

US Interest Rate Derivatives Analytics Package

For Business: September 12, 2024

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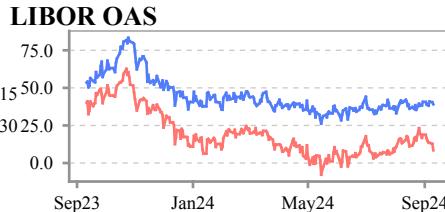
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Derivatives Strategy

Cross Market Asset Swap Report

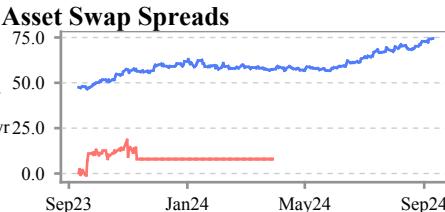
MBS Passthroughs

Mat	Lib OAS	High	Low	Avg	Z
FN 30	39.0	83.3	26.3	44.4	-0.4
GN 30	76.1	165.0	56.3	80.0	-0.2
FN 15	8.5	62.6	-7.7	18.6	-0.7
GN 10	57.7	85.0	18.7	47.3	0.7



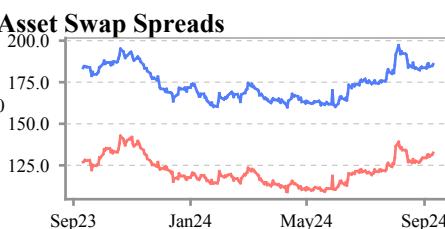
Agency Bullet Benchmarks

Mat	ASP	High	Low	Avg	Z
2.0	-16.5	-16.2	-24.1	-19.7	-0.3
5.0	7.9	18.5	7.9	12.1	0.4
10.0	49.6	49.7	35.1	40.8	2.8
30.0	74.4	74.4	49.3	60.2	2.7



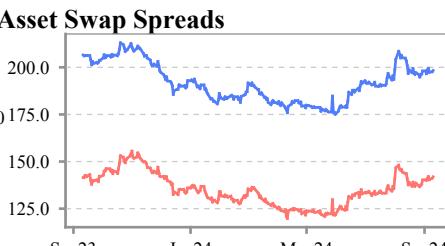
Industrial A

Mat	ASP	High	Low	Avg	Z
1-3	69.2	73.6	43.4	58.4	1.4
3-5	96.8	105.8	71.3	86.6	1.1
5-7	110.6	131.0	90.9	105.2	0.6
7-10	132.5	142.7	109.0	121.7	1.3
10+	185.8	197.2	160.0	173.6	1.3



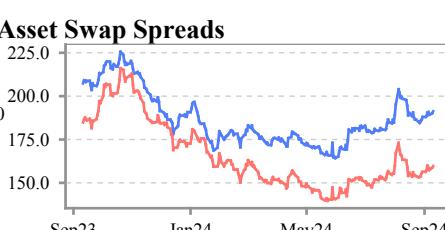
Utilities

Mat	ASP	High	Low	Avg	Z
1-3	77.1	84.7	54.2	69.9	0.9
3-5	99.1	115.3	80.1	95.4	0.4
5-7	119.2	146.9	102.5	118.8	0.0
7-10	142.0	155.5	119.8	134.8	0.8
10+	198.3	213.0	175.1	191.1	0.7



Financials

Mat	ASP	High	Low	Avg	Z
1-3	95.6	139.7	73.5	97.5	-0.1
3-5	124.0	181.4	103.3	129.8	-0.3
5-7	144.8	198.8	124.6	149.7	-0.2
7-10	159.6	216.1	139.7	165.3	-0.3
10+	191.3	225.6	164.3	186.0	0.4



1.The High, Low, Average and Z-Scores are based on 1 Year history of historical data.

2.ASP on Agencies refers to the matched-maturity swap spreads of benchmarks.

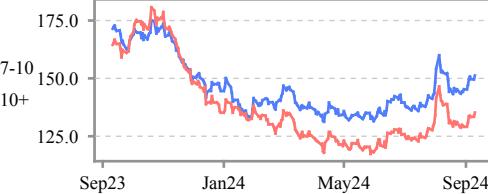
3.Libor OAS refers to OAS to Libor Curve. ASP refers to Asset Swap Spread

4.We use the interpolated swap spreads and last valid data for corporates.

Industrials BBB (ex-auto)

Mat	ASP	High	Low	Avg	Z
1-3	91.6	125.5	71.8	90.8	0.1
3-5	109.2	149.9	89.6	110.1	-0.1
5-7	120.4	169.5	104.3	124.3	-0.2
7-10	135.3	180.7	117.4	137.0	-0.1
10+	151.2	175.2	131.3	145.3	0.5

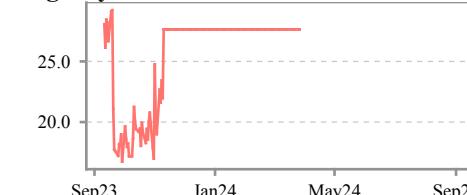
Asset Swap Spread



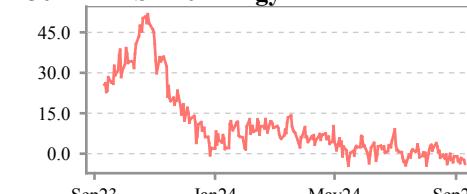
MBS: 30Yr - 15Yr



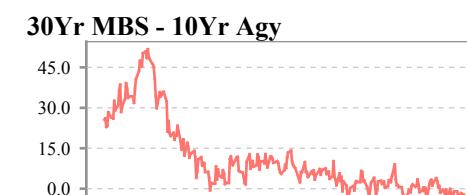
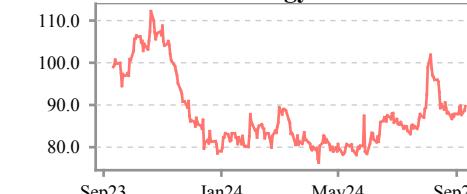
Agency: 10Yr - 5Yr



30Yr MBS - 10Yr Agy



7-10Yr A Ind - 7-10Yr A Fin



Derivatives Strategy

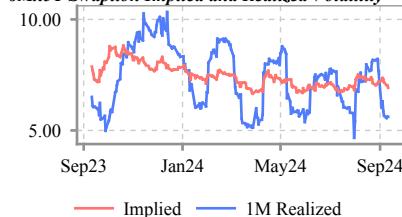
Cross Market Volatility Report

Short Dated Swaptions

Implied (bps/day)

Mat/Und	Current	6M					Realized Vol	
		Chg	Min	Avg	Max	1M	3M	
3Mx1Y	7.61	1.35	4.79	5.99	8.48	7.77	7.91	
3Mx2Y	7.87	0.70	6.38	7.21	8.72	7.34	7.54	
6Mx1Y	7.58	0.59	6.31	6.89	8.20	8.28	8.36	
6Mx2Y	7.59	0.25	6.88	7.41	8.19	7.38	7.65	
6Mx5Y	6.92	-0.05	6.66	7.07	7.69	5.62	6.45	
6Mx7Y	6.66	-0.04	6.41	6.82	7.40	5.13	6.16	
6Mx10Y	6.29	-0.02	6.06	6.48	7.01	4.72	5.91	
6Mx30Y	5.65	0.19	5.37	5.80	6.28	4.12	5.51	

6Mx5Y Swaption Implied and Realized Volatility

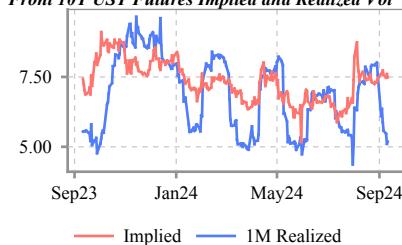


Exchange Traded Options

Implied (bps/day)

Mat/Und	Current	6M					Realized Vol	
		Chg	Min	Avg	Max	1M	3M	
Front TU	8.5	1.1	6.0	7.4	11.4	6.5	7.0	
Front FV	8.03	0.57	6.35	7.52	9.92	5.76	6.54	
Front TY	7.48	0.68	5.17	6.91	8.73	5.19	6.20	
Front TN	6.5	0.0	5.5	6.3	7.9	4.8	5.9	
Front US	6.75	0.66	5.45	6.35	7.83	4.50	5.88	
Front WN	6.02	0.67	4.82	5.60	6.82	4.17	5.63	

Front 10Y UST Futures Implied and Realized Vol

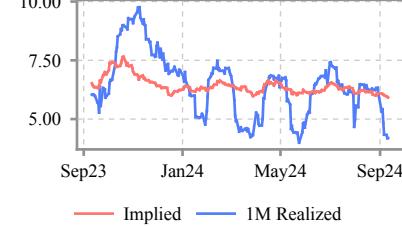


Long Dated Swaptions

Implied (bps/day)

Mat/Und	Current	6M					Realized Vol	
		Chg	Min	Avg	Max	1M	3M	
2Yx2Y	6.83	-0.65	6.83	7.28	7.81	5.30	6.39	
2Yx5Y	6.43	-0.48	6.43	6.83	7.33	4.63	6.02	
5Yx5Y	5.98	-0.30	5.98	6.29	6.60	4.22	5.76	
1Yx10Y	6.20	-0.34	6.14	6.50	7.02	4.55	5.89	
2Yx10Y	6.05	-0.38	6.05	6.39	6.85	4.30	5.78	
3Yx10Y	5.92	-0.32	5.92	6.24	6.65	4.19	5.73	
5Yx10Y	5.71	-0.17	5.71	5.96	6.27	4.15	5.67	
10Yx10Y	5.10	0.07	4.96	5.22	5.38	4.12	5.54	

3Yx10Y Swaption Implied and Realized Volatility

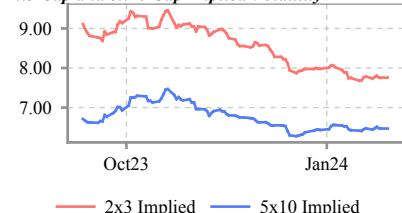


SOFR Cap Volatility

Implied (bps/day)

Mat/Und	Current	6M					Realized Vol	
		Chg	Min	Avg	Max	1M	3M	
1x2	7.50	-0.65	7.41	7.68	8.21			
2x3	7.14	-0.78	7.11	7.55	8.11			
3x5	6.81	-0.62	6.81	7.22	7.66			
5x7	6.54	-0.38	6.53	6.80	7.10			
5x10	6.34	-0.24	6.29	6.52	6.77			
7x10	6.22	-0.15	6.15	6.34	6.58			
10x20	5.41	0.15	5.14	5.38	5.53			

2x3 Cap and 5x10 Cap Implied Volatility

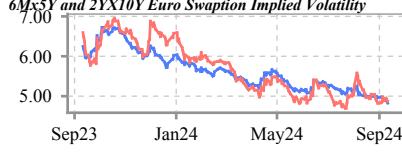


EUR Swaption Volatility

Implied (bps/day)

Mat/Und	Current	6M					Realized Vol	
		Chg	Min	Avg	Max	1M	3M	
6Mx2Y	5.13	-0.50	4.71	5.16	5.96	10.08	26.62	
6Mx5Y	4.87	-0.51	4.70	5.11	5.58	6.47	18.55	
2Yx2Y	5.28	-0.51	5.28	5.65	5.97	5.56	16.20	
2Yx10Y	4.82	-0.59	4.82	5.23	5.66	3.74	11.18	

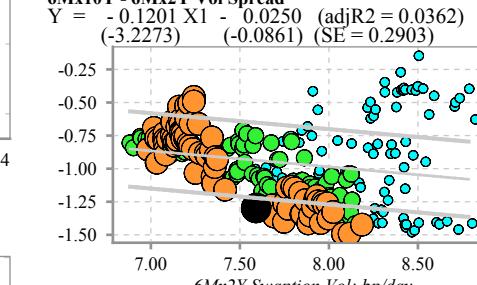
6mx5Y and 2Yx10Y Euro Swaption Implied Volatility



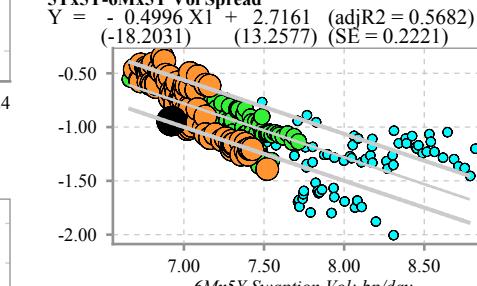
Other Vols (% per year)

Mat/Und	Current	6M				
		Chg	Min	Avg	Max	
VIX	17.7	3.9	11.9	15.3	38.6	
3M Gold vol	15.0	2.6	11.2	14.4	16.9	
3M EUR/USD vol	6.2	0.9	5.2	5.9	7.3	
3M USD/JPY vol	11.6	3.3	7.7	9.5	12.6	

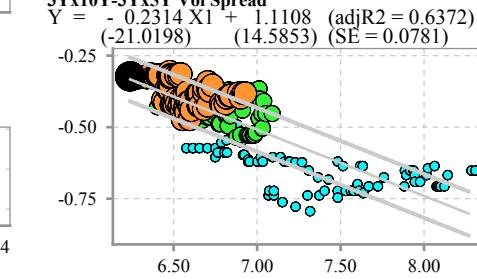
6Mx2Y - 6Mx5Y Vol Spread



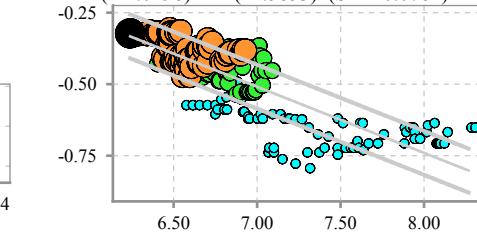
5Yx5Y-6Mx5Y Vol Spread



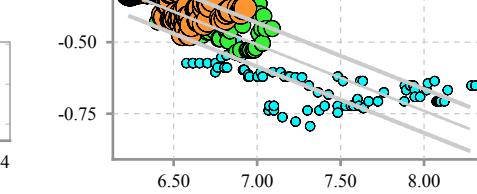
3Yx10Y-3Yx5Y Vol Spread



1x3 cap - 1Yx2Y Swaption Vol Spread



2Yx2Y EUR - 2Yx2Y US Vol Spread



Note:

1. All regressions use a 1 year historical window.

Derivatives Strategy

jpmorganmarkets.com

CC MBS/Swap Basis Model

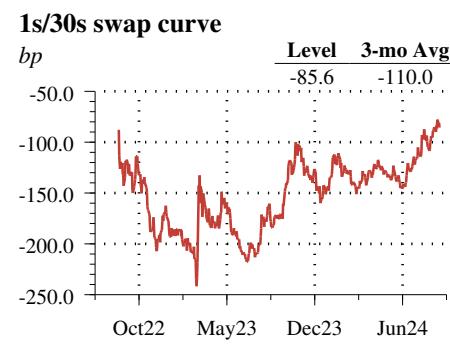
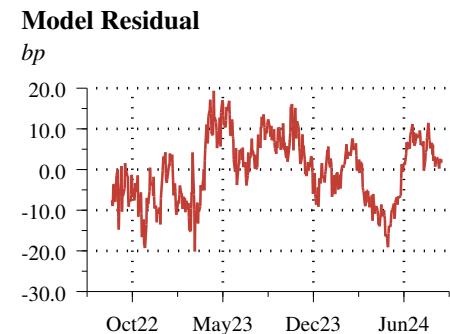
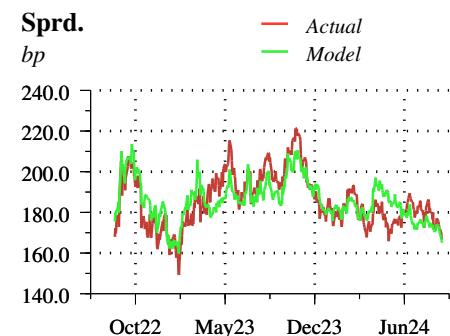
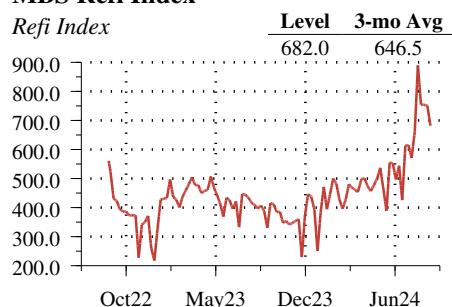
	Level	1-day Chg	1-wk Chg	3-mo Avg	1-yr Avg
CC MBS/7y swaps	166.7	-1.21	-7.21	179.9	185.2
CC MBS/10y swaps	162.4	-0.77	-7.57	179.6	187.3
CC SOFR-OAS	64.4	-0.93	-1.20	64.0	71.1
2yx5y swap ylds	3.01	0.00	-0.12	3.40	3.67
3yx10y (bp/day)	5.92	-0.02	-0.15	6.22	6.42
6mx5y (bp/day)	6.92	-0.10	-0.43	7.09	7.44

	Coeff	T-stat
Intercept	51.82	8.64
2yx5y swap ylds	27.50	18.31
3yx10y (bp/day)	-12.71	-7.05
6mx5y (bp/day)	15.28	19.20

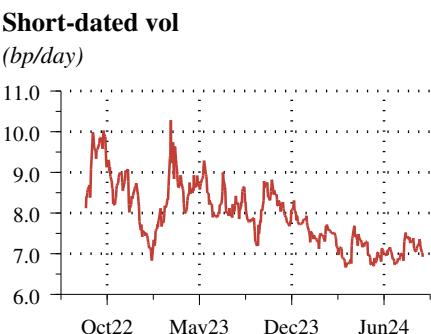
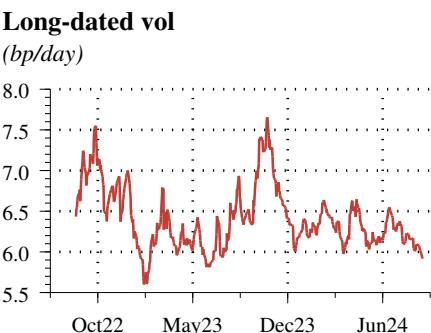
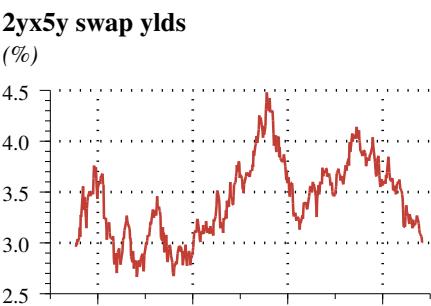
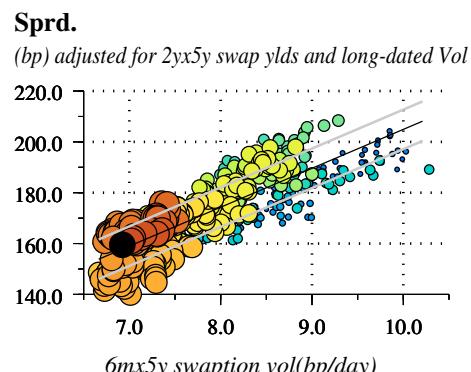
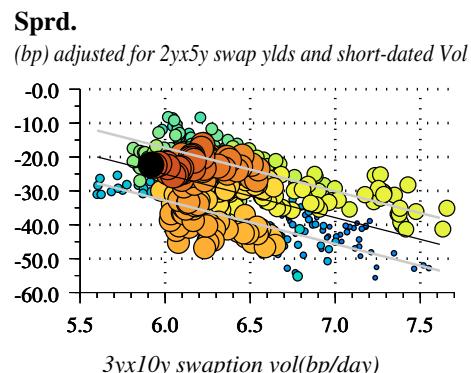
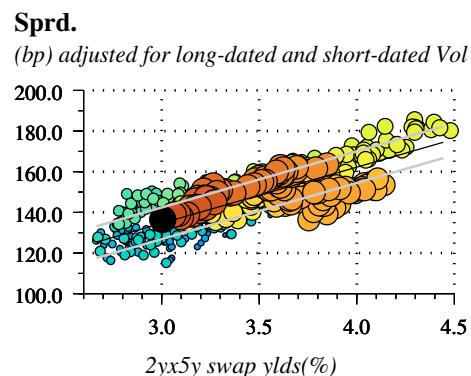
Observations	500
Adjusted R2	61.9%
Std Error	7.95
Residual	1.66
Z-Score	0.21

Other Drivers of MBS/Swap Basis

MBS Refi Index



Model Independent Variables



1.CC MBS refers to current coupon 30-year pass-through securities.

2.The Sprd. is computed as the difference between the CC MBS and 7-year swap yields.

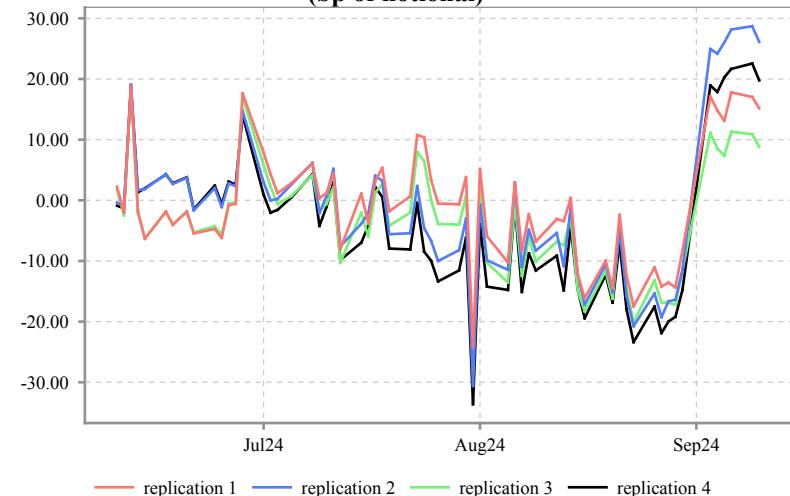
3.The model is based on 2-years of history.

Derivatives Strategy

Benchmark and Bond Index Replication with Futures

Hedge Ratio (# of contracts)						
// shock	FV	TU	TY	TN	US	WN
Replication 1	145	172	180	na	227	na
Replication 2	145	172	180	na	na	148
Replication 3	145	172	91	65	227	na
Replication 4	145	172	91	65	na	148
Beta-adjusted	TU	FV	TY	TN	US	WN
Replication 1	145	174	174	na	205	na
Replication 2	145	174	174	na	na	146
Replication 3	145	174	88	65	205	na
Replication 4	145	174	88	65	na	146

Cumulative outperformance of replication strategies over the index
(bp of notional)



Tenor	Hedge Ratio (// shock, # of contracts)			Hedge Ratio (Beta-adj, # of contracts)		
	1 contract	2 contracts(L)	2 contracts(R)	1 contract	2 contracts(L)	2 contracts(R)
2Y	45	na	na	45	na	na
3Y(TU)	68	na	na	68	na	na
3Y(FV)	62	14	53	63	14	53
5Y	101	56	28	102	56	24
7Y	89	na	na	86	na	na
10Y(TY)	120	53	27	116	52	24
10Y(TN)	87	na	na	87	na	na
30Y(US)	120	na	na	108	na	na
30Y(WN)	78	na	na	77	na	na

December 2024 Futures

Contract	Price	BPV (\$/contract)		BNOC	Repo rate (bp)
		// shock	beta-adj (32nds)		
TU	104.39	41.7	41.6	-0.2	516
FV	110.67	45.3	44.9	-0.1	515
TY	115.45	69.8	72.2	-0.4	519
TN	119.89	95.7	95.7	0.6	506
US	126.91	150.5	167.1	0.4	508
WN	137.22	231.9	235.0	1.5	495

Note: For replication of the J.P. Morgan Government Bond Index (GBI) we consider 4 replication strategies: We assume the 1- to 3-year bucket is hedged with TU and 3- to 5-year with FV for all. Replications 1 and 3 hedge the 10+ year bucket with US, and Replications 2 and 4 do the same with WN. For replications without TN (replications 1 and 2), we assume the entire 5- to 10-year bucket is hedged with TY, and for those with TN (replication 2 and 3) we use TY for 5- to 7-year maturities and TN for 7- to 10-year maturities. We assume monthly rebalancing of bpv-based hedge ratios (either using parallel or beta-adjusted shocks to the curve). The GBI index is also assumed to be unlevered--i.e., no repo funding cost.

For benchmarks, we assume hot-run returns, rolled on the first day of the month and financed in term repo through the next roll (accounting for specialness as well) versus a either one future contract (specified in parenthesis if necessary) or, a TU/FV, FV/TY or TY/US blend for 3Y, 5Y and 10Y OTRs, respectively. When using a single contract we assume pbpb-neutral hedge ratios matching the pbpb of the current note to the futures DV01 (based on parallel or beta-adjusted shocks to the curve), rebalanced monthly and rolling the contracts on the first delivery date. When using 2 contract blends, we use empirical hedge ratios calculated as the 3-month beta of daily changes in the hot-run yield versus the 2 underlying CTD yields, again with monthly rebalancing.

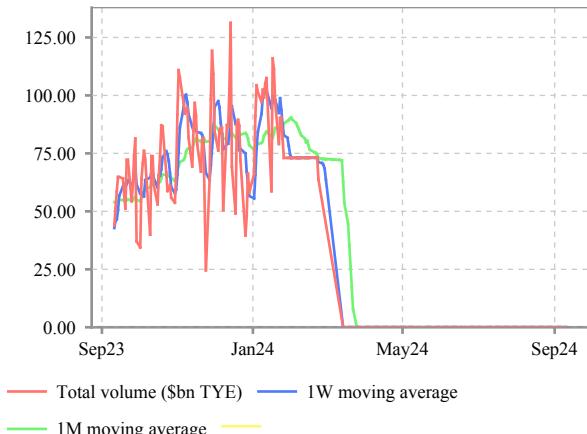
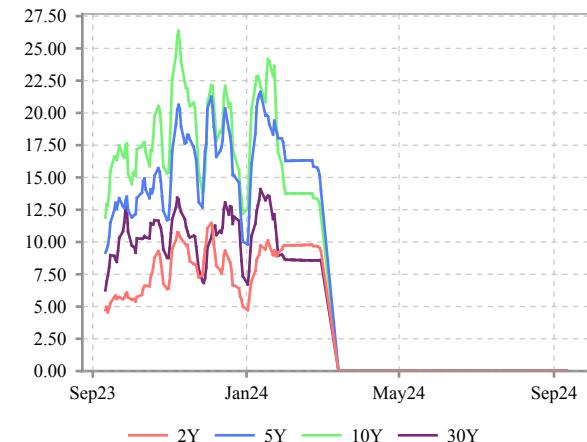
USD Swap Trading Volume

		1-yr	2-yr	2-5-yr	5-yr	5-10-yr	10-yr	10-20yr	20-yr	20-30-yr	30-yr	50-yr	Total**
spot	notional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one week avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one month avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6m-1Y	notional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one week avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one month avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1Y-2Y	notional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one week avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one month avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2Y-5Y	notional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one week avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one month avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-10Y	notional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one week avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one month avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total	notional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one week avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	one month avg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Notional amount in \$bn

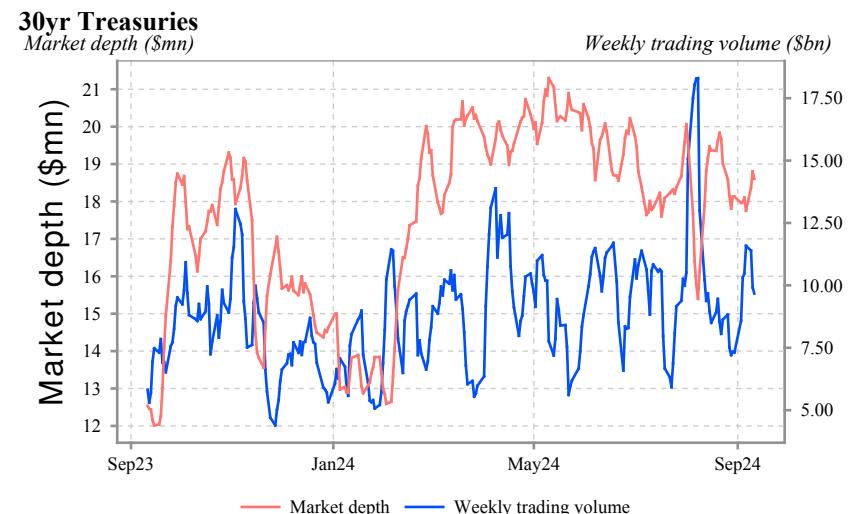
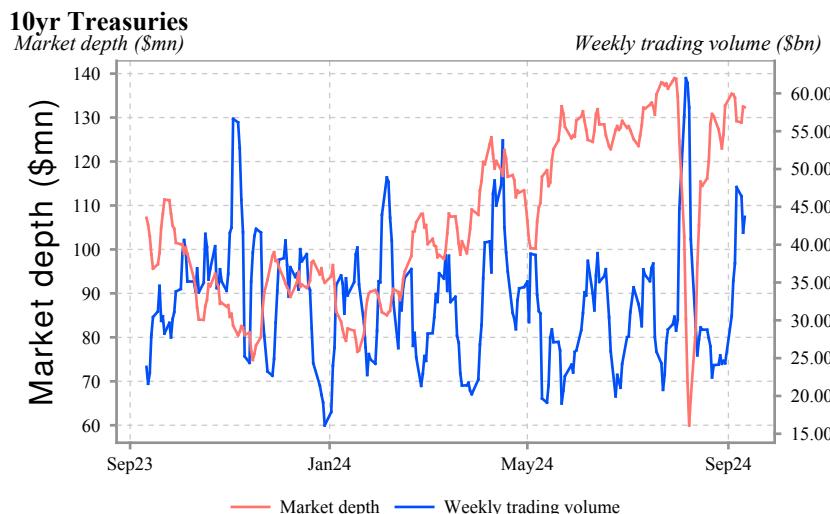
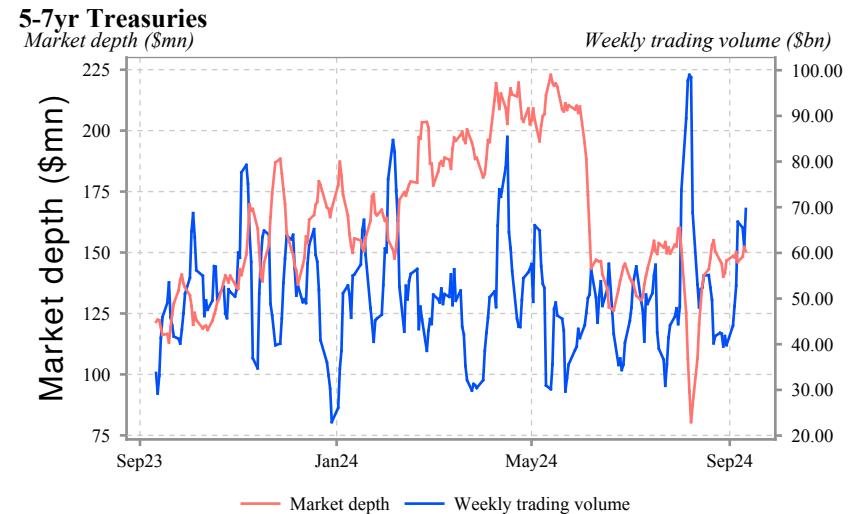
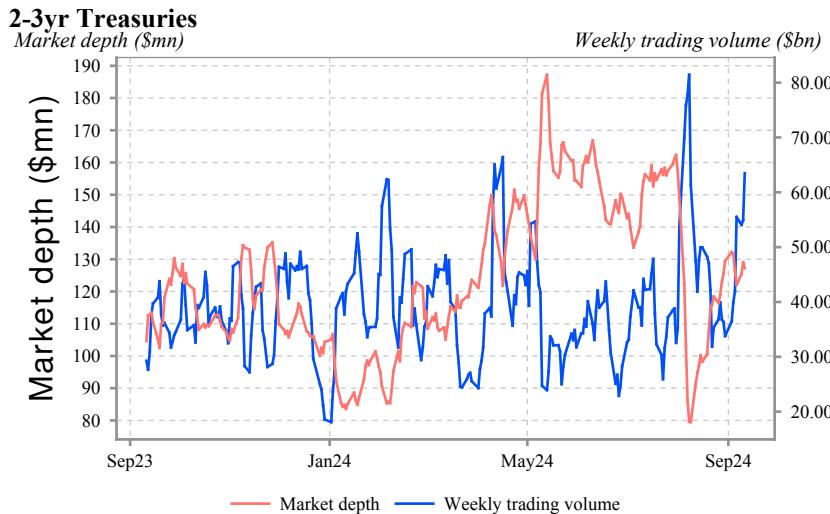
** 10-yr equivalents

Source: J.P. Morgan, DTCC



Fixed Income Strategy

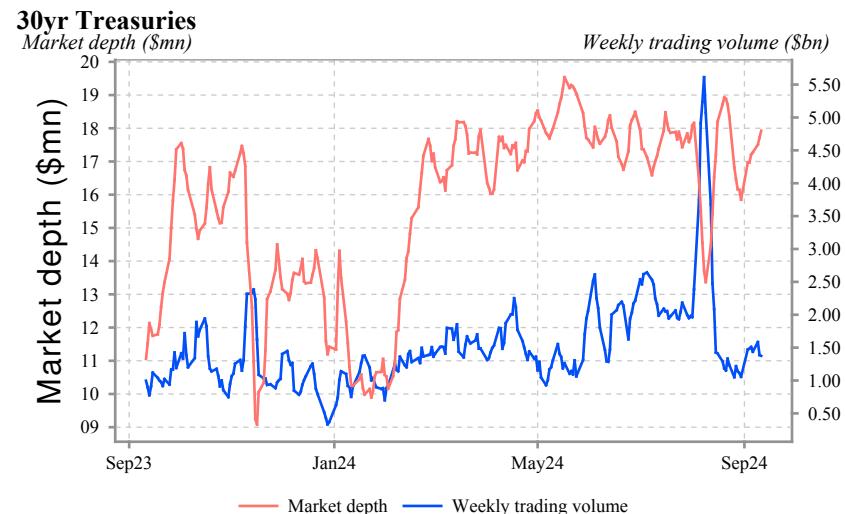
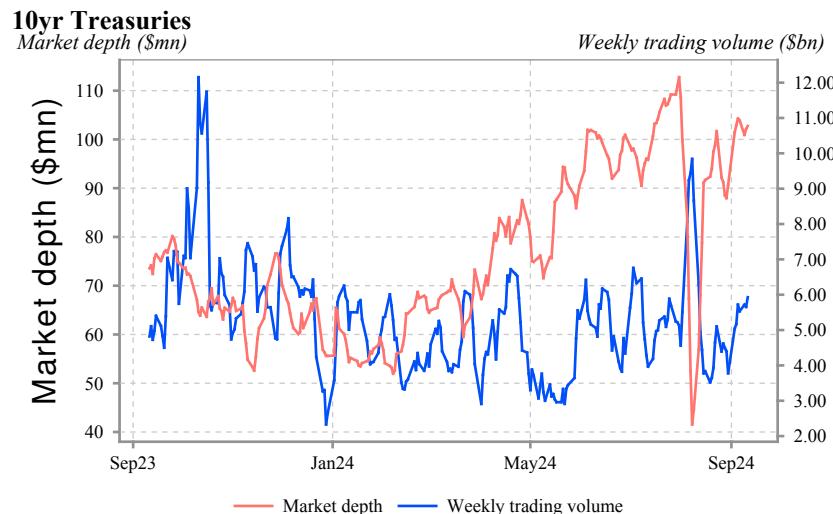
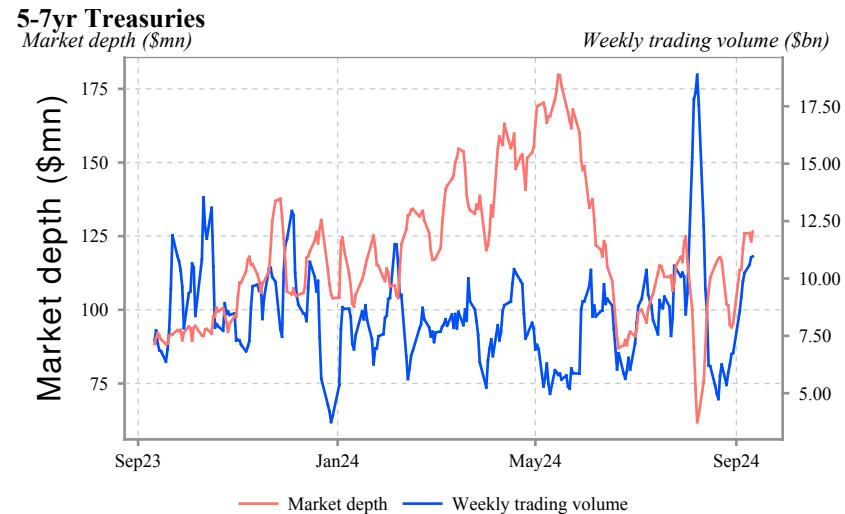
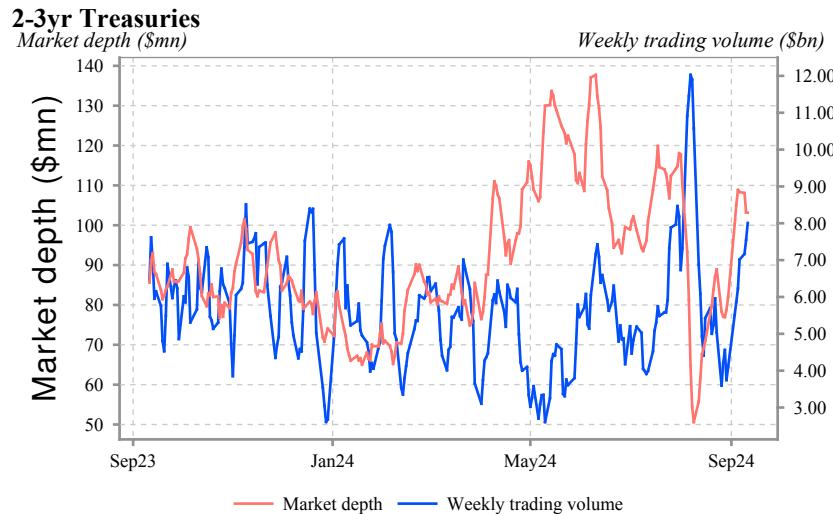
Cash Treasury Market Liquidity Summary



Market depth is defined as the weekly moving average of the top 3 bid/ask sizes in OTR Treasuries, averaged between 8:30am and 10:30am daily. Both market depth and volume data are taken from BrokerTec, an interdealer electronic trading platform

Fixed Income Strategy

Cash Treasury Market Liquidity Summary - London time



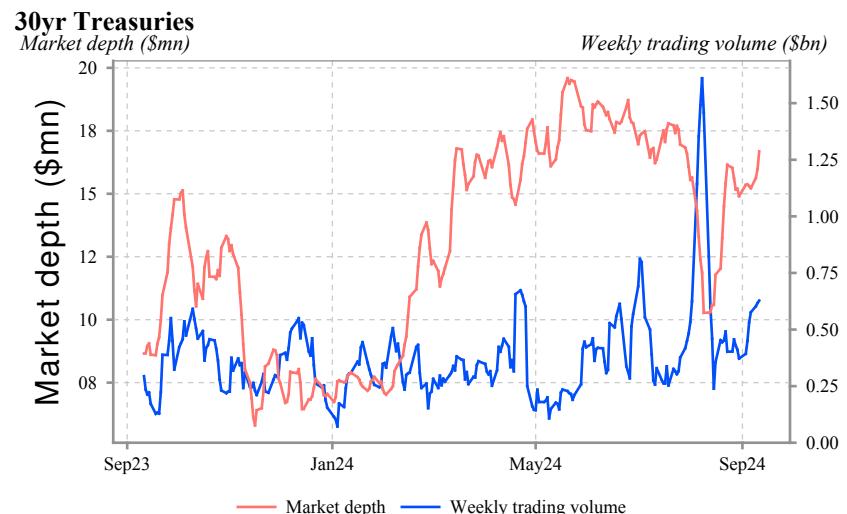
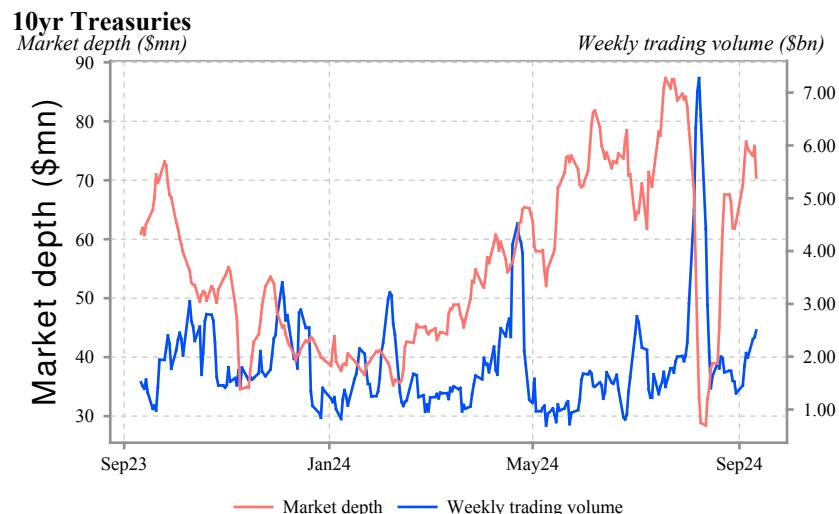
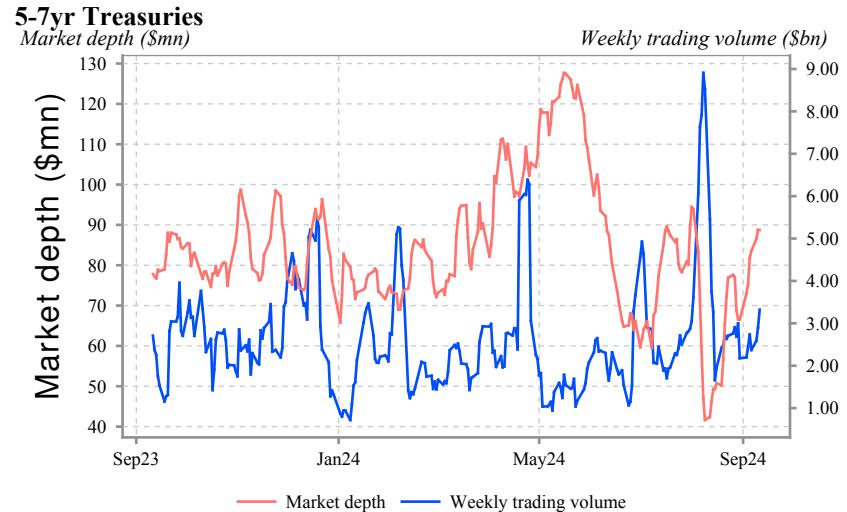
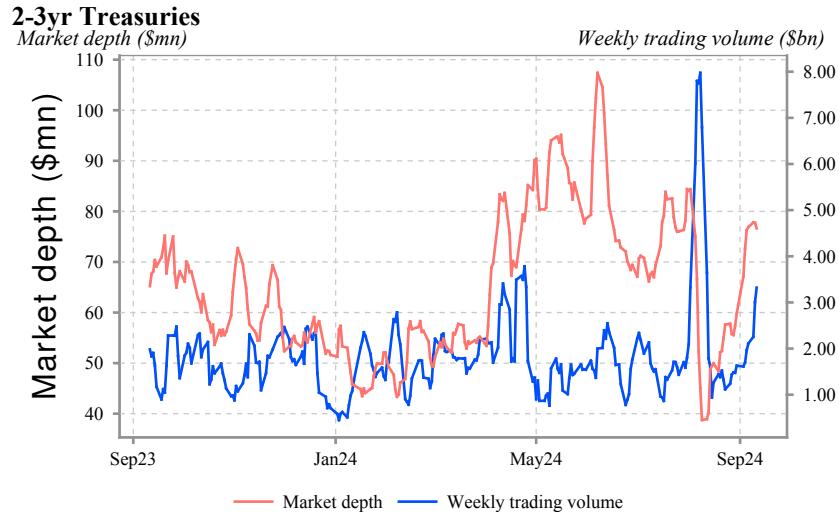
Market depth is defined as the weekly moving average of the top 3 bid/ask sizes in OTR Treasuries, averaged between 8:30am and 10:30am daily. Both market depth and volume data are taken from BrokerTec, an interdealer electronic trading platform.

Source: J.P. Morgan, BrokerTec

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Fixed Income Strategy

Cash Treasury Market Liquidity Summary - Tokyo time



Market depth is defined as the weekly moving average of the top 3 bid/ask sizes in OTR Treasuries, averaged between 8:30am and 10:30am daily. Both market depth and volume data are taken from BrokerTec, an interdealer electronic trading platform.

Source: J.P. Morgan, BrokerTec

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Fixed Income Strategy

Treasury Futures Liquidity Report

2-year note (TU) current open interest ('000s)



5-year note (FV) current open interest ('000s)



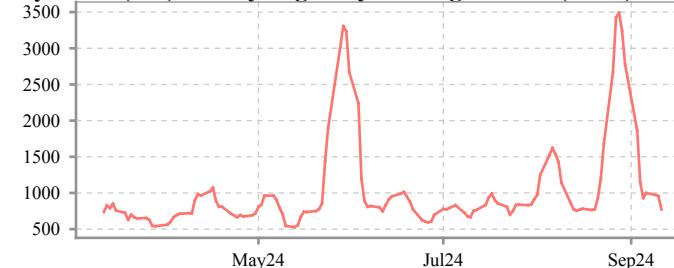
10-year note (TY) current open interest ('000s)



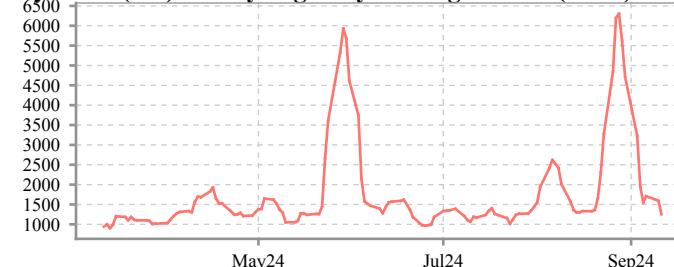
Classic Bond (US) current open interest ('000s)



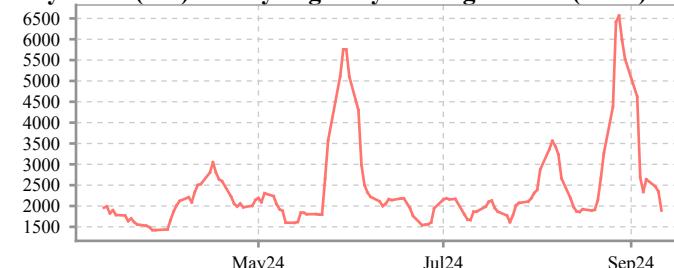
2-yr note (TU) weekly avg daily trading volume ('000s)



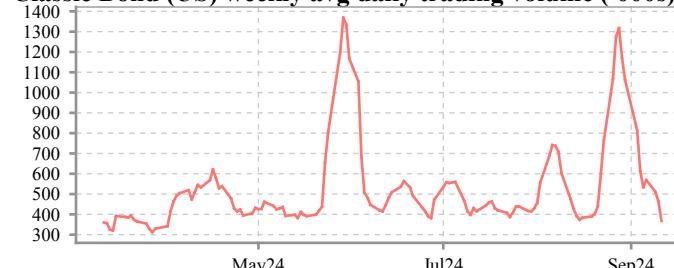
5-yr note (FV) weekly avg daily trading volume ('000s)



10-yr note (TY) weekly avg daily trading volume ('000s)



Classic Bond (US) weekly avg daily trading volume ('000s)



2-year note (TU) market depth ('000s)



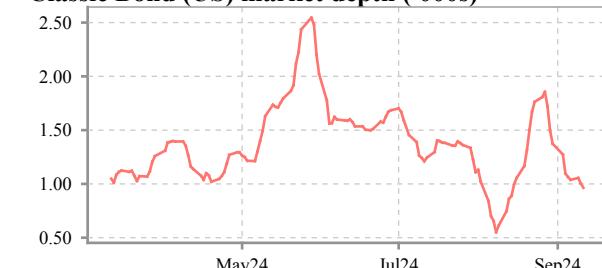
5-year note (FV) market depth ('000s)



10-year note (TY) market depth ('000s)



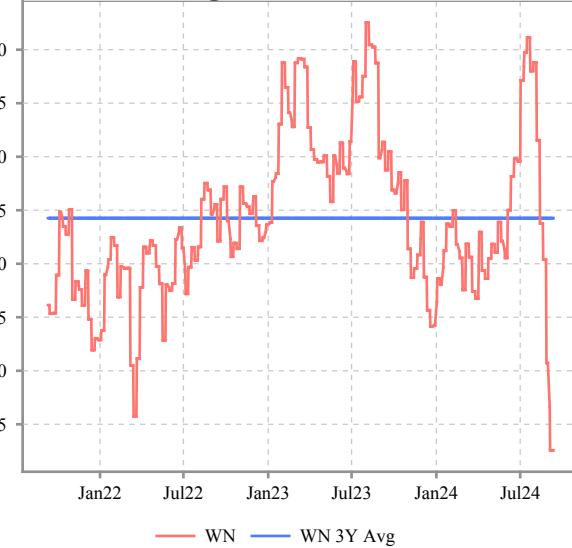
Classic Bond (US) market depth ('000s)



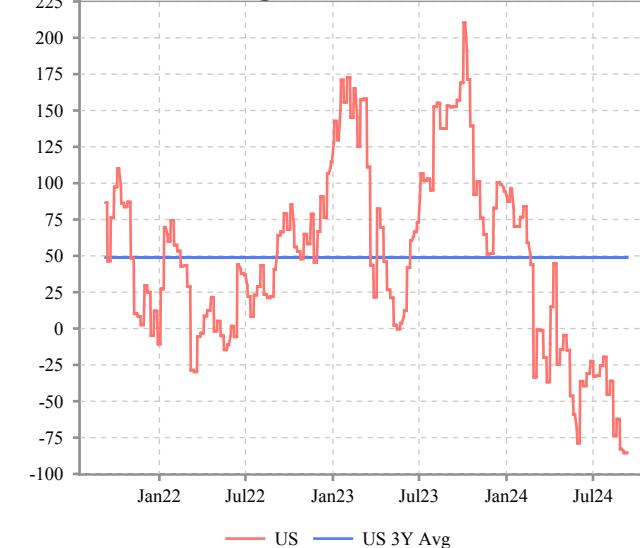
Derivatives Strategy

Treasury Future Net Commercial Longs Report

Net Commercial Longs - WN



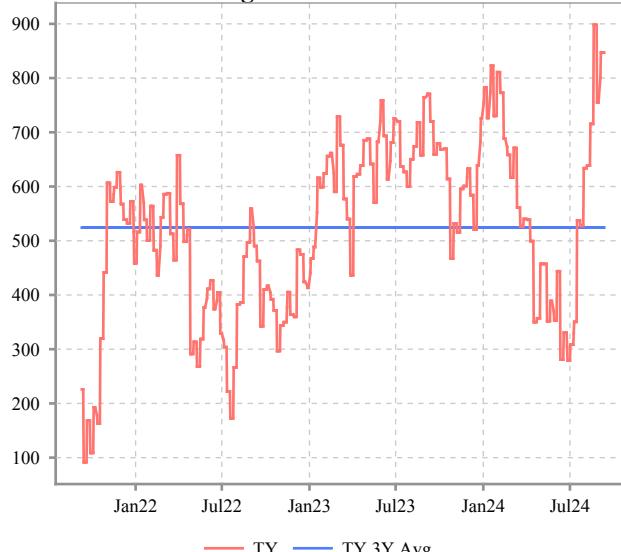
Net Commercial Longs - US



Net Commercial Longs - UXY



Net Commercial Longs - TY



Net Commercial Longs - FV



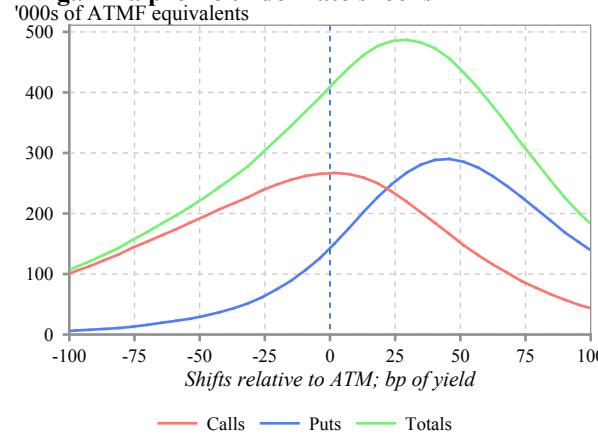
Net Commercial Longs - TU



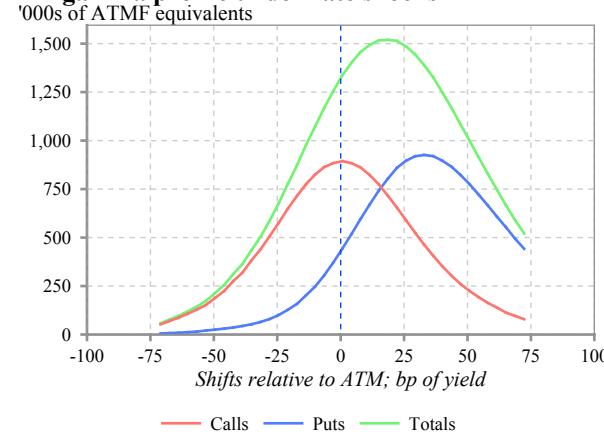
* Net commercial longs minus shorts in various contracts; '000s of contracts, 3Y history and 3Y average. Source: CFTC, J.P. Morgan

Options on Treasury Futures Strike Concentration Report

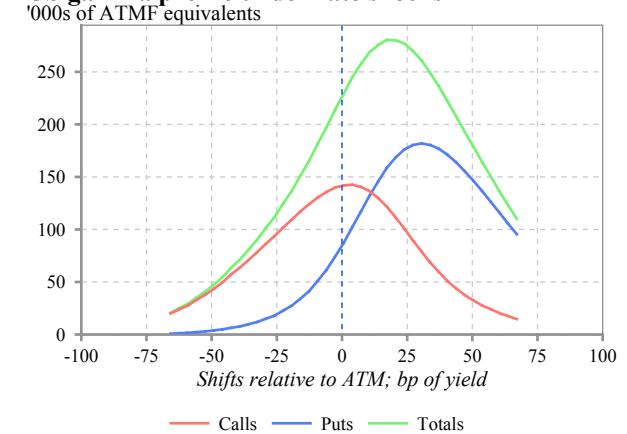
FV gamma profile under rate shocks



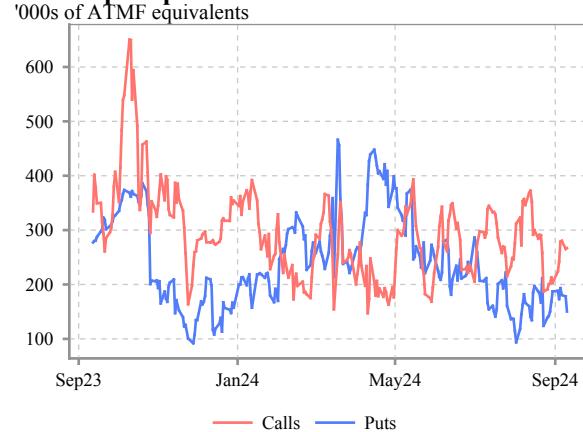
TY gamma profile under rate shocks



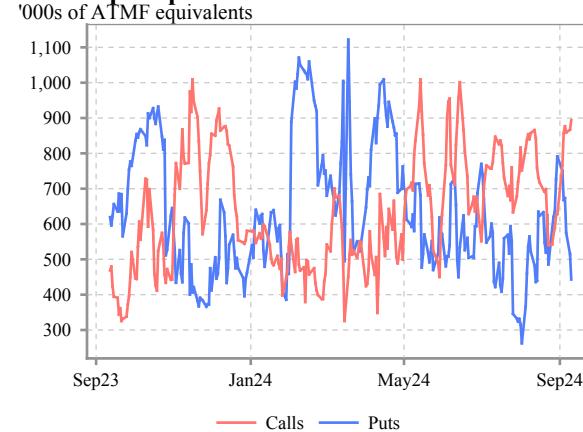
US gamma profile under rate shocks



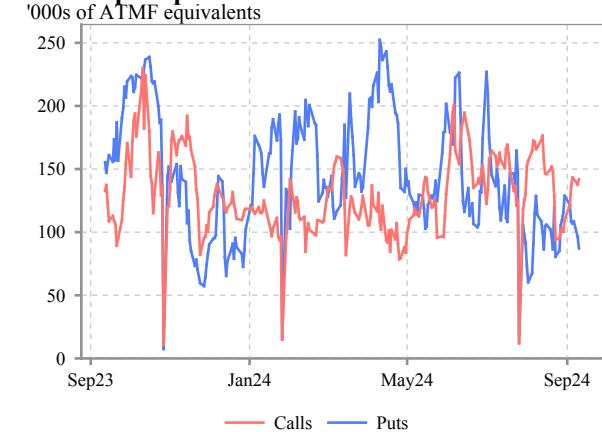
FV call/put open interest



TY call/put open interest



US call/put open interest



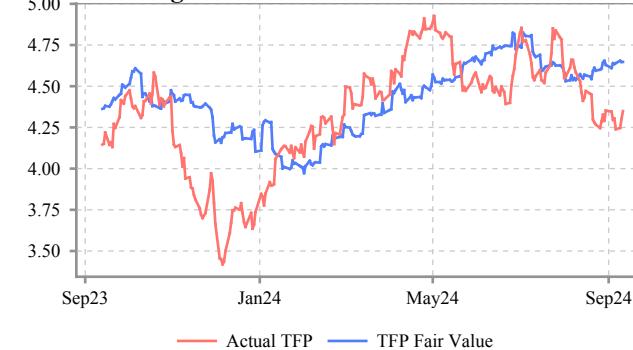
Derivatives Strategy

Swap Spread Fair Value Model Report – Term Funding Premium and Zero Duration Swap Spreads

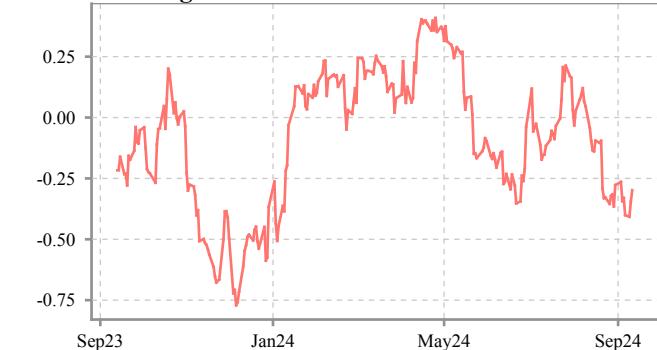
Term Funding Premium Model

	Coeff	T-Stat	Current Value
Fed balance sheet size (\$Tn)	-1.4	-21.18	7.17
AUM at top 20 core bond funds (\$bn)	-0.01	-19.93	443.85
Monthly UST supply (\$bn 10s)	0.01	7.75	234.76
RRP (\$Tn)	0.82	16.01	0.81
Intercept	18.74	58.11	
R-squared	0.89		
Std. error	0.3		
Actual TFP	4.35		
TFP Fair value	4.65		

Term Funding Premium Model: Actual vs Fair Value



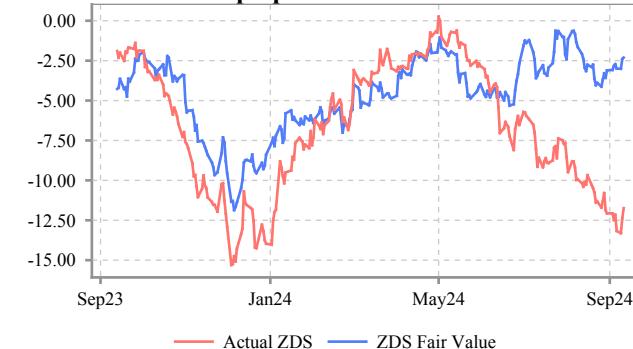
Term Funding Premium Model: Residual



Zero Duration Swap Spread Model

	Coeff	T-Stat	Current Value
TFP (bp/yr)	8.2	39.49	4.35
RRP (\$Tn)	4.1	33.27	0.81
3Mx3M OIS rate (%)	-3.36	-37.77	4.15
Intercept	-27.34	-47.56	
R-squared	0.72		
Std. error	2.17		
Actual ZDS	-11.74		
ZDS Fair value	-2.31		

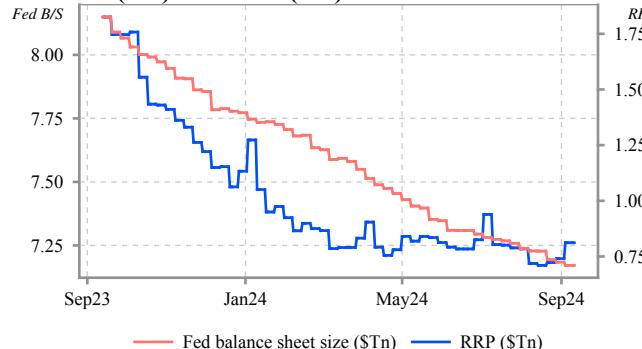
Zero Duration Swap Spread: Actual vs Fair Value



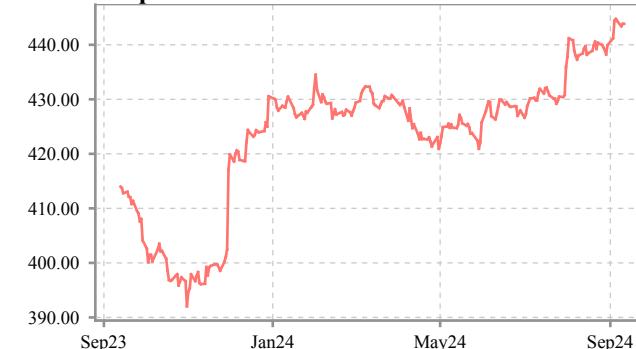
Zero Duration Swap Spread: Residual



Fed B/S (\$tn) and RRP (\$tn)



AUM at top 20 core bond funds



3Mx3M OIS rate (%)



* Term Funding Premium is defined as the negative of the slope of a regression of maturity matched swap spreads versus modified duration in benchmark sectors (2Y, 3Y, 5Y, 7Y, 10Y, 20Y and 30Y) on any given day

** Zero-duration swap spread is defined as the intercept from a regression of maturity matched swap spreads versus modified duration in benchmark sectors (2Y, 3Y, 5Y, 7Y, 10Y, 20Y and 30Y) on any given day

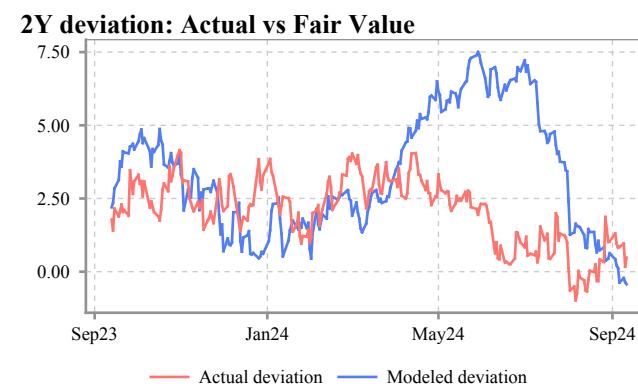
*** Regression from Apr 2021 – Jun 2024

Derivatives Strategy

Swap Spread Fair Value Model Report – Swap Spread Deviation from Term Structure

2Y modeled deviation from term structure

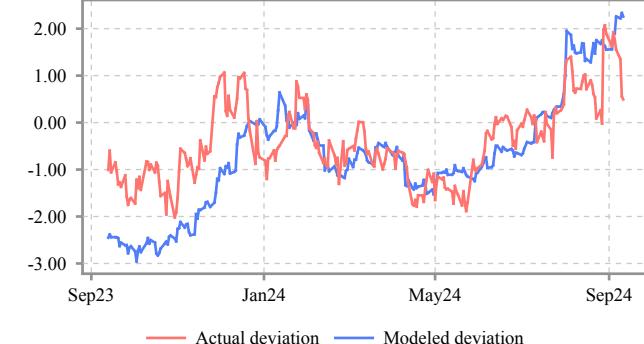
	Coeff	T-Stat	Current Value
RRP (\$Tn)	4.1	19.88	0.81
1Yx1Y imp. Vol (bp/day)	-0.74	-7.17	7.70
T-bill stock 3M pct chg	-0.31	-19.73	4.58
2Y UST yield (%)	3.09	15.82	3.64
1st/5th 3M SOFR futures curve %	2.78	15.62	-1.37
Intercept	-4.1	-13.09	
R-squared	0.67		
Std. error	2.53		
2Y Swap spread actual deviation	0.48		
2Y Swap spread modeled deviation	-0.43		



5Y modeled deviation from term structure

	Coeff	T-Stat	Current Value
2Yx2Y implied vol (bp/day)	-0.55	-17.0	6.83
6Mx1M - 1M OIS rate (%)	-2.57	-32.64	-1.48
Intercept	2.21	9.44	
R-squared	0.7		
Std. error	1.48		
5Y Swap spread actual deviation	0.49		
5Y Swap spread modeled deviation	2.26		

5Y deviation: Actual vs Fair Value



5Y deviation: Residual



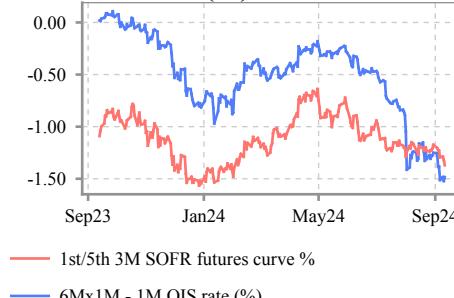
1Yx1Y and 2Yx2Y implied volatility (bp/day)



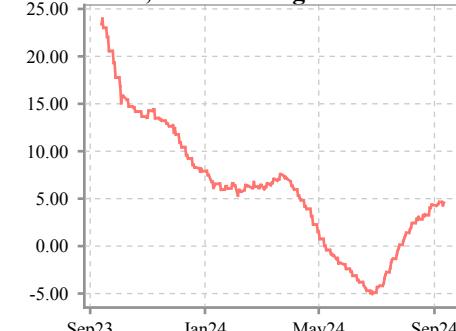
2Y UST yield (%)



Fed expectations and 6m1m-1m OIS (%)



T-bill stock, 3M % change



* 2Y/5Y swap spread deviation relative to the term structure of swap spreads is calculated for any given day as the actual 2Y/5Y maturity matched swap spread minus the fitted value as of that day. The fitted value is calculated from a cross sectional regression of maturity matched swap spreads at benchmark tenors (2s, 3s, 5s, 7s, 10s, 20s, 30s) versus their modified durations, and evaluated at the OTR 2Y/5Y note's modified duration.

** 2Y/5Y swap spread deviation relative to term structure of swap spreads is calculated for every day in this historical period, using the above definition

*** Regression period from April 2021 - Apr 2024

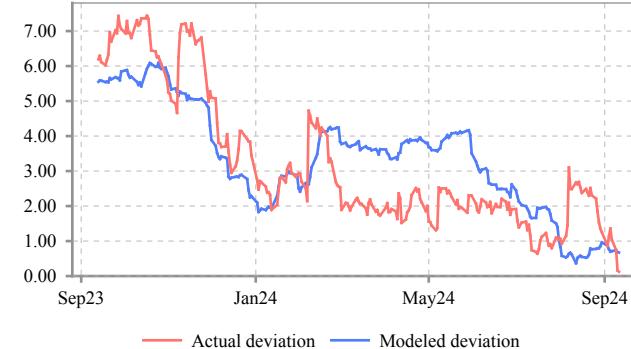
Derivatives Strategy

Swap Spread Fair Value Model Report – Swap Spread Deviation from Term Structure

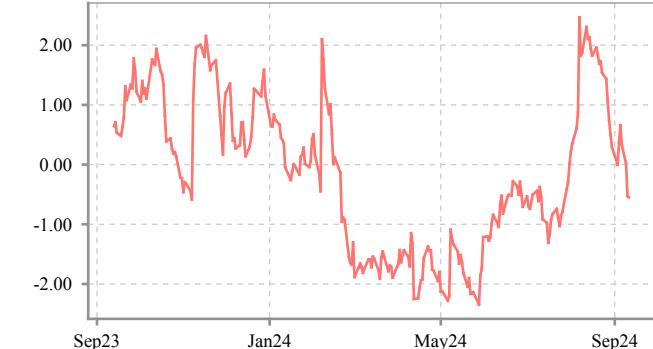
10Y modeled deviation from term structure

	Coeff	T-Stat	Current Value
Monthly UST supply	-0.04	-8.72	234.76
10Y yields	0.91	7.51	3.65
sofr-ioer (6w avg)	-0.98	-17.81	-6.38
Intercept	-0.37	-0.23	
R-squared	0.62		
Std. error	2.03		
10Y Swap spread actual deviation	0.12		
10Y Swap spread modeled deviation	0.67		

10Y deviation: Actual vs Fair Value



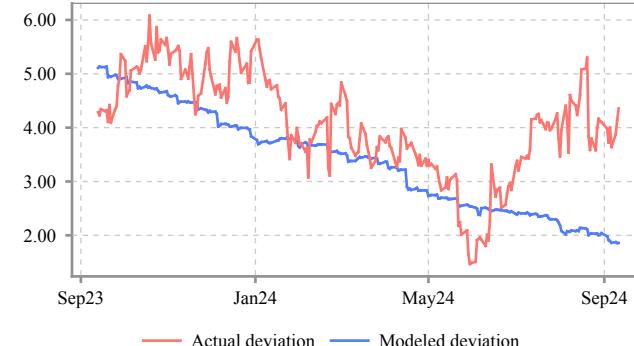
10Y deviation: Residual



30Y modeled deviation from term structure

	Coeff	T-Stat	Current Value
Fed balance sheet size (\$tn)	2.93	34.44	7.17
VA hedging needs (\$bn 20s)	-0.02	-16.06	75.83
Intercept	-17.36	-21.73	
R-squared	0.82		
Std. error	1.26		
30Y Swap spread actual deviation	4.36		
30Y Swap spread modeled deviation	1.86		

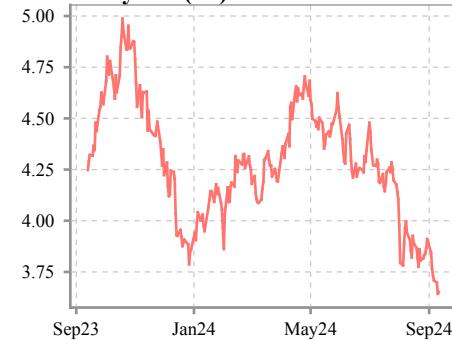
30Y deviation: Actual vs Fair Value



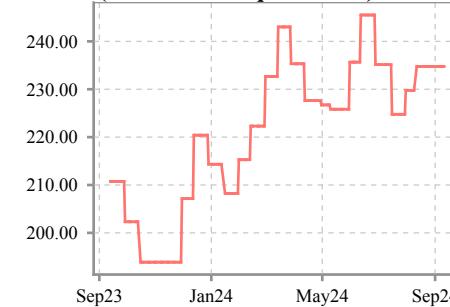
30Y deviation: Residual



10Y UST yield (%)



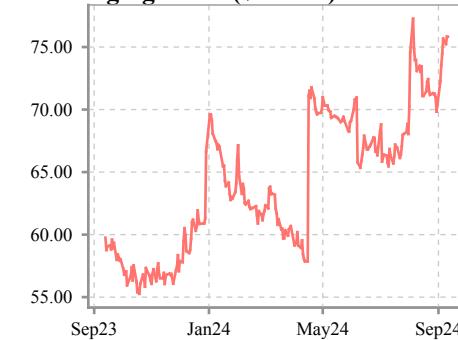
Monthly UST supply – 6w moving avg (\$bn of 10Y equivalents)



SOFR-IOER – 6w moving avg (%)



VA hedging needs (\$bn 20s)



* 10Y/30Y swap spread deviation relative to the term structure of swap spreads is calculated for any given day as the actual 10Y/30Y maturity matched swap spread minus the fitted value as of that day. The fitted value is calculated from a cross sectional regression of maturity matched swap spreads at benchmark tenors (2s, 3s, 5s, 7s, 10s, 20s, 30s) versus their modified durations, and evaluated at the OTR 10Y/30Y note's modified duration.

** 10Y/30Y swap spread deviation relative to term structure of swap spreads is calculated for every day in this historical period, using the above definition

*** Regression period from Apr 2021 - Apr 2024 (10Y deviation model) and Apr 2020 - Apr 2024 (30Y deviation model)

We use 6-week moving averages of Monthly UST duration supply as well as the SOFR-IOER differential for smoothing purposes

† Aggregate Variable Annuity duration, in \$bn 20s, is estimated using an approach developed and described in a separate JPMorgan Research Note - Interest Rate Risk in Variable Annuities, Sep 2011. Available upon request.

