay-fixed positions in 3Mx5Y swaps	05/31/24	06/06/24	0.0
Initiate conditional exposure to a flatter 1s/2s swap yield curve in a rally using 1Y expiry receiver swaptions	04/05/24	06/14/24	4.0

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**North America Fixed Income
Strategy**
Interest Rate Derivatives
28 June 2024

J.P.Morgan

Options	Entry	Exit	P/L
Buy 6Mx5Y swaption straddles, versus weighted longs in S&P futures	06/09/23	07/07/23	12.8
Sell 1Yx10Y 50bp OTM receiver swaptions versus buying 50bp OTM payer swaptions	04/21/23	07/07/23	1.1
Buy 6Mx30Y swaption straddles versus selling a vega-neutral amount of 1Yx30Y swaption straddles	06/02/23	08/04/23	(2.7)
Overweight 6Mx10Y swaption straddles versus vega-neutral amount of 1Yx10Y swaption straddles	07/07/23	08/04/23	1.0
Sell 5Yx10Y straddles vs 9Mx30Y straddles	07/14/23	08/04/23	5.9
Overweight volatility in 5Y tails versus 15Y tails using 9M expiry swaptions	07/28/23	08/18/23	(7.9)
Sell volatility on 5-year tails paired with a pay-fixed swap overlay	08/18/23	08/25/23	6.2
Sell 6Mx30Y swaption straddles versus buying 6Mx10Y and selling 6Mx2Y straddles on a suitably weighted and delta hedged basis	08/04/23	09/08/23	0.0
Sell 9M expiry single-look YCSO straddles on the 5s/30s curve, versus buying 35% vega-weighted amount of 9Mx2Y swaption straddles	06/02/23	09/08/23	2.3
Sell volatility on 30-year tails paired with a pay-fixed swap overlay	08/25/23	09/15/23	8.6
Sell 2Yx5Y swaption straddles versus buying 10Yx10Y swaption straddles	08/25/23	09/15/23	5.3
Buy 10Yx10Y straddles	03/17/23	09/22/23	1.9
Sell 2Yx2Y swaption straddles versus buying a vega-neutral amount of 1Yx10Y swaption straddles	08/25/23	09/29/23	3.4
Buy 1Yx10Y straddles versus selling 140% of the vega risk in 1Yx5Y straddles and buying 50% of the risk in 1Yx2Y swaption straddles	08/25/23	10/13/23	3.2
Sell 2Yx30Y swaption straddles versus buying a vega-neutral amount of 10Yx10Y swaption straddles	09/08/23	10/13/23	(4.5)
Sell 2Yx2Y swaption straddles versus buying a vega-neutral amount of 7Yx10Y swaption straddles	09/15/23	10/13/23	3.0
Sell 6Mx30Y swaption straddles with a pay fixed swap overlay	09/22/23	10/13/23	(11.6)
Sell 1Yx30Y swaptions straddles versus buying a vega-neutral amount of 5Yx30Y swaption straddles, paired with a 1Yx30Y pay-fix swap	09/22/23	10/13/23	(1.5)
Overweight 6Mx7Y swaption volatility versus a vega-neutral amount of 1Yx10Y swaption volatility	10/13/23	11/03/23	3.5
Buy 1Yx10Y swaption straddles paired with a receive-fixed swap overlay to hedge against a decrease in implieds due to lower yields	10/27/23	11/03/23	(1.1)
Initiate short gamma exposure in the 6Mx30Y sector	11/03/23	12/08/23	7.9
Sell 6Mx30Y swaption straddles versus buying a vega-neutral amount of 1Yx30Y swaption straddles	11/03/23	12/08/23	0.4
Initiate long gamma exposure in the 1Yx10Y sector	12/08/23	02/23/24	(2.1)
Initiate long exposure to 2Yx2Y volatility with a suitably weighted short in July Fed funds futures to hedge the downside risk from a fall in Fed-easing expectations	01/05/24	02/23/24	2.6
Overweight 2Yx2Y swaption straddles versus a vega-neutral amount of 5Yx5Y swaption straddles	01/19/24	02/23/24	3.2
Overweight 6Mx10Y swaption straddles versus selling 110% of the vega risk in 1Yx10Y swaption straddles	01/26/24	02/23/24	1.3
Buy 6Mx10Y straddles	03/01/24	03/08/24	(6.6)
Initiate longs in 6Mx10Y swaption implied volatility, delta hedged daily	03/15/24	03/22/24	(5.1)
Overweight 6Mx2Y swaption straddles versus a theta-neutral amount of 6Mx5Y swaption straddles	01/19/24	04/12/24	(8.8)
Sell 2Yx30Y swaption volatility versus buying 50% of the vega risk in 2Yx2Y swaption volatility, and pay fixed in 2Yx 10Y swaps to neutralize the bullish bias in this trade	02/23/24	04/12/24	1.5
Buy 6Mx10Y volatility versus 6M forward 6Mx10Y volatility, synthetically constructed via suitably weighted 1Yx10Y and 6Mx10Y swaptions	04/05/24	04/12/24	3.2
Buy 2Yx5Y swaption straddles on a delta hedged basis	04/12/24	04/19/24	1.0
Sell 6Mx10Y straddles on a delta hedged basis	04/26/24	05/03/24	3.1
Sell 6Mx15Y straddles on a delta hedged basis	05/03/24	05/10/24	(1.6)
Sell 1Yx2Y volatility versus buying a theta neutral amount of 1Yx5Y volatility	05/17/24	06/06/24	0.6
Initiate Fronts/Green curve flatteners, paired with delta hedged long volatility positions in the 1Yx10Y swaption sector	05/31/24	06/06/24	5.6
Initiate exposure to long curve volatility by buying 6Mx2Y and 6Mx10Y straddles (41.60 vega weighted) versus selling 6Mx5Y straddles	12/08/23	06/07/24	1.1
Buy 2Yx5Y swaption straddles on a delta hedged basis, versus 6Mx1Y / 18Mx1Y flatteners	06/07/24	06/14/24	3.6
Others	Entry	Exit	P/L
TU calendar spread narrowers	8/18/2023	8/25/2023	0.5
WN calendar spread wideners	8/18/2023	8/25/2023	(3.5)
Position for a widening in WN calendar spreads	11/9/2023	11/22/2023	1.8
Buy the US23/USH4 weighted calendar spread hedged with US23/WNZ3 Treasury futures curve flatteners	11/9/2023	11/22/2023	0.2
Position for a narrowing in FV calendar spreads	11/9/2023	11/22/2023	0.3
WN calendar spreads narrowers	2/13/2024	2/23/2024	(0.7)
UXY calendar spreads narrowers	2/13/2024	2/23/2024	(0.8)
TU calendar spreads narrowers	2/13/2024	2/23/2024	(0.3)
Sell the 4.75% Nov 2053 WNM4 basis, versus buying payer swaptions	3/8/2024	4/12/2024	1.0
Initiate calendar spread wideners in US Futures	5/17/2024	5/28/2024	(3.0)
Initiate calendar spread narrowers in UXY Futures	5/17/2024	5/28/2024	0.4
Initiate calendar spread narrowers in FV futures	5/17/2024	5/28/2024	1.0
Total number of trades			137
Number of winners			97
Hit rate			71%

