Interest Rate Derivatives

Fear is now the first principal component

- Markets remain in the grip of a banking crisis, but there are signs of stabilization. Deposits continue to migrate out of small banks into large banks and into money market funds, and central bank liquidity facilities saw increased usage. But Reserves did not rise this week, suggesting that last week's liquidity build-up actions did not accelerate further.
- Correlations are higher and rising, as fear becomes the dominant principal component driving markets. Our implied PCA framework captures this and the percent of variation explained by the first implied principal component spiked higher, reflecting the fact that crisis-related expectations are now the dominant undercurrent in markets
- The Fed's 25bp hike this week and diminished forward guidance reflects a trade-off between persistent but backward-looking inflation pressures and the highly likely but as-yet unknown consequences of the credit tightening. We estimate that a 2% pullback in the annualized rate of loan growth should be roughly equivalent to 50-100bp in rate hikes. Though currently unknown, the likely structural increase in liquidity ratios for all banks (including small banks) points to long run impacts of around 1.5-2%, but short-term credit contraction will likely be more severe. Thus, risks of the Fed being forced to lower rates as an offset to a potential more-than-desired credit tightening have risen sharply
- Spot and forward swap curve steepeners with the short leg anchored in the belly offer bullish exposure to short rates, are less vulnerable to moves in the Fronts/Reds curve, and are currently too flat, making them efficient ways of constructing exposure to lower front end yields
- Volatility is not just elevated, but implied distributions are "shifting left" and away from the lognormality that has characterized much of this hiking cycle. This is seen in the probability distribution inferred from options on SOFR futures for instance. But it is also seen in the sudden shift in vol-rate betas from positive to negative territory
- Negative vol-rate betas are likely to persist. Fundamentally, this is due to the overarching nature of the crisis, which has effect of driving volatility as well as easing expectations. Empirical evidence also supports the expectation that vol-rate betas should be persistently negative in the weeks ahead
- Even as correlations are poised to rise, YCSO market implied correlation has fallen. Thus, we find 6M expiry volatility on 2s/30s to be rich, for instance - we recommend substituting curve volatility in this sector with 6Mx2Y swaption volatility
- Swap spreads appear too wide in the 5Y sector - we look for a narrowing in 5Y swap spreads and expect the 5s/30s swap spread curve to steepen

US Rates Strategy

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Fear is now the first principal component

Markets remain in the grip of a banking crisis, as illustrated by wider funding spreads and credit spreads, cheaper bank stocks, more negative cross-currency bases and worsening market depth (**Exhibit 1**). Large scale rotations are underway with strong inflows into (mostly government) money market funds, which saw AUMs rise by $130bn this week. Without a commensurate increase in FHLB issuance and with a decline in the TGA, RRP balances rose by $230bn over the week. At a more detailed level, the Fed's newly created BTFP facility saw usage climb to $53.6bn, over $40bn more than last week, while the discount window usage declined by a similar amount.

Exhibit 1: Markets continue to remain in the grip of a banking crisis

March 23rd levels, week-to-date and month-to-date changes for various metrics that seek to measure funding pressures, risk appetite, and volatility; units as indicated

	Last (Dates Indicated)	1W Change from date indicated	MTD Change from date indicated
Other ($bn)	22-Mar	15-Mar	28-Feb
MMF AUMs	5401	130	267
FHLB Issuance	-7	32	Chg from 3/9: 271
Fed Balance Sheet ($bn)	22-Mar	15-Mar	2-Mar
Discount Window Usage (Primary Credit)	110	-43	106
BTFP Usage	54	42	54
Repurchase agreements (foreign official)	60	60	60
Swap Lines	0.59	0.12	0.17
Fed B/S Size	8,784	94	394
RRP	2,650	227	149
TGA	200	-78	-151
Reserves	3,370	-74	342
Commercial Bank Data ($bn)*	15-Mar	8-Mar	1-Mar
Securities in bank credit	5,452	-1	-20
UST & Agency	4,357	1	-15
MBS	111	0	0
Cash Assets	3,443	381	363
FF sold / RRP	604	2	5
Deposits	17,562	-53	-99
Borrowings	2,414	436	420
Liquidity ($mn)	24-Mar	17-Mar	1-Mar
Duration weighted market detph**	69	12	-87
Risk appetite	24-Mar	17-Mar	1-Mar
SPX	3971	54	20
Juli / Treasury spread (bp)	166	-7	17
High Yield (bp)	560	2	106
Big Bank CDS*** (bp)	112 (23-Mar)	8 (16-Mar)	37
Crude Oil	75	2	-9
OFR Financial Stress Index US	0.46 (23-Mar)	.14 (16-Mar)	0.88
KBW Bank Index	78	0	-31
EURO STOXX Banks	96	-1	-20
Funding (bp)	24-Mar	17-Mar	1-Mar
1M Libor-OIS Basis	2.1	-2.7	4.3
3M EUR xccy basis	-22.1	6.9	-17.9
3M GBR xccy basis	-4.4	2.5	-10.2
Vol (bp/day)	24-Mar	17-Mar	1-Mar
3Mx2Y	13.84	-0.11	5.33
6Mx10Y	7.78	-0.12	0.67
3Yx10Y	6.52	0.04	0.29

* Commercial bank data is lagged by 1 week (data shown for Mar 15th), release date is as of Mar 24th

** 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

*** Big bank 5Y CDS spreads include JPM, C, WFC, BAC, MS, and GS

Source: JPMorgan, Federal Reserve H.4, Federal Reserve H.8., BrokerTec, Bloomberg Finance L.P.