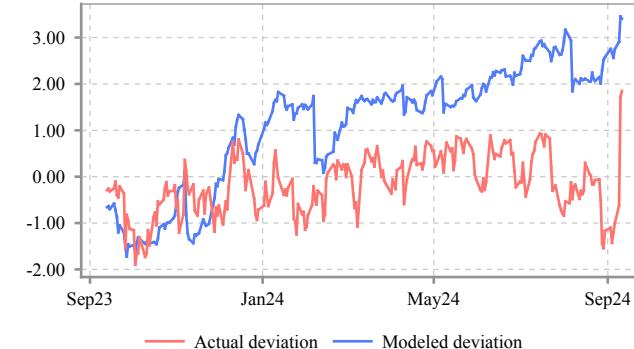
Derivatives Strategy

Swap Spread Fair Value Model Report – Swap Spread Deviation from Term Structure

3Y modeled deviation from term structure

	Coeff	T-Stat	Current Value
2-year spreads deviation from fitted structure	-0.23	-19.2	0.48
10-year spreads deviation from fitted structure	-0.62	-38.24	0.12
Intercept	3.59	35.97	
R-squared	0.76		
Std. error	1.41		
3Y Swap spread actual deviation	1.85		
3Y Swap spread modeled deviation	3.41		

3Y deviation: Actual vs Fair Value



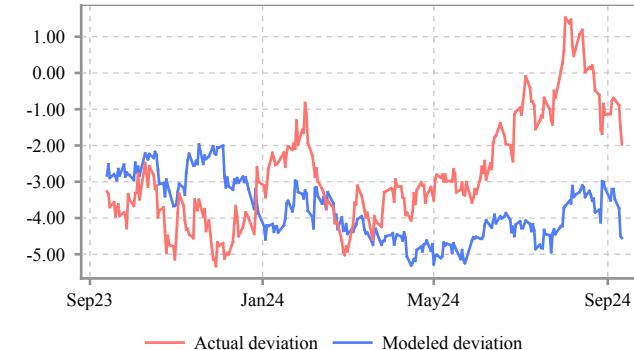
3Y deviation: Residual



7Y modeled deviation from term structure

	Coeff	T-Stat	Current Value
5-year spreads deviation from fitted structure	0.63	40.26	0.49
10-year spreads deviation from fitted structure	0.44	33.89	0.12
Intercept	-4.92	-74.03	
R-squared	0.72		
Std. error	1.05		
7Y Swap spread actual deviation	-1.97		
7Y Swap spread modeled deviation	-4.55		

7Y deviation: Actual vs Fair Value



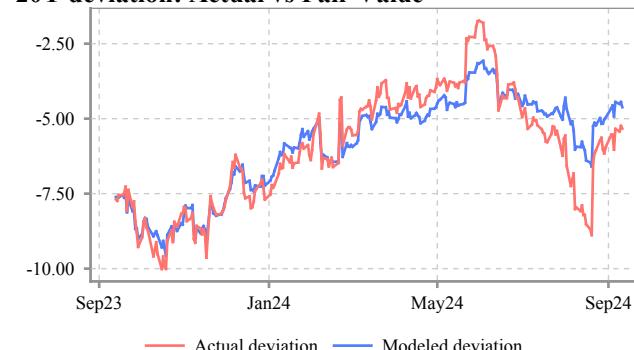
7Y deviation: Residual



20Y modeled deviation from term structure

	Coeff	T-Stat	Current Value
30-year spreads deviation from fitted structure	-0.89	-43.28	4.36
10-year spreads deviation from fitted structure	-0.5	-51.16	0.12
Intercept	-0.69	-5.67	
R-squared	0.87		
Std. error	0.87		
20Y Swap spread actual deviation	-5.33		
20Y Swap spread modeled deviation	-4.62		

20Y deviation: Actual vs Fair Value



20Y deviation: Residual



* 3Y, 7Y, and 20Y swap spread deviation relative to the term structure of swap spreads is calculated for any given day as the actual 3Y, 7Y, and 20Y maturity matched swap spread minus the fitted value as of that day. The fitted value is calculated from a cross sectional regression of maturity matched swap spreads at benchmark tenors (2s, 3s, 5s, 7s, 10s, 20s, 30s) versus their modified durations, and evaluated at the OTR 3Y, 7Y, and 20Y note's modified duration.

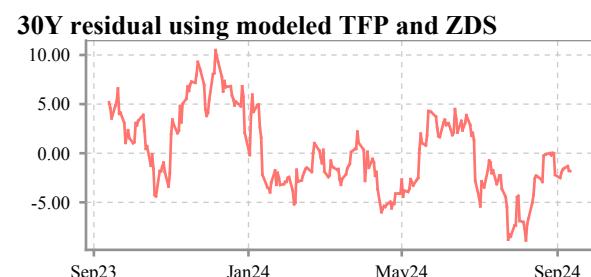
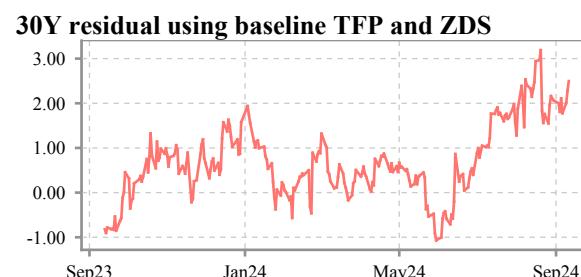
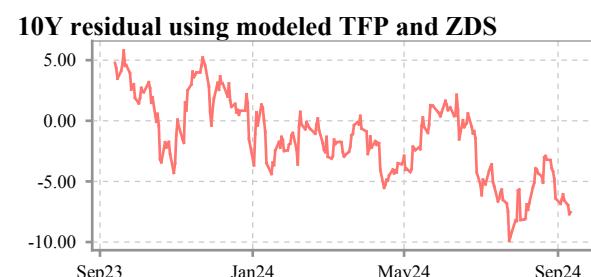
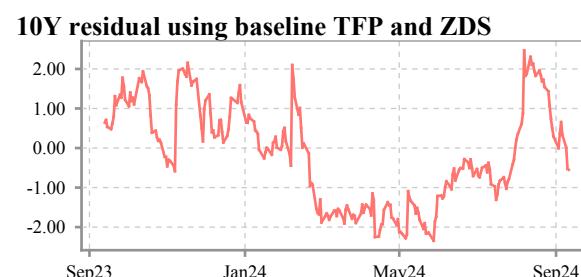
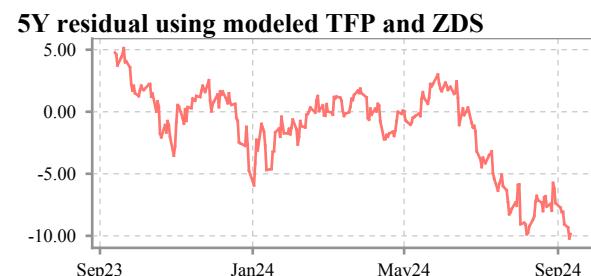
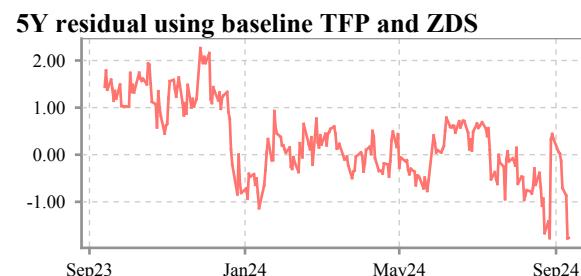
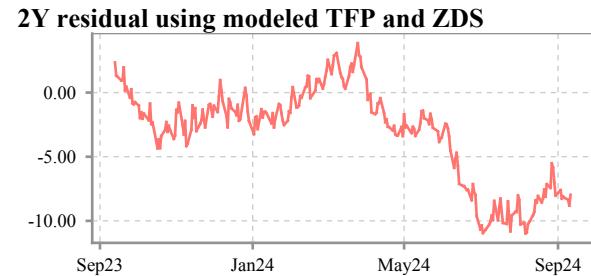
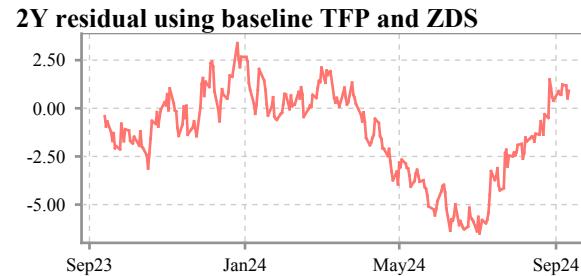
** 3Y, 7Y, and 20Y swap spread deviation relative to term structure of swap spreads is calculated for every day in this historical period, using the above definition

*** Regression period from Apr 2021 - Apr 2024

Derivatives Strategy

Swap Spread Fair Value Model Report – Swap Spread Fair Value Summary

Sector	Actual spread level	FV using baseline TFP and ZDS	FV using modeled TFP and ZDS	Residual using baseline TFP and ZDS	Residual using modeled TFP and ZDS
2Y	-19.4	-20.3	-11.5	0.9	-8.0
3Y	-22.2	-20.6	-12.0	-1.6	-10.1
5Y	-30.9	-29.1	-21.0	-1.8	-9.9
7Y	-40.2	-42.8	-35.1	2.6	-5.0
10Y	-47.2	-46.6	-39.6	-0.6	-7.5
20Y	-75.8	-75.1	-69.7	-0.7	-6.1
30Y	-81.9	-84.4	-80.1	2.5	-1.8



* Swap spread fair value is calculated as Term funding premium times modified duration of OTR bond + zero duration swap spread + modeled deviation

** Baseline TFP is defined as the negative of the slope of a regression of maturity matched swap spreads versus modified duration in benchmark sectors (2Y, 3Y, 5Y, 7Y, 10Y, 20Y and 30Y) on any given day

** Baseline ZDS is defined as the intercept from a regression of maturity matched swap spreads versus modified duration in benchmark sectors (2Y, 3Y, 5Y, 7Y, 10Y, 20Y and 30Y) on any given day

*** Modeled TFP is defined as the current Term funding premium fair value as defined on the page titled "Swap spread fair value model report – Term funding premium and Zero duration swap spreads"

*** Modeled ZDS is defined as the current Zero duration swap spread fair value as defined on the page titled "Swap spread fair value model report – Term funding premium and Zero duration swap spreads"

* Residual is calculated as Actual swap spread minus swap spread fair value.

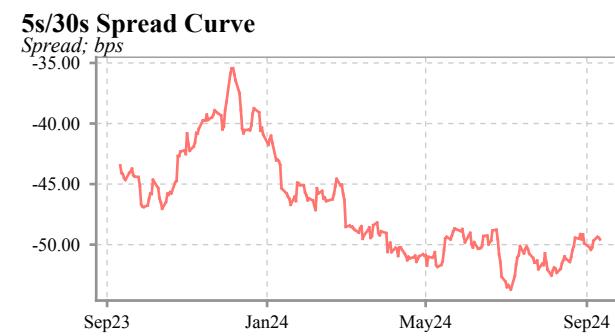
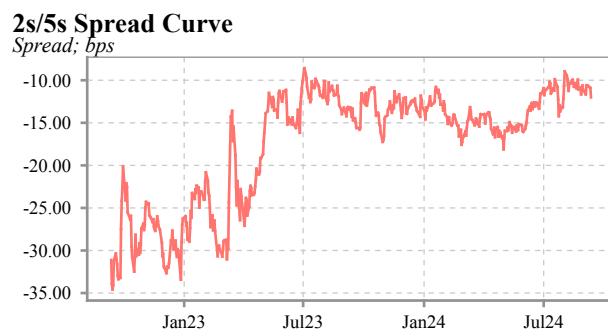
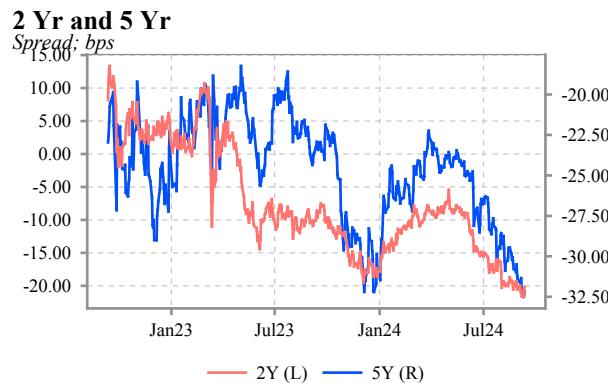
Derivatives Strategy

Off-the-run SOFR Swap Spread

Spreads	1-day	1-wk	1-mo	3-month				Total	6M Avg
	Spot	Chg	Chg	Chg	Repo	Carry	Slide		
1 Year	-9.0	1.0	1.4	1.7	5.09	2.2	-4.9	-2.6	1.3
2 Year	-20.1	1.4	0.8	-0.6	5.11	-0.2	-1.4	-1.6	-2.3
3 Year	-24.0	0.9	1.6	-1.6	5.11	-0.5	-1.2	-1.7	-2.0
5 Year	-32.2	0.3	-0.6	-2.7	5.11	-0.6	-1.1	-1.7	-2.0
7 Year	-39.9	0.0	-0.7	-4.8	5.11	-0.7	-0.4	-1.1	-1.2
10 Year	-47.4	0.3	-0.4	-3.3	5.11	-0.6	-0.3	-0.9	-1.1
20 Year	-76.0	0.0	0.4	-0.5	5.09	-0.8	-1.0	-1.8	-1.8
30 Year	-81.7	0.1	0.2	-1.0	5.07	-0.7	-0.3	-1.0	-1.0

Curves	1-day	1-wk	1-mo	2-Year				Z
	Spot	Chg	Chg	Chg	High	Low	Avg	
2s/3s	-3.9	-0.5	0.8	-1.0	-0.1	-23.2	-7.9	0.8
2s/5s	-12.0	-1.1	-1.4	-2.1	-8.6	-33.4	-16.9	0.8
2s/10s	-27.3	-1.1	-1.2	-2.7	-12.7	-39.2	-26.3	-0.2
2s/30s	-61.6	-1.2	-0.6	-0.4	-47.9	-86.0	-64.0	0.3
3s/5s	-8.2	-0.6	-2.2	-1.0	-2.3	-18.1	-9.0	0.3
3s/10s	-23.4	-0.6	-2.0	-1.6	-6.9	-26.6	-18.4	-1.2
5s/10s	-15.3	0.0	0.2	-0.6	-1.5	-16.5	-9.4	-1.6
5s/20s	-43.8	-0.3	1.1	2.2	-36.0	-53.1	-42.7	-0.4
5s/30s	-49.6	-0.1	0.8	1.7	-35.4	-57.0	-47.1	-0.6
7s/10s	-7.5	0.2	0.3	1.5	4.9	-9.3	-1.2	-1.8
10s/30s	-34.3	-0.2	0.6	2.3	-27.4	-50.9	-37.7	0.8
20s/30s	-5.7	0.1	-0.2	-0.4	3.0	-10.3	-4.4	-0.4

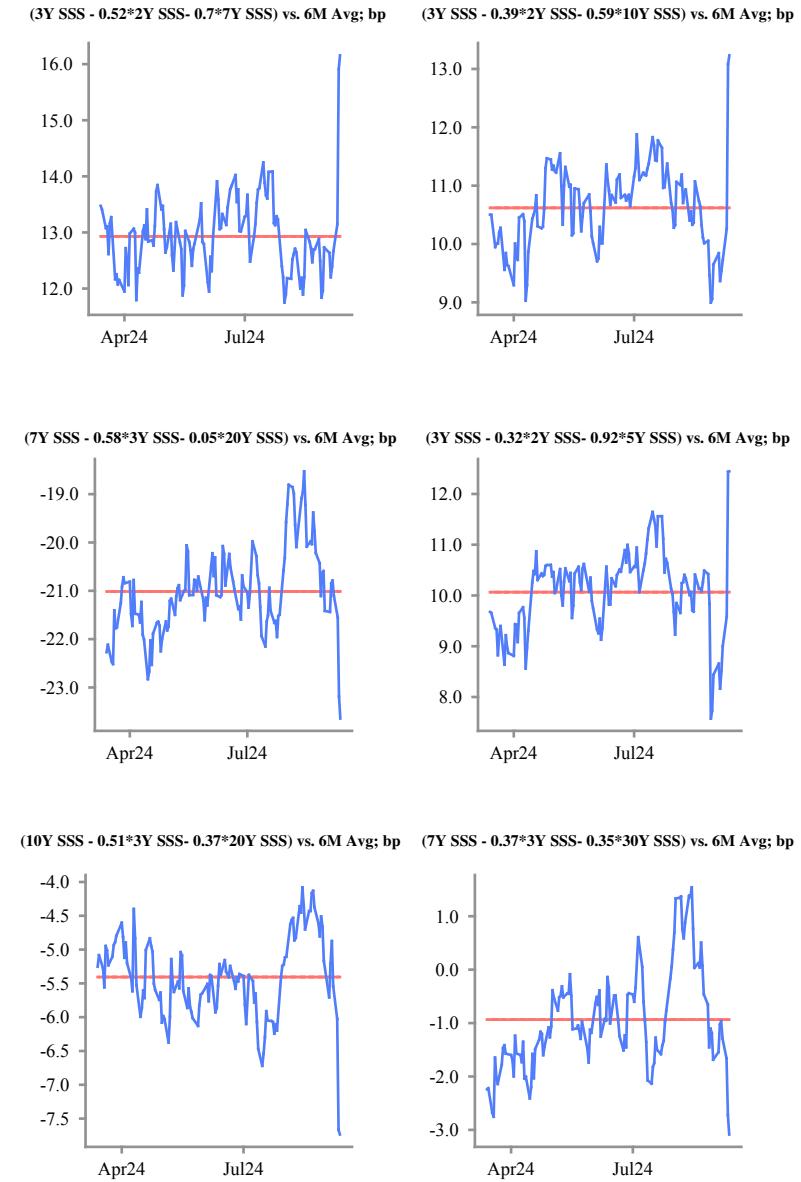
Butterflies	1-day	1-wk	1-mo	2-Year				Z
	Spot	Chg	Chg	Chg	High	Low	Avg	
2s/3s/5s	2.1	0.1	1.5	0.0	5.1	-8.6	0.5	0.7
2s/5s/10s	1.6	-0.6	-0.8	-0.7	3.2	-14.6	-3.7	1.2
2s/5s/30s	18.8	-0.5	-1.1	-1.9	21.6	3.5	15.1	1.0
2s/10s/30s	3.5	-0.5	-0.9	-2.5	14.5	-0.9	5.7	-0.7
3s/5s/10s	3.5	-0.3	-1.2	-0.2	5.4	-5.9	0.2	1.4
5s/7s/10s	-0.2	-0.2	-0.2	-1.8	1.8	-7.7	-3.6	1.7
5s/10s/20s	6.7	0.1	-0.3	-1.7	22.4	6.0	11.9	-1.4
5s/10s/30s	9.5	0.1	-0.2	-1.4	23.9	8.8	14.1	-1.3
10s/20s/30s	-11.4	-0.2	0.5	1.6	-8.3	-23.6	-14.5	1.0
10s/25s/30s	-23.2	-0.1	0.6	1.7	-18.1	-35.2	-24.0	0.2
20s/25s/30s	-8.9	0.1	0.2	0.4	-2.6	-12.5	-7.3	-1.0



Derivatives Strategy

SOFR Swap Spread Butterfly Report

Fly	3M Left Wt	3M Right Wt	6M Left Wt	6M Right Wt	9M Left Wt	9M Right Wt	1Y Left Wt	1Y Right Wt	Wtd Fly Cur.	Wtd Fly 6M Avg	6M Residual	6M Rsq	Ann. Rlzd Vol
2Ys3Ys5Ys	0.64	0.80	0.32	0.92	0.37	0.85	0.39	0.80	12.4	10.1	2.4	23%	4.4
2Ys3Ys7Ys	0.77	0.57	0.52	0.70	0.54	0.68	0.55	0.59	16.2	12.9	3.2	44%	5.5
2Ys3Ys10Ys	0.66	0.52	0.39	0.59	0.85	0.04	0.92	-0.05	13.2	10.6	2.6	8%	5.8
2Ys3Ys20Ys	0.84	0.24	0.60	0.25	0.84	0.04	0.84	0.08	8.3	6.6	1.6	41%	4.7
2Ys3Ys30Ys	0.79	0.47	0.59	0.40	0.88	-0.04	0.90	-0.06	22.2	20.4	1.9	6%	5.5
2Ys5Ys7Ys	0.30	0.64	0.26	0.70	0.27	0.72	0.27	0.67	2.5	1.6	0.9	61%	3.0
2Ys5Ys10Ys	0.12	0.64	0.07	0.68	0.45	0.29	0.57	0.15	2.5	2.0	0.4	86%	4.0
2Ys5Ys20Ys	0.46	0.26	0.31	0.29	0.48	0.19	0.53	0.21	-2.7	-2.0	-0.6	76%	5.3
2Ys5Ys30Ys	0.38	0.53	0.28	0.50	0.61	0.10	0.65	0.09	15.5	15.9	-0.4	60%	6.5
2Ys7Ys10Ys	-0.05	0.93	-0.24	0.96	0.35	0.41	0.62	0.17	0.4	0.8	-0.5	79%	5.6
2Ys7Ys20Ys	0.98	0.09	0.22	0.33	0.44	0.22	0.60	0.22	-11.2	-9.5	-1.7	49%	8.0
2Ys7Ys30Ys	0.46	0.78	0.06	0.75	0.59	0.14	0.72	0.09	22.4	23.8	-1.4	47%	10.2
2Ys10Ys20Ys	0.46	0.48	0.32	0.47	0.07	0.78	0.47	1.03	-5.2	-3.6	-1.5	57%	9.1
2Ys10Ys30Ys	0.41	0.83	0.31	0.74	0.46	0.53	0.55	0.69	19.4	20.5	-1.2	24%	8.7
2Ys20Ys30Ys	0.36	1.26	0.11	1.39	0.62	0.63	0.69	0.55	40.1	39.1	1.0	77%	8.7
3Ys5Ys7Ys	0.25	0.69	0.32	0.70	0.33	0.70	0.35	0.62	4.5	4.1	0.4	18%	2.8
3Ys5Ys10Ys	0.03	0.72	0.08	0.68	0.56	0.25	0.64	0.17	2.9	2.7	0.3	74%	4.0
3Ys5Ys20Ys	0.47	0.22	0.48	0.21	0.59	0.17	0.64	0.18	-4.4	-3.0	-1.4	70%	4.5
3Ys5Ys30Ys	0.36	0.52	0.41	0.41	0.70	0.12	0.74	0.13	11.7	12.7	-1.1	38%	5.6
3Ys7Ys10Ys	0.02	0.87	0.00	0.66	0.55	0.19	0.71	0.12	-8.9	-8.0	-0.8	57%	4.4
3Ys7Ys20Ys	1.03	-0.11	0.58	0.05	0.62	0.08	0.76	0.06	-23.6	-21.0	-2.6	58%	7.2
3Ys7Ys30Ys	0.54	0.55	0.37	0.35	0.67	0.09	0.79	0.08	-3.1	-0.9	-2.2	30%	7.7
3Ys10Ys20Ys	0.54	0.38	0.51	0.37	0.06	0.80	0.60	1.06	-7.7	-5.4	-2.3	37%	8.7
3Ys10Ys30Ys	0.47	0.69	0.49	0.59	0.54	0.57	0.64	0.74	12.1	14.1	-2.0	16%	8.1
3Ys20Ys30Ys	0.36	1.23	0.30	1.19	0.73	0.66	0.82	0.57	28.0	27.5	0.5	83%	7.0
5Ys7Ys10Ys	1.27	0.00	1.17	-0.21	1.03	-0.09	1.14	-0.08	-13.9	-12.6	-1.3	45%	5.0
5Ys7Ys20Ys	1.80	-0.35	1.29	-0.24	1.10	-0.12	1.19	-0.15	-18.9	-18.1	-0.9	78%	3.9
5Ys7Ys30Ys	1.42	-0.15	1.03	-0.13	0.96	-0.04	1.07	-0.06	-19.2	-18.1	-1.1	42%	4.3
5Ys10Ys20Ys	1.15	0.19	1.03	0.19	0.32	0.67	1.50	0.50	-1.1	-0.3	-0.8	53%	6.1
5Ys10Ys30Ys	1.06	0.37	1.00	0.31	0.80	0.50	0.92	0.64	9.2	9.9	-0.7	82%	5.2
5Ys20Ys30Ys	0.71	1.12	0.67	0.98	1.08	0.57	1.19	0.45	24.9	23.5	1.4	91%	6.4
7Ys10Ys20Ys	0.69	0.41	0.82	0.41	0.32	0.71	1.31	0.78	16.4	16.3	0.1	35%	5.3
7Ys10Ys30Ys	0.74	0.61	0.81	0.62	0.88	0.58	0.92	0.72	36.5	36.0	0.5	86%	4.9
7Ys20Ys30Ys	0.29	1.45	0.56	1.18	1.20	0.68	1.24	0.60	42.9	40.8	2.1	93%	8.4
10Ys20Ys30Ys	0.47	1.12	0.52	0.95	1.30	-0.02	0.98	0.23	26.5	24.8	1.6	84%	8.5



Note: SOFR swap spreads are calculated as the maturity matched swap spread for the current on the run security. To calculate the weights, a 6M empirical regression is used of the 50/50 weighted spread fly regressed against the belly spread and the difference in the wing spreads. Weights on the butterfly are calculated similar to swap curve butterfly trades, i.e. they are structured to be "level" and "curve" neutral with respect to the maturity matched swap spread curve: left weight = $(0.5 \cdot \text{beta_curve}) / (1 - \text{beta_level})$ and right weight = $(0.5 + \text{beta_curve}) / (1 - \text{beta_level})$, where beta_level and beta_curve are calculated from the 6M regression described previously. The weighted spread is plotted and the 6M average of the weight spread is compared to the current weighted spread value to compute the residual. The weighted butterfly spreads trades with the greatest absolute residual are shown. SSS stands for SOFR swap spread.

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Derivatives Strategy

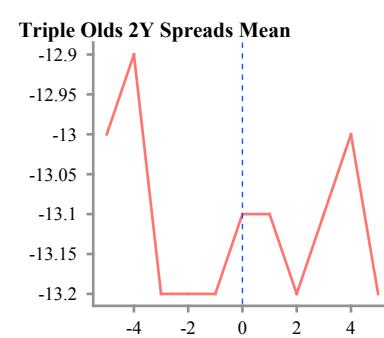
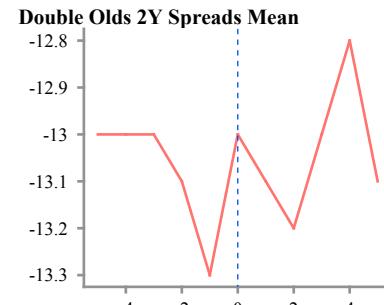
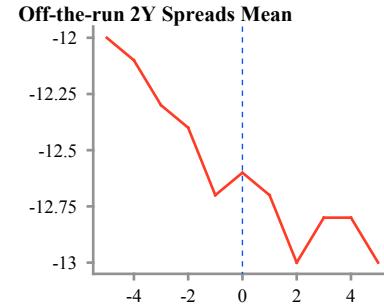
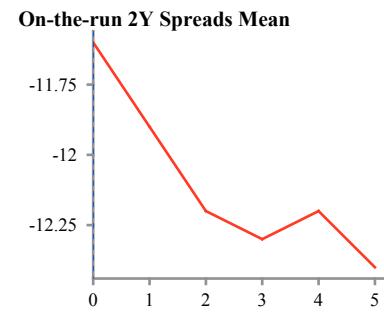
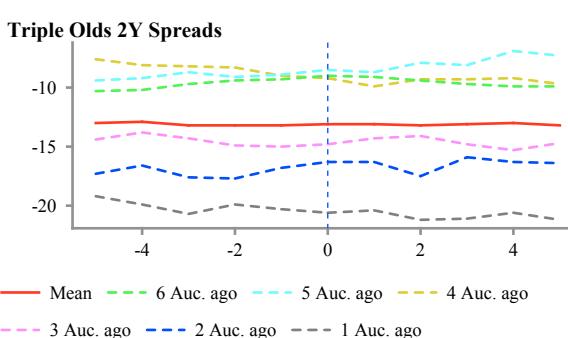
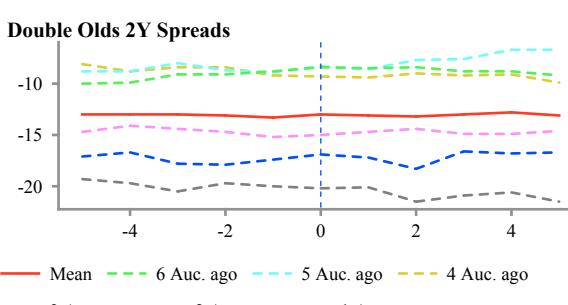
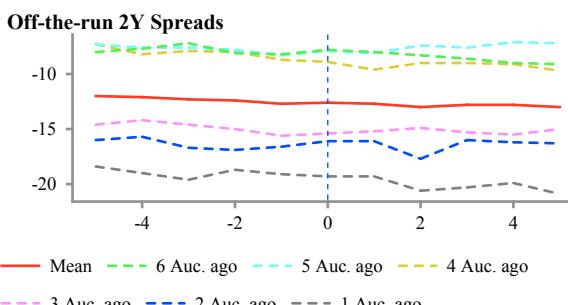
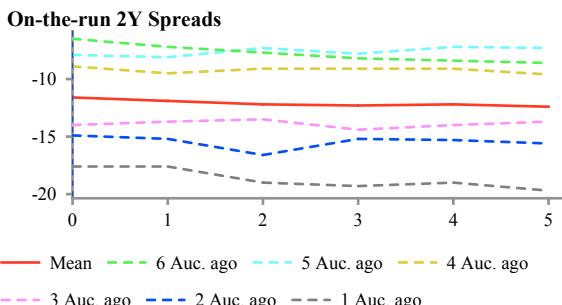
SOFR Swap Spreads Auction Cycle Report

On-the-run 2Y Spreads	0	1	2	3	4	5
Mean	-11.6	-11.9	-12.2	-12.3	-12.2	-12.4
6. Auc Day 2024-03-25: T 4.5% Mar 31 2026	-6.5	-7.2	-7.7	-8.2	-8.4	-8.6
5. Auc Day 2024-04-23: T 4.875% Apr 30 2026	-7.9	-8.1	-7.3	-7.8	-7.2	-7.3
4. Auc Day 2024-05-28: T 4.875% May 31 2026	-8.9	-9.5	-9.1	-9.1	-9.1	-9.6
3. Auc Day 2024-06-25: T 4.625% Jun 30 2026	-14.0	-13.7	-13.5	-14.4	-14.0	-13.7
2. Auc Day 2024-07-23: T 4.375% Jul 31 2026	-14.9	-15.2	-16.6	-15.2	-15.3	-15.6
1. Auc Day 2024-08-27: T 3.75% Aug 31 2026	-17.6	-17.6	-19.0	-19.3	-19.0	-19.7

Off-the-run 2Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-12.0	-12.1	-12.3	-12.4	-12.7	-12.6	-12.7	-13.0	-12.8	-12.8	-13.0
6. Auc Day 2024-03-25: T 4.625% Feb 28 2026	-8.0	-7.7	-7.2	-8.1	-8.2	-7.8	-8.0	-8.3	-8.6	-9.0	-9.1
5. Auc Day 2024-04-23: T 4.5% Mar 31 2026	-7.3	-7.6	-7.6	-7.8	-8.3	-7.9	-8.1	-7.4	-7.6	-7.1	-7.2
4. Auc Day 2024-05-28: T 4.875% Apr 30 2026	-7.3	-8.2	-7.9	-8.0	-8.7	-8.9	-9.6	-9.0	-9.0	-9.1	-9.7
3. Auc Day 2024-06-25: T 4.875% May 31 2026	-14.6	-14.2	-14.6	-15.0	-15.6	-15.4	-15.2	-14.9	-15.3	-15.5	-15.0
2. Auc Day 2024-07-23: T 4.625% Jun 30 2026	-16.0	-15.7	-16.7	-16.9	-16.6	-16.1	-16.1	-17.7	-16.0	-16.2	-16.3
1. Auc Day 2024-08-27: T 4.375% Jul 31 2026	-18.4	-19.0	-19.6	-18.7	-19.1	-19.3	-19.3	-20.6	-20.3	-19.9	-20.9

Double Olds 2Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-13.0	-13.0	-13.0	-13.1	-13.3	-13.0	-13.1	-13.2	-13.0	-12.8	-13.1
6. Auc Day 2024-03-25: T 4.25% Jan 31 2026	-10.0	-9.9	-9.1	-9.1	-8.8	-8.4	-8.5	-8.4	-8.8	-8.8	-9.2
5. Auc Day 2024-04-23: T 4.625% Feb 28 2026	-8.8	-8.8	-8.0	-8.7	-8.9	-8.3	-8.6	-7.7	-7.6	-6.7	-6.7
4. Auc Day 2024-05-28: T 4.5% Mar 31 2026	-8.1	-8.8	-8.4	-8.4	-9.2	-9.3	-9.4	-9.0	-9.2	-9.1	-9.9
3. Auc Day 2024-06-25: T 4.875% Apr 30 2026	-14.7	-14.1	-14.4	-14.7	-15.2	-15.0	-14.7	-14.4	-14.9	-14.9	-14.6
2. Auc Day 2024-07-23: T 4.875% May 31 2026	-17.1	-16.7	-17.8	-17.9	-17.4	-16.9	-17.2	-18.3	-16.6	-16.8	-16.7
1. Auc Day 2024-08-27: T 4.625% Jun 30 2026	-19.3	-19.7	-20.5	-19.7	-20.0	-20.2	-20.1	-21.5	-20.9	-20.6	-21.5

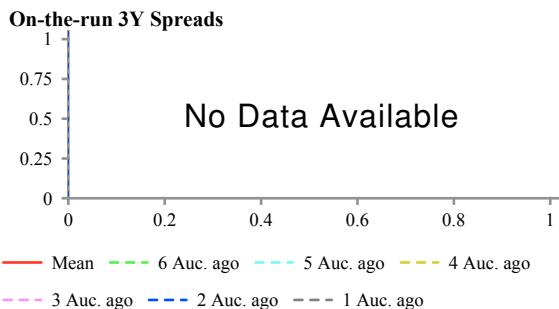
Triple Olds 2Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-13.0	-12.9	-13.2	-13.2	-13.2	-13.1	-13.1	-13.2	-13.1	-13.0	-13.2
6. Auc Day 2024-03-25: T 4.25% Dec 31 2025	-10.3	-10.2	-9.7	-9.4	-9.3	-9.0	-9.1	-9.4	-9.7	-9.9	-9.9
5. Auc Day 2024-04-23: T 4.25% Jan 31 2026	-9.4	-9.2	-8.7	-9.1	-8.9	-8.5	-8.7	-7.9	-8.1	-6.9	-7.3
4. Auc Day 2024-05-28: T 4.625% Feb 28 2026	-7.6	-8.1	-8.2	-8.3	-9.0	-9.2	-9.9	-9.3	-9.3	-9.2	-9.7
3. Auc Day 2024-06-25: T 4.5% Mar 31 2026	-14.4	-13.8	-14.3	-14.9	-15.0	-14.8	-14.3	-14.1	-14.8	-15.3	-14.7
2. Auc Day 2024-07-23: T 4.875% Apr 30 2026	-17.3	-16.6	-17.6	-17.7	-16.8	-16.3	-16.3	-17.5	-15.9	-16.3	-16.4
1. Auc Day 2024-08-27: T 4.875% May 31 2026	-19.2	-19.9	-20.7	-19.9	-20.3	-20.6	-20.4	-21.2	-21.1	-20.6	-21.2



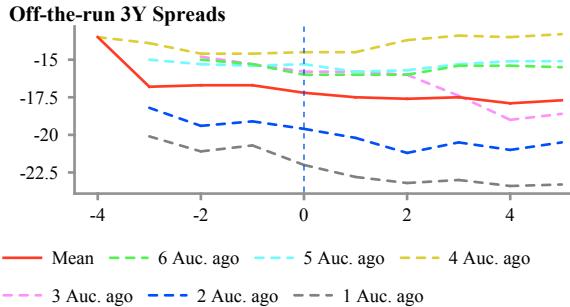
Derivatives Strategy

SOFR Swap Spreads Auction Cycle Report

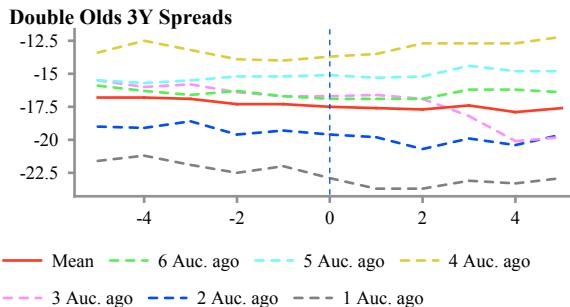
On-the-run 3Y Spreads	0	1	2	3	4	5
Mean						
6. Auc Day 2024-03-11: T 4.5% Apr 15 2027						
5. Auc Day 2024-04-09: T 4.5% May 15 2027	-16.8	-16.7	-16.7	-17.2	-17.5	-17.6
4. Auc Day 2024-05-07: T 4.625% Jun 15 2027	-15.0	-15.3	-16.0	-16.0	-16.0	-15.4
3. Auc Day 2024-06-10: T 4.375% Jul 15 2027	-15.0	-15.3	-15.4	-15.3	-15.7	-15.3
2. Auc Day 2024-07-09: T 3.75% Aug 15 2027	-14.8	-15.3	-15.8	-15.8	-16.0	-17.4
1. Auc Day 2024-08-06: T 3.375% Sep 15 2027	-20.1	-21.1	-20.7	-22.0	-22.8	-23.2



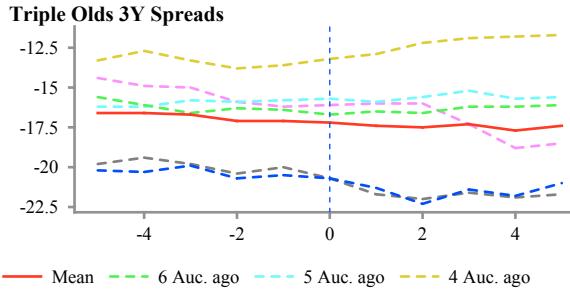
Off-the-run 3Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean											
6. Auc Day 2024-03-11: T 4.25% Mar 15 2027	-13.5	-16.8	-16.7	-16.7	-17.2	-17.5	-17.6	-17.5	-17.9	-17.7	-17.7
5. Auc Day 2024-04-09: T 4.5% Apr 15 2027	-15.0	-15.3	-15.4	-15.3	-15.8	-15.7	-15.3	-15.1	-15.1	-15.1	-15.5
4. Auc Day 2024-05-07: T 4.5% May 15 2027	-13.5	-13.9	-14.6	-14.6	-14.5	-14.5	-13.7	-13.4	-13.5	-13.3	-13.3
3. Auc Day 2024-06-10: T 4.625% Jun 15 2027	-14.8	-15.3	-15.8	-15.8	-16.0	-17.4	-19.0	-18.6	-18.6	-18.6	-18.6
2. Auc Day 2024-07-09: T 4.375% Jul 15 2027	-18.2	-19.4	-19.1	-19.6	-20.2	-21.2	-20.5	-21.0	-21.0	-20.5	-20.5
1. Auc Day 2024-08-06: T 3.75% Aug 15 2027	-20.1	-21.1	-20.7	-22.0	-22.8	-23.2	-23.0	-23.4	-23.3	-23.3	-23.3



Double Olds 3Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean											
6. Auc Day 2024-03-11: T 4.125% Feb 15 2027	-16.8	-16.8	-16.9	-17.3	-17.3	-17.5	-17.6	-17.7	-17.4	-17.9	-17.6
5. Auc Day 2024-04-09: T 4.25% Mar 15 2027	-15.9	-16.3	-16.6	-16.3	-16.7	-16.9	-16.9	-16.9	-16.2	-16.2	-16.4
4. Auc Day 2024-05-07: T 4.5% Apr 15 2027	-15.5	-15.7	-15.5	-15.2	-15.2	-15.1	-15.3	-15.2	-14.4	-14.8	-14.8
3. Auc Day 2024-06-10: T 4.5% May 15 2027	-13.4	-12.5	-13.2	-13.9	-14.0	-13.7	-13.5	-12.7	-12.7	-12.7	-12.2
2. Auc Day 2024-07-09: T 4.625% Jun 15 2027	-15.5	-16.0	-15.8	-16.4	-16.7	-16.7	-16.6	-16.9	-18.2	-20.1	-19.8
1. Auc Day 2024-08-06: T 3.75% Jul 15 2027	-19.0	-19.1	-18.6	-19.6	-19.3	-19.6	-19.8	-20.7	-19.9	-20.4	-19.6



Triple Olds 3Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean											
6. Auc Day 2024-03-11: T 4.0% Jan 15 2027	-16.6	-16.6	-16.7	-17.1	-17.1	-17.2	-17.4	-17.5	-17.3	-17.7	-17.4
5. Auc Day 2024-04-09: T 4.125% Feb 15 2027	-15.6	-16.1	-16.6	-16.3	-16.4	-16.7	-16.5	-16.6	-16.2	-16.2	-16.1
4. Auc Day 2024-05-07: T 4.25% Mar 15 2027	-16.2	-16.2	-15.8	-15.9	-15.8	-15.7	-15.9	-15.6	-15.2	-15.7	-15.6
3. Auc Day 2024-06-10: T 4.5% Apr 15 2027	-13.3	-12.7	-13.3	-13.8	-13.6	-13.2	-12.9	-12.2	-11.9	-11.8	-11.7
2. Auc Day 2024-07-09: T 4.5% May 15 2027	-14.4	-14.9	-15.0	-15.9	-16.2	-16.1	-16.0	-16.0	-17.3	-18.8	-18.5
1. Auc Day 2024-08-06: T 4.625% Jun 15 2027	-20.2	-20.3	-19.9	-20.7	-20.5	-20.7	-21.3	-22.3	-21.4	-21.8	-21.0



Derivatives Strategy

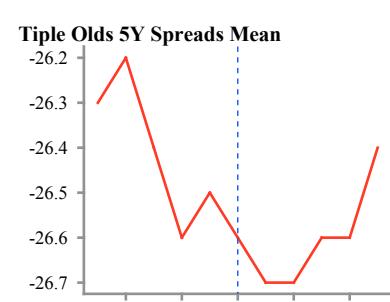
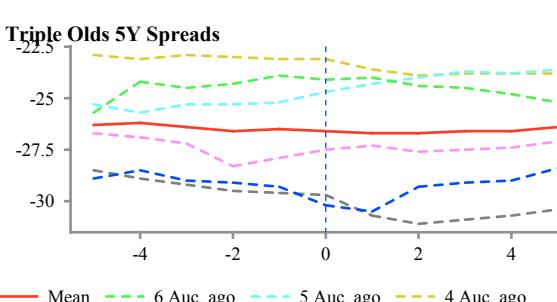
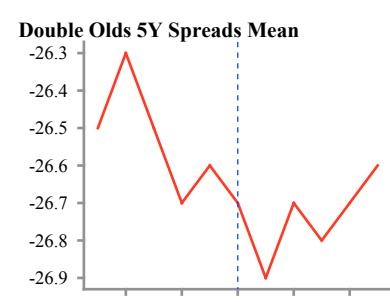
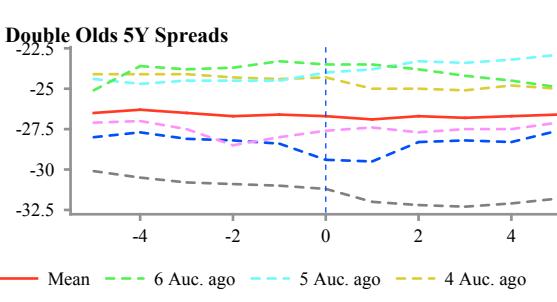
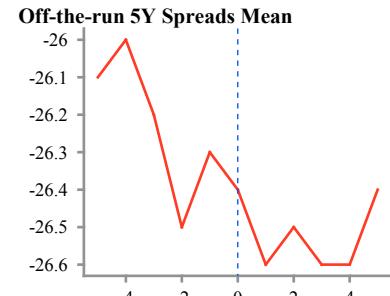
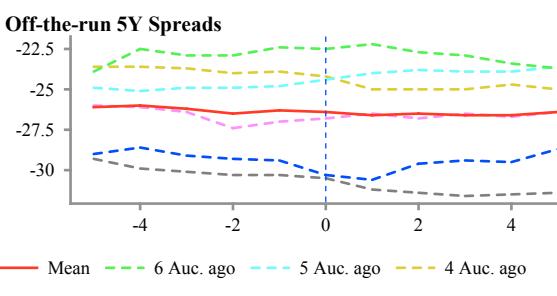
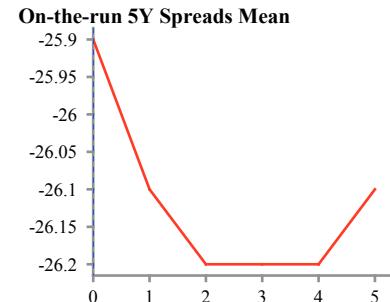
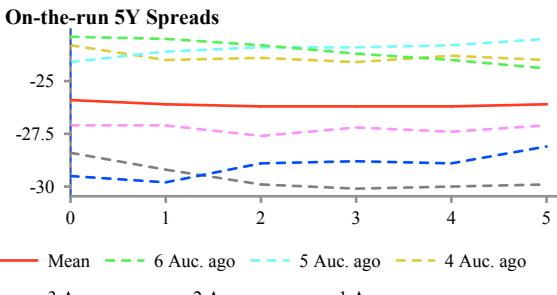
SOFR Swap Spreads Auction Cycle Report

On-the-run 5Y Spreads	0	1	2	3	4	5
Mean	-25.9	-26.1	-26.2	-26.2	-26.2	-26.1
6. Auc Day 2024-03-26: T 4.125% Mar 31 2029	-22.9	-23.0	-23.3	-23.7	-24.0	-24.4
5. Auc Day 2024-04-24: T 4.625% Apr 30 2029	-24.1	-23.6	-23.4	-23.4	-23.3	-23.0
4. Auc Day 2024-05-28: T 4.5% May 31 2029	-23.3	-24.0	-23.9	-24.1	-23.8	-24.0
3. Auc Day 2024-06-26: T 4.25% Jun 30 2029	-27.1	-27.1	-27.6	-27.2	-27.4	-27.1
2. Auc Day 2024-07-24: T 4.0% Jul 31 2029	-29.5	-29.8	-28.9	-28.8	-28.9	-28.1
1. Auc Day 2024-08-28: T 3.625% Aug 31 2029	-28.4	-29.2	-29.9	-30.1	-30.0	-29.9

Off-the-run 5Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-26.1	-26.0	-26.2	-26.5	-26.3	-26.4	-26.6	-26.5	-26.6	-26.6	-26.4
6. Auc Day 2024-03-26: T 4.25% Feb 28 2029	-23.9	-22.5	-22.9	-22.9	-22.4	-22.5	-22.2	-22.7	-22.9	-23.4	-23.7
5. Auc Day 2024-04-24: T 4.125% Mar 31 2029	-24.9	-25.1	-24.9	-24.9	-24.8	-24.4	-24.0	-23.8	-23.9	-23.9	-23.6
4. Auc Day 2024-05-28: T 4.625% Apr 30 2029	-23.6	-23.6	-23.7	-24.0	-23.9	-24.2	-25.0	-25.0	-25.0	-24.7	-25.0
3. Auc Day 2024-06-26: T 4.5% May 31 2029	-26.0	-26.1	-26.4	-27.4	-27.0	-26.8	-26.5	-26.8	-26.5	-26.7	-26.4
2. Auc Day 2024-07-24: T 4.25% Jun 30 2029	-29.0	-28.6	-29.1	-29.3	-29.4	-30.3	-30.6	-29.6	-29.4	-29.5	-28.7
1. Auc Day 2024-08-28: T 4.0% Jul 31 2029	-29.3	-29.9	-30.1	-30.3	-30.3	-30.5	-31.2	-31.4	-31.6	-31.5	-31.4

Double Olds 5Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-26.5	-26.3	-26.5	-26.7	-26.6	-26.7	-26.9	-26.7	-26.8	-26.7	-26.6
6. Auc Day 2024-03-26: T 4.0% Jan 31 2029	-25.1	-23.6	-23.8	-23.7	-23.3	-23.5	-23.5	-23.8	-24.2	-24.5	-24.9
5. Auc Day 2024-04-24: T 4.25% Feb 28 2029	-24.4	-24.7	-24.5	-24.5	-24.5	-24.0	-23.8	-23.3	-23.4	-23.2	-22.9
4. Auc Day 2024-05-28: T 4.125% Mar 31 2029	-24.1	-24.1	-24.1	-24.3	-24.4	-24.3	-25.0	-25.0	-25.1	-24.8	-25.0
3. Auc Day 2024-06-26: T 4.625% Apr 30 2029	-27.1	-27.0	-27.5	-28.5	-28.0	-27.6	-27.4	-27.7	-27.5	-27.5	-27.1
2. Auc Day 2024-07-24: T 4.5% May 31 2029	-28.0	-27.7	-28.1	-28.2	-28.4	-29.4	-29.5	-28.3	-28.2	-28.3	-27.6
1. Auc Day 2024-08-28: T 4.25% Jun 30 2029	-30.1	-30.5	-30.8	-30.9	-31.0	-31.2	-32.0	-32.2	-32.3	-32.1	-31.8

Triple Olds 5Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-26.3	-26.2	-26.4	-26.6	-26.5	-26.6	-26.7	-26.7	-26.6	-26.6	-26.4
6. Auc Day 2024-03-26: T 3.75% Dec 31 2028	-25.7	-24.2	-24.5	-24.3	-23.9	-24.1	-24.0	-24.4	-24.5	-24.8	-25.2
5. Auc Day 2024-04-24: T 4.0% Jan 31 2029	-25.3	-25.7	-25.3	-25.3	-25.2	-24.7	-24.3	-24.0	-23.7	-23.8	-23.6
4. Auc Day 2024-05-28: T 4.25% Feb 28 2029	-22.9	-23.1	-22.9	-23.0	-23.1	-23.1	-23.6	-23.9	-23.8	-23.8	-23.8
3. Auc Day 2024-06-26: T 4.125% Mar 31 2029	-26.7	-26.9	-27.2	-28.3	-27.9	-27.5	-27.3	-27.6	-27.5	-27.4	-27.1
2. Auc Day 2024-07-24: T 4.625% Apr 30 2029	-28.9	-28.5	-29.0	-29.1	-29.3	-30.2	-30.5	-29.3	-29.1	-29.0	-28.4
1. Auc Day 2024-08-28: T 4.5% May 31 2029	-28.5	-28.9	-29.2	-29.5	-29.6	-29.7	-30.7	-31.1	-30.9	-30.7	-30.4

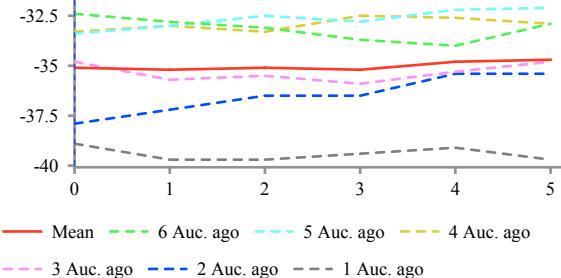


Derivatives Strategy

SOFR Swap Spreads Auction Cycle Report

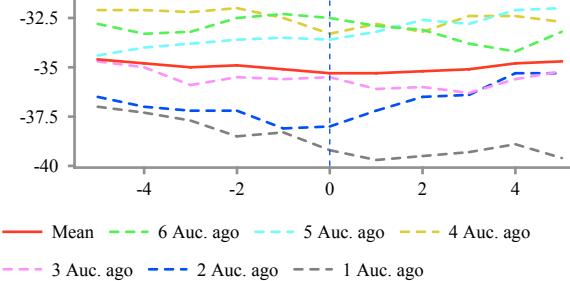
On-the-run 7Y Spreads	0	1	2	3	4	5
Mean	-35.1	-35.2	-35.1	-35.2	-34.8	-34.7
6. Auc Day 2024-03-27: T 4.125% Mar 31 2031	-32.4	-32.8	-33.1	-33.7	-34.0	-32.9
5. Auc Day 2024-04-25: T 4.625% Apr 30 2031	-33.4	-33.0	-32.5	-32.8	-32.2	-32.1
4. Auc Day 2024-05-29: T 4.625% May 31 2031	-33.3	-33.0	-33.3	-32.5	-32.6	-32.9
3. Auc Day 2024-06-27: T 4.25% Jun 30 2031	-34.8	-35.7	-35.5	-35.9	-35.3	-34.8
2. Auc Day 2024-07-25: T 4.125% Jul 31 2031	-37.9	-37.2	-36.5	-36.5	-35.4	-35.4
1. Auc Day 2024-08-29: T 3.75% Aug 31 2031	-38.9	-39.7	-39.7	-39.4	-39.1	-39.7

On-the-run 7Y Spreads



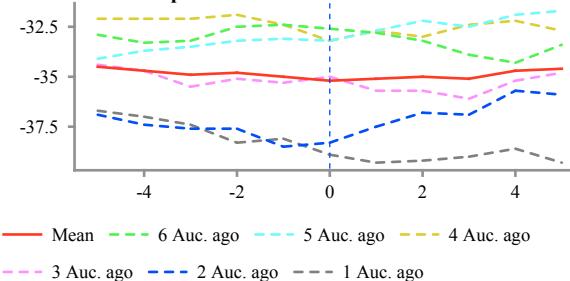
Off-the-run 7Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-34.6	-34.8	-35.0	-34.9	-35.1	-35.3	-35.3	-35.2	-35.1	-34.8	-34.7
6. Auc Day 2024-03-27: T 4.25% Feb 28 2031	-32.8	-33.3	-33.2	-32.5	-32.3	-32.5	-32.9	-33.1	-33.8	-34.2	-33.2
5. Auc Day 2024-04-25: T 4.125% Mar 31 2031	-34.4	-34.0	-33.8	-33.6	-33.5	-33.6	-33.2	-32.6	-32.8	-32.1	-32.0
4. Auc Day 2024-05-29: T 4.625% Apr 30 2031	-32.1	-32.1	-32.2	-32.0	-32.5	-33.3	-32.8	-33.2	-32.4	-32.4	-32.7
3. Auc Day 2024-06-27: T 4.625% May 31 2031	-34.7	-35.0	-35.9	-35.5	-35.6	-35.5	-36.1	-36.0	-36.3	-35.6	-35.2
2. Auc Day 2024-07-25: T 4.25% Jun 30 2031	-36.5	-37.0	-37.2	-37.2	-38.1	-38.0	-37.2	-36.5	-36.4	-35.3	-35.3
1. Auc Day 2024-08-29: T 4.125% Jul 31 2031	-37.0	-37.3	-37.7	-38.5	-38.3	-39.2	-39.7	-39.5	-39.3	-38.9	-39.6

Off-the-run 7Y Spreads



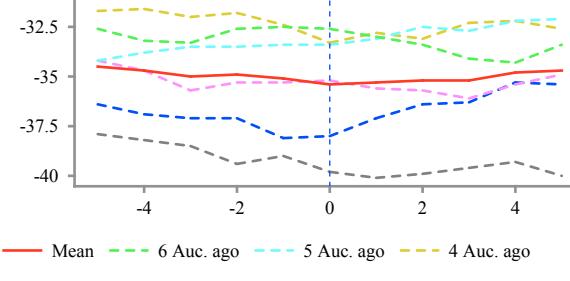
Double Olds 7Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-34.5	-34.7	-34.9	-34.8	-35.0	-35.2	-35.1	-35.0	-35.1	-34.7	-34.6
6. Auc Day 2024-03-27: T 4.0% Jan 31 2031	-32.9	-33.3	-33.2	-32.5	-32.4	-32.6	-32.8	-33.2	-33.9	-34.3	-33.4
5. Auc Day 2024-04-25: T 4.25% Feb 28 2031	-34.1	-33.7	-33.5	-33.2	-33.1	-33.2	-32.7	-32.2	-32.5	-31.9	-31.7
4. Auc Day 2024-05-29: T 4.125% Mar 31 2031	-32.1	-32.1	-32.1	-31.9	-32.4	-33.2	-32.7	-33.0	-32.4	-32.2	-32.7
3. Auc Day 2024-06-27: T 4.625% Apr 30 2031	-34.4	-34.7	-35.5	-35.1	-35.3	-35.0	-35.7	-35.7	-36.1	-35.2	-34.8
2. Auc Day 2024-07-25: T 4.625% May 31 2031	-36.9	-37.4	-37.6	-37.6	-38.5	-38.3	-37.5	-36.8	-36.9	-35.7	-35.9
1. Auc Day 2024-08-29: T 4.25% Jun 30 2031	-36.7	-37.0	-37.4	-38.3	-38.1	-38.9	-39.3	-39.2	-39.0	-38.6	-39.3

Double Olds 7Y Spreads

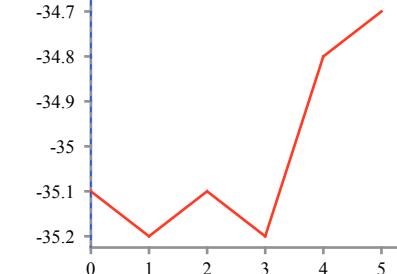


Triple Olds 7Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-34.5	-34.7	-35.0	-34.9	-35.1	-35.4	-35.3	-35.2	-35.2	-34.8	-34.7
6. Auc Day 2024-03-27: T 3.75% Dec 31 2030	-32.6	-33.2	-33.3	-32.6	-32.5	-32.6	-33.0	-33.4	-34.1	-34.3	-33.4
5. Auc Day 2024-04-25: T 4.0% Jan 31 2031	-34.2	-33.8	-33.5	-33.5	-33.4	-33.4	-33.1	-32.5	-32.7	-32.2	-32.1
4. Auc Day 2024-05-29: T 4.25% Feb 28 2031	-31.7	-31.6	-32.0	-31.8	-32.4	-33.3	-32.8	-33.1	-32.3	-32.2	-32.6
3. Auc Day 2024-06-27: T 4.125% Mar 31 2031	-34.2	-34.7	-35.7	-35.3	-35.3	-35.2	-35.6	-35.7	-36.1	-35.4	-34.9
2. Auc Day 2024-07-25: T 4.625% Apr 30 2031	-36.4	-36.9	-37.1	-37.1	-38.1	-38.0	-37.1	-36.4	-36.3	-35.3	-35.4
1. Auc Day 2024-08-29: T 4.625% May 31 2031	-37.9	-38.2	-38.5	-39.4	-39.0	-39.8	-40.1	-39.9	-39.6	-39.3	-40.0

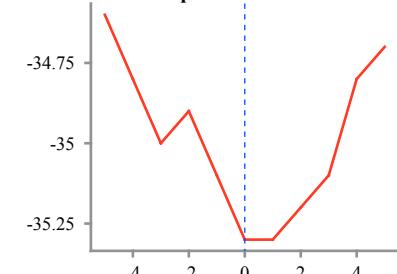
Triple Olds 7Y Spreads



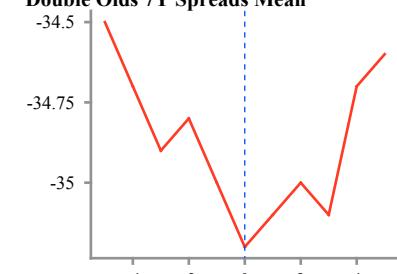
On-the-run 7Y Spreads Mean



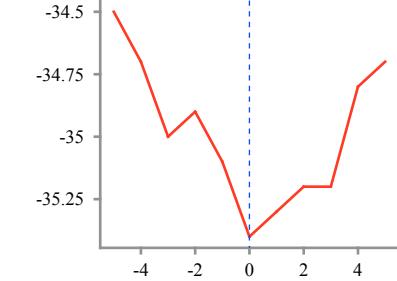
Off-the-run 7Y Spreads Mean



Double Olds 7Y Spreads Mean



Triple Olds 7Y Spreads Mean



Derivatives Strategy

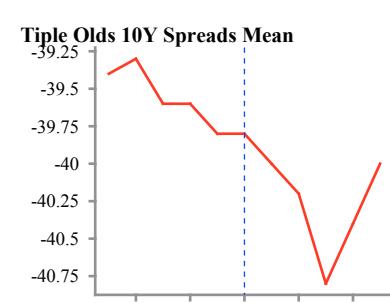
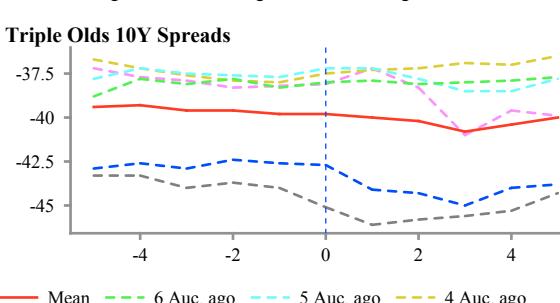
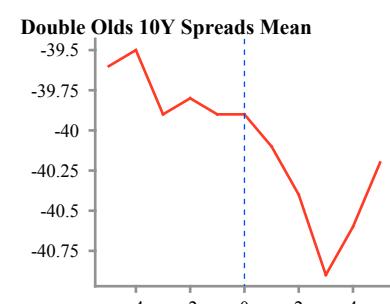
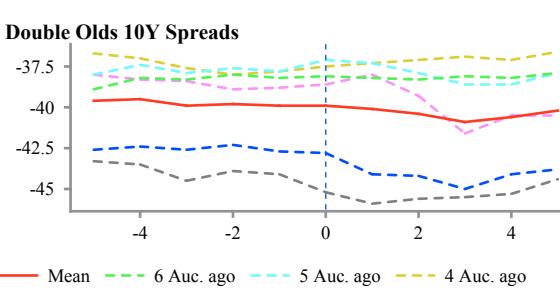
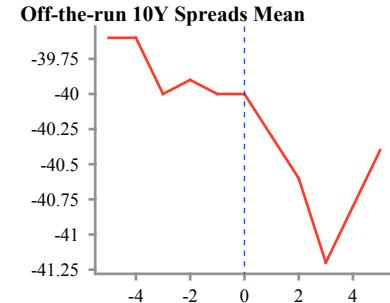
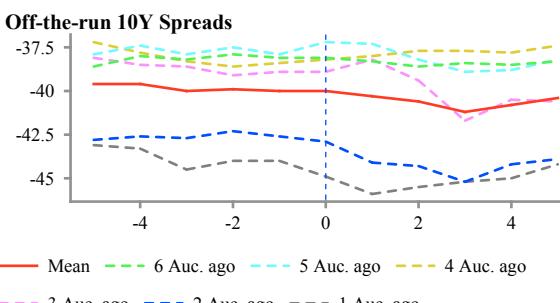
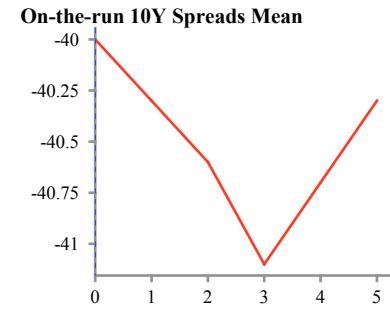
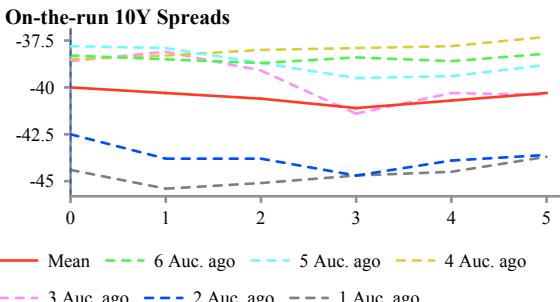
SOFR Swap Spreads Auction Cycle Report

On-the-run 10Y Spreads	0	1	2	3	4	5
Mean	-40.0	-40.3	-40.6	-41.1	-40.7	-40.3
6. Auc Day 2024-03-12: T 3.375% May 15 2033	-38.3	-38.5	-38.7	-38.4	-38.6	-38.2
5. Auc Day 2024-04-10: T 3.875% Aug 15 2033	-37.8	-37.9	-38.7	-39.5	-39.4	-38.8
4. Auc Day 2024-05-08: T 4.5% Nov 15 2033	-38.5	-38.3	-38.0	-37.9	-37.8	-37.3
3. Auc Day 2024-06-11: T 4.0% Feb 15 2034	-38.6	-38.1	-39.1	-41.4	-40.3	-40.4
2. Auc Day 2024-07-10: T 4.375% May 15 2034	-42.5	-43.8	-43.8	-44.7	-43.9	-43.6
1. Auc Day 2024-08-07: T 3.875% Aug 15 2034	-44.4	-45.4	-45.1	-44.7	-44.5	-43.7

Off-the-run 10Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-39.6	-39.6	-40.0	-39.9	-40.0	-40.0	-40.3	-40.6	-41.2	-40.8	-40.4
6. Auc Day 2024-03-12: T 3.5% Feb 15 2033	-38.6	-38.0	-38.2	-37.9	-38.1	-38.1	-38.3	-38.6	-38.4	-38.5	-38.3
5. Auc Day 2024-04-10: T 3.375% May 15 2033	-37.9	-37.4	-37.9	-37.5	-37.9	-37.2	-37.3	-38.2	-38.9	-38.8	-38.2
4. Auc Day 2024-05-08: T 3.875% Aug 15 2033	-37.2	-37.8	-38.3	-38.6	-38.4	-38.2	-38.0	-37.7	-37.7	-37.8	-37.4
3. Auc Day 2024-06-11: T 4.5% Nov 15 2033	-38.1	-38.5	-38.6	-39.1	-38.9	-38.9	-38.2	-39.4	-41.7	-40.5	-40.6
2. Auc Day 2024-07-10: T 4.0% Feb 15 2034	-42.8	-42.6	-42.7	-42.3	-42.6	-42.9	-44.1	-44.3	-45.2	-44.2	-43.9
1. Auc Day 2024-08-07: T 4.375% May 15 2034	-43.1	-43.3	-44.5	-44.0	-44.0	-44.9	-45.9	-45.5	-45.2	-45.0	-44.2

Double Olds 10Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-39.6	-39.5	-39.9	-39.8	-39.9	-39.9	-40.1	-40.4	-40.9	-40.6	-40.2
6. Auc Day 2024-03-12: T 4.125% Nov 15 2032	-38.9	-38.2	-38.3	-38.0	-38.2	-38.1	-38.2	-38.3	-38.1	-38.2	-37.9
5. Auc Day 2024-04-10: T 3.5% Feb 15 2033	-38.0	-37.4	-37.9	-37.6	-37.8	-37.1	-37.3	-37.9	-38.6	-38.6	-37.9
4. Auc Day 2024-05-08: T 3.375% May 15 2033	-36.7	-37.0	-37.6	-38.0	-37.8	-37.5	-37.3	-37.1	-36.9	-37.1	-36.6
3. Auc Day 2024-06-11: T 3.875% Aug 15 2033	-38.0	-38.3	-38.4	-38.9	-38.8	-38.6	-38.0	-39.3	-41.6	-40.5	-40.5
2. Auc Day 2024-07-10: T 4.5% Nov 15 2033	-42.6	-42.4	-42.6	-42.3	-42.7	-42.8	-44.1	-44.2	-45.0	-44.1	-43.8
1. Auc Day 2024-08-07: T 4.0% Feb 15 2034	-43.3	-43.5	-44.5	-43.9	-44.1	-45.2	-45.9	-45.6	-45.5	-45.3	-44.4

Triple Olds 10Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-39.4	-39.3	-39.6	-39.6	-39.8	-39.8	-40.0	-40.2	-40.8	-40.4	-40.0
6. Auc Day 2024-03-12: T 2.75% Aug 15 2032	-38.8	-37.8	-38.1	-37.8	-38.3	-38.0	-37.9	-38.1	-38.0	-37.9	-37.7
5. Auc Day 2024-04-10: T 4.125% Nov 15 2032	-37.8	-37.2	-37.5	-37.6	-37.7	-37.2	-37.2	-37.8	-38.5	-38.5	-37.8
4. Auc Day 2024-05-08: T 3.5% Feb 15 2033	-36.7	-37.2	-37.6	-37.9	-38.0	-37.5	-37.3	-37.2	-36.9	-37.0	-36.5
3. Auc Day 2024-06-11: T 3.375% May 15 2033	-37.2	-37.7	-37.9	-38.3	-38.2	-38.1	-37.2	-38.3	-41.0	-39.6	-39.9
2. Auc Day 2024-07-10: T 3.875% Aug 15 2033	-42.9	-42.6	-42.9	-42.4	-42.6	-42.7	-44.1	-44.3	-45.0	-44.0	-43.8
1. Auc Day 2024-08-07: T 4.5% Nov 15 2033	-43.3	-43.3	-44.0	-43.7	-44.0	-45.1	-46.1	-45.8	-45.6	-45.3	-44.3



Derivatives Strategy

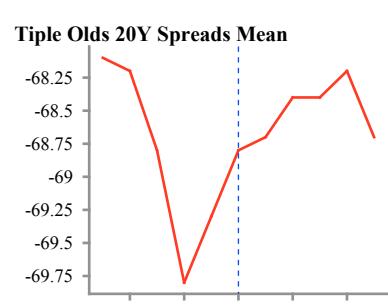
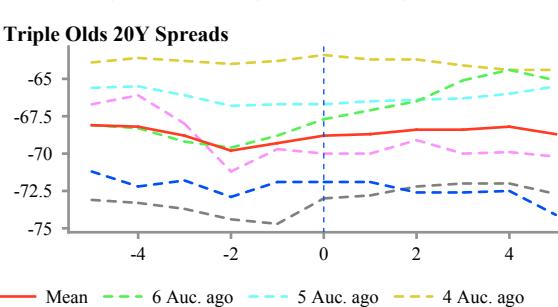
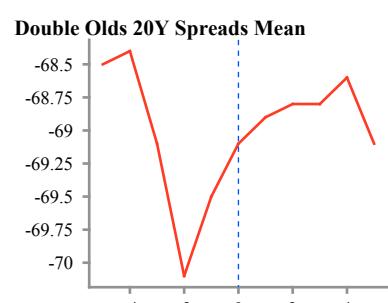
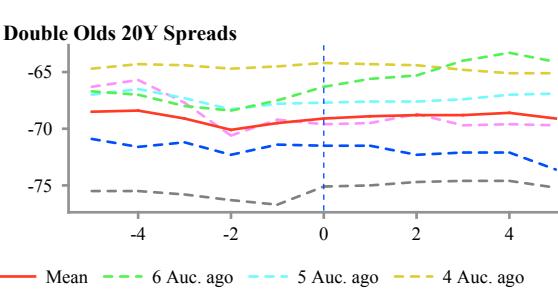
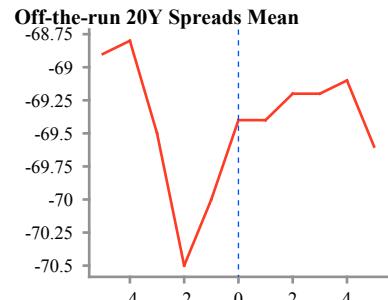
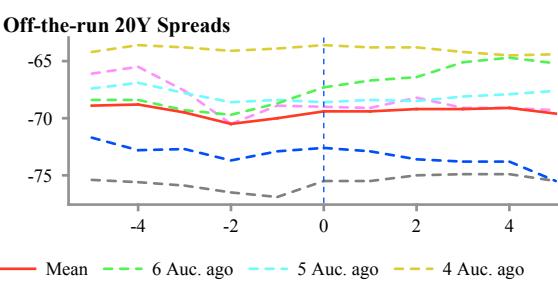
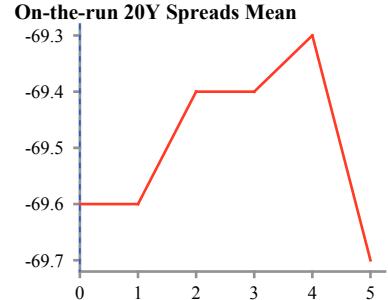
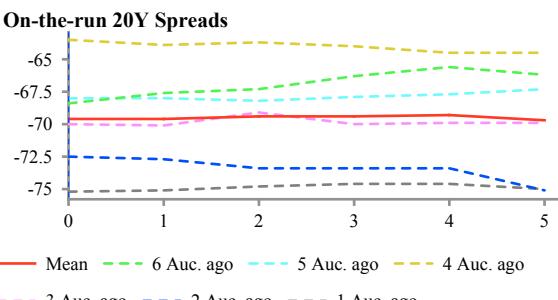
SOFR Swap Spreads Auction Cycle Report

On-the-run 20Y Spreads	0	1	2	3	4	5
Mean	-69.6	-69.6	-69.4	-69.4	-69.3	-69.7
6. Auc Day 2024-03-19: T 3.875% May 15 2043	-68.4	-67.6	-67.3	-66.3	-65.6	-66.2
5. Auc Day 2024-04-17: T 4.375% Aug 15 2043	-68.0	-68.0	-68.2	-67.9	-67.7	-67.3
4. Auc Day 2024-05-22: T 4.75% Nov 15 2043	-63.5	-63.9	-63.7	-64.0	-64.5	-64.5
3. Auc Day 2024-06-18: T 4.5% Feb 15 2044	-70.0	-70.1	-69.1	-70.0	-69.9	-69.9
2. Auc Day 2024-07-17: T 4.625% May 15 2044	-72.5	-72.7	-73.4	-73.4	-73.4	-75.1
1. Auc Day 2024-08-21: T 4.125% Aug 15 2044	-75.2	-75.1	-74.8	-74.6	-74.6	-75.0

Off-the-run 20Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-68.9	-68.8	-69.5	-70.5	-70.0	-69.4	-69.4	-69.2	-69.2	-69.1	-69.6
6. Auc Day 2024-03-19: T 3.875% Feb 15 2043	-68.4	-68.4	-69.3	-69.7	-68.7	-67.3	-66.7	-66.4	-65.1	-64.7	-65.2
5. Auc Day 2024-04-17: T 3.875% May 15 2043	-67.4	-66.9	-67.8	-68.6	-68.4	-68.6	-68.4	-68.5	-68.1	-67.9	-67.6
4. Auc Day 2024-05-22: T 4.375% Aug 15 2043	-64.2	-63.6	-63.8	-64.1	-63.9	-63.6	-63.8	-63.8	-64.2	-64.5	-64.4
3. Auc Day 2024-06-18: T 4.75% Nov 15 2043	-66.1	-65.5	-67.6	-70.5	-68.9	-69.0	-69.1	-68.2	-69.1	-69.1	-69.3
2. Auc Day 2024-07-17: T 4.5% Feb 15 2044	-71.7	-72.8	-72.7	-73.7	-72.9	-72.6	-72.9	-73.6	-73.8	-73.8	-75.5
1. Auc Day 2024-08-21: T 4.625% May 15 2044	-75.4	-75.6	-75.9	-76.5	-76.9	-75.5	-75.5	-75.0	-74.9	-74.9	-75.5

Double Olds 20Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-68.5	-68.4	-69.1	-70.1	-69.5	-69.1	-68.9	-68.8	-68.8	-68.6	-69.1
6. Auc Day 2024-03-19: T 4.0% Nov 15 2042	-66.7	-67.0	-68.0	-68.4	-67.5	-66.3	-65.6	-65.3	-64.0	-63.3	-64.1
5. Auc Day 2024-04-17: T 3.875% Feb 15 2043	-67.0	-66.5	-67.3	-68.3	-67.8	-67.7	-67.6	-67.6	-67.4	-67.0	-66.9
4. Auc Day 2024-05-22: T 3.875% May 15 2043	-64.7	-64.3	-64.4	-64.7	-64.5	-64.2	-64.3	-64.4	-64.8	-65.1	-65.1
3. Auc Day 2024-06-18: T 4.375% Aug 15 2043	-66.3	-65.7	-67.7	-70.6	-69.2	-69.6	-69.5	-68.7	-69.7	-69.6	-69.7
2. Auc Day 2024-07-17: T 4.75% Nov 15 2043	-70.9	-71.6	-71.2	-72.3	-71.4	-71.5	-71.5	-72.3	-72.1	-72.1	-73.6
1. Auc Day 2024-08-21: T 4.5% Feb 15 2044	-75.5	-75.5	-75.8	-76.3	-76.7	-75.1	-75.0	-74.7	-74.6	-74.6	-75.2

Triple Olds 20Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-68.1	-68.2	-68.8	-69.8	-69.3	-68.8	-68.7	-68.4	-68.4	-68.2	-68.7
6. Auc Day 2024-03-19: T 3.375% Aug 15 2042	-68.1	-68.3	-69.2	-69.6	-68.8	-67.7	-67.1	-66.5	-65.1	-64.4	-65.1
5. Auc Day 2024-04-17: T 4.0% Nov 15 2042	-65.6	-65.5	-66.1	-66.8	-66.7	-66.7	-66.5	-66.4	-66.3	-66.0	-65.5
4. Auc Day 2024-05-22: T 3.875% Feb 15 2043	-63.9	-63.6	-63.8	-64.0	-63.8	-63.4	-63.7	-63.7	-64.1	-64.4	-64.4
3. Auc Day 2024-06-18: T 3.875% May 15 2043	-66.7	-66.1	-68.0	-71.2	-69.7	-70.0	-70.0	-69.1	-70.0	-69.9	-70.2
2. Auc Day 2024-07-17: T 4.375% Aug 15 2043	-71.2	-72.2	-71.8	-72.9	-71.9	-71.9	-71.9	-72.6	-72.6	-72.5	-74.1
1. Auc Day 2024-08-21: T 4.75% Nov 15 2043	-73.1	-73.3	-73.7	-74.4	-74.7	-73.0	-72.8	-72.2	-72.0	-72.0	-72.7



Derivatives Strategy

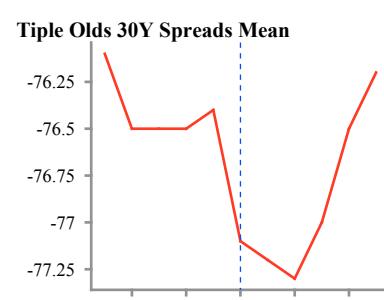
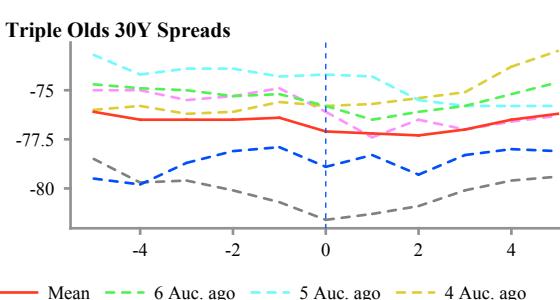
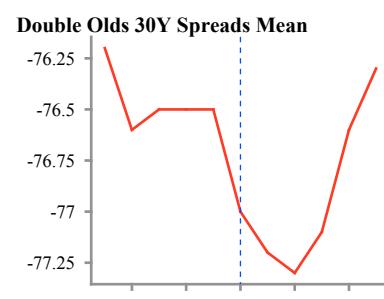
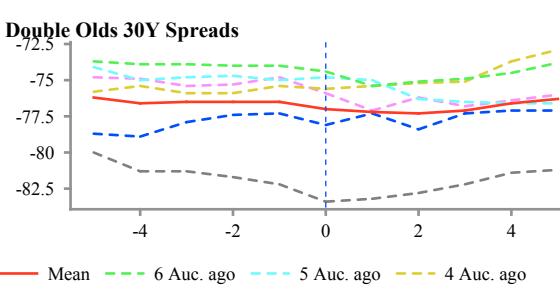
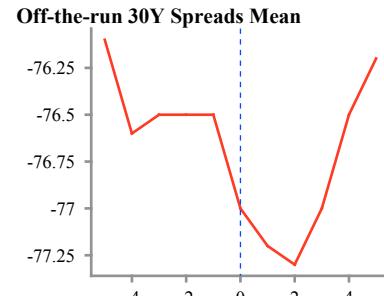
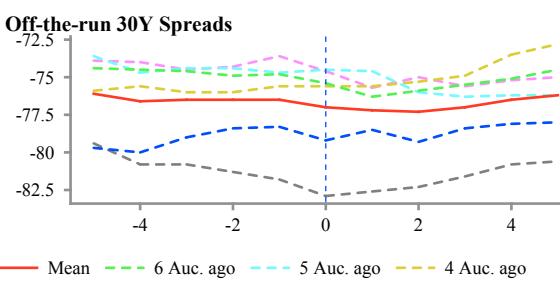
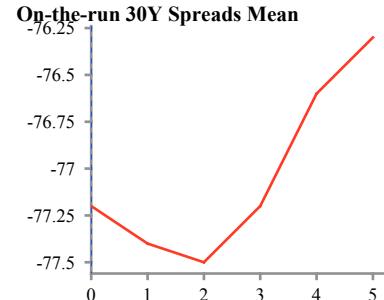
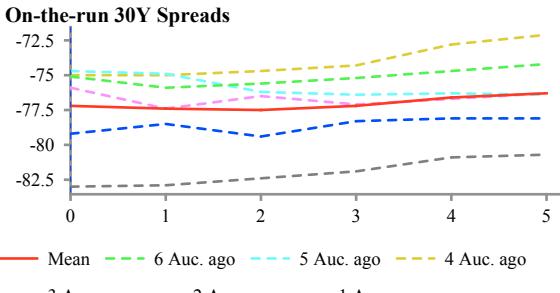
SOFR Swap Spreads Auction Cycle Report

On-the-run 30Y Spreads	0	1	2	3	4	5
Mean	-77.2	-77.4	-77.5	-77.2	-76.6	-76.3
6. Auc Day 2024-03-13: T 3.625% May 15 2053	-75.1	-75.9	-75.6	-75.2	-74.7	-74.2
5. Auc Day 2024-04-11: T 4.125% Aug 15 2053	-74.7	-74.9	-76.2	-76.4	-76.3	-76.4
4. Auc Day 2024-05-09: T 4.75% Nov 15 2053	-75.0	-75.0	-74.7	-74.3	-72.8	-72.1
3. Auc Day 2024-06-13: T 4.25% Feb 15 2054	-75.9	-77.4	-76.5	-77.1	-76.7	-76.3
2. Auc Day 2024-07-11: T 4.625% May 15 2054	-79.2	-78.5	-79.4	-78.3	-78.1	-78.1
1. Auc Day 2024-08-08: T 4.25% Aug 15 2054	-83.0	-82.9	-82.4	-81.9	-80.9	-80.7

Off-the-run 30Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-76.1	-76.6	-76.5	-76.5	-76.5	-77.0	-77.2	-77.3	-77.0	-76.5	-76.2
6. Auc Day 2024-03-13: T 3.625% Feb 15 2053	-74.4	-74.5	-74.6	-74.9	-74.8	-75.4	-76.3	-75.9	-75.5	-75.1	-74.5
5. Auc Day 2024-04-11: T 3.625% May 15 2053	-73.6	-74.7	-74.4	-74.4	-74.7	-74.5	-74.6	-76.0	-76.3	-76.2	-76.2
4. Auc Day 2024-05-09: T 4.125% Aug 15 2053	-75.9	-75.6	-76.0	-76.0	-75.6	-75.6	-75.6	-75.3	-74.9	-73.5	-72.8
3. Auc Day 2024-06-13: T 4.75% Nov 15 2053	-73.9	-74.0	-74.5	-74.3	-73.6	-74.6	-75.7	-75.0	-75.6	-75.2	-75.0
2. Auc Day 2024-07-11: T 4.25% Feb 15 2054	-79.7	-80.0	-79.0	-78.4	-78.3	-79.2	-78.5	-79.3	-78.4	-78.1	-78.0
1. Auc Day 2024-08-08: T 4.625% May 15 2054	-79.4	-80.8	-80.8	-81.3	-81.8	-82.9	-82.6	-82.3	-81.6	-80.8	-80.6

Double Olds 30Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-76.2	-76.6	-76.5	-76.5	-76.5	-77.0	-77.2	-77.3	-77.1	-76.6	-76.3
6. Auc Day 2024-03-13: T 4.0% Nov 15 2052	-73.7	-73.9	-73.9	-74.0	-74.0	-74.4	-75.4	-75.1	-74.9	-74.5	-73.8
5. Auc Day 2024-04-11: T 3.625% Feb 15 2053	-74.1	-75.0	-74.8	-74.7	-75.0	-74.8	-75.0	-76.3	-76.5	-76.6	-76.6
4. Auc Day 2024-05-09: T 3.625% May 15 2053	-75.8	-75.4	-75.9	-75.9	-75.4	-75.6	-75.4	-75.2	-75.1	-73.7	-72.9
3. Auc Day 2024-06-13: T 4.125% Aug 15 2053	-74.8	-74.9	-75.4	-75.3	-74.8	-75.9	-77.1	-76.2	-76.8	-76.4	-76.0
2. Auc Day 2024-07-11: T 4.75% Nov 15 2053	-78.7	-78.9	-77.9	-77.4	-77.3	-78.1	-77.3	-78.4	-77.3	-77.1	-77.1
1. Auc Day 2024-08-08: T 4.25% Feb 15 2054	-80.0	-81.3	-81.3	-81.7	-82.2	-83.4	-83.2	-82.8	-82.2	-81.4	-81.2

Triple Olds 30Y Spreads	-5	-4	-3	-2	-1	0	1	2	3	4	5
Mean	-76.1	-76.5	-76.5	-76.5	-76.4	-77.1	-77.2	-77.3	-77.0	-76.5	-76.2
6. Auc Day 2024-03-13: T 3.0% Aug 15 2052	-74.7	-74.9	-75.0	-75.3	-75.2	-75.8	-76.5	-76.1	-75.8	-75.2	-74.6
5. Auc Day 2024-04-11: T 4.0% Nov 15 2052	-73.2	-74.2	-73.9	-73.9	-74.3	-74.2	-74.3	-75.5	-75.8	-75.8	-75.8
4. Auc Day 2024-05-09: T 3.625% Feb 15 2053	-76.0	-75.8	-76.2	-76.1	-75.6	-75.8	-75.7	-75.4	-75.1	-73.8	-73.0
3. Auc Day 2024-06-13: T 3.625% May 15 2053	-75.0	-75.0	-75.5	-75.3	-74.9	-76.1	-77.4	-76.5	-77.0	-76.6	-76.3
2. Auc Day 2024-07-11: T 4.125% Aug 15 2053	-79.5	-79.8	-78.7	-78.1	-77.9	-78.9	-78.3	-79.3	-78.3	-78.0	-78.1
1. Auc Day 2024-08-08: T 4.75% Nov 15 2053	-78.5	-79.7	-79.6	-80.1	-80.7	-81.6	-81.3	-80.9	-80.1	-79.6	-79.4



Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread			Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %			
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
1.750	Mar 15 2025	3	56.1	4.541	3.925	4.603	4.194	6.2	26.9	20.7	20.4	12.0	37.4	25.3	-37.4	2.5	22.4	19.9	18.7	5.24	5.09	2.05	9.64	14.4
2.625	Mar 31 2025	7	34.1	4.545	3.995	4.542	4.129	-0.3	13.3	13.6	11.7	3.5	17.7	14.2	-17.4	-3.9	9.0	12.9	10.4	5.24	5.09	1.89	8.29	54.0
3.875	Mar 31 2025	2	42.0	4.556	4.014	4.542	4.129	-1.4	11.4	12.8	10.8	3.1	15.8	12.7	-21.6	-5.0	7.1	12.1	9.5	5.24	5.09	1.89	8.30	0.0
0.500	Mar 31 2025	5	46.5	4.601	4.097	4.542	4.128	-5.8	3.0	8.9	7.0	-3.1	7.5	10.6	-20.4	-9.5	-1.3	8.2	5.6	5.24	5.09	1.88	8.28	14.8
2.625	Apr 15 2025	3	57.0	4.493	3.969	4.481	4.067	-1.2	9.9	11.0	8.0	2.5	14.2	11.7	-16.0	-4.8	5.6	10.4	7.1	5.24	5.09	1.74	7.31	19.3
2.875	Apr 30 2025	7	32.7	4.528	4.082	4.428	4.018	-10.0	-6.3	3.7	-0.8	-7.6	-4.1	3.6	-21.1	-13.6	-10.4	3.2	-1.5	5.24	5.09	1.61	6.51	25.1
3.875	Apr 30 2025	2	46.1	4.501	4.036	4.428	4.019	-7.3	-1.7	5.5	1.0	-4.4	0.5	4.9	-19.3	-10.9	-5.8	5.0	0.4	5.24	5.09	1.61	6.53	8.9
0.375	Apr 30 2025	5	46.7	4.519	4.070	4.428	4.019	-9.1	-5.1	3.9	-0.3	-8.1	-2.9	5.2	-19.1	-12.7	-9.3	3.4	-1.0	5.24	5.09	1.59	6.47	10.4
2.125	May 15 2025	10	66.5	4.459	4.011	4.374	3.969	-8.4	-4.2	4.2	3.3	-6.5	-2.0	4.5	-13.9	-12.0	-8.2	3.8	2.9	5.24	5.09	1.49	5.88	23.8
2.750	May 15 2025	3	76.5	4.464	4.018	4.374	3.969	-9.0	-5.0	4.0	3.1	-6.7	-2.7	3.9	-13.5	-12.5	-8.9	3.6	2.6	5.24	5.09	1.49	5.89	41.4
2.875	May 31 2025	7	35.2	4.405	3.972	4.318	3.915	-8.7	-5.7	3.0	2.6	-7.0	-3.7	3.4	-10.9	-12.1	-9.5	2.6	2.4	5.24	5.09	1.39	5.39	36.1
0.250	May 31 2025	5	49.7	4.430	4.016	4.318	3.915	-11.2	-10.1	1.1	1.1	-11.0	-8.0	2.9	-13.1	-14.7	-13.9	0.8	0.9	5.24	5.09	1.38	5.33	17.3
4.250	May 31 2025	2	49.9	4.416	3.986	4.318	3.915	-9.8	-7.1	2.6	2.1	-7.4	-5.1	2.3	-10.2	-13.2	-10.9	2.3	1.9	5.24	5.09	1.40	5.42	15.8
2.875	Jun 15 2025	3	46.6	4.360	3.940	4.262	3.865	-9.8	-7.5	2.3	1.8	-5.1	-1.0	4.0	-20.8	-13.2	-11.2	2.0	1.8	5.24	5.09	1.31	4.96	5.6
2.750	Jun 30 2025	7	33.7	4.268	3.830	4.215	3.822	-5.3	-0.7	4.6	1.3	-3.1	1.7	4.7	-11.2	-8.7	-4.4	4.3	1.3	5.24	5.09	1.23	4.56	48.5
4.625	Jun 30 2025	2	42.0	4.321	3.903	4.215	3.822	-10.5	-8.1	2.5	-1.0	-7.4	-5.4	1.9	-12.3	-13.9	-11.7	2.3	-1.0	5.24	5.09	1.24	4.60	0.0
0.250	Jun 30 2025	5	53.4	4.316	3.904	4.215	3.822	-10.1	-8.2	1.9	-1.1	-9.2	-5.8	3.3	-9.3	-13.5	-11.9	1.6	-1.1	5.24	5.09	1.22	4.51	18.7
3.000	Jul 15 2025	3	48.5	4.271	3.864	4.168	3.779	-10.3	-8.5	1.9	-2.0	-8.1	-5.8	2.2	-12.7	-13.8	-12.1	1.6	-2.0	5.24	5.09	1.16	4.25	11.3
2.875	Jul 31 2025	7	31.6	4.210	3.808	4.122	3.740	-8.8	-6.8	2.0	-2.7	-6.7	-4.1	2.7	-1.8	-12.3	-10.4	1.8	-2.8	5.24	5.09	1.10	3.95	32.9
4.750	Jul 31 2025	2	41.9	4.212	3.808	4.122	3.740	-9.0	-6.8	2.2	-2.6	-6.0	-3.9	2.1	-3.7	-12.5	-10.4	2.0	-2.7	5.24	5.09	1.10	3.98	0.0
0.250	Jul 31 2025	5	54.6	4.220	3.825	4.122	3.740	-9.8	-8.5	1.3	-3.4	-9.0	-6.0	3.0	-3.8	-13.2	-12.1	1.0	-3.4	5.24	5.09	1.09	3.91	17.4
6.875	Aug 15 2025	30	12.6	3.539	2.907	4.078	3.704	53.8	79.7	25.8	20.9	57.0	80.5	23.5	-45.9	50.3	76.0	25.6	20.7	5.24	5.09	1.05	3.74	70.0
2.000	Aug 15 2025	10	66.5	4.182	3.795	4.078	3.700	-10.4	-9.5	1.0	-4.0	-8.8	-6.7	2.1	-4.4	-13.9	-13.2	0.7	-4.2	5.24	5.09	1.04	3.69	16.9
3.125	Aug 15 2025	3	68.6	4.185	3.798	4.078	3.700	-10.7	-9.7	1.0	-4.0	-8.6	-6.8	1.8	-3.8	-14.2	-13.4	0.8	-4.2	5.24	5.09	1.04	3.71	38.7
2.750	Aug 31 2025	7	33.2	4.165	3.816	4.040	3.667	-12.5	-14.9	-2.4	-4.0	-12.8	-12.5	0.4	-6.0	-16.0	-18.7	-2.6	-4.3	5.24	5.09	0.99	3.50	33.9
5.000	Aug 31 2025	2	49.7	4.170	3.820	4.040	3.667	-12.9	-15.3	-2.3	-3.9	-12.3	-12.6	-0.3	-4.5	-16.5	-19.1	-2.5	-4.2	5.24	5.09	1.00	3.53	9.4
0.250	Aug 31 2025	5	55.4	4.164	3.818	4.040	3.667	-12.4	-15.1	-2.7	-4.2	-14.0	-13.0	1.0	-3.9	-15.9	-18.9	-2.9	-4.5	5.24	5.09	0.99	3.47	17.8
3.500	Sep 15 2025	3	41.0	4.127	3.783	3.995	3.633	-13.2	-15.0	-1.8	-3.7	-10.7	-10.1	0.5	-6.0	-16.8	-18.9	-2.1	-4.2	5.24	5.09	0.95	3.32	0.0
3.000	Sep 30 2025	7	31.0	4.097	3.755	3.955	3.602	-14.2	-15.2	-1.0	-4.5	-11.8	-11.5	0.3	-8.9	-17.9	-19.2	-1.3	-5.0	5.24	5.09	0.92	3.14	28.6
5.000	Sep 30 2025	2	48.0	4.099	3.754	3.955	3.602	-14.3	-15.1	-0.8	-4.3	-10.9	-11.1	-0.2	-3.3	-18.0	-19.1	-1.0	-4.9	5.24	5.09	0.93	3.16	0.0
0.250	Sep 30 2025	5	60.3	4.099	3.761	3.955	3.602	-14.4	-15.9	-1.5	-4.8	-13.5	-12.5	1.0	-5.2	-18.1	-19.8	-1.7	-5.3	5.24	5.09	0.90	3.10	13.3
4.250	Oct 15 2025	3	40.0	4.055	3.712	3.916	3.574	-13.9	-13.8	0.0	-4.0	-10.5	-10.3	0.2	-2.6	-17.6	-17.8	-0.2	-4.5	5.24	5.09	0.89	3.01	0.0
3.000	Oct 31 2025	7	31.0	4.023	3.688	3.877	3.546	-14.5	-14.1	0.4	-4.0	-11.3	-10.8	0.4	-4.9	-18.3	-18.1	0.2	-4.5	5.24	5.09	0.85	2.85	37.4
5.000	Oct 31 2025	2	51.0	4.025	3.687	3.877	3.546	-14.8	-14.1	0.7	-3.8	-10.5	-10.5	-0.1	-4.3	-18.5	-18.1	0.4	-4.4	5.24	5.09	0.86	2.88	0.0
0.250	Oct 31 2025	5	60.8	4.024	3.695	3.877	3.546	-14.7	-14.8	-0.1	-4.3	-12.9	-11.9	1.0	-4.9	-18.4	-18.8	-0.4	-4.9	5.24	5.09	0.83	2.81	12.0
4.500	Nov 15 2025	3	54.0	3.980	3.641	3.839	3.517	-14.1	-12.4	1.8	-3.4	-8.0	-7.2	0.8	-0.3	-17.9	-16.4	1.5	-3.9	5.24	5.09	0.82	2.75	26.0
2.250	Nov 15 2025	10	66.1	3.988	3.656	3.839	3.517	-14.9	-13.9	1.1	-3.8	-10.0	-9.0	1.0	-2.1	-18.7	-17.9	0.8	-4.4	5.24	5.09	0.81	2.71	11.7

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions

2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %		
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
2.875	Nov 30 2025	7	34.8	3.969	3.645	3.814	3.500	-15.4	-14.5	0.9	-3.4	-13.9	-14.2	-0.3	-0.8	-19.2	-18.6	0.7	-3.9	5.24	5.09	0.78	2.61	32.0
4.875	Nov 30 2025	2	54.6	3.974	3.649	3.814	3.500	-16.0	-14.8	1.2	-3.3	-13.4	-14.2	-0.8	-0.3	-19.8	-18.9	0.9	-3.8	5.24	5.09	0.79	2.65	1.1
0.375	Nov 30 2025	5	64.9	3.977	3.661	3.814	3.500	-16.3	-16.1	0.2	-3.9	-16.2	-16.1	0.1	-2.3	-20.0	-20.1	-0.1	-4.4	5.24	5.09	0.77	2.57	21.1
4.000	Dec 15 2025	3	40.0	3.941	3.621	3.779	3.473	-16.3	-14.8	1.5	-2.7	-12.1	-12.0	0.1	-1.5	-20.1	-18.8	1.2	-3.2	5.24	5.09	0.76	2.53	0.0
2.625	Dec 31 2025	7	32.0	3.931	3.619	3.749	3.447	-18.2	-17.1	1.0	-3.4	-14.3	-14.4	-0.1	-2.4	-22.0	-21.2	0.8	-3.8	5.24	5.09	0.73	2.40	32.6
4.250	Dec 31 2025	2	57.0	3.927	3.611	3.749	3.447	-17.8	-16.3	1.5	-3.0	-13.1	-13.3	-0.2	-1.1	-21.6	-20.4	1.2	-3.5	5.24	5.09	0.73	2.43	0.0
0.375	Dec 31 2025	5	68.0	3.920	3.610	3.749	3.447	-17.1	-16.3	0.8	-3.4	-14.6	-14.1	0.5	-1.5	-20.9	-20.4	0.5	-3.9	5.24	5.09	0.72	2.36	19.1
3.875	Jan 15 2026	3	40.0	3.879	3.565	3.722	3.424	-15.7	-14.1	1.6	-2.3	-11.2	-10.9	0.3	-1.0	-19.6	-18.3	1.4	-2.7	5.24	5.09	0.71	2.33	0.0
2.625	Jan 31 2026	7	32.0	3.868	3.565	3.697	3.402	-17.1	-16.3	0.8	-2.4	-13.9	-13.9	0.0	-2.7	-21.0	-20.5	0.5	-2.8	5.24	5.09	0.68	2.22	19.7
4.250	Jan 31 2026	2	60.0	3.868	3.563	3.697	3.402	-17.1	-16.1	1.1	-2.2	-13.1	-13.3	-0.2	-1.6	-21.0	-20.2	0.8	-2.6	5.24	5.09	0.68	2.24	0.0
0.375	Jan 31 2026	5	69.2	3.875	3.579	3.697	3.402	-17.8	-17.7	0.1	-2.9	-16.0	-15.8	0.2	-3.1	-21.7	-21.8	-0.1	-3.3	5.24	5.09	0.67	2.18	13.9
6.000	Feb 15 2026	30	12.9	3.615	3.263	3.667	3.377	5.2	11.4	6.2	3.6	11.8	16.3	4.5	-4.5	1.2	7.2	6.0	3.2	5.24	5.09	0.67	2.18	51.7
4.000	Feb 15 2026	3	55.6	3.828	3.525	3.667	3.377	-16.1	-14.8	1.2	-1.4	-9.9	-9.3	0.6	-2.4	-20.0	-19.0	1.0	-1.8	5.24	5.09	0.66	2.16	28.1
1.625	Feb 15 2026	10	64.9	3.847	3.552	3.667	3.377	-18.0	-17.6	0.4	-2.2	-13.1	-12.6	0.5	-3.5	-21.9	-21.8	0.1	-2.6	5.24	5.09	0.65	2.13	20.2
2.500	Feb 28 2026	7	33.5	3.833	3.557	3.652	3.364	-18.1	-19.3	-1.2	-2.6	-17.0	-17.5	-0.5	-2.5	-22.0	-23.5	-1.5	-3.0	5.24	5.09	0.64	2.07	21.8
4.625	Feb 28 2026	2	65.7	3.831	3.551	3.652	3.364	-17.8	-18.7	-0.8	-2.2	-15.6	-16.3	-0.7	-1.5	-21.8	-22.9	-1.1	-2.7	5.24	5.09	0.64	2.09	4.1
0.500	Feb 28 2026	5	74.2	3.840	3.570	3.652	3.364	-18.8	-20.5	-1.7	-3.0	-18.9	-19.3	-0.4	-2.3	-22.8	-24.7	-2.0	-3.5	5.24	5.09	0.63	2.04	18.7
4.625	Mar 15 2026	3	40.0	3.800	3.523	3.628	3.344	-17.3	-18.0	-0.7	-1.6	-13.4	-14.0	-0.6	-0.7	-21.3	-22.2	-0.9	-2.0	5.24	5.09	0.63	2.02	0.1
2.250	Mar 31 2026	7	32.0	3.793	3.522	3.607	3.328	-18.5	-19.4	-0.9	-1.9	-16.1	-16.6	-0.5	-1.3	-22.5	-23.7	-1.2	-2.3	5.24	5.09	0.60	1.93	19.9
4.500	Mar 31 2026	2	66.0	3.794	3.520	3.607	3.328	-18.6	-19.2	-0.5	-1.6	-14.9	-15.8	-0.9	-0.9	-22.7	-23.5	-0.8	-2.0	5.24	5.09	0.61	1.96	0.0
0.750	Mar 31 2026	5	72.0	3.790	3.522	3.607	3.328	-18.3	-19.4	-1.2	-2.1	-16.9	-17.0	-0.1	-2.2	-22.3	-23.7	-1.4	-2.5	5.24	5.09	0.60	1.91	22.0
3.750	Apr 15 2026	3	42.5	3.770	3.500	3.588	3.312	-18.2	-18.8	-0.6	-1.6	-14.9	-15.6	-0.6	-3.1	-22.3	-23.1	-0.8	-2.0	5.24	5.09	0.60	1.90	6.1
2.375	Apr 30 2026	7	32.4	3.765	3.503	3.570	3.297	-19.5	-20.6	-1.1	-2.2	-17.6	-18.3	-0.7	-3.0	-23.6	-24.9	-1.3	-2.6	5.24	5.09	0.57	1.82	40.5
4.875	Apr 30 2026	2	69.3	3.765	3.498	3.570	3.297	-19.5	-20.1	-0.6	-1.8	-16.0	-17.2	-1.1	-1.8	-23.6	-24.4	-0.8	-2.2	5.24	5.09	0.59	1.86	0.5
0.750	Apr 30 2026	5	72.6	3.759	3.500	3.570	3.297	-19.0	-20.3	-1.3	-2.3	-18.2	-18.5	-0.3	-1.9	-23.1	-24.6	-1.5	-2.7	5.24	5.09	0.56	1.80	22.6
3.625	May 15 2026	3	50.9	3.748	3.486	3.552	3.283	-19.6	-20.2	-0.7	-1.4	-16.8	-17.7	-0.9	-6.1	-23.7	-24.6	-0.9	-1.7	5.24	5.09	0.56	1.79	21.6
1.625	May 15 2026	10	69.5	3.751	3.494	3.552	3.283	-19.9	-21.1	-1.2	-1.7	-18.5	-19.1	-0.6	-4.9	-24.0	-25.4	-1.4	-2.1	5.24	5.09	0.55	1.76	27.0
2.125	May 31 2026	7	35.4	3.731	3.477	3.536	3.271	-19.5	-20.7	-1.2	-2.2	-18.7	-19.4	-0.8	-0.9	-23.6	-25.0	-1.4	-2.6	5.24	5.09	0.54	1.72	31.7
0.750	May 31 2026	5	72.8	3.736	3.487	3.536	3.271	-20.0	-21.6	-1.6	-2.5	-20.1	-20.7	-0.6	-0.6	-24.2	-25.9	-1.8	-2.9	5.24	5.09	0.54	1.70	19.3
4.875	May 31 2026	2	73.1	3.735	3.475	3.536	3.271	-19.8	-20.4	-0.6	-1.8	-17.2	-18.4	-1.2	-0.3	-24.0	-24.8	-0.8	-2.2	5.24	5.09	0.56	1.76	5.6
4.125	Jun 15 2026	3	40.0	3.715	3.460	3.518	3.257	-19.7	-20.4	-0.6	-1.7	-16.4	-17.0	-0.5	-2.4	-23.9	-24.7	-0.8	-2.0	5.24	5.09	0.54	1.71	0.0
1.875	Jun 30 2026	7	33.8	3.704	3.456	3.503	3.245	-20.1	-21.0	-1.0	-2.3	-18.6	-19.0	-0.4	-2.0	-24.2	-25.4	-1.2	-2.6	5.24	5.09	0.51	1.62	30.0
0.875	Jun 30 2026	5	70.3	3.698	3.452	3.503	3.245	-19.5	-20.7	-1.1	-2.4	-18.7	-19.0	-0.3	-2.3	-23.7	-25.0	-1.3	-2.7	5.24	5.09	0.51	1.61	26.2
4.625	Jun 30 2026	2	71.4	3.703	3.444	3.503	3.245	-20.0	-19.9	0.1	-1.3	-16.7	-16.9	-0.2	-1.6	-24.1	-24.2	-0.1	-1.7	5.22	5.11	0.53	1.66	3.4
4.500	Jul 15 2026	3	40.0	3.690	3.440	3.489	3.234	-20.1	-20.6	-0.5	-1.8	-17.0	-17.6	-0.6	-1.4	-24.3	-25.0	-0.7	-2.2	5.24	5.09	0.51	1.62	0.0
1.875	Jul 31 2026	7	33.3	3.680	3.441	3.474	3.223	-20.5	-21.7	-1.2	-2.5	-19.2	-19.7	-0.5	-1.1	-24.8	-26.2	-1.4	-2.9	5.24	5.09	0.49	1.54	28.3
0.625	Jul 31 2026	5	66.8	3.675	3.439	3.474	3.223	-20.1	-21.5	-1.4	-2.7	-19.7	-20.0	-0.3	-1.1	-24.4	-26.0	-1.6	-3.1	5.24	5.09	0.48	1.52	16.7

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions

2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %		
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
4.375	Jul 31 2026	2	72.8	3.676	3.427	3.474	3.224	-20.1	-20.4	-0.2	-1.6	-17.2	-17.4	-0.2	-0.9	-24.4	-24.8	-0.4	-2.0	5.22	5.11	0.50	1.57	5.2
6.750	Aug 15 2026	30	10.9	3.500	3.230	3.459	3.213	-4.1	-1.7	2.4	0.9	0.8	2.3	1.5	-7.0	-8.3	-6.2	2.2	0.5	5.24	5.09	0.50	1.56	58.3
4.375	Aug 15 2026	3	57.7	3.652	3.411	3.459	3.213	-19.3	-19.8	-0.5	-2.0	-15.4	-15.7	-0.3	1.8	-23.6	-24.3	-0.7	-2.3	5.24	5.09	0.49	1.53	27.2
1.500	Aug 15 2026	10	65.4	3.662	3.428	3.459	3.213	-20.3	-21.5	-1.2	-2.7	-18.2	-18.5	-0.3	0.6	-24.5	-26.0	-1.4	-3.0	5.24	5.09	0.48	1.49	16.5
1.375	Aug 31 2026	7	36.2	3.641	3.418	3.450	3.206	-19.0	-21.2	-2.1	-2.4	-18.3	-18.6	-0.3	0.6	-23.6	-25.9	-2.3	-3.0	5.24	5.09	0.47	1.46	35.4
0.750	Aug 31 2026	5	68.7	3.653	3.432	3.450	3.206	-20.2	-22.7	-2.4	-2.7	-20.0	-20.3	-0.4	-0.9	-24.8	-27.3	-2.6	-3.2	5.24	5.09	0.46	1.45	12.2
3.750	Aug 31 2026	2	74.5	3.645	3.414	3.450	3.206	-19.4	-20.8	-1.4	-1.6	-17.2	-17.4	-0.1	0.1	-24.0	-25.5	-1.5	-2.2	5.20	5.11	0.48	1.49	7.4
4.625	Sep 15 2026	3	44.0	3.641	3.417	3.434	3.196	-20.7	-22.1	-1.5	-2.0	-17.3	-18.3	-1.0	0.2	-25.0	-26.7	-1.7	-2.3	5.24	5.09	0.47	1.46	0.0
1.625	Sep 30 2026	7	35.3	3.621	3.401	3.422	3.188	-19.9	-21.4	-1.5	-2.4	-18.6	-19.1	-0.5	0.5	-24.2	-25.9	-1.7	-2.8	5.24	5.09	0.45	1.39	49.5
0.875	Sep 30 2026	5	68.3	3.615	3.396	3.422	3.188	-19.3	-20.8	-1.6	-2.5	-18.6	-18.8	-0.3	0.3	-23.6	-25.4	-1.8	-2.9	5.24	5.09	0.45	1.38	16.8
4.625	Oct 15 2026	3	46.0	3.621	3.400	3.409	3.180	-21.3	-22.0	-0.7	-2.1	-17.7	-18.8	-1.1	0.4	-25.6	-26.6	-0.9	-2.4	5.24	5.09	0.46	1.40	0.0
1.625	Oct 31 2026	7	35.3	3.618	3.407	3.396	3.173	-22.2	-23.4	-1.2	-2.7	-21.0	-21.8	-0.8	-0.9	-26.6	-28.0	-1.4	-3.1	5.24	5.09	0.43	1.33	34.1
1.125	Oct 31 2026	5	67.2	3.616	3.405	3.396	3.173	-21.9	-23.2	-1.3	-2.8	-21.1	-21.8	-0.7	-1.2	-26.4	-27.8	-1.5	-3.1	5.24	5.09	0.43	1.33	14.8
6.500	Nov 15 2026	30	11.5	3.261	2.993	3.383	3.166	12.2	17.3	5.1	3.1	16.3	20.1	3.8	11.4	7.8	12.6	4.9	2.8	5.24	5.09	0.45	1.37	60.7
4.625	Nov 15 2026	3	48.9	3.603	3.386	3.383	3.165	-22.0	-22.1	-0.1	-1.9	-17.6	-18.6	-1.0	1.0	-26.4	-26.7	-0.3	-2.3	5.24	5.09	0.44	1.35	1.9
2.000	Nov 15 2026	10	69.1	3.604	3.393	3.383	3.165	-22.1	-22.8	-0.7	-2.5	-19.6	-20.3	-0.7	-0.6	-26.5	-27.4	-0.9	-2.9	5.24	5.09	0.42	1.31	25.9
1.625	Nov 30 2026	7	34.5	3.596	3.389	3.373	3.160	-22.3	-23.0	-0.7	-2.9	-20.6	-21.3	-0.7	-1.5	-26.8	-27.7	-0.9	-3.0	5.24	5.09	0.41	1.28	37.6
1.250	Nov 30 2026	5	63.9	3.584	3.377	3.373	3.160	-21.1	-21.8	-0.6	-2.8	-19.7	-20.2	-0.5	-0.8	-25.6	-26.5	-0.9	-2.9	5.24	5.09	0.41	1.27	7.8
4.375	Dec 15 2026	3	50.0	3.573	3.361	3.362	3.153	-21.1	-20.8	0.3	-1.8	-17.3	-17.8	-0.5	0.5	-25.6	-25.5	0.1	-2.2	5.24	5.09	0.42	1.30	0.0
1.750	Dec 31 2026	7	35.0	3.566	3.361	3.352	3.145	-21.4	-21.6	-0.2	-2.4	-19.2	-19.6	-0.4	-0.2	-25.9	-26.3	-0.4	-2.8	5.24	5.09	0.40	1.23	34.2
1.250	Dec 31 2026	5	64.7	3.546	3.340	3.352	3.145	-19.4	-19.4	-0.1	-2.3	-17.6	-17.7	-0.1	1.1	-23.9	-24.2	-0.3	-2.7	5.24	5.09	0.40	1.22	12.0
4.000	Jan 15 2027	3	52.0	3.565	3.359	3.343	3.138	-22.2	-22.0	0.1	-2.0	-18.4	-18.9	-0.6	-0.1	-26.7	-26.8	-0.1	-2.4	5.24	5.09	0.40	1.24	0.0
1.500	Jan 31 2027	7	98.5	3.561	3.364	3.335	3.132	-22.6	-23.2	-0.6	-0.6	-21.4	-22.0	-0.6	0.2	-27.2	-28.0	-0.8	-2.9	5.24	5.09	0.38	1.18	22.4
6.625	Feb 15 2027	30	10.5	3.338	3.107	3.325	3.125	-1.3	1.7	3.0	1.3	3.9	5.4	1.5	-13.7	-6.0	-3.1	2.8	0.9	5.24	5.09	0.40	1.22	70.0
4.125	Feb 15 2027	3	58.0	3.561	3.362	3.325	3.124	-23.6	-23.8	-0.2	-1.9	-19.2	-19.9	-0.6	-1.0	-28.3	-28.7	-0.4	-2.3	5.24	5.09	0.39	1.19	6.9
2.250	Feb 15 2027	10	65.8	3.555	3.359	3.325	3.124	-23.0	-23.5	-0.5	-2.2	-20.0	-20.5	-0.5	0.1	-27.7	-28.4	-0.7	-2.6	5.24	5.09	0.38	1.16	30.3
1.125	Feb 28 2027	7	36.8	3.543	3.359	3.320	3.120	-22.3	-23.9	-1.5	-2.5	-22.5	-23.1	-0.6	-1.3	-27.0	-28.7	-1.7	-2.8	5.24	5.09	0.37	1.13	62.9
1.875	Feb 28 2027	5	62.1	3.542	3.357	3.320	3.120	-22.3	-23.6	-1.3	-2.3	-21.9	-22.5	-0.6	-0.7	-26.9	-28.5	-1.6	-2.7	5.24	5.09	0.37	1.14	14.6
4.250	Mar 15 2027	3	56.0	3.518	3.328	3.311	3.114	-20.7	-21.4	-0.7	-1.6	-17.5	-18.4	-0.8	0.6	-25.4	-26.3	-0.9	-2.0	5.24	5.09	0.37	1.15	0.0
0.625	Mar 31 2027	7	36.3	3.537	3.357	3.304	3.109	-23.3	-24.8	-1.5	-2.6	-22.8	-23.4	-0.6	-3.0	-28.1	-29.8	-1.7	-3.0	5.24	5.09	0.35	1.08	37.9
2.500	Mar 31 2027	5	60.5	3.509	3.322	3.304	3.109	-20.6	-21.3	-0.8	-1.9	-18.4	-19.0	-0.6	1.4	-25.3	-26.3	-1.0	-2.3	5.24	5.09	0.36	1.11	15.7
4.500	Apr 15 2027	3	59.0	3.526	3.339	3.297	3.104	-22.9	-23.5	-0.6	-1.8	-19.2	-20.3	-1.1	0.2	-27.7	-28.5	-0.8	-2.1	5.24	5.09	0.37	1.11	1.6
0.500	Apr 30 2027	7	38.0	3.520	3.345	3.290	3.100	-23.0	-24.5	-1.5	-2.7	-22.9	-23.5	-0.5	-1.0	-27.8	-29.5	-1.7	-3.1	5.24	5.09	0.34	1.04	15.7
2.750	Apr 30 2027	5	55.8	3.517	3.336	3.290	3.100	-22.7	-23.6	-0.9	-2.2	-20.7	-21.5	-0.8	1.6	-27.5	-28.6	-1.1	-2.6	5.24	5.09	0.35	1.07	12.2
4.500	May 15 2027	3	65.3	3.522	3.339	3.283	3.095	-23.9	-24.4	-0.5	-1.8	-19.8	-20.8	-1.1	0.6	-28.7	-29.4	-0.7	-2.2	5.24	5.09	0.36	1.08	11.2
2.375	May 15 2027	10	71.0	3.535	3.358	3.283	3.095	-25.2	-26.3	-1.2	-2.4	-22.7	-23.7	-1.0	-1.8	-30.0	-31.3	-1.3	-2.7	5.24	5.09	0.35	1.05	22.4
0.500	May 31 2027	7	42.0	3.518	3.347	3.279	3.092	-23.9	-25.5	-1.6	-2.9	-24.7	-25.4	-0.7	-1.5	-28.7	-30.5	-1.8	-3.2	5.24	5.09	0.33	1.01	25.5

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions
2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue	Issue Size *	Yield		Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %
				Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m	
2.625	May 31 2027	5	55.2	3.514	3.338	3.279	3.092	-23.5	-24.6	-1.1	-2.4	-22.5	-23.4	-1.0	1.0	-28.4	-29.6	-1.3	-2.7	5.24	5.09	0.34	1.04	13.1
4.625	Jun 15 2027	3	59.9	3.490	3.306	3.272	3.088	-21.8	-21.9	-0.1	-1.4	-18.2	-18.4	-0.2	-0.5	-26.7	-26.9	-0.2	-1.7	5.22	5.11	0.35	1.05	3.1
0.500	Jun 30 2027	7	46.6	3.502	3.334	3.267	3.084	-23.6	-25.0	-1.4	-2.8	-23.6	-24.0	-0.5	-0.3	-28.4	-30.0	-1.6	-3.1	5.24	5.09	0.32	0.97	20.4
3.250	Jun 30 2027	5	50.6	3.495	3.319	3.267	3.084	-22.9	-23.5	-0.6	-2.1	-20.5	-21.0	-0.5	-1.6	-27.7	-28.6	-0.8	-2.4	5.24	5.09	0.33	1.01	7.1
4.375	Jul 15 2027	3	67.4	3.499	3.321	3.262	3.081	-23.7	-24.0	-0.3	-1.6	-20.6	-20.9	-0.3	-1.0	-28.6	-29.1	-0.5	-2.0	5.22	5.11	0.33	1.01	14.0
0.375	Jul 31 2027	7	49.0	3.497	3.334	3.257	3.078	-24.0	-25.6	-1.6	-2.9	-24.6	-25.1	-0.5	-1.1	-28.9	-30.7	-1.7	-3.2	5.24	5.09	0.31	0.94	11.1
2.750	Jul 31 2027	5	50.0	3.497	3.328	3.257	3.078	-24.0	-25.0	-1.0	-2.3	-22.5	-23.1	-0.6	-1.2	-29.0	-30.2	-1.2	-2.6	5.24	5.09	0.32	0.97	8.0
6.375	Aug 15 2027	30	10.7	3.425	3.245	3.252	3.075	-17.4	-16.9	0.4	-0.7	-12.8	-12.9	-0.1	-8.2	-22.3	-22.1	0.2	-1.1	5.24	5.09	0.33	1.00	60.5
3.750 Aug 15 2027	3	69.0		3.492	3.321	3.252	3.075	-24.0	-24.6	-0.5	-1.7	-21.1	-21.4	-0.3	1.9	-29.0	-29.7	-0.7	-2.1	5.22	5.11	0.32	0.97	16.0
2.250	Aug 15 2027	10	69.9	3.500	3.335	3.252	3.075	-24.8	-26.0	-1.2	-2.4	-23.1	-23.7	-0.6	0.2	-29.8	-31.2	-1.4	-2.7	5.24	5.09	0.31	0.95	37.7
3.125	Aug 31 2027	5	50.9	3.493	3.333	3.248	3.072	-24.5	-26.1	-1.6	-2.4	-22.5	-23.1	-0.6	0.5	-29.5	-31.3	-1.8	-2.7	5.24	5.09	0.31	0.95	11.5
0.500	Aug 31 2027	7	51.1	3.488	3.333	3.248	3.072	-24.0	-26.1	-2.1	-2.9	-24.2	-24.6	-0.5	1.0	-29.0	-31.2	-2.3	-3.3	5.24	5.09	0.30	0.92	26.7
3.375 Sep 15 2027	3	58.6		3.464	3.309	3.242	3.070	-22.2	-23.9	-1.7	-1.9	-20.4	-20.9	-0.5	-1.7	-27.2	-29.1	-1.9	-2.3	5.24	5.09	0.28	0.91	0.0
4.125	Sep 30 2027	5	44.0	3.466	3.304	3.237	3.068	-22.8	-23.6	-0.8	-1.9	-19.7	-20.5	-0.9	1.7	-27.8	-28.8	-1.0	-2.2	5.24	5.09	0.31	0.93	0.0
0.375	Sep 30 2027	7	56.8	3.485	3.333	3.237	3.068	-24.7	-26.5	-1.8	-2.9	-24.9	-25.5	-0.5	-0.8	-29.7	-31.7	-2.0	-3.2	5.24	5.09	0.29	0.89	15.7
4.125	Oct 31 2027	5	43.0	3.482	3.325	3.227	3.064	-25.4	-26.1	-0.6	-2.1	-22.6	-23.7	-1.2	1.1	-30.5	-31.3	-0.8	-2.4	5.24	5.09	0.30	0.91	0.0
0.500	Oct 31 2027	7	58.6	3.490	3.341	3.227	3.064	-26.2	-27.8	-1.5	-3.0	-26.8	-27.5	-0.7	-1.4	-31.3	-33.0	-1.7	-3.3	5.24	5.09	0.29	0.86	19.8
6.125	Nov 15 2027	30	22.5	3.448	3.285	3.222	3.062	-22.6	-22.3	0.3	-1.3	-17.7	-18.7	-1.0	-3.8	-27.7	-27.5	0.2	-1.6	5.24	5.09	0.31	0.92	64.7
2.250	Nov 15 2027	10	66.5	3.491	3.340	3.222	3.062	-26.9	-27.8	-0.9	-2.6	-24.9	-25.9	-1.0	-0.8	-31.9	-33.0	-1.1	-2.9	5.24	5.09	0.29	0.88	32.5
3.875	Nov 30 2027	5	47.7	3.480	3.327	3.218	3.060	-26.3	-26.7	-0.4	-2.2	-23.0	-24.2	-1.1	0.6	-31.4	-32.0	-0.6	-2.5	5.24	5.09	0.29	0.89	9.8
0.625	Nov 30 2027	7	63.8	3.475	3.329	3.218	3.060	-25.8	-26.9	-1.1	-2.9	-25.5	-26.1	-0.6	-0.7	-30.9	-32.2	-1.3	-3.2	5.24	5.09	0.28	0.84	21.5
3.875	Dec 31 2027	5	43.0	3.459	3.306	3.209	3.056	-25.0	-25.0	0.0	-2.0	-21.6	-22.1	-0.5	-1.3	-30.2	-30.4	-0.2	-2.3	5.24	5.09	0.29	0.86	0.0
0.625	Dec 31 2027	7	68.0	3.477	3.333	3.209	3.056	-26.7	-27.7	-1.0	-2.9	-26.3	-26.9	-0.6	-0.7	-31.9	-33.1	-1.2	-3.2	5.24	5.09	0.27	0.82	18.0
3.500	Jan 31 2028	5	43.0	3.472	3.325	3.202	3.051	-27.0	-27.5	-0.4	-2.2	-23.9	-24.5	-0.6	-0.7	-32.2	-32.8	-0.6	-2.6	5.24	5.09	0.28	0.83	0.0
0.750	Jan 31 2028	7	70.4	3.475	3.335	3.202	3.051	-27.4	-28.5	-1.1	-2.9	-26.8	-27.4	-0.6	0.6	-32.6	-33.8	-1.3	-3.3	5.24	5.09	0.27	0.80	12.8
2.750	Feb 15 2028	10	70.6	3.488	3.346	3.198	3.048	-29.0	-29.8	-0.8	-2.5	-26.4	-27.2	-0.7	-0.7	-34.2	-35.2	-1.0	-2.8	5.24	5.09	0.27	0.81	14.3
4.000	Feb 29 2028	5	52.8	3.472	3.332	3.195	3.047	-27.6	-28.6	-1.0	-2.1	-24.6	-25.3	-0.7	-0.8	-32.9	-34.0	-1.1	-2.4	5.24	5.09	0.27	0.82	18.5
1.125	Feb 29 2028	7	75.4	3.480	3.348	3.195	3.046	-28.5	-30.1	-1.6	-2.9	-28.1	-28.8	-0.7	-1.8	-33.7	-35.5	-1.8	-3.2	5.24	5.09	0.26	0.78	17.8
3.625	Mar 31 2028	5	43.0	3.465	3.327	3.189	3.043	-27.5	-28.4	-0.9	-2.1	-24.2	-25.3	-1.1	-1.5	-32.8	-33.9	-1.1	-2.4	5.24	5.09	0.27	0.79	0.0
1.250	Mar 31 2028	7	73.1	3.483	3.352	3.189	3.043	-29.3	-30.9	-1.5	-2.8	-28.4	-29.3	-0.9	-1.2	-34.6	-36.3	-1.7	-3.1	5.24	5.09	0.26	0.76	23.1
3.500	Apr 30 2028	5	47.2	3.469	3.334	3.184	3.040	-28.5	-29.4	-1.0	-2.2	-26.0	-27.2	-1.2	-0.9	-33.8	-34.9	-1.1	-2.5	5.24	5.09	0.26	0.78	8.9
1.250	Apr 30 2028	7	73.8	3.481	3.352	3.184	3.040	-29.7	-31.2	-1.6	-2.8	-29.6	-30.5	-1.0	-1.9	-35.0	-36.7	-1.7	-3.1	5.24	5.09	0.25	0.75	16.1
2.875	May 15 2028	10	75.1	3.481	3.349	3.182	3.039	-29.9	-31.0	-1.1	-2.4	-27.5	-28.7	-1.2	0.1	-35.2	-36.5	-1.3	-2.7	5.24	5.09	0.26	0.76	14.5
3.625	May 31 2028	5	51.1	3.469	3.336	3.179	3.037	-29.0	-29.9	-0.9	-2.2	-25.8	-27.0	-1.1	-0.1	-34.3	-35.4	-1.1	-2.5	5.24	5.09	0.26	0.76	15.8
1.250	May 31 2028	7	74.0	3.475	3.348	3.179	3.037	-29.5	-31.1	-1.5	-2.8	-28.8	-29.7	-0.9	0.1	-34.9	-36.6	-1.7	-3.2	5.24	5.09	0.24	0.73	16.3
4.000	Jun 30 2028	5	43.0	3.460	3.327	3.175	3.035	-28.5	-29.2	-0.7	-2.1	-25.3	-25.9	-0.6	-0.4	-33.9	-34.7	-0.8	-2.4	5.24	5.09	0.25	0.75	0.0
1.250	Jun 30 2028	7	71.4	3.474	3.349	3.175	3.035	-29.9	-31.3	-1.4	-2.9	-29.4	-30.1	-0.7	-0.3	-35.3	-36.9	-1.6	-3.2	5.24	5.09	0.24	0.71	19.9

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions
2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread			Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %			
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
4.125	Jul 31 2028	5	43.0	3.467	3.338	3.171	3.034	-29.6	-30.4	-0.8	-2.2	-26.4	-27.1	-0.7	0.3	-35.0	-36.0	-1.0	-2.5	5.24	5.09	0.25	0.73	0.0
1.000	Jul 31 2028	7	67.9	3.475	3.353	3.171	3.034	-30.3	-31.9	-1.6	-3.0	-30.2	-30.9	-0.7	0.0	-35.8	-37.5	-1.7	-3.3	5.24	5.09	0.23	0.69	10.2
5.500	Aug 15 2028	30	11.8	3.373	3.235	3.170	3.033	-20.3	-20.2	0.1	-1.1	-16.3	-16.4	-0.2	4.6	-25.8	-25.8	-0.1	-1.4	5.24	5.09	0.25	0.74	60.6
2.875	Aug 15 2028	10	75.5	3.479	3.354	3.170	3.033	-30.9	-32.1	-1.2	-2.5	-28.9	-29.6	-0.7	-0.6	-36.3	-37.7	-1.4	-2.8	5.24	5.09	0.24	0.71	14.2
4.375	Aug 31 2028	5	50.8	3.467	3.345	3.168	3.033	-29.9	-31.2	-1.3	-2.1	-26.7	-27.3	-0.7	-0.1	-35.4	-36.8	-1.4	-2.4	5.24	5.09	0.24	0.72	9.4
1.125	Aug 31 2028	7	69.8	3.470	3.355	3.168	3.033	-30.2	-32.2	-2.0	-2.9	-30.1	-30.7	-0.6	-0.6	-35.7	-37.9	-2.1	-3.2	5.24	5.09	0.23	0.68	13.2
4.625	Sep 30 2028	5	49.0	3.467	3.344	3.164	3.032	-30.3	-31.3	-1.0	-2.1	-26.5	-27.8	-1.3	0.1	-35.8	-36.9	-1.1	-2.3	5.24	5.09	0.24	0.71	0.0
1.250	Sep 30 2028	7	69.5	3.475	3.360	3.164	3.032	-31.1	-32.8	-1.7	-2.9	-30.9	-31.8	-0.9	-0.5	-36.6	-38.5	-1.9	-3.2	5.24	5.09	0.22	0.67	12.4
4.875	Oct 31 2028	5	52.0	3.469	3.347	3.159	3.031	-31.0	-31.6	-0.6	-2.0	-26.6	-28.0	-1.3	1.1	-36.6	-37.3	-0.8	-2.3	5.24	5.09	0.24	0.70	0.0
1.375	Oct 31 2028	7	68.3	3.473	3.360	3.159	3.031	-31.5	-32.9	-1.4	-2.9	-30.7	-31.6	-0.9	0.5	-37.0	-38.6	-1.6	-3.2	5.24	5.09	0.22	0.65	15.9
5.250	Nov 15 2028	30	10.9	3.442	3.318	3.157	3.031	-28.5	-28.7	-0.2	-1.8	-23.8	-25.0	-1.2	-6.2	-34.1	-34.4	-0.3	-2.0	5.24	5.09	0.24	0.70	29.3
3.125	Nov 15 2028	10	80.5	3.483	3.366	3.157	3.031	-32.6	-33.5	-0.9	-2.5	-29.8	-31.1	-1.3	0.3	-38.2	-39.2	-1.1	-2.8	5.24	5.09	0.23	0.67	25.8
4.375	Nov 30 2028	5	55.6	3.465	3.346	3.465	3.031	0.0	-31.5	-31.5	-33.2	-27.2	-28.4	-1.3	0.8	-36.6	-37.3	-0.6	-2.4	5.24	5.09	0.23	0.68	1.1
1.500	Nov 30 2028	7	63.9	3.473	3.361	3.155	3.031	-31.8	-33.0	-1.2	-2.9	-31.0	-31.9	-1.0	0.1	-37.4	-38.8	-1.3	-3.1	5.24	5.09	0.22	0.64	9.7
3.750	Dec 31 2028	5	58.0	3.464	3.347	3.151	3.030	-31.3	-31.7	-0.4	-2.2	-28.2	-28.9	-0.7	-1.0	-36.9	-37.5	-0.6	-2.4	5.24	5.09	0.22	0.66	0.0
1.375	Dec 31 2028	7	63.6	3.462	3.351	3.151	3.030	-31.1	-32.1	-1.0	-2.7	-30.6	-31.3	-0.7	0.9	-36.7	-37.9	-1.2	-3.0	5.24	5.09	0.21	0.63	12.0
1.750	Jan 31 2029	7	60.9	3.473	3.364	3.148	3.028	-32.6	-33.6	-1.0	-2.7	-31.2	-31.9	-0.7	0.2	-38.2	-39.4	-1.2	-3.0	5.24	5.09	0.21	0.62	13.0
4.000	Jan 31 2029	5	61.0	3.460	3.345	3.148	3.028	-31.2	-31.7	-0.5	-2.1	-27.6	-28.2	-0.6	-0.3	-36.8	-37.5	-0.6	-2.3	5.24	5.09	0.22	0.65	0.0
5.250	Feb 15 2029	30	11.3	3.382	3.261	3.146	3.027	-23.6	-23.3	0.2	-1.3	-19.0	-19.3	-0.3	5.0	-29.2	-29.1	0.1	-1.5	5.24	5.09	0.22	0.66	62.3
2.625	Feb 15 2029	10	81.5	3.468	3.358	3.146	3.027	-32.2	-33.1	-0.9	-2.5	-29.9	-30.5	-0.7	0.6	-37.8	-38.9	-1.0	-2.7	5.24	5.09	0.21	0.63	26.4
1.875	Feb 28 2029	7	58.6	3.471	3.367	3.145	3.027	-32.6	-34.0	-1.4	-2.7	-31.7	-32.4	-0.7	-0.1	-38.2	-39.8	-1.6	-2.9	5.24	5.09	0.21	0.61	14.6
4.250	Feb 28 2029	5	66.8	3.451	3.341	3.145	3.027	-30.6	-31.4	-0.8	-1.9	-27.3	-28.0	-0.6	0.5	-36.2	-37.2	-1.0	-2.2	5.24	5.09	0.21	0.64	4.1
2.375	Mar 31 2029	7	55.8	3.476	3.372	3.143	3.026	-33.3	-34.6	-1.3	-2.5	-31.8	-32.9	-1.1	-0.1	-38.9	-40.4	-1.4	-2.7	5.24	5.09	0.21	0.61	15.7
4.125	Mar 31 2029	5	67.0	3.461	3.352	3.143	3.026	-31.7	-32.6	-0.8	-2.0	-28.3	-29.6	-1.2	1.1	-37.4	-38.4	-1.0	-2.2	5.24	5.09	0.21	0.63	0.0
2.875	Apr 30 2029	7	50.1	3.474	3.369	3.142	3.026	-33.2	-34.3	-1.1	-2.3	-31.0	-32.2	-1.2	1.4	-38.9	-40.2	-1.3	-2.6	5.24	5.09	0.20	0.60	12.2
4.625	Apr 30 2029	5	70.3	3.457	3.348	3.142	3.026	-31.6	-32.2	-0.7	-1.8	-27.5	-28.8	-1.2	1.3	-37.2	-38.1	-0.8	-2.1	5.24	5.09	0.21	0.62	0.5
2.375	May 15 2029	10	84.4	3.469	3.366	3.141	3.026	-32.8	-34.0	-1.2	-2.4	-31.2	-32.3	-1.0	-0.3	-38.5	-39.9	-1.3	-2.6	5.24	5.09	0.20	0.59	41.8
2.750	May 31 2029	7	48.3	3.478	3.375	3.140	3.026	-33.7	-34.9	-1.2	-2.4	-31.6	-32.8	-1.1	1.2	-39.5	-40.8	-1.3	-2.6	5.24	5.09	0.20	0.59	13.1
4.500	May 31 2029	5	74.2	3.449	3.341	3.140	3.026	-30.9	-31.5	-0.6	-1.8	-27.0	-28.1	-1.1	1.5	-36.6	-37.3	-0.8	-2.0	5.24	5.09	0.21	0.61	5.6
3.250	Jun 30 2029	7	43.1	3.481	3.378	3.139	3.026	-34.2	-35.2	-1.0	-2.2	-31.9	-32.6	-0.7	0.6	-39.9	-41.1	-1.1	-2.4	5.24	5.09	0.20	0.59	7.1
4.250	Jun 30 2029	5	72.4	3.463	3.355	3.139	3.026	-32.4	-32.9	-0.5	-1.7	-29.1	-29.5	-0.5	-0.3	-38.1	-38.8	-0.7	-1.9	5.26	5.11	0.20	0.60	3.4
2.625	Jul 31 2029	7	41.3	3.480	3.380	3.138	3.027	-34.1	-35.3	-1.2	-2.3	-32.5	-33.2	-0.7	-0.8	-39.9	-41.2	-1.3	-2.5	5.24	5.09	0.19	0.57	8.0
4.000	Jul 31 2029	5	73.9	3.460	3.355	3.138	3.027	-32.2	-32.8	-0.6	-1.7	-29.1	-29.5	-0.4	2.3	-37.9	-38.7	-0.8	-1.9	5.26	5.11	0.20	0.58	5.2
6.125	Aug 15 2029	30	11.2	3.461	3.355	3.138	3.028	-32.3	-32.7	-0.4	-1.4	-27.3	-27.9	-0.6	0.8	-38.1	-38.6	-0.5	-1.6	5.24	5.09	0.20	0.60	64.1
1.625	Aug 15 2029	10	92.6	3.445	3.347	3.138	3.027	-30.7	-31.9	-1.2	-2.4	-30.1	-30.6	-0.5	1.5	-36.4	-37.8	-1.4	-2.6	5.24	5.09	0.19	0.55	50.9
3.125	Aug 31 2029	7	41.8	3.483	3.388	3.138	3.028	-34.6	-36.0	-1.5	-2.2	-32.5	-33.2	-0.7	-0.2	-40.3	-41.9	-1.6	-2.4	5.24	5.09	0.19	0.56	11.5
3.625	Aug 31 2029	5	75.6	3.446	3.348	3.138	3.028	-30.9	-32.0	-1.1	-1.8	-28.3	-28.8	-0.5	3.8	-36.6	-37.9	-1.3	-2.0	5.22	5.09	0.19	0.57	7.4

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions

2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %		
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
3.875	Sep 30 2029	7	36.0	3.486	3.390	3.136	3.029	-35.0	-36.1	-1.1	-2.0	-32.0	-33.3	-1.3	1.3	-40.8	-42.1	-1.3	-2.2	5.24	5.09	0.19	0.56	0.0
4.000	Oct 31 2029	7	35.0	3.489	3.393	3.134	3.030	-35.5	-36.3	-0.8	-2.0	-31.9	-33.2	-1.3	1.9	-41.3	-42.3	-1.0	-2.2	5.24	5.09	0.19	0.56	0.0
1.750	Nov 15 2029	10	88.6	3.462	3.370	3.134	3.031	-32.8	-33.9	-1.1	-2.3	-31.9	-32.7	-0.9	-0.8	-38.7	-39.9	-1.2	-2.5	5.24	5.09	0.18	0.53	61.6
3.875	Nov 30 2029	7	38.8	3.490	3.396	3.133	3.032	-35.7	-36.4	-0.7	-1.9	-32.3	-33.6	-1.3	1.5	-41.6	-42.4	-0.8	-2.1	5.24	5.09	0.19	0.55	9.8
3.875	Dec 31 2029	7	35.0	3.496	3.402	3.132	3.032	-36.4	-36.9	-0.6	-1.8	-32.9	-33.5	-0.7	-0.2	-42.2	-42.9	-0.7	-2.0	5.24	5.09	0.18	0.54	0.0
3.500	Jan 31 2030	7	35.0	3.495	3.403	3.131	3.033	-36.3	-37.1	-0.7	-1.8	-33.3	-34.0	-0.7	-0.7	-42.2	-43.1	-0.9	-2.0	5.24	5.09	0.18	0.53	0.0
1.500	Feb 15 2030	10	88.1	3.489	3.403	3.131	3.033	-35.9	-37.0	-1.2	-2.3	-35.3	-35.9	-0.6	-2.7	-41.7	-43.0	-1.3	-2.5	5.24	5.09	0.17	0.50	33.5
4.000	Feb 28 2030	7	43.0	3.493	3.405	3.131	3.033	-36.2	-37.2	-1.0	-1.7	-33.2	-33.9	-0.7	-0.2	-42.1	-43.2	-1.1	-1.9	5.24	5.09	0.18	0.52	18.6
3.625	Mar 31 2030	7	35.0	3.494	3.407	3.131	3.034	-36.3	-37.3	-1.0	-1.7	-33.4	-34.6	-1.3	0.7	-42.2	-43.3	-1.1	-1.9	5.24	5.09	0.18	0.51	0.0
3.500	Apr 30 2030	7	38.4	3.501	3.415	3.131	3.035	-37.0	-38.0	-1.0	-1.7	-34.1	-35.4	-1.3	0.4	-42.9	-44.1	-1.1	-1.9	5.24	5.09	0.17	0.50	8.9
6.250	May 15 2030	31	17.0	3.494	3.403	3.131	3.036	-36.3	-36.7	-0.4	-1.1	-30.6	-32.0	-1.5	0.4	-42.2	-42.7	-0.5	-1.2	5.24	5.09	0.18	0.53	62.2
0.625	May 15 2030	10	109.9	3.493	3.414	3.131	3.036	-36.2	-37.8	-1.6	-2.3	-37.5	-38.2	-0.7	-1.5	-42.1	-43.8	-1.7	-2.5	5.24	5.09	0.16	0.46	27.3
3.750	May 31 2030	7	41.6	3.504	3.419	3.131	3.036	-37.3	-38.3	-0.9	-1.6	-34.1	-35.4	-1.3	0.4	-43.2	-44.3	-1.1	-1.8	5.24	5.09	0.17	0.50	15.9
3.750	Jun 30 2030	7	35.0	3.511	3.425	3.132	3.038	-37.9	-38.8	-0.9	-1.6	-35.2	-35.8	-0.6	-1.2	-43.8	-44.9	-1.0	-1.8	5.24	5.09	0.17	0.50	0.0
4.000	Jul 31 2030	7	35.0	3.508	3.424	3.132	3.039	-37.6	-38.5	-0.9	-1.5	-34.5	-35.1	-0.6	0.3	-43.6	-44.6	-1.0	-1.7	5.24	5.09	0.17	0.49	0.0
0.625	Aug 15 2030	10	133.0	3.504	3.427	3.133	3.040	-37.1	-38.7	-1.6	-2.3	-38.6	-39.1	-0.6	-0.5	-43.0	-44.8	-1.7	-2.5	5.24	5.09	0.15	0.44	21.3
4.125	Aug 31 2030	7	39.7	3.513	3.432	3.133	3.041	-38.0	-39.2	-1.2	-1.5	-35.0	-35.6	-0.6	-0.2	-43.9	-45.3	-1.3	-1.6	5.24	5.09	0.16	0.48	9.4
4.625	Sep 30 2030	7	37.0	3.516	3.435	3.133	3.043	-38.3	-39.2	-0.9	-1.3	-34.0	-35.4	-1.4	2.5	-44.3	-45.3	-1.0	-1.5	5.24	5.09	0.17	0.48	0.0
4.875	Oct 31 2030	7	38.0	3.516	3.435	3.132	3.045	-38.4	-39.1	-0.7	-1.3	-33.8	-35.2	-1.4	2.1	-44.4	-45.2	-0.8	-1.5	5.24	5.09	0.17	0.48	0.0
0.875	Nov 15 2030	10	133.7	3.506	3.432	3.132	3.046	-37.3	-38.7	-1.3	-2.1	-38.2	-39.0	-0.8	1.1	-43.3	-44.8	-1.5	-2.3	5.24	5.09	0.15	0.43	18.6
4.375	Nov 30 2030	7	39.5	3.523	3.444	3.132	3.046	-39.1	-39.7	-0.6	-1.4	-35.3	-36.6	-1.4	1.1	-45.1	-45.9	-0.7	-1.6	5.24	5.09	0.16	0.47	1.1
3.750	Dec 31 2030	7	40.0	3.523	3.445	3.132	3.048	-39.1	-39.7	-0.6	-1.5	-35.8	-36.4	-0.6	-1.2	-45.1	-45.9	-0.7	-1.6	5.24	5.09	0.16	0.46	0.0
4.000	Jan 31 2031	7	41.0	3.526	3.448	3.132	3.049	-39.3	-40.0	-0.6	-1.4	-35.8	-36.4	-0.6	0.6	-45.4	-46.1	-0.8	-1.5	5.24	5.09	0.15	0.45	0.0
5.375	Feb 15 2031	30	16.4	3.462	3.380	3.132	3.049	-33.0	-33.1	-0.1	-0.8	-27.9	-28.3	-0.4	5.4	-39.0	-39.3	-0.2	-0.9	5.24	5.09	0.16	0.47	50.6
1.125	Feb 15 2031	10	140.1	3.490	3.417	3.132	3.049	-35.7	-36.8	-1.1	-1.9	-35.5	-36.0	-0.5	3.1	-41.8	-43.0	-1.2	-2.0	5.24	5.09	0.14	0.42	24.9
4.250	Feb 28 2031	7	43.8	3.526	3.452	3.133	3.049	-39.4	-40.3	-0.9	-1.3	-36.1	-36.7	-0.6	-0.2	-45.4	-46.5	-1.0	-1.5	5.24	5.09	0.15	0.45	4.1
4.125	Mar 31 2031	7	43.0	3.530	3.456	3.133	3.051	-39.6	-40.5	-0.9	-1.3	-35.8	-37.1	-1.3	1.4	-45.7	-46.7	-1.0	-1.5	5.24	5.09	0.15	0.44	0.0
4.625	Apr 30 2031	7	44.2	3.531	3.457	3.134	3.052	-39.7	-40.5	-0.7	-1.2	-35.4	-36.8	-1.4	1.7	-45.8	-46.6	-0.9	-1.3	5.24	5.09	0.15	0.45	0.5
1.625	May 15 2031	10	148.5	3.540	3.472	3.134	3.053	-40.6	-41.9	-1.4	-1.9	-40.6	-41.6	-1.0	-4.2	-46.6	-48.1	-1.5	-2.0	5.24	5.09	0.14	0.41	29.9
4.625	May 31 2031	7	46.6	3.538	3.464	3.135	3.053	-40.3	-41.0	-0.7	-1.2	-36.2	-37.5	-1.4	1.3	-46.4	-47.2	-0.9	-1.3	5.24	5.09	0.15	0.44	5.6
4.250	Jun 30 2031	7	45.5	3.531	3.456	3.136	3.055	-39.5	-40.1	-0.6	-1.1	-36.0	-36.4	-0.4	0.2	-45.6	-46.3	-0.7	-1.2	5.26	5.11	0.15	0.43	3.4
4.125 Jul 31 2031	7	46.4	3.537	3.463	3.137	3.057	-39.9	-40.6	-0.7	-1.1	-36.7	-37.1	-0.4	-0.8	-46.1	-46.9	-0.8	-1.2	5.26	5.11	0.14	0.42	5.2	
1.250	Aug 15 2031	10	142.2	3.549	3.483	3.138	3.058	-41.1	-42.6	-1.5	-1.9	-42.1	-42.7	-0.6	-0.9	-47.2	-48.8	-1.6	-2.0	5.24	5.09	0.13	0.39	19.7
3.750 Aug 31 2031	7	47.5	3.540	3.471	3.138	3.059	-40.2	-41.2	-1.1	-1.2	-37.8	-38.2	-0.4	-1.1	-46.3	-47.5	-1.2	-1.3	5.26	5.11	0.14	0.42	7.4	
1.375	Nov 15 2031	10	144.6	3.558	3.496	3.139	3.064	-41.9	-43.2	-1.3	-1.8	-42.2	-43.1	-0.9	0.8	-48.1	-49.4	-1.4	-2.0	5.24	5.09	0.13	0.38	23.3
1.875	Feb 15 2032	10	141.2	3.572	3.510	3.141	3.069	-43.1	-44.2	-1.1	-1.6	-42.6	-43.1	-0.6	0.2	-49.2	-50.4	-1.2	-1.8	5.24	5.09	0.13	0.37	25.6
2.875	May 15 2032	10	133.3	3.572	3.511	3.145	3.074	-42.7	-43.7	-1.0	-1.3	-40.6	-41.7	-1.1	3.1	-48.9	-50.0	-1.1	-1.5	5.24	5.09	0.13	0.37	23.5

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions

2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %		
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
2.750	Aug 15 2032	10	121.1	3.582	3.522	3.149	3.079	-43.2	-44.3	-1.1	-1.3	-41.8	-42.2	-0.5	-0.7	-49.4	-50.6	-1.2	-1.5	5.24	5.09	0.12	0.36	18.3
4.125	Nov 15 2032	10	111.3	3.582	3.522	3.152	3.086	-43.0	-43.7	-0.6	-1.0	-39.1	-40.4	-1.3	3.8	-49.3	-50.0	-0.7	-1.2	5.24	5.09	0.13	0.37	11.0
3.500	Feb 15 2033	10	114.7	3.604	3.547	3.155	3.091	-44.9	-45.6	-0.8	-1.2	-42.1	-42.6	-0.5	-2.4	-51.1	-52.0	-0.9	-1.3	5.24	5.09	0.12	0.35	13.7
3.375	May 15 2033	10	108.5	3.614	3.560	3.159	3.096	-45.5	-46.4	-0.9	-1.2	-42.7	-43.9	-1.2	0.5	-51.7	-52.8	-1.0	-1.3	5.24	5.09	0.12	0.34	8.8
3.875	Aug 15 2033	10	122.2	3.627	3.573	3.164	3.102	-46.3	-47.2	-0.9	-1.1	-43.3	-43.7	-0.4	-0.1	-52.6	-53.5	-1.0	-1.2	5.24	5.09	0.12	0.33	11.7
4.500	Nov 15 2033	10	114.7	3.630	3.577	3.167	3.108	-46.3	-46.9	-0.6	-1.0	-41.9	-43.2	-1.3	2.7	-52.6	-53.3	-0.7	-1.1	5.24	5.09	0.12	0.33	0.7
4.000	Feb 15 2034	10	123.7	3.643	3.592	3.171	3.113	-47.3	-47.9	-0.6	-1.0	-43.8	-44.2	-0.3	-1.6	-53.6	-54.3	-0.7	-1.1	5.26	5.11	0.11	0.32	3.0
4.375	May 15 2034	10	132.9	3.650	3.599	3.175	3.118	-47.4	-48.0	-0.6	-0.9	-43.2	-44.5	-1.2	1.8	-53.7	-54.5	-0.7	-1.0	5.26	5.11	0.11	0.32	9.7
3.875	Aug 15 2034	10	39.0	3.653	3.606	3.181	3.124	-47.2	-48.1	-1.0	-1.2	-44.2	-44.8	-0.5	-0.5	-53.5	-54.6	-1.1	-1.3	5.03	5.04	0.11	0.31	16.0
4.500	Feb 15 2036	30	26.4	3.579	3.533	3.209	3.161	-37.0	-37.1	-0.2	-0.7	-33.2	-33.4	-0.1	1.9	-43.4	-43.7	-0.3	-0.7	5.24	5.09	0.10	0.28	68.3
4.750	Feb 15 2037	30	16.6	3.652	3.610	3.227	3.183	-42.4	-42.7	-0.3	-0.9	-38.1	-38.3	-0.2	-1.0	-48.9	-49.3	-0.3	-0.9	5.24	5.09	0.09	0.26	70.0
5.000	May 15 2037	30	21.4	3.669	3.629	3.232	3.188	-43.7	-44.1	-0.4	-0.9	-39.0	-40.0	-1.0	0.2	-50.2	-50.7	-0.4	-1.0	5.24	5.09	0.09	0.26	70.0
4.375	Feb 15 2038	30	22.5	3.703	3.665	3.244	3.203	-45.8	-46.2	-0.4	-1.1	-42.0	-42.2	-0.2	0.2	-52.4	-52.8	-0.4	-1.2	5.24	5.09	0.08	0.24	70.0
4.500	May 15 2038	30	25.5	3.719	3.683	3.248	3.208	-47.1	-47.5	-0.5	-1.2	-42.7	-43.8	-1.0	0.3	-53.6	-54.1	-0.5	-1.3	5.24	5.09	0.08	0.24	70.0
3.500	Feb 15 2039	30	25.9	3.756	3.723	3.258	3.220	-49.8	-50.3	-0.6	-1.7	-47.5	-47.6	-0.2	-1.4	-56.4	-57.0	-0.6	-1.7	5.24	5.09	0.08	0.22	69.8
4.250	May 15 2039	30	38.8	3.784	3.751	3.261	3.223	-52.2	-52.8	-0.6	-1.6	-48.2	-49.4	-1.1	0.4	-58.8	-59.5	-0.6	-1.7	5.24	5.09	0.08	0.23	70.0
4.500	Aug 15 2039	30	41.4	3.799	3.766	3.265	3.226	-53.4	-54.0	-0.6	-1.7	-49.5	-49.7	-0.1	-1.1	-60.0	-60.7	-0.7	-1.7	5.24	5.09	0.08	0.23	70.0
4.375	Nov 15 2039	30	44.6	3.805	3.774	3.266	3.229	-53.9	-54.4	-0.5	-1.8	-49.6	-50.8	-1.2	1.1	-60.5	-61.1	-0.6	-1.8	5.24	5.09	0.08	0.22	70.0
4.625	Feb 15 2040	30	44.9	3.810	3.778	3.268	3.231	-54.2	-54.7	-0.5	-1.7	-49.9	-50.0	-0.2	-0.1	-60.8	-61.4	-0.5	-1.8	5.24	5.09	0.08	0.22	70.0
4.375	May 15 2040	30	43.5	3.814	3.784	3.270	3.234	-54.4	-55.0	-0.6	-1.8	-50.2	-51.3	-1.2	0.9	-61.1	-61.7	-0.6	-1.9	5.24	5.09	0.08	0.22	70.0
1.125	May 15 2040	20	60.4	3.930	3.907	3.270	3.234	-66.0	-67.4	-1.3	-2.8	-73.7	-74.5	-0.9	-0.1	-72.7	-74.1	-1.4	-2.9	5.24	5.09	0.06	0.18	33.4
3.875	Aug 15 2040	30	43.2	3.836	3.806	3.272	3.236	-56.3	-57.0	-0.7	-1.9	-53.6	-53.7	-0.1	-3.2	-63.0	-63.7	-0.8	-2.0	5.24	5.09	0.07	0.21	70.0
1.125	Aug 15 2040	20	76.5	3.954	3.931	3.272	3.236	-68.1	-69.5	-1.4	-2.9	-76.7	-77.0	-0.2	-2.8	-74.8	-76.2	-1.4	-3.0	5.24	5.09	0.06	0.18	35.8
4.250	Nov 15 2040	30	42.9	3.838	3.808	3.274	3.239	-56.4	-57.0	-0.6	-1.9	-52.3	-53.5	-1.2	2.5	-63.1	-63.7	-0.6	-1.9	5.24	5.09	0.07	0.21	70.0
1.375	Nov 15 2040	20	85.6	3.983	3.961	3.274	3.239	-70.9	-72.2	-1.3	-2.9	-78.3	-79.3	-1.1	-0.4	-77.6	-78.9	-1.3	-2.9	5.24	5.09	0.06	0.18	36.0
4.750	Feb 15 2041	30	43.0	3.833	3.803	3.275	3.241	-55.8	-56.3	-0.4	-1.8	-51.2	-51.3	-0.1	1.2	-62.5	-63.0	-0.5	-1.8	5.24	5.09	0.07	0.21	68.3
1.875	Feb 15 2041	20	89.7	3.989	3.966	3.275	3.240	-71.4	-72.6	-1.2	-2.7	-76.5	-76.8	-0.3	2.0	-78.1	-79.3	-1.2	-2.8	5.24	5.09	0.06	0.18	26.1
4.375	May 15 2041	30	42.0	3.861	3.832	3.277	3.242	-58.4	-59.0	-0.6	-1.9	-54.1	-55.3	-1.2	-1.6	-65.1	-65.8	-0.7	-1.9	5.24	5.09	0.07	0.21	70.0
2.250	May 15 2041	20	86.2	3.999	3.977	3.277	3.242	-72.3	-73.5	-1.2	-2.6	-75.4	-76.7	-1.3	2.5	-79.0	-80.2	-1.3	-2.7	5.24	5.09	0.06	0.19	34.1
3.750	Aug 15 2041	30	42.5	3.910	3.883	3.279	3.244	-63.1	-63.9	-0.8	-2.1	-60.8	-61.0	-0.1	-6.5	-69.8	-70.7	-0.9	-2.2	5.24	5.09	0.07	0.20	70.0
1.750	Aug 15 2041	20	83.7	4.028	4.007	3.279	3.244	-75.0	-76.3	-1.3	-2.8	-81.8	-82.0	-0.2	-6.0	-81.7	-83.1	-1.4	-2.9	5.24	5.09	0.06	0.18	10.5
3.125	Nov 15 2041	30	44.6	3.946	3.922	3.279	3.246	-66.7	-67.6	-0.9	-2.3	-65.8	-67.1	-1.3	1.3	-73.4	-74.3	-0.9	-2.4	5.24	5.09	0.07	0.19	70.0
2.000	Nov 15 2041	20	70.6	4.034	4.013	3.279	3.246	-75.4	-76.7	-1.2	-2.7	-80.4	-81.7	-1.3	2.7	-82.2	-83.4	-1.3	-2.8	5.24	5.09	0.06	0.18	10.8
3.125	Feb 15 2042	30	47.2	3.976	3.952	3.280	3.247	-69.6	-70.5	-0.9	-2.3	-69.3	-69.4	-0.2	-3.2	-76.4	-77.3	-0.9	-2.4	5.24	5.09	0.07	0.19	70.0
2.375	Feb 15 2042	20	59.4	4.040	4.019	3.280	3.247	-76.0	-77.2	-1.1	-2.6	-79.5	-79.7	-0.2	-13.1	-82.8	-83.9	-1.2	-2.7	5.24	5.09	0.06	0.18	14.4
3.000	May 15 2042	30	43.9	4.013	3.991	3.281	3.248	-73.2	-74.3	-1.1	-2.4	-73.3	-74.8	-1.4	-2.7	-80.0	-81.1	-1.1	-2.4	5.24	5.09	0.07	0.19	70.0
3.250	May 15 2042	20	49.8	4.021	3.998	3.281	3.248	-74.0	-75.0	-1.0	-2.3	-73.2	-74.7	-1.5	-2.4	-80.7	-81.8	-1.1	-2.4	5.24	5.09	0.07	0.19	9.8

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions

2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

Cpn	Mat	Orig Issue Size *	Yield	Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %		
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
3.375	Aug 15 2042	20	40.9	4.023	4.000	3.282	3.249	-74.1	-75.2	-1.0	-2.3	-73.5	-73.7	-0.2	0.0	-80.9	-82.0	-1.1	-2.3	5.24	5.09	0.07	0.19	4.8
2.750	Aug 15 2042	30	42.0	4.035	4.013	3.282	3.249	-75.3	-76.5	-1.1	-2.4	-77.4	-77.6	-0.2	-3.8	-82.1	-83.3	-1.2	-2.5	5.24	5.09	0.06	0.18	63.3
4.000	Nov 15 2042	20	40.6	3.998	3.974	3.282	3.250	-71.6	-72.4	-0.8	-2.1	-68.0	-69.5	-1.5	10.7	-78.4	-79.2	-0.9	-2.2	5.24	5.09	0.07	0.19	4.0
2.750	Nov 15 2042	30	42.0	4.042	4.021	3.282	3.250	-76.0	-77.1	-1.1	-2.4	-77.4	-78.9	-1.5	1.4	-82.8	-83.9	-1.1	-2.5	5.24	5.09	0.06	0.18	46.8
3.125	Feb 15 2043	30	42.0	4.051	4.030	3.281	3.250	-77.0	-78.0	-1.0	-2.3	-77.3	-77.5	-0.2	0.2	-83.8	-84.8	-1.0	-2.4	5.24	5.09	0.06	0.18	54.4
3.875	Feb 15 2043	20	43.6	4.019	3.996	3.281	3.250	-73.8	-74.6	-0.8	-2.1	-71.2	-71.3	-0.2	6.2	-80.6	-81.4	-0.9	-2.2	5.24	5.09	0.07	0.19	10.5
3.875	May 15 2043	20	41.7	4.036	4.013	3.282	3.250	-75.4	-76.4	-0.9	-2.1	-72.4	-74.0	-1.6	6.6	-82.2	-83.2	-1.0	-2.2	5.24	5.09	0.07	0.19	6.8
2.875	May 15 2043	30	42.0	4.068	4.047	3.282	3.250	-78.6	-79.7	-1.1	-2.3	-79.9	-81.4	-1.5	-1.0	-85.4	-86.6	-1.2	-2.4	5.24	5.09	0.06	0.18	27.9
3.625	Aug 15 2043	30	42.0	4.059	4.037	3.282	3.250	-77.7	-78.7	-1.0	-2.1	-76.3	-76.5	-0.1	3.6	-84.5	-85.6	-1.1	-2.2	5.24	5.09	0.06	0.18	48.2
4.375	Aug 15 2043	20	43.7	4.021	3.998	3.282	3.250	-74.0	-74.8	-0.9	-1.9	-70.0	-70.1	-0.1	9.8	-80.8	-81.7	-0.9	-2.0	5.24	5.09	0.07	0.19	3.8
3.750	Nov 15 2043	30	42.0	4.060	4.039	3.281	3.250	-78.0	-78.9	-0.9	-2.1	-75.4	-77.0	-1.6	2.5	-84.8	-85.8	-1.0	-2.1	5.24	5.09	0.06	0.18	47.3
4.750	Nov 15 2043	20	42.2	4.013	3.990	3.281	3.250	-73.3	-74.0	-0.7	-1.8	-67.5	-69.1	-1.6	10.2	-80.1	-80.9	-0.8	-1.9	5.24	5.09	0.07	0.19	0.4
3.625	Feb 15 2044	30	42.0	4.068	4.047	3.279	3.249	-78.9	-79.8	-0.9	-2.0	-77.5	-77.6	-0.1	-1.9	-85.7	-86.7	-1.0	-2.1	5.24	5.09	0.06	0.18	43.9
4.500	Feb 15 2044	20	42.7	4.037	4.014	3.279	3.249	-75.8	-76.5	-0.8	-1.8	-71.3	-71.4	-0.1	4.2	-82.6	-83.4	-0.8	-1.9	5.24	5.09	0.07	0.19	1.8
3.375	May 15 2044	30	42.0	4.076	4.055	3.278	3.248	-79.7	-80.8	-1.0	-2.0	-78.8	-80.4	-1.6	0.3	-86.6	-87.7	-1.1	-2.1	5.24	5.09	0.06	0.18	48.0
4.625	May 15 2044	20	44.1	4.038	4.016	3.278	3.248	-76.0	-76.8	-0.8	-1.8	-70.5	-72.1	-1.6	8.6	-82.8	-83.7	-0.9	-1.8	5.24	5.09	0.07	0.19	4.8
4.125	Aug 15 2044	20	17.3	4.035	4.019	3.277	3.247	-75.8	-77.2	-1.4	-2.3	-72.6	-73.3	-0.6	6.7	-82.6	-84.1	-1.5	-2.4	4.22	4.80	0.07	0.19	7.4
3.125	Aug 15 2044	30	42.0	4.076	4.056	3.277	3.247	-79.8	-80.9	-1.1	-2.0	-80.9	-81.0	-0.1	-1.9	-86.7	-87.8	-1.1	-2.1	5.24	5.09	0.06	0.17	33.0
3.000	Nov 15 2044	30	42.0	4.082	4.062	3.275	3.246	-80.7	-81.7	-1.0	-2.0	-81.7	-83.2	-1.6	0.8	-87.5	-88.6	-1.1	-2.0	5.24	5.09	0.06	0.17	41.5
2.500	Feb 15 2045	30	42.0	4.087	4.068	3.273	3.243	-81.4	-82.5	-1.1	-2.0	-86.0	-86.1	-0.1	-4.1	-88.3	-89.4	-1.1	-2.0	5.24	5.09	0.06	0.16	22.2
3.000	May 15 2045	30	42.4	4.079	4.060	3.271	3.241	-80.8	-81.9	-1.1	-1.8	-82.0	-83.5	-1.5	5.5	-87.7	-88.8	-1.1	-1.8	5.24	5.09	0.06	0.17	63.1
2.875	Aug 15 2045	30	42.3	4.079	4.060	3.269	3.239	-81.0	-82.1	-1.1	-1.7	-83.7	-83.7	-0.1	-1.5	-87.9	-89.0	-1.1	-1.8	5.24	5.09	0.06	0.16	49.3
3.000	Nov 15 2045	30	42.1	4.076	4.057	3.266	3.238	-81.0	-82.0	-1.0	-1.6	-82.2	-83.8	-1.5	2.9	-87.9	-88.9	-1.0	-1.7	5.24	5.09	0.06	0.17	69.5
2.500	Feb 15 2046	30	40.3	4.090	4.072	3.263	3.235	-82.7	-83.7	-1.0	-1.6	-87.8	-87.9	-0.1	-5.4	-89.6	-90.7	-1.1	-1.6	5.24	5.09	0.05	0.16	34.3
2.500	May 15 2046	30	43.2	4.093	4.076	3.261	3.232	-83.2	-84.3	-1.1	-1.5	-88.0	-89.4	-1.5	1.3	-90.1	-91.3	-1.2	-1.5	5.24	5.09	0.05	0.16	38.0
2.250	Aug 15 2046	30	40.5	4.095	4.077	3.259	3.230	-83.6	-84.8	-1.2	-1.4	-91.0	-91.1	-0.1	-3.0	-90.5	-91.8	-1.2	-1.5	5.24	5.09	0.05	0.15	18.4
2.875	Nov 15 2046	30	42.9	4.091	4.073	3.255	3.227	-83.6	-84.6	-1.0	-1.3	-86.0	-87.6	-1.6	6.5	-90.5	-91.6	-1.1	-1.4	5.24	5.09	0.06	0.16	65.3
3.000	Feb 15 2047	30	40.8	4.095	4.077	3.252	3.224	-84.3	-85.3	-1.0	-1.2	-86.8	-86.8	-0.1	-0.7	-91.3	-92.3	-1.0	-1.3	5.24	5.09	0.06	0.16	28.0
3.000	May 15 2047	30	44.2	4.101	4.084	3.249	3.221	-85.2	-86.3	-1.0	-1.2	-87.2	-88.8	-1.6	1.2	-92.2	-93.3	-1.1	-1.2	5.24	5.09	0.06	0.16	48.8
2.750	Aug 15 2047	30	43.5	4.105	4.088	3.246	3.218	-85.9	-87.0	-1.1	-1.1	-90.4	-90.4	0.0	-3.1	-92.9	-94.0	-1.1	-1.2	5.24	5.09	0.05	0.15	25.6
2.750	Nov 15 2047	30	41.2	4.107	4.090	3.243	3.215	-86.4	-87.4	-1.0	-1.1	-90.2	-91.8	-1.6	1.8	-93.4	-94.5	-1.1	-1.2	5.24	5.09	0.05	0.15	20.8
3.000	Feb 15 2048	30	45.0	4.109	4.091	3.239	3.212	-87.0	-88.0	-1.0	-1.0	-89.8	-89.8	0.0	0.4	-94.0	-95.0	-1.0	-1.1	5.24	5.09	0.05	0.15	17.2
3.125	May 15 2048	30	49.2	4.108	4.091	3.236	3.209	-87.2	-88.2	-1.0	-1.0	-88.7	-90.3	-1.6	2.8	-94.2	-95.3	-1.1	-1.0	5.24	5.09	0.05	0.16	18.7
3.000	Aug 15 2048	30	50.4	4.105	4.088	3.233	3.205	-87.2	-88.2	-1.0	-1.0	-90.3	-90.3	0.0	-1.6	-94.2	-95.3	-1.1	-1.0	5.24	5.09	0.05	0.15	13.0
3.375	Nov 15 2048	30	54.9	4.105	4.088	3.229	3.202	-87.6	-88.5	-0.9	-0.9	-87.6	-89.2	-1.7	4.3	-94.6	-95.6	-1.0	-1.0	5.24	5.09	0.05	0.16	18.1
3.000	Feb 15 2049	30	55.6	4.104	4.087	3.225	3.199	-87.8	-88.8	-1.0	-0.9	-91.0	-91.0	0.0	-3.3	-94.9	-95.9	-1.0	-0.9	5.24	5.09	0.05	0.15	14.8
2.875	May 15 2049	30	57.6	4.100	4.084	3.222	3.195	-87.8	-88.8	-1.0	-0.8	-91.2	-92.8	-1.6	1.4	-94.9	-95.9	-1.1	-0.9	5.24	5.09	0.05	0.15	19.8

* in \$ billions

Note:

1. Carry and slide calculated for swap spread receiving positions

2. A bp change in carry for a 10 bp change in repo rate

Derivatives Strategy

Issue Specific SOFR Swap Spread Detailed Report

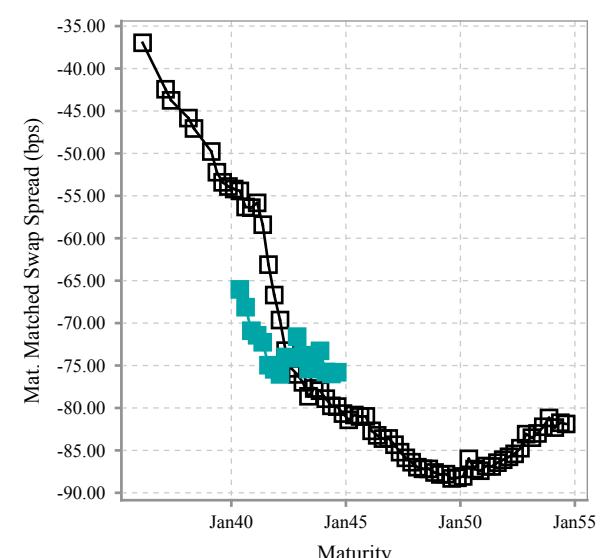
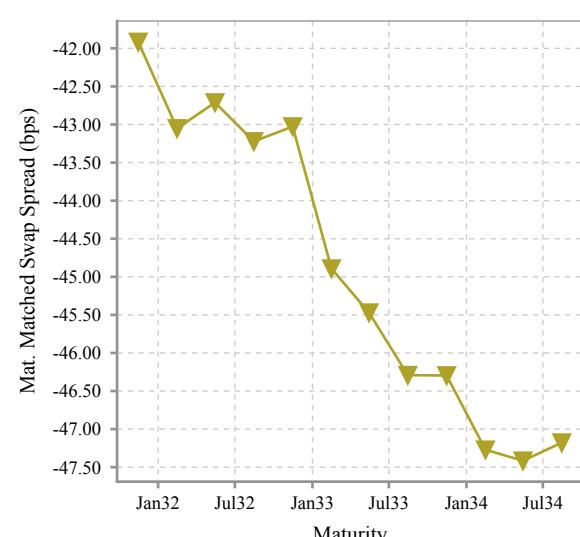
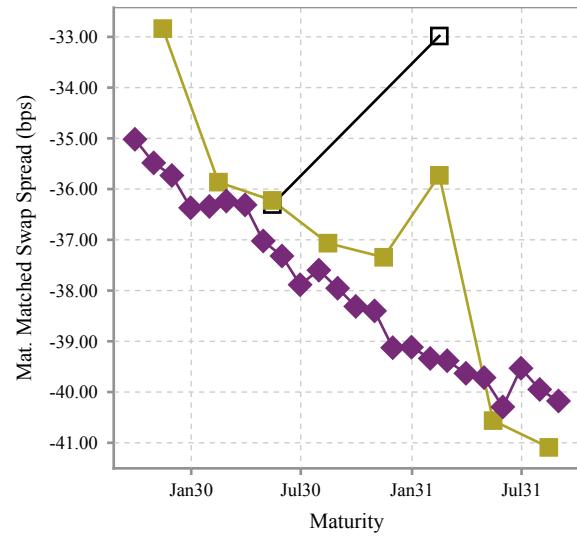
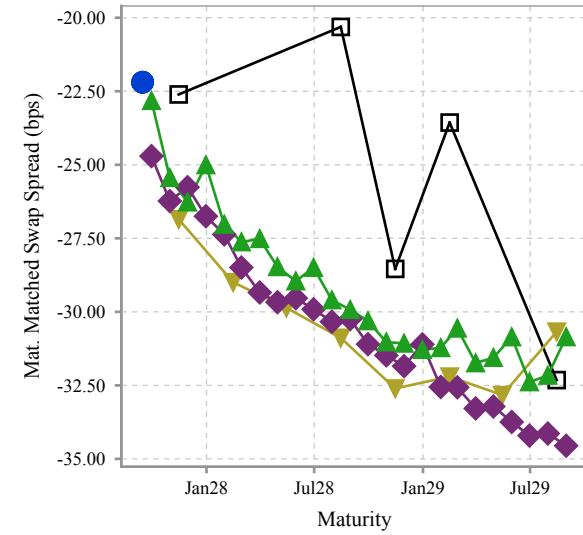
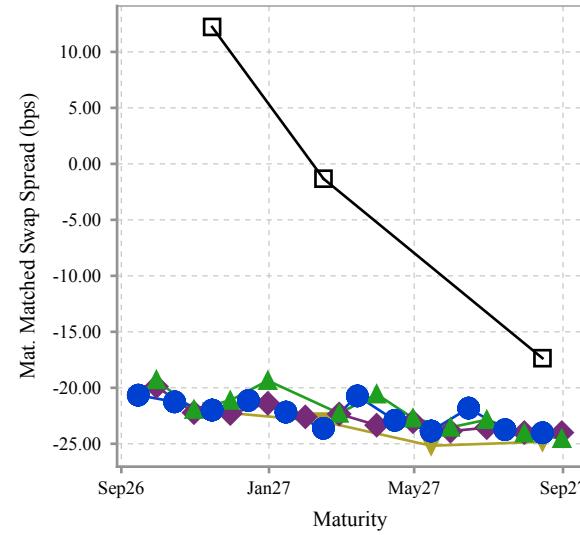
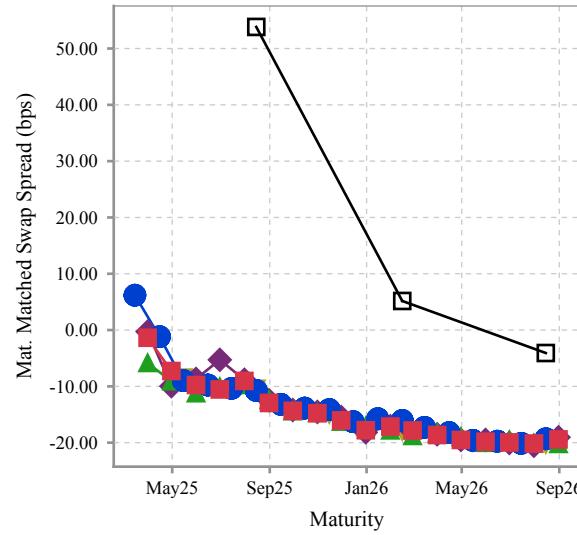
Cpn	Mat	Orig Issue Size *	Yield		Interpolated Swap Yield		Matched Maturity Swap Spread				Asset Swap Spread				OIS Matched Maturity Swap Spread				Repo		Repo Beta		Soma %	
			Spot	3m Fwd	Spot	3m Fwd	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	Spot	3m Fwd	3m Carry	C + S	1m	3m	1m	3m		
2.250	Aug 15 2049	30	63.4	4.102	4.086	3.219	3.192	-88.3	-89.4	-1.1	-0.9	-97.9	-97.8	0.0	-6.6	-95.4	-96.5	-1.2	-0.9	5.24	5.09	0.05	0.14	31.3
2.375	Nov 15 2049	30	60.5	4.098	4.082	3.215	3.189	-88.2	-89.3	-1.0	-0.8	-95.9	-97.5	-1.5	3.4	-95.3	-96.4	-1.1	-0.9	5.24	5.09	0.05	0.14	32.4
2.000	Feb 15 2050	30	60.5	4.092	4.077	3.211	3.185	-88.1	-89.1	-1.1	-0.8	-100.3	-100.2	0.0	-4.3	-95.2	-96.3	-1.1	-0.9	5.24	5.09	0.05	0.14	15.0
1.250	May 15 2050	30	73.6	4.068	4.054	3.208	3.182	-86.0	-87.2	-1.2	-0.8	-107.2	-108.3	-1.2	-5.8	-93.1	-94.4	-1.3	-0.9	5.24	5.09	0.04	0.12	18.7
1.375	Aug 15 2050	30	89.1	4.077	4.063	3.205	3.178	-87.2	-88.4	-1.2	-0.8	-107.8	-107.7	0.1	-0.7	-94.3	-95.6	-1.3	-0.9	5.24	5.09	0.04	0.12	24.4
1.625	Nov 15 2050	30	85.8	4.075	4.061	3.201	3.175	-87.4	-88.5	-1.1	-0.8	-103.9	-105.2	-1.3	5.1	-94.5	-95.7	-1.2	-0.9	5.24	5.09	0.04	0.13	22.4
1.875	Feb 15 2051	30	90.0	4.066	4.051	3.197	3.172	-86.8	-87.9	-1.1	-0.8	-100.7	-100.7	0.1	3.0	-94.0	-95.1	-1.1	-0.8	5.24	5.09	0.05	0.13	17.4
2.375	May 15 2051	30	95.5	4.063	4.047	3.194	3.168	-86.9	-87.9	-1.0	-0.8	-94.9	-96.4	-1.5	1.5	-94.0	-95.1	-1.1	-0.8	5.24	5.09	0.05	0.14	21.6
2.000	Aug 15 2051	30	91.4	4.055	4.040	3.191	3.165	-86.4	-87.5	-1.1	-0.8	-99.2	-99.1	0.1	-4.3	-93.6	-94.7	-1.1	-0.9	5.24	5.09	0.05	0.13	19.0
1.875	Nov 15 2051	30	90.2	4.048	4.033	3.187	3.161	-86.1	-87.1	-1.0	-0.8	-99.6	-101.0	-1.4	1.0	-93.3	-94.3	-1.1	-0.9	5.24	5.09	0.04	0.13	23.6
2.250	Feb 15 2052	30	85.0	4.040	4.024	3.183	3.157	-85.8	-86.7	-1.0	-0.8	-95.7	-95.6	0.1	3.7	-92.9	-93.9	-1.0	-0.9	5.24	5.09	0.05	0.13	25.9
2.875	May 15 2052	30	78.9	4.033	4.017	3.179	3.154	-85.4	-86.3	-0.9	-0.8	-89.0	-90.5	-1.5	8.2	-92.6	-93.5	-1.0	-0.9	5.24	5.09	0.05	0.14	24.1
3.000	Aug 15 2052	30	70.3	4.023	4.006	3.176	3.150	-84.7	-85.6	-0.9	-0.8	-88.2	-88.0	0.1	0.7	-91.9	-92.9	-0.9	-0.9	5.24	5.09	0.05	0.14	18.9
4.000	Nov 15 2052	30	64.3	4.002	3.985	3.172	3.147	-83.1	-83.8	-0.7	-0.8	-79.3	-80.8	-1.5	10.1	-90.3	-91.0	-0.7	-0.9	5.24	5.09	0.05	0.15	11.4
3.625	Feb 15 2053	30	66.3	4.002	3.985	3.167	3.142	-83.5	-84.2	-0.7	-0.9	-82.5	-82.3	0.1	-3.2	-90.7	-91.5	-0.8	-0.9	5.24	5.09	0.05	0.14	14.2
3.625	May 15 2053	30	62.7	3.994	3.976	3.164	3.138	-83.0	-83.8	-0.8	-0.9	-81.3	-82.8	-1.4	2.6	-90.2	-91.0	-0.8	-0.9	5.24	5.09	0.05	0.14	9.1
4.125	Aug 15 2053	30	71.6	3.982	3.964	3.160	3.135	-82.2	-82.9	-0.7	-0.9	-78.6	-78.4	0.1	2.6	-89.4	-90.2	-0.8	-0.9	5.24	5.09	0.05	0.15	12.0
4.750	Nov 15 2053	30	66.4	3.967	3.949	3.156	3.131	-81.2	-81.8	-0.6	-0.9	-73.8	-75.3	-1.4	6.0	-88.4	-89.0	-0.6	-0.9	5.24	5.09	0.05	0.15	0.7
4.250	Feb 15 2054	30	71.2	3.974	3.956	3.151	3.127	-82.3	-83.0	-0.7	-1.0	-77.8	-77.7	0.1	-4.0	-89.5	-90.3	-0.7	-1.0	5.20	5.07	0.05	0.14	3.1
4.625	May 15 2054	30	76.4	3.965	3.947	3.147	3.122	-81.7	-82.4	-0.7	-1.0	-74.9	-76.3	-1.4	4.4	-89.0	-89.7	-0.7	-1.0	5.20	5.07	0.05	0.15	9.7
4.250	Aug 15 2054	30	22.0	3.962	3.944	3.143	3.118	-81.9	-82.6	-0.7	-1.1	-77.4	-77.3	0.1	-2.6	-89.1	-89.9	-0.8	-1.2	5.20	5.07	0.05	0.14	16.0

* in \$ billions

Note:

- 1. Carry and slide calculated for swap spread receiving positions
- 2. A bp change in carry for a 10 bp change in repo rate

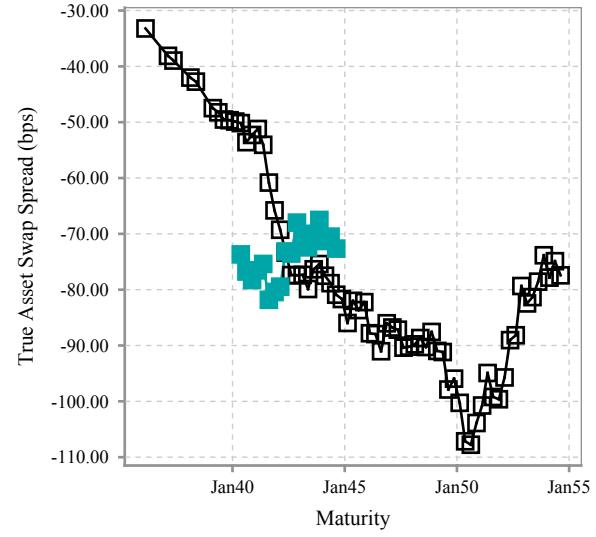
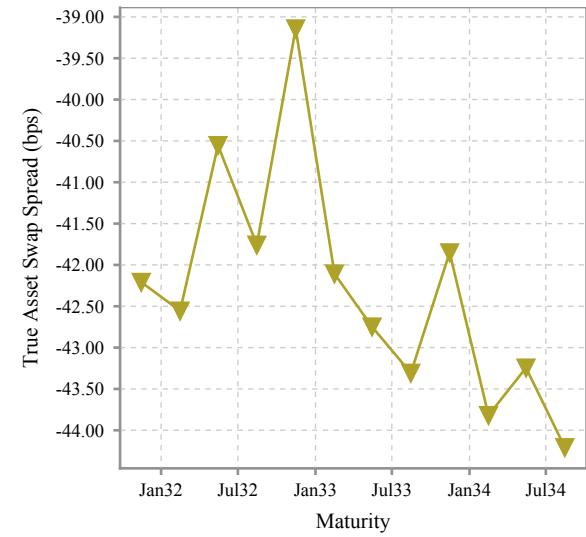
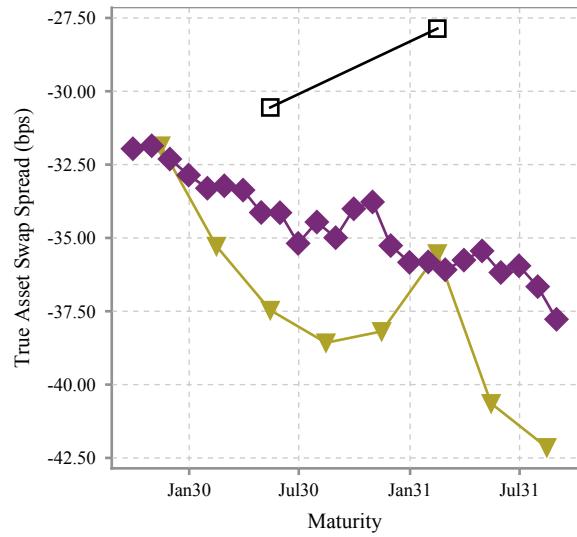
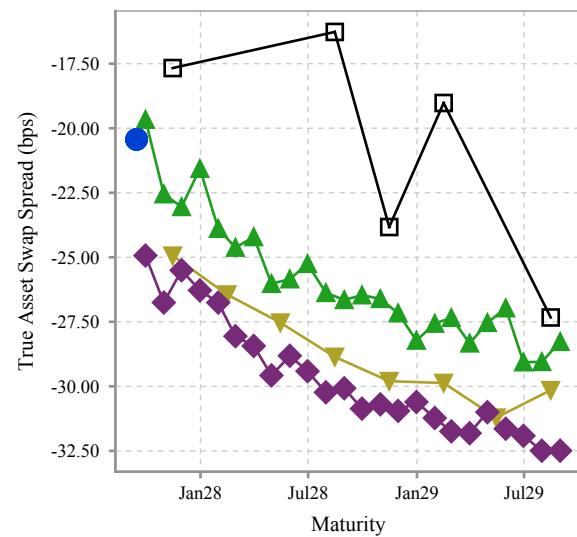
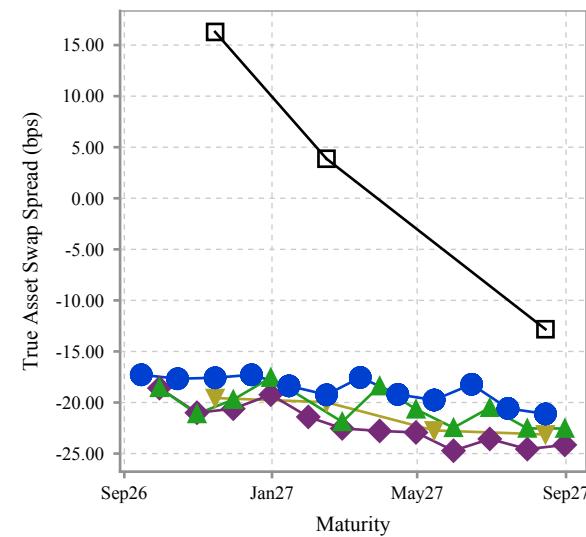
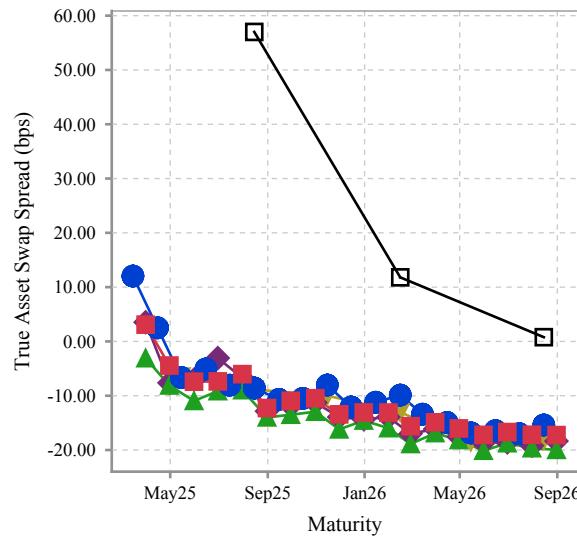
Issue Specific Maturity Matched SOFR Swap Spread



1) The charts are broken down into six buckets, that is, shorter than 2yr, 2yr-3yr, 3yr-5yr, 5yr-7yr, 7yr-10yr and 10yr+ remaining maturities

2) Notes/bonds in each bucket are grouped based on their original issue maturities: 2-, 3-, 5-, 7-, 10-, 20- and 30-year.

Issue Specific SOFR True Asset Swap Spread



1) The charts are broken down into six buckets, that is, shorter than 2yr, 2yr-3yr, 3yr-5yr, 5yr-7yr, 7yr-10yr and 10yr+ remaining maturities

2) Notes/bonds in each bucket are grouped based on their original issue maturities: 2-, 3-, 5-, 7-, 10-, 20- and 30-year.

■ 2y ● 3y ▲ 5y △ 7y ▽ 10y □ 20y ▨ 30y

Derivatives Strategy

Issue-Specific Treasury Relative Value Report

Remaining Maturity	Richest issue by yield error					Cheapest issue by yield error					Yield Error differential stats				ASW differential stats					
	Original Mat		Old	Yld Err	ASW	Original Mat		Old	Yld Err	ASW	Curr	1Y Avg	R/C	Z-score	Curr	1Y Avg	R/C	Z-score		
1y-3y	6.5%	NOV-26	30	76	-44.1	24.9	0.25%	AUG-25	5	47	8.0	-10.5	52.2	13.2	38.9	2.4	-35.3	2.7	-38.1	-2.2
3y-5y	5.5%	AUG-28	30	72	-11.7	-16.1	0.375%	JUL-27	7	48	3.6	-21.7	15.3	4.0	11.3	2.0	-5.6	3.8	-9.4	-2.4
5y-10y	5.375%	FEB-31	30	67	-9.0	-28.4	3.875%	AUG-33	10	3	5.4	-44.6	14.3	7.4	7.0	1.5	-16.2	-5.3	-10.9	-1.8
10y-30y	4.5%	FEB-36	30	66	-7.2	-36.2	2.25%	MAY-41	20	12	3.5	-70.6	10.7	6.6	4.0	0.8	-34.5	-32.6	-1.9	-0.4

*Yield error and maturity matched spread differential stats for selected pairs in various maturity buckets. The selection is based on max/min yield error irrespective of original issue sector.

Original Maturity	Remaining Maturity	Richest issue by yield error					Cheapest issue by yield error					Yield Error differential stats				ASW differential stats					
		Original Mat		Old	Yld Err	ASW	Original Mat		Old	Yld Err	ASW	Curr	1Y Avg	R/C	Z-score	Curr	1Y Avg	R/C	Z-score		
3s	1y-3y	4%	FEB-26	3	17	-0.7	-15.6	3.5%	SEP-25	3	22	2.6	-9.3	3.3	0.4	3.0	1.8	6.3	6.4	0.0	0.0
5s	1y-3y	1.25%	DEC-26	5	31	-0.7	-17.1	0.25%	AUG-25	5	47	8.0	-10.5	8.7	2.4	6.3	1.7	6.6	12.2	-5.6	-1.3
5s	3y-5y	4.5%	MAY-29	5	2	-3.4	-28.3	2.75%	JUL-27	5	24	3.0	-22.1	6.4	5.0	1.4	0.8	6.2	8.6	-2.4	-1.5
7s	1y-3y	1.875%	JUN-26	7	61	1.0	-15.6	2.75%	AUG-25	7	71	7.6	-10.4	6.6	1.7	4.9	1.9	5.3	9.4	-4.1	-1.4
7s	3y-5y	2.75%	MAY-29	7	26	-0.5	-30.7	0.375%	JUL-27	7	48	3.6	-21.7	4.1	2.3	1.8	1.4	8.9	10.4	-1.5	-1.0
7s	5y-10y	3.875%	NOV-29	7	20	-0.9	-32.8	4.625%	MAY-31	7	2	1.0	-37.5	1.9	3.0	-1.1	-0.9	-4.7	-4.5	-0.2	-0.3
10s	1y-3y	1.625%	FEB-26	10	33	-0.2	-15.6	1.625%	MAY-26	10	32	2.4	-16.5	2.6	-0.2	2.9	2.0	-0.9	-1.2	0.3	0.2
10s	3y-5y	2.625%	FEB-29	10	21	-0.3	-30.2	2.875%	MAY-28	10	24	3.0	-28.3	3.3	2.4	0.9	1.3	1.9	3.1	-1.2	-1.7
10s	5y-10y	1.75%	NOV-29	10	18	-4.2	-28.9	3.875%	AUG-33	10	3	5.4	-44.6	9.6	8.7	0.9	0.3	-15.7	-8.9	-6.8	-1.2
30s	1y-3y	6.5%	NOV-26	30	76	-44.1	24.9	6.75%	AUG-26	30	77	-18.6	0.8	25.5	-2.8	28.3	1.8	-24.0	6.3	-30.3	-1.8
30s	3y-5y	5.5%	AUG-28	30	72	-11.7	-16.1	5.25%	NOV-28	30	71	-5.3	-24.4	6.3	-0.4	6.7	1.5	-8.3	-2.1	-6.2	-1.5
30s	5y-10y	5.375%	FEB-31	30	67	-9.0	-28.4	6.25%	MAY-30	30	68	-1.4	-33.8	7.5	0.1	7.4	1.5	-5.4	1.2	-6.5	-1.4
30s	10y-30y	4.5%	FEB-36	30	66	-7.2	-36.2	3.375%	NOV-48	30	22	2.2	-86.0	9.4	5.0	4.4	0.9	-49.8	-46.2	-3.6	-0.7

*Yield error and maturity matched spread differential stats for selected pairs in various maturity buckets. The selection is based on max/min yield error segregated by original issue sector.

Notes: Old refers to the number of newer issues in that original maturity series: OTR=0, Olds=1, double olds=2, etc. The 1Y avg, residual and z-score are estimated rolling to the equivalently old issues. R/C is the difference between the current and 1Y Average. Asset swap spreads are based on SOFR swaps.

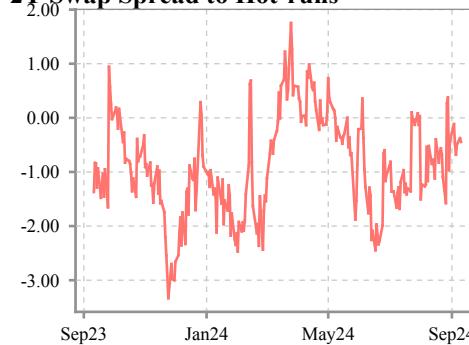
Derivatives Strategy

Treasury Futures Asset Swap Report - Front Contract

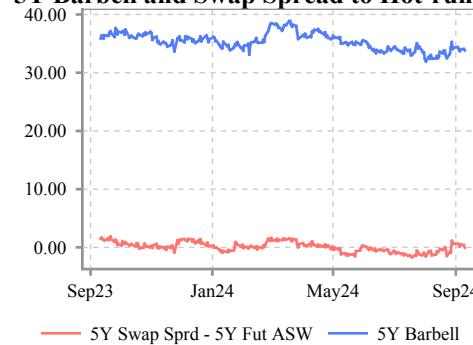
Swap Spread		ASW		Carry to Deliver			Spread to Hot-Run			Weighted Spread to Hot-Run			Barbell to Hot-Run			Weighted Barbell to Hot-Run					
Futures	CTD	Cash	Futures	Current	Average	ZScore	Current	Average	ZScore	Weight	Current	Average	Zscore	Current	Average	ZScore	Weight 1	Weight 2	Current	Average	ZScore
TUU24	0.875 06/30/2026	-20.87	-20.96	-0.09	0.58	-0.44	0.65	-0.35	0.88	1.10	-1.46	-1.64	0.14								
FVU24	4.375 11/30/2028	-31.66	-30.61	1.06	0.44	0.65	-0.64	-0.64	0.00	0.90	2.55	2.03	0.45	4.83	6.24	-0.86	-0.54	2.09	-23.67	-22.40	-1.01
TYU24	4.625 04/30/2031	-39.80	-39.66	0.15	-0.14	0.70	-7.77	-5.34	-1.40	0.49	16.18	15.04	1.11	0.32	1.75	-1.03	2.06	-0.83	14.86	14.76	0.07
USU24	4.375 11/15/2039	-54.00	-54.77	-0.77	-0.06	-0.64	-20.99	-18.88	-0.79	0.77	-3.19	-2.57	-0.29	-6.82	-4.34	-1.04	2.26	-0.73	3.16	10.29	-2.19
WNU24	4.750 11/15/2053	-81.30	-82.75	-1.46	-4.25	0.94	0.75	3.31	-0.88	0.42	48.21	48.00	0.05	3.87	7.18	-1.45	0.02	1.93	-77.50	-70.29	-3.15

OIS Spread		ASW		Carry to Deliver			Spread to Hot-Run			Weighted Spread to Hot-Run			Barbell to Hot-Run			Weighted Barbell to Hot-Run					
Futures	CTD	Cash	Futures	Current	Average	ZScore	Current	Average	ZScore	Weight	Current	Average	Zscore	Current	Average	ZScore	Weight 1	Weight 2	Current	Average	ZScore
TUU24	0.875 06/30/2026	-25.15	-31.48	-6.33	-3.86	-0.91	6.54	4.10	1.08	1.05	5.31	3.37	0.93								
FVU24	4.375 11/30/2028	-37.27	-39.31	-2.04	-2.12	0.05	2.25	1.78	0.27	0.89	6.18	4.97	0.61	13.54	12.61	0.44	-0.58	2.94	-40.70	-37.78	-1.57
TYU24	4.625 04/30/2031	-45.90	-47.56	-1.66	-2.06	0.62	-6.23	-3.84	-1.67	0.60	15.44	14.32	0.90	8.22	7.96	0.26	1.49	-0.04	2.94	3.87	-0.94
USU24	4.375 11/15/2039	-60.64	-62.22	-1.58	-0.97	-0.50	-20.38	-18.23	-0.84	0.80	-3.51	-2.94	-0.28	0.63	1.69	-0.56	1.47	-0.05	-3.63	0.81	-1.91
WNU24	4.750 11/15/2053	-88.53	-90.53	-2.00	-4.84	0.96	1.26	3.89	-0.89	0.55	41.46	41.31	0.04	11.65	13.65	-0.68	0.36	1.69	-75.69	-68.81	-3.20

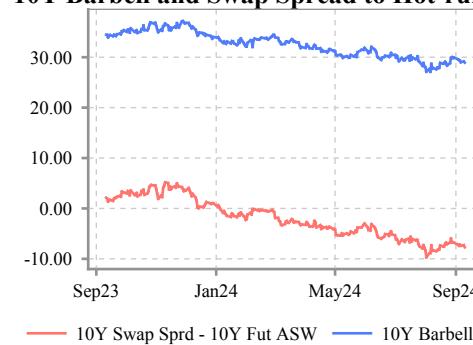
2Y Swap Spread to Hot-runs



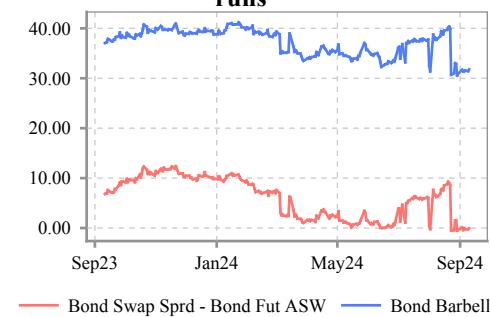
5Y Barbell and Swap Spread to Hot-runs



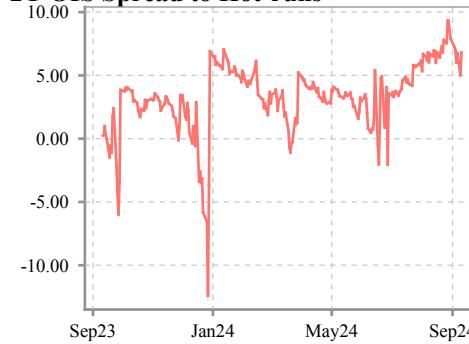
10Y Barbell and Swap Spread to Hot-runs



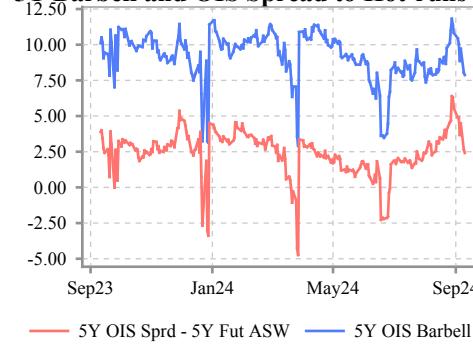
Bond Barbell and Swap Spread to Hot-runs



2Y OIS Spread to Hot-runs



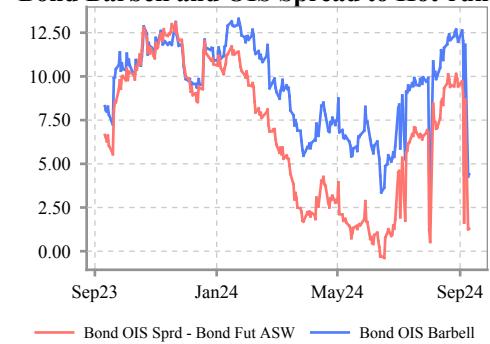
5Y Barbell and OIS Spread to Hot-runs



10Y Barbell and OIS Spread to Hot-runs



Bond Barbell and OIS Spread to Hot-runs



Notes: The weight on the spread to HR is the curve neutral risk weighting on the HR and the Wt1 and Wt2 on the weighted barbell refer to the curve- and leve-neutral risk weightings in the short and long legs of the barbell.

The 5y barbell to HR is defined as $0.5 * (2Y \text{ OTR swap sprd} + 5Y \text{ OTR swap sprd}) - 5Y \text{ futures ASW}$. The 10y barbell to HR is defined as $0.5 * (5Y \text{ OTR swap sprd} + 10Y \text{ OTR swap sprd}) - 10Y \text{ futures ASW}$.

The bond barbell to HR is defined as $0.5 * (10Y \text{ OTR swap sprd} + 20Y \text{ swap sprd}) - \text{bond futures ASW}$. The Ultra-bond barbell to HR is defined as $0.5 * (20Y \text{ swap sprd} + 30Y \text{ OTR swap sprd}) - \text{ultra-bond futures ASW}$.

Asset swap spreads are based on SQFR swaps.

Derivatives Strategy

Treasury Futures Asset Swap Report - Back Contract

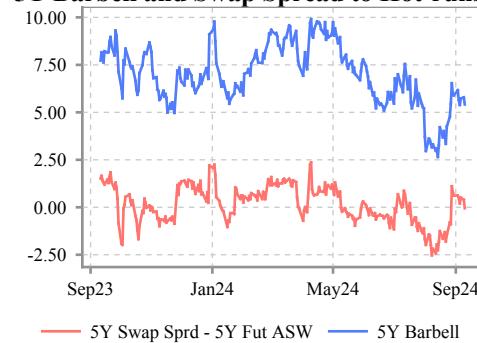
Swap Spread		ASW		Carry to Deliver			Spread to Hot-Run			Weighted Spread to Hot-Run				Barbell to Hot-Run			Weighted Barbell to Hot-Run				
Futures	CTD	Cash	Futures	Current	Average	ZScore	Current	Average	ZScore	Weight	Current	Average	Zscore	Current	Average	ZScore	Weight 1	Weight 2	Current	Average	ZScore
TUZ24	0.875 09/30/2026	-19.79	-19.87	-0.07	1.90	-1.39	-0.45	-0.36	-0.08	1.07	-1.88	-1.24	-0.46								
FVZ24	4.250 02/28/2029	-30.92	-31.19	-0.27	-0.47	0.25	-0.05	-0.12	0.06	0.93	2.27	1.83	0.47	5.42	6.76	-0.70	-0.47	1.69	-12.06	-12.33	0.29
TYZ24	4.250 06/30/2031	-39.56	-39.71	-0.15	-0.72	0.53	-7.71	-4.72	-1.34	0.53	14.37	14.09	0.21	0.38	2.38	-1.06	4.08	-2.33	22.60	22.80	-0.09
USZ24	4.625 02/15/2040	-54.24	-54.62	-0.38	-1.32	1.02	-21.14	-17.11	-1.14	0.76	-3.28	-0.73	-0.94	-6.97	-2.56	-1.40	4.87	-2.55	16.68	32.78	-2.72
WNZ24	4.750 11/15/2053	-81.30	-81.95	-0.65	-1.57	0.46	-0.06	0.63	-0.33	0.19	66.05	62.87	1.13	3.07	4.50	-0.57	-2.01	4.23	-113.08	-109.47	-1.21

OIS Spread		ASW		Carry to Deliver			Spread to Hot-Run			Weighted Spread to Hot-Run				Barbell to Hot-Run			Weighted Barbell to Hot-Run				
Futures	CTD	Cash	Futures	Current	Average	ZScore	Current	Average	ZScore	Weight	Current	Average	Zscore	Current	Average	ZScore	Weight 1	Weight 2	Current	Average	ZScore
TUZ24	0.875 09/30/2026	-24.24	-32.24	-8.00	-3.28	-1.97	7.31	5.03	1.82	1.01	7.07	4.89	1.76								
FVZ24	4.250 02/28/2029	-36.61	-40.63	-4.03	-3.39	-0.84	3.57	2.73	0.91	0.92	6.71	5.28	1.60	14.86	13.56	1.22	-0.15	1.71	-9.63	-9.94	0.34
TYZ24	4.250 06/30/2031	-45.68	-47.97	-2.29	-2.71	0.37	-5.82	-3.21	-1.19	0.62	14.40	13.83	0.43	8.64	8.68	-0.04	2.65	-1.02	13.47	13.65	-0.11
USZ24	4.625 02/15/2040	-60.89	-62.18	-1.29	-2.26	1.03	-20.43	-16.40	-1.13	0.80	-3.82	-1.36	-0.93	0.59	3.51	-1.29	1.75	-0.49	16.70	22.18	-2.15
WNZ24	4.750 11/15/2053	-88.53	-89.84	-1.30	-2.25	0.48	0.56	1.29	-0.35	0.37	56.45	53.31	1.15	10.95	11.06	-0.05	-1.32	3.38	-86.92	-84.45	-1.05

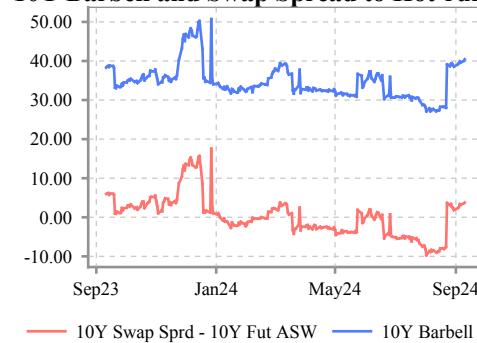
2Y Swap Spread to Hot-runs



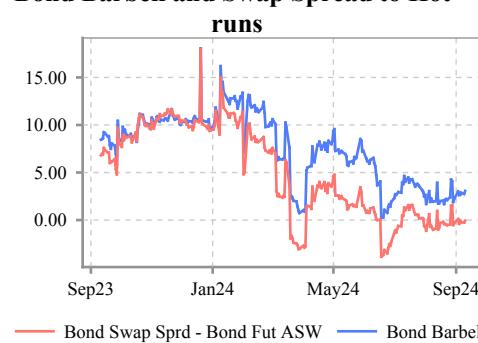
5Y Barbell and Swap Spread to Hot-runs



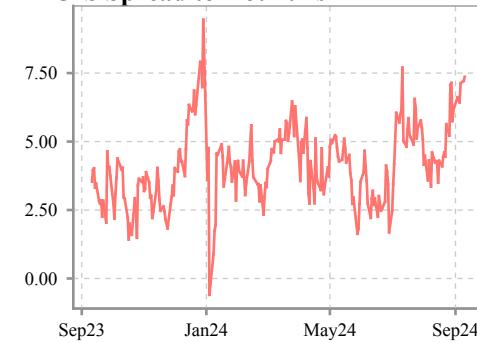
10Y Barbell and Swap Spread to Hot-runs



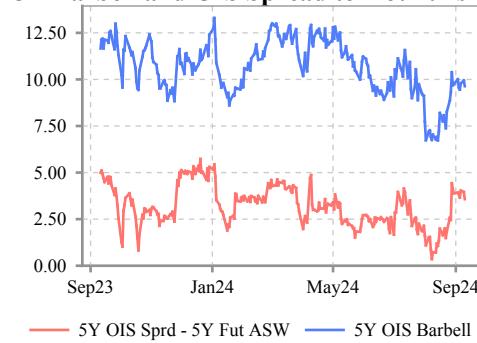
Bond Barbell and Swap Spread to Hot-runs



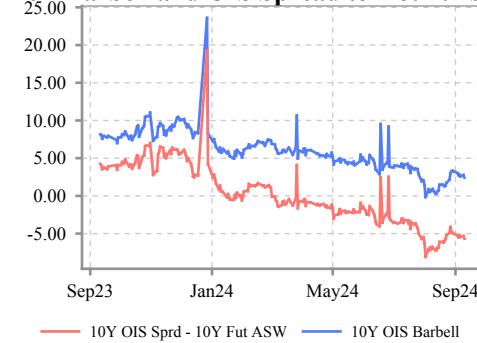
2Y OIS Spread to Hot-runs



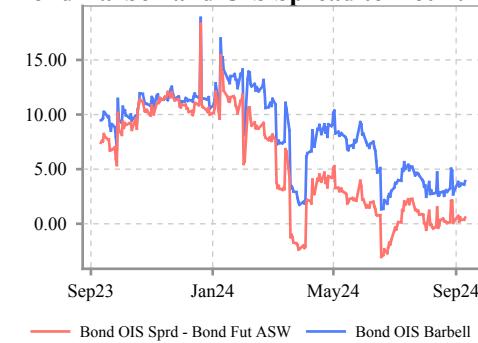
5Y Barbell and OIS Spread to Hot-runs



10Y Barbell and OIS Spread to Hot-runs



Bond Barbell and OIS Spread to Hot-runs



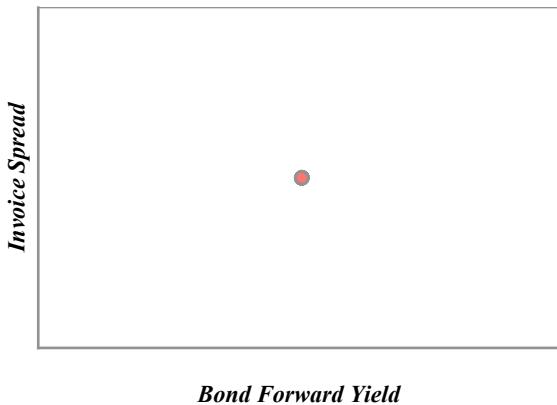
US Fixed Income Rates Strategy

USD Conditional SOFR Swap Spread Report

Dec24 Bond Isopremium Line

FRONT US CTD Swap Spread (bp), (beta = -8.7 , r2 = 35.0 %)

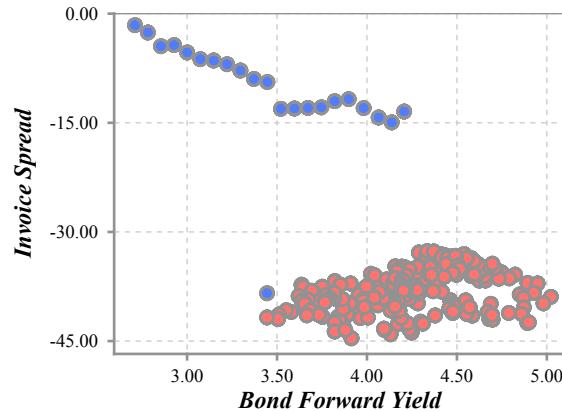
Bond vol = 6.85 bp/day, Swaption vol = 6.39 bp/day



Dec24 Note Isopremium Line

FRONT TY CTD Swap Spread (bp), (beta = -2.9 , r2 = 12.9 %)

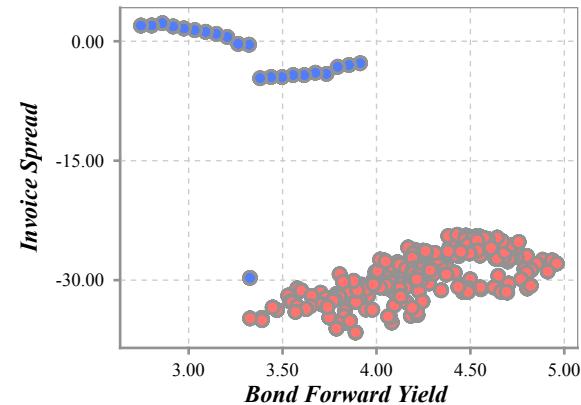
Note vol = 7.60 bp/day, Swaption vol = 7.16 bp/day



Dec24 5-Year Isopremium Line

FRONT FV CTD Swap Spread (bp), (beta = 5.4 , r2 = 44.5 %)

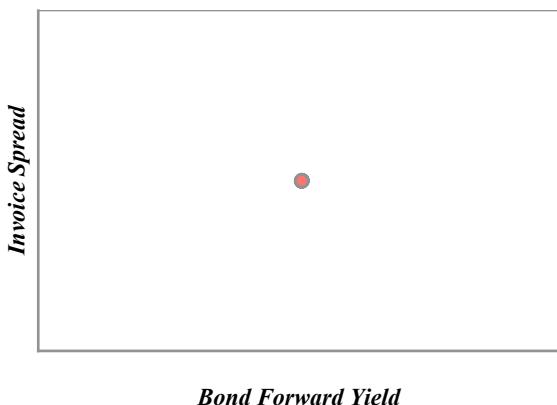
5-Year vol 8.20 bp/day, Swaption vol = 7.64 bp/day



Mar25 Bond Isopremium Line

BACK US CTD Swap Spread (bp), (beta = -10.1 , r2 = 47.2 %)

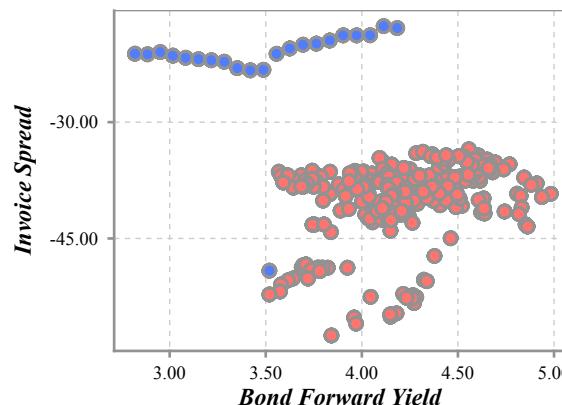
Bond vol = 6.48 bp/day, Swaption vol = 6.13 bp/day



Mar25 Note Isopremium Line

BACK TY CTD Swap Spread (bp), (beta = -4.6 , r2 = 8.6 %)

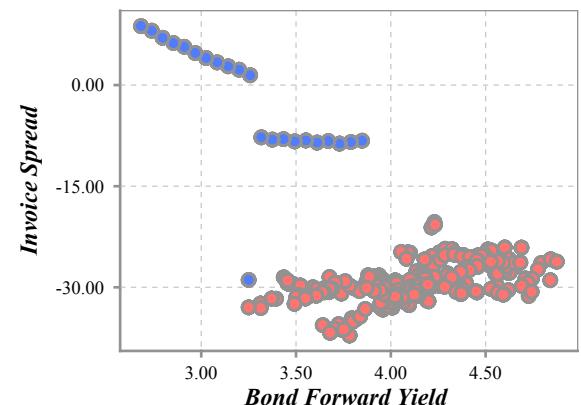
Note vol = 6.63 bp/day, Swaption vol = 6.76 bp/day



Mar25 5-Year Isopremium Line

BACK FV CTD Swap Spread (bp), (beta = 4.2 , r2 = 33.6 %)

5-Year vol 7.76 bp/day, Swaption vol = 7.16 bp/day



US Fixed Income Rates Strategy

Bond vs. Swap TradeMaker

Dec24 Bond Futures vs. Swaps																
Future			Swap				Future Option / Swaption									
Price	126.91	Start Date	2024-11-26	Expiry Date	2024-11-22											
CTD	UST 4.62 FEB40	End Date	2040-02-15													
Future Delivery Date	2024-12-31															
Type	CTD					Swap				Swap Spread	Options per 100 mln					
PUT	117.00	-	-	-	-	-	-	-	-	-	-					
PUT	118.00	-	-	-	-	-	-	-	-	-	-					
PUT	119.00	-	-	-	-	-	-	-	-	-	-					
PUT	120.00	-	-	-	-	-	-	-	-	-	-					
PUT	121.00	-	-	-	-	-	-	-	-	-	-					
PUT	122.00	-	-	-	-	-	-	-	-	-	-					
PUT	123.00	-	-	-	-	-	-	-	-	-	-					
PUT	124.00	-	-	-	-	-	-	-	-	-	-					
PUT	125.00	-	-	-	-	-	-	-	-	-	-					
PUT	126.00	-	-	-	-	-	-	-	-	-	-					
PUT	127.00	-	-	-	-	-	-	-	-	-	-					
FORWARD	126.91	3.77	15.05	3.228		12.04	-54.3	800.2								
CALL	127.00	-	-	-	-	-	-	-	-	-	-					
CALL	128.00	-	-	-	-	-	-	-	-	-	-					
CALL	129.00	-	-	-	-	-	-	-	-	-	-					
CALL	130.00	-	-	-	-	-	-	-	-	-	-					
CALL	131.00	-	-	-	-	-	-	-	-	-	-					
CALL	132.00	-	-	-	-	-	-	-	-	-	-					
CALL	133.00	-	-	-	-	-	-	-	-	-	-					
CALL	134.00	-	-	-	-	-	-	-	-	-	-					
CALL	135.00	-	-	-	-	-	-	-	-	-	-					
CALL	136.00	-	-	-	-	-	-	-	-	-	-					
CALL	137.00	-	-	-	-	-	-	-	-	-	-					

US Fixed Income Rates Strategy

Note vs. Swap TradeMaker

Dec24 Note Futures vs. Swaps												
Future				Swap				Future Option / Swaption				
Price		115.45		Start Date		2024-11-26		Expiry Date	2024-11-22			
CTD		UST 4.25 JUN31		End Date		2031-06-30						
Future Delivery Date		2024-12-31										
Type	CTD					Swap				Swap Spread		
Type	Strike Rate	Strike Yld	Premium	Volatility	PVBP	Strike	Premium	Volatility	PVBP	Options per 100 mln		
PUT	110.50	4.207	0.141	7.52	6.43	4.072				-13.5 0.0		
PUT	111.00	4.138	0.188	7.53	6.45	3.988				-14.9 0.0		
PUT	111.50	4.065	0.234	7.42	6.48	3.922				-14.3 0.0		
PUT	112.00	3.982	0.297	7.35	6.51	3.852				-13.0 0.0		
PUT	112.50	3.898	0.375	7.28	6.55	3.781				-11.8 0.0		
PUT	113.00	3.821	0.484	7.30	6.58	3.701				-12.0 0.0		
PUT	113.50	3.746	0.625	7.36	6.60	3.618				-12.9 0.0		
PUT	114.00	3.672	0.781	7.37	6.61	3.542				-13.0 0.0		
PUT	114.50	3.597	0.969	7.40	6.63	3.466				-13.0 0.0		
PUT	115.00	3.521	1.188	7.45	6.64	3.391				-13.1 0.0		
PUT	115.50		1.453	7.60	-	-	-	-	-	-		
FORWARD	115.45	3.444			6.98	3.060			6.05	-38.4 867.4		
CALL	115.50	3.446	1.406	7.60	6.66	3.352				-9.4 0.0		
CALL	116.00	3.371	1.188	7.66	6.68	3.282				-9.0 0.0		
CALL	116.50	3.296	1.016	7.83	6.71	3.218				-7.8 0.0		
CALL	117.00	3.222	0.859	7.95	6.73	3.152				-6.9 0.0		
CALL	117.50	3.148	0.719	8.04	6.76	3.083				-6.4 0.0		
CALL	118.00	3.074	0.594	8.10	6.79	3.011				-6.3 0.0		
CALL	118.50	3.000	0.500	8.25	6.82	2.947				-5.3 0.0		
CALL	119.00	2.927	0.422	8.41	6.85	2.884				-4.3 0.0		
CALL	119.50	2.854	0.344	8.47	6.89	2.809				-4.5 0.0		
CALL	120.00	2.782	0.297	8.69	6.92	2.756				-2.6 0.0		
CALL	120.50	2.710	0.250	8.85	6.95	2.694				-1.6 0.0		

US Fixed Income Rates Strategy

5-Year vs. Swap TradeMaker

Dec245-Year Futures vs. Swaps										
Future			Swap			Future Option / Swaption				
Price	110.67	Start Date	2024-11-26	Expiry Date	2024-11-22					
CTD	UST 4.25 FEB29	End Date	2029-02-28							
Future Delivery Date		2025-01-06								
Type	CTD					Swap			Swap Spread	
Type	Strike Rate	Strike Yld	Premium	Volatility	PVBP	Strike	Premium	Volatility	PVBP	Options per 100 mln
PUT	108.25	3.913	0.172	7.65	4.17	3.885				-2.8 0.0
PUT	108.50	3.853	0.211	7.64	4.18	3.823				-3.0 0.0
PUT	108.75	3.794	0.258	7.64	4.20	3.761				-3.2 0.0
PUT	109.00	3.734	0.320	7.73	4.21	3.693				-4.1 0.0
PUT	109.25	3.675	0.383	7.72	4.22	3.635				-4.0 0.0
PUT	109.50	3.616	0.461	7.77	4.23	3.573				-4.3 0.0
PUT	109.75	3.556	0.547	7.81	4.24	3.514				-4.2 0.0
PUT	110.00	3.498	0.648	7.89	4.25	3.453				-4.5 0.0
PUT	110.25	3.439	0.758	7.95	4.26	3.394				-4.5 0.0
PUT	110.50	3.380	0.883	8.05	4.28	3.334				-4.6 0.0
PUT	110.75		1.023	8.19	-	-	-	-	-	-
FORWARD	110.67	3.327		4.53	3.029			4.11	-29.7	906.5
CALL	110.75	3.322	0.945	8.19	4.29	3.317			-0.4	0.0
CALL	111.00	3.264	0.836	8.23	4.30	3.260			-0.3	0.0
CALL	111.25	3.206	0.750	8.39	4.31	3.211			0.5	0.0
CALL	111.50	3.147	0.664	8.48	4.32	3.157			0.9	0.0
CALL	111.75	3.090	0.586	8.56	4.33	3.102			1.2	0.0
CALL	112.00	3.032	0.516	8.64	4.34	3.046			1.4	0.0
CALL	112.25	2.975	0.453	8.72	4.35	2.991			1.6	0.0
CALL	112.50	2.917	0.398	8.82	4.37	2.936			1.9	0.0
CALL	112.75	2.860	0.352	8.93	4.38	2.883			2.3	0.0
CALL	113.00	2.803	0.305	8.98	4.39	2.823			2.0	0.0
CALL	113.25	2.746	0.266	9.06	4.40	2.766			2.0	0.0

US Fixed Income Rates Strategy

Bond vs. Swap TradeMaker

Mar25 Bond Futures vs. Swaps															
Future			Swap				Future Option / Swaption								
Price	127.12	Start Date	2025-02-25	Expiry Date	2025-02-21										
CTD	UST 4.38 MAY40	End Date	2040-05-15												
Future Delivery Date		2025-03-31													
Type	CTD					Swap				Swap Spread	Options per 100 mln				
PUT	117.00	-	-	-	-	-	-	-	-	-	-				
PUT	118.00	-	-	-	-	-	-	-	-	-	-				
PUT	119.00	-	-	-	-	-	-	-	-	-	-				
PUT	120.00	-	-	-	-	-	-	-	-	-	-				
PUT	121.00	-	-	-	-	-	-	-	-	-	-				
PUT	122.00	-	-	-	-	-	-	-	-	-	-				
PUT	123.00	-	-	-	-	-	-	-	-	-	-				
PUT	124.00	-	-	-	-	-	-	-	-	-	-				
PUT	125.00	-	-	-	-	-	-	-	-	-	-				
PUT	126.00	-	-	-	-	-	-	-	-	-	-				
PUT	127.00	-	-	-	-	-	-	-	-	-	-				
FORWARD	127.12	3.776	16.15	3.210		12.06	-56.6	746.7							
CALL	127.00	-	-	-	-	-	-	-	-	-	-				
CALL	128.00	-	-	-	-	-	-	-	-	-	-				
CALL	129.00	-	-	-	-	-	-	-	-	-	-				
CALL	130.00	-	-	-	-	-	-	-	-	-	-				
CALL	131.00	-	-	-	-	-	-	-	-	-	-				
CALL	132.00	-	-	-	-	-	-	-	-	-	-				
CALL	133.00	-	-	-	-	-	-	-	-	-	-				
CALL	134.00	-	-	-	-	-	-	-	-	-	-				
CALL	135.00	-	-	-	-	-	-	-	-	-	-				
CALL	136.00	-	-	-	-	-	-	-	-	-	-				
CALL	137.00	-	-	-	-	-	-	-	-	-	-				

US Fixed Income Rates Strategy

Note vs. Swap TradeMaker

Mar25 Note Futures vs. Swaps												
Future				Swap				Future Option / Swaption				
Price		115.77		Start Date		2025-02-25		Expiry Date		2025-02-21		
CTD		UST 1.38 NOV31		End Date		2031-11-15						
Future Delivery Date		2025-03-31										
Type	CTD					Swap				Swap Spread		
Type	Strike Rate	Strike Yld	Premium	Volatility	PVBP	Strike	Premium	Volatility	PVBP	Options per 100 mln		
PUT	111.00	4.184	0.484	6.68	7.02	4.005				-17.9 0.0		
PUT	111.50	4.113	0.562	6.61	7.05	3.937				-17.6 0.0		
PUT	112.00	4.043	0.672	6.62	7.08	3.855				-18.8 0.0		
PUT	112.50	3.973	0.781	6.56	7.10	3.785				-18.8 0.0		
PUT	113.00	3.903	0.906	6.52	7.13	3.715				-18.8 0.0		
PUT	113.50	3.833	1.062	6.53	7.16	3.638				-19.5 0.0		
PUT	114.00	3.764	1.234	6.53	7.19	3.565				-19.9 0.0		
PUT	114.50	3.694	1.422	6.52	7.22	3.494				-20.0 0.0		
PUT	115.00	3.625	1.641	6.55	7.25	3.420				-20.5 0.0		
PUT	115.50	3.556	1.891	6.62	7.29	3.345				-21.2 0.0		
PUT	116.00		2.141	6.67	-	-	-	-	-	-		
FORWARD	115.77	3.519			7.90	3.027			6.29	-49.2 796.5		
CALL	116.00	3.488	1.922	6.67	7.32	3.255				-23.3 0.0		
CALL	116.50	3.420	1.703	6.68	7.35	3.186				-23.3 0.0		
CALL	117.00	3.352	1.516	6.74	7.39	3.122				-23.0 0.0		
CALL	117.50	3.284	1.359	6.84	7.42	3.062				-22.2 0.0		
CALL	118.00	3.217	1.203	6.89	7.45	2.997				-22.0 0.0		
CALL	118.50	3.150	1.062	6.94	7.49	2.931				-21.9 0.0		
CALL	119.00	3.083	0.938	7.00	7.52	2.866				-21.7 0.0		
CALL	119.50	3.017	0.828	7.07	7.55	2.802				-21.4 0.0		
CALL	120.00	2.951	0.734	7.15	7.59	2.741				-21.0 0.0		
CALL	120.50	2.885	0.641	7.19	7.62	2.673				-21.2 0.0		
CALL	121.00	2.819	0.562	7.25	7.66	2.608				-21.2 0.0		

US Fixed Income Rates Strategy

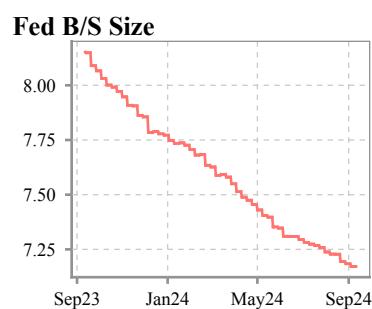
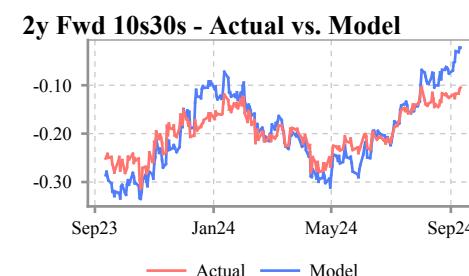
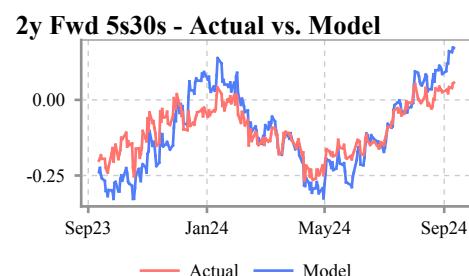
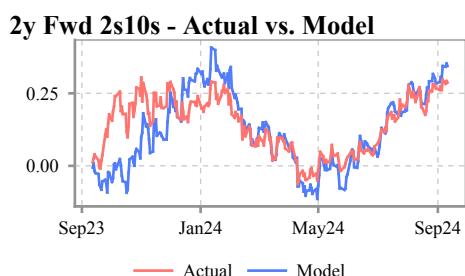
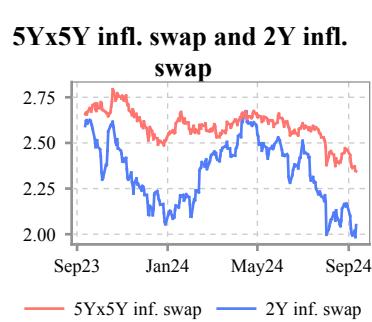
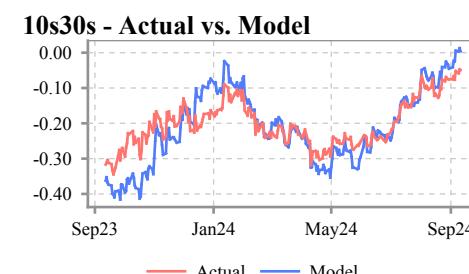
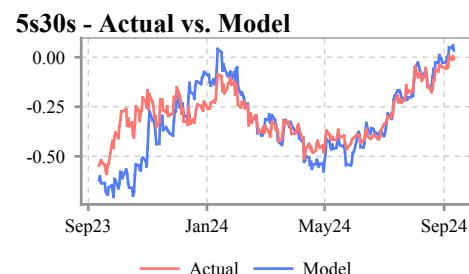
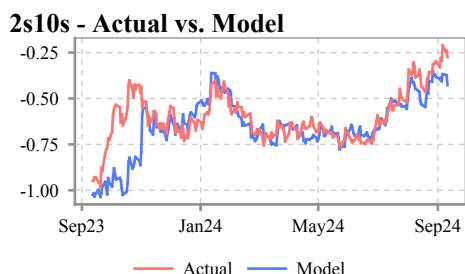
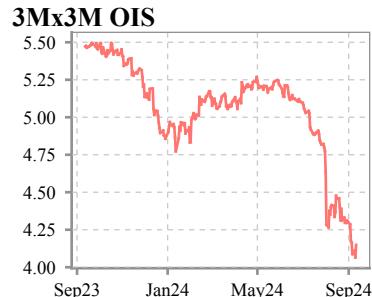
5-Year vs. Swap TradeMaker

Mar25 5-Year Futures vs. Swaps										
Future			Swap			Future Option / Swaption				
Price	110.98	Start Date	2025-02-25	Expiry Date	2025-02-21					
CTD	UST 4.50 MAY29	End Date	2029-05-31							
Future Delivery Date		2025-04-03								
Type	CTD					Swap			Swap Spread	
Type	Strike Rate	Strike Yld	Premium	Volatility	PVBP	Strike	Premium	Volatility	PVBP	Options per 100 mln
PUT	108.50	3.849	0.445	7.45	4.18	3.766				-8.3 0.0
PUT	108.75	3.789	0.508	7.47	4.19	3.705				-8.5 0.0
PUT	109.00	3.730	0.578	7.50	4.20	3.643				-8.7 0.0
PUT	109.25	3.670	0.648	7.49	4.21	3.587				-8.3 0.0
PUT	109.50	3.611	0.734	7.53	4.22	3.526				-8.5 0.0
PUT	109.75	3.552	0.820	7.54	4.23	3.470				-8.2 0.0
PUT	110.00	3.493	0.922	7.59	4.24	3.409				-8.3 0.0
PUT	110.25	3.434	1.023	7.60	4.25	3.354				-8.0 0.0
PUT	110.50	3.375	1.141	7.67	4.26	3.295				-8.1 0.0
PUT	110.75	3.317	1.258	7.69	4.27	3.239				-7.7 0.0
PUT	111.00		1.391	7.76	-	-	-	-	-	-
FORWARD	110.98	3.250			4.82	2.961		4.28	-28.9	888.4
CALL	111.00	3.258	1.375	7.76	4.28	3.273			1.5	0.0
CALL	111.25	3.200	1.273	7.84	4.29	3.223			2.3	0.0
CALL	111.50	3.142	1.172	7.89	4.31	3.170			2.8	0.0
CALL	111.75	3.084	1.078	7.95	4.32	3.118			3.4	0.0
CALL	112.00	3.026	0.992	8.02	4.33	3.066			4.0	0.0
CALL	112.25	2.968	0.914	8.10	4.34	3.016			4.8	0.0
CALL	112.50	2.911	0.844	8.19	4.35	2.968			5.7	0.0
CALL	112.75	2.853	0.773	8.25	4.36	2.916			6.2	0.0
CALL	113.00	2.796	0.711	8.33	4.37	2.866			7.0	0.0
CALL	113.25	2.739	0.656	8.43	4.37	2.820			8.1	0.0
CALL	113.50	2.682	0.602	8.50	4.38	2.769			8.7	0.0

Derivatives Strategy

SOFR Swap Curve Fair Value Model Report

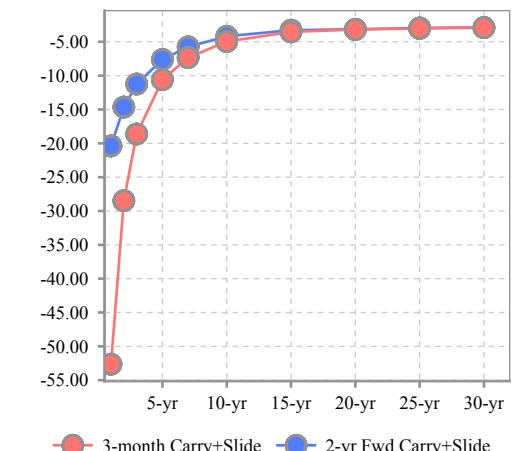
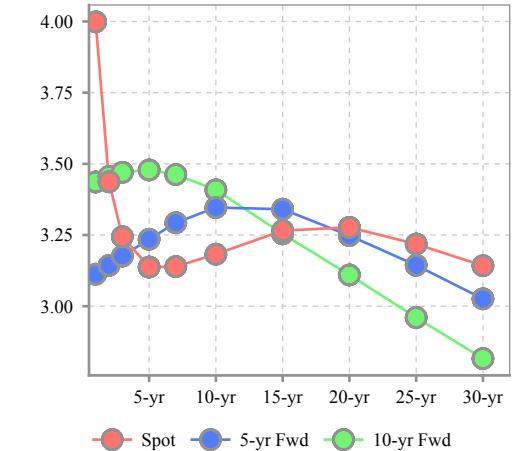
Curve	Coefficients									Model Info.			Results Summary			Current Driver	Values
	Intercept	Guidance	3Mx3M OIS Fed Expec. Crv	Fed B/S	5Yx5Y Infl. swap	2Y Infl. swap	Intercept shift	Rsq	Std. Err.	Cur. Curve	Fair Value	Residual	Guidance	0.00			
Curve	-1.08	-0.04	-0.27	0.05	-0.03	0.91	-0.12	0.15	96 %	0.10	-0.31	-0.46	0.14				
2s/5s	-1.64	-0.07	-0.50	-0.15	-0.04	1.53	-0.21	0.22	95 %	0.17	-0.27	-0.43	0.15				
2s/10s	-1.65	-0.11	-0.73	-0.41	-0.07	1.90	-0.25	0.27	95 %	0.21	-0.32	-0.42	0.10				
5s/10s	-0.56	-0.03	-0.23	-0.20	-0.01	0.62	-0.09	0.07	91 %	0.08	0.04	0.03	0.01				
5s/30s	-0.56	-0.07	-0.46	-0.46	-0.04	0.99	-0.12	0.12	93 %	0.14	-0.01	0.03	-0.04				
10s/30s	-0.00	-0.04	-0.23	-0.27	-0.03	0.37	-0.03	0.05	94 %	0.07	-0.05	0.00	-0.05				
20s/30s	0.11	-0.01	-0.08	-0.08	-0.02	0.06	-0.00	0.02	97 %	0.02	-0.14	-0.10	-0.03				
1Y fwd 2s/5s	-0.94	-0.03	-0.26	-0.27	-0.02	0.82	-0.12	0.09	89 %	0.10	0.09	0.03	0.06				
1Y fwd 2s/10s	-1.25	-0.06	-0.43	-0.52	-0.02	1.25	-0.18	0.12	89 %	0.15	0.25	0.21	0.04				
1Y fwd 2s/30s	-1.11	-0.09	-0.62	-0.79	-0.06	1.48	-0.19	0.16	92 %	0.19	0.21	0.24	-0.03				
1Y fwd 5s/10s	-0.31	-0.03	-0.17	-0.25	-0.01	0.43	-0.06	0.03	85 %	0.07	0.16	0.18	-0.02				
1Y fwd 5s/30s	-0.17	-0.05	-0.36	-0.51	-0.04	0.66	-0.07	0.07	90 %	0.12	0.13	0.21	-0.09				
1Y fwd 10s/30s	0.14	-0.03	-0.19	-0.27	-0.03	0.23	-0.01	0.03	92 %	0.06	-0.04	0.03	-0.07				
1Y fwd 20s/30s	0.14	-0.00	-0.06	-0.07	-0.02	0.03	0.00	0.01	97 %	0.02	-0.14	-0.10	-0.04				
2Y fwd 2s/5s	-0.45	-0.02	-0.17	-0.24	0.00	0.45	-0.07	0.02	80 %	0.08	0.13	0.15	-0.03				
2Y fwd 2s/10s	-0.52	-0.04	-0.28	-0.43	0.00	0.68	-0.10	0.02	80 %	0.13	0.29	0.34	-0.06				
2Y fwd 2s/30s	-0.23	-0.06	-0.42	-0.65	-0.03	0.77	-0.10	0.04	87 %	0.16	0.18	0.32	-0.14				
2Y fwd 5s/10s	-0.07	-0.02	-0.11	-0.19	-0.00	0.23	-0.03	-0.00	75 %	0.06	0.16	0.19	-0.03				
2Y fwd 5s/30s	0.22	-0.04	-0.26	-0.41	-0.04	0.32	-0.02	0.01	87 %	0.10	0.06	0.17	-0.11				
2Y fwd 10s/30s	0.29	-0.02	-0.14	-0.21	-0.04	0.09	0.01	0.01	92 %	0.05	-0.10	-0.02	-0.08				
2Y fwd 20s/30s	0.18	-0.00	-0.05	-0.06	-0.02	-0.00	0.01	0.00	96 %	0.02	-0.16	-0.12	-0.04				



Derivatives Strategy

USD SOFR 3M Swap Carry+Slide Matrix

		1-yr	2-yr	3-yr	5-yr	7-yr	10-yr	15-yr	20-yr	25-yr	30-yr
Spot	Rate	4.00	3.44	3.24	3.14	3.14	3.18	3.27	3.28	3.22	3.14
1D Chg		5.63	4.53	3.26	2.25	1.62	1.18	0.99	0.99	0.99	0.99
5D Chg		-8.41	-12.75	-13.09	-12.79	-12.49	-12.13	-11.36	-10.88	-10.58	-10.40
20D Chg		-29.54	-30.52	-27.76	-23.90	-21.81	-20.10	-17.95	-16.78	-16.01	-15.74
Carry + Slide		-64.22	-32.43	-20.39	-11.25	-7.61	-5.10	-3.55	-3.19	-3.03	-2.90
6-mo Fwd	Rate	3.13	2.97	2.94	2.97	3.03	3.11	3.21	3.23	3.17	3.09
	Carry + Slide	-43.52	-25.07	-17.02	-9.97	-7.01	-4.79	-3.47	-3.17	-3.00	-2.89
1-yr Fwd	Rate	2.85	2.85	2.87	2.94	3.01	3.11	3.21	3.22	3.16	3.08
	Carry + Slide	-32.43	-20.39	-14.65	-9.06	-6.55	-4.54	-3.40	-3.17	-2.99	-2.89
2-yr Fwd	Rate	2.84	2.88	2.92	3.01	3.08	3.17	3.25	3.23	3.16	3.07
	Carry + Slide	-20.39	-14.65	-11.25	-7.61	-5.74	-4.18	-3.28	-3.15	-2.95	-2.89
3-yr Fwd	Rate	2.92	2.97	3.01	3.09	3.15	3.24	3.29	3.25	3.16	3.06
	Carry + Slide	-14.65	-11.25	-9.06	-6.55	-5.10	-3.87	-3.21	-3.11	-2.93	-2.87
5-yr Fwd	Rate	3.11	3.14	3.18	3.24	3.29	3.35	3.34	3.25	3.14	3.03
	Carry + Slide	-9.06	-7.61	-6.55	-5.10	-4.18	-3.55	-3.19	-3.03	-2.90	-2.85
10-yr Fwd	Rate	3.44	3.46	3.47	3.48	3.46	3.41	3.25	3.11	2.96	2.82
	Carry + Slide	-4.54	-4.18	-3.87	-3.55	-3.28	-3.19	-3.03	-2.90	-2.85	-2.78



USD OIS Swap 3M Carry+Slide Matrix

		1-yr	2-yr	3-yr	5-yr	7-yr	10-yr	15-yr	20-yr	25-yr	30-yr
Spot	Rate	3.96	3.39	3.19	3.08	3.08	3.12	3.20	3.21	3.15	3.07
1D Chg		5.79	4.62	3.32	2.28	1.64	1.20	1.00	1.00	1.00	1.00
5D Chg		-8.14	-12.56	-12.96	-12.71	-12.43	-12.08	-11.32	-10.85	-10.55	-10.37
20D Chg		-27.95	-29.71	-28.06	-25.05	-23.83	-22.81	-21.70	-21.08	-20.58	-20.53
Carry + Slide		-63.36	-32.02	-20.16	-11.10	-7.51	-5.03	-3.51	-3.16	-3.01	-2.89
6-mo Fwd	Rate	3.09	2.92	2.89	2.91	2.96	3.04	3.14	3.16	3.10	3.02
	Carry + Slide	-44.22	-25.61	-17.25	-10.20	-7.06	-4.90	-3.49	-3.22	-3.03	-2.92
1-yr Fwd	Rate	2.80	2.79	2.81	2.88	2.95	3.04	3.14	3.15	3.08	3.00
	Carry + Slide	-32.02	-20.16	-14.51	-8.94	-6.46	-4.48	-3.36	-3.15	-2.97	-2.88

Derivatives Strategy

USD Front-end Bullish SOFR Swaption Structures Report

Structure	Swaprate			Rec swaption prem (bp/yl)			Outrights (bp/yl)			Spreads (bp/yl)			1x2s (bp/yl)		Ladders (bp/yl)		Bflies (bp/yl)		Condors (bp/yl)		
	Fwd (%)	3M aged (%)	3M Carry (bp)	ATMF	ATMS	ATMS-1C	Cost	Proj	Ret	Cost	Proj	Ret	Cost	Proj	Ret	Cost	Proj	Ret	Cost	Proj	Ret
3Mx1Y	3.472	3.999	-52.6	24.0	58.0	106.6	24.0	-52.6	-34.0	-52.6	-92.0	-52.6	-140.6	-52.6	14.6	-52.6	-18.4	-52.6	18.4	-52.6	
3Mx2Y	3.152	3.437	-28.5	24.8	41.0	62.5	24.8	-28.5	-16.2	-28.5	-57.2	-28.5	-78.8	-28.5	5.3	-28.5	9.0	-28.5	9.0	-28.5	
3Mx3Y	3.058	3.244	-18.6	24.4	34.5	47.2	24.4	-18.6	-10.1	-18.6	-44.6	-18.6	-57.4	-18.6	2.6	-18.6	4.2	-18.6	4.2	-18.6	
3Mx5Y	3.032	3.138	-10.6	22.7	28.2	34.8	22.7	-10.6	-5.5	-10.6	-33.8	-10.6	-40.3	-10.6	1.0	-10.6	1.9	-10.6	1.9	-10.6	
6Mx1Y	3.129	3.472	-34.3	33.4	92.3	175.1	33.4	-20.3	-58.9	13.6	-151.2	47.4	-234.0	46.8	23.8	14.2	26.9	15.2	23.8	14.2	15.2
6Mx2Y	2.974	3.152	-17.8	33.5	60.9	98.2	33.5	-15.6	-27.4	4.1	-88.3	23.7	-125.6	23.9	9.9	3.9	16.5	4.9	9.9	3.9	16.5
6Mx3Y	2.944	3.058	-11.4	32.8	49.6	71.0	32.8	-13.0	-16.9	1.9	-66.5	16.8	-87.8	16.9	4.5	1.7	8.0	3.1	4.5	1.7	8.0
6Mx5Y	2.970	3.032	-6.1	30.5	39.6	50.4	30.5	-10.4	-9.1	0.8	-48.8	12.0	-59.6	12.1	1.6	0.7	2.6	1.8	1.6	0.7	2.6
1Yx1Y	2.854	2.941	-8.7	48.5	126.0	231.2	48.5	-10.1	-77.5	1.0	-203.5	12.0	-308.7	8.2	27.7	4.8	34.2	3.7	27.7	4.8	3.7
1Yx2Y	2.847	2.883	-3.6	46.3	81.2	128.5	46.3	-7.0	-34.9	0.1	-116.0	7.3	-163.4	5.9	12.5	1.5	18.5	2.1	12.5	1.5	18.5
1Yx3Y	2.871	2.889	-1.8	45.1	66.1	91.8	45.1	-5.9	-21.0	0.0	-87.1	5.9	-112.8	5.1	4.7	0.8	10.0	0.9	4.7	0.8	10.0
1Yx5Y	2.944	2.946	-0.2	42.2	52.7	64.9	42.2	-5.0	-10.5	-0.1	-63.3	4.9	-75.5	4.6	1.6	0.2	2.8	0.4	1.6	0.2	2.8
18Mx1Y	2.815	2.820	-0.6	57.3	137.5	243.7	57.3	-4.3	-80.2	-0.8	-217.7	2.8	-323.9	0.4	25.9	1.6	33.4	1.1	25.9	1.6	33.4
18Mx2Y	2.847	2.840	0.7	54.6	89.6	135.3	54.6	-3.5	-35.1	-0.3	-124.7	2.9	-170.4	1.6	10.6	1.0	16.2	1.1	10.6	1.0	16.2
18Mx3Y	2.885	2.873	1.2	53.3	73.6	97.7	53.3	-3.2	-20.4	-0.2	-94.0	2.8	-118.1	2.3	3.7	0.4	7.8	0.8	3.7	0.4	7.8
18Mx5Y	2.968	2.953	1.5	50.5	59.7	69.9	50.5	-3.0	-9.2	-0.1	-68.9	2.8	-79.1	2.5	1.0	0.1	1.6	0.2	1.0	0.1	1.6
2Yx1Y	2.840	2.823	1.7	62.9	140.8	241.4	62.9	-1.5	-77.9	-0.9	-218.6	-0.4	-319.3	-2.3	22.7	1.0	30.5	0.9	22.7	1.0	30.5
2Yx2Y	2.880	2.861	1.9	60.8	94.2	135.8	60.8	-1.6	-33.4	-0.2	-127.6	1.2	-169.2	0.3	8.2	0.6	13.8	0.7	8.2	0.6	13.8
2Yx3Y	2.923	2.902	2.1	59.7	78.1	99.2	59.7	-1.6	-18.4	-0.1	-96.4	1.4	-117.6	1.1	2.8	0.1	5.2	0.3	2.8	0.1	5.2
2Yx5Y	3.007	2.987	2.0	57.3	64.3	71.9	57.3	-1.7	-7.1	-0.1	-71.4	1.6	-79.0	1.4	0.5	0.1	1.2	0.0	0.5	0.1	1.2

Swaprates shown for at-the-money forward (ATMF) and 3M aged ATMF. 3M carry defined as (ATMF - 3M aged ATMF).

Swaption premia shown for options struck ATMF, at-the-money spot (ATMS), and ATMS - (ATMF-ATMS). For example: for 6Mx1Y, ATMF corresponds to 6Mx1Y swaption struck at 6Mx1Y swaprate, ATMS corresponds to 6Mx1Y swaption struck at 1Y swaprate, and ATMS-1C corresponds to 6Mx1Y swaption struck at (1Y swaprate - (6Mx1Y - 1Y)).

bpyld: All swaption premiums are defined in bp of yield.

Trade cost defined as the initial cost to enter the trade (negative number indicates a credit at inception). Projected return defined as P/L from unwinding these trades in 3M assuming unchanged yield curve and volatility surface. All #s in bp of yield.

Trade structures:

Rec Spreads: +ATMF/-ATMS

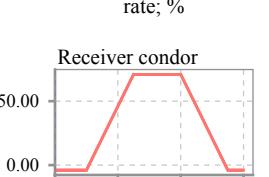
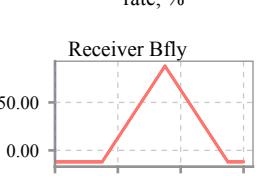
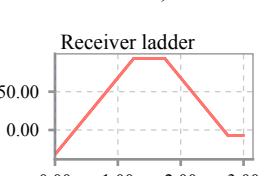
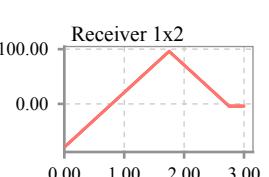
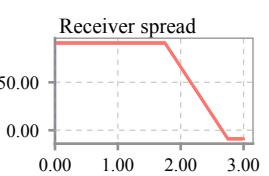
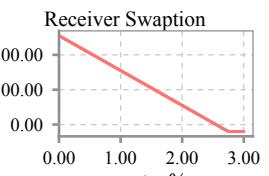
1x2: +ATMF/-2xATMS

Ladders: +ATMF/-ATMS/-/(ATMS-1C)

Bflies: +ATMF/-2*ATMS/+(ATMS-1C)

Condors: +ATMF/-ATMS/-/(ATMS-1C)/+(ATMS-2C); ATMS-2C is defined as swaption struck at (ATMS - 2*(ATMF-ATMS))

Stylized payoff (bp) profile of various bullish structures



Derivatives Strategy

USD Front-end Bullish SOFR Swaption Structures Statistics Report: 3M expiry

3Mx1Y ATMF: 3.472 ATMS: 3.999 3M Carry: -52.6 1Y min: 3.942 1Y max: 5.487

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Downside / Payoff
					Lower	Upper	Upside	Downside	
Outright	3.472	+1	24.0	-52.6	-	323.2	-	24.0	-319%
Spread	3.472/3.999	+1/-1	-34.0	-52.6	-	381.2	-18.6	-34.0	55%
1x2	3.472/3.999	+1/-2	-92.0	-52.6	360.5	439.3	39.4	-33.8	-43%
Ladder	3.472/3.999/4.525	+1/-1/-1	-140.6	-52.6	364.5	487.8	88.0	-29.7	-63%
Ladder	3.472/3.999/5.052	+1/-1/-1	-193.0	-52.6	364.8	540.2	140.4	-29.4	-73%
Butterfly	3.472/3.999/4.525	+1/-2/+1	14.6	-52.6	467.1	332.7	-67.2	14.6	-461%
Condor	3.472/3.999/4.525/5.052	+1/-1/-1/+1	18.4	-52.6	523.5	328.9	-71.0	18.4	-386%
									-35%

Proj payoff: Projected payoff of the structure at option maturity under the assumption that the forward rate rolls to current spot.

Proj return: Projected return defined as (proj payoff – cost) / cost.

Yield bounds: Lower and upper breakeven levels at option maturity.

Max P&L: Maximum upside is achieved if the forward rolls to current spot rate (for all structures except outright receivers). For outright receivers, 1:1 spreads, butterflies and condors, maximum downside is limited to the upfront trade cost. For 1:2 spreads and ladders, maximum downside is defined as the P/L achieved if rates fall to the minimum level of the past 12M.

3Mx2Y ATMF: 3.152 ATMS: 3.437 3M Carry: -28.5 1Y min: 3.392 1Y max: 5.097

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Downside / Payoff
					Lower	Upper	Upside	Downside	
Outright	3.152	+1	24.8	-28.5	-	290.5	-	24.8	-215%
Spread	3.152/3.437	+1/-1	-16.2	-28.5	-	331.5	-12.2	-16.2	75%
1x2	3.152/3.437	+1/-2	-57.2	-28.5	314.9	372.4	28.7	-24.2	-50%
Ladder	3.152/3.437/3.722	+1/-1/-1	-78.8	-28.5	321.9	394.0	50.3	-17.3	-64%
Ladder	3.152/3.437/4.006	+1/-1/-1	-104.0	-28.5	325.1	419.2	75.5	-14.0	-73%
Butterfly	3.152/3.437/3.722	+1/-2/+1	5.3	-28.5	377.5	309.9	-33.8	5.3	-636%
Condor	3.152/3.437/3.722/4.006	+1/-1/-1/+1	9.0	-28.5	409.6	306.2	-37.5	9.0	-417%
									-32%

3Mx3Y ATMF: 3.058 ATMS: 3.244 3M Carry: -18.6 1Y min: 3.211 1Y max: 4.864

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Downside / Payoff
					Lower	Upper	Upside	Downside	
Outright	3.058	+1	24.4	-18.6	-	281.4	-	24.4	-176%
Spread	3.058/3.244	+1/-1	-10.1	-18.6	-	315.9	-8.5	-10.1	84%
1x2	3.058/3.244	+1/-2	-44.6	-18.6	298.4	350.4	26.0	-22.8	-58%
Ladder	3.058/3.244/3.430	+1/-1/-1	-57.4	-18.6	304.3	363.1	38.7	-16.9	-68%
Ladder	3.058/3.244/3.617	+1/-1/-1	-71.7	-18.6	308.6	377.5	53.1	-12.6	-74%
Butterfly	3.058/3.244/3.430	+1/-2/+1	2.6	-18.6	345.6	303.2	-21.2	2.6	-816%
Condor	3.058/3.244/3.430/3.617	+1/-1/-1/+1	4.2	-18.6	365.9	301.5	-22.9	4.2	-540%
									-23%

3Mx5Y ATMF: 3.032 ATMS: 3.138 3M Carry: -10.6 1Y min: 3.115 1Y max: 4.702

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Downside / Payoff
					Lower	Upper	Upside	Downside	
Outright	3.032	+1	22.7	-10.6	-	280.5	-	22.7	-147%
Spread	3.032/3.138	+1/-1	-5.5	-10.6	-	308.7	-5.1	-5.5	91%
1x2	3.032/3.138	+1/-2	-33.8	-10.6	290.6	336.9	23.2	-20.9	-69%
Ladder	3.032/3.138/3.244	+1/-1/-1	-40.3	-10.6	294.6	343.5	29.7	-16.9	-74%
Ladder	3.032/3.138/3.350	+1/-1/-1	-47.8	-10.6	297.8	350.9	37.2	-13.7	-78%
Butterfly	3.032/3.138/3.244	+1/-2/+1	1.0	-10.6	325.3	302.2	-11.6	1.0	-1189%
Condor	3.032/3.138/3.244/3.350	+1/-1/-1/+1	1.9	-10.6	336.9	301.2	-12.5	1.9	-656%
									-18%

Derivatives Strategy

USD Front-end Bullish SOFR Swaption Structures Statistics Report: 6M expiry

6Mx1Y ATMF: 3.129 ATMS: 3.999 6M Carry: -87.0 1Y min: 3.942 1Y max: 5.487

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	3.129	+1	33.4	-87.0	-	279.5	-	33.4	-360%	-38%
Spread	3.129/3.999	+1/-1	-58.9	-87.0	-	371.8	-28.0	-58.9	48%	68%
1x2	3.129/3.999	+1/-2	-151.2	-87.0	335.6	464.2	64.3	-58.7	-43%	67%
Ladder	3.129/3.999/4.868	+1/-1/-1	-234.0	-87.0	339.8	546.9	147.0	-54.4	-63%	63%
Ladder	3.129/3.999/5.738	+1/-1/-1	-319.8	-87.0	340.9	632.7	232.9	-53.3	-73%	61%
Butterfly	3.129/3.999/4.868	+1/-2/+1	23.8	-87.0	510.6	289.1	-110.8	23.8	-465%	-27%
Condor	3.129/3.999/4.868/5.738	+1/-1/-1/+1	26.9	-87.0	600.7	286.0	-113.9	26.9	-423%	-31%

Proj payoff: Projected payoff of the structure at option maturity under the assumption that the forward rate rolls to current spot.

Proj return: Projected return defined as (proj payoff – cost) / cost.

Yield bounds: Lower and upper breakeven levels at option maturity.

Max P&L: Maximum upside is achieved if the forward rolls to current spot rate (for all structures except outright receivers). For outright receivers, 1:1 spreads, butterflies and condors, maximum downside is limited to the upfront trade cost. For 1:2 spreads and ladders, maximum downside is defined as the P/L achieved if rates fall to the minimum level of the past 12M.

6Mx2Y ATMF: 2.974 ATMS: 3.437 6M Carry: -46.3 1Y min: 3.392 1Y max: 5.097

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.974	+1	33.5	-46.3	-	263.9	-	33.5	-238%	-72%
Spread	2.974/3.437	+1/-1	-27.4	-46.3	-	324.8	-18.9	-27.4	69%	59%
1x2	2.974/3.437	+1/-2	-88.3	-46.3	301.7	385.7	42.0	-37.5	-48%	81%
Ladder	2.974/3.437/3.900	+1/-1/-1	-125.6	-46.3	310.7	423.0	79.3	-28.4	-63%	61%
Ladder	2.974/3.437/4.363	+1/-1/-1	-169.5	-46.3	313.2	466.9	123.2	-26.0	-73%	56%
Butterfly	2.974/3.437/3.900	+1/-2/+1	9.9	-46.3	399.9	287.5	-56.2	9.9	-569%	-21%
Condor	2.974/3.437/3.900/4.363	+1/-1/-1/+1	16.5	-46.3	452.8	280.9	-62.8	16.5	-381%	-36%

6Mx3Y ATMF: 2.944 ATMS: 3.244 6M Carry: -30.0 1Y min: 3.211 1Y max: 4.864

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.944	+1	32.8	-30.0	-	261.6	-	32.8	-192%	-109%
Spread	2.944/3.244	+1/-1	-16.9	-30.0	-	311.2	-13.2	-16.9	78%	56%
1x2	2.944/3.244	+1/-2	-66.5	-30.0	288.0	360.8	36.4	-33.2	-55%	110%
Ladder	2.944/3.244/3.544	+1/-1/-1	-87.8	-30.0	296.7	382.2	57.8	-24.5	-66%	81%
Ladder	2.944/3.244/3.845	+1/-1/-1	-112.7	-30.0	301.8	407.1	82.7	-19.3	-73%	64%
Butterfly	2.944/3.244/3.544	+1/-2/+1	4.5	-30.0	358.9	289.9	-34.5	4.5	-769%	-15%
Condor	2.944/3.244/3.544/3.845	+1/-1/-1/+1	8.0	-30.0	392.5	286.3	-38.1	8.0	-475%	-27%

6Mx5Y ATMF: 2.970 ATMS: 3.138 6M Carry: -16.7 1Y min: 3.115 1Y max: 4.702

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.970	+1	30.5	-16.7	-	266.5	-	30.5	-155%	-182%
Spread	2.970/3.138	+1/-1	-9.1	-16.7	-	306.2	-7.6	-9.1	83%	55%
1x2	2.970/3.138	+1/-2	-48.8	-16.7	281.7	345.8	32.0	-29.8	-66%	178%
Ladder	2.970/3.138/3.305	+1/-1/-1	-59.6	-16.7	287.7	356.6	42.8	-23.8	-72%	142%
Ladder	2.970/3.138/3.472	+1/-1/-1	-71.3	-16.7	292.7	368.3	54.5	-18.8	-77%	112%
Butterfly	2.970/3.138/3.305	+1/-2/+1	1.6	-16.7	332.1	295.4	-18.4	1.6	-1120%	-10%
Condor	2.970/3.138/3.305/3.472	+1/-1/-1/+1	2.6	-16.7	349.8	294.5	-19.3	2.6	-755%	-15%

Derivatives Strategy

USD Front-end Bullish SOFR Swaption Structures Statistics Report: 1Y expiry

1Yx1Y ATMF: 2.854 ATMS: 3.999 1Y Carry: -114.5 1Y min: 3.942 1Y max: 5.487

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff(bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.854	+1	48.5	-114.5	-	237.0	-	48.5	-336%	-42%
Spread	2.854/3.999	+1/-1	-77.5	-114.5	-	362.9	-36.9	-77.5	48%	68%
1x2	2.854/3.999	+1/-2	-203.5	-114.5	310.9	488.9	89.0	-83.4	-44%	73%
Ladder	2.854/3.999/5.143	+1/-1/-1	-308.7	-114.5	320.1	594.1	194.2	-74.2	-63%	65%
Ladder	2.854/3.999/6.288	+1/-1/-1	-420.4	-114.5	322.8	705.8	306.0	-71.4	-73%	62%
Butterfly	2.854/3.999/5.143	+1/-2/+1	27.7	-114.5	542.1	257.7	-142.2	27.7	-513%	-24%
Condor	2.854/3.999/5.143/6.288	+1/-1/-1/+1	34.2	-114.5	663.0	251.2	-148.7	34.2	-435%	-30%

1Yx2Y ATMF: 2.847 ATMS: 3.437 1Y Carry: -59.0 1Y min: 3.392 1Y max: 5.097

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.847	+1	46.3	-59.0	-	238.4	-	46.3	-227%	-78%
Spread	2.847/3.437	+1/-1	-34.9	-59.0	-	319.6	-24.1	-34.9	69%	59%
1x2	2.847/3.437	+1/-2	-116.0	-59.0	286.6	400.7	57.0	-52.5	-49%	89%
Ladder	2.847/3.437/4.027	+1/-1/-1	-163.4	-59.0	298.3	448.1	104.4	-40.9	-64%	69%
Ladder	2.847/3.437/4.617	+1/-1/-1	-216.7	-59.0	303.9	501.4	157.8	-35.2	-73%	60%
Butterfly	2.847/3.437/4.027	+1/-2/+1	12.5	-59.0	415.1	272.2	-71.5	12.5	-573%	-21%
Condor	2.847/3.437/4.027/4.617	+1/-1/-1/+1	18.5	-59.0	480.2	266.2	-77.5	18.5	-419%	-31%

1Yx3Y ATMF: 2.871 ATMS: 3.244 1Y Carry: -37.3 1Y min: 3.211 1Y max: 4.864

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.871	+1	45.1	-37.3	-	242.0	-	45.1	-183%	-121%
Spread	2.871/3.244	+1/-1	-21.0	-37.3	-	308.1	-16.3	-21.0	78%	56%
1x2	2.871/3.244	+1/-2	-87.1	-37.3	274.6	374.2	49.8	-46.6	-57%	125%
Ladder	2.871/3.244/3.617	+1/-1/-1	-112.8	-37.3	286.2	399.9	75.5	-35.0	-67%	94%
Ladder	2.871/3.244/3.989	+1/-1/-1	-143.7	-37.3	292.5	430.8	106.4	-28.6	-74%	77%
Butterfly	2.871/3.244/3.617	+1/-2/+1	4.7	-37.3	366.4	282.4	-42.0	4.7	-894%	-13%
Condor	2.871/3.244/3.617/3.989	+1/-1/-1/+1	10.0	-37.3	408.9	277.2	-47.2	10.0	-474%	-27%

1Yx5Y ATMF: 2.944 ATMS: 3.138 1Y Carry: -19.4 1Y min: 3.115 1Y max: 4.702

Structure	Strike	Contracts	Cost (bpyld)	Proj payoff (bpyld)	Yield bounds (bpyld)		Max P&L (bpyld)		Proj return (%)	Downside / Payoff
					Lower	Upper	Upside	Downside		
Outright	2.944	+1	42.2	-19.4	-	252.2	-	42.2	-146%	-218%
Spread	2.944/3.138	+1/-1	-10.5	-19.4	-	304.9	-8.8	-10.5	84%	54%
1x2	2.944/3.138	+1/-2	-63.3	-19.4	269.8	357.7	43.9	-41.7	-69%	215%
Ladder	2.944/3.138/3.331	+1/-1/-1	-75.5	-19.4	277.0	369.9	56.1	-34.5	-74%	178%
Ladder	2.944/3.138/3.525	+1/-1/-1	-88.8	-19.4	283.0	383.2	69.5	-28.5	-78%	147%
Butterfly	2.944/3.138/3.331	+1/-2/+1	1.6	-19.4	334.8	292.8	-21.0	1.6	-1282%	-8%
Condor	2.944/3.138/3.331/3.525	+1/-1/-1/+1	2.8	-19.4	355.3	291.6	-22.2	2.8	-788%	-15%

Proj payoff: Projected payoff of the structure at option maturity under the assumption that the forward rate rolls to current spot.

Proj return: Projected return defined as (proj payoff – cost) / cost.

Yield bounds: Lower and upper break-even levels at option maturity.

Max P&L: Maximum upside is achieved if the forward rolls to current spot rate (for all structures except outright receivers). For outright receivers, 1:1 spreads, butterflies and condors, maximum downside is limited to the upfront trade cost. For 1:2 spreads and ladders, maximum downside is defined as the P/L achieved if rates fall to the minimum level of the past 12M.

Derivatives Strategy

USD SOFR Spot and Forward Swap Butterflies - Summary

Structure	Crvt and Lvl Sprd						Spot		1Y Fwd				2Y Fwd				3Y Fwd				5Y Fwd				
	Not1	Not2	Wt1	Wt2	Spot	1mf	3mf	6mf	Res	Z	Wt1	Wt2	CLSpr	Res	Z	Wt1	Wt2	CLSpr	Res	Z	Wt1	Wt2	CLSpr	Res	Z
2Y3Y5Y	79.6	29.9	53.8	48.5	-12.7	-12.1	-10.9	-9.7	0.6	-0.2	58.0	41.2	0.8	0.5	2.1	53.3	47.1	-3.0	0.2	0.4	56.0	44.5	-2.3	0.1	1.5
2Y5Y7Y	58.8	56.7	24.5	77.1	-12.6	-11.9	-10.6	-9.2	0.9	0.7	24.4	75.8	-3.5	0.5	1.5	24.4	76.4	-4.8	0.2	1.4	27.9	72.5	-2.5	0.1	0.8
2Y5Y10Y	95.7	33.9	39.9	63.0	-24.1	-22.7	-20.2	-17.6	1.9	1.1	38.4	62.1	-7.8	0.9	1.3	38.8	62.8	-9.8	0.2	0.8	42.7	58.2	-6.1	-0.1	-0.2
2Y5Y15Y	119.5	21.0	49.9	54.2	-34.8	-32.8	-29.2	-25.5	2.6	1.0	46.5	54.8	-14.0	1.1	1.1	46.6	56.3	-16.5	0.3	0.7	50.3	51.9	-11.5	0.0	0.3
2Y5Y30Y	137.4	12.1	57.3	50.6	-42.3	-39.7	-35.1	-30.1	3.5	1.2	52.8	52.3	-16.8	1.6	1.3	53.1	53.9	-17.8	0.8	1.1	58.0	47.7	-9.2	0.5	1.0
2Y7Y15Y	100.2	38.4	30.8	72.9	-30.0	-28.6	-26.0	-23.2	1.7	0.9	28.8	72.8	-14.3	0.7	0.9	28.8	73.9	-15.6	0.0	0.3	30.7	71.8	-12.5	-0.1	0.0
2Y10Y30Y	115.3	36.8	25.9	82.6	-30.3	-28.6	-25.5	-21.9	2.2	1.1	22.8	84.8	-15.3	1.2	1.2	22.4	86.6	-13.4	0.9	1.1	25.6	82.9	-6.1	1.0	1.3
3Y5Y7Y	61.6	45.9	38.0	62.4	-5.6	-5.2	-4.5	-3.8	0.6	1.1	35.9	64.5	-3.3	0.3	1.2	37.7	62.8	-2.8	0.1	1.8	40.8	59.3	-1.1	0.0	0.2
3Y5Y10Y	88.4	25.1	54.5	46.5	-11.2	-10.5	-9.3	-8.1	1.2	1.3	52.1	48.7	-6.5	0.4	1.1	54.2	46.7	-5.7	0.1	0.9	57.0	43.3	-3.2	-0.1	-0.9
3Y7Y15Y	87.0	33.1	39.5	62.7	-19.1	-18.2	-16.8	-15.2	1.2	1.0	37.5	64.2	-12.4	0.4	0.6	38.4	63.6	-11.3	-0.1	0.2	39.5	62.4	-9.3	-0.1	-0.2
5Y7Y10Y	64.8	38.7	47.7	52.9	-3.9	-3.8	-3.6	-3.4	0.3	1.5	48.0	52.2	-2.0	0.1	0.4	48.4	51.8	-1.9	-0.1	-1.4	48.1	52.1	-1.9	-0.2	-1.6
5Y10Y30Y	84.1	26.7	45.3	59.9	-12.0	-11.4	-10.4	-9.1	0.8	1.1	44.0	61.3	-7.3	0.6	1.1	44.4	61.2	-4.3	0.7	1.3	47.8	57.5	0.0	0.8	1.6
5Y15Y30Y	58.2	51.5	22.6	83.2	-5.7	-5.3	-4.5	-3.4	1.0	1.5	21.9	83.9	-1.6	0.8	1.5	22.8	82.9	2.0	0.8	1.5	26.7	78.2	7.1	0.9	1.7
7Y10Y12Y	41.2	60.1	30.2	70.0	-1.9	-1.8	-1.7	-1.6	-0.1	-1.1	29.2	71.0	-1.7	-0.1	-1.1	28.4	71.8	-1.6	0.0	0.3	27.7	72.7	-1.5	0.1	1.2
7Y15Y30Y	60.4	45.1	31.8	72.9	-2.3	-2.0	-1.4	-0.6	0.8	1.6	31.5	73.3	0.7	0.7	1.6	33.6	70.9	4.2	0.8	1.7	39.3	64.2	8.9	0.9	2.0
7Y20Y30Y	39.2	66.2	16.7	86.5	3.3	3.5	3.9	4.3	0.7	1.7	16.6	86.5	5.5	0.7	1.7	17.9	84.8	7.6	0.7	1.7	20.6	81.4	10.1	0.8	1.8
10Y12Y15Y	57.2	42.9	49.1	51.2	-1.3	-1.3	-1.2	-1.1	0.1	1.1	48.5	51.9	-1.3	0.1	1.5	48.3	52.3	-1.4	0.0	1.5	50.8	49.7	-0.9	0.1	1.9
10Y15Y30Y	70.9	32.1	51.1	51.9	0.9	1.0	1.4	1.8	0.7	1.9	52.0	50.8	3.2	0.6	2.0	55.9	46.3	5.8	0.5	2.0	61.7	39.5	8.6	0.5	2.0
10Y20Y30Y	46.5	57.6	27.1	75.3	5.0	5.2	5.4	5.6	0.7	1.9	27.8	74.3	6.9	0.6	1.9	30.1	71.4	8.5	0.6	1.9	32.2	68.7	9.9	0.6	1.7
15Y20Y30Y	67.0	35.5	54.2	46.5	4.9	4.9	4.9	4.9	0.3	1.9	54.5	45.9	5.4	0.3	1.8	54.6	45.7	5.4	0.3	1.6	52.5	47.8	5.4	0.4	1.4

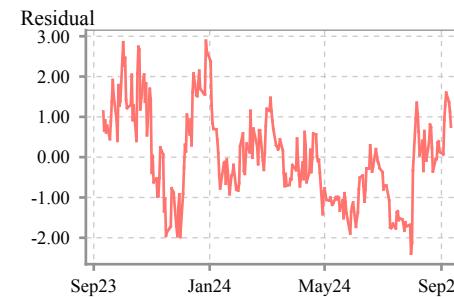
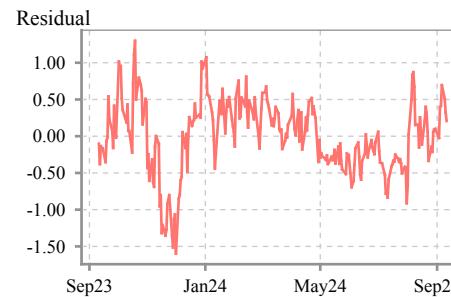
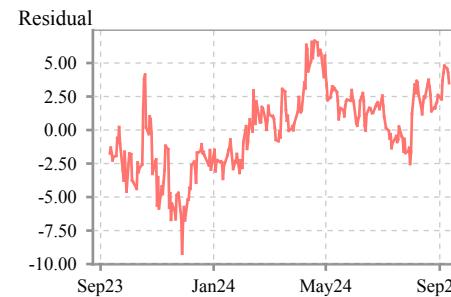
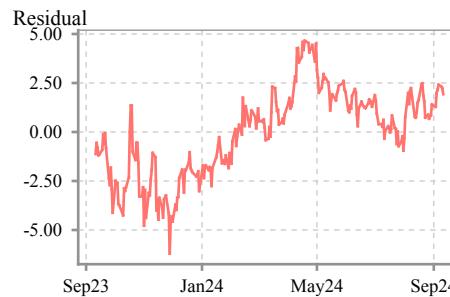
Note:

1. Wt1 and Wt2 refer to the curve- and level-neutral risk weightings in the short and long legs of the butterfly.
2. Not1 and Not2 refer to the pbvp-weighted notional in the short and long legs of the butterfly.
3. CrvLSpd refers to the current value of the curve- and level-neutral butterfly spread, i.e Body - Wt1 * short_wing - Wt2 * long_wing. 1mf, 3mf, 6mf refer to the butterfly spread 1-month, 3-month and 6-month forward respectively.
4. Res refers to the mispricing of the curve butterfly and is based on a model of the butterfly spread. Z refers to the z-score of the residual. Res and Z are calculated based on 3-month of historical data.

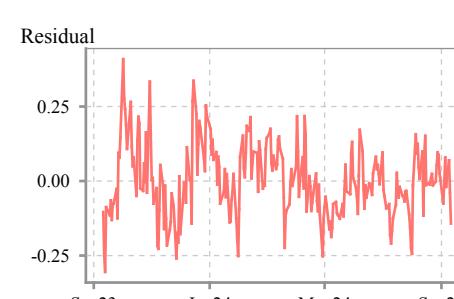
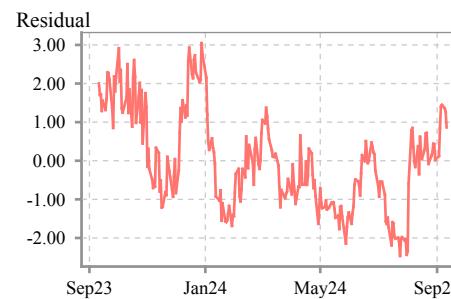
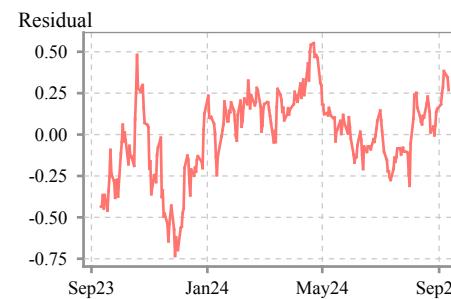
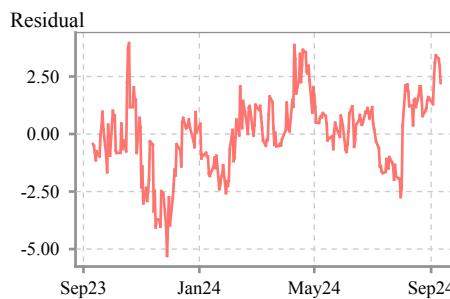
Derivatives Strategy

Benchmark SOFR Butterflies

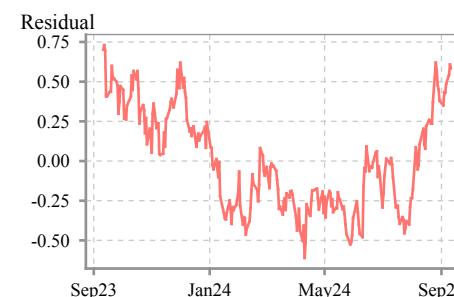
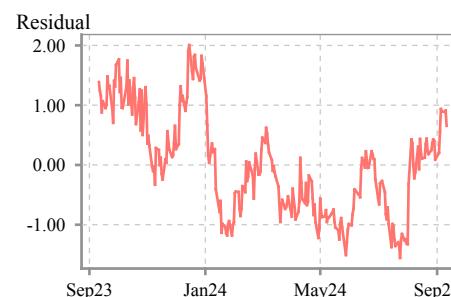
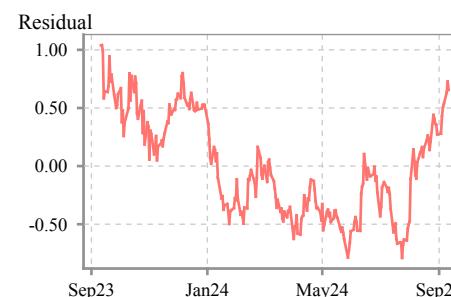
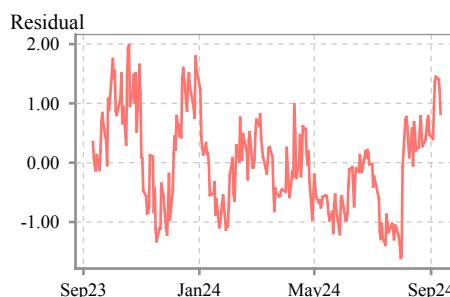
2Y5Y10Y Spot		Wt1	Wt2	CLsp	Res	Z	Sprd MRev	2Y5Y30Y Spot	Wt1	Wt2	CLsp	Res	Z	Sprd MRev	2Y5Y10Y 2YF	Wt1	Wt2	CLsp	Res	Z	Sprd MRev	2Y5Y30Y 2YF	Wt1	Wt2	CLsp	Res	Z	Sprd MRev
39.9	63.0	-24.1	1.9	1.1	-17.2	0.9		57.3	50.6	-42.3	3.5	1.2	-15.2	1.1	38.8	62.8	-9.8	0.2	0.8	-1.8	0.9	53.1	53.9	-17.8	0.8	1.1	3.1	1.1



2Y10Y30Y Spot		Wt1	Wt2	CLsp	Res	Z	Sprd MRev	5Y7Y10Y Spot	Wt1	Wt2	CLsp	Res	Z	Sprd MRev	2Y10Y30Y 2YF	Wt1	Wt2	CLsp	Res	Z	Sprd MRev	5Y7Y10Y 2YF	Wt1	Wt2	CLsp	Res	Z	Sprd MRev
25.9	82.6	-30.3	2.2	1.1	-10.7	1.2		47.7	52.9	-3.9	0.3	1.5	-2.1	1.0	22.4	86.6	-13.4	0.9	1.1	19.4	1.2	48.4	51.8	-1.9	-0.1	-1.4	-1.1	0.6



5Y10Y30Y Spot		Wt1	Wt2	CLsp	Res	Z	Sprd MRev	10Y20Y30Y Spot	Wt1	Wt2	CLsp	Res	Z	Sprd MRev	5Y10Y30Y 2YF	Wt1	Wt2	CLsp	Res	Z	Sprd MRev	10Y20Y30Y 2YF	Wt1	Wt2	CLsp	Res	Z	Sprd MRev
45.3	59.9	-12.0	0.8	1.1	4.3	1.1		27.1	75.3	5.0	0.7	1.9	11.5	1.3	44.4	61.2	-4.3	0.7	1.3	13.0	1.2	30.1	71.4	8.5	0.6	1.9	11.2	1.3



Note:

1. Wt1 and Wt2 refer to the curve- and leve-neutral risk weightings in the short and long legs of the butterfly.

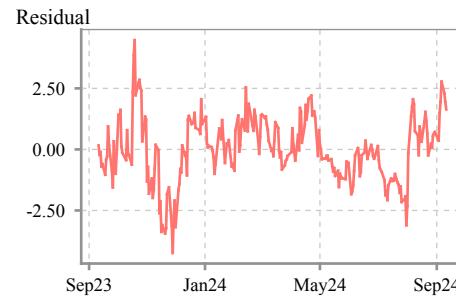
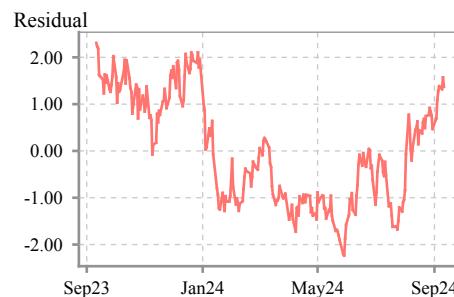
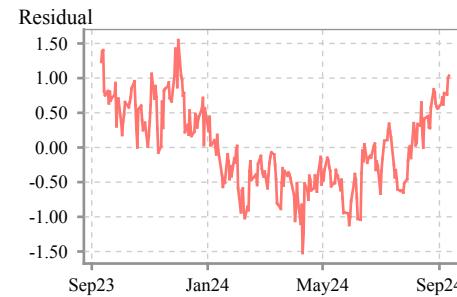
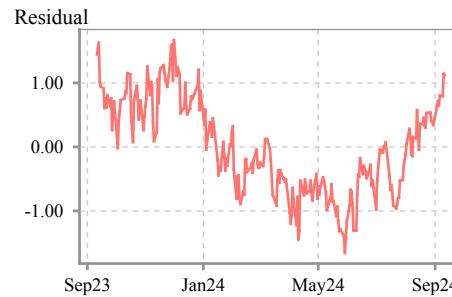
2. CrvlSpd and Spd refer to the current value of the curve- and level neutral spread and the 50:50 weighted spread, respectively.

3. The expected time to mean reversion assumes that the residual will converge to the mean in three eights (i.e., average of half and a quarter) of the peak-to-peak period; and the period is reported in months.

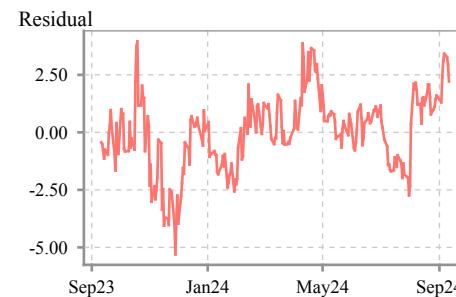
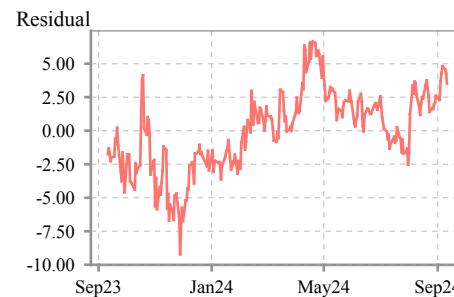
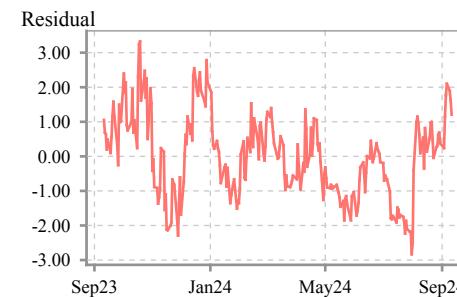
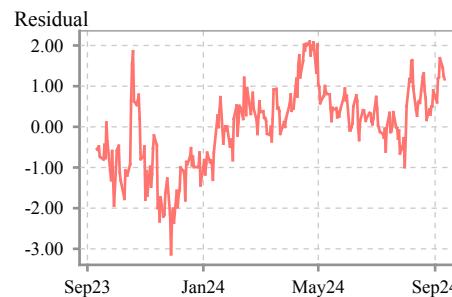
Derivatives Strategy

Most Mispriced SOFR Butterflies I – spot and fwd

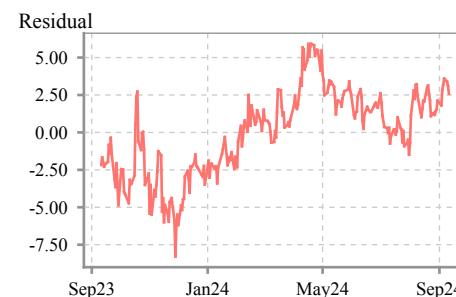
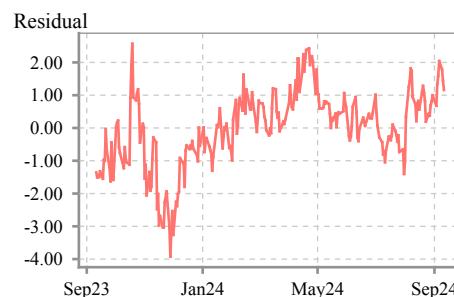
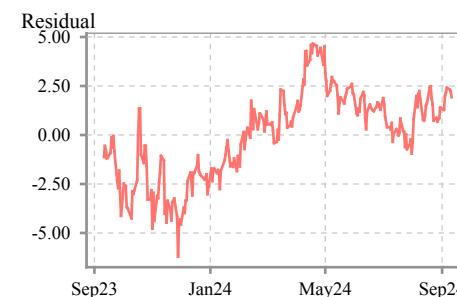
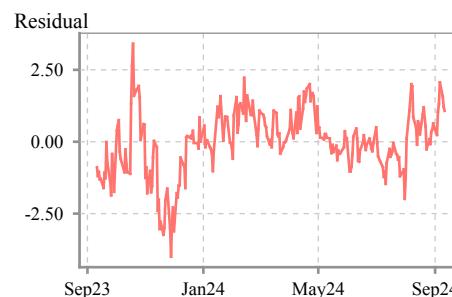
	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		
5Y10Y30Y 5YF	62.3	41.0	9.1	1.1	2.2	21.6	1.0		5Y15Y30Y 5YF	38.5	64.1	15.6	1.0	2.1	21.0	1.0	2Y10Y30Y 5YF	35.1	71.8	7.1	1.4	1.7	26.2	1.2		2Y5Y30Y 1YF	52.8	52.3	-16.8	1.6	1.3	-1.9	1.0



	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		
3Y5Y10Y Spot	54.5	46.5	-11.2	1.2	1.3	-7.6	0.8		2Y10Y30Y 1YF	22.8	84.8	-15.3	1.2	1.2	14.5	1.1	2Y5Y30Y Spot	57.3	50.6	-42.3	3.5	1.2	-15.2	1.1		2Y10Y30Y Spot	25.9	82.6	-30.3	2.2	1.1	-10.7	1.2



	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		Wt1	Wt2	CLsp	Res	Z	Sprd	MRev		
2Y5Y15Y 1YF	46.5	54.8	-14.0	1.1	1.1	-8.5	0.9		2Y5Y10Y Spot	39.9	63.0	-24.1	1.9	1.1	-17.2	0.9	3Y7Y15Y Spot	39.5	62.7	-19.1	1.2	1.0	-11.6	1.0		2Y5Y15Y Spot	49.9	54.2	-34.8	2.6	1.0	-21.4	0.9



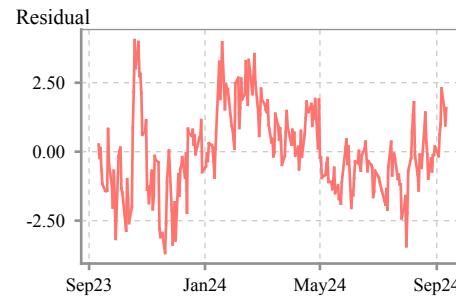
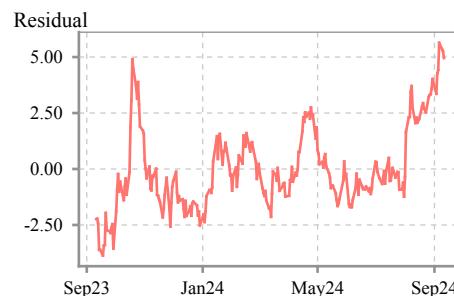
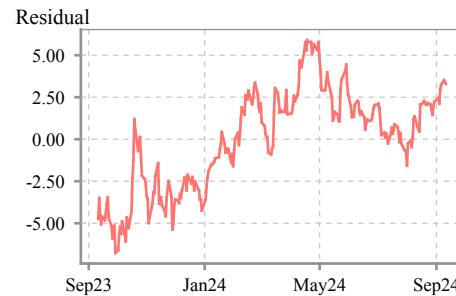
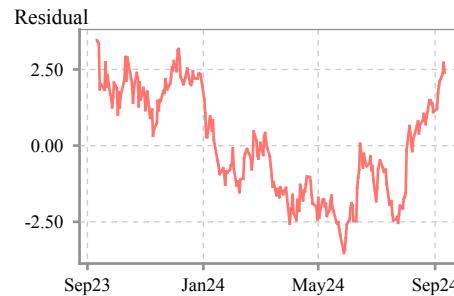
Note:

1. The most mispriced butterflies are the curve- and level-neutral structures that have the greatest z-scores (in absolute values)
2. CrvlSpd refers to the current value of the curve- and level-neutral spread. Wt1 and Wt2 refer to the curve- and level-neutral weightings in the short and long legs of the butterfly.
3. The expected time to mean reversion assumes that the residual will converge to the mean in three eights (i.e., average of half and a quarter) of the peak-to-peak period; and the period is reported in months.

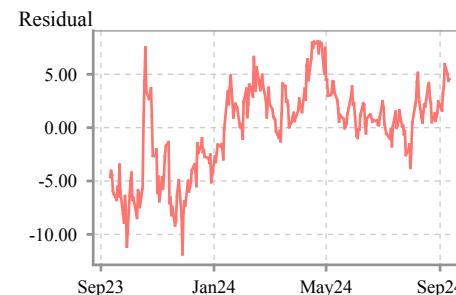
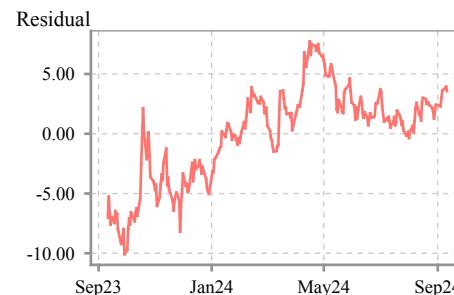
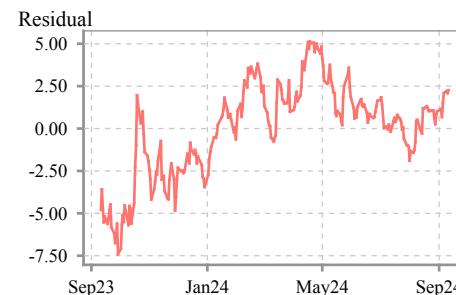
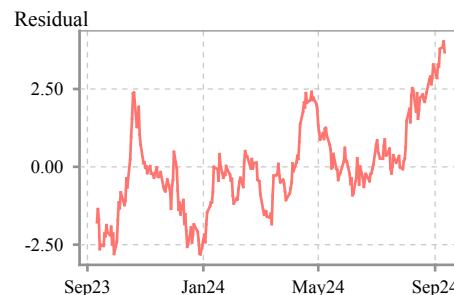
Derivatives Strategy

Most Mispriced SOFR Butterflies II – spot and fwd

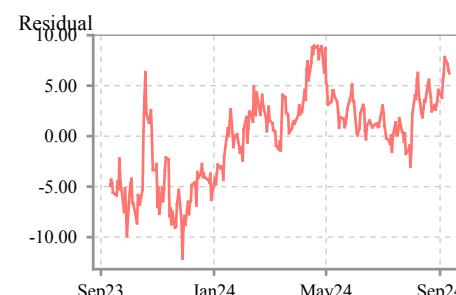
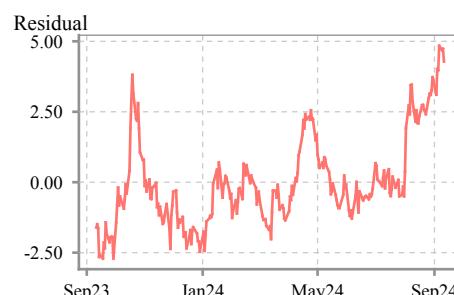
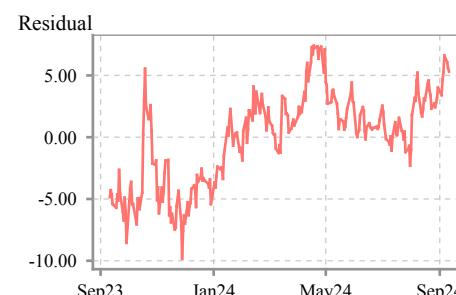
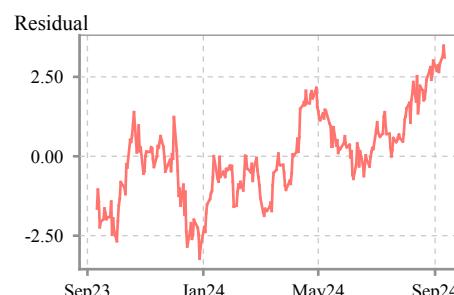
Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev				
15Y/10Yx10Y/30Y	-144.5	254.0	14.4	2.4	1.9	20.5	1.3	3Y/3Yx1Y/4Yx1Y	24.1	75.8	-14.5	3.3	1.9	-20.6	1.1	3Yx1Y/10Yx10Y/30Y	-56.6	159.3	5.6	5.0	1.9	37.7	1.1	2Yx1Y/3Yx1Y/5Yx5Y	55.3	44.6	-9.0	1.6	1.8	-11.6	0.7



Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev				
2Yx2Y/10Yx10Y/30Y	-40.1	1141.7	10.8	3.7	1.8	39.7	1.1	1Yx1Y/3Yx1Y/4Yx1Y	20.0	76.1	5.7	2.3	1.8	-1.1	1.1	1Yx1Y/2Yx2Y/4Yx1Y	36.3	59.5	5.1	3.6	1.8	-5.3	0.9	1Yx1Y/3Yx1Y/5Yx5Y	32.5	64.8	-10.1	4.5	1.7	-12.3	0.8



Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev	Wt1	Wt2	CLsp	Res	Z	Sprd	MRev				
2Yx1Y/10Yx10Y/30Y	-30.3	1313.1	14.3	3.1	1.7	41.8	1.0	1Yx1Y/3Yx1Y/10Y	0.2	101.5	-31.2	5.3	1.7	-9.7	1.0	2Yx3Y/10Yx10Y/30Y	-52.5	155.7	5.0	4.3	1.7	37.6	1.1	3Y/3Yx1Y/5Yx5Y	40.0	63.1	-41.7	6.2	1.7	-31.8	0.9



Note:

- The most mispriced butterflies are the curve- and level-neutral structures that have the greatest z-scores (in absolute values)
- CrvlSpd refers to the current value of the curve- and level-neutral spread. Wt1 and Wt2 refer to the curve- and level-neutral weightings in the short and long legs of the butterfly.
- The expected time to mean reversion assumes that the residual will converge to the mean in three eights (i.e., average of half and a quarter) of the peak-to-peak period; and the period is reported in months.

Derivatives Strategy

SOFR Future Butterfly Spreads - Curve and Level Neutral Analysis

Price	3 - Month						6 - Month						9 - Month						12 - Month						
	Wt1	Wt2	CrvSprd	Res	Z	Carry	Wt1	Wt2	CrvSprd	Res	Z	Carry	Wt1	Wt2	CrvSprd	Res	Z	Carry	Wt1	Wt2	CrvSprd	Res	Z	Carry	
Sep24	95.052	69.3	51.9	-108.2	0.0	0.0	42.47	115.6	56.8	-389.9	-9.6	-3.6	53.47	143.1	63.7	-576.7	-11.4	-3.4	31.07	118.9	80.0	-521.0	-8.5	-2.2	15.30
Dec24	95.850	61.6	49.5	-61.5	-4.4	-4.3	-0.47	76.3	50.9	-151.3	-8.0	-3.6	-27.19	66.0	65.7	-165.5	-5.1	-1.7	-34.93	42.4	87.5	-140.6	-1.4	-0.3	-23.11
Mar25	96.525	58.2	47.0	-29.9	-2.0	-2.6	-9.76	53.3	57.6	-54.7	-0.5	-0.3	-19.99	36.4	78.0	-62.1	1.5	0.4	-14.89	18.8	99.8	-70.8	2.8	0.4	-6.71
Jun25	96.905	49.4	53.3	-12.0	0.5	0.8	-5.28	37.9	68.1	-24.1	1.6	0.7	-6.23	21.2	90.1	-41.1	2.7	0.6	-2.31	13.5	101.0	-54.1	2.9	0.5	-1.60
Sep25	97.085	43.1	58.2	-5.2	0.5	0.6	-1.29	29.0	76.0	-18.1	1.9	0.7	-0.58	20.1	88.3	-31.5	3.0	0.6	-0.90	21.0	86.5	-32.9	2.7	0.5	-2.68
Dec25	97.170	39.0	62.2	-4.4	0.6	0.7	-0.13	30.9	72.3	-13.0	2.0	0.7	-0.32	30.8	72.0	-14.4	2.1	0.6	-1.96	32.5	68.4	-10.5	2.1	0.6	-3.21
Mar26	97.205	41.8	58.8	-2.7	0.7	0.9	-0.08	40.6	59.8	-3.7	1.2	0.7	-1.43	38.4	61.7	-4.1	0.8	0.4	-1.99	36.7	62.3	-2.8	0.4	0.3	-1.61
Jun26	97.210	46.8	53.1	-0.4	0.2	0.4	-0.41	42.2	57.7	-1.4	0.1	0.1	-0.98	39.4	60.3	-2.1	-0.1	-0.1	-0.89	37.4	61.5	-1.2	0.1	0.1	-1.03
Sep26	97.195	45.5	54.5	-0.4	0.1	0.4	-0.45	41.6	58.6	-2.0	-0.4	-0.8	-0.12	39.9	59.7	-1.2	0.0	0.0	-0.31	38.6	59.7	1.0	0.1	0.1	-0.33
Dec26	97.170	45.6	54.4	-0.5	-0.3	-1.4	0.27	43.6	56.3	-0.6	0.2	0.5	-0.22	41.8	57.1	1.1	0.0	0.1	0.04	40.5	57.5	2.2	0.0	0.0	0.31
Mar27	97.145	46.3	53.8	-0.5	0.1	0.9	-0.23	45.0	54.3	1.1	0.2	0.6	0.03	43.1	55.7	1.5	0.0	0.0	0.03	42.1	56.0	2.3	0.3	0.3	0.07
Jun27	97.115	48.9	50.8	0.9	0.1	0.9	-0.01	45.1	54.3	0.8	-0.3	-0.6	0.25	45.3	53.5	2.2	0.2	0.3	0.00	41.4	57.1	0.8	0.4	0.4	0.03

Note:

1. Wt1 and Wt2 refer to the curve- and level-neutral weightings in the front and back legs of the butterfly. Wt1=40 and Wt2=55 mean that for every 100 middle-leg contracts we sell, we buy 40 front-leg contracts and 55 contracts.
2. CrvSprd refers to the current value of the curve- and level-neutral butterfly spread, i.e. body - Wt1 * short wing - Wt2 * long wing.
3. Res refers to the mispricing of the curve- and level neutral butterfly, is based on a model of the butterfly spread and is calculated on a turn adjusted basis. Z refers to the z-score of the residual.
4. Wt1 and Wt2 are estimated through a multiple regression using 1-year of historical data.
5. Carry is 3-month carry + slide and is presented in basis points of yield. Front contract carry is estimated via 3M Libor carry + slide

Derivatives Strategy

SOFR Futures Butterfly Carry Report

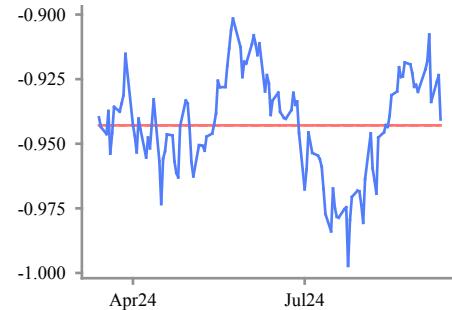
Structure	Trade	Left Wt	Belly Wt	Right Wt	Rsq	Wtd Fly Cur (%)	Wtd Fly Mean (%)	Resid (bp)	Wtd Fly Aged 3M (%)	Wtd Fly 3M Carry (bp)	Rlzd Vol Ann.	Risk Adj Ann. Carry
6Mx3M/9Mx3M/33Mx3M	Belly richening	-0.91	1.00	-0.30	98%	-0.94	-0.94	0.23	-1.1	20.8	19	4.5
6Mx3M/9Mx3M/30Mx3M	Belly richening	-0.90	1.00	-0.30	98%	-0.89	-0.89	0.15	-1.1	20.1	18	4.5
6Mx3M/9Mx3M/36Mx3M	Belly richening	-0.92	1.00	-0.30	99%	-0.99	-0.99	0.24	-1.2	21.3	19	4.4
6Mx3M/12Mx3M/33Mx3M	Belly richening	-0.68	1.00	-0.60	97%	-1.19	-1.20	0.40	-1.4	26.1	30	3.5
6Mx3M/12Mx3M/30Mx3M	Belly richening	-0.66	1.00	-0.60	97%	-1.09	-1.09	0.24	-1.3	24.8	29	3.5
6Mx3M/12Mx3M/36Mx3M	Belly richening	-0.70	1.00	-0.61	97%	-1.29	-1.29	0.43	-1.6	27.1	32	3.4
6Mx3M/15Mx3M/30Mx3M	Belly richening	-0.47	1.00	-0.77	94%	-1.00	-1.01	1.15	-1.2	21.8	27	3.3
6Mx3M/15Mx3M/33Mx3M	Belly richening	-0.50	1.00	-0.77	94%	-1.14	-1.15	1.36	-1.4	23.4	29	3.2
6Mx3M/15Mx3M/27Mx3M	Belly richening	-0.44	1.00	-0.77	94%	-0.86	-0.87	0.70	-1.1	19.1	24	3.2
6Mx3M/15Mx3M/36Mx3M	Belly richening	-0.52	1.00	-0.79	95%	-1.26	-1.27	1.41	-1.5	24.6	32	3.1
6Mx3M/15Mx3M/24Mx3M	Belly richening	-0.38	1.00	-0.79	94%	-0.70	-0.71	0.46	-0.9	16.2	21	3.1
6Mx3M/15Mx3M/21Mx3M	Belly richening	-0.30	1.00	-0.82	95%	-0.52	-0.52	0.20	-0.7	12.5	17	2.9
6Mx3M/18Mx3M/21Mx3M	Belly richening	-0.13	1.00	-0.93	97%	-0.25	-0.25	0.05	-0.3	5.9	8	2.9
6Mx3M/18Mx3M/24Mx3M	Belly richening	-0.21	1.00	-0.89	92%	-0.45	-0.46	0.32	-0.6	10.0	14	2.9
6Mx3M/18Mx3M/30Mx3M	Belly richening	-0.32	1.00	-0.87	88%	-0.79	-0.80	1.11	-0.9	16.3	23	2.8
6Mx3M/18Mx3M/27Mx3M	Belly richening	-0.27	1.00	-0.88	89%	-0.63	-0.64	0.60	-0.8	13.3	19	2.8
6Mx3M/18Mx3M/33Mx3M	Belly richening	-0.35	1.00	-0.88	89%	-0.95	-0.96	1.36	-1.1	18.0	27	2.7
6Mx3M/15Mx3M/18Mx3M	Belly richening	-0.19	1.00	-0.89	97%	-0.30	-0.30	0.11	-0.4	7.0	11	2.6
9Mx3M/12Mx3M/36Mx3M	Belly richening	-0.77	1.00	-0.36	98%	-0.51	-0.52	0.35	-0.6	11.6	18	2.6
9Mx3M/12Mx3M/33Mx3M	Belly richening	-0.76	1.00	-0.36	98%	-0.47	-0.47	0.32	-0.6	11.2	17	2.6
6Mx3M/18Mx3M/36Mx3M	Belly richening	-0.37	1.00	-0.90	89%	-1.09	-1.10	1.41	-1.3	19.4	30	2.5
9Mx3M/12Mx3M/30Mx3M	Belly richening	-0.75	1.00	-0.36	98%	-0.42	-0.42	0.22	-0.5	10.7	17	2.5
9Mx3M/12Mx3M/27Mx3M	Belly richening	-0.72	1.00	-0.37	98%	-0.37	-0.37	0.01	-0.5	9.7	16	2.4
6Mx3M/21Mx3M/30Mx3M	Belly richening	-0.20	1.00	-0.94	87%	-0.58	-0.59	1.04	-0.7	10.6	18	2.3
9Mx3M/15Mx3M/30Mx3M	Belly richening	-0.54	1.00	-0.59	92%	-0.51	-0.53	1.19	-0.6	11.9	20	2.3
9Mx3M/15Mx3M/33Mx3M	Belly richening	-0.57	1.00	-0.58	93%	-0.60	-0.61	1.36	-0.7	12.7	22	2.3
6Mx3M/21Mx3M/27Mx3M	Belly richening	-0.15	1.00	-0.94	91%	-0.41	-0.41	0.50	-0.5	7.5	13	2.3
9Mx3M/15Mx3M/24Mx3M	Belly richening	-0.46	1.00	-0.63	88%	-0.35	-0.36	0.62	-0.4	8.9	16	2.3
9Mx3M/15Mx3M/27Mx3M	Belly richening	-0.51	1.00	-0.60	90%	-0.44	-0.45	0.83	-0.5	10.4	18	2.3
9Mx3M/15Mx3M/36Mx3M	Belly richening	-0.58	1.00	-0.59	94%	-0.67	-0.69	1.41	-0.8	13.4	24	2.3
9Mx3M/15Mx3M/21Mx3M	Belly richening	-0.38	1.00	-0.69	86%	-0.26	-0.26	0.37	-0.3	7.0	13	2.2
9Mx3M/18Mx3M/21Mx3M	Belly richening	-0.16	1.00	-0.88	97%	-0.14	-0.14	0.14	-0.2	3.7	7	2.1
9Mx3M/18Mx3M/24Mx3M	Belly richening	-0.26	1.00	-0.81	84%	-0.26	-0.26	0.44	-0.3	5.9	12	2.0
9Mx3M/15Mx3M/18Mx3M	Belly richening	-0.25	1.00	-0.79	92%	-0.15	-0.16	0.24	-0.2	4.0	8	2.0
9Mx3M/18Mx3M/33Mx3M	Belly richening	-0.40	1.00	-0.75	74%	-0.57	-0.58	1.39	-0.7	10.7	23	1.8

Note: 3M SOFR futures are proxied via SOFR swap yields. To calculate the weights, a 6M empirical regression is used of the 50/50 weighted fly regressed against the belly rate and the difference in the wing rates so that the weights are constructed to be "level" and "curve" neutral: left weight = $(0.5 \cdot \text{beta_curve}) / (1 - \text{beta_level})$ and right weight = $(0.5 + \text{beta_curve}) / (1 - \text{beta_level})$, where beta_level and beta_curve are calculated from the 6M regression described previously. The residual is the difference of the weighted spread with the 6M avg of the weighted spread. The trade will be a belly cheapener if the residual is less than 0 and a belly richener otherwise. Realized vol is calculated as the 2 year standard deviation of quarterly changes in the weighted spread, and multiplied by sqrt(4) to annualize. Risk adjusted ann. carry is the 3M slide in the weighted spread divided by the realized vol and table is sorted by highest risk adjusted ann. carry.

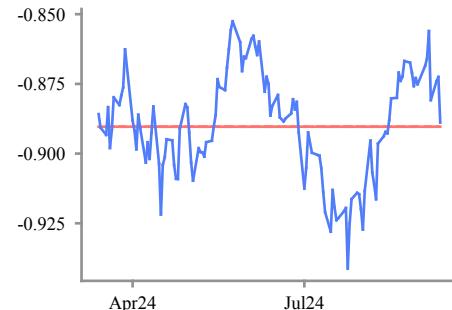
Derivatives Strategy

SOFR Futures Butterfly Carry Report

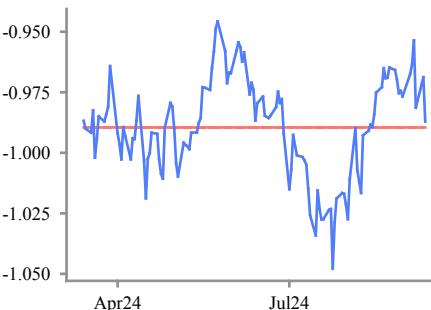
9Mx3M-0.91*6Mx3M-0.3*33Mx3M vs. 6M Avg; %



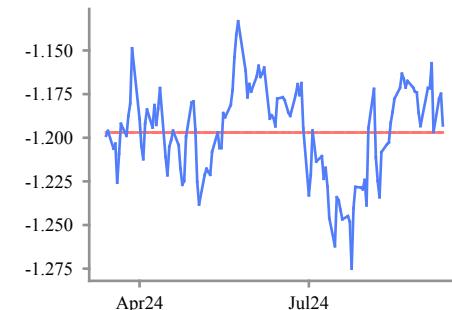
9Mx3M-0.91*6Mx3M-0.3*33Mx3M vs. 6M Avg; %



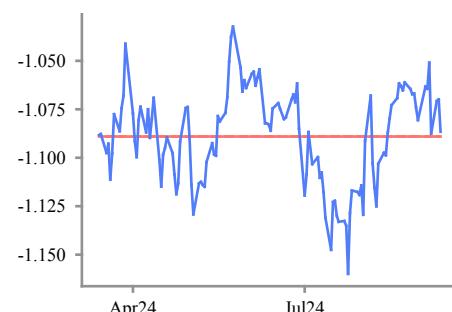
9Mx3M-0.92*6Mx3M-0.3*36Mx3M vs. 6M Avg; %



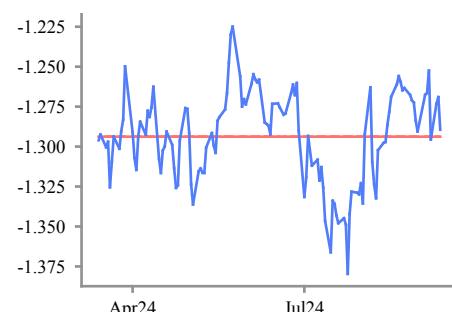
12Mx3M-0.68*6Mx3M-0.6*33Mx3M vs. 6M Avg; %



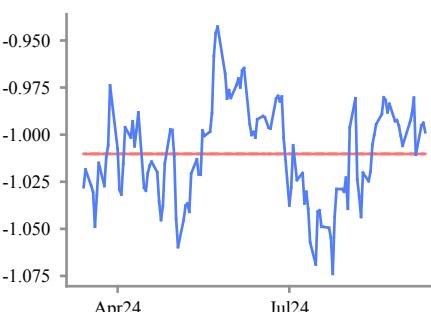
12Mx3M-0.66*6Mx3M-0.6*30Mx3M vs. 6M Avg; %



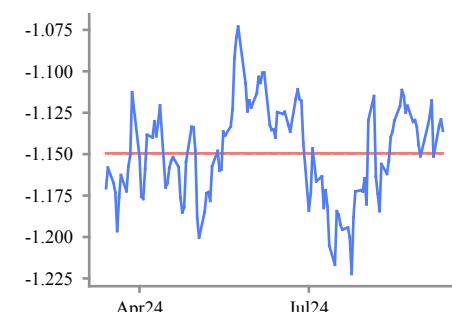
12Mx3M-0.7*6Mx3M-0.61*36Mx3M vs. 6M Avg; %



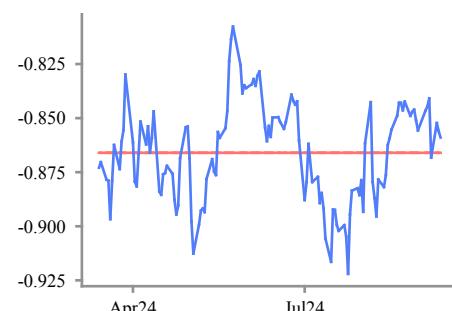
15Mx3M-0.47*6Mx3M-0.77*30Mx3M vs. 6M Avg; %



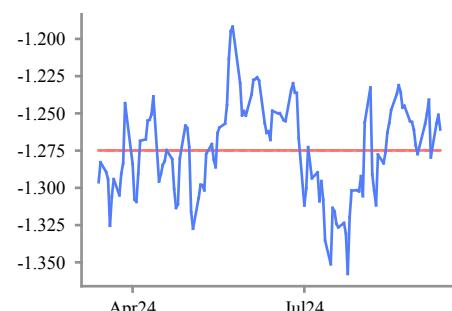
15Mx3M-0.5*6Mx3M-0.77*33Mx3M vs. 6M Avg; %



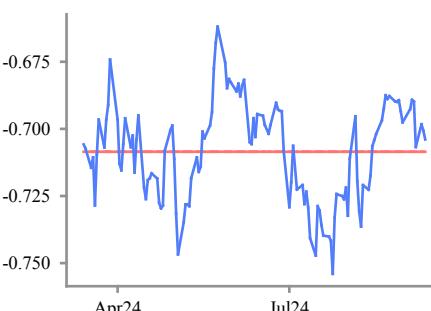
15Mx3M-0.44*6Mx3M-0.77*27Mx3M vs. 6M Avg; %



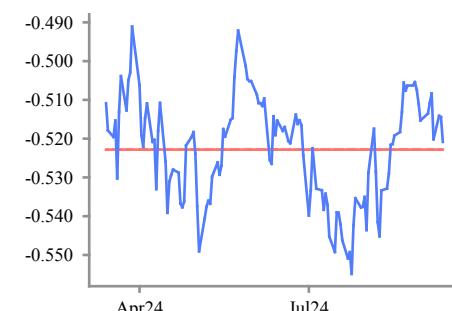
15Mx3M-0.52*6Mx3M-0.79*36Mx3M vs. 6M Avg; %



15Mx3M-0.38*6Mx3M-0.79*24Mx3M vs. 6M Avg; %



15Mx3M-0.3*6Mx3M-0.82*21Mx3M vs. 6M Avg; %



Note: 3M SOFR futures are proxied via SOFR swap yields. To calculate the weights, a 6M empirical regression is used of the 50/50 weighted fly regressed against the belly rate and the difference in the wing rates so that the weights are constructed to be "level" and "curve" neutral: left weight = $(0.5 \cdot \text{beta_curve}) / (1 \cdot \text{beta_level})$ and right weight = $(0.5 + \text{beta_curve}) / (1 - \text{beta_level})$, where beta_level and beta_curve are calculated from the 6M regression described previously. The residual is the difference of the weighted spread with the 6M avg of the weighted spread. The trade will be a belly cheapener if the residual is less than 0 and a belly richener otherwise. Realized vol is calculated as the 2 year standard deviation of quarterly changes in the weighted spread, and multiplied by sqrt(4) to annualize. Risk adjusted ann. carry is the 3M slide in the weighted spread divided by the realized vol and table is sorted by highest risk adjusted ann. carry.

Derivatives Strategy

SOFR Futures Box Trades Carry Report

Curve 1	Curve 2	Curve 1 Trade	Curve 2 Trade (Hedge)	Curve 1 Cur	Curve 2 Cur	Wtd Spread Cur.	Curve2 Rsk Wt	Residual (%)	Rsq	3M Carry Curve1 (bp)	3M Wtd Carry Curve2 (bp)	3M Net Carry (bp)	Rlzd Vol Ann	Risk Adj Ann. Carry
9Mx3M-6Mx3M	36Mx3M-24Mx3M	flattener	flattener	-0.41	0.08	0.36	-0.65	0.01	77%	27.4	-0.8	26.6	21	5.0
9Mx3M-6Mx3M	36Mx3M-27Mx3M	flattener	flattener	-0.41	0.06	0.35	-0.93	0.01	80%	27.4	-0.2	27.1	22	5.0
9Mx3M-6Mx3M	33Mx3M-24Mx3M	flattener	flattener	-0.41	0.06	0.36	-0.81	0.00	75%	27.4	-1.1	26.3	21	5.0
9Mx3M-6Mx3M	36Mx3M-21Mx3M	flattener	flattener	-0.41	0.09	0.37	-0.48	0.01	74%	27.4	-1.6	25.8	21	4.9
9Mx3M-6Mx3M	33Mx3M-21Mx3M	flattener	flattener	-0.41	0.07	0.37	-0.56	0.00	72%	27.4	-1.9	25.5	21	4.8
9Mx3M-6Mx3M	30Mx3M-21Mx3M	flattener	flattener	-0.41	0.04	0.38	-0.69	0.00	69%	27.4	-2.0	25.3	22	4.7
36Mx3M-6Mx3M	33Mx3M-12Mx3M	flattener	steepener	-0.65	-0.08	0.58	0.90	0.01	89%	70.2	-19.2	51.0	45	4.5
9Mx3M-6Mx3M	36Mx3M-18Mx3M	flattener	flattener	-0.41	0.07	0.38	-0.37	0.01	71%	27.4	-2.2	25.2	22	4.5
9Mx3M-6Mx3M	27Mx3M-21Mx3M	flattener	flattener	-0.41	0.03	0.38	-0.96	0.00	66%	27.4	-2.9	24.4	22	4.4
9Mx3M-6Mx3M	33Mx3M-18Mx3M	flattener	flattener	-0.41	0.05	0.39	-0.41	0.00	69%	27.4	-2.5	24.9	23	4.4
9Mx3M-6Mx3M	30Mx3M-18Mx3M	flattener	flattener	-0.41	0.03	0.39	-0.48	0.00	66%	27.4	-2.6	24.7	24	4.2
33Mx3M-6Mx3M	36Mx3M-12Mx3M	flattener	steepener	-0.67	-0.05	0.63	0.75	0.01	83%	70.3	-15.9	54.4	53	4.1
30Mx3M-6Mx3M	33Mx3M-12Mx3M	flattener	steepener	-0.70	-0.08	0.64	0.72	0.01	79%	69.8	-15.3	54.5	54	4.0
27Mx3M-6Mx3M	30Mx3M-12Mx3M	flattener	steepener	-0.71	-0.10	0.65	0.69	0.00	74%	69.9	-14.4	55.5	55	4.0
9Mx3M-6Mx3M	36Mx3M-15Mx3M	flattener	flattener	-0.41	0.04	0.40	-0.29	0.01	68%	27.4	-3.2	24.1	25	3.9
9Mx3M-6Mx3M	27Mx3M-18Mx3M	flattener	flattener	-0.41	0.01	0.40	-0.59	0.00	63%	27.4	-3.3	24.1	25	3.9
30Mx3M-6Mx3M	36Mx3M-12Mx3M	flattener	steepener	-0.70	-0.05	0.66	0.65	0.01	77%	69.8	-13.9	56.0	57	3.9
27Mx3M-6Mx3M	33Mx3M-12Mx3M	flattener	steepener	-0.71	-0.08	0.67	0.61	0.01	71%	69.9	-13.0	57.0	59	3.8
9Mx3M-6Mx3M	33Mx3M-15Mx3M	flattener	flattener	-0.41	0.02	0.40	-0.31	0.00	66%	27.4	-3.5	23.8	25	3.8
27Mx3M-6Mx3M	36Mx3M-12Mx3M	flattener	steepener	-0.71	-0.05	0.68	0.55	0.02	68%	69.9	-11.7	58.2	63	3.7
24Mx3M-6Mx3M	30Mx3M-12Mx3M	flattener	steepener	-0.73	-0.10	0.68	0.56	0.01	61%	69.0	-11.6	57.4	62	3.7
33Mx3M-6Mx3M	36Mx3M-15Mx3M	flattener	steepener	-0.67	0.04	0.71	0.85	0.03	78%	70.3	-9.5	60.8	67	3.6
30Mx3M-6Mx3M	33Mx3M-15Mx3M	flattener	steepener	-0.70	0.02	0.71	0.82	0.03	73%	69.8	-9.3	60.5	67	3.6
27Mx3M-6Mx3M	30Mx3M-15Mx3M	flattener	steepener	-0.71	-0.01	0.71	0.80	0.03	67%	69.9	-8.7	61.2	68	3.6
24Mx3M-6Mx3M	33Mx3M-12Mx3M	flattener	steepener	-0.73	-0.08	0.69	0.49	0.01	58%	69.0	-10.4	58.6	65	3.6
9Mx3M-6Mx3M	30Mx3M-15Mx3M	flattener	flattener	-0.41	-0.01	0.41	-0.35	0.00	63%	27.4	-3.8	23.6	26	3.6
24Mx3M-6Mx3M	27Mx3M-15Mx3M	flattener	steepener	-0.73	-0.02	0.71	0.77	0.02	57%	69.0	-8.4	60.5	69	3.5
30Mx3M-6Mx3M	36Mx3M-15Mx3M	flattener	steepener	-0.70	0.04	0.72	0.74	0.03	71%	69.8	-8.3	61.6	70	3.5
24Mx3M-6Mx3M	36Mx3M-12Mx3M	flattener	steepener	-0.73	-0.05	0.71	0.44	0.02	55%	69.0	-9.3	59.7	68	3.5
27Mx3M-6Mx3M	33Mx3M-15Mx3M	flattener	steepener	-0.71	0.02	0.72	0.69	0.03	64%	69.9	-7.8	62.1	71	3.5
24Mx3M-6Mx3M	30Mx3M-15Mx3M	flattener	steepener	-0.73	-0.01	0.73	0.64	0.03	54%	69.0	-6.9	62.0	72	3.4
27Mx3M-6Mx3M	36Mx3M-15Mx3M	flattener	steepener	-0.71	0.04	0.74	0.61	0.04	61%	69.9	-6.9	63.0	73	3.4
24Mx3M-6Mx3M	33Mx3M-15Mx3M	flattener	steepener	-0.73	0.02	0.74	0.54	0.03	51%	69.0	-6.2	62.8	75	3.4
9Mx3M-6Mx3M	27Mx3M-15Mx3M	flattener	flattener	-0.41	-0.02	0.42	-0.40	0.00	61%	27.4	-4.4	23.0	28	3.3
27Mx3M-6Mx3M	33Mx3M-18Mx3M	flattener	steepener	-0.71	0.05	0.76	0.85	0.05	59%	69.9	-5.1	64.8	80	3.2

Note: 3M SOFR futures are proxied via SOFR swap yields. This construction is designed to be a well hedged box trade that offers attractive risk adjusted carry. One reference leg curve is regressed against the other and that other curve is risk weighted based on this 6M empirical regression to serve as the hedge for the reference curve. The direction of the reference curve depends on the residual of the regression while the direction of the hedge curve depends on the residual of the regression as well as the regression beta. Realized vol is calculated as the 2 year standard deviation of quarterly changes in the weighted spread, and multiplied by sqrt(4) to annualize. Risk adjusted ann. carry is the 3M slide in the weighted spread divided by the realized vol and table is sorted by highest risk adjusted ann. carry.

Derivatives Strategy

Swap Curve Butterfly Carry Report

Structure	Trade	Left Wt	Belly Wt	Right Wt	Rsq	Wtd Fly Cur (%)	Wtd Fly Mean (%)	Resid (bp)	Wtd Fly Aged 3M (%)	Wtd Fly 3M Carry (bp)	Rlzd Vol Ann.	Risk Adj Ann. Carry
3Mx2Y/3Mx5Y/3Mx30Y	Belly richening	-0.50	1.00	-0.62	71%	-0.46	-0.49	3.09	-0.5	5.4	16	1.4
3Mx2Y/3Mx3Y/3Mx30Y	Belly richening	-0.79	1.00	-0.29	98%	-0.32	-0.34	2.43	-0.4	4.5	12	1.5
3Mx2Y/3Mx3Y/3Mx20Y	Belly richening	-0.76	1.00	-0.31	98%	-0.35	-0.37	2.13	-0.4	4.0	11	1.4
3Mx2Y/3Mx10Y/3Mx30Y	Belly richening	-0.23	1.00	-0.86	94%	-0.25	-0.27	2.12	-0.3	3.9	12	1.3
3Mx2Y/3Mx7Y/3Mx20Y	Belly richening	-0.30	1.00	-0.79	83%	-0.43	-0.45	2.10	-0.5	3.7	12	1.3
3Mx2Y/3Mx3Y/3Mx15Y	Belly richening	-0.74	1.00	-0.33	98%	-0.33	-0.35	1.91	-0.4	3.5	10	1.3
6Mx2Y/6Mx10Y/6Mx30Y	Belly richening	-0.23	1.00	-0.83	96%	-0.15	-0.17	1.82	-0.2	3.0	11	1.1
6Mx2Y/6Mx3Y/6Mx30Y	Belly richening	-0.79	1.00	-0.26	98%	-0.20	-0.22	2.03	-0.2	2.9	10	1.2
3Mx3Y/3Mx10Y/3Mx30Y	Belly richening	-0.30	1.00	-0.75	91%	-0.11	-0.13	1.41	-0.1	2.8	9	1.2
3Mx3Y/3Mx5Y/3Mx30Y	Belly richening	-0.66	1.00	-0.39	95%	-0.19	-0.20	1.47	-0.2	2.8	8	1.3
3Mx2Y/3Mx3Y/3Mx10Y	Belly richening	-0.69	1.00	-0.37	97%	-0.27	-0.29	1.66	-0.3	2.7	9	1.2
6Mx2Y/6Mx7Y/6Mx20Y	Belly richening	-0.31	1.00	-0.76	89%	-0.33	-0.34	1.77	-0.3	2.7	10	1.1
3Mx2Y/3Mx7Y/3Mx15Y	Belly richening	-0.25	1.00	-0.82	93%	-0.36	-0.38	1.55	-0.4	2.7	9	1.2
9Mx2Y/9Mx7Y/9Mx30Y	Belly richening	-0.37	1.00	-0.69	72%	-0.17	-0.19	2.11	-0.2	2.7	11	0.9
3Mx2Y/3Mx10Y/3Mx20Y	Belly richening	-0.17	1.00	-0.89	98%	-0.28	-0.29	1.23	-0.3	2.6	8	1.3
3Mx2Y/3Mx15Y/3Mx30Y	Belly richening	-0.12	1.00	-0.94	99%	-0.07	-0.08	1.58	-0.1	2.5	8	1.2
6Mx2Y/6Mx3Y/6Mx20Y	Belly richening	-0.76	1.00	-0.28	98%	-0.23	-0.25	1.79	-0.3	2.5	9	1.1
9Mx2Y/9Mx10Y/9Mx30Y	Belly richening	-0.24	1.00	-0.81	96%	-0.08	-0.09	1.62	-0.1	2.4	10	0.9
6Mx3Y/6Mx10Y/6Mx30Y	Belly richening	-0.31	1.00	-0.73	93%	-0.05	-0.07	1.20	-0.1	2.3	9	1.0
3Mx3Y/3Mx5Y/3Mx20Y	Belly richening	-0.62	1.00	-0.42	93%	-0.23	-0.24	1.15	-0.2	2.3	7	1.3
3Mx2Y/3Mx5Y/3Mx10Y	Belly richening	-0.32	1.00	-0.74	79%	-0.30	-0.32	1.49	-0.3	2.2	9	1.0
6Mx2Y/6Mx3Y/6Mx15Y	Belly richening	-0.74	1.00	-0.30	98%	-0.23	-0.24	1.62	-0.2	2.2	8	1.0
6Mx3Y/6Mx5Y/6Mx30Y	Belly richening	-0.66	1.00	-0.37	95%	-0.13	-0.14	1.21	-0.1	2.1	8	1.1
3Mx2Y/3Mx3Y/3Mx7Y	Belly richening	-0.62	1.00	-0.43	96%	-0.20	-0.21	1.23	-0.2	2.1	7	1.1
6Mx2Y/6Mx10Y/6Mx20Y	Belly richening	-0.17	1.00	-0.87	99%	-0.21	-0.22	1.05	-0.2	2.1	7	1.1
9Mx2Y/9Mx7Y/9Mx20Y	Belly richening	-0.32	1.00	-0.73	90%	-0.25	-0.26	1.51	-0.3	2.0	9	0.9
6Mx2Y/6Mx15Y/6Mx30Y	Belly richening	-0.12	1.00	-0.92	99%	-0.01	-0.02	1.42	0.0	2.0	8	1.0
3Mx3Y/3Mx15Y/3Mx30Y	Belly richening	-0.16	1.00	-0.88	99%	0.01	0.00	1.23	0.0	2.0	7	1.1
12Mx2Y/12Mx7Y/12Mx30Y	Belly richening	-0.39	1.00	-0.65	72%	-0.09	-0.11	1.66	-0.1	1.9	10	0.8
6Mx2Y/6Mx7Y/6Mx15Y	Belly richening	-0.26	1.00	-0.79	96%	-0.28	-0.29	1.30	-0.3	1.9	8	1.0
3Mx3Y/3Mx10Y/3Mx20Y	Belly richening	-0.23	1.00	-0.80	98%	-0.18	-0.18	0.77	-0.2	1.9	6	1.2
12Mx2Y/12Mx10Y/12Mx30Y	Belly richening	-0.25	1.00	-0.78	96%	-0.02	-0.03	1.33	0.0	1.9	10	0.8
9Mx3Y/9Mx10Y/9Mx30Y	Belly richening	-0.32	1.00	-0.71	93%	-0.01	-0.02	1.07	0.0	1.9	9	0.9
9Mx2Y/9Mx3Y/9Mx30Y	Belly richening	-0.79	1.00	-0.23	99%	-0.12	-0.13	1.68	-0.1	1.9	8	1.0
3Mx3Y/3Mx5Y/3Mx15Y	Belly richening	-0.58	1.00	-0.46	91%	-0.21	-0.22	0.92	-0.2	1.8	6	1.2

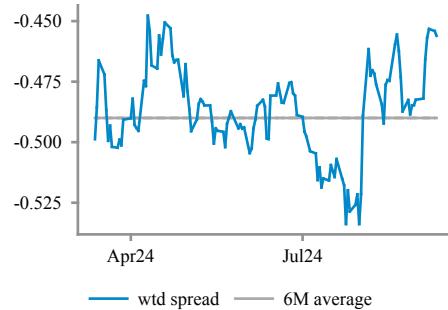
* To calculate the weights, a 6M empirical regression is used of the 50/50 weighted fly regressed against the belly rate and the difference in the wing rates so that the weights are constructed to be "level" and "curve" neutral: left weight = $(0.5 \cdot \text{beta_curve}) / (1 - \text{beta_level})$ and right weight = $(0.5 \cdot \text{beta_curve}) / (1 - \text{beta_level})$, where beta_level and beta_curve are calculated from the 6M regression described previously.

** The residual is the difference of the weighted spread with the 6M avg of the weighted spread. The trade will be a belly cheapener if the residual is less than 0 and a belly richener otherwise. Realized vol is calculated as the 2 year standard deviation of quarterly changes in the weighted spread, and multiplied by sqrt(4) to annualize. Risk-adjusted ann. carry is the 3M slide in the weighted spread divided by the realized vol and table is sorted by highest Wtd Fly 3M Carry.

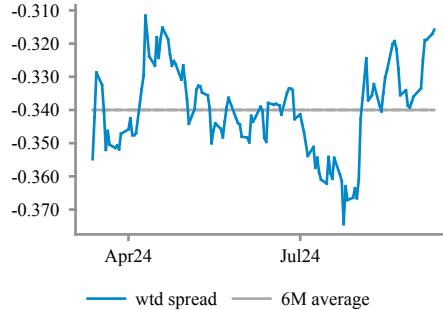
Derivatives Strategy

Swap Curve Butterfly Carry Report

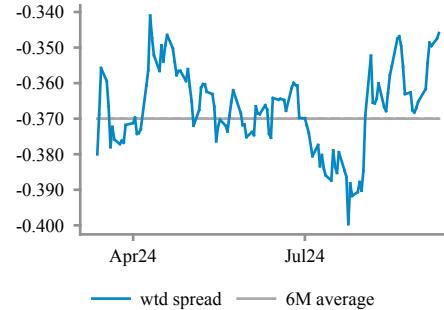
3Mx5Y-0.5*3Mx2Y-0.62*3Mx30Y vs. 6M Avg; %



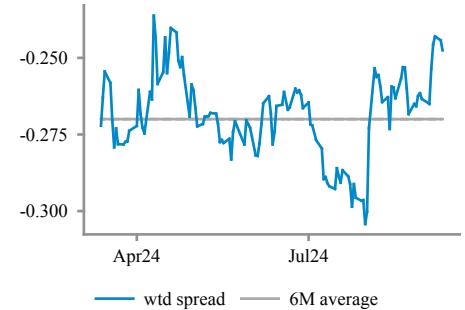
3Mx3Y-0.79*3Mx2Y-0.29*3Mx30Y vs. 6M Avg; %



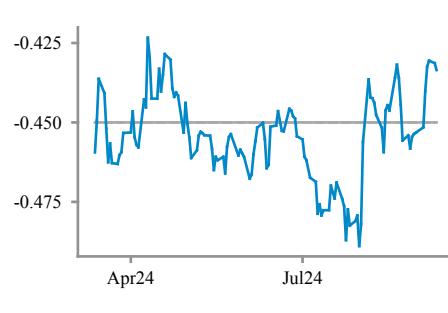
3Mx3Y-0.76*3Mx2Y-0.31*3Mx20Y vs. 6M Avg; %



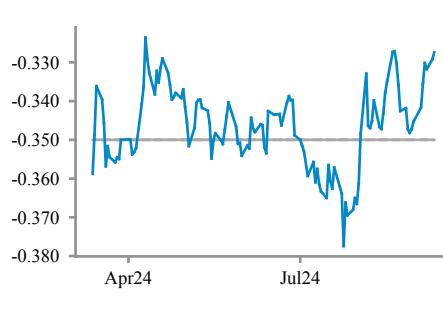
3Mx10Y-0.23*3Mx2Y-0.86*3Mx30Y vs. 6M Avg; %



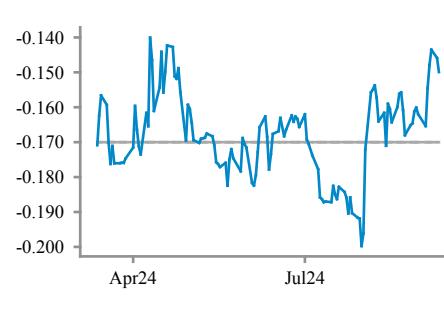
3Mx7Y-0.3*3Mx2Y-0.79*3Mx20Y vs. 6M Avg; %



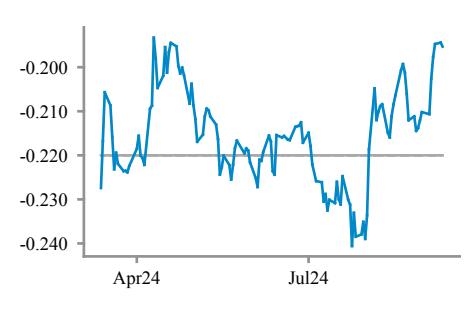
3Mx3Y-0.74*3Mx2Y-0.33*3Mx15Y vs. 6M Avg; %



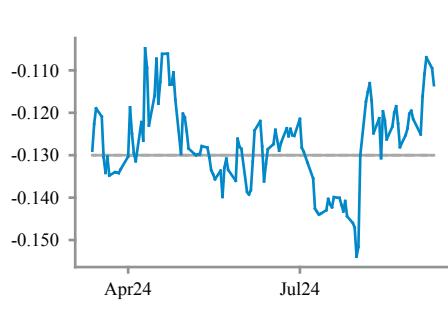
6Mx10Y-0.23*6Mx2Y-0.83*6Mx30Y vs. 6M Avg; %



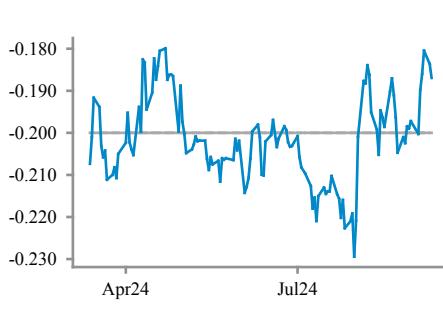
6Mx3Y-0.79*6Mx2Y-0.26*6Mx30Y vs. 6M Avg; %



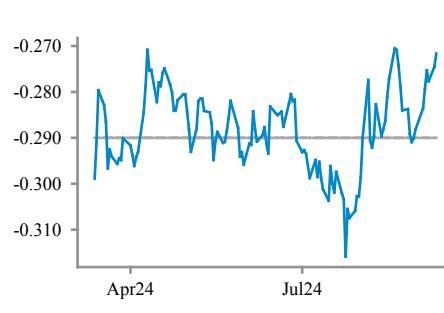
3Mx10Y-0.3*3Mx3Y-0.75*3Mx30Y vs. 6M Avg; %



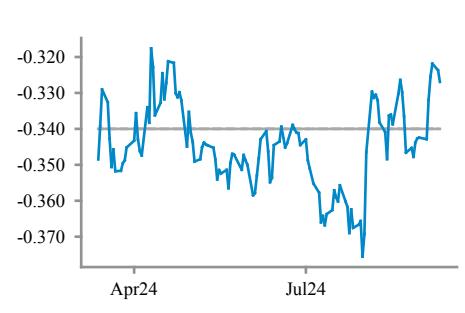
3Mx5Y-0.66*3Mx3Y-0.39*3Mx30Y vs. 6M Avg; %



3Mx3Y-0.69*3Mx2Y-0.37*3Mx10Y vs. 6M Avg; %



6Mx7Y-0.31*6Mx2Y-0.76*6Mx20Y vs. 6M Avg; %



* To calculate the weights, a 6M empirical regression is used of the 50/50 weighted fly regressed against the belly rate and the difference in the wing rates so that the weights are constructed to be "level" and "curve" neutral: left weight = $(0.5\beta_{beta_curve})/(1\beta_{beta_level})$ and right weight = $(0.5+\beta_{beta_curve})/(1-\beta_{beta_level})$, where beta_level and beta_curve are calculated from the 6M regression described previously.

** The residual is the difference of the weighted spread with the 6M avg of the weighted spread. The trade will be a belly cheapener if the residual is less than 0 and a belly richener otherwise. Realized vol is calculated as the 2-year standard deviation of quarterly changes in the weighted spread, and multiplied by sqrt(4) to annualize. Risk-adjusted ann. carry is the 3M slide in the weighted spread divided by the realized vol and table is sorted by highest Wtd Fly 3M-Carry.

Derivatives Strategy

i-PCA: Implied Principal Component Analysis Report

Implied Correlation, from YCSOs				
	2Y	5Y	10Y	30Y
2Y	1.00	0.93	0.83	0.63
5Y	0.93	1.00	0.96	0.84
10Y	0.83	0.96	1.00	0.94
30Y	0.63	0.84	0.94	1.00

combined with

Implied Vol, 6M Exp	
6M expiry btpvol	
2Y	7.59
5Y	6.92
10Y	6.29
30Y	5.65

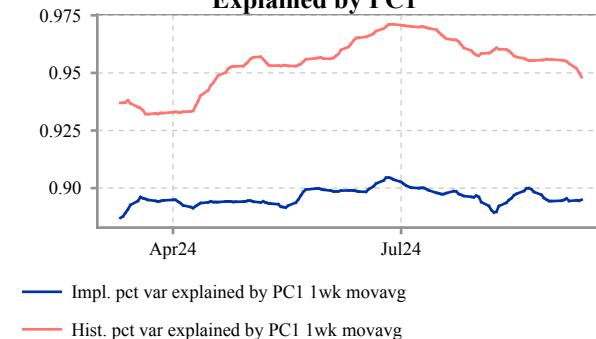
gives us

Implied Covariance Matrix				
	2Y	5Y	10Y	30Y
2Y	57.63	49.11	39.57	26.96
5Y	49.11	47.93	41.82	32.90
10Y	39.57	41.82	39.61	33.36
30Y	26.96	36.07	33.36	31.90

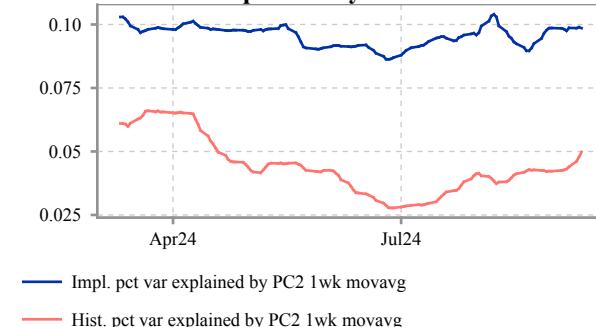
which
when
factorized
gives

Implied Principal Components			
	PC1	PC2	PC3
2Y	7.05	2.79	0.35
5Y	6.89	0.26	-0.38
10Y	6.13	-1.29	-0.36
30Y	4.90	-2.77	0.49

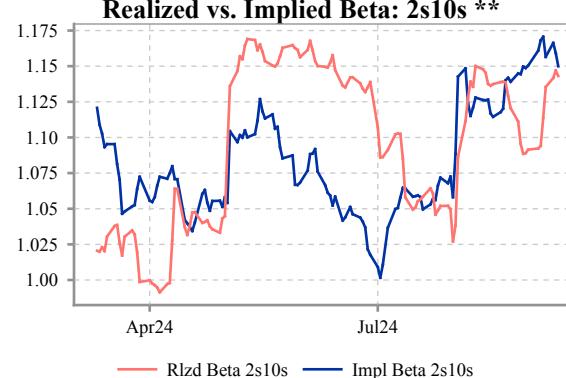
Historical vs. Implied Percent of Variance -
Explained by PC1 *



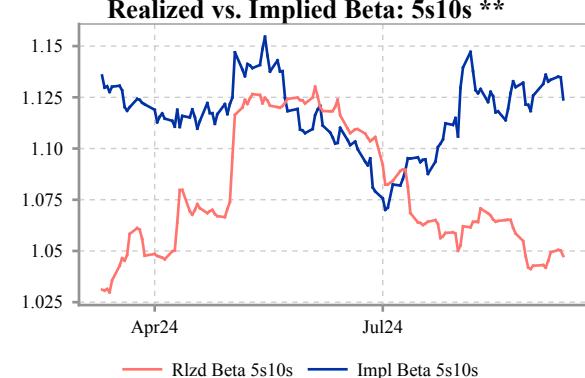
Historical vs. Implied Percent of Variance -
Explained by PC2 *



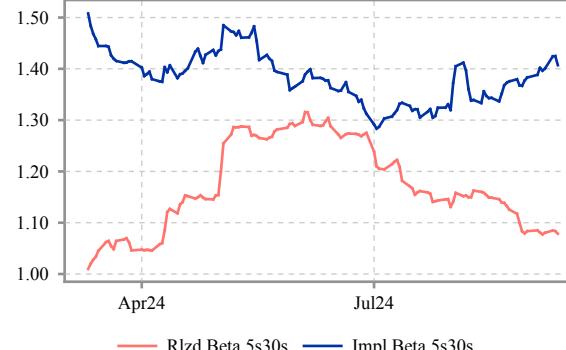
Realized vs. Implied Beta: 2s10s **



Realized vs. Implied Beta: 5s10s **



Realized vs. Implied Beta: 5s30s **



Realized vs. Implied Beta: 10s30s **



Note: * For each principal component, we define its loadings on the 2Y, 5Y, 10Y and 30Y sector to be the impact of a 1-sigma move in that component on 2Y, 5Y, 10Y and 30Y rates respectively. For each principal component, we also define a quantity called its norm, which is calculated as the square root of the sum of squares of the loadings. Finally, the percent variation explained by each component is calculated as the square of its norm, divided by the sum of squared norms of all the components.

** 6M rolling beta between weekly changes in 2Y yields versus 10Y yields, and the 6M lagged implied beta calculated from the first implied principal component; unitless. Implied beta is calculated as the ratio of left tenor weighting to the right tenor weighting (e.g. ratio of 2Y weighting to 10Y weighting for 2s10s) in the first implied principal component.

Derivatives Strategy

SOFR Carry Efficient Bearish Trades Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd Return to		
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25	Std Dev	Risk Ratio
-3Mx2Y	-1/	1.00	100	1.00	0.0	28.5	21.3	1.8	53.5	28.5	3.5	65.4	0.8
-GRNS/-SFR2/+SFR4	-0.487/-1.000/1.000	0.24	77	0.27	-8.6	48.4	12.5	2.7	54.5	48.4	42.4	28.6	1.9
-SFR2/+SFR3/-SFR6	-1.000/1.000/-0.283	0.13	81	0.15	-2.7	28.4	7.1	2.9	31.7	28.4	25.2	17.1	1.9
-3Mx10Y/-SFR2/+SFR4	-0.434/-1.000/1.000	0.10	37	0.09	-10.2	51.2	12.3	2.7	53.8	51.2	48.5	29.5	1.8
-3Mx7Y/-SFR2/+SFR4	-0.504/-1.000/1.000	0.19	61	0.19	-9.9	52.7	13.6	2.7	57.5	52.7	47.9	31.6	1.8
-3Mx3Y/-SFR2/+SFR5	-1.000/-0.263/1.000	0.11	62	0.10	-6.3	27.4	6.3	2.5	30.3	27.4	24.5	17.3	1.8
-3Mx3Y/-SFR2/+SFR3	-0.396/-1.000/1.000	0.22	89	0.24	-4.0	34.7	9.6	2.8	40.2	34.7	29.3	23.3	1.7
-3Mx5Y/-SFR2/+SFR4	-0.642/-1.000/1.000	0.35	83	0.36	-9.5	55.8	16.2	2.6	64.5	55.8	47.1	37.7	1.7
-3Mx1Y/-GRNS/+SFR4	-1.000/-0.352/1.000	0.17	76	0.17	-5.2	31.6	9.0	2.2	35.8	31.6	27.3	21.5	1.7
-3Mx1Y/-3Mx7Y/+SFR4	-1.000/-0.364/1.000	0.13	60	0.12	-6.2	34.7	9.8	2.2	38.0	34.7	31.4	23.7	1.6
-BLUE/-SFR2/+SFR5	-0.668/-1.000/1.000	0.32	71	0.32	-12.9	57.6	16.4	2.7	65.6	57.6	49.6	41.1	1.6
-GOLD/-SFR2/+SFR5	-0.576/-1.000/1.000	0.20	49	0.17	-13.9	57.7	14.9	2.7	62.6	57.7	52.7	39.7	1.6
-SFR2/+SFR4/-SFR7	-1.000/1.000/-0.688	0.48	95	0.52	-6.4	49.8	16.4	2.7	61.9	49.8	37.8	39.3	1.6
-3Mx1Y/-3Mx3Y/+SFR5	-0.327/-1.000/1.000	0.19	80	0.17	-5.6	26.2	7.4	2.3	30.9	26.2	21.5	19.7	1.6
-3Mx1Y/-3Mx5Y/+SFR4	-1.000/-0.464/1.000	0.25	82	0.24	-5.9	37.0	11.7	2.2	43.1	37.0	30.8	27.9	1.5
-3Mx10Y/-SFR2/+SFR5	-0.761/-1.000/1.000	0.36	71	0.29	-14.2	62.7	18.7	2.6	71.7	62.7	53.8	46.9	1.5
-3Mx30Y/-SFR2/+SFR5	-0.657/-1.000/1.000	0.17	40	0.05	-15.5	60.9	17.1	2.6	65.2	60.9	56.6	42.7	1.5
-GOLD/-SFR3/+SFR4	-0.235/-1.000/1.000	0.12	60	0.11	-5.7	21.1	6.7	2.3	24.0	21.1	18.2	15.7	1.5
-3Mx15Y/-SFR2/+SFR5	-0.692/-1.000/1.000	0.26	57	0.16	-14.4	61.4	17.5	2.6	67.8	61.4	55.0	44.7	1.5
-3Mx20Y/-SFR2/+SFR5	-0.672/-1.000/1.000	0.22	49	0.11	-14.7	61.1	17.3	2.6	66.5	61.1	55.7	43.9	1.5
-GRNS/-SFR2/+SFR5	-0.854/-1.000/1.000	0.60	93	0.61	-11.3	57.9	19.1	2.7	72.9	57.9	42.9	48.2	1.5
-3Mx7Y/-SFR2/+SFR5	-0.884/-1.000/1.000	0.51	84	0.47	-13.7	65.4	21.0	2.6	78.2	65.4	52.7	52.3	1.5
-3Mx30Y/-SFR3/+SFR4	-0.268/-1.000/1.000	0.11	51	0.06	-6.4	22.4	7.5	2.3	25.1	22.4	19.8	16.9	1.5
-3Mx3Y/-SFR2/+SFR4	-1.000/-0.799/1.000	0.58	95	0.60	-7.3	53.9	19.0	2.6	68.4	53.9	39.5	46.0	1.5
+3Mx30Y/-SFR2	1.000/-1.000	0.27	40	0.42	-24.5	65.2	30.0	2.5	71.9	65.2	58.5	48.4	1.5
+REDS/-BLUE/-SFR2	1.000/-0.777/-1.000	0.39	77	0.41	-12.5	57.8	18.5	2.6	67.7	57.8	47.9	45.8	1.5
+REDS/-GOLD/-SFR2	1.000/-0.670/-1.000	0.25	57	0.25	-13.7	57.9	16.7	2.6	64.3	57.9	51.5	43.5	1.5

Note:

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Derivatives Strategy

Carry Efficient Bearish Trades Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd Return to		
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25	Std Dev	Risk Ratio
-3Mx5Y	-1/	1.00	100	1.00	0.0	10.6	9.3	1.4	35.6	10.6	-14.4	55.6	0.6
-3Mx2Y/-SFR3/+SFR4	-1.000/-0.204/1.000	0.13	83	0.13	-1.9	17.7	4.6	2.2	20.9	17.7	14.5	11.9	1.8
-BLUE/-SFR2/+SFR4	-0.561/-1.000/1.000	0.27	73	0.33	-9.4	47.9	11.3	2.7	54.7	47.9	41.0	32.0	1.7
-3Mx20Y/-SFR2/+SFR4	-0.510/-1.000/1.000	0.13	39	0.10	-10.9	50.6	11.8	2.7	54.0	50.6	47.3	32.3	1.7
-3Mx15Y/-SFR2/+SFR4	-0.569/-1.000/1.000	0.20	54	0.18	-10.7	51.0	12.2	2.7	56.1	51.0	45.9	34.3	1.6
-3Mx1Y/-BLUE/+SFR4	-1.000/-0.386/1.000	0.17	68	0.20	-5.8	31.2	8.1	2.2	35.6	31.2	26.9	23.3	1.5
-3Mx10Y/-SFR2/+SFR4	-0.762/-1.000/1.000	0.41	80	0.40	-10.8	52.8	13.8	2.7	63.1	52.8	42.5	41.3	1.5
-3Mx1Y/-3Mx15Y/+SFR4	-1.000/-0.392/1.000	0.13	49	0.09	-6.7	33.4	8.7	2.2	36.5	33.4	30.3	25.0	1.5
-3Mx7Y/-SFR2/+SFR5	-1.000/-0.671/1.000	0.38	79	0.38	-11.0	43.9	11.0	2.6	53.4	43.9	34.3	37.9	1.4
-3Mx1Y/-3Mx10Y/+SFR4	-1.000/-0.525/1.000	0.27	78	0.25	-6.7	34.6	9.8	2.2	41.4	34.6	27.9	29.5	1.4
-3Mx3Y/-SFR4/+SFR5	-1.000/-0.249/1.000	0.18	88	0.18	-3.8	14.2	3.3	2.4	18.8	14.2	9.7	13.5	1.4
-3Mx7Y/-SFR2/+SFR4	-1.000/-0.939/1.000	0.63	92	0.64	-9.8	52.2	14.9	2.6	68.0	52.2	36.4	48.9	1.4
-GOLD/-SFR2/+SFR5	-0.887/-1.000/1.000	0.52	79	0.56	-14.4	57.0	14.8	2.7	69.9	57.0	44.0	51.0	1.4
-3Mx2Y/+SFR4	-1.000/0.739	0.21	95	0.21	-0.8	14.4	4.5	2.2	19.6	14.4	9.1	14.4	1.4
-3Mx10Y/-SFR2/+SFR5	-1.000/-0.802/1.000	0.44	77	0.40	-12.9	50.4	13.3	2.6	61.4	50.4	39.5	45.1	1.4
-3Mx2Y/-3Mx7Y/+SFR5	-1.000/-0.403/1.000	0.28	90	0.26	-4.9	22.3	6.2	2.3	29.3	22.3	15.3	21.6	1.4
-SFR2/+SFR4	-1.000/0.119	0.71	84	0.68	-22.8	65.8	30.2	2.6	83.5	65.8	48.1	61.9	1.4
-3Mx30Y/-SFR2/+SFR5	-1.000/-0.995/1.000	0.44	67	0.30	-16.8	61.5	17.9	2.6	72.6	61.5	50.4	53.8	1.4
-BLUE/-SFR2/+SFR5	-1.000/-0.908/1.000	0.60	88	0.66	-12.0	50.6	14.0	2.7	65.6	50.6	35.7	48.6	1.3
-3Mx7Y/+REDS/-SFR2	-1.000/1.000/-0.573	0.28	70	0.29	-9.8	37.7	9.6	2.6	44.6	37.7	30.7	33.3	1.3
+3Mx3Y/-SFR2	0.144/-1.000	0.69	82	0.66	-23.5	65.4	30.7	2.6	82.7	65.4	48.2	61.9	1.3
+3Mx2Y/-SFR2	0.135/-1.000	0.70	84	0.67	-22.9	64.3	30.0	2.6	81.8	64.3	46.7	61.5	1.3
-3Mx3Y/+REDS	-1.000/0.766	0.15	89	0.16	-2.7	12.0	3.2	2.3	15.8	12.0	8.1	11.9	1.3
-3Mx20Y/-SFR2/+SFR5	-1.000/-0.948/1.000	0.45	71	0.34	-15.2	58.6	16.6	2.6	70.0	58.6	47.3	52.8	1.3
-SFR2/+SFR3	-1.000/0.120	0.72	85	0.69	-21.7	63.2	29.4	2.6	81.2	63.2	45.3	61.4	1.3
-3Mx15Y/-SFR2/+SFR5	-1.000/-0.902/1.000	0.46	74	0.37	-14.2	55.8	15.3	2.6	67.2	55.8	44.4	50.9	1.3
+3Mx1Y/-SFR2	0.134/-1.000	0.72	85	0.69	-21.5	61.3	28.9	2.6	79.2	61.3	43.3	60.6	1.3

Note:

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Derivatives Strategy

Carry Efficient Bearish Trades Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd Return to		
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25	Std Dev	Risk Ratio
-3Mx10Y	-1/	1.00	100	1.00	0.0	5.0	4.6	1.0	30.0	5.0	-20.0	51.0	0.6
-GOLD/-SFR2+/SFR4	-0.584/-1.000/1.000	0.33	72	0.41	-9.9	47.7	10.0	2.7	55.8	47.7	39.6	34.3	1.6
-3Mx2Y/+SFR4	-1.000/0.793	0.16	90	0.16	-0.6	13.3	3.3	2.2	17.3	13.3	9.3	11.4	1.5
-3Mx1Y/-GOLD/+SFR4	-1.000/-0.376/1.000	0.18	63	0.22	-6.2	31.2	7.2	2.2	35.7	31.2	26.7	24.0	1.5
-3Mx3Y/-SFR4+/SFR5	-1.000/-0.202/1.000	0.15	83	0.15	-3.6	13.3	2.2	2.4	17.1	13.3	9.6	11.6	1.5
-SFR2/+SFR5	-1.000/0.228	0.57	71	0.53	-26.4	66.0	28.9	2.6	80.3	66.0	51.8	56.1	1.4
+REDS/-SFR2	0.231/-1.000	0.56	70	0.52	-26.6	66.1	29.2	2.6	80.1	66.1	52.1	56.4	1.4
-SFR2/+SFR4	-1.000/0.216	0.59	74	0.56	-24.7	64.0	28.0	2.6	78.8	64.0	49.2	55.5	1.4
-3Mx2Y/-3Mx15Y/+SFR5	-1.000/-0.307/1.000	0.18	76	0.16	-4.9	20.4	4.6	2.3	25.0	20.4	15.9	17.8	1.4
+3Mx5Y/-SFR2	0.289/-1.000	0.52	65	0.47	-27.1	65.0	30.2	2.6	78.1	65.0	51.9	56.4	1.4
+3Mx3Y/-SFR2	0.261/-1.000	0.55	69	0.51	-26.0	63.2	28.9	2.6	77.0	63.2	49.5	55.6	1.4
+3Mx7Y/-SFR2	0.309/-1.000	0.51	62	0.45	-27.7	65.8	30.9	2.5	78.6	65.8	53.0	56.9	1.4
+3Mx2Y/-SFR2	0.244/-1.000	0.58	72	0.54	-24.9	61.2	27.7	2.6	75.6	61.2	46.7	54.9	1.4
-SFR2/+SFR3	-1.000/0.217	0.61	76	0.57	-22.8	59.3	26.5	2.6	74.6	59.3	44.0	54.6	1.4
-3Mx30Y/-SFR2+/SFR4	-1.000/-1.000/0.931	0.65	85	0.59	-12.1	53.2	14.7	2.7	69.6	53.2	36.9	51.9	1.3
+3Mx1Y/-SFR2	0.242/-1.000	0.61	77	0.58	-22.4	55.7	25.6	2.7	71.1	55.7	40.4	53.1	1.3
-3Mx20Y/-SFR2+/SFR4	-1.000/-1.000/0.986	0.64	86	0.61	-11.0	52.5	13.7	2.7	68.4	52.5	36.5	51.3	1.3
-3Mx15Y/-SFR2+/SFR4	-1.000/-0.969/1.000	0.63	88	0.63	-10.2	50.4	12.6	2.7	66.3	50.4	34.6	49.7	1.3
-3Mx30Y/-SFR2+/SFR5	-1.000/-0.851/1.000	0.42	66	0.35	-14.8	51.7	13.2	2.6	62.1	51.7	41.3	46.8	1.3
-3Mx3Y/+SFR5	-1.000/0.735	0.23	94	0.23	-2.5	11.9	2.3	2.4	17.7	11.9	6.1	13.5	1.3
-3Mx20Y/-SFR2+/SFR5	-1.000/-0.803/1.000	0.42	70	0.39	-13.1	48.7	11.8	2.6	59.3	48.7	38.2	45.6	1.3
-3Mx15Y/-SFR2+/SFR5	-1.000/-0.759/1.000	0.42	73	0.41	-12.2	46.1	10.6	2.6	56.6	46.1	35.5	43.8	1.3
-GOLD/-SFR2+/SFR5	-1.000/-0.875/1.000	0.62	84	0.74	-12.5	48.2	10.6	2.7	63.7	48.2	32.7	49.3	1.3
-3Mx2Y/-3Mx3Y/+SFR4	-1.000/-0.370/1.000	0.33	95	0.32	-0.4	16.3	4.3	2.2	24.5	16.3	8.1	19.5	1.3
-3Mx30Y/+REDS/-SFR2	-1.000/1.000/-0.777	0.32	56	0.27	-13.9	47.1	12.6	2.6	55.2	47.1	39.0	43.9	1.3
+REDS/-GOLD/-SFR2	1.000/-1.000/-0.801	0.53	80	0.66	-11.6	43.6	10.0	2.7	56.8	43.6	30.4	45.9	1.2
-3Mx20Y/+REDS/-SFR2	-1.000/1.000/-0.728	0.33	60	0.31	-12.3	44.1	11.2	2.6	52.3	44.1	35.9	42.6	1.2

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		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25		
3Mx2Y	1/	1.00	100	1.00	0.0	-28.5	-21.3	-1.8	-53.5	-28.5	-3.5	65.4	-0.1
-SFR2/+SFR4	-1.000/1.000	0.23	65	0.22	-14.4	49.0	10.3	2.7	43.4	49.0	54.7	24.8	2.2
-3Mx1Y/+SFR4	-1.000/1.000	0.17	66	0.18	-9.4	32.0	7.4	2.2	27.8	32.0	36.2	19.2	1.9
-3Mx1Y/-3Mx3Y/+SFR3	-1.000/-0.010/1.000	0.10	82	0.11	-0.5	10.6	0.8	2.0	8.0	10.6	13.1	8.8	1.5
-3Mx1Y/+SFR3/-SFR7	-1.000/1.000/-0.005	0.11	84	0.11	-0.5	10.4	0.7	2.0	7.7	10.4	13.1	8.8	1.5
-3Mx1Y/-3Mx5Y/+SFR3	-1.000/-0.005/1.000	0.11	84	0.11	-0.6	10.4	0.7	2.0	7.7	10.4	13.1	8.9	1.5
-3Mx1Y/-GRNS/+SFR3	-1.000/-0.004/1.000	0.11	84	0.11	-0.5	10.4	0.6	2.0	7.7	10.4	13.1	8.9	1.5
-3Mx1Y/-BLUE/+SFR3	-1.000/-0.003/1.000	0.11	84	0.11	-0.6	10.4	0.6	2.0	7.6	10.4	13.1	8.9	1.5
-3Mx1Y/+SFR3	-0.994/1.000	0.12	86	0.12	-0.5	10.1	0.4	2.0	7.1	10.1	13.0	9.1	1.4
-SFR2/+SFR3	-0.799/1.000	0.34	97	0.33	-2.5	13.7	-3.1	2.9	5.1	13.7	22.3	20.1	1.1
-3Mx3Y/+REDS/+GRNS	-1.000/1.000/0.041	0.17	85	0.16	-3.7	10.0	-0.7	2.3	5.9	10.0	14.1	13.2	1.1
+3Mx1Y/-SFR2/+SFR3	0.251/-1.000/1.000	0.40	97	0.38	-3.0	14.5	-4.0	3.1	4.5	14.5	24.6	23.5	1.0
-3Mx3Y/+REDS/+SFR7	-1.000/1.000/0.057	0.18	86	0.18	-3.9	9.9	-1.1	2.3	5.3	9.9	14.5	14.4	1.0
-3Mx3Y/+REDS/+SFR6	-1.000/1.000/0.083	0.21	89	0.21	-4.1	9.6	-1.6	2.3	4.3	9.6	15.0	16.1	0.9
-3Mx3Y/+REDS	-0.884/1.000	0.24	92	0.24	-3.7	7.8	-2.3	2.3	1.8	7.8	13.8	16.8	0.8
-3Mx3Y/+GRNS/+SFR5	-1.000/0.180/1.000	0.29	93	0.30	-4.4	9.7	-3.2	2.4	2.5	9.7	16.9	21.1	0.8
-3Mx5Y/+GRNS/+SFR7	-1.000/0.051/1.000	0.18	73	0.22	-4.6	9.5	0.2	2.3	4.9	9.5	14.0	18.7	0.7
-3Mx5Y/+SFR7	-0.933/1.000	0.19	76	0.23	-4.5	8.7	-0.2	2.3	3.8	8.7	13.5	18.7	0.7
-3Mx3Y/+SFR5/+SFR7	-1.000/1.000/0.255	0.38	94	0.40	-5.2	9.2	-4.6	2.4	-0.2	9.2	18.6	26.9	0.7
+3Mx1Y/-SFR2	1.000/-0.804	0.23	98	0.21	-2.0	3.6	-3.5	4.7	-2.1	3.6	9.3	14.4	0.6
-3Mx7Y/+GRNS/+SFR3	-1.000/1.000/0.062	0.20	81	0.25	-2.5	6.0	0.3	2.2	1.2	6.0	10.9	17.0	0.6
-SFR2/+SFR3/+SFR4	-1.000/0.963/0.796	1.00	99	0.98	-5.2	13.7	-13.4	2.8	-11.4	13.7	38.8	61.1	0.6
+3Mx3Y/-3Mx5Y/+SFR7	0.145/-1.000/1.000	0.28	85	0.31	-4.5	6.7	-1.7	2.3	-0.2	6.7	13.6	22.1	0.6
-3Mx10Y/+GRNS/+GOLD	-1.000/1.000/0.083	0.26	82	0.35	-3.4	6.4	0.1	2.2	-0.1	6.4	12.9	21.5	0.6
-3Mx10Y/+GRNS/+BLUE	-1.000/1.000/0.096	0.28	83	0.37	-3.6	6.4	-0.1	2.2	-0.5	6.4	13.3	22.6	0.6
-3Mx3Y/+SFR5/+SFR6	-1.000/1.000/0.370	0.51	96	0.53	-5.9	8.1	-7.1	2.4	-4.6	8.1	20.8	35.3	0.6
-3Mx5Y/+GRNS/+SFR6	-1.000/0.271/1.000	0.43	92	0.46	-5.6	7.1	-4.8	2.3	-3.7	7.1	18.0	30.7	0.6

Note:

- We assume a 25bp selloff in the reference leg's swap yield to compute the projected PnL. The assumed reversion to the mean of any mispricing is adjusted by the historical mean reversion time of the weighted spread.
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Derivatives Strategy

Carry Efficient Bullish Trades Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd Return to		
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25	Std Dev	Risk Ratio
3Mx5Y	1/	1.00	100	1.00	0.0	-10.6	-9.3	-1.4	-35.6	-10.6	14.4	55.6	0.3
-BLUE/-SFR2/+SFR3	-0.017/-1.000/1.000	0.17	79	0.16	-4.2	27.3	3.5	2.9	23.1	27.3	31.6	13.6	2.3
+3Mx1Y/-SFR2/+SFR3	0.007/-1.000/1.000	0.19	83	0.18	-4.1	27.0	3.3	2.9	22.2	27.0	31.8	14.0	2.3
-SFR2/+SFR3	-0.993/1.000	0.19	83	0.18	-4.1	26.9	3.3	2.9	22.1	26.9	31.7	13.9	2.3
+3Mx2Y/-SFR2/+SFR3	0.012/-1.000/1.000	0.20	84	0.18	-4.2	27.0	3.3	2.9	22.1	27.0	32.0	14.2	2.3
+3Mx1Y/-SFR2	1.000/-0.930	0.13	86	0.10	-3.0	12.2	0.6	4.2	9.0	12.2	15.4	7.5	2.1
-SFR2/+SFR5	-1.000/1.000	0.29	63	0.29	-20.7	59.0	15.2	2.6	51.6	59.0	66.3	32.5	2.0
-SFR2/+SFR3/+SFR4	-1.000/0.227/1.000	0.50	91	0.47	-8.5	39.8	3.6	2.7	27.2	39.8	52.4	30.9	1.7
+3Mx1Y/-SFR2/+SFR4	0.242/-1.000/1.000	0.49	91	0.45	-8.3	36.6	3.0	2.8	24.4	36.6	48.9	29.8	1.6
-SFR2/+SFR4	-0.775/1.000	0.46	91	0.43	-7.6	33.7	2.9	2.7	22.2	33.7	45.2	28.1	1.6
-3Mx1Y/+SFR3/+SFR4	-1.000/0.156/1.000	0.36	90	0.35	-5.2	25.7	2.8	2.2	16.6	25.7	34.7	23.1	1.5
-3Mx2Y/+SFR3/+SFR5	-1.000/0.067/1.000	0.17	82	0.18	-4.3	16.6	1.6	2.4	12.2	16.6	21.0	14.1	1.5
-3Mx2Y/+SFR4/+SFR5	-1.000/0.085/1.000	0.20	84	0.20	-4.6	17.7	1.6	2.4	12.7	17.7	22.7	15.6	1.5
-3Mx1Y/+SFR4	-0.833/1.000	0.35	91	0.34	-5.1	23.5	2.4	2.2	14.7	23.5	32.3	22.3	1.5
+3Mx2Y/-SFR2/+SFR4	0.393/-1.000/1.000	0.68	93	0.63	-9.5	37.8	1.9	2.7	20.9	37.8	54.7	39.0	1.4
-3Mx2Y/+SFR5	-0.884/1.000	0.23	87	0.23	-4.5	16.0	1.1	2.4	10.4	16.0	21.7	16.2	1.3
-3Mx1Y/+3Mx2Y/+SFR4	-1.000/0.271/1.000	0.48	93	0.47	-5.9	24.3	1.6	2.2	12.3	24.3	36.3	28.5	1.3
-SFR2/+SFR3/+SFR5	-1.000/0.497/1.000	0.81	94	0.78	-10.9	38.7	0.6	2.7	18.6	38.7	58.8	46.8	1.3
-3Mx1Y/+BLUE/+SFR3	-1.000/0.157/1.000	0.27	96	0.29	-0.6	10.7	0.3	2.0	4.0	10.7	17.4	14.1	1.2
-SFR2/+SFR4/+SFR5	-1.000/0.637/1.000	1.00	94	0.96	-13.7	46.8	0.8	2.7	21.7	46.8	71.9	58.8	1.2
+REDS/-SFR2/+SFR4	0.797/-1.000/0.870	1.05	95	0.99	-12.7	44.6	0.6	2.6	18.3	44.6	70.8	59.3	1.2
-3Mx2Y/+REDS/+SFR3	-1.000/1.000/0.165	0.30	94	0.29	-3.5	13.1	0.5	2.3	5.6	13.1	20.5	17.3	1.2
-3Mx2Y/+REDS/+SFR4	-1.000/1.000/0.211	0.36	93	0.35	-4.4	15.8	0.6	2.3	6.7	15.8	24.8	21.2	1.2
-3Mx3Y/+SFR4/+SFR6	-1.000/0.076/1.000	0.18	77	0.16	-4.7	13.4	0.8	2.2	8.9	13.4	17.8	15.2	1.2
-SFR2/+SFR4/+SFR6	-0.939/1.000/0.643	1.05	95	1.00	-12.3	42.4	0.0	2.6	16.1	42.4	68.7	59.8	1.1
-3Mx2Y/+3Mx3Y/+SFR5	-1.000/0.211/1.000	0.33	93	0.33	-4.7	15.4	0.3	2.4	7.3	15.4	23.5	20.5	1.1
+REDS/-SFR2/+SFR3	1.000/-1.000/0.595	0.93	96	0.88	-10.1	35.2	-0.5	2.7	11.9	35.2	58.4	51.0	1.1

Note:

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Derivatives Strategy

Carry Efficient Bullish Trades Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd Return to		
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25	Std Dev	Risk Ratio
3Mx10Y	1/	1.00	100	1.00	0.0	-5.0	-4.6	-1.0	-30.0	-5.0	20.0	51.0	0.4
-SFR2/+SFR3	-1.000/0.965	0.15	71	0.14	-4.6	28.8	4.5	2.8	24.9	28.8	32.6	13.6	2.4
-3Mx1Y/-SFR2/+SFR3	-0.038/-1.000/1.000	0.16	71	0.15	-4.6	29.3	4.6	2.8	25.4	29.3	33.2	13.9	2.4
-SFR2/+SFR3/+SFR4	-1.000/0.114/1.000	0.40	80	0.36	-9.6	44.4	6.9	2.7	34.3	44.4	54.4	26.9	2.0
+3Mx1Y/-SFR2/+SFR4	0.124/-1.000/1.000	0.40	81	0.36	-9.5	42.7	6.6	2.7	32.7	42.7	52.6	26.2	2.0
-SFR2/+SFR4	-0.882/1.000	0.38	81	0.35	-9.1	41.0	6.4	2.7	31.4	41.0	50.5	25.4	2.0
+GOLD/-SFR2/+SFR3	0.177/-1.000/1.000	0.37	92	0.38	-4.5	27.8	3.6	2.8	18.4	27.8	37.1	18.8	2.0
+3Mx2Y/-SFR2/+SFR4	0.170/-1.000/1.000	0.46	83	0.42	-10.2	44.2	6.7	2.7	32.6	44.2	55.7	29.1	1.9
+3Mx3Y/-SFR2/+SFR4	0.240/-1.000/1.000	0.54	86	0.50	-10.5	44.5	6.6	2.7	30.9	44.5	58.1	31.9	1.8
-3Mx1Y/+SFR3/+SFR4	-1.000/0.074/1.000	0.29	80	0.28	-6.0	29.0	5.2	2.2	21.8	29.0	36.2	20.4	1.8
-3Mx1Y/+SFR4	-0.920/1.000	0.28	80	0.27	-6.0	27.9	5.0	2.2	20.8	27.9	35.1	19.9	1.8
-3Mx1Y/+3Mx2Y/+SFR4	-1.000/0.109/1.000	0.33	82	0.31	-6.4	28.9	5.1	2.2	20.8	28.9	37.1	21.7	1.7
-3Mx2Y/+SFR4/+SFR5	-1.000/0.030/1.000	0.14	69	0.15	-4.8	18.8	2.9	2.4	15.2	18.8	22.3	13.3	1.7
-3Mx1Y/+3Mx3Y/+SFR4	-1.000/0.154/1.000	0.38	85	0.37	-6.6	29.2	5.0	2.2	19.7	29.2	38.6	23.4	1.7
-3Mx2Y/+SFR5	-0.962/1.000	0.15	71	0.15	-4.8	18.2	2.7	2.4	14.6	18.2	21.9	13.3	1.6
-3Mx2Y/+3Mx3Y/+SFR5	-1.000/0.054/1.000	0.17	74	0.17	-4.8	18.3	2.7	2.4	14.2	18.3	22.5	13.8	1.6
-SFR2/+SFR3/+SFR5	-1.000/0.317/1.000	0.65	86	0.61	-12.6	46.0	5.9	2.7	29.9	46.0	62.2	38.6	1.6
-SFR2/+SFR4/+SFR5	-1.000/0.372/1.000	0.74	86	0.70	-14.5	51.9	6.8	2.7	33.4	51.9	70.3	44.2	1.6
+3Mx5Y/-SFR2/+SFR4	0.487/-1.000/1.000	0.81	92	0.78	-10.8	43.8	5.7	2.7	23.7	43.8	64.0	41.4	1.5
-3Mx2Y/+3Mx5Y/+SFR5	-1.000/0.110/1.000	0.23	83	0.23	-4.9	18.2	2.5	2.4	12.5	18.2	23.8	15.4	1.5
+3Mx1Y/-SFR2/+SFR5	0.343/-1.000/1.000	0.63	87	0.59	-12.3	41.4	4.9	2.8	25.6	41.4	57.2	37.2	1.5
+REDS/-SFR2/+SFR3	1.000/-1.000/0.388	0.75	89	0.70	-12.1	43.6	5.6	2.7	24.9	43.6	62.3	40.8	1.5
-3Mx2Y/+REDS/+SFR4	-1.000/1.000/0.115	0.27	85	0.25	-4.7	17.6	2.8	2.3	10.9	17.6	24.2	16.0	1.5
+REDS/-SFR2/+SFR4	1.000/-1.000/0.456	0.86	88	0.80	-14.4	50.7	6.7	2.6	29.2	50.7	72.2	47.8	1.5
+3Mx2Y/-SFR2/+SFR3	1.000/-1.000/0.291	0.51	90	0.48	-8.0	27.8	3.1	2.9	15.0	27.8	40.6	26.9	1.5
-SFR2/+SFR5	-0.672/1.000	0.59	87	0.57	-11.1	36.6	4.4	2.6	21.8	36.6	51.5	35.1	1.5
-3Mx1Y/+3Mx5Y/+SFR4	-1.000/0.313/1.000	0.55	91	0.54	-6.7	28.7	4.5	2.2	15.0	28.7	42.4	29.0	1.5

Note:

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Derivatives Strategy

Carry Efficient Steepener Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd	Return to	3M Carry/Beta	
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0				
2s10s	1/	1.00	100	1.00	0.0	-23.5	-16.7	-1.8	1.5	-23.5	-48.5	31.9	0.0	-23.5
-3Mx30Y/-SFR2+SFR3	-0.188/-1.000/1.000	0.18	52	0.15	-4.9	27.9	4.0	2.9	32.5	27.9	23.4	14.9	2.2	153.64
-SFR2+SFR3	-0.877/1.000	0.32	48	0.20	-13.4	19.0	-0.5	2.9	26.9	19.0	11.1	16.6	1.6	60.00
-3Mx3Y+REDS/-SFR7	-1.000/1.000/-0.100	0.15	66	0.13	-3.2	10.1	0.3	2.3	13.9	10.1	6.3	9.1	1.5	66.22
-3Mx1Y/-3Mx15Y/+SFR3	-1.000/-0.117/1.000	0.13	64	0.10	-0.6	10.8	1.0	2.0	14.1	10.8	7.5	9.4	1.5	81.20
-3Mx1Y/-3Mx20Y/+SFR3	-1.000/-0.121/1.000	0.14	66	0.11	-0.7	10.8	1.0	2.0	14.3	10.8	7.2	9.5	1.5	76.35
-3Mx1Y/-3Mx30Y/+SFR3	-1.000/-0.127/1.000	0.15	68	0.12	-0.8	10.8	1.0	2.0	14.6	10.8	7.0	9.7	1.5	70.86
-3Mx3Y+REDS/-GRNS	-1.000/1.000/-0.102	0.18	70	0.16	-3.4	9.8	-0.1	2.3	14.4	9.8	5.2	9.9	1.5	53.05
-3Mx3Y-SFR4/+SFR5	-1.000/-0.084/1.000	0.18	64	0.17	-3.8	11.1	-0.5	2.4	15.5	11.1	6.7	11.0	1.4	63.04
-3Mx3Y+REDS-BLUE	-1.000/1.000/-0.105	0.23	76	0.21	-3.6	9.7	-0.4	2.3	15.4	9.7	4.0	11.1	1.4	42.67
-3Mx3Y+SFR5	-1.000/0.918	0.19	69	0.18	-3.5	10.2	-0.9	2.4	15.0	10.2	5.5	10.9	1.4	53.65
-3Mx3Y-REDS/+SFR5	-1.000/-0.081/1.000	0.20	69	0.18	-3.5	10.2	-1.1	2.4	15.1	10.2	5.3	11.1	1.4	51.99
-3Mx3Y+SFR5-SFR6	-1.000/1.000/-0.084	0.20	71	0.18	-3.4	9.8	-1.3	2.4	14.8	9.8	4.8	11.2	1.3	48.62
-3Mx3Y+SFR5-SFR7	-1.000/1.000/-0.085	0.21	72	0.19	-3.4	9.6	-1.6	2.4	15.0	9.6	4.2	11.6	1.3	44.68
-3Mx3Y-GRNS/+SFR5	-1.000/-0.087/1.000	0.24	75	0.21	-3.6	9.4	-2.0	2.4	15.4	9.4	3.3	12.4	1.2	38.66
-3Mx3Y-BLUE/+SFR5	-1.000/-0.089/1.000	0.28	79	0.26	-3.7	9.3	-2.2	2.4	16.3	9.3	2.3	13.3	1.2	33.32
-3Mx3Y-3Mx5Y/+SFR7	-0.044/-1.000/1.000	0.30	70	0.41	-4.9	10.2	1.1	2.3	17.8	10.2	2.6	16.7	1.1	33.49
-3Mx5Y+SFR7	-1.000/0.958	0.31	72	0.41	-4.7	9.4	0.8	2.3	17.1	9.4	1.7	16.3	1.1	30.64
-3Mx5Y-GRNS/+SFR7	-1.000/-0.043/1.000	0.32	73	0.42	-4.8	9.3	0.7	2.3	17.4	9.3	1.3	16.6	1.0	29.00
-3Mx5Y-BLUE/+SFR7	-1.000/-0.044/1.000	0.34	74	0.44	-4.8	9.3	0.6	2.3	17.8	9.3	0.8	17.2	1.0	27.35
-3Mx3Y-3Mx5Y+SFR6	-0.067/-1.000/1.000	0.45	85	0.50	-5.1	8.0	-2.5	2.3	19.2	8.0	-3.2	18.6	1.0	17.94
-3Mx5Y-SFR4/+SFR6	-1.000/-0.062/1.000	0.43	84	0.49	-5.1	8.0	-2.1	2.3	18.6	8.0	-2.7	18.1	1.0	18.74
-3Mx5Y-REDS/+SFR6	-1.000/-0.060/1.000	0.44	86	0.50	-4.8	7.3	-2.6	2.3	18.3	7.3	-3.7	18.1	1.0	16.62
-3Mx5Y+SFR6	-1.000/0.938	0.44	86	0.50	-4.7	7.0	-2.7	2.3	18.1	7.0	-4.1	18.1	1.0	15.81
-3Mx5Y+SFR6-SFR7	-1.000/1.000/-0.064	0.45	87	0.50	-4.8	6.9	-3.0	2.3	18.2	6.9	-4.5	18.3	1.0	15.16
-3Mx5Y-GRNS/+SFR6	-1.000/-0.065/1.000	0.47	87	0.52	-4.9	6.7	-3.2	2.3	18.6	6.7	-5.1	18.9	1.0	14.15
-SFR3+SFR4	-0.773/1.000	0.26	37	0.25	-16.3	12.4	0.1	2.3	18.9	12.4	5.9	19.5	1.0	47.38

Note:

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Derivatives Strategy

Carry Efficient Flatener Report

Trade	Wts	6M Fed tightening			3M Carry/Slide			Proj PnL			Wtd Sprd	Return to	3M Carry/Beta	
		Beta	Corr	Beta	Mispricing	Current	6M Avg	ZScore	+25	0	-25			
2s10s	1/	1.00	100	1.00	0.0	23.5	16.7	1.8	-1.5	23.5	48.5	31.9	1.5	23.5
+GOLD/-SFR2/+SFR3	0.501/-1.000/0.467	0.69	77	0.65	2.5	50.2	19.4	2.6	33.1	50.2	67.4	29.4	2.3	73.18
-SFR2/+3Mx1Y/+3Mx10Y	-1.000/0.287/0.658	0.80	86	0.73	2.1	50.2	21.3	2.7	30.1	50.2	70.2	31.5	2.2	62.58
-SFR2/+BLUE/+3Mx3Y	-1.000/0.320/0.576	0.70	71	0.52	2.9	58.0	23.5	2.6	40.5	58.0	75.6	35.5	2.1	82.74
-3Mx1Y/+GRNS/+SFR3	-1.000/0.808/0.073	0.75	75	0.46	2.9	49.2	24.2	2.1	30.5	49.2	67.8	37.7	1.8	65.78
+SFR5/-3Mx3Y/+3Mx7Y	0.338/-1.000/0.685	0.28	93	0.32	0.1	10.5	4.8	2.2	3.5	10.5	17.6	9.8	1.8	37.37
+3Mx1Y/+3Mx20Y/-SFR2	0.364/0.542/-1.000	0.83	93	0.77	-7.4	47.8	20.3	2.7	26.9	47.8	68.6	30.8	2.2	57.21
+3Mx1Y/+3Mx15Y/-SFR2	0.339/0.549/-1.000	0.83	92	0.76	-7.8	48.8	20.9	2.7	28.1	48.8	69.6	31.3	2.2	58.78
+3Mx1Y/+3Mx30Y/-SFR2	0.392/0.541/-1.000	0.84	94	0.79	-6.6	46.5	19.6	2.8	25.4	46.5	67.6	30.7	2.2	55.18
+3Mx10Y/-SFR2/+SFR3	0.573/-1.000/0.263	0.81	88	0.73	-8.6	54.5	22.6	2.6	34.3	54.5	74.8	34.2	2.2	67.21
+3Mx1Y/+3Mx10Y/-SFR2	0.286/0.583/-1.000	0.82	89	0.72	-8.4	50.6	21.7	2.7	30.2	50.6	71.0	32.4	2.2	62.03
+GOLD/-SFR2/+SFR3	0.465/-1.000/0.356	0.84	87	0.75	-8.4	54.7	22.7	2.6	33.6	54.7	75.7	34.6	2.2	64.95
+3Mx1Y/+GOLD/-SFR2	0.389/0.476/-1.000	0.85	89	0.75	-8.0	49.3	21.5	2.7	28.1	49.3	70.5	32.4	2.2	58.12
+3Mx1Y/+3Mx7Y/-SFR2	0.207/0.643/-1.000	0.79	85	0.67	-9.3	52.8	22.5	2.7	33.1	52.8	72.5	33.6	2.2	66.90
+3Mx15Y/-3Mx30Y/-SFR2	1.000/-0.421/0.711	0.84	92	0.75	-7.7	46.1	21.3	2.6	25.1	46.1	67.1	31.5	2.1	54.97
+3Mx20Y/-3Mx30Y/-SFR2	1.000/-0.430/-0.667	0.85	94	0.78	-6.8	43.5	20.1	2.5	22.3	43.5	64.7	30.4	2.1	51.23
+3Mx15Y/-GOLD/-SFR2	1.000/-0.371/-0.708	0.83	94	0.78	-6.6	43.8	19.8	2.6	23.0	43.8	64.7	30.4	2.1	52.60
+3Mx10Y/-GOLD/-SFR2	1.000/-0.326/-0.792	0.80	90	0.72	-7.8	48.2	21.3	2.6	28.1	48.2	68.4	32.2	2.1	59.96
+3Mx7Y/-BLUE/-SFR2	1.000/-0.287/-0.862	0.80	87	0.69	-8.7	50.8	22.3	2.6	30.9	50.8	70.7	33.4	2.1	63.72
+3Mx15Y/-3Mx20Y/-SFR2	1.000/-0.420/-0.689	0.85	93	0.76	-7.0	44.7	20.6	2.6	23.6	44.7	65.9	31.2	2.1	52.93
+3Mx15Y/-SFR2	0.576/-0.671	0.85	94	0.78	-6.6	43.7	20.2	2.5	22.4	43.7	64.9	30.8	2.1	51.34
+3Mx7Y/-SFR2	0.662/-0.803	0.80	87	0.68	-8.6	49.8	22.1	2.6	29.8	49.8	69.8	33.3	2.1	62.29
+3Mx10Y/-SFR2	0.607/-0.725	0.83	91	0.74	-7.3	46.4	21.1	2.6	25.6	46.4	67.2	32.0	2.1	55.73
+3Mx20Y/-SFR2	0.571/-0.645	0.86	95	0.79	-6.0	42.1	19.5	2.5	20.7	42.1	63.5	30.2	2.1	49.20
+3Mx10Y/-3Mx30Y/-SFR2	1.000/-0.370/-0.795	0.81	87	0.69	-8.8	50.3	22.7	2.6	30.0	50.3	70.5	33.8	2.1	62.07
+3Mx10Y/-3Mx15Y/-SFR2	1.000/-0.372/-0.759	0.82	89	0.71	-7.8	48.0	21.6	2.6	27.6	48.0	68.5	32.8	2.1	58.68
+3Mx10Y/-3Mx20Y/-SFR2	1.000/-0.369/-0.776	0.82	88	0.70	-8.2	49.1	22.1	2.6	28.7	49.1	69.5	33.4	2.1	60.16

Note:

- We assume a 25bp selloff in the reference leg's swap yield to compute the projected PnL. The assumed reversion to the mean of any mispricing is adjusted by the historical mean reversion time of the weighted spread.
- Beta is calculated by regressing daily changes in the weighted spread against daily changes in the reference leg's yield over the past six months.
- The risk of the weighted spread is calculated as the standard deviation of three month changes in the spread over the past 5 years.
- Fed tightening Beta is calculated by regressing daily changes in the weighted spread against daily changes in the reference leg's yield over the period March 16, 2022 to Sep 16, 2022, which is a Fed tightening period.
- Correlation is calculated by regressing daily changes in the weighted spread against daily changes in the reference leg's yield over the past six months.
- REDS, GRNS, BLUE, and GOLD refers to the 1Yx1Y, 2Yx1Y, 3Yx1Y, and 4Yx1Y SOFR swap rates respectively. SFR1 is the constant maturity swap rate proxy for the 3Mx3M SOFR rate, SFR2 proxies the 6Mx3M rate, and so on.

SOFR Risk-adjusted Carry on Swap Curve Flatteners

Forward curves	3M carry (bp)	Current level	St dev over 5yrs	St dev over Fed pause	Risk Adj Carry*	Risk Adj Carry**	Avg level over last 6 mos	% of time flatter than current level over 6 mos	Mean Reversion (Months)
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Notes:

* 3M carry / st dev of 3M changes over the last 5 yrs.

** 3M carry / st dev of 3M changes from 6/30/2006 - present

SOFR Risk-adjusted Carry Report

Top Ten

Trade	Wts	3M Carry/Slide			Wtd Sprd	Risk Adj
		Current	6M Avg	ZScore		
XCCY -U_1Y/+C_1Y/+J_1Y/+J_RED\$	-0.922/0.843/1.000/1.000	28.33	20.50	1.92	17.67	2.87
XCCY -U_1Y/+C_1Y/+J_1Y/+J_2Y	-0.834/0.819/1.000/1.000	24.15	18.07	1.75	15.24	2.83
XCCY -U_1Y/+C_1Y/+J_1Y/+J_5Y	-0.856/0.725/1.000/1.000	27.16	19.24	1.97	18.06	2.72
XCCY -U_1Y/+C_1Y/+J_1Y/+J_10Y	-0.864/0.655/1.000/1.000	30.36	20.86	2.16	19.62	2.71
XCCY -U_1Y/+C_1Y/+J_2Y/+J_RED\$	-1.000/0.858/0.977/1.000	29.75	20.46	1.93	20.45	2.70
XCCY -U_1Y/+U_2Y/+C_1Y/+J_1Y	-1.000/0.384/0.533/1.000	28.21	16.26	2.44	16.03	2.69
XCCY -U_1Y/+C_1Y/+J_1Y/+J_GRNS	-0.944/0.763/1.000/1.000	29.28	20.12	1.98	21.00	2.62
XCCY -U_1Y/+U_2Y/+C_1Y/+J_2Y	-1.000/0.330/0.538/1.000	27.53	15.40	2.34	17.43	2.58
EUR -E_RED\$/+E_GRNS/-E_BLUE/+E_2x2	-0.703/1.000/-1.000/0.828	15.64	6.90	2.01	8.86	2.57
EUR -E_RED\$/+E_GRNS	-0.779/1.000	18.07	9.82	1.91	11.55	2.55

Swap Curves and Butterflies

Trade	Wts	3M Carry/Slide			Wtd Sprd	Risk Adj
		Current	6M Avg	ZScore		
-1Y/+2Y/+3Y/-1x2	-1.000/1.000/0.402/-0.535	18.74	8.24	2.48	12.95	2.00
-1Y/+5Y	-1.000/0.887	43.24	22.02	2.33	35.35	2.00
-1Y/-3Y/+5Y	-1.000/-0.107/1.000	44.02	22.61	2.32	36.23	1.99
-1Y/-2Y/+5Y	-1.000/-0.105/1.000	45.01	23.20	2.31	37.21	1.99
-1Y/+1x5	-1.000/0.895	52.50	26.79	2.36	44.42	1.98
-1Y/+3Y	-1.000/0.839	37.11	17.43	2.40	29.31	1.98
-1Y/-7Y/+1x5	-1.000/-0.109/1.000	53.28	27.10	2.36	45.08	1.98
-1Y/-10Y/+1x5	-1.000/-0.115/1.000	53.06	26.91	2.37	44.84	1.97

USD/EUR Swap Curve

Trade	Wts	3M Carry/Slide			Wtd Sprd	Risk Adj
		Current	6M Avg	ZScore		
-E_RED\$/+E_GRNS/-E_BLUE/+E_2x2	-0.703/1.000/-1.000/0.828	15.64	6.90	2.01	8.86	2.57
-E_RED\$/+E_GRNS	-0.779/1.000	18.07	9.82	1.91	11.55	2.55
-U_1Y/+U_10x2/+E_BLUE	-1.000/0.223/1.000	55.22	29.43	2.37	45.21	2.55
-U_1Y/+E_30Y/+E_BLUE	-1.000/0.249/1.000	54.41	28.62	2.37	46.47	2.54
+E_5Y/-E_RED\$/+E_GRNS	0.285/-1.000/1.000	20.88	11.93	1.85	13.10	2.54
-U_1Y/+U_30Y/+E_BLUE	-1.000/0.222/1.000	54.26	28.54	2.37	44.53	2.53
-U_1Y/+E_BLUE/+E_10x2	-1.000/1.000/0.231	55.08	29.36	2.36	47.34	2.53
-U_1Y/+U_10x2/+E_2x2	-1.000/0.153/1.000	54.65	27.35	2.52	44.83	2.52

Note:

- Risk adjusted carry is expected return (assuming mean reversion of residual as well as carry/slide) divided by standard deviation.
- This report uses 1 year of history, except for the standard deviation of 3-month changes in the weighted, which is estimated over 5 years of history.
- A "+" indicates long position in yield curve trades, and a spread widening position in spread trades.

Eurodollar Curves and Butterflies

Trade	Wts	3M Carry/Slide			Wtd Sprd	Risk Adj
		Current	6M Avg	ZScore		
+SFR2/-SFR3/+SFR6/-SFR8	0.610/-1.000/1.000/-0.571	38.03	6.84	3.13	6.33	6.02
+SFR2/-SFR3/+SFR5/-SFR7	0.455/-1.000/1.000/-0.495	29.23	5.54	3.70	5.29	5.54
+SFR2/-SFR4/+SFR5/-SFR8	0.242/-1.000/1.000/-0.212	18.98	3.22	2.42	3.57	5.33
+SFR2/-SFR3/+SFR6/-SFR9	0.488/-1.000/1.000/-0.499	42.21	6.86	3.97	8.90	4.75
+SFR2/-SFR3/+SFR5/-SFR6	0.656/-1.000/1.000/-0.582	25.48	5.50	1.51	6.04	4.22
+SFR2/-SFR3/+SFR6/-SFR10	0.412/-1.000/1.000/-0.455	44.71	6.89	3.83	11.55	3.88
+SFR2/-SFR3/+SFR7/-SFR11	0.596/-1.000/1.000/-0.494	44.50	7.42	3.47	12.20	3.64
+SFR2/-SFR3/+SFR7/-SFR10	0.656/-1.000/1.000/-0.532	41.75	7.04	3.13	11.59	3.60

Swap Spread Curves

Trade	Wts	3M Carry/Slide			Wtd Sprd	Risk Adj
		Current	6M Avg	ZScore		

USD/CAD/JPY Swap Curve

Trade	Wts	3M Carry/Slide			Wtd Sprd	Risk Adj
		Current	6M Avg	ZScore		
-U_1Y/+C_1Y/+J_1Y/+J_RED\$	-0.922/0.843/1.000/1.000	28.33	20.50	1.92	17.67	2.87
-U_1Y/+C_1Y/+J_1Y/+J_2Y	-0.834/0.819/1.000/1.000	24.15	18.07	1.75	15.24	2.83
-U_1Y/+C_1Y/+J_1Y/+J_5Y	-0.856/0.725/1.000/1.000	27.16	19.24	1.97	18.06	2.72
-U_1Y/+C_1Y/+J_1Y/+J_10Y	-0.864/0.655/1.000/1.000	30.36	20.86	2.16	19.62	2.71
-U_1Y/+C_1Y/+J_2Y/+J_RED\$	-1.000/0.858/0.977/1.000	29.75	20.46	1.93	20.45	2.70
-U_1Y/+U_2Y/+C_1Y/+J_1Y	-1.000/0.384/0.533/1.000	28.21	16.26	2.44	16.03	2.69
-U_1Y/+C_1Y/+J_1Y/+J_GRNS	-0.944/0.763/1.000/1.000	29.28	20.12	1.98	21.00	2.62
-U_1Y/+U_2Y/+C_1Y/+J_2Y	-1.000/0.330/0.538/1.000	27.53	15.40	2.34	17.43	2.58

Derivatives Strategy

SOFR Swap Curves and Butterflies Risk-adjusted Carry Report

Trade	Wts	3M Carry/Slide			Mispricing	Wtd Sprd	Risk Adj	Std Dev	Carry	2y beta	beta
		Current	6M Avg	ZScore							
-1Y/+2Y/+3Y/-1x2	-1.000/1.000/0.393/-0.526	18.742	3.897	0.554	-6.457	8.903	2.105	0.023	0.000		
-1Y/+7Y/+10Y/-3x2	-0.404/1.000/0.329/-1.000	10.179	1.905	0.541	-3.371	4.930	2.065	0.002	0.000		
-1Y/+7Y/+10Y/-2x5	-0.389/1.000/0.315/-1.000	9.665	1.804	0.630	-3.545	4.868	1.985	0.012	0.000		
-1Y/+2Y/+3Y/-GRNS	-1.000/0.321/1.000/-0.505	24.232	3.501	0.575	-8.873	12.369	1.959	0.032	0.000		
-1Y/+5Y/+7Y/-BLUE	-0.616/1.000/0.483/-1.000	16.210	3.867	0.640	-5.719	8.357	1.940	0.021	0.000		
-1Y/+7Y/-3x2/+2x5	-0.360/1.000/-1.000/0.289	10.010	2.156	0.551	-3.523	5.205	1.923	0.001	0.000		
-1Y/+3Y/+5Y/-2x2	-1.000/1.000/0.599/-0.794	26.338	4.912	0.606	-9.812	13.993	1.882	0.032	0.000		
-1Y/+2Y/+10Y/-GOLD	-1.000/0.659/1.000/-0.827	27.051	3.672	0.502	-10.101	14.377	1.882	0.008	0.000		
-1Y/+2Y/-3x2/+2x5	-1.000/0.893/-1.000/0.923	26.857	3.624	0.504	-9.978	14.426	1.862	0.015	0.000		
-1Y/+7Y/-BLUE/+1x5	-0.242/0.146/-1.000/1.000	9.457	0.156	0.424	-3.299	5.105	1.852	0.014	0.000		
-1Y/+2Y/+7Y/-3x2	-1.000/0.582/1.000/-0.772	27.077	4.415	0.548	-10.177	14.619	1.852	0.019	0.000		
-1Y/+12Y/+15Y/-3x5	-0.246/1.000/0.212/-1.000	6.033	0.864	0.549	-2.401	3.265	1.848	0.004	0.000		
-1Y/+2Y/-BLUE/+1x5	-1.000/0.727/-0.963/1.000	29.790	2.794	0.510	-11.164	16.143	1.845	0.033	0.000		
-1Y/+2Y/-5Y/-1x5	-1.000/1.000/-0.179/-0.005	26.064	3.091	0.520	-9.930	14.242	1.830	0.025	0.000		
-1Y/+2Y/-5Y/-2x2	-1.000/1.000/-0.177/-0.006	26.041	3.058	0.519	-9.916	14.243	1.828	0.024	0.000		
-1Y/+5Y/+10Y/-3x2	-0.667/1.000/0.539/-1.000	19.664	4.456	0.589	-7.422	10.822	1.817	0.009	0.000		
-1Y/+10Y/+15Y/-3x5	-0.333/1.000/0.275/-1.000	9.558	1.996	0.580	-3.795	5.268	1.814	0.009	0.000		
-1Y/+5Y/-BLUE/+1x5	-0.593/1.000/-1.000/0.447	18.466	3.638	0.607	-6.912	10.203	1.810	0.021	0.000		
-1Y/+2Y/+5Y/-BLUE	-1.000/0.459/1.000/-0.658	27.633	5.292	0.588	-10.480	15.279	1.809	0.027	0.000		
-1Y/+12Y/+GOLD/-3x5	-0.224/1.000/0.185/-1.000	6.035	1.227	0.610	-2.507	3.337	1.808	0.009	0.000		
-1Y/+3Y/-GRNS/+1x2	-1.000/0.735/-1.000/0.990	34.136	1.161	0.532	-13.325	18.886	1.807	0.046	0.000		
-1Y/+2Y/+7Y/-2x5	-1.000/0.591/1.000/-0.782	26.958	4.369	0.571	-10.411	14.960	1.802	0.026	0.000		
-1Y/+10Y/+12Y/-GOLD	-0.313/1.000/0.279/-1.000	8.107	0.876	0.379	-2.669	4.513	1.796	-0.013	0.000		
-1Y/+2Y/-GRNS/+1x2	-1.000/0.494/-0.768/1.000	34.008	0.325	0.497	-13.318	18.936	1.796	0.044	0.000		
-1Y/+3Y/+REDS/-1x2	-0.963/0.699/1.000/-1.000	32.586	-0.632	0.466	-12.818	18.234	1.787	0.042	0.000		
-1Y/+10Y/+12Y/-3x5	-0.357/1.000/0.292/-1.000	10.605	2.370	0.584	-4.216	5.974	1.775	0.010	0.000		
-1Y/+2Y/+10Y/-3x5	-1.000/0.629/1.000/-0.816	28.132	4.759	0.554	-10.998	15.873	1.772	0.026	0.000		
-1Y/+2Y	-1.000/0.830	29.022	5.315	0.570	-12.206	16.381	1.772	0.036	0.000		
-1Y/+2Y/+3Y/-2x2	-1.000/0.175/1.000/-0.368	28.417	5.186	0.581	-10.996	16.052	1.770	0.025	0.000		
-1Y/+10Y/-GOLD/+3x2	-0.296/1.000/-1.000/0.260	8.950	1.405	0.440	-3.297	5.083	1.761	-0.012	0.000		
-1Y/+2Y/+15Y/-5x2	-1.000/0.693/1.000/-0.857	27.618	3.894	0.566	-11.310	15.695	1.760	0.023	0.000		
-1Y/+7Y/+BLUE/-3x2	-0.402/1.000/0.325/-1.000	12.374	2.731	0.567	-4.792	7.042	1.757	0.000	0.000		

Note:

- We assume a 25bp selloff in 3Mx2Y swap yields to compute the projected PnL. The assumed reversion to the mean of any mispricing is adjusted by the historical mean reversion time of the weighted spread.
- Beta is calculated by regressing daily changes in the weighted spread against daily changes in the 3Mx2Y yield over the past six months.
- The risk of the weighted spread is calculated as the standard deviation of three month changes in the spread over the past 5 years.
- Fed tightening Beta is calculated by regressing daily changes in the weighted spread against daily changes in the 3Mx2Y yield over the period March 16, 2022 to Sep 16, 2022, which is a Fed tightening period.
- Correlation is calculated by regressing daily changes in the weighted spread against daily changes in the 3Mx2Y yield over the past six months.
- REDS, GRNS, BLUE, and GOLD refers to the 1Yx1Y, 2Yx1Y, 3Yx1Y, and 4Yx1Y SOFR swap rates respectively. SFR1 is the constant maturity swap rate proxy for the 3Mx3M SOFR rate, SFR2 proxies the 6Mx3M rate, and so on.

Derivatives Strategy

SOFR Swap Curves and Butterflies Risk-adjusted Carry Report

Trade	Wts	3M Carry/Slide			Mispricing	Wtd Sprd	Risk Adj		
		Current	6M Avg	ZScore			Std Dev	Carry	2y beta
-1Y/+2Y/-7Y/+BLUE	-1.000/1.000/-0.378/0.195	27.337	3.527	0.525	-10.729	15.590	1.753	0.024	0.000
-1Y/+2Y/+REDS/-1x2	-1.000/0.322/1.000/-0.626	37.026	-2.081	0.432	-14.783	21.132	1.752	0.048	0.000
-1Y/+10Y/-GOLD/+2x5	-0.300/1.000/-1.000/0.263	9.082	1.450	0.420	-3.254	5.201	1.746	-0.013	0.000
-1Y/+3Y/+7Y/-BLUE	-1.000/1.000/0.405/-0.607	29.801	6.285	0.597	-11.496	17.068	1.746	0.022	0.000
-1Y/+7Y/+12Y/-GOLD	-0.531/1.000/0.444/-1.000	16.524	3.269	0.525	-6.475	9.468	1.745	-0.009	0.000
-1Y/+2Y/-12Y/+3x5	-1.000/1.000/-0.570/0.379	27.290	3.715	0.533	-10.552	15.645	1.744	0.025	0.000
-1Y/+2Y/+20Y/-5x5	-1.000/0.703/1.000/-0.857	27.941	3.811	0.565	-11.801	16.059	1.740	0.009	0.000
-1Y/+5Y/+10Y/-2x5	-0.651/1.000/0.525/-1.000	19.150	4.329	0.626	-7.595	11.035	1.735	0.018	0.000
-1Y/+2Y/-3Y/+REDS	-1.000/0.919/-1.000/0.764	38.453	-3.120	0.401	-15.463	22.182	1.733	0.048	0.000
-1Y/+2Y/+7Y/-GOLD	-1.000/0.491/1.000/-0.677	29.800	5.421	0.548	-11.786	17.260	1.727	0.010	0.000
-1Y/+3Y/-BLUE/+1x5	-1.000/0.913/-1.000/0.848	33.440	5.599	0.571	-13.034	19.378	1.726	0.027	0.000
-1Y/+2Y/+10x2/-10x5	-1.000/0.875/0.914/-1.000	28.470	4.885	0.542	-11.121	16.511	1.724	0.025	0.000
-1Y/+REDS/-GRNS/+1x2	-1.000/0.497/-0.860/1.000	43.653	-2.553	0.455	-17.692	25.370	1.721	0.057	0.000
-1Y/+2Y/+10Y/-12Y	-1.000/0.827/0.978/-1.000	28.384	4.614	0.549	-11.035	16.512	1.719	0.027	0.000
-1Y/+7Y/+10Y/-GOLD	-0.575/1.000/0.476/-1.000	18.317	3.847	0.535	-7.186	10.658	1.719	-0.007	0.000
-1Y/+3Y/+REDS/-GRNS	-1.000/0.008/1.000/-0.370	43.343	-3.369	0.429	-17.610	25.254	1.716	0.057	0.000
-1Y/+2Y/+30Y/-10x2	-1.000/0.696/1.000/-0.828	28.705	4.410	0.551	-10.990	16.727	1.716	0.013	0.000
-1Y/+2Y/+REDS/-GRNS	-1.000/0.005/1.000/-0.367	43.340	-3.370	0.429	-17.610	25.261	1.716	0.057	0.000
-1Y/+3Y/+10Y/-3x2	-1.000/1.000/0.387/-0.579	30.854	6.371	0.578	-12.095	17.988	1.715	0.015	0.000
-1Y/+2Y/+12Y/-5x2	-1.000/0.630/1.000/-0.808	28.918	4.890	0.575	-11.831	16.880	1.713	0.025	0.000
-1Y/+2Y/-3x2/+1x5	-1.000/0.602/-0.833/1.000	33.527	4.172	0.521	-13.366	19.581	1.712	0.022	0.000
-1Y/+2Y/+12Y/-15Y	-1.000/0.829/0.971/-1.000	28.567	4.834	0.550	-11.130	16.695	1.711	0.026	0.000
-1Y/+5Y/+7Y/-3x2	-0.820/1.000/0.655/-1.000	25.611	6.151	0.603	-10.087	14.984	1.709	0.012	0.000
-1Y/+2Y/+25Y/-30Y	-1.000/0.864/0.922/-1.000	28.156	4.525	0.549	-11.430	16.506	1.706	0.031	0.000
-1Y/+2Y/+5Y/-3x2	-1.000/0.373/1.000/-0.569	30.187	6.248	0.583	-11.985	17.736	1.702	0.020	0.000
-1Y/+10Y/-3x2/+1x5	-0.372/0.261/-1.000/1.000	15.974	1.628	0.489	-6.374	9.388	1.702	0.005	0.000
-1Y/+5Y/+1x2/-2x2	-0.910/0.636/1.000/-1.000	35.869	2.350	0.537	-14.426	21.095	1.700	0.038	0.000
-1Y/+2Y/+30Y/-10x5	-1.000/0.697/1.000/-0.846	29.401	5.049	0.551	-11.284	17.312	1.698	0.012	0.000
-1Y/+2Y/-25Y/+5x5	-1.000/1.000/-0.872/0.631	27.908	4.801	0.530	-10.283	16.463	1.695	0.047	0.000
-1Y/+2Y/+20Y/-25Y	-1.000/0.852/0.930/-1.000	28.424	4.799	0.553	-11.206	16.767	1.695	0.037	0.000
-1Y/+3Y/+10Y/-2x5	-1.000/1.000/0.443/-0.635	30.590	6.266	0.591	-12.166	18.047	1.695	0.021	0.000
-1Y/+2Y/-GOLD/+2x5	-1.000/0.765/-0.943/1.000	30.663	5.038	0.510	-12.198	18.112	1.693	0.002	0.000
-1Y/+2Y/+3Y/-5Y	-1.000/0.326/1.000/-0.518	30.214	5.432	0.564	-12.019	17.889	1.689	0.020	0.000

Note:

- We assume a 25bp selloff in 3Mx2Y swap yields to compute the projected PnL. The assumed reversion to the mean of any mispricing is adjusted by the historical mean reversion time of the weighted spread.
- Beta is calculated by regressing daily changes in the weighted spread against daily changes in the 3Mx2Y yield over the past six months.
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Derivatives Strategy

SOFR Swap Curves and Butterflies Risk-adjusted Carry Report

Trade	Wts	3M Carry/Slide			Mispricing	Wtd Sprd	Risk Adj		
		Current	6M Avg	ZScore			Std Dev	Carry	2y beta
-1Y/+2Y/-7Y/+1x5	-1.000/0.985/-1.000/0.799	31.795	3.186	0.507	-12.816	18.848	1.687	0.026	0.000
-1Y/-12Y/+30Y/+REDS	-1.000/-1.000/0.709/0.982	46.172	-3.068	0.440	-19.044	27.387	1.686	0.028	0.000
-1Y/+2Y/+3Y/-BLUE	-1.000/0.089/1.000/-0.287	30.896	6.393	0.588	-12.259	18.364	1.682	0.020	0.000
-1Y/+3Y/+5Y/-BLUE	-1.000/1.000/0.194/-0.395	31.151	6.761	0.597	-12.348	18.526	1.681	0.021	0.000
-1Y/+2Y/+25Y/-10x2	-1.000/0.670/1.000/-0.823	29.347	4.870	0.558	-11.721	17.476	1.679	0.018	0.000
-1Y/+5Y/+12Y/-GOLD	-0.773/1.000/0.640/-1.000	25.216	5.523	0.559	-10.212	15.033	1.677	-0.004	0.000
-1Y/-10Y/+30Y/+REDS	-1.000/-0.817/0.492/1.000	46.573	-3.061	0.439	-19.386	27.808	1.675	0.032	0.000
-1Y/+5Y/-3x2/+2x5	-0.593/1.000/-1.000/0.474	19.387	4.816	0.593	-7.670	11.576	1.675	0.005	0.000
-1Y/+2Y/+15Y/-20Y	-1.000/0.833/0.950/-1.000	28.772	5.094	0.553	-11.271	17.207	1.672	0.036	0.000
-1Y/+3Y/-3x2/+2x5	-0.953/1.000/-1.000/0.766	30.870	6.693	0.570	-12.203	18.471	1.671	0.009	0.000
-1Y/-3Y/+REDS/-2x2	-1.000/-0.131/1.000/-0.237	45.995	-2.427	0.442	-18.968	27.524	1.671	0.052	0.000
-1Y/+2Y/+1x5/-2x5	-1.000/0.612/1.000/-0.844	33.399	4.115	0.541	-13.618	19.987	1.671	0.030	0.000
-1Y/-12Y/+25Y/+REDS	-1.000/-1.000/0.716/0.965	46.225	-2.687	0.446	-19.376	27.666	1.671	0.030	0.000
-1Y/+2Y/+5Y/-2x5	-1.000/0.380/1.000/-0.577	30.100	6.205	0.596	-12.157	18.022	1.670	0.026	0.000
-1Y/+2Y/+10Y/-5x2	-1.000/0.565/1.000/-0.751	30.047	5.687	0.583	-12.257	18.000	1.669	0.027	0.000
-1Y/-10Y/+25Y/+REDS	-1.000/-0.872/0.541/1.000	46.643	-3.024	0.440	-19.634	27.946	1.669	0.033	0.000
-1Y/+2Y/-12Y/-GOLD	-1.000/1.000/-0.657/0.455	27.907	4.308	0.561	-11.049	16.724	1.669	0.035	0.000
-1Y/+2Y/-15Y/+3x5	-1.000/1.000/-0.876/0.671	28.622	4.602	0.544	-11.096	17.163	1.668	0.027	0.000
-1Y/-2Y/+REDS/-2x2	-1.000/-0.101/1.000/-0.268	46.386	-2.145	0.449	-19.155	27.830	1.667	0.052	0.000
-1Y/+2Y/+5Y/-7Y	-1.000/0.641/1.000/-0.833	29.887	5.542	0.571	-12.049	17.932	1.667	0.025	0.000
-1Y/+2Y/+3Y/-1x5	-1.000/0.152/1.000/-0.334	29.735	6.615	0.592	-11.876	17.853	1.666	0.018	0.000
-1Y/+2Y/-20Y/+5x2	-1.000/1.000/-0.889/0.656	28.353	4.949	0.528	-10.640	17.031	1.665	0.036	0.000
-1Y/+2Y/+10Y/-15Y	-1.000/0.748/1.000/-0.956	29.756	5.665	0.561	-11.621	17.892	1.663	0.030	0.000
-1Y/+2Y/+15Y/-5x5	-1.000/0.643/1.000/-0.827	29.350	5.014	0.577	-12.421	17.649	1.663	0.021	0.000
-1Y/-10Y/+20Y/+REDS	-1.000/-0.983/0.642/1.000	46.778	-2.896	0.443	-19.759	28.136	1.663	0.037	0.000
-1Y/+2Y/+25Y/-10x5	-1.000/0.670/1.000/-0.840	30.038	5.531	0.559	-12.013	18.069	1.662	0.017	0.000
-1Y/+2Y/-10Y/+2x5	-1.000/1.000/-0.771/0.578	29.115	4.468	0.539	-11.718	17.516	1.662	0.022	0.000
-1Y/-7Y/+30Y/+REDS	-1.000/-0.511/0.160/1.000	47.233	-2.375	0.443	-19.649	28.511	1.657	0.043	0.000
-1Y/-7Y/+25Y/+REDS	-1.000/-0.522/0.168/1.000	47.269	-2.345	0.443	-19.732	28.559	1.655	0.044	0.000
-1Y/-12Y/+20Y/+REDS	-1.000/-1.000/0.731/0.936	46.301	-1.963	0.456	-19.478	27.980	1.655	0.037	0.000
-1Y/+10Y/+GOLD/-3x5	-0.304/1.000/0.241/-1.000	9.561	2.455	0.626	-3.933	5.783	1.653	0.014	0.000
-1Y/+5Y/+10Y/-GOLD	-0.837/1.000/0.686/-1.000	27.802	6.372	0.566	-11.236	16.816	1.653	0.000	0.000
-1Y/-12Y/+REDS/+10x5	-1.000/-0.702/1.000/0.347	47.054	-2.580	0.445	-19.712	28.461	1.653	0.042	0.000

Note:

- We assume a 25bp selloff in 3Mx2Y swap yields to compute the projected PnL. The assumed reversion to the mean of any mispricing is adjusted by the historical mean reversion time of the weighted spread.
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Derivatives Strategy

SOFR Swap Curves and Butterflies Risk-adjusted Carry Report

Trade	Wts	3M Carry/Slide			Mispricing	Wtd Sprd	Risk Adj		
		Current	6M Avg	ZScore			Std Dev	Carry	2y beta
-1Y/-15Y/+REDS/+10x5	-1.000/-0.833/1.000/0.476	47.175	-2.449	0.445	-19.696	28.539	1.653	0.041	0.000
-1Y/+7Y/-3x2/+1x5	-0.447/0.318/-1.000/1.000	18.858	2.466	0.519	-7.667	11.409	1.653	0.006	0.000
-1Y/-7Y/+20Y/+REDS	-1.000/-0.541/0.184/1.000	47.330	-2.286	0.444	-19.771	28.649	1.652	0.045	0.000
-1Y/+2Y/+20Y/-30Y	-1.000/0.824/0.937/-1.000	29.086	5.278	0.561	-11.948	17.618	1.651	0.041	0.000
-1Y/-10Y/+REDS/+10x5	-1.000/-0.605/1.000/0.249	47.100	-2.531	0.445	-19.794	28.535	1.651	0.042	0.000
-1Y/-3Y/+REDS/-BLUE	-1.000/-0.198/1.000/-0.173	47.284	-1.845	0.450	-19.630	28.650	1.650	0.050	0.000
-1Y/+3Y/+7Y/-3x2	-1.000/1.000/0.160/-0.358	32.070	6.947	0.588	-12.903	19.433	1.650	0.017	0.000
-1Y/-12Y/+REDS/+10x2	-1.000/-0.701/1.000/0.340	47.344	-2.312	0.445	-19.835	28.697	1.650	0.041	0.000
-1Y/-15Y/+REDS/+10x2	-1.000/-0.832/1.000/0.465	47.571	-2.080	0.445	-19.864	28.836	1.650	0.040	0.000
-1Y/-7Y/+REDS/+10x5	-1.000/-0.459/1.000/0.098	47.373	-2.234	0.445	-19.783	28.720	1.649	0.046	0.000
-1Y/-10Y/+REDS/+10x2	-1.000/-0.605/1.000/0.244	47.308	-2.335	0.445	-19.882	28.691	1.649	0.042	0.000
-1Y/-7Y/+REDS/+10x2	-1.000/-0.459/1.000/0.096	47.455	-2.157	0.445	-19.818	28.782	1.649	0.046	0.000
-1Y/+2Y/+7Y/-3x5	-1.000/0.466/1.000/-0.668	30.684	6.322	0.584	-12.520	18.625	1.647	0.025	0.000
-1Y/-7Y/+12Y/+REDS	-1.000/-0.640/0.277/1.000	47.499	-2.098	0.444	-19.811	28.833	1.647	0.047	0.000
-1Y/-7Y/+15Y/+REDS	-1.000/-0.578/0.217/1.000	47.425	-2.182	0.444	-19.806	28.788	1.647	0.047	0.000
-1Y/-7Y/+10Y/+REDS	-1.000/-0.757/0.394/1.000	47.551	-2.047	0.444	-19.776	28.872	1.647	0.048	0.000
-1Y/+2Y/+1x2/-2x2	-1.000/0.272/1.000/-0.560	40.376	2.889	0.523	-16.548	24.522	1.647	0.033	0.000
-1Y/+2Y/+7Y/-10Y	-1.000/0.703/1.000/-0.903	29.782	5.419	0.572	-12.093	18.102	1.645	0.023	0.000
-1Y/+2Y/-GOLD/+3x2	-1.000/0.775/-0.955/1.000	30.558	4.995	0.533	-12.525	18.582	1.644	0.013	0.000
-1Y/-7Y/+REDS/+5x5	-1.000/-0.476/1.000/0.111	47.633	-2.004	0.445	-19.810	28.967	1.644	0.048	0.000
-1Y/+3Y/+5Y/-1x5	-1.000/1.000/0.454/-0.627	29.316	7.642	0.614	-11.750	17.835	1.644	0.017	0.000
-1Y/+5Y/+7Y/-2x5	-0.801/1.000/0.638/-1.000	24.944	6.005	0.631	-10.192	15.182	1.643	0.022	0.000
-1Y/+2Y/+BLUE/-3x2	-1.000/0.774/1.000/-0.954	30.598	4.996	0.533	-12.540	18.625	1.643	0.012	0.000
-1Y/+2Y/+3Y/-3x2	-1.000/0.052/1.000/-0.248	32.012	6.797	0.585	-12.915	19.490	1.643	0.017	0.000
-1Y/+2Y/-5x2/+3x5	-1.000/0.807/-0.992/1.000	29.660	4.983	0.577	-12.187	18.067	1.642	0.027	0.000
-1Y/-5Y/+REDS/-2x2	-1.000/-0.346/1.000/-0.022	47.588	-1.985	0.447	-19.839	28.989	1.642	0.048	0.000
-1Y/-3Y/+REDS/-1x5	-1.000/-0.149/1.000/-0.211	46.772	-1.580	0.455	-19.497	28.510	1.641	0.047	0.000
-1Y/-10Y/+15Y/+REDS	-1.000/-1.000/0.686/0.962	46.819	-1.975	0.453	-19.779	28.543	1.640	0.043	0.000
-1Y/+3Y/+5Y/-3x2	-1.000/0.438/1.000/-0.639	32.507	7.662	0.601	-13.151	19.826	1.640	0.017	0.000
-1Y/-3Y/+REDS	-1.000/-0.347/1.000	50.410	0.398	0.492	-22.376	30.747	1.640	0.066	0.000
-1Y/-7Y/+REDS/+5x2	-1.000/-0.490/1.000/0.122	47.795	-1.903	0.446	-19.918	29.153	1.639	0.048	0.000

Note:

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US Fixed Income Derivatives Strategy

SOFR Implied and delivered directionality report - USD

		Directionality*: %						Weighted curve**; bp			3M regression stats***			
Trades	Implied vol; bp/day	Implied		Deliv	(Imp - Deliv)	Implied weights; %		Short	Long	3M fwd	Spot	3M Carry	Beta	Rsq
	Short	Long	Current	3M Lagged	Levels	Levels	Short	Long	3M fwd	Spot	3M Carry			
1s/3s	7.61	7.77	2 %	24 %	-0 %	-0 %	100 %	98 %	-47		34	-24 %	88 %	
1s/5s	7.61	7.23	-5 %	22 %	-46 %	-46 %	100 %	105 %	-28		41	-41 %	84 %	
1s/10s	7.61	6.47	-18 %	15 %	-81 %	-81 %	100 %	118 %	21		47	-64 %	73 %	
1s/30s	7.61	6.47	-31 %	3 %	-124 %	-124 %	100 %	131 %	61		49	-94 %	56 %	
2s/5s	7.61	7.23	-9 %	-1 %	-34 %	-34 %	100 %	109 %	15		17	-26 %	81 %	
2s/7s	7.87	7.23	-9 %	-1 %	-50 %	-50 %	100 %	114 %	34		20	-37 %	75 %	
2s/10s	7.87	6.47	-14 %	-5 %	-67 %	-67 %	100 %	122 %	66		22	-46 %	67 %	
2s/20s	7.87	6.47	-22 %	-11 %	-95 %	-95 %	100 %	129 %	104		24	-66 %	57 %	
2s/30s	7.87	6.47	-36 %	-27 %	-107 %	-107 %	100 %	136 %	107		25	-72 %	49 %	
3s/5s	7.87	7.23	-7 %	-2 %	-20 %	-20 %	100 %	107 %	20		7	-13 %	74 %	
3s/7s	7.77	6.91	-12 %	-6 %	-34 %	-34 %	100 %	112 %	39		10	-22 %	69 %	
3s/10s	7.77	6.47	-20 %	-12 %	-50 %	-50 %	100 %	120 %	70		13	-30 %	59 %	
3s/20s	7.77	6.09	-28 %	-21 %	-74 %	-74 %	100 %	128 %	108		15	-47 %	51 %	
3s/30s	7.77	5.81	-34 %	-28 %	-86 %	-86 %	100 %	134 %	111		15	-52 %	42 %	
5s/10s	7.77	6.47	-12 %	-10 %	-25 %	-25 %	100 %	112 %	47		5	-14 %	52 %	
5s/20s	7.23	6.09	-19 %	-18 %	-47 %	-47 %	100 %	119 %	82		7	-28 %	46 %	
5s/30s	7.23	5.81	-24 %	-25 %	-57 %	-57 %	100 %	124 %	84		7	-32 %	37 %	
10s/30s	7.23	5.81	-11 %	-15 %	-27 %	-27 %	100 %	111 %	34		2	-16 %	37 %	
TU/FV	8.54	8.03	-6 %	7 %	-24 %	-24 %	100 %	106 %				-18 %	77 %	
TU/TY	8.54	7.48	-14 %	2 %	-42 %	-42 %	100 %	114 %				-28 %	64 %	
FV/TY	8.03	7.48	-7 %	-6 %	-15 %	-15 %	100 %	107 %				-8 %	44 %	
Fronts/reds							100 %							
Fronts/greens							100 %							
Fronts/blues							100 %							
Reds/greens							100 %							
Reds/blues							100 %							
Greens/blues							100 %							

* Implied directionality is defined as: (1 - (Implied vol on short maturity/Implied vol on long maturity)). We use 3M expiry swaptions and front futures options (rolled 20D before option expiry).

Delivered directionality is defined as: (1 - 3M beta obtained from regressing short maturity yields to long maturity yields). For swaps, we use 3M forward swap curve for the calculation of delivered directionality and regression stats. For futures, we use the futures yield.

** Curve weighted by the implied weights listed in the adjacent column.

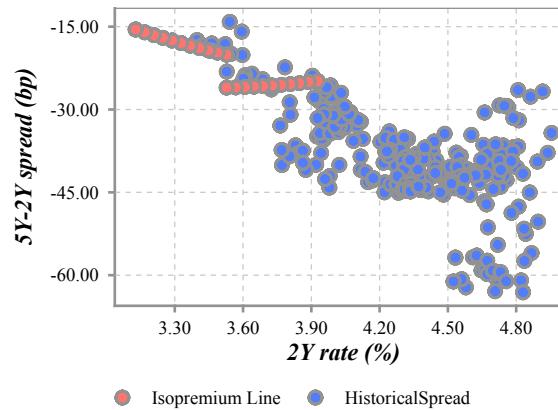
*** 3M regression stats obtained from regressing the weighted curve (using the weights in the adjacent columns on the left) with long maturity yields.

Derivatives Strategy

USD Swaption Conditional Curve Report (3M Expiry)

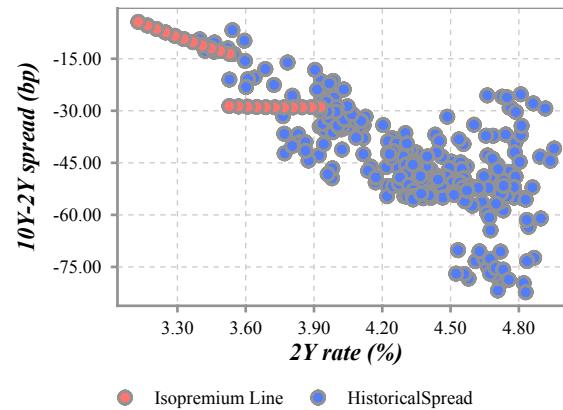
3Mx(2s/5s) Isopremium Line

Conditional Directionality: 3 % (pay), -11 % (rec), Lost Carry: -3.0 (bp)
Historical beta(R2): 1M -22 % (71 %) 3M -24 % (80 %) 1Y -15 % (16 %)
3Mx2Y vol: 8.17 bp/day, 3Mx5Y vol 7.69 bp/day



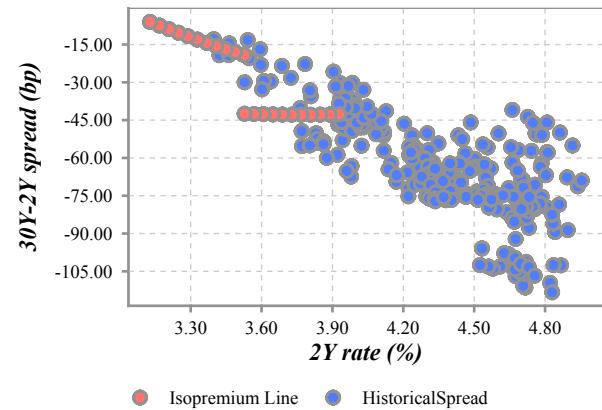
3Mx(2s/10s) Isopremium Line

Conditional Directionality: -1 % (pay), -23 % (rec), Lost Carry: -7.5 (bp)
Historical beta(R2): 1M -31 % (70 %) 3M -40 % (86 %) 1Y -26 % (27 %)
3Mx2Y vol: 8.17 bp/day, 3Mx10Y vol 6.89 bp/day



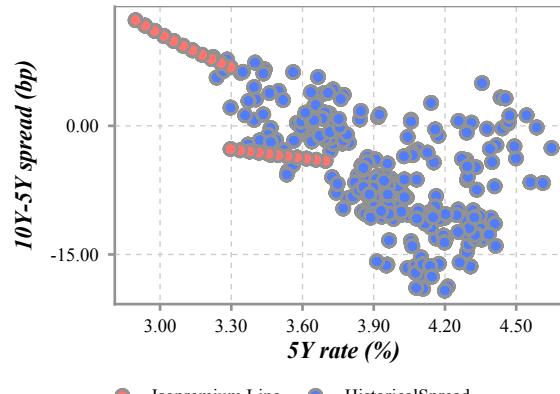
3Mx(2s/30s) Isopremium Line

Conditional Directionality: -1 % (pay), -33 % (rec), Lost Carry: -11.6 (bp)
Historical beta(R2): 1M -38 % (72 %) 3M -56 % (88 %) 1Y -41 % (45 %)
3Mx5Y vol: 8.17 bp/day, 3Mx10Y vol 6.23 bp/day



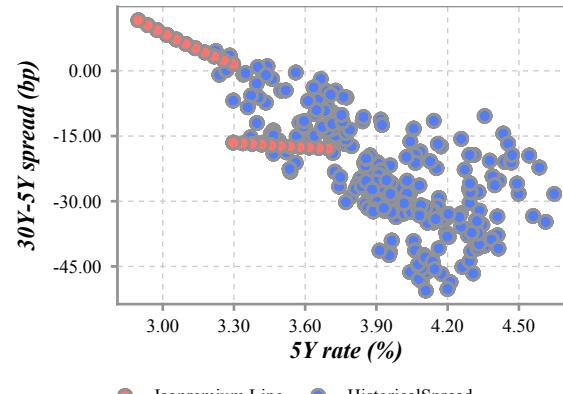
3Mx(5s/10s) Isopremium Line

Conditional Directionality: -3 % (pay), -14 % (rec), Lost Carry: -4.8 (bp)
Historical beta(R2): 1M -11 % (49 %) 3M -21 % (82 %) 1Y -10 % (21 %)
3Mx5Y vol: 7.69 bp/day, 3Mx10Y vol 6.89 bp/day



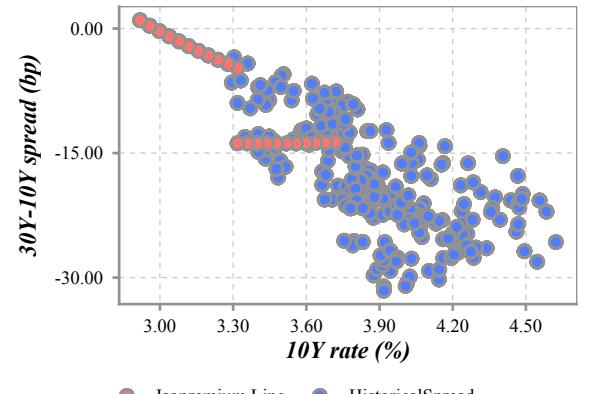
3Mx(5s/30s) Isopremium Line

Conditional Directionality: -3 % (pay), -25 % (rec), Lost Carry: -9.0 (bp)
Historical beta(R2): 1M -19 % (53 %) 3M -41 % (84 %) 1Y -26 % (41 %)
3Mx5Y vol: 7.69 bp/day, 3Mx30Y vol 6.23 bp/day



3Mx(10s/30s) Isopremium Line

Conditional Directionality: 0 % (pay), -14 % (rec), Lost Carry: -4.5 (bp)
Historical beta(R2): 1M -9 % (43 %) 3M -24 % (76 %) 1Y -15 % (44 %)
3Mx10Y vol: 6.89 bp/day, 3Mx30Y vol 6.23 bp/day



Lost carry measures the jump in spread required to go from an unconditional trade to a conditional trade and is defined as (closest to the money payer spread - closest to the money receiver spread) / 2.

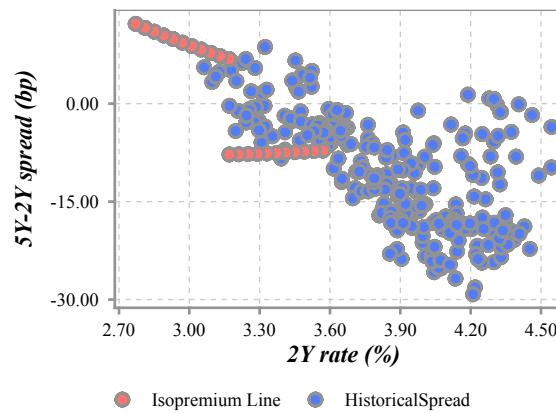
Conditional directionality is the directionality implied from zero cost conditional curve trades, i.e. the slope of the red lines. Payer directionality is calculated as (closest to the money zero cost spread with payers - farthest from the money zero cost spread with payers) / (closest to the money strike - farthest from the money strike). Regression over past 12M

Derivatives Strategy

USD Swaption Conditional Curve Report (1Y Expiry)

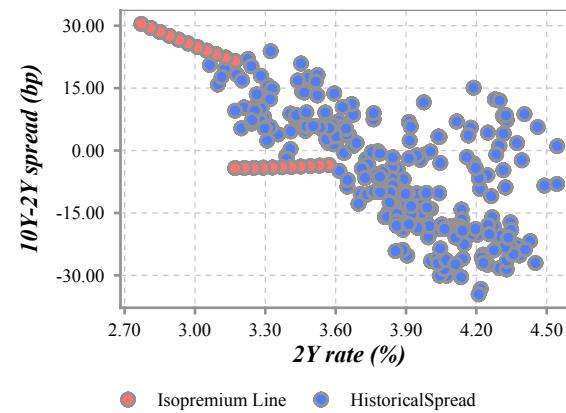
1Yx(2s/5s) Isopremium Line

Conditional Directionality: 2 % (pay), -14 % (rec), Lost Carry: -7.3 (bp)
Historical beta(R2): 1M -16 % (71 %) 3M -24 % (80 %) 1Y -15 % (16 %)
1Yx2Y vol: 7.62 bp/day, 1Yx5Y vol 7.02 bp/day



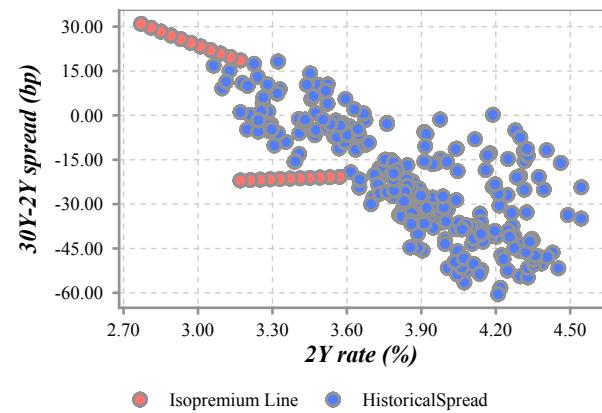
1Yx(2s/10s) Isopremium Line

Conditional Directionality: 2 % (pay), -22 % (rec), Lost Carry: -12.9 bp
Historical beta(R2): 1M -23 % (70 %) 3M -39 % (86 %) 1Y -26 % (27 %)
1Yx2Y vol: 7.62 bp/day, 1Yx10Y vol 6.53 bp/day



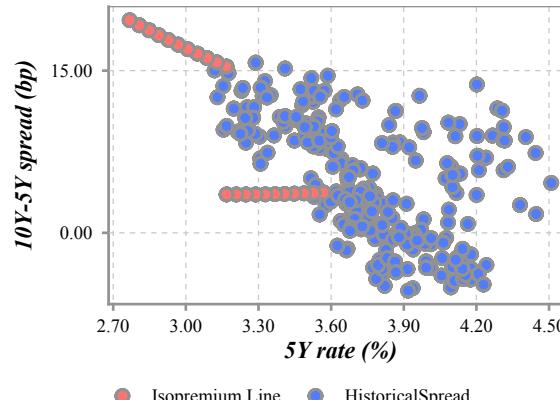
1Yx(2s/30s) Isopremium Line

Conditional Directionality: 3 % (pay), -31 % (rec), Lost Carry: -20.3 bp
Historical beta(R2): 1M -29 % (72 %) 3M -54 % (88 %) 1Y -40 % (45 %)
1Yx5Y vol: 7.62 bp/day, 1Yx10Y vol 5.98 bp/day



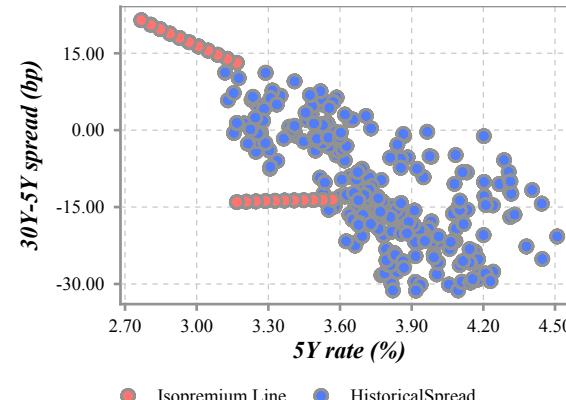
1Yx(5s/10s) Isopremium Line

Conditional Directionality: 0 % (pay), -11 % (rec), Lost Carry: -5.9 (bp)
Historical beta(R2): 1M -7 % (49 %) 3M -18 % (82 %) 1Y -9 % (21 %)
1Yx5Y vol: 7.02 bp/day, 1Yx10Y vol 6.53 bp/day



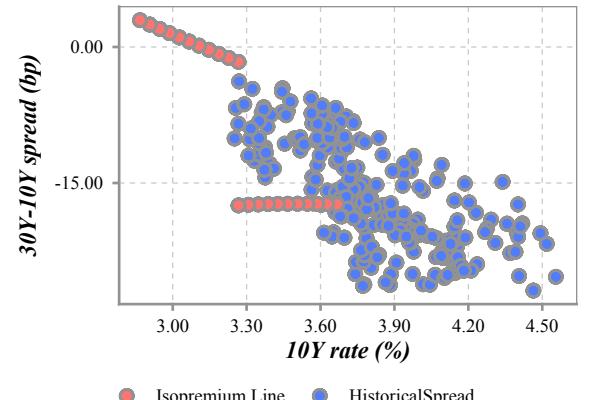
1Yx(5s/30s) Isopremium Line

Conditional Directionality: 1 % (pay), -21 % (rec), Lost Carry: -13.6 bp
Historical beta(R2): 1M -13 % (53 %) 3M -37 % (84 %) 1Y -24 % (41 %)
1Yx5Y vol: 7.02 bp/day, 1Yx30Y vol 5.98 bp/day



1Yx(10s/30s) Isopremium Line

Conditional Directionality: 0 % (pay), -11 % (rec), Lost Carry: -7.9 (bp)
Historical beta(R2): 1M -6 % (43 %) 3M -22 % (76 %) 1Y -14 % (44 %)
1Yx10Y vol: 6.53 bp/day, 1Yx30Y vol 5.98 bp/day



Derivatives Strategy

Conditional Isopremium Curve Trades Report - 1M Expiry

Curve Structure	Curve Left Struct	Curve Right Struct	Spot Rate Left (%)	Spot Rate Right (%)	Spot Curve (bp)	ATMF Left (%)	ATMF Right (%)	ATMF Curve (bp)	Bp vol Left	Bp vol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq	Carry on Stpn (bp)	Trade Risk (bp)	Trade 1 Bull	Trade1 Left Strike (%)	Trade1 Right Strike (%)	0 Cost Entry Bull (bp)	Pickup vs. Spot Crv (Bull)	Pickup vs. ATMF Crv (Bull)	Bull Entry %ile	Below ATMF Beta	Below ATMF Rsq	Trade 2 Bear	Trade2 Left Strike (%)	Trade2 Right Strike (%)	0 Cost Entry Bear (bp)	Pickup vs. Spot Crv (Bear)	Pickup vs. ATMF Crv (Bear)	Bear Entry %ile	Above ATMF Beta	Above ATMF Rsq
1m 1s/2s	1Mx1Y	1Mx2Y	3.999	3.437	-56.2	3.806	3.330	-47.6	7.38	7.68	0.507	0.12	23%	-8.6	37	steepener	3.806	3.316	-49	-7.2	1.4	41	None	None	flattener	3.806	3.346	-46	10.2	1.6	20	0.12	23%
1m 1s/3s	1Mx1Y	1Mx3Y	3.999	3.244	-75.5	3.806	3.173	-63.3	7.38	7.51	0.343	0.06	4%	-12.2	52	steepener	3.806	3.166	-64	-11.5	0.7	11	None	None	flattener	3.806	3.176	-63	12.5	0.3	6	0.06	4%
1m 1s/5s	1Mx1Y	1Mx5Y	3.999	3.138	-86.1	3.806	3.096	-70.9	7.38	6.85	0.211	-0.04	1%	-15.2	65	flattener	3.786	3.096	-69	17.1	1.9	99	None	None	steepener	3.826	3.096	-73	-13.1	2.1	99	-0.04	1%
1m 1s/7s	1Mx1Y	1Mx7Y	3.999	3.139	-86.0	3.806	3.110	-69.5	7.38	6.47	0.155	-0.10	7%	-16.4	72	flattener	3.770	3.110	-66	20.0	3.5	99	None	None	steepener	3.840	3.110	-73	-13.0	3.5	99	-0.10	7%
1m 1s/10s	1Mx1Y	1Mx10Y	3.999	3.183	-81.6	3.806	3.163	-64.3	7.38	5.94	0.114	-0.16	14%	-17.3	79	flattener	3.763	3.163	-60	21.6	4.3	99	None	None	steepener	3.853	3.163	-69	-12.6	4.7	99	-0.16	14%
1m 1s/20s	1Mx1Y	1Mx20Y	3.999	3.277	-72.2	3.806	3.265	-54.1	7.38	5.55	0.066	-0.27	28%	-18.1	88	flattener	3.745	3.265	-48	24.2	6.1	99	None	None	steepener	3.865	3.265	-60	-12.2	5.9	99	-0.27	28%
1m 1s/30s	1Mx1Y	1Mx30Y	3.999	3.142	-85.6	3.806	3.131	-67.4	7.38	5.26	0.051	-0.33	38%	-18.2	93	flattener	3.741	3.131	-61	24.6	6.4	99	None	None	steepener	3.871	3.131	-74	-11.6	6.6	99	-0.33	38%
1m 2s/3s	1Mx2Y	1Mx3Y	3.437	3.244	-19.3	3.330	3.173	-15.7	7.68	7.51	0.675	-0.04	14%	-3.6	19	flattener	3.323	3.173	-15	4.3	0.7	99	None	None	steepener	3.333	3.173	-16	-3.3	0.3	99	-0.04	14%
1m 2s/5s	1Mx2Y	1Mx5Y	3.437	3.138	-29.9	3.330	3.096	-23.3	7.68	6.85	0.416	-0.12	33%	-6.6	38	flattener	3.296	3.096	-20	9.9	3.3	99	None	None	steepener	3.356	3.096	-26	-3.9	2.7	99	-0.12	33%
1m 2s/7s	1Mx2Y	1Mx7Y	3.437	3.139	-29.8	3.330	3.110	-21.9	7.68	6.47	0.306	-0.18	39%	-7.9	50	flattener	3.290	3.110	-18	11.8	3.9	99	None	None	steepener	3.370	3.110	-26	-3.8	4.1	99	-0.18	39%
1m 2s/10s	1Mx2Y	1Mx10Y	3.437	3.183	-25.4	3.330	3.163	-16.7	7.68	5.94	0.224	-0.24	44%	-8.8	61	flattener	3.273	3.163	-11	14.4	5.7	99	None	None	steepener	3.383	3.163	-22	-3.4	5.3	99	-0.24	44%
1m 2s/20s	1Mx2Y	1Mx20Y	3.437	3.277	-16.0	3.330	3.265	-6.5	7.68	5.55	0.131	-0.33	53%	-9.5	76	flattener	3.265	3.265	0	16.0	6.5	99	None	None	steepener	3.395	3.265	-13	-3.0	6.5	99	-0.33	53%
1m 2s/30s	1Mx2Y	1Mx30Y	3.437	3.142	-29.5	3.330	3.131	-19.8	7.68	5.26	0.100	-0.39	59%	-9.6	84	flattener	3.251	3.131	-12	17.5	7.8	99	None	None	steepener	3.411	3.131	-28	-1.5	8.2	99	-0.39	59%
1m 3s/5s	1Mx3Y	1Mx5Y	3.244	3.138	-10.6	3.173	3.096	-7.6	7.51	6.85	0.616	-0.08	36%	-3.0	21	flattener	3.146	3.096	-5	5.6	2.6	99	None	None	steepener	3.196	3.096	-10	-0.6	2.4	99	-0.08	36%
1m 3s/7s	1Mx3Y	1Mx7Y	3.244	3.139	-10.5	3.173	3.110	-6.2	7.51	6.47	0.454	-0.14	38%	-4.3	34	flattener	3.140	3.110	-3	7.5	3.2	99	None	None	steepener	3.210	3.110	-10	-0.5	3.8	99	-0.14	38%
1m 3s/10s	1Mx3Y	1Mx10Y	3.244	3.183	-6.1	3.173	3.163	-1.0	7.51	5.94	0.332	-0.19	42%	-5.2	46	flattener	3.123	3.163	4	10.1	5.0	99	None	None	steepener	3.223	3.163	-6	-0.1	5.0	99	-0.19	42%
1m 3s/20s	1Mx3Y	1Mx20Y	3.244	3.277	3.3	3.173	3.265	9.2	7.51	5.55	0.193	-0.29	51%	-5.9	64	flattener	3.105	3.265	16	12.7	6.8	99	None	None	steepener	3.235	3.265	3	0.3	6.2	99	-0.29	51%
1m 3s/30s	1Mx3Y	1Mx30Y	3.244	3.142	-10.2	3.173	3.131	-4.1	7.51	5.26	0.148	-0.35	58%	-6.0	72	flattener	3.101	3.131	3	13.2	7.1	99	None	None	steepener	3.241	3.131	-11	0.8	6.9	99	-0.35	58%
1m 5s/7s	1Mx5Y	1Mx7Y	3.138	3.139	0.2	3.096	3.110	1.4	6.85	6.47	0.736	-0.05	30%	-1.2	13	flattener	3.080	3.110	3	2.8	1.6	99	None	None	steepener	3.110	3.110	0	0.2	1.4	98	-0.05	30%
1m 5s/10s	1Mx5Y	1Mx10Y	3.138	3.183	4.5	3.096	3.163	6.7	6.85	5.94	0.539	-0.11	35%	-2.2	26	flattener	3.063	3.163	10	5.5	3.3	99	None	None	steepener	3.123	3.163	4	0.5	2.7	98	-0.11	35%
1m 5s/20s	1Mx5Y	1Mx20Y	3.138	3.277	13.9	3.096	3.265	16.8	6.85	5.55	0.314	-0.21	46%	-2.9	45	flattener	3.055	3.265	21	7.1	4.2	99	None	None	steepener	3.135	3.265	13	0.9	3.8	99	-0.21	46%
1m 8s/30s	1Mx5Y	1Mx30Y	3.138	3.142	0.5	3.096	3.131	3.5	6.85	5.26	0.240	-0.27	54%	-3.0	54	flattener	3.041	3.131	9	8.5	5.5	99	None	None	steepener	3.151	3.131	-2	2.5	5.5	98	-0.27	54%
1m 7s/10s	1Mx7Y	1Mx10Y	3.139	3.183	4.3	3.110	3.163	5.3	6.47	5.94	0.732	-0.05	32%	-0.9	13	flattener	3.093	3.163	7	2.7	1.7	99	None	None	steepener	3.123	3.163	4	0.3	1.3	98	-0.05	32%
1m 7s/20s	1Mx7Y	1Mx20Y	3.139	3.277	13.8	3.110	3.265	15.4	6.47	5.55	0.426	-0.15	44%	-1.6	32	flattener	3.085	3.265	18	4.2	2.6	99	None	None	steepener	3.145	3.265	12	1.8	3.4	98	-0.15	44%
1m 7s/30s	1Mx7Y	1Mx30Y	3.139	3.142	0.3	3.110	3.131	2.1	6.47	5.26	0.326	-0.21	54%	-1.8	42	flattener	3.071	3.131	6	5.7	3.9	99	None	None	steepener	3.151	3.131	-2	2.3	4.1	98	-0.21	54%
1m 10s/20s	1Mx10Y	1Mx20Y	3.183	3.277	9.4	3.163	3.265	10.2	5.94	5.55	0.582	-0.09	45%	-0.7	20	flattener	3.145	3.265	12	2.6	1.8	99	None	None	steepener	3.175	3.265	9	0.4	1.2	99	-0.09	45%
1m 10s/30s	1Mx10Y	1Mx30Y	3.183	3.142	-4.0	3.163	3.131	-3.2	5.94	5.26	0.445	-0.16	56%	-0.9	30	flattener	3.141	3.131	-1	3.0	2.2	99	None	None	steepener	3.181	3.131	-5	1.0	1.8	99	-0.16	56%
1m 20s/30s	1Mx20Y	1Mx30Y	3.277	3.142	-13.5	3.265	3.131	-13.3	5.55	5.26	0.764	-0.06	64%	-0.1	10	flattener	3.251	3.131	-12	1.5	1.3	99	None	None	steepener	3.271	3.131	-14	0.5	0.7	98	-0.06	64%

*The table provides various benchmark curve trades that can be done conditionally in a rally or a selloff for various forwards (1M, 3M, 6M and 9M) and relevant statistics. For example, a given benchmark structure such as 3m 2s/10s can be broken down into a left structure (3Mx2Y) and right structure (3Mx10Y) with the relevant left and right spot rates, ATMF rates, and swaption vols. Fwd risk ratio is the ratio between the annuities of the left swap to the right swap. 1Y beta and 1Y rsq columns indicate the regression stats for regressing the spot curve against the spot rates. Carry on steepener column indicates the 3M slide (i.e. slide) of the specific curve pair for a steepener, except for 1M expiries which will show 1M slide. Trade risk is the 2Y standard deviation of quarterly changes in the weighted yield spread, annualized by multiplying by sqrt(4).

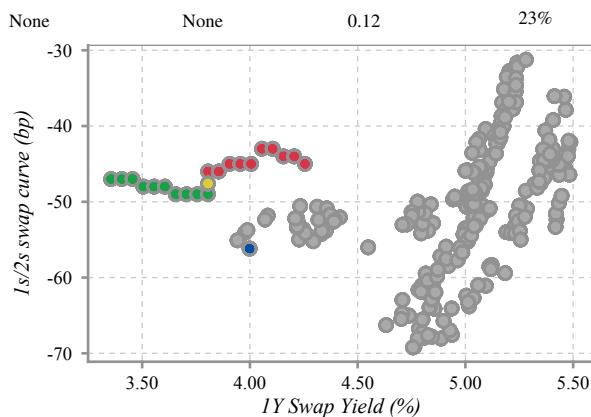
** Trade 1 (Trade 2) is a conditional bull (bear) trade done with receiver (payer) swaptions. In this construction, it will take the vol that is lower and assume it buys that swaption at the ATMF strike. Then, the strike on the other leg is iterated OTM until a risk weighted premium neutral ratio can be found, and the implied yield spread on those strikes is labeled as the "0 Cost Entry" bull (bear) columns. This implied spread is compared with both the current spot curve and the current ATMF curve, and the differences will be labeled in the "Pickup" columns. Lastly, we run two separate regressions for the spot yield curve (Y) against the spot rates (X) for all X coordinates below and above the current ATMF, and record the beta and Rsquared (note these stats will be labeled as "None" if no such points exist). For more details, refer to the footnotes of this report where the historical spread charts and isopremium lines are plotted.

Derivatives Strategy

Conditional Isopremium Curve Trades Report - 1M Expiry

1m 1s/2s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
7.38	7.68	0.51	0.12	23%

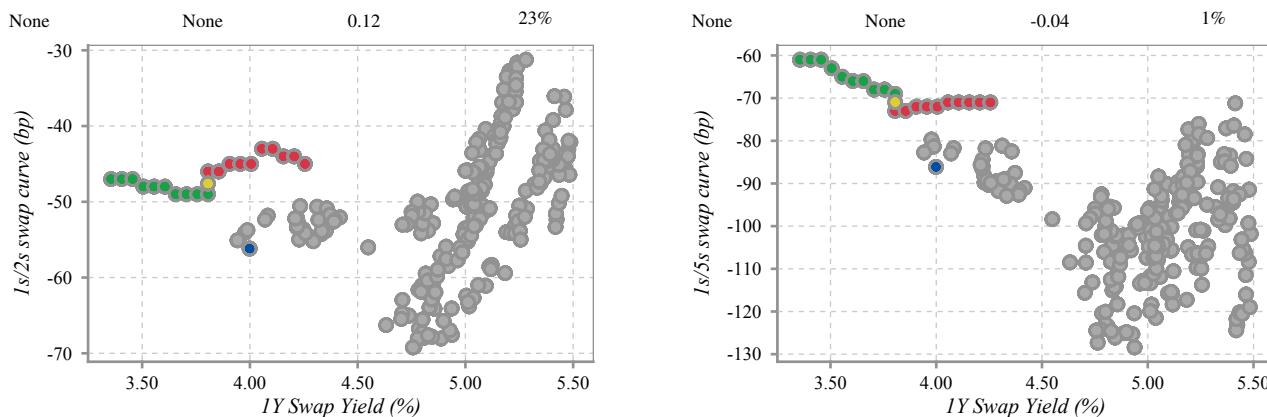


Legend:

- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATMF

1m 1s/5s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
7.38	6.85	0.21	-0.04	1%

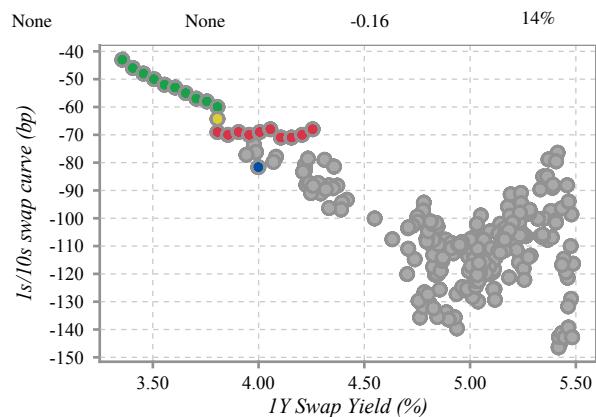


Legend:

- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATMF

1m 1s/10s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
7.38	5.94	0.11	-0.16	14%

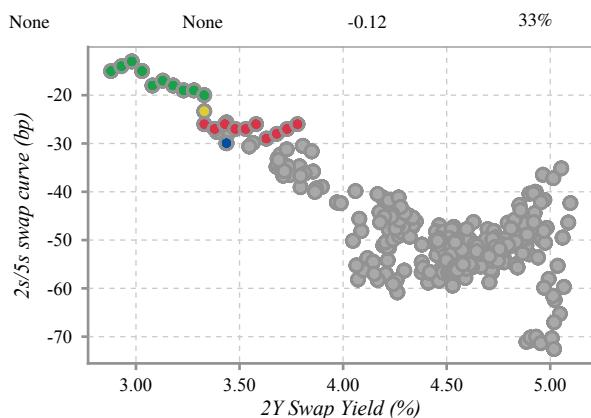


Legend:

- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATMF

1m 2s/5s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
7.68	6.85	0.42	-0.12	33%

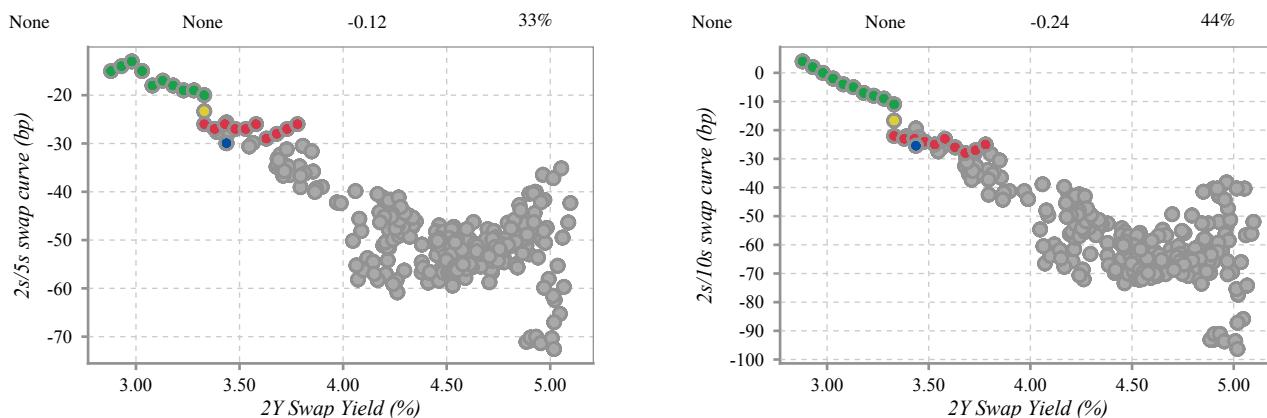


Legend:

- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATMF

1m 2s/10s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
7.68	5.94	0.22	-0.24	44%

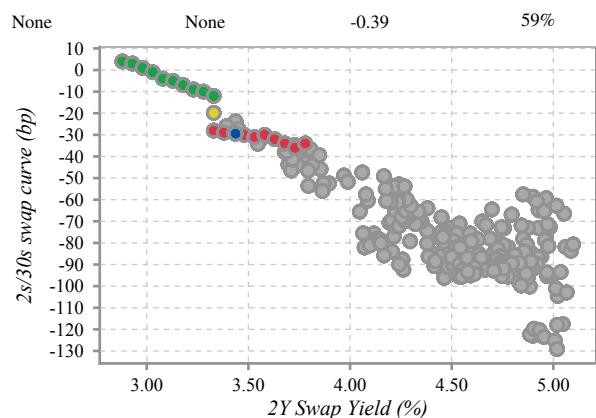


Legend:

- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATMF

1m 2s/30s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
7.68	5.26	0.10	-0.39	59%



Legend:

- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATMF

* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus current 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATMF (yellow dot); past 1Y history.

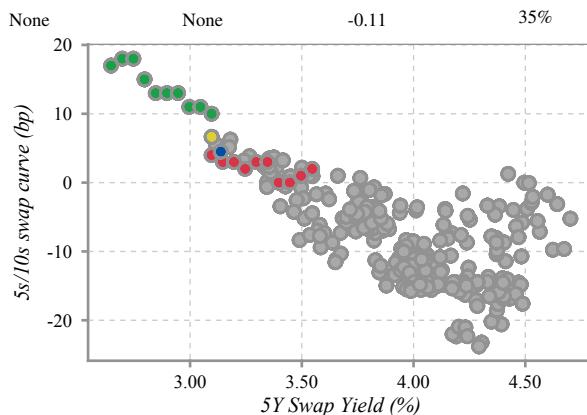
** Premium neutral strike levels are determined by starting at the ATMF strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wols for each leg risk ratio, and two other separate regression stats of beta above and below ATMF rates (spot yield curve (Y) against the spot rates (X) for all t-cordinates below and above the current ATMF); stats will be labeled as "None" if no such points exist. For more details, refer to the footnotes of this report where the full statistics tables are shown.

Derivatives Strategy

Conditional Isopremium Curve Trades Report - 1M Expiry

1m 5s/10s

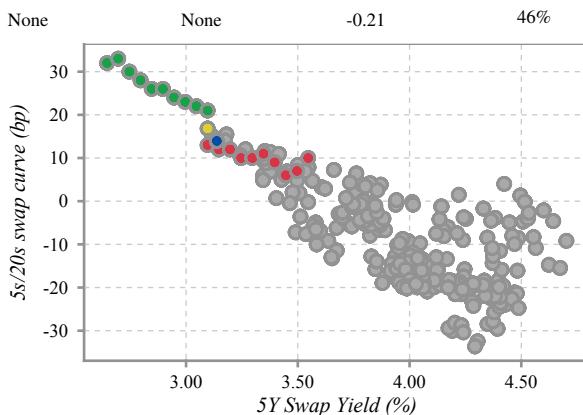
Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.85	5.94	0.54	-0.11	35%



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

1m 5s/20s

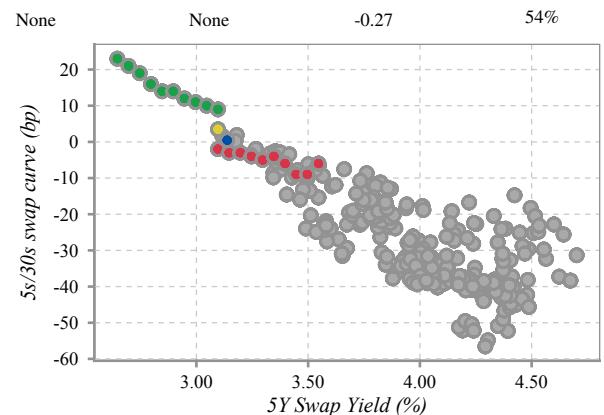
Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.85	5.55	0.31	-0.21	46%



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

1m 5s/30s

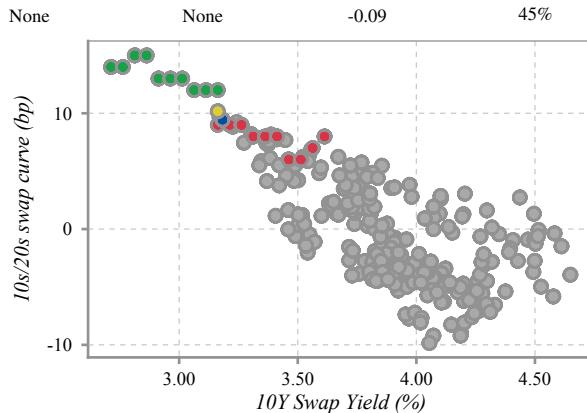
Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.85	5.26	0.24	-0.27	54%



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

1m 10s/20s

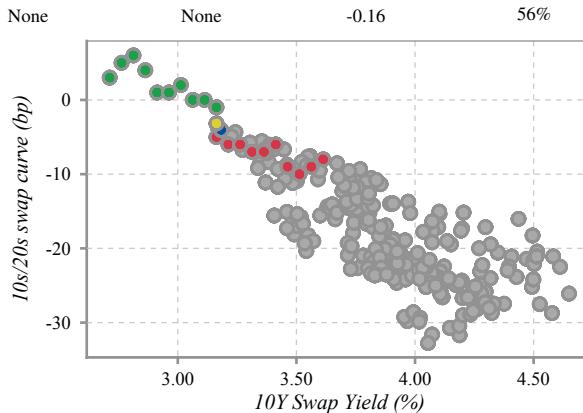
Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
5.94	5.55	0.58	-0.09	45%



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

1m 10s/30s

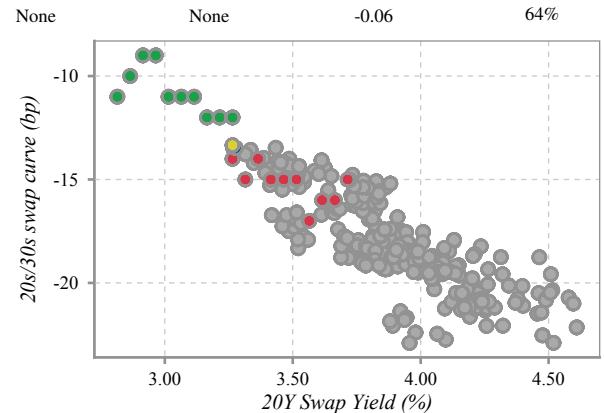
Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
5.94	5.26	0.44	-0.16	56%



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

1m 20s/30s

Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
5.55	5.26	0.76	-0.06	64%



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus spot 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATMF (yellow dot); past 1Y history.
** Premium neutral strike levels are determined by starting at the ATMF strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wvol for each leg risk ratio, and two other separate regression stats of beta above and below ATMF rates (spot yield curve (Y) against the spot rates (X) for all x coordinates below and above the current ATMF; stats will be labeled "None" if no such points exist). For more details, refer to the footnotes of this report where the full statistics tables are shown.

Derivatives Strategy

Conditional Isopremium Curve Trades Report - 3M Expiry

Curve Structure	Curve Left Struct	Curve Right Struct	Spot Rate Left (%)	Spot Rate Right (%)	Spot Curve (bp)	ATMF Left (%)	ATMF Right (%)	ATMF Curve (bp)	Bp vol Left	Bp vol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq	Carry on Stpnrs (bp)	Trade Risk (bp)	Trade 1 Bull	Trade1 Left Strike (%)	Trade1 Right Strike (%)	0 Cost Entry Bull (bp)	Pickup vs. Spot Crv (Bull)	Pickup vs. ATMF Crv (Bull)	Bull Entry %ile	Below ATMF Beta	Below ATMF Rsrq	Trade 2 Bear	Trade2 Left Strike (%)	Trade2 Right Strike (%)	0 Cost Entry Bear (bp)	Pickup vs. Spot Crv (Bear)	Pickup vs. ATMF Crv (Bear)	Bear Entry %ile	Above ATMF Beta	Above ATMF Rsrq
3m 1s/2s	3Mx1Y 3Mx2Y	3.999 3.437 -56.2	3.472 3.152 -32.0	7.61 7.87 0.509	0.12 23%	-24.2 33	steepener	3.472 3.132 -34	-22.2	2.0	3	None None	flattener	3.472 3.172 -30	26.2	2.0	1	0.12 23%															
3m 1s/3s	3Mx1Y 3Mx3Y	3.999 3.244 -75.5	3.472 3.058 -41.5	7.61 7.77 0.345	0.06 4%	-34.0 49	steepener	3.472 3.042 -43	-32.5	1.5	1	None None	flattener	3.472 3.062 -41	34.5	0.5	1	0.06 4%															
3m 1s/5s	3Mx1Y 3Mx5Y	3.999 3.138 -86.1	3.472 3.032 -44.1	7.61 7.23 0.213	-0.04 1%	-42.0 63	flattener	3.452 3.032 -42	44.1	2.1	99	None None	steepener	3.492 3.032 -46	-40.1	1.9	99	-0.04 1%															
3m 1s/7s	3Mx1Y 3Mx7Y	3.999 3.139 -86.0	3.472 3.066 -40.6	7.61 6.91 0.156	-0.10 7%	-45.3 71	flattener	3.426 3.066 -36	50.0	4.6	99	None None	steepener	3.516 3.066 -45	-41.0	4.4	99	-0.10 7%															
3m 1s/10s	3Mx1Y 3Mx10Y	3.999 3.183 -81.6	3.472 3.133 -33.9	7.61 6.47 0.115	-0.16 14%	-47.7 80	flattener	3.403 3.133 -27	54.6	6.9	99	None None	steepener	3.543 3.133 -41	-40.6	7.1	99	-0.16 14%															
3m 1s/20s	3Mx1Y 3Mx20Y	3.999 3.277 -72.2	3.472 3.245 -22.7	7.61 6.09 0.067	-0.27 28%	-49.5 92	flattener	3.385 3.245 -14	58.2	8.7	99	None None	steepener	3.565 3.245 -32	-40.2	9.3	99	-0.27 28%															
3m 1s/30s	3Mx1Y 3Mx30Y	3.999 3.142 -85.6	3.472 3.113 -35.9	7.61 5.81 0.051	-0.33 38%	-49.7 98	flattener	3.373 3.113 -26	59.6	9.9	99	None None	steepener	3.573 3.113 -46	-39.6	10.1	99	-0.33 38%															
3m 2s/3s	3Mx2Y 3Mx3Y	3.437 3.244 -19.3	3.152 3.058 -9.4	7.87 7.77 0.677	-0.04 14%	-9.8 18	flattener	3.148 3.058 -9	10.3	0.4	99	None None	steepener	3.158 3.058 -10	-9.3	0.6	99	-0.04 14%															
3m 2s/5s	3Mx2Y 3Mx5Y	3.437 3.138 -29.9	3.152 3.032 -12.1	7.87 7.23 0.418	-0.12 33%	-17.9 38	flattener	3.112 3.032 -8	21.9	4.1	99	None None	steepener	3.192 3.032 -16	-13.9	3.9	99	-0.12 33%															
3m 2s/7s	3Mx2Y 3Mx7Y	3.437 3.139 -29.8	3.152 3.066 -8.6	7.87 6.91 0.307	-0.18 39%	-21.1 50	flattener	3.096 3.066 -3	26.8	5.6	99	None None	steepener	3.206 3.066 -14	-15.8	5.4	99	-0.18 39%															
3m 2s/10s	3Mx2Y 3Mx10Y	3.437 3.183 -25.4	3.152 3.133 -1.9	7.87 6.47 0.225	-0.24 44%	-23.5 61	flattener	3.073 3.133 -6	31.4	7.9	99	None None	steepener	3.233 3.133 -10	-15.4	8.1	99	-0.24 44%															
3m 2s/20s	3Mx2Y 3Mx20Y	3.437 3.277 -16.0	3.152 3.245 9.3	7.87 6.09 0.131	-0.33 53%	-25.3 78	flattener	3.055 3.245 -19	35.0	9.7	99	None None	steepener	3.255 3.245 -1	-15.0	10.3	99	-0.33 53%															
3m 2s/30s	3Mx2Y 3Mx30Y	3.437 3.142 -29.5	3.152 3.113 -3.9	7.87 5.81 0.100	-0.39 59%	-25.6 86	flattener	3.033 3.113 -8	37.5	11.9	99	None None	steepener	3.273 3.113 -16	-13.5	12.1	99	-0.39 59%															
3m 3s/5s	3Mx3Y 3Mx5Y	3.244 3.138 -10.6	3.058 3.032 -2.6	7.77 7.23 0.617	-0.08 36%	-8.0 21	flattener	3.022 3.032 -1	11.6	3.6	99	None None	steepener	3.092 3.032 -6	-4.6	3.4	99	-0.08 36%															
3m 3s/7s	3Mx3Y 3Mx7Y	3.244 3.139 -10.5	3.058 3.066 0.8	7.77 6.91 0.454	-0.14 38%	-11.3 34	flattener	3.006 3.066 -6	16.5	5.2	99	None None	steepener	3.106 3.066 -4	-6.5	4.8	99	-0.14 38%															
3m 3s/10s	3Mx3Y 3Mx10Y	3.244 3.183 -6.1	3.058 3.133 7.5	7.77 6.47 0.333	-0.19 42%	-13.7 46	flattener	2.983 3.133 -15	21.1	7.5	99	None None	steepener	3.133 3.133 -0	-6.1	7.5	99	-0.19 42%															
3m 3s/20s	3Mx3Y 3Mx20Y	3.244 3.277 3.3	3.058 3.245 18.7	7.77 6.09 0.194	-0.29 51%	-15.4 64	flattener	2.965 3.245 -28	24.7	9.3	99	None None	steepener	3.155 3.245 -9	-5.7	9.7	99	-0.29 51%															
3m 3s/30s	3Mx3Y 3Mx30Y	3.244 3.142 -10.2	3.058 3.113 5.5	7.77 5.81 0.148	-0.35 58%	-15.7 73	flattener	2.953 3.113 -16	26.2	10.5	99	None None	steepener	3.173 3.113 -6	-4.2	11.5	99	-0.35 58%															
3m 5s/7s	3Mx5Y 3Mx7Y	3.138 3.139 0.2	3.032 3.066 3.4	7.23 6.91 0.735	-0.05 30%	-3.3 13	flattener	3.016 3.066 -5	4.8	1.6	99	None None	steepener	3.046 3.066 -2	-1.8	1.4	99	-0.05 30%															
3m 5s/10s	3Mx5Y 3Mx10Y	3.138 3.183 4.5	3.032 3.133 10.1	7.23 6.47 0.539	-0.11 35%	-5.6 26	flattener	2.993 3.133 -14	9.5	3.9	99	None None	steepener	3.073 3.133 -6	-1.5	4.1	99	-0.11 35%															
3m 5s/20s	3Mx5Y 3Mx20Y	3.138 3.277 13.9	3.032 3.245 21.4	7.23 6.09 0.314	-0.21 46%	-7.4 45	flattener	2.965 3.245 -28	14.1	6.6	99	None None	steepener	3.095 3.245 -15	-1.1	6.4	99	-0.21 46%															
3m 5s/30s	3Mx5Y 3Mx30Y	3.138 3.142 0.5	3.032 3.113 8.2	7.23 5.81 0.240	-0.27 54%	-7.7 54	flattener	2.953 3.113 -16	15.5	7.8	99	None None	steepener	3.113 3.113 -0	0.5	8.2	99	-0.27 54%															
3m 7s/10s	3Mx7Y 3Mx10Y	3.139 3.183 4.3	3.066 3.133 6.7	6.91 6.47 0.733	-0.05 32%	-2.4 13	flattener	3.043 3.133 -9	4.7	2.3	99	None None	steepener	3.093 3.133 -4	0.3	2.7	99	-0.05 32%															
3m 7s/20s	3Mx7Y 3Mx20Y	3.139 3.277 13.8	3.066 3.245 17.9	6.91 6.09 0.427	-0.15 44%	-4.1 32	flattener	3.015 3.245 -23	9.2	5.1	99	None None	steepener	3.115 3.245 -13	0.8	4.9	99	-0.15 44%															
3m 7s/30s	3Mx7Y 3Mx30Y	3.139 3.142 0.3	3.066 3.113 4.7	6.91 5.81 0.326	-0.21 54%	-4.4 42	flattener	3.003 3.113 -11	10.7	6.3	99	None None	steepener	3.133 3.113 -2	2.3	6.7	98	-0.21 54%															
3m 10s/20s	3Mx10Y 3Mx20Y	3.183 3.277 9.4	3.133 3.245 11.2	6.47 6.09 0.582	-0.09 45%	-1.8 20	flattener	3.115 3.245 -13	3.6	1.8	99	None None	steepener	3.155 3.245 -9	0.4	2.2	99	-0.09 45%															
3m 10s/30s	3Mx10Y 3Mx30Y	3.183 3.142 -4.0	3.133 3.113 -2.0	6.47 5.81 0.445	-0.16 56%	-2.1 30	flattener	3.093 3.113 -2	6.0	4.0	99	None None	steepener	3.173 3.113 -6	2.0	4.0	98	-0.16 56%															
3m 20s/30s	3Mx20Y 3Mx30Y	3.277 3.142 -13.5	3.245 3.113 -13.2	6.09 5.81 0.764	-0.06 64%	-0.3 10	flattener	3.233 3.113 -12	1.5	1.2	99	None None	steepener	3.263 3.113 -15	1.5	1.8	89	-0.06 64%															

*The table provides various benchmark curve trades that can be done conditionally in a rally or a selloff for various forwards (1M, 3M, 6M and 9M) and relevant statistics. For example, a given benchmark structure such as 3m 2s/10s can be broken down into a left structure (3Mx2Y) and right structure (3Mx10Y) with the relevant left and right spot rates, ATMF rates, and swaption vols. Fwd risk ratio is the ratio between the annuities of the left swap to the right swap. 1Y beta and 1Y rsq columns indicate the regression stats for regressing the spot curve against the spot rates. Carry on steepener column indicates the 3M slide (i.e. slide) of the specific curve pair for a steepener, except for 1M expiries which will show 1M slide. Trade risk is the 2Y standard deviation of quarterly changes in the weighted yield spread, annualized by multiplying by sqrt(4).

** Trade 1 (Trade 2) is a conditional bull (bear) trade done with receiver (payer) swaptions. In this construction, it will take the vol that is lower and assume it buys that swaption at the ATMF strike. Then, the strike on the other leg is iterated OTM until a risk weighted premium neutral ratio can be found, and the implied yield spread on those strikes is labeled as the "0 Cost Entry" bull (bear) columns. This implied spread is compared with both the current spot curve and the current ATMF curve, and the differences will be labeled in the "Pickup" columns. Lastly, we run two separate regressions for the spot yield curve (Y) against the spot rates (X) for all X coordinates below and above the current ATMF, and record the beta and R-squared (note these stats will be labeled as "None" if no such points exist). For more details, refer to the footnotes of this report where the historical spread charts and isopremium lines are plotted.

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Derivatives Strategy

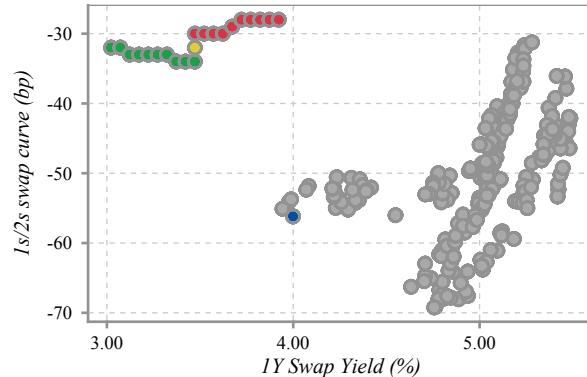
Conditional Isopremium Curve Trades Report - 3M Expiry

3m 1s/2s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.61	7.87	0.51	0.12	23%

Beta below ATMF Rsq below ATMF Beta above ATMF Rsq above ATMF

None None 0.12 23%



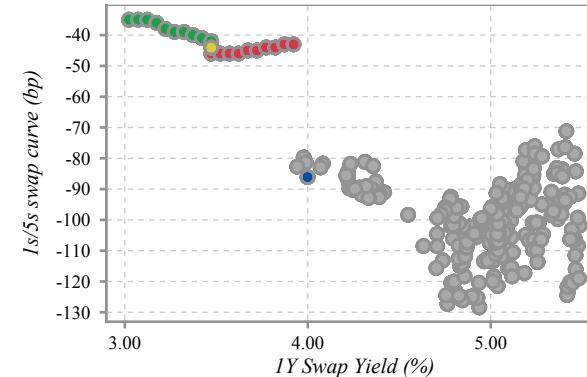
- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATM

3m 1s/5s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.61	7.23	0.21	-0.04	1%

Beta below ATMF Rsq below ATMF Beta above ATMF Rsq above ATMF

None None -0.04 1%



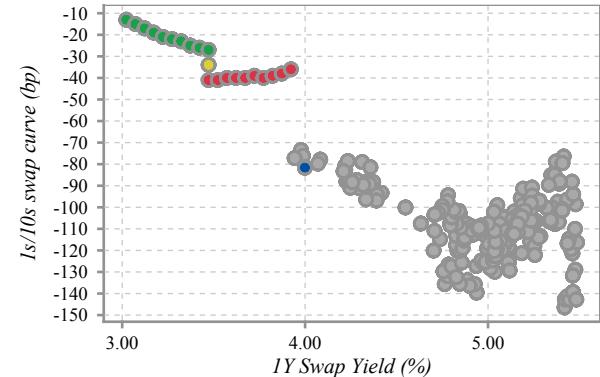
- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATM

3m 1s/10s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.61	6.47	0.11	-0.16	14%

Beta below ATMF Rsq below ATMF Beta above ATMF Rsq above ATMF

None None -0.16 14%



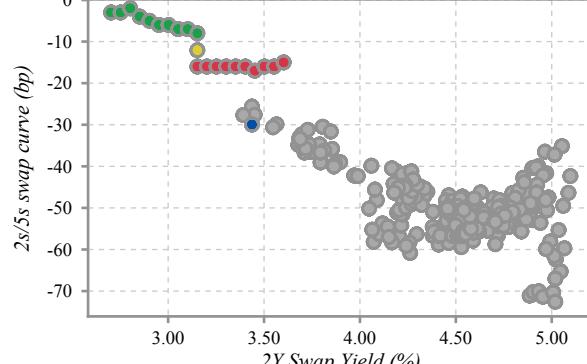
- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATM

3m 2s/5s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.87	7.23	0.42	-0.12	33%

Beta below ATMF Rsq below ATMF Beta above ATMF Rsq above ATMF

None None -0.12 33%



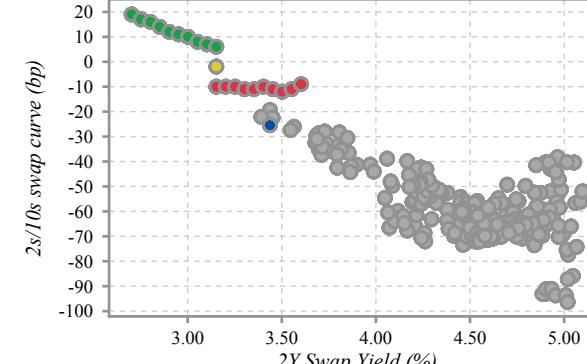
- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATM

3m 2s/10s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.87	6.47	0.23	-0.24	44%

Beta below ATMF Rsq below ATMF Beta above ATMF Rsq above ATMF

None None -0.24 44%



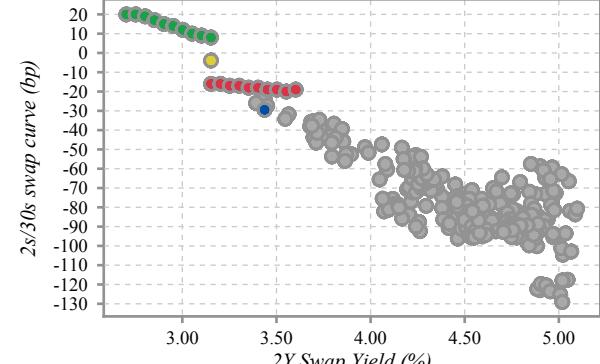
- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATM

3m 2s/30s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.87	5.81	0.10	-0.39	59%

Beta below ATMF Rsq below ATMF Beta above ATMF Rsq above ATMF

None None -0.39 59%



- Historical spread
- Isopremium (Bull)
- Isopremium (Bear)
- Spot
- ATM

* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus spot 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATM (yellow dot); past 1Y history.

** Premium neutral strike levels are determined by starting at the ATM strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wvol for each leg risk ratio, and two other separate regression stats of beta above and below ATM rates (spot yield curve (%)) against the spot rates (%) for all x-coordinates below and above the current ATM; stats will be labeled as "None" if no such points exist. For more details, refer to the footnotes of this report where the full statistics tables are shown.

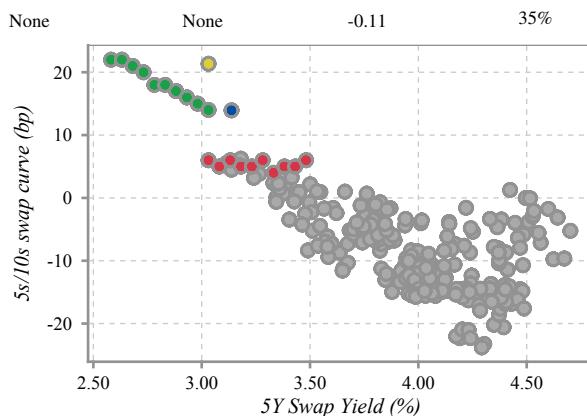
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Derivatives Strategy

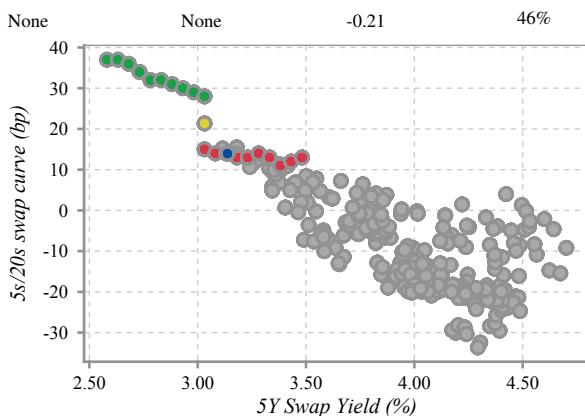
Conditional Isopremium Curve Trades Report - 3M Expiry

3m 5s/10s

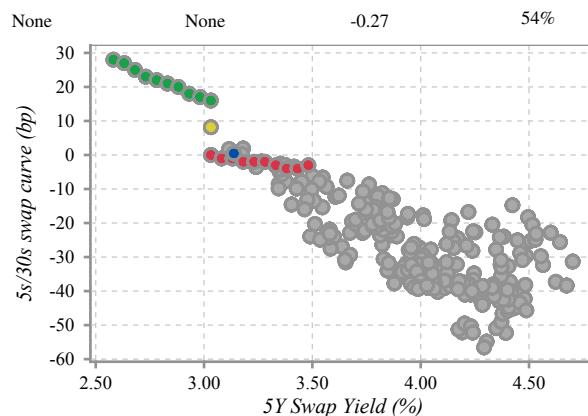
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.23	6.47	0.54	-0.11	35%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.23	6.09	0.31	-0.21	46%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	

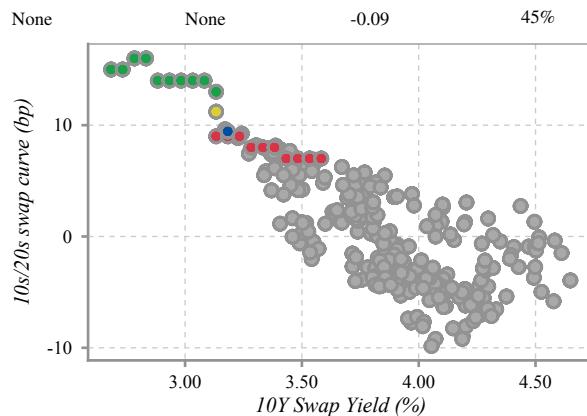


Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.23	5.81	0.24	-0.27	54%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	

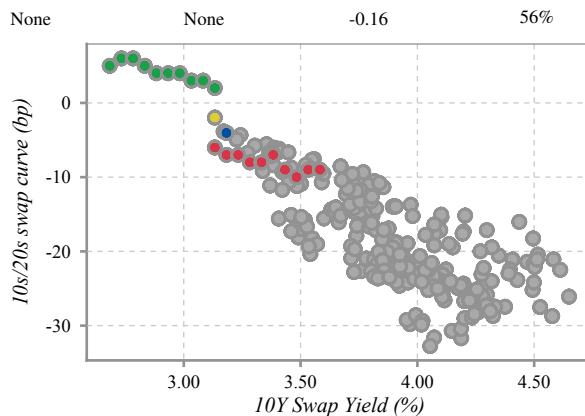


3m 10s/20s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.47	6.09	0.58	-0.09	45%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	

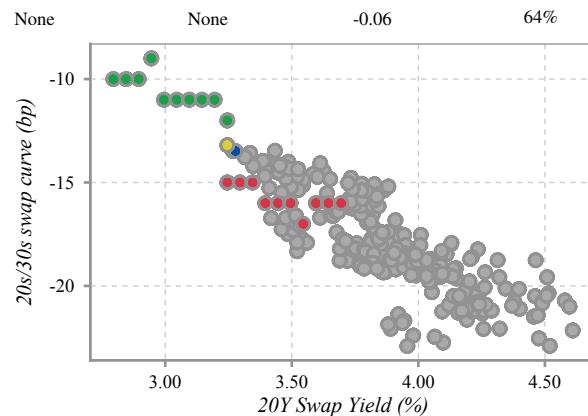


Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.47	5.81	0.45	-0.16	56%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



3m 10s/30s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.09	5.81	0.76	-0.06	64%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus spot 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATM (yellow dot); past 1Y history.
** Premium neutral strike levels are determined by starting at the ATM (ATMF) strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wvol for each leg risk ratio, and two other separate regression stats of beta above and below ATM (wvol = spot yield curve (Y) against the spot rates (X) for all x-coordinates below and above the current ATM); stats will be labeled as "None" if no such points exist. For more details, refer to the footnotes of this report where the full statistics tables are shown.

Derivatives Strategy

Conditional Isopremium Curve Trades Report - 6M Expiry

Curve Structure	Curve Left Struct	Curve Right Struct	Spot Rate Left (%)	Spot Rate Right (%)	Spot Curve (bp)	ATMF Left (%)	ATMF Right (%)	ATMF Curve (bp)	Bp vol Left	Bp vol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq	Carry on Stpnrs (bp)	Trade Risk (bp)	Trade 1 Bull	Trade1 Left Strike (%)	Trade1 Right Strike (%)	0 Cost Entry Bull (bp)	Pickup vs. Spot Crv (Bull)	Pickup vs. ATMF Crv (Bull)	Bull Entry %ile	Below ATMF Beta	Below ATMF Rsrq	Trade 2 Bear	Trade2 Left Strike (%)	Trade2 Right Strike (%)	0 Cost Entry Bear (bp)	Pickup vs. Spot Crv (Bear)	Pickup vs. ATMF Crv (Bear)	Bear Entry %ile	Above ATMF Beta	Above ATMF Rsrq
6m 1s/2s	6Mx1Y 6Mx2Y	3.999 3.437 -56.2	3.129 2.974 -15.5	7.58 7.59 0.506	0.12 23%	-16.5 31	steepener	3.129 2.969 -16	-40.2	0.5	1	None	None	flattener	3.129 2.979 -15	41.2	0.5	1	0.12	23%													
6m 1s/3s	6Mx1Y 6Mx3Y	3.999 3.244 -75.5	3.129 2.944 -18.6	7.58 7.44 0.343	0.06 4%	-22.9 46	flattener	3.114 2.944 -17	58.5	1.6	99	None	None	steepener	3.144 2.944 -20	-55.5	1.4	99	0.06	4%													
6m 1s/5s	6Mx1Y 6Mx5Y	3.999 3.138 -86.1	3.129 2.970 -15.9	7.58 6.92 0.212	-0.04 1%	-28.2 62	flattener	3.070 2.970 -10	76.1	5.9	99	None	None	steepener	3.180 2.970 -21	-65.1	5.1	99	-0.04	1%													
6m 1s/7s	6Mx1Y 6Mx7Y	3.999 3.139 -86.0	3.129 3.025 -10.4	7.58 6.66 0.156	-0.10 7%	-30.2 72	flattener	3.055 3.025 -3	83.0	7.4	99	None	None	steepener	3.205 3.025 -18	-68.0	7.6	99	-0.10	7%													
6m 1s/10s	6Mx1Y 6Mx10Y	3.999 3.183 -81.6	3.129 3.107 -2.2	7.58 6.29 0.114	-0.16 14%	-31.7 81	flattener	3.027 3.107 8	89.6	10.2	99	None	None	steepener	3.237 3.107 -13	-68.6	10.8	99	-0.16	14%													
6m 1s/20s	6Mx1Y 6Mx20Y	3.999 3.277 -72.2	3.129 3.227 9.7	7.58 5.92 0.067	-0.27 28%	-32.5 95	flattener	2.997 3.227 23	95.2	13.3	99	None	None	steepener	3.267 3.227 -4	-68.2	13.7	99	-0.27	28%													
6m 1s/30s	6Mx1Y 6Mx30Y	3.999 3.142 -85.6	3.129 3.094 -3.5	7.58 5.65 0.051	-0.33 38%	-32.4 103	flattener	2.984 3.094 11	96.6	14.5	99	None	None	steepener	3.284 3.094 -19	-66.6	15.5	99	-0.33	38%													
6m 2s/3s	6Mx2Y 6Mx3Y	3.437 3.244 -19.3	2.974 2.944 -3.0	7.59 7.44 0.678	-0.04 14%	-6.4 17	flattener	2.964 2.944 -2	17.3	1.0	99	None	None	steepener	2.984 2.944 -4	-15.3	1.0	99	-0.04	14%													
6m 2s/5s	6Mx2Y 6Mx5Y	3.437 3.138 -29.9	2.974 2.970 -0.4	7.59 6.92 0.419	-0.12 33%	-11.7 37	flattener	2.920 2.970 5	34.9	5.4	99	None	None	steepener	3.030 2.970 -6	-23.9	5.6	99	-0.12	33%													
6m 2s/7s	6Mx2Y 6Mx7Y	3.437 3.139 -29.8	2.974 3.025 5.1	7.59 6.66 0.308	-0.18 39%	-13.8 49	flattener	2.895 3.025 13	42.8	7.9	99	None	None	steepener	3.055 3.025 -3	-26.8	8.1	99	-0.18	39%													
6m 2s/10s	6Mx2Y 6Mx10Y	3.437 3.183 -25.4	2.974 3.107 13.3	7.59 6.29 0.226	-0.24 44%	-15.3 61	flattener	2.867 3.107 24	49.4	10.7	99	None	None	steepener	3.077 3.107 3	-28.4	10.3	99	-0.24	44%													
6m 2s/20s	6Mx2Y 6Mx20Y	3.437 3.277 -16.0	2.974 3.227 25.3	7.59 5.92 0.131	-0.33 53%	-16.0 78	flattener	2.847 3.227 38	54.0	12.7	99	None	None	steepener	3.107 3.227 12	-28.0	13.3	99	-0.33	53%													
6m 2s/30s	6Mx2Y 6Mx30Y	3.437 3.142 -29.5	2.974 3.094 12.1	7.59 5.65 0.100	-0.39 59%	-16.0 86	flattener	2.824 3.094 27	56.5	14.9	99	None	None	steepener	3.124 3.094 -3	-26.5	15.1	99	-0.39	59%													
6m 3s/5s	6Mx3Y 6Mx5Y	3.244 3.138 -10.6	2.944 2.970 2.7	7.44 6.92 0.618	-0.08 36%	-5.3 21	flattener	2.900 2.970 7	17.6	4.3	99	None	None	steepener	2.990 2.970 -2	-8.6	4.7	99	-0.08	36%													
6m 3s/7s	6Mx3Y 6Mx7Y	3.244 3.139 -10.5	2.944 3.025 8.2	7.44 6.66 0.454	-0.14 38%	-7.3 33	flattener	2.875 3.025 15	25.5	6.8	99	None	None	steepener	3.005 3.025 2	-12.5	6.2	99	-0.14	38%													
6m 3s/10s	6Mx3Y 6Mx10Y	3.244 3.183 -6.1	2.944 3.107 16.4	7.44 6.29 0.333	-0.19 42%	-8.8 46	flattener	2.847 3.107 26	32.1	9.6	99	None	None	steepener	3.037 3.107 7	-13.1	9.4	99	-0.19	42%													
6m 3s/20s	6Mx3Y 6Mx20Y	3.244 3.277 3.3	2.944 3.227 28.3	7.44 5.92 0.194	-0.29 51%	-9.6 64	flattener	2.827 3.227 40	36.7	11.7	99	None	None	steepener	3.067 3.227 16	-12.7	12.3	99	-0.29	51%													
6m 3s/30s	6Mx3Y 6Mx30Y	3.244 3.142 -10.2	2.944 3.094 15.1	7.44 5.65 0.148	-0.35 58%	-9.5 72	flattener	2.804 3.094 29	39.2	13.9	99	None	None	steepener	3.084 3.094 1	-11.2	14.1	99	-0.35	58%													
6m 5s/7s	6Mx5Y 6Mx7Y	3.138 3.139 0.2	2.970 3.025 5.5	6.92 6.66 0.735	-0.05 30%	-2.1 13	flattener	2.945 3.025 8	7.8	2.5	99	None	None	steepener	2.995 3.025 3	-2.8	2.5	99	-0.05	30%													
6m 5s/10s	6Mx5Y 6Mx10Y	3.138 3.183 4.5	2.970 3.107 13.7	6.92 6.29 0.539	-0.11 35%	-3.6 26	flattener	2.917 3.107 19	14.5	5.3	99	None	None	steepener	3.027 3.107 8	-3.5	5.7	99	-0.11	35%													
6m 5s/20s	6Mx5Y 6Mx20Y	3.138 3.277 13.9	2.970 3.227 25.6	6.92 5.92 0.314	-0.21 46%	-4.3 44	flattener	2.887 3.227 34	20.1	8.4	99	None	None	steepener	3.057 3.227 17	-3.1	8.6	99	-0.21	46%													
6m 5s/30s	6Mx5Y 6Mx30Y	3.138 3.142 0.5	2.970 3.094 12.4	6.92 5.65 0.240	-0.27 54%	-4.3 54	flattener	2.864 3.094 23	22.5	10.6	99	None	None	steepener	3.074 3.094 2	-1.5	10.4	99	-0.27	54%													
6m 7s/10s	6Mx7Y 6Mx10Y	3.139 3.183 4.3	3.025 3.107 8.2	6.66 6.29 0.733	-0.05 32%	-1.5 13	flattener	2.997 3.107 11	6.7	2.8	99	None	None	steepener	3.057 3.107 5	-0.7	3.2	99	-0.05	32%													
6m 7s/20s	6Mx7Y 6Mx20Y	3.139 3.277 13.8	3.025 3.227 20.1	6.66 5.92 0.427	-0.15 44%	-2.2 32	flattener	2.967 3.227 26	12.2	5.9	99	None	None	steepener	3.087 3.227 14	-0.2	6.1	99	-0.15	44%													
6m 7s/30s	6Mx7Y 6Mx30Y	3.139 3.142 0.3	3.025 3.094 6.9	6.66 5.65 0.326	-0.21 54%	-2.2 42	flattener	2.944 3.094 15	14.7	8.1	99	None	None	steepener	3.114 3.094 -2	2.3	8.9	98	-0.21	54%													
6m 10s/20s	6Mx10Y 6Mx20Y	3.183 3.277 9.4	3.107 3.227 11.9	6.29 5.92 0.582	-0.09 45%	-0.7 19	flattener	3.077 3.227 15	5.6	3.1	99	None	None	steepener	3.137 3.227 9	0.4	2.9	99	-0.09	45%													
6m 10s/30s	6Mx10Y 6Mx30Y	3.183 3.142 -4.0	3.107 3.094 -1.3	6.29 5.65 0.445	-0.16 56%	-0.7 29	flattener	3.054 3.094 4	8.0	5.3	99	None	None	steepener	3.164 3.094 -7	3.0	5.7	95	-0.16	56%													
6m 20s/30s	6Mx20Y 6Mx30Y	3.277 3.142 -13.5	3.227 3.094 -13.2	5.92 5.65 0.764	-0.06 64%	0.0 10	flattener	3.204 3.094 -11	2.5	2.2	99	None	None	steepener	3.254 3.094 -16	2.5	2.8	79	-0.06	64%													

*The table provides various benchmark curve trades that can be done conditionally in a rally or a selloff for various forwards (1M, 3M, 6M and 9M) and relevant statistics. For example, a given benchmark structure such as 3m 2s/10s can be broken down into a left structure (3Mx2Y) and right structure (3Mx10Y) with the relevant left and right spot rates, ATMF rates, and swaption vols. Fwd risk ratio is the ratio between the annuities of the left swap to the right swap. 1Y beta and 1Y rsq columns indicate the regression stats for regressing the spot curve against the spot rates. Carry on steepener column indicates the 3M slide (i.e. slide) of the specific curve pair for a steepener, except for 1M expiries which will show 1M slide. Trade risk is the 2Y standard deviation of quarterly changes in the weighted yield spread, annualized by multiplying by sqrt(4).

** Trade 1 (Trade 2) is a conditional bull (bear) trade done with receiver (payer) swaptions. In this construction, it will take the vol that is lower and assume it buys that swaption at the ATMF strike. Then, the strike on the other leg is iterated OTM until a risk weighted premium neutral ratio can be found, and the implied yield spread on those strikes is labeled as the "0 Cost Entry" bull (bear) columns. This implied spread is compared with both the current spot curve and the current ATMF curve, and the differences will be labeled in the "Pickup" columns. Lastly, we run two separate regressions for the spot yield curve (Y) against the spot rates (X) for all X coordinates below and above the current ATMF, and record the beta and Rsquared (note these stats will be labeled as "None" if no such points exist). For more details, refer to the footnotes of this report where the historical spread charts and isopremium lines are plotted.

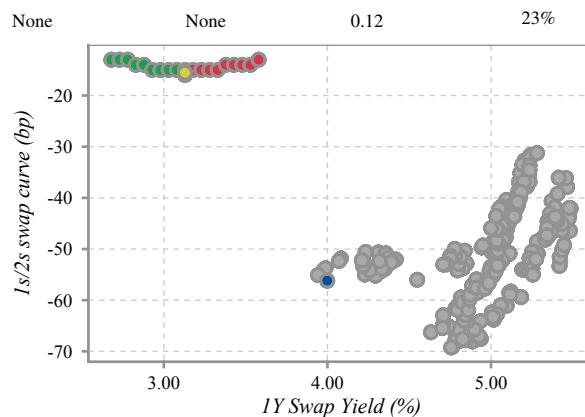
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Derivatives Strategy

Conditional Isopremium Curve Trades Report - 6M Expiry

6m 1s/2s

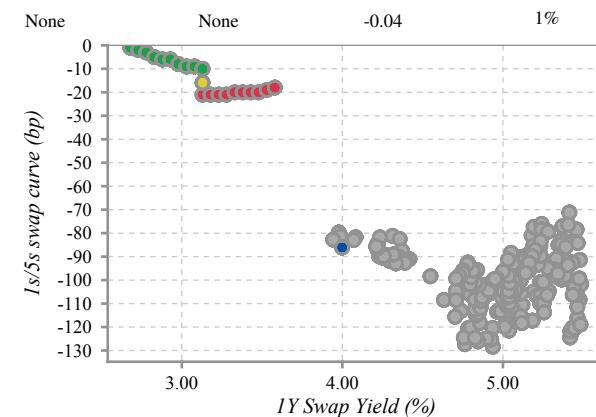
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.58	7.59	0.51	0.12	23%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

6m 1s/5s

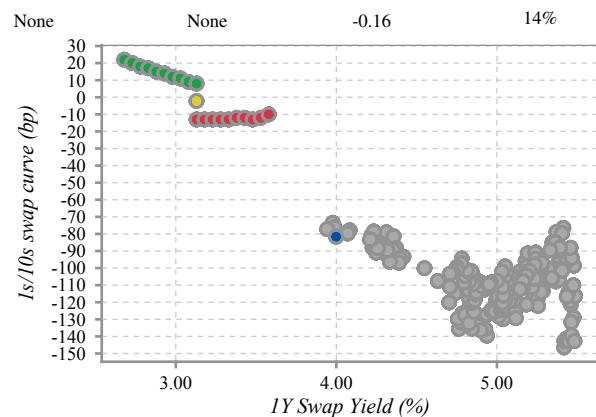
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.58	6.92	0.21	-0.04	1%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

6m 1s/10s

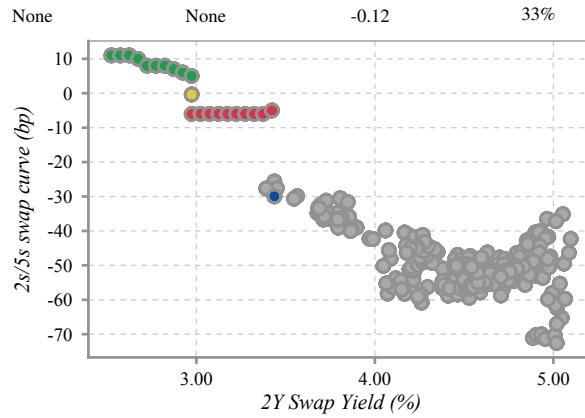
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.58	6.29	0.11	-0.16	14%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

6m 2s/5s

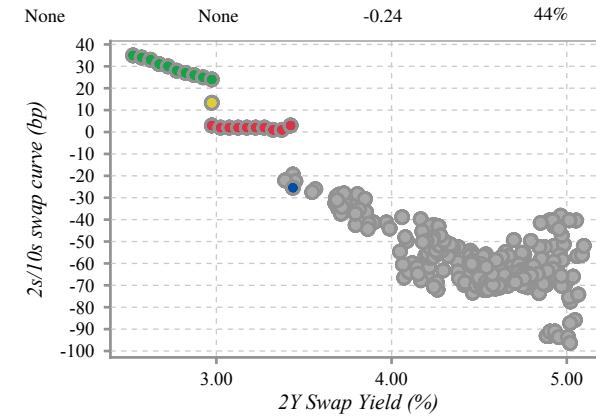
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.59	6.92	0.42	-0.12	33%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

6m 2s/10s

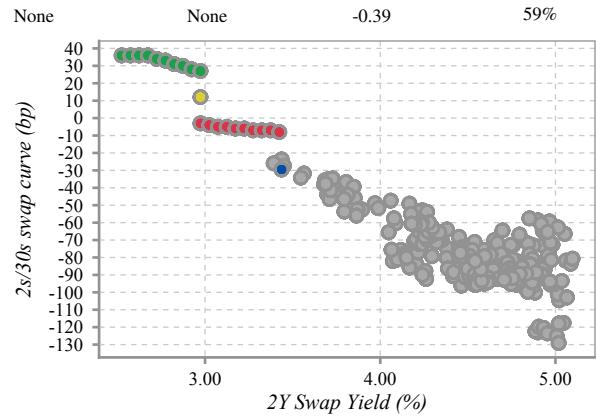
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.59	6.29	0.23	-0.24	44%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

6m 2s/30s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.59	5.65	0.10	-0.39	59%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

* On the x-axis, the chart shows the left spot rate and the y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the y axis versus spot 2Y SOFR swap yields (%) on the x axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper and flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATM (yellow dot); past 1Y history.

** Premium neutral strike levels are determined by starting at the ATM strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold and solving for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the r-squared for each leg's risk ratio and two other separate regression stats of Beta above and below ATM rates (spot yield curve (Y) against the spot rates (X) for all X coordinates below and above the current ATM; rates will be labeled as "None" if no such points exist). For more details refer to the footnotes of this report where the full statistics tables are shown.

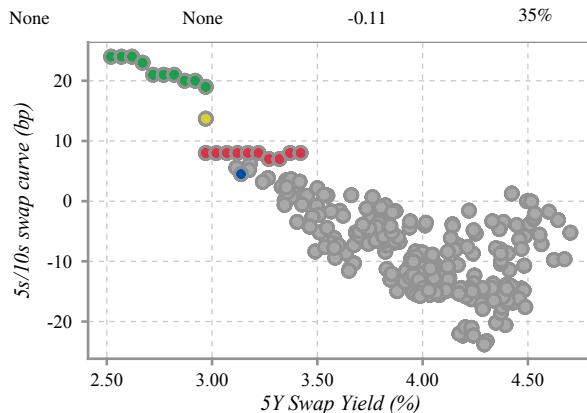
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Derivatives Strategy

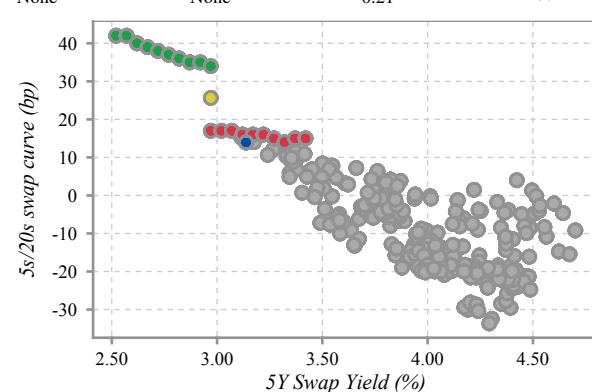
Conditional Isopremium Curve Trades Report - 6M Expiry

6m 5s/10s

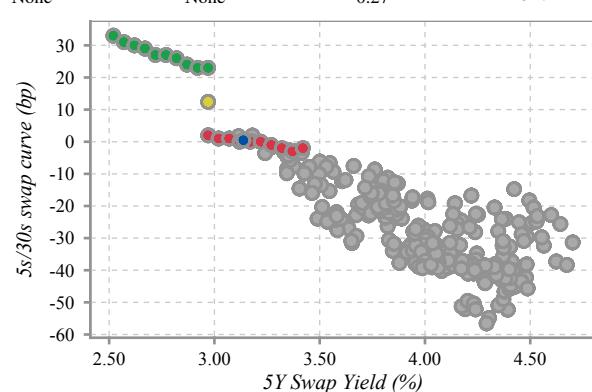
Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.92	6.29	0.54	-0.11	35%



Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.92	5.92	0.31	-0.21	46%

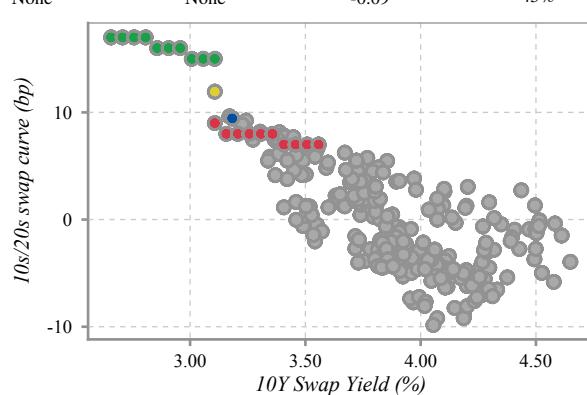


Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.92	5.65	0.24	-0.27	54%

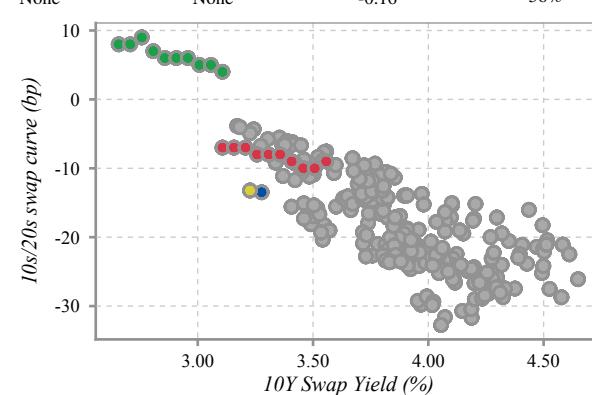


6m 10s/20s

Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.29	5.92	0.58	-0.09	45%

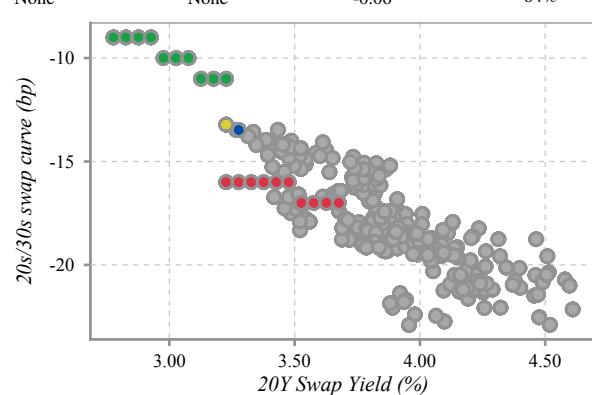


Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
6.29	5.65	0.45	-0.16	56%



6m 20s/30s

Bpvols Left	Bpvols Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	
5.92	5.65	0.76	-0.06	64%



* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus spot 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATMF (yellow dot); past 1Y history.
** Premium neutral strike levels are determined by starting at the ATMF strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wvol for each leg risk ratio, and two other separate regression stats of beta above and below ATMF rates (spot yield curve (Y) against the spot rates (X) for all coordinates below and above the current ATMF; stats will be labeled as "None" if no such points exist). For more details, refer to the footnotes of this report where the full statistics tables are shown.

Derivatives Strategy

Conditional Isopremium Curve Trades Report - 9M Expiry

Curve Structure	Curve Left Struct	Curve Right Struct	Spot Rate Left (%)	Spot Rate Right (%)	Spot Curve (bp)	ATMF Left (%)	ATMF Right (%)	ATMF Curve (bp)	Bp vol Left	Bp vol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq	Carry on Stpntr (bp)	Trade Risk (bp)	Trade 1 Bull	Trade1 Left Strike (%)	Trade1 Right Strike (%)	0 Cost Entry Bull (bp)	Pickup vs. Spot Crv (Bull)	Pickup vs. ATMF Crv (Bull)	Bull Entry %ile	Below ATMF Beta	Below ATMF Rsrq	Trade 2 Bear	Trade2 Left Strike (%)	Trade2 Right Strike (%)	0 Cost Entry Bear (bp)	Pickup vs. Spot Crv (Bear)	Pickup vs. ATMF Crv (Bear)	Bear Entry %ile	Above ATMF Beta	Above ATMF Rsrq
9m 1s/2s	9Mx1Y 9Mx2Y	3.999 3.437	-56.2	2.941 2.883	-5.8	7.65 7.45	0.509	0.12 23%	-9.7 27	flattener	2.923 2.883	-4	52.2 1.8	99 None None	steepener	2.963 2.883	-8	-48.2 2.2	99 0.12	23%													
9m 1s/3s	9Mx1Y 9Mx3Y	3.999 3.244	-75.5	2.941 2.889	-5.2	7.65 7.30	0.345	0.06 4%	-13.3 42	flattener	2.899 2.889	-1	74.5 4.2	99 None None	steepener	2.979 2.889	-9	-66.5 3.8	99 0.06	4%													
9m 1s/5s	9Mx1Y 9Mx5Y	3.999 3.138	-86.1	2.941 2.946	0.5	7.65 6.79	0.213	-0.04 1%	-16.4 58	flattener	2.856 2.946	9	95.1 8.5	99 None None	steepener	3.026 2.946	-8	-78.1 8.5	99 -0.04	1%													
9m 1s/7s	9Mx1Y 9Mx7Y	3.999 3.139	-86.0	2.941 3.011	7.0	7.65 6.57	0.157	-0.10 7%	-17.4 69	flattener	2.831 3.011	18	104.0 11.0	99 None None	steepener	3.051 3.011	-4	-82.0 11.0	99 -0.10	7%													
9m 1s/10s	9Mx1Y 9Mx10Y	3.999 3.183	-81.6	2.941 3.101	16.0	7.65 6.24	0.115	-0.16 14%	-18.2 79	flattener	2.801 3.101	30	111.6 14.0	99 None None	steepener	3.081 3.101	2	-83.6 14.0	99 -0.16	14%													
9m 1s/20s	9Mx1Y 9Mx20Y	3.999 3.277	-72.2	2.941 3.219	27.8	7.65 5.83	0.067	-0.27 28%	-18.1 94	flattener	2.769 3.219	45	117.2 17.2	99 None None	steepener	3.119 3.219	10	-82.2 17.8	99 -0.27	28%													
9m 1s/30s	9Mx1