Recent Weeklies	
14-Jun-24	Pardon my French
07-Jun-24	The BOC and ECB begin a game of BOCCE-Ball, likely without the Fed for now
31-May-24	The planets, if not the stars, are aligning
17-May-24	Another brick in the vol
10-May-24	The election enters the hearts and minds of options traders
3-May-24	R2-P2
26-Apr-24	Perfectly priced to patience
19-Apr-24	Should I stay or should I go?
12-Apr-24	A hairpin bend on the road to easing
5-Apr-24	Shaken, not stirred
22-Mar-24	The Fed, walking a tightrope, finds better balance
15-Mar-24	(P)PI day
08-Mar-24	The sun is the same, in a relative way, but vol is lower
01-Mar-24	Governor Vol-ler moves the market
23-Feb-24	What's the rush
09-Feb-24	Soft landings, TouchdoWNs, and Safety in the End Zone
02-Feb-24	When it rains, it pours
26-Jan-24	All eyes on Washington
19-Jan-24	Polar vortex duration extension
05-Jan-24	Happy new taper
15-Dec-23	On the second day of FOMC, my true dove spoke to me
8-Dec-23	What I tell you three times is true
9-Nov-23	The tail that wagged the market
3-Nov-23	Descent towards a soft landing
27-Oct-23	Refunding, FOMC and Payrolls - a witch's brew awaits
20-Oct-23	Early Onset Volloween
13-Oct-23	Darkening skies, even before the solar eclipse
29-Sep-23	Bennu there, done that
22-Sep-23	Central banks line up in a holding pattern
15-Sep-23	Hold my Fed
08-Sep-23	A Goldilocks economy leaves us thrice bearish
25-Aug-23	Navigate by the stars when R-star is blurry
18-Aug-23	The Relative Rise of the Curve Factor
04-Aug-23	Everything everywhere all at once
28-Jul-23	Bar-Fed-Heimer
14-Jul-23	Banks to face a higher Barr
7-Jul-23	Cruel Summer

Annual Outlooks	
21-Nov-23	Interest Rate Derivatives 2024 Outlook: Goodbye Hard Times, Hello Great Expectations?
23-Jun-23	Interest Rate Derivatives: 2023 Mid-Year Outlook
Recent Special Topic Pieces	
15-May-24	US bond futures rollover outlook: June 2024 / September 2024
29-Apr-24	Term Funding Premium and the Term Structure of SOFR Swap Spreads
13-Feb-24	US bond futures rollover outlook: March 2024 / June 2024
9-Nov-23	Death cab for QT
8-Nov-23	US bond futures rollover outlook: December 2023 / March 2024
10-Aug-23	US bond futures rollover outlook: September 2023 / December 2023

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