Interest Rate Derivatives

For cheap gamma, look to the long end

- Vols remain elevated both in an absolute sense and relative to fair value
- We continue to like short exposures in the upper left of the grid …
- … but look for opportunities to buy cheap convexity in the long end
- Convexity-related receiving from insurance companies and mortgage servicers has richened 20s versus neighboring maturities …
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- Based on their Q2 disclosure, mREITs had a very short duration gap as of late-June; to maintain dividend yields this creates a strong bias to add duration in a rally more so than shed it in a sell-off …
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- We preview our U9/Z9 Futures Rollover Outlook, where we are bearish across the futures complex

US Fixed Income Strategy

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See page 15 for analyst certification and important disclosures.

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For cheap gamma, look to the long end

Volatility jumped heading into August, rising roughly 25abp across tails in 3-month expiry swaptions into the highs of the month. As we highlighted last week, **this rise in implieds was accompanied by a drop in market depth, with evidence that the move was led by an outsized drop in the share of liquidity provision among high frequency trading (HFT) participants** (see *Where have all the cowboys gone?* M. Salem et al., 8/22/19). This episode stands in stark contrast to typical August dynamics, which traditionally have seen only a modest downtick in liquidity provision and a modest enhanced-vol cyclical.

Since its mid-month apogee, **vols have come off their highs** a bit, though with a notable rebound on Friday on an apparent escalation in the trade conflict between the U.S. and China. **In an affirmation of the high beta between vol and market depth, liquidity provision has likewise improved in rates markets,** with market depth rising from roughly 3-sigma below average to just two (**Exhibit 1**). This improvement has likewise been marked by an uptick in HFT depth provision, as a percentage of total.

This points to the greater potential for virtuous than vicious cycles going forward, and is bolstered by the typical liquidity/vol cyclicals heading into the fall. In particular, **we note a consistent trend towards deeper markets and lower implieds heading into September, worth on average ~5abp over the post-crisis era** (**Exhibit 2**). This dip in implieds is quite consistent, having been observed in 7 of the past 9 years. **Should this calendar-driven dynamic materialize in 2019, this could catalyze a** falling realized vol driving lower vol pricing, coaxing algorithmic liquidity back into the market and thus feeding into enhanced market depth—essentially the reverse of the episode we saw earlier this month. Indeed recent days

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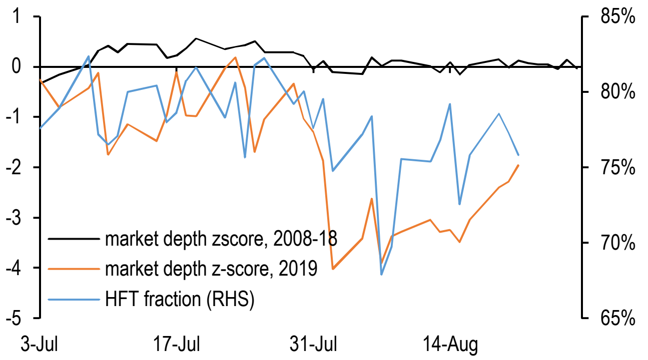
suggest such a process is likely already underway, Friday's hiccups aside (again Exhibit 1).

Exhibit 1: Market depth has improved measurably over the past week, as implied vol has likewise fallen off its highs; liquidity provision among HFTs has likewise rebounded from its lows

Change in 1-year z-score of market depth into August, shown in 2019 and averaged over prior 10-years (LHS; unitless); high frequency trading (HFT) share of market depth (RHS; %)

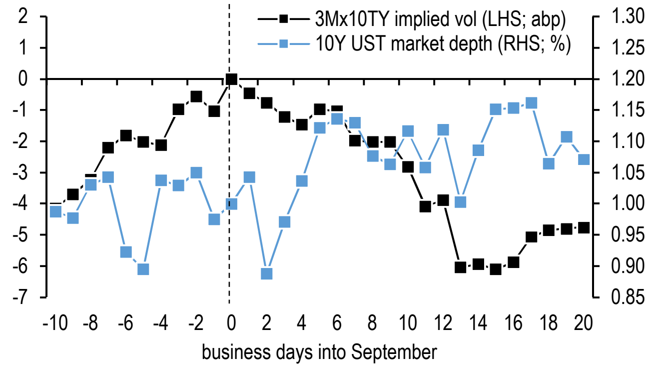


Note: Market depth defined as the total notional available in the central limit order book (CLOB) at the best three prices, averaged across both the bid and ask stacks. We take snapshots of the live order book for every $500mn in traded notional, and average market depth measurements from these snapshots, thus forming a volume-weighted average. See *Drivers of price impact and the role of hidden liquidity*, J. Younger et al., 1/13/17 for more details. (*Notes continued in next figure…*)

Source: J.P. Morgan, BrokerTec

Exhibit 2: 2019's idiosyncrasies aside, market depth generically tends to improve into September, and vol has likewise fallen measurably in 7 of the past 9 years

Average change in 3Mx10Y swaption implied volatility (LHS; abp) and average percent change in market depth in 10-year Treasuries (RHS; %) from 2008-18 heading into September



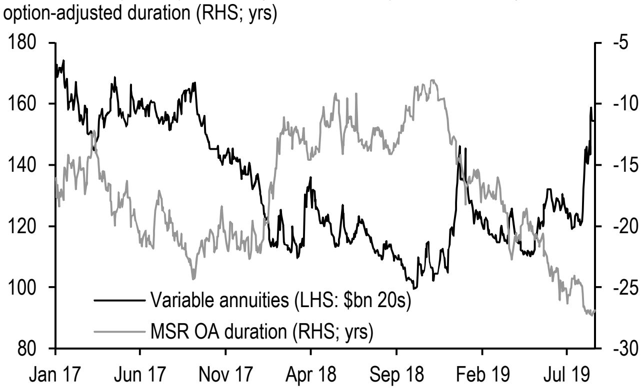
(*…notes continued from last figure*) We break participants into HFT and non-HFT based on reaction speed. Reaction speed is defined as the minimum time between when an order is created or explicitly deleted by the user and the previous change to the CLOB. Whereas the tail outcome from random updates is perhaps a fraction of a second, we find reaction speeds remarkably faster than this, inconsistent with human reaction speed or random noise. Here we define reaction speeds as follows: slower than 300 milliseconds; fast: faster than 300 micro-seconds. See *Far from the shallow now?* M. Salem et al., 4/12/19.

Source: J.P. Morgan, BrokerTec

We've expressed this view via selling 1Yx1Y delta-neutral swaption strangles, as well as selling 1Yx1Y vs 6Mx30Y OTM receivers (see Trade recommendations). As mentioned last week, these OTM structures would likewise enjoy a likely strong performance if rates were to move materially lower from here, as lognormality ought to begin reasserting itself at such levels.

Exhibit 3: In addition to more traditional mortgage convexity flows, the rally has generated significant convexity-related demand in the long end from insurance companies and servicers …

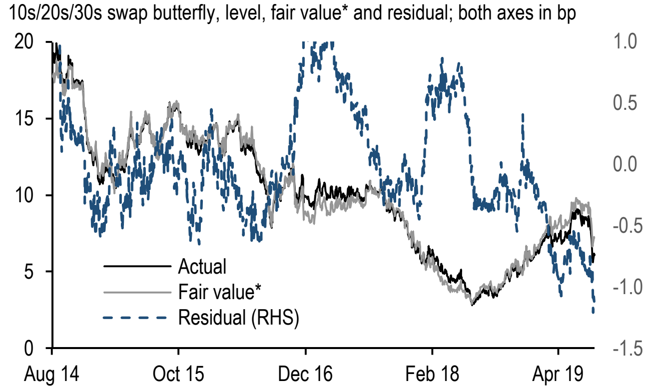
Variable annuity liability duration (LHS; $bn of 20-year equivalents) and MSR option-adjusted duration (RHS; yrs)



Source: J.P. Morgan

Exhibit 4: … which is likely responsible for the rally in 20s versus other neighboring maturities, though current levels are stretched

10s/20s/30s swap butterfly, level, fair value* and residual; both axes in bp



* Fair value based on a 5Y regression of the 10s/20s/30s swap butterfly against the 10s/30s curve and variable annuity liability durations. R-sq and std. error are 98% and 0.5 bp.

Source: J.P. Morgan

That said, the market remains very much at risk to gappy price action, rapid shifts in sentiment, and pro-cyclical flows (see slides and podcast from our

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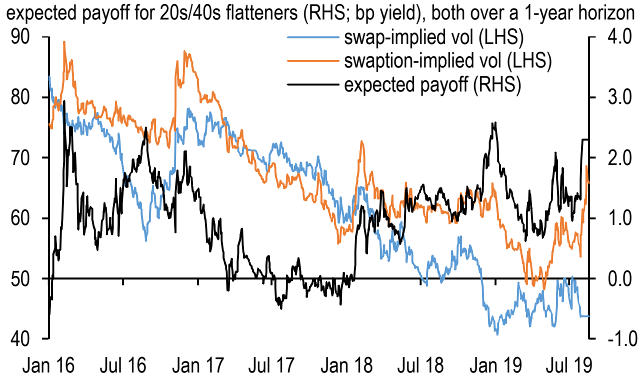
recent conference call). If short-dated vols are still rich, **what is the best way to own convexity in such an environment?** For this we once again turn to the long end of the curve. But before we do, it is important to consider the dynamic activity that is largely responsible for the distortions in this sector which have created these cheap sources of gamma.

This arises from convexity hedging activity that, unlike banks and actively managed mortgage portfolios, is concentrated in longer maturities. As is often the case, **we are primarily referring to the active management of variable annuities**. These investors are delivered net short in a rally, particularly when equities underperform, as their liabilities extend. Secondarily, **mortgage servicers need to add back duration in a rally** as the underlying mortgages become more refinance-able. Between the two we have seen more than $60mn per bp in long end duration demand generated by the rally since late-July (**Exhibit 3**), much of which we believe occurred in Libor swaps.

This is usually apparent in the outperformance of 20s versus neighboring maturities, and true to form 10s/20s/30s flies have re-priced rapidly. That said, current levels look stretched even adjusting for these flows (**Exhibit 4**). Going forward, we would expect this butterfly to trade with mostly positive directionality relative to the level of rates, though with some bias towards cheapening of 20s in a sell-off. In the meantime, the tail curve in swaptions remains relatively flat beyond 10-year tails. **Thus we have our first source of cheap convexity: conditional exposure to underperformance of 20s on the fly in a sell-off**. We specifically like buying OTM payers in 6Mx20Y versus 50% risk-weighted and equal delta payers in 6Mx10Y and 6Mx30Y (see Trade recommendations).

Exhibit 5: While long-end swap curve flatteners have been a consistently cheap source of gamma, levels have looked particularly attractive since the recent rally in rates and vol ...

Implied volatility for 20s/40s flatteners* and 1Yx30Y swaptions (LHS; abp) and expected payoff for 20s/40s flatteners (RHS; bp yield), both over a 1-year horizon

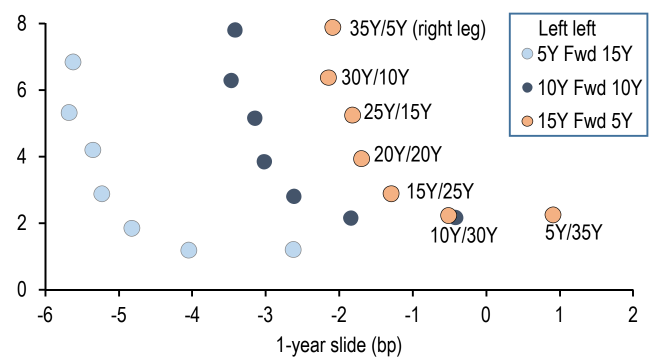


*Implied volatility on a 20s/40s flattener comes from solving for the level of prevailing volatility that would make the flattener's expected convexity P/L precisely offset 1-year slide under parallel rate shocks. Expected payoff comes from using swaption-implied vol to solve for the flattener's expected convexity P/L. For details see *An option by any other name*, J. Younger et al., 2/3/17.

Source: J.P. Morgan

Exhibit 6: ... in particular, long-dated forwards probing the 20s/40s curve take advantage of a strong option-like payoff while giving exposure to a renormalization of the 10s/20s/30s fly

1Y expected payoff vs ex ante slide among various swap curve flatteners; bp yield



Note: See previous Exhibit's footnotes for details. Data as of 8/22/19 close.

Source: J.P. Morgan

The second source of cheap convexity is in ultra-long end flatteners. We have highlighted this sector in the past, and find it generally offers a lower cost source of long gamma positions than vol markets (see *An option by any other name*, J. Younger et al., 2/3/17 and Interest Rate Derivatives, *US Fixed Income Markets Weekly*, 4/26/17). These positions look considerably more appealing now in light of

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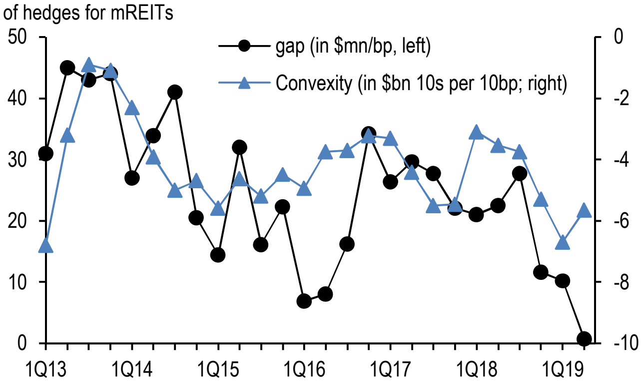
very elevated swaption volatility and receiving pressure in 20s and 30s that have kept the ultra-long end of the USD swap curve relatively steep. Reflecting this, the implied distribution extracted from swaptions markets leads to a significantly positive expected payoff in e.g. 20s/40s flatteners (**Exhibit 5**). Looking across pairs and optimizing for carry, we specifically like **paying 15Y/5Y vs receiving 35Y/5Y** (**Exhibit 6**; see Trade recommendations).

mREIT 2Q19 Quarterly Update

With the latest round of quarterly mREIT results on hand (see Bank and REIT MBS Quarterly Update: Q2 2019, A. Kraus & B. Ye, 8/15/19)**, we update estimates regarding the progression of duration and convexity profiles.** With 10-year Treasury yields having declined by close to 50bp over 2Q19, **the aggregate REIT duration gap has contracted significantly, and is now close to completely neutral, at 0.7 $mn/bp** (**Exhibit 7**). In terms of the scale of the contraction, this is close to two thirds that seen in the final quarter of last year, in response to an almost identically-sized, albeit more abrupt, rally. Of the available data on hand, this is the lowest duration gap, eclipsing the previous record of 5.7 $mn/bp in 2Q12, by some way. With such a narrow duration gap but a need to maintain their dividend yield, the sensitivity of mREIT hedging to further declines in yields in likely to be quite high. This suggests **they will remain active receivers in a rally but less likely to pay fixed in a sell-off, imparting a narrowing bias in the intermediate sector.**

Exhibit 7: As rates have rallied further, REIT duration gaps have almost completely narrowed, whilst convexity has retreated a bit

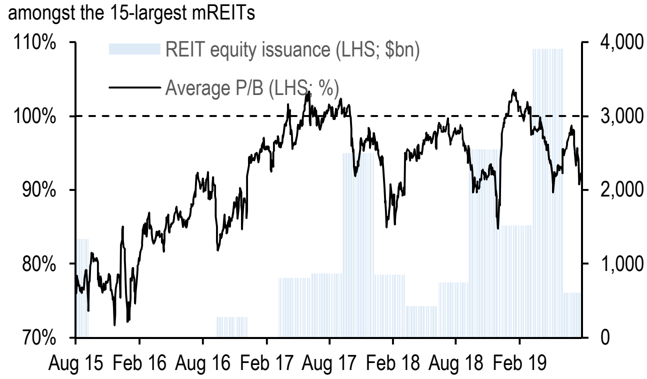
Duration gap (LHS; $mn per bp) and dollar convexity (RHS; $bn 10s per 10 bp) net of hedges for mREITs



Note: Based on a quadratic fit to reported interest rate sensitivities for NLY, AGNC, CMO, and CYS using quarterly disclosure.
Source: J.P. Morgan, company filings

Exhibit 8: With average Price-to-Book ratios having retreated, REITs are less likely to add exposure via issuance raisings

Average price-to-book (LHS; %) and equity secondary offerings (RHS; $bn) amongst the 15-largest mREITs



Source: J.P. Morgan, Bloomberg, Quarterly disclosure

Meanwhile, the move lower in rate has left REITs with a more even and symmetric profile of duration delivery under parallel rate shocks. As such, the aggregate negative convexity profile has retreated from the local highs, from -6.7 to -5.7 $bn/10bp as of late-June. This convexity profile is closer to levels observed in recent years, and comfortably below peak negative convexity, but still towards the lower end of the range.

It is also notable that REIT price-to-book (P/B) ratios have declined sharply, remaining below 100%, on average, since early 2Q. As **Exhibit 8** illustrates, equity raisings tend to rise subsequent to a sustained uplift in P/B above 100%. Following a strong pace of equity issuance in late 2018/early 2019, we would expect the pace of issuance to slow from here. **This suggests that it is unlikely they would look to add back duration by adding new assets.** As a consequence, their interest rate risk

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management should remain concentrated in swaps, and **their bias to extend should keep pressure on intermediate spreads.**

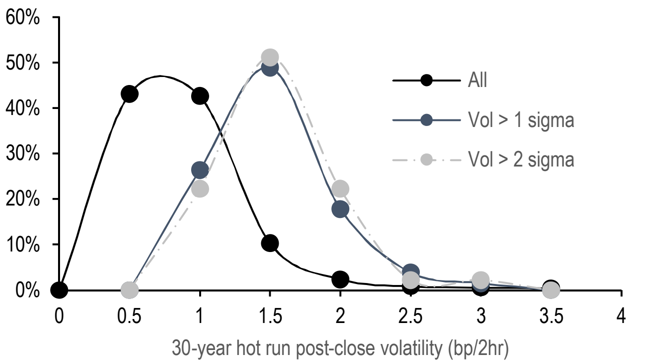
U9/Z9 Futures Rollover Outlook

Featured below is a brief summary of our U9/Z9 Futures Rollover Outlook. See here for full text.

Market depth has contracted sharply in recent weeks, exacerbated by the pullback in HFT market share as implied volatility has lifted. **On this note, we expect the wildcard option to impart a bearish bias on the roll, particularly at the long-end.** As we highlighted during our last outlook, post-close volatility tends to be closely related with daily volatility—during "high-vol" regimes, where the trailing monthly standard deviation of daily yield changes is comfortably above historical averages, we find that the distribution of post-close 30-year Treasury vol tends to shift towards the 1.5-2 bp/2hr range (**Exhibit 9**). This suggests that owning the wildcard via bearish weighted calendar spread positions does provide a form of cheap, long-vol exposure. Further to this, we find that the realized correlation between higher daily volatility and lower market depth in hot run Treasuries has tended to rise on approach to the first delivery date over the previous 16 roll cycles (**Exhibit 10**). This theme is consistent across the complex, though most acute at the long-end. Assuming depth remains subdued over the coming weeks, this would also be consistent with it being advantageous to be long the wildcard wherever it appears cheap relative to the current net basis.

Exhibit 9: In higher delivered vol regimes during the normal trading day, we find that the post pit-close volatility in the 30-year hot run Treasury tends to be biased higher as well

Frequency of post pit-close volatility by vol regime; %

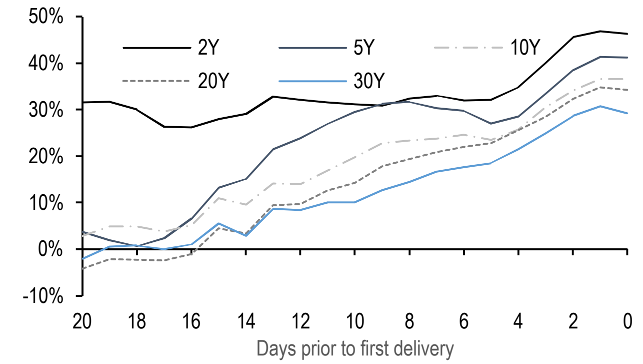


Note: Post pit close volatility measured as the standard deviation in changes per minute between 3pm-5pm. Vol regime defined as the rolling 2-year z-score of realized daily volatility in the 30-year hot run Treasury.

Source: J.P. Morgan, BrokerTec, Bloomberg

Exhibit 10: The correlation between low market depth and delivered volatility in hot run Treasuries tends to rise on approach to the first delivery date

Correlation between daily volatility* and inverse market depth; %



* Trailing monthly standard deviation of daily changes in hot run Treasury yields

Source: J.P. Morgan, BrokerTec

Despite the sustained rally in fixed income in recent weeks, reduced asset manager net longs in futures appears to have remained prevalent (**Exhibit 11**). On a relative basis, this appears most evident in TU, FV and WN, which are all close to the bottom of their 2-year standardized ranges. By contrast, TY, UXY and US are closer to mid-range at present. As was the case for the M9/U9 roll, the scaling-back of asset manager net longs has been partially offset by extended longs amongst "other reportables", which also tend not to be capable of taking physical delivery, and are also therefore meaningful drivers of the roll. Consistent with this, TU, FV, US and WN net longs look particularly extended for other reportable accounts (**Exhibit 12**).

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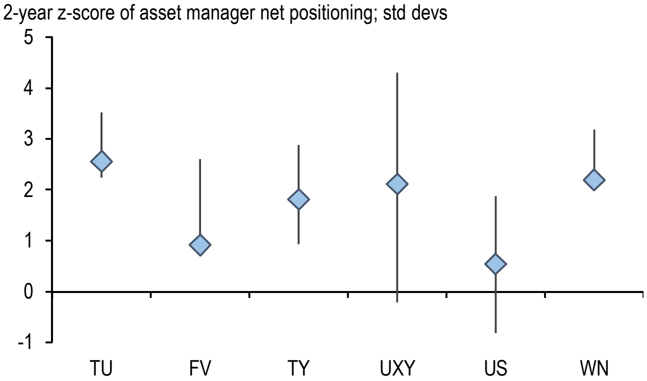
Exhibit 11: Asset manager net longs have retreated somewhat, particularly in the shorter contracts...

2-year z-score of asset manager net positioning; std devs

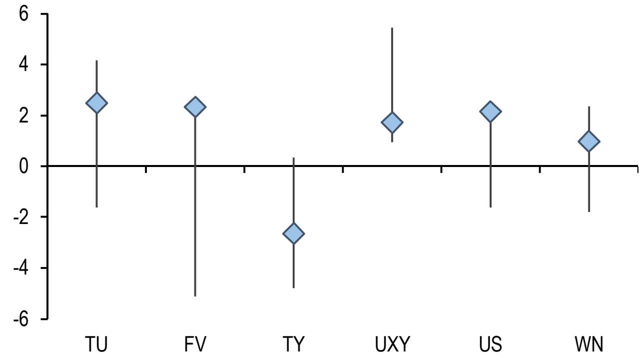


Note: Vertical lines indicate 12-month min/max of rolling 2-year z-score.

Source: J.P. Morgan, CFTC

Exhibit 12: ... but offsetting this, other reportables net longs have extended

2-year z-score of other reportables net positioning; std devs



Note: Vertical lines indicate 12-month min/max of rolling 2-year z-score.

Source: J.P. Morgan, CFTC

The early resolution of the debt ceiling suspension by Congress has spurred an earlier than expected resumption of positive net T-bill supply for the remainder of 3Q. Over the next 4 weeks, our colleagues in Treasury strategy forecast on average ~$29bn of net supply per week, with the cash balance climbing to $194bn from $129bn over that time span. Term GC has widened measurably as a result, aided by significant dealer balance sheet longs, and FRA/OIS spreads have also widened. Nonetheless, the surge in net supply is not particularly large in the context of recent history, particularly since the TGA balance is set to remain below $200bn over the delivery period. With the Aug/Sep GC/OIS box spread trading fairly flat, **one near-term risk is that this spread steepens based on abating risk in the August month-end turn, imparting a bearish bias on the roll**. Conceivably, FOMC OIS pricing could change, either if markets were to price out some of the October ease, or by moving towards a higher likelihood of an earlier cut in September (receiving Sep vs Oct FOMC). **However, we do not view OIS pricing as likely to move drastically in the coming weeks as a base case, and the more likely risk remains that the GC/OIS term structure steepens—bearish for the roll.**

We are bearish on the weighted calendar spread across the futures complex. Our key views on each contract are summarized in Exhibit 13.

We are bearish the WN weighted calendar spread, most reflecting the benefits from owning the wildcard during high-vol regimes.

We are bearish the US weighted calendar spread. Both asset manager and other reportable net longs should contribute a bearish bias.

We are bearish the UXY weighted calendar spread, reflecting a cheap wildcard BNOC relative to the current net basis, and real money net positioning.

We are bearish the TY weighted calendar spread. The wildcard option appears cheap, along with favorable asset manager net positioning, and the tendency towards cyclical cheapening.

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Exhibit 13: A continuation in the substantial flattening theme seen month to date would be a bearish influence on the weighted calendar spreads across the complex

Summary of calendar spreads, hedge ratios*, CTDs, and views across Treasury futures; units as indicated

	Front Price	Calendar Spread	HR*	CTD Front	CTD Back	View	Main drivers
WN	194-01	-0-31 /32nds	974	3 Nov 44	3 May 45	Bearish	AM positioning, 10s/30s flattener, wildcard
US	165-00	0-26 /32nds	995	4-1/2 Feb 36	4-1/2 Feb 36	Bearish	Asset manager and other reportable positioning
UXY	143-11+	-0-19+/32nds	960	2-5/8 Feb 29	2-3/8 May 29	Bearish	Other reportable positioning, wildcard
TY	130-23+	-0-20+/32nds	950	2-3/8 Apr 26	1-7/8 Jul 26	Bearish	Wildcard, cyclical cheapening, AM positioning
FV	119-12+	-0-14 /32nds	932	2-7/8 Nov 23	2-3/8 Feb 24	Bearish	Other reportable positioning
TU	107-27	-0-08+/32nds	854	2-5/8 Jun 21	1-1/8 Sep 21	Bearish	Asset manager and other reportable positioning

Note: All data as of 2/20/19 as per the publication of the original piece. * hedge ratio: recommended number of back contracts per 1000 Front contracts.
Source: J.P. Morgan

We are bearish the FV weighted calendar spread. While asset manager net longs appear less stretched, other reportables are increasingly the dominant driver of the roll in this contract.

We are bearish the TU weighted calendar spread. On a relative basis, asset manager positioning appears less stretched, but real money positioning remains net long on an outright basis.

Trading recommendations

- **Buy OTM payers in 6Mx20Y versus 50% risk-weighted and equal delta payers in 6Mx10Y and 6Mx30Y**
  We look for the 10s/20s/30s fly to renormalize in a selloff, as VA hedging activity runs in reverse after flows triggered by the recent rally.
  – Buy $100mn of a 25-delta 6Mx20Y payer swaptions (notification date 2/24/20, maturity 2/27/40, ATMF strike 1.61%, 25-delta strike 1.94%, premium 135c) versus selling $93mn 25-delta 6Mx10Y payer swaptions (notification date 2/24/20, maturity 2/26/30, ATMF strike 1.44%, 25-delta strike 1.77%, premium 71.5c) and $35.6mn 25-delta 6Mx30Y payer swaptions (notification date 2/24/20, maturity 2/28/50, ATMF strike 1.65%, 25-delta strike 1.95%, premium 196c). This trade is premium neutral at inception, and has a 50% risk weight versus the belly.

- **Add cheap convexity via swap flatteners in 15Y/5Y vs 35Y/5Y**
  While short-dated swaptions remain quite rich, long-end flatteners offer cheap gamma exposure amidst low liquidity and elevated convexity hedging risk. This trade also positions for a widening in the (quite rich) 10s/20s/30s fly.
  – Pay in $250mn notional of a 15Yx5Y forward-starting swap (start date 8/29/34, maturity 8/30/39, coupon 1.83%) versus receiving in $357mn notional of a 35Yx5Y forward-starting swap (start date 8/28/54, maturity 8/28/59, coupon 1.49%) @ a current spread of -35.7bp. Slide on this trade is -2bp over a 1-year horizon.

- **Stay short 25-delta strangles in 1Yx1Y**
  – Stay short $500mn notional 1Yx1Y 25-delta swaption strangles (notification 8/17/20, maturity 8/19/21, strikes receiver @ 0.775% and payer @ 1.785%, premium 23.3bp). This trade requires frequent delta hedging (Fixed Income Market Weekly 8/16/19). P/L since inception: +4.8abp

- **Stay short 25-delta 1Yx1Y vs 6Mx30Y receivers, duration weighted**

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– Stay short $500mn notional 1Yx1Y 25-delta receiver swaptions (notification 8/17/20, maturity 8/19/21, strike @ 0.775% premium 13.6bp) versus $20mn notional 6Mx30Y 25-delta receiver swaptions (notification 2/18/20, maturity 2/20/50, strike @ 1.23%, premium 205.9c; Fixed Income Market Weekly 8/16/19). P/L since inception: +6.5bp

- **Stay long the 1.875% of Apr 2022 vs OIS vs selling the 2.0% of Nov 2026 vs Libor swaps, hedged for repo via selling the front 3M SOFR vs FF futures**

– Stay long $500mn notional of the 1.875% of Apr 2022 versus $501mn notional of a 5/31/20 OIS @ a spread of 28.3bp, and sell $195mn of the 2.0% of Nov 2026 versus $194mn notional of an 11/15/26 swap @ a spread of 6.8bp. Finally, hedge this position via selling 1781 each of Q9, U9 and V9 SOFR futures contracts vs buying the same pack of FF futures @ a spread of 7.6bp. One month carry and slide on this trade is 0.6bp; Fixed Income Markets Weekly 8/2/19). P/L since inception: +4.7bp

- **Maintain FF/Libor narrowers in 10Yx20Y versus wideners in Greens**

– Stay short $100k/bp 10Yx20Y FF/Libor basis (swap start 7/30/29, maturity 7/30/49) vs. buying $100k/bp 2Yx1Y FF/Libor basis (swap start 7/30/21, maturity 7/30/22) at a spread curve (10Yx20Y spread less 2Yx1Y spread) of 0.1bp (Fixed Income Market Weekly 7/28/19). P/L since inception: +0.8bp.

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

Trade	Entry	Exit	P/L
Spreads and basis			
Sell OTM July TY calls vs matched swaptions	05/04/18	07/27/18	0.0
Sell U8x3M 1s/OIS	07/13/18	07/27/18	1.2
Sell 30Y spreads hedged for the 10s/30s curve	08/03/18	09/14/18	1.0
Position for a widening of the 2Yx1Y 3s/6s basis	09/23/16	09/21/18	(13.0)
Initiate 1s/6s widener in 6Mx1Y	03/23/18	09/21/18	(10.0)
Sell 3Y Treasuries vs OIS	06/15/18	09/28/18	0.9
Z8 FRA/OIS widener	07/13/18	09/28/18	(8.8)
Pay November FOMC OIS	09/28/18	10/19/18	2.1
Buy 2Yx2Y 1s/3s basis	06/08/18	10/19/18	1.5
Buy 30Y maturity matched swap spreads	10/12/18	11/09/18	0.6
Buy EDZ8 versus FV invoice spread wideners	10/19/18	11/21/18	0.4
Long May-44s/WNZ8 Treasury futures basis	10/12/18	11/21/18	0.1
Buy 10Y versus TY invoice swap spreads	12/03/18	01/11/19	2.4
Sell H9 versus Z9 FRA/OIS	12/03/18	01/25/19	3.6
Sell WNH9/M9 synthetic calendar spreads	12/14/18	01/25/19	(0.4)
Receive H9x3M EUR/USD cross-currency basis	12/03/18	02/01/19	5.0
Sell TUH9 invoice versus Aug-22s swap spreads	12/14/18	02/22/19	5.4
Sell TUH9/M9 synthetic calendar spreads	01/04/19	02/22/19	1.9
5s/30s swap spread curve flatteners via WN	01/09/19	02/22/19	0.7
Sell 6Mx3M 1s/OIS basis	12/14/18	03/08/19	3.6
Buy SERH9 versus FFH9	01/25/19	03/08/19	1.5
H9/M9 FRA/OIS steepeners	01/25/19	03/08/19	1.5

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Buy 2s versus OIS	09/28/18	05/10/19	(0.3)
Buy 5-year maturity matched swap spreads	01/04/19	05/10/19	(3.7)
2Yx5Y Treasury/OIS wideners	05/17/19	05/31/19	(3.9)
Buy M9 vs Z9 FRA/OIS	03/22/19	06/19/19	(5.0)
Sell current 5s vs OIS	05/31/19	07/26/19	7.3

Source: J.P. Morgan

- **Stay received 3Mx1Y OIS vs paying 3Yx1Y IRS**
  - Stay received $500m of 3Mx1Y OIS (start: 10/15/2019, maturity: 10/15/2020) vs paying $43m of 3Yx1Y IRS (start: 7/15/2022, maturity: 7/15/2023) (Fixed Income Markets Weekly; 7/12/19) at 19.5bp (Fixed Income Markets Weekly, 7/12/19). P/L since inception: -22.5bp.
- **Stay short 1Yx(2s/10s) correlation via partial-vega hedged straddles**
  - Stay long $1bn 1Y expiry 2s/10s single-look CMS curve straddles (expiry: 7/13/2020, strike: 38.5bp) at 28c vs selling $198m 1Yx2Y ATMF straddles (notification: 7/15/2020, expiry: 7/17/2022, strike: 1.70%) at 102c, and selling $12m in 1Yx10Y ATMF straddles at 437c (notification: 7/15/2020, expiry: 7/17/2030, strike: 2.06%; Fixed Income Markets Weekly; 7/12/19). P/L since inception: -4.9abp.

Closed trades over the past 12 months (continued)

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

Duration and curve	Entry	Exit	P/L
Sell U9 Eurodollar outright	05/18/18	08/03/18	1.5
Buy 3Mx2Y payer on USD vs AUD	06/15/18	08/17/18	2.1
6M-expiry 1x2 2s/10s floor spreads @ zero	04/20/18	08/17/18	1.8
3M caps on 2s/10s in EUR vs USD	06/08/18	09/10/18	1.0
EDZ9 vs EDU9 and EDH0	03/02/18	09/14/18	0.2
Buy 3Mx2Y 1x2 receiver spreads	08/24/18	10/12/18	0.4
Buy EUR versus USD 3Mx30Y ATMF payers	07/27/18	10/29/18	(17.8)
Buy 6M 5s/30s versus 2s/10s ATMF curve caps	07/06/18	11/02/18	4.2
3Mx 2s/10s/30s conditional rec fly (term premium)	08/24/18	12/07/18	(0.2)
Reds/Blues conditional bear steepeners	09/07/18	12/11/18	0.0
Z9 covered puts	08/03/18	12/14/18	(0.8)
Sell EDZ1 versus EDZ0 Eurodollars	09/28/18	01/04/19	7.0
OTM 3s/10s/30s flies (term premium in rally)	04/27/18	01/04/19	5.0
Receive 1Yx1Y HKD versus USD swaps	11/09/18	02/01/19	23.0
1Yx 2s/10s/30s conditional rec fly (term premium)	02/08/19	06/07/19	0.2
Sell the ATM strike of 1x2 call spreads on EDU0	01/04/19	06/07/19	0.9
15Y/25Yx15Y swap yield curve flatteners	04/26/19	07/26/19	4.1
Options relative value	**Entry**	**Exit**	**P/L**
Buy 5Y expiry 2s/10s straddle	10/27/17	07/27/18	8.0
Aug RX vs TY ATM delta-neutral straddles	07/06/18	07/27/18	18.3
Long 20Yx10Y vs 5Yx25Y vega-neutral straddles	05/18/18	10/19/18	1.7
Long 10Yx10Y vs 2Yx1Y delta-neutral straddles	04/20/18	10/19/18	2.2
Sell 3Mx10Y ATMF straddles	10/12/18	11/09/18	12.0

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Buy 2-year forward 3Yx30Y FVAs	10/20/17	12/07/18	(1.6)
Buy 5Yx30Y vs beta-wtd 1Yx30Y	10/19/18	12/07/18	2.5
Sell OTM USD vs AUD 6Mx2Y payers	11/09/18	02/22/19	0.6
Buy 3Mx2Y vs 3Mx30Y ATMF swaption straddles	03/01/19	03/29/19	6.9
Buy 5Yx30Y ATMF delta hedged straddles	12/07/18	04/12/19	(11.9)
Buy 3Mx1Y vs 3Mx(1Yx1Y) ATMF straddles	02/01/19	04/12/19	(0.2)
Sell 3Mx10Y ATMF straddles	04/05/19	05/03/19	3.3
Buy 3Mx(2s/10s) ATMF caps vs bull steepeners	02/08/19	05/09/19	5.5
Buy 3Mx10Y 1x2 payer spreads	04/05/19	05/10/19	1.3
Buy 3Mx30Y 1x2 receiver spreads	05/10/19	05/31/19	10.2
Buy 25-delta receivers vs selling OTM TYN9 calls	05/31/19	06/21/19	3.9
Sell 3Mx2Y volatility	06/06/19	06/28/19	0.8
Sell straddles versus strangles in 3Mx2Y	06/28/19	07/26/19	0.2
Buy 6Mx2Y USD vs 6Mx2Y AUD ATMF straddles	01/25/19	08/02/19	(6.8)
Total number of trades			**62**
Number of winners			**46**
Hit rate			**77%**

Source: J.P. Morgan

- **Maintain shifted 1x2 receiver spreads in 1Yx1Y**
  – Stay long $500mn notional 1Yx1Y 50bp OTM receiver swaptions (notification 6/22/20, maturity 6/24/21, strike @ 1.08%, ATMF @ 1.58%, premium 12.4c) versus shorts in $1bn notional 1Yx1Y OTM receiver swaptions (notification 6/22/20, maturity 6/24/21, strike @ 0.76%, premium 6.2c). This trade is constructed to be premium neutral at inception (Fixed Income Markets Weekly 6/21/19). P/L since inception -28.3bp.

- **Stay long the belly of the 3M 2s10s30s payer fly, risk-weighted to replicate ACM term premia**
  – Stay short $250mn 3Mx2Y ATMF payers (notification 9/9/19, maturity 9/11/21, ATMF strike @ 1.82%) at a premium of 31c and $11.7mn 3Mx30Y ATMF payers (notification 9/9/19, maturity 9/11/49, ATMF strike @ 2.31%) at a premium of 259c vs long $99mn 3Mx10Y ATMF+3bp payers (notification 9/9/19, maturity 9/11/29, strike @ 2.10%, ATMF strike @ 2.07%) at a premium of 106c (Fixed Income Markets Weekly 6/7/19). P/L since inception +0.9bp

- **Stay short 10Yx10Y versus 1Yx1Y 3s/6s**
  – Stay short $100k/bp 10Yx10Y 6s/3s basis (swap start: 5/20/29, swap end: 5/20/2039) at 12bp vs. buying $100k/bp 1Yx1Y 6s/3s basis at 7bp (swap start: 5/20/20, swap end: 5/20/2021 (Fixed Income Market Weekly 5/17/19). P/L since inception: -0.1bp.

- **Stay long 5Yx5Y 1s/3s versus selling 50% risk each in 1Yx1Y and 20Yx10Y**
  – Stay long $100k/bp 5Yx5Y 1s/3s basis (swap start: 5/20/24, swap end: 5/20/2029) at 9bp vs selling $50k/bp 1Yx1Y (swap start: 5/20/20, swap end: 5/20/2021) at 10.75bp and $50k/bp 20Yx10Y (swap start: 5/20/39, swap end: 5/20/2049) at 12.5bp (Fixed Income Market Weekly 5/17/19). P/L since inception: +0.7bp.

- **Stay short the 3Yx27Y B/E switch @ 4.5% to buy the 5Yx25Y B/E switch @ 3%**

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- Stay short $100mn notional 3Yx27Y Bermudan receiver swaptions (first notification date 3/28/22, annual exercise frequency, maturity date 3/30/49, strike @ 4.5%, premium 3585 bp of notional) versus long $100mn notional 3Yx27Y European receiver swaptions (notification date 3/28/22, maturity date 3/30/49, strike @ 4.5%; premium 3523 bp of notional) and stay long $100mn notional 5Yx25Y Bermudan receiver swaptions (first notification date 3/28/24, annual exercise frequency maturity date 4/2/49, strike @ 3.0%; premium 1385 bp of notional) versus short $100mn notional 5Yx25Y European receiver swaptions (notification date 3/28/24, maturity date 4/2/49, strike @ 3.0%; premium 1161 bp of notional). This trade requires frequent delta rebalancing (see *The potential impact of shadow volatility supply*, J. Younger et al., 3/29/19). P/L since inception: +0.3abp.

- **Stay short Z9 FRA/OIS versus 50% risk in U9 and H0**
- Sell $100k/bp Z9 FRA/OIS vs buying $50k/bp H0 FRA/OIS and $50k/bp U9 FRA/OIS at 8.25bp (Fixed Income Markets Weekly 3/22/19). P/L since inception: -5.2bp.

- **Continue paying 1Yx1Y FF/SOFR basis swaps**
- Pay $100k/bp of 1Yx1Y FF/SOFR @ a spread of -2.25bp (pay SOFR, receive FF, Fixed Income Markets Weekly 3/8/19). P/L since inception: -4.4bp.

- **Continue paying 4Yx1Y FF/Libor**
- Stay paid $100k/bp of 4Yx1Y FF/Libor basis at a spread of 28.9bp (Fixed Income Markets Weekly 1/4/19). P/L since inception: -4.8bp.

Note: new trades and unwinds reflect Friday COB levels unless otherwise stated and all others reflect Thursday COB levels

Recent Weeklies	
26-Jul-19	Weekly: The big bang and the basis
12-Jul-19	Weekly: The best defense is a good offense
28-Jun-19	Weekly: So fly - like a G20
21-Jun-19	Weekly: The Summer of discontent
14-Jun-19	Weekly: Second verse, same as the first
7-Jun-19	Weekly: Simmer down now
31-May-19	Weekly: Is bank convexity hedging lying in wait?
17-May-19	Weekly: Don't call it a fallback
10-May-19	Weekly: What's past is prologue
3-May-19	Weekly: Do not attempt to adjust the picture
26-Apr-19	Weekly: The long and the short of it
12-Apr-19	Weekly: Event horizon
5-Apr-19	Weekly: Something in the way
29-Mar-19	Weekly: A comprehensive look at convexity hedging in interest rates
22-Mar-19	Weekly: For everything, there is a season
15-Mar-19	Weekly: Stand and deliver
8-Mar-19	Weekly: Basis in stasis?
1-Mar-19	Weekly: Digital witness
22-Feb-19	Weekly: Going rogue
8-Feb-19	Weekly: Earn selective carry, but cover your tail
1-Feb-19	Weekly: Desperately seeking stability
25-Jan-19	Weekly: Smoke on the water
11-Jan-19	Weekly: Good things come in threes
4-Jan-19	Weekly: Midnight in the garden of good and evil
14-Dec-18	Weekly: Funding market stocking stuffers

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7-Dec-18	Weekly: Vega is the new gamma
9-Nov-18	Weekly: Like sands through the hourglass
2-Nov-18	Weekly: Where have all the hedgers gone?
26-Oct-18	Weekly: Red October
19-Oct-18	Weekly: Libor is at it again, but have the forwards gone too far?
12-Oct-18	Weekly: Stay thirsty my friends
28-Sep-18	Weekly: The Fed funds market tip-toes into the Rubicon
21-Sep-18	Weekly: Team of rivals
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7-Sep-18	Weekly: All low vol markets are alike ...
24-Aug-18	Weekly: Apogee
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3-Aug-18	Weekly: The long and short of it
27-Jul-18	Weekly: Lost in translation
13-Jul-18	Weekly: Revisiting basis positioning
6-Jul-18	Weekly: Cloudy with a chance of meatballs
22-Jun-18	Mid-year Outlook: We're all front-end traders now
15-Jun-18	Weekly: Hello… Jerry
8-Jun-18	Weekly: What a day that was
1-Jun-18	Weekly: Maledetta Primavera
18-May-18	Weekly: Free fallin'
11-May-18	Weekly: We are never ever (ever) getting back together
4-May-18	Weekly: The new normal for convexity hedgers
Annual Outlooks	
20-Nov-18	Interest Rate Derivatives 2019 Outlook: Powaqqatsi
20-Nov-18	Outlook: Fast and furious: The link between rapid trading and volatility in U.S. rates markets
20-Nov-18	Outlook: An update on global interest rate benchmark reform
20-Nov-18	Outlook: The Fed's undoing project: an update
Recent Special Topic Pieces	
14-Aug-19	Where have all the cowboys gone?
25-Jul-19	The case for term SOFR
16-Jul-19	Quick thoughts on the big bang
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28-Jun-19	Fallback to the Future: XCCY basis implications of Libor fallbacks
18-Jun-19	Big Little Turns
20-May-19	An update on Libor discontinuation and SOFR development
13-May-19	U.S. Interest Rates: Market Structure Update 2Q19
26-Apr-19	The SOFR they come, the harder they fallback
12-Apr-19	Far from the shallow now?: Liquidity provision by high frequency participants in U.S. rates
5-Apr-19	Automating asset allocation in fixed income: Incorporating machine learning into active management of investment-grade bond portfolios
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9-Jan-19	More than a few reasons to be in spread curve flatteners
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