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Collectively, this week's flows paint a picture of unintentional disintermediation of the banking system on the margin, as depositors shift into money market funds which are then forced to either turn to the RRP at the Fed (likely the dominant flow this week) or indirectly fund the banking system via intermediaries such as the FHLB (last week). But it is noteworthy that Reserves actually fell modestly this week, by $75bn, despite what was very likely a week of deposit outflows for the banking system. Given that banks are almost surely in a state of high alert with respect to liquidity, the absence of a significant increase in Reserves on the Fed's balance sheet corroborates the notion that last week's liquidity buildup was likely proactive in nature, and banks in the aggregate did not feel the need to accelerate their liquidity build-up this week. This in turn suggests that at least at an aggregate level, bank liquidity positions are likely approaching stabilization. This does not necessarily mean that deposit balances are stabilizing - **for bank liquidity positions to stabilize, it is sufficient that deposit flight be limited to classes of deposits that banks did not view as stable sources of funding** (**Exhibit 2**).

Exhibit 2: Liquidity ratios can stabilize even as deposits migrate externally, so long as the migration occurs in deposit categories that were not thought to be stable

An illustration of liquidity impacts on a simple and hypothetical bank's balance sheet, based on two stylized classes of deposits assumed to be stable or unstable

Assets			Liabilities		
Starting stylized balance sheet					
Type	**Notional**	**Liquidity Value**	**Type**	**Notional**	**Outflow Assumption**
HQLA	50	100%	Stylized stable deposit	50	10%
Non-HQLA	50	0%	Stylized unstable deposit	50	70%
Size of balance sheet	100				
Net Liquidity		10			
Liquidity Ratio		125%			
25% of deposits classified as unstable leave					
Type	**Notional**	**Liquidity Value**	**Type**	**Notional**	**Outflow Assumption**
HQLA	37.5	100%	Stylized stable deposit	50	10%
Non-HQLA	50	0%	Stylized unstable deposit	37.5	70%
Size of balance sheet	87.5				
Net Liquidity		6.25			
Liquidity Ratio		120%			
25% of deposits classified as stable leave					
Type	**Notional**	**Liquidity Value**	**Type**	**Notional**	**Outflow Assumption**
HQLA	37.5	100%	Stylized stable deposit	37.5	10%
Non-HQLA	50	0%	Stylized unstable deposit	50	70%
Size of balance sheet	87.5				
Net Liquidity		-1.25			
Liquidity Ratio		97%			

Source: JPMorgan

Of course, we certainly would not read too much into the fact banks did not accelerate their liquidity build up this week, as it is still early days of a financial crisis. Indeed, we view it as highly likely that banks of all stripes will be focused on boosting liquidity ratios to well above BAU levels for the foreseeable future. But the **impact will likely be more pronounced for smaller banks that may have been subject to less stringent rules in the past. This in turn is likely to be credit contractionary as banks curtail loan growth as one among several tools to boost liquid asset buffers**. As seen in **Exhibit 3**, as large banks began managing to stricter liquidity ratios, their loan growth fell by ~1.5% points from the prior trend, while small banks saw little change in loan growth. This provides a crude but worrisome guide as to what might be in store. In the long run, a 1-2% reduction in annual loan

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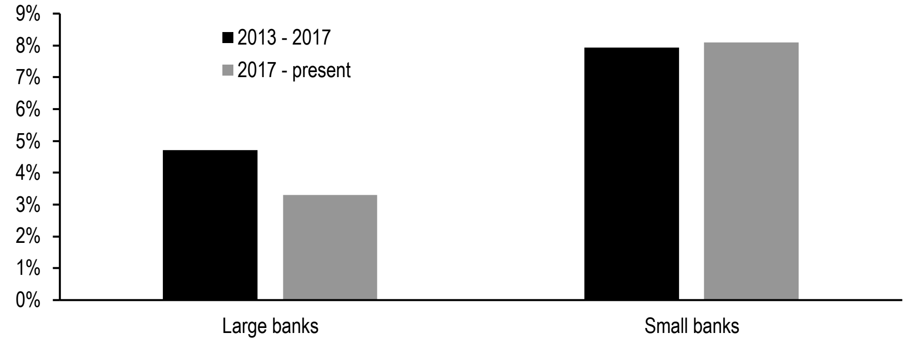
growth seems plausible. But in the short run, the pullback in lending motivated by the urgency to build up liquidity could well exceed this pace. Our economists estimate a growth multiplier of 0.3 - 0.5 - this implies that a 2% annualized reduction in lending (~$250bn) could in turn lead to a 0.3 - 0.5% downward impact on growth (see US: Move fast and break things, Michael Feroli, 3/16/2023).

Exhibit 3: Loan growth declined for large banks when they started managing to stricter liquidity requirements

Loan growth for large* and small* banks between before liquidity requirements were in place (2013-2017) and after (2017 - present), %



* Large and small banks as defined in Federal Reserve H.8.

Source: FRED, Federal Reserve H.8

As banking system fears haunt both sides of the Atlantic, fear has become the "first principal component" driving markets. **As is historically the case in such periods, correlations tend to rise both within and across markets**. This is intuitive, as shifting perceptions of the crisis become the most important driver of all markets. In line with this expectation, the percent of variation that is expected to be explained by the first implied principal component has spiked recently (**Exhibit 4** - for details of our approach and methodology for inferring forward-looking principal components from the options market, see i-PCA: Implied Principal Component Analysis). **Barring some wide-ranging emergency action** (such as a temporary guarantee of all deposits in the US banking system, which was a tool in the 2008 playbook), **correlations will likely be higher in the weeks and months ahead** (see Options).

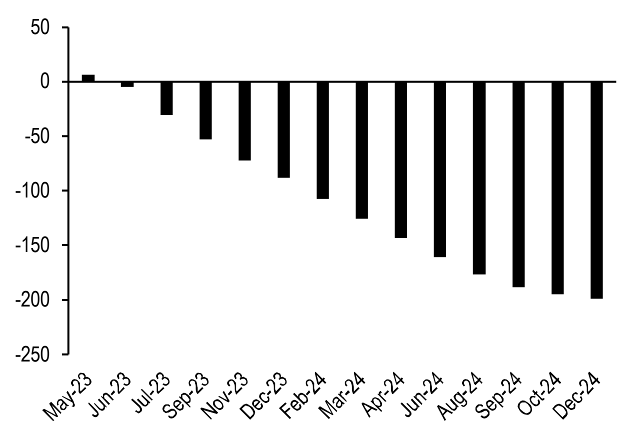
Exhibit 4: Percent variation explained by the first implied principal component has spiked up in the past week

Percent variation explained by the first implied principal component, Mar 2022 - current, %

Source: JPMorgan

Exhibit 5: OIS forwards are now pricing in nearly 100 bp of easing by year-end

Cumulative change from spot OIS at future FOMC meetings, 3/24/2023; bp



Source: JPMorgan

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It is against such a backdrop that the Fed delivered a 25bp hike this week. While well telegraphed and in line with our economists' forecast, forward-looking policy expectations are now more uncertain than ever before. The hike this week reflected a balancing act between the certainty of thus-far persistent inflation and hitherto-tight labor markets on the one hand, weighed against the as-yet unknown but potentially significant contractionary influences from a flight-to-liquidity in the banking system. Fed Chair Powell acknowledged as much - when asked about the message that "some policy firming may be appropriate", he appeared to stress the words "some" and "may". **All this suggests that as the extent of credit tightening becomes clearer in the weeks and months ahead, the imperative for further rate-tightening diminishes and a Fed pause (or even Fed easing) may not be as distant as it seemed a few weeks ago**. Seen in this light, the easing being currently priced into forwards does not at all seem inappropriate (**Exhibit 5**); indeed, risks are growing that the Fed may perhaps need to cut rates more aggressively than what is priced into forwards. As we discussed above, a 2% slowing in annualized loan growth would be sufficient to cause a 0.3-0.5% drag on growth. Based on typical Taylor rule coefficients, it would take a 50-100bp rise in the funds rate to create approximately the same drag. Thus, it appears possible that the banking sector retrenchment that is likely underway now could deliver the equivalent of a rate hike of 50-100bp or more. Given that this is occurring at a stage where the hiking cycle was nearing its end, it is thus increasingly plausible (though not yet our economists' baseline case) that rate cuts will need to offset the exogenous tightening that is being delivered via a credit shock.

One implication for the swap yield curve is that forward curves will likely be biased steeper. **Exhibit 6** shows our empirical fair value model for the swap yield curve, which we have discussed previously (see Blast from distant past) and which uses the short rate and the Fronts/Reds curve as factors (in addition to other factors). We make several observations from this. **First**, the partial coefficient with respect to the short rate (15Mx3M forward swap yield, in this case) is negative for all curve sectors, meaning that curve steepeners should benefit from larger-than-expected Fed rate cuts. **Second**, in most sectors, the swap yield curve currently appears too flat relative to fair value, making steepeners attractive from a valuations standpoint. **Third**, for yield curve pairs where the short leg is anchored in the belly, the coefficient with respect to the Fronts/Reds curve is much smaller in magnitude relative to the short rate coefficient. This is useful because the Fronts/Reds curve can be significantly volatile in such regimes and an unwanted source of noise. Thus, **spot and 1Y and 2Y forward 5s/10s or 10s/30s steepeners are likely attractive ways to gain exposure to lower front-end yields**. Given these arguments and given our Treasury strategists' expectation of a steepening of the long end of the curve (see *Treasuries*), **we look for a steepening of spot and near-forward swap yield curves anchored in the belly and beyond**.

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Exhibit 6: In most sectors, the swap yield curve appears too flat relative to fair value

Statistics from regressing* various spot and forward curves against 4 drivers** with an additional control variable, current yield curve level, and model R-squared; current value as of 3/23/2022

		Coefficients							T-stats							
	Curve	15Mx3M OIS rate	5x5 infl	Fed B/S	15Mx3M - 3Mx3M OIS curve	Fwd Guide	Intercept	R-sq	15Mx3M OIS rate	5x5 infl	Fed B/S	15Mx3M - 3Mx3M OIS curve	Fwd Guide	Intercept	Cur. Pred.	Residual
2s/5s	-0.58	-0.29	0.58	-0.04	0.36	-0.01	-0.45	86%	-59.5	52.3	-22.2	33.3	-11.8	-17	-0.82	0.24
2s/10s	-0.68	-0.59	1.3	-0.08	0.28	-0.01	-1.13	90%	-77.3	77	-27	17	-14.1	-28.1	-0.79	0.11
2s/30s	-0.87	-0.85	1.77	-0.13	0.18	-0.01	-1.28	93%	-98.1	91.6	-37.7	9.4	-17	-27.7	-0.84	-0.03
5s/10s	-0.1	-0.29	0.72	-0.04	-0.08	0	-0.68	91%	-85.4	95.1	-27.8	-10.5	-14.2	-37.6	0.03	-0.13
5s/30s	-0.29	-0.56	1.2	-0.09	-0.18	-0.01	-0.84	94%	-106	102	-41.3	-15.6	-17.1	-29.7	-0.03	-0.27
10s/30s	-0.2	-0.27	0.47	-0.05	-0.1	0	-0.15	95%	-114.9	91.6	-52.7	-20	-17.8	-12.2	-0.06	-0.14
1y fwd 2s/5s	-0.09	-0.31	0.72	-0.04	-0.07	-0.01	-0.7	86%	-67.2	70.2	-21.9	-7.2	-13	-28.6	-0.08	-0.01
1y fwd 2s/10s	0	-0.54	1.32	-0.07	-0.26	-0.01	-1.27	90%	-80.3	88.6	-26.6	-17.5	-14.2	-35.5	0.17	-0.17
1y fwd 2s/30s	-0.15	-0.75	1.65	-0.12	-0.39	-0.01	-1.27	93%	-98.9	97.8	-38.1	-23.5	-16.6	-31.5	0.16	-0.3
1y fwd 5s/10s	0.09	-0.23	0.61	-0.03	-0.19	0	-0.57	91%	-82.9	98.1	-28.1	-30.5	-13	-38.7	0.25	-0.16
1y fwd 5s/30s	-0.06	-0.44	0.93	-0.08	-0.32	-0.01	-0.57	93%	-100.9	95.8	-43.1	-33.1	-15.2	-24.6	0.24	-0.3
1y fwd 10s/30s	-0.15	-0.21	0.33	-0.04	-0.13	0	0	94%	-105.6	73.4	-55.3	-30.1	-15.2	-0.1	-0.02	-0.13
3y fwd 2s/5s	0.08	-0.16	0.45	-0.02	-0.17	0	-0.47	87%	-64.4	81.7	-18.8	-31.5	-9.2	-35.7	0.27	-0.19
3y fwd 2s/10s	0.24	-0.27	0.77	-0.03	-0.33	0	-0.76	86%	-62	81.3	-20	-35.3	-9.3	-33.3	0.57	-0.34
3y fwd 2s/30s	-0.03	-0.38	0.82	-0.07	-0.38	0	-0.45	89%	-72.8	70.6	-34.7	-33.2	-9.5	-16.2	0.38	-0.41
3y fwd 5s/10s	0.16	-0.1	0.32	-0.02	-0.16	0	-0.28	83%	-52.2	71.8	-19.2	-36.1	-8.4	-26.6	0.3	-0.15
3y fwd 5s/30s	-0.1	-0.22	0.37	-0.05	-0.21	0	0.02	86%	-65.2	49	-40	-28.2	-7.8	1.3	0.11	-0.22
3y fwd 10s/30s	-0.26	-0.11	0.04	-0.04	-0.05	0	0.31	87%	-66.4	11.5	-55.8	-12.8	-5.5	34	-0.19	-0.07

* Regression from Jan 2013 – Jan 2023

** Underlying drivers are: 15Mx3M OIS rate (%), 5Yx5Y inflation swap yield (%), size of the Fed balance sheet ($Tn), Fronts / Reds curve (15Mx3M - 3Mx3M SOFR curve as a proxy, %) with additional control variable for the Fed's forward guidance (in # months)

Source: JPMorgan, Federal Reserve H.4.

Policy uncertainty and poor liquidity keep volatility high

As we have noted often in recent months, **policy uncertainty, market depth and delivered volatility can feed on each other to create either virtuous or vicious cycles**. Unfortunately, at a stage of the cycle where one would have expected diminishing policy uncertainty to trigger a virtuous cycle of self-reinforcing improvement, we are now facing the opposite. As discussed above, policy uncertainty remains greater than at any point during this cycle with rate hikes as well as rate cuts in play, market depth continues to plumb new lows, and volatility remains elevated near 2008 crisis levels (**Exhibit 7**). The emergent banking system crisis appears to have laid to waste any prospects for stabilization in markets and sustained declines in implied volatility.

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Exhibit 7: After a choppy week, implieds ended the week slightly lower in the upper left
Statistics for selected swaption structures for the past week and the peak observed implied volatility during the 2008 crisis*, 3/17/2023 - 3/24/2023

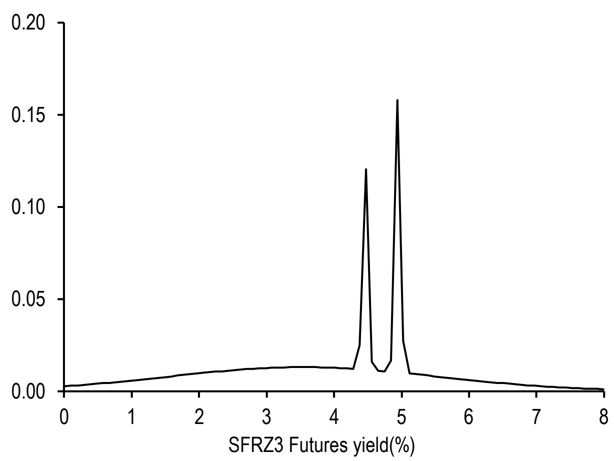
	Start	Chg	End	Min	Max	2008 Crisis Max
6Mx2Y	12.35	-0.26	12.09	11.05	12.59	13.5
6Mx5Y	9.67	-0.03	9.64	8.84	9.74	12.7
6Mx10Y	7.89	-0.12	7.78	7.31	7.89	12.1
6Mx30Y	6.30	-0.02	6.27	5.75	6.30	12.7
3Yx2Y	8.41	-0.42	7.99	7.62	8.41	9.7
3Yx5Y	7.44	-0.11	7.33	7.05	7.44	9.7
3Yx10Y	6.48	0.04	6.52	6.28	6.52	9.4
3Yx30Y	5.35	0.02	5.36	5.15	5.36	9.0

*Between Aug 2008 and Dec 2008

Source: JPMorgan

But it is not just implied volatility levels that have been impacted - the shape or skew of the probability distribution for yields has been shifted to the left as well. We can see this in at least two ways. **First**, we can see this by looking at the implied distribution of (say) Dec 3M SOFR futures. Although there are mathematically more "proper" ways to calculate implied distributions, we find it useful to assume a distribution that is defined to be a weighted combination of many different Gaussian distributions, and we solve for the weights that best fit to observed prices of options at a wide range of strikes. Such an approach leads to a more interpretable implied distribution, which is shown in **Exhibit 8**. We can conclude from this exhibit that options markets are pricing to an approximately trimodal distribution where in addition to a baseline distribution centered around the a rate level that prices in 75bp of rate cuts but with very fat tails, there is also significant weight assigned to distributions centered around rate levels consistent with cuts of 0bp and 50bp.

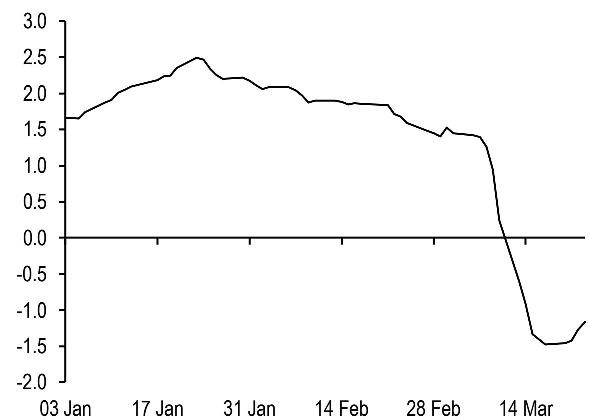
Exhibit 8: Options markets are pricing to a tri-modal distribution
Implied probability density function* calculated from SFRZ3 option premia; unitless



*Implied density function 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.

Source: JPMorgan

Exhibit 9: Vol-rate correlation has turned sharply negative in the recent weeks
Rolling vol-rate beta* between 1yx2y volatility and 1yx2y SOFR swap rate, 1/3/2023 - 3/23/2023; unitless



*Calculated as the 6-week beta on weekly changes on 1Yx2Y volatility and the ATMF rate

Source: JPMorgan

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A second way to see the left-shift in distributions is via vol-rate correlations. This crisis has brought about a swift change in vol-rate betas - for much of the latter part of the hiking cycle, lognormality was a dominant theme and normal basis point implied volatility was positively correlated to forward yields. But those betas quickly turned negative during the crisis (**Exhibit 9**), which is no coincidence since rising banking sector stress lead to increased volatility as well as increased easing expectations. Thus, although it is still too early to draw definitive conclusions, there is a strong basis for expecting negative vol-rate betas to persist. Empirical evidence supports this as well - vol-rate betas indeed tend to turn negative when we go from late hiking stages to easing stages, and in other words, when easing expectations increase. One way to measure this is by looking at the 4Mx1M OIS rate minus 1M OIS rate, which roughly measures Fed expectations in the next two meetings. For example, when this is negative, it means that markets are biased towards an easing regime. **Exhibit 10** shows vol-rate betas averaged over different Fed regime expectations, and for how much of the time during those periods vol-rate betas were negative. As the Exhibit shows, **as markets begin to price in easing (as we currently are), this is when vol-rate betas become negative and stay negative**. Therefore, given the current macro backdrop, and where we are in the hiking cycle, we are biased towards negative vol-rate correlations.

What does this mean going forward? First, **we would caution against selling volatility in the upper left on the premise of lower rates and therefore lower volatility.** If the moves today are any indication, implieds in the upper left could have more room to go. For example, in 2008, they continued to increase well after initially peaking in mid-September and started stabilizing only in October / November. **Second**, **we continue to be biased towards long vega positions with longer expiries**. Should rates rally further, mortgage convexity hedging needs that pick up at lower rates should be supportive of longer expiry vol and negative vol-rate beta could also be supportive. Additionally, we saw some callable issuance pick-up as rates rallied and dollar fell from its peak, but it's still projected to be low in the near-term even in a 100bp rally, and unlikely to be a source of vega supply. **Third**, payer skew in shorter expiries and shorter tails is relatively flat, out to strikes of A+100bp or so. Given negative vol-rate betas (which we expect to persist) and elevated ATMF implied vol levels, this makes high strike payers rich in these sectors.

Lastly, as we noted earlier in this piece, one recurrent theme in crisis periods is a pickup in correlations. This is seen, for instance, in **Exhibit 11** which shows a sustained pick up in realized correlations between 2s and 30s during crisis periods. Within the YCSO market, however, 2s/30s implied correlation has fallen likely on the back of increased demand for limited-risk curve steepening exposure by market participants. **Investors seeking to position for a rise in implied correlation and/or elevated realized correlation can do so by replacing 6M expiry single look 2s/30s YCSO straddles with 84% of the vega risk in 6Mx2Y swaption straddles** (there is also a small vega weight required on the 6Mx30Y leg, which we ignore).

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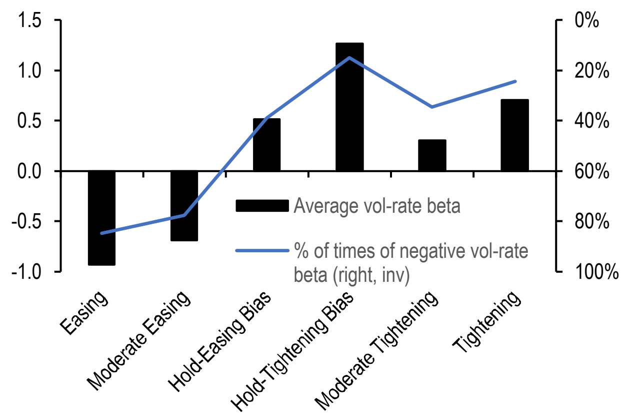
Exhibit 10: Vol-rate correlation tends to be negative when the markets are biased towards Fed easing

Vol-rate beta for 1Yx2Y averaged over periods of different Fed hiking / easing expectations**, and the percentage of times when vol-rate beta was negative during these periods***, Jan 2000 - Mar 2023; unitless



* Vol-rate beta calculated as defined Exhibit 8, uses LIBOR before 2022

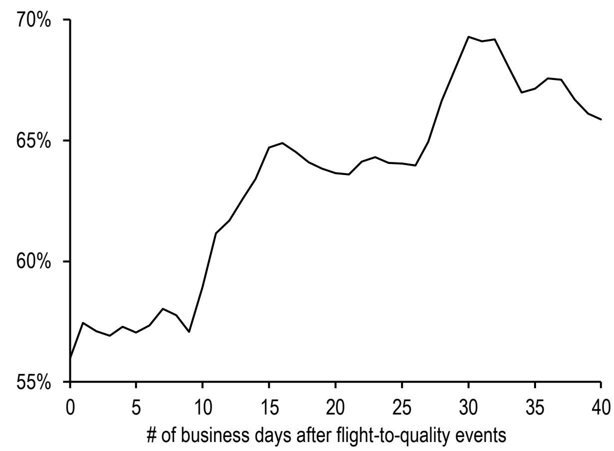
** Fed expectations is defined as 4Mx1M minus 1M OIS rate. Easing refers to 50bp+ cut priced in the next 2 meetings, moderate easing refers to 25-50bp cut, hold-easing bias refers to 0-25bp cut, hold-tightening bias refers to 0-25bp hike, moderate tightening refers to 25-50bp hike, tightening refers to 50bp+ hike

*** Calculated by counting the number of days when vol-rate beta was negative during the selected regime and dividing it by the total number of days in that regime

Source: JPMorgan

Exhibit 11: Realized correlations tend to increase during flight-to-quality episodes

Ex-*post* 3-month realized correlation* between 6mx2y and 6mx30y swap rates during periods of flight to quality**, %



* Realized correlation is calculated as 3-month correlation of weekly changes

** Flight-to-quality periods are defined as 6/1/2000, 9/11/2001, 10/2/2008, 5/5/2010, 11/25/2011, 3/30/2020

Source: JPMorgan

Spreads

Swaps spreads once again saw large moves over the week - front end spreads ended the week 4-6bp wider and the belly and long end spreads narrowed by 2-4bp (**Exhibit 12**).

Exhibit 12: Spreads ended the week wider in the front end and narrower everywhere else

Current levels and 1-week stats for SOFR swap spreads, 3/17/2023 - 3/24/2023; bp

	Start	Change	End	Min	Mean	Max
2Y	-2.6	5.5	2.9	-2.6	1.6	5.3
3Y	-15.5	3.6	-11.9	-15.5	-12.4	-9.7
5Y	-17.6	-3.3	-20.9	-20.9	-19.1	-17.6
7Y	-27.6	-1.9	-29.4	-29.5	-28.3	-26.9
10Y	-25.1	-4.4	-29.5	-29.5	-26.8	-25.1
20Y	-65.8	-2.5	-68.3	-68.3	-66.9	-65.4
30Y	-71.3	-3.4	-74.7	-74.7	-73.0	-71.3

Source: JPMorgan

On swap spreads, our main views remain unchanged in the front end and long end of the curve. In the front end, we remain biased towards wider spreads. As we have noted before, front end spreads are mostly driven by the level of short rates rather than flight-to-quality flows. While we recognize the risk of narrower spreads due to a rally in rates, 2-year spreads continue to appear narrow to fair value and **we continue to remain biased towards wideners and recommend hedging for**

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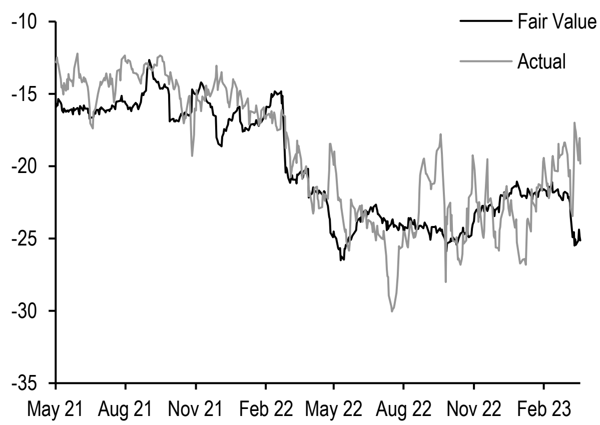
directional exposure to rates. At the same time, we recommend unwinding exposure to 3-year wideners as spreads in this sector no longer appear narrow enough to warrant maintaining exposure (see Trade recommendations). In the long end, even though spreads continue to appear considerably cheap, **we are biased towards narrower spreads given the asymmetric risks from VA hedgers in the event of an equity sell-off and a rates rally** (see Clear Air Turbulence).

In the belly of the curve, **5-year swap spreads now appear wide to fair value (Exhibit 13) and we turn biased towards narrower spreads.** For investors looking to add exposure in this sector, we like 5s/30s spread curve steepeners as an efficient way to gain exposure to narrower spreads in the belly. The spread curve currently appears too flat with respect to rates (**Exhibit 14**) and should steepen in a rally. Additionally, there is some empirical evidence for the notion that **the spread curve should exhibit increasing (in magnitude, but negative in sign) directionality with yields in a rally, making spread curve steepeners attractive as a bullish trade**.

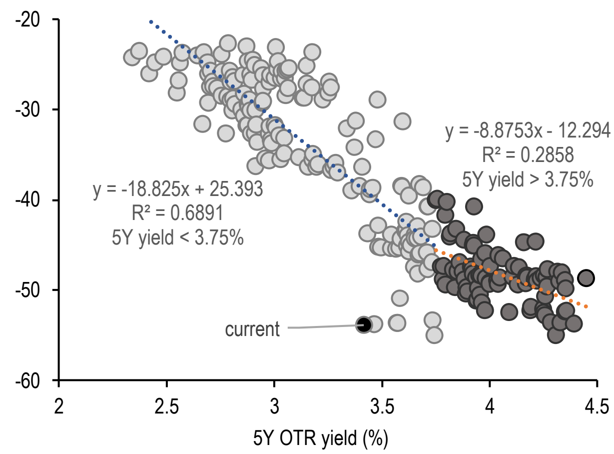
Exhibit 13: 5-year spreads are now wide to fair value
Fair value* for 5-year spreads, and 5-year swap spreads, May 2021 - current; bp



* Fair value for 5Y SOFR swap spreads denoted by 2.07 × 1Yx3M forward OIS (%), plus 0.18 × Monthly Fed purchases ($bn 10s), minus 0.05 × Monthly HG issuance ($bn), plus 0.01 × Bank demand ($bn), minus 0.48 × Dollar index, plus 35.7

Source: JPMorgan

Exhibit 14: 5s/30s swap spread curve could exhibit increased directionality at lower yield levels, making spread curve steepeners an attractive way to position for lower yields
30Y swap spread - 5Y swap spread (bp) versus 5Y OTR treasury yield (%); past 1Y



Source: JPMorgan

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Trading recommendations

- **Unwind swap spread wideners in the 3Y sector**
  Spreads in this sector no longer appear narrow enough to warrant maintaining a widening exposure and we unwind this trade at a profit.
- – Unwind pay fixed in 4% Feb 15 2026 maturity matched SOFR swap spreads. Unwind long $100mn notional of the 4% Feb 15 2026, versus paying fixed in $95.2mn notional of a maturity matched SOFR swap at a profit of 5.1bp (for original trade write up, see Fixed Income Markets Weekly 2023-03-10).

- **Maintain longs in the USM3 CTD basis (with repo termed out to 6/1) as a way of gaining option-like exposure to a potential Fed rate cuts**
- – Maintain longs in $100mn notional of the 4.5% Aug '39s versus shorts in 847 USM3 contracts at a gross basis of -5.7 ticks (term repo 4.84%, termed to 6/1/23, net basis 0.5ticks). P/L on this trade since inception: -0.1 ticks (for original trade write up, see Fixed Income Markets Weekly 2023-03-17).

- **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: -0.9 (for original trade write up, see Fixed Income Markets Weekly 2023-03-17).

- **Maintain 2s/3s swap spread curve flatteners coupled with a 10% risk-weighted 2s/3s Treasury curve flattener**
- – Stay long $100mn notional of the 4.25% Dec 31 versus paying fixed in $107mn notional of a maturity matched SOFR swap.
- – Stay short $66.1mn notional of the 3.875% Jan 15 2026 versus receiving fixed in $70.7mn notional of a maturity matched SOFR swap.
- – This overall package included a 10% risk weighted 2s/3s Treasury curve flattener overlay on top of the 2s/3s swap spread curve flattener, and was initiated at a weighted yield spread of -19bp. P/L on this trade since inception: -4bp (for original trade write up, see Fixed Income Markets Weekly 2023-01-20).

- **Maintain 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 6Mx1Y receiver swaptions (strike at inception: 4.3524%, implied vol at inception: 6.51bp/day). Maintain longs in $100mn notional 6Mx5Y receiver swaptions (strike at inception: 3.1216%, implied vol at inception: 7.6bp/day). Maintain shorts in $19.7mn notional 6Mx20Y receiver swaptions (strike at inception: 3.0982%, implied vol at inception: 6.42bp/day). P/L on this trade since inception: -18.4bp (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			
Front end SOFR swap spread wideners	3/25/2022	4/8/2022	3.5

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Tactical exposure to SOFR swap spread narrowers in the belly	3/25/2022	4/22/2022	3.4
SOFR swap spread wideners in the long end	4/22/2022	5/20/2022	(7.0)
2s/5s sofr swap spread steepener	5/20/2022	6/3/2022	(16.6)
2Y spread wideners, hedged with 10% risk weighted long duration	7/8/2022	7/29/2022	0.2
2Y spread wideners outright	7/29/2022	8/11/2022	7.8
Conditional bull 5Y spread wideners	7/8/2022	8/26/2022	0.0
Swap spread wideners in the 10Y sector	7/15/2022	8/26/2022	1.0
Conditional bull spread wideners via TYU2 calls	7/15/2022	8/26/2022	0.0
3Y spread wideners	6/10/2022	9/1/2022	7.7
3Y spread wideners using 2.625% Apr 2025	8/19/2022	9/9/2022	3.1
TUZ2 invoice spread narrowers	8/19/2022	9/16/2022	(5.0)
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
Initiate swap spread wideners in the 3Y sector	3/10/2023	3/24/2023	5.1
Duration and curve	**Entry**	**Exit**	**P/L**
Outright 30M forward 2s5s steepeners	03/18/22	03/25/22	(11.0)
18M forward 2s/10s SOFR swap curve steepener, paired with 25% risk in pay fixed 18Mx1Y forward swap	03/18/22	03/25/22	(4.6)
2Y forward 10s/30s steepener paired with 10% risk in 2Yx1Y pay-fixed swaps	03/11/22	03/25/22	(2.5)
1Y forward 3s/10s curve steepeners versus 25% risk in 2Yx1Y	03/04/22	03/25/22	(3.4)
6M forward 2s/5s SOFR swap curve steepener	04/08/22	05/06/22	16.2
6M forward 3s/7s SOFR swap curve steepener	04/22/22	05/06/22	15.0
3M forward 3s/5s SOFR swap curve steepener	04/29/22	05/06/22	8.2
6M forward 1s/5s SOFR swap curve steepener	05/13/22	05/20/22	(15.3)
9M fwd 2s/3s steepeners	05/06/22	07/15/22	(8.6)
Receive in the belly of a 1Yx1Y / 3Mx3Y / 3Yx1Y 70:25 weighted swap yield butterfly	04/29/22	07/29/22	(14.1)
Belly cheapening 2s/5s/10s	06/03/22	07/29/22	(9.8)
3M forward 5s/10s swap curve flatteners, coupled with 3Y forward 5s/10s swap curve steepeners on a 0.5:1 risk weighted basis	07/15/22	08/05/22	4.3
3Y fwd 5s/10s steepener hedged with 0.25 risk in 3M fwd 5s/30s flatteners	07/29/22	08/05/22	3.2

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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
1Yx1Y / 3Mx7Y flatteners paired with 0.7 risk in 3M forward 2s/10s 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)
Options	**Entry**	**Exit**	**P/L**
Enter into long gamma positions in the 6Mx10Y sector	04/01/22	04/22/22	8.3
Overweight 5Yx5Y swaption volatility versus 2Yx2Y	03/11/22	07/08/22	(2.7)
Sell 1yx3y straddles versus 3yx10y straddles	04/08/22	07/08/22	(19.3)
Sell 1Yx1Y straddles versus buy 5Yx10Y straddles vega risk weighted 80:100	05/06/22	07/08/22	(22.6)
Sell 6Mx2Y swaption straddles	05/06/22	07/08/22	(39.2)
Buy 3mx2y swaption straddles, delta hedged every 10 days	07/29/22	08/05/22	31.0

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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
Others	**Entry**	**Exit**	**P/L**
WN calendar spreads narrowers	5/13/2022	5/25/2022	(7.5)
UXY calendar spread narrowers	5/13/2022	5/25/2022	3.0
FV calendar spread narrowers	5/13/2022	5/25/2022	0.0
WN calendar spreads narrowers	8/19/2022	8/26/2022	(0.5)
TN calendar spreads narrowers	8/19/2022	8/26/2022	(0.3)
TU calendar spread wideners	8/19/2022	8/26/2022	(2.3)
WN calendar spreads narrowers	2/10/2023	2/22/2023	0.0
US calendar spread wideners	2/10/2023	2/22/2023	1.0
Total number of trades			**91**
Number of winners			**53**
Hit rate			**58%**

Recent Weeklies

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

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14-Oct-22	DEC-eleration - 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
15-Jun-22	US Treasury Market Daily: Everyone's got a plan until...
10-Jun-22	Inflation permeates the cosmic background
3-Jun-22	Weekly: QTer than a June bug
25-May-22	US Treasury Market Daily: 7-year auction preview; Treasury Futures Calendar Spreads Update
20-May-22	Weekly: Interest Rate Derivatives: The TLDR - Technicals, Liquidity & economic Downturn Risk
13-May-22	Weekly: Stable Algorithms, Unstable Coins
6-May-22	Weekly: Expeditiarmus
29-Apr-22	Weekly: May the Fourth not catch you by surprise
22-Apr-22	Weekly: April showers, Flowers bloom, Hikes loom
7-Apr-22	Weekly: Keep your eyes on me
1-Apr-22	Weekly: March Madness comes to a close?
25-Mar-22	Weekly: What I tell you three times is true
18-Mar-22	Weekly: Higher rates, wider tails
11-Mar-22	Weekly: Vollelujah
04-Mar-22	Weekly: Vol-halla
Annual Outlooks	
22-Nov-22	Interest Rate Derivatives 2023 Outlook: From tiger's roar to rabbit's foot
Recent Special Topic Pieces	
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
21-Jun-22	WN-dow Dressing
2-Jun-22	The Fed's New Undoing Project
1-Jun-22	Cross currency basis 3Q22 Outlook: Relative monetary policy and Fed's QT support wider FX OIS basis
25-May-22	Cross Asset Strategy: What if the mean reverts?
12-May-22	US bond futures rollover outlook
27-Apr-22	Curve, Volatility and Curve Volatility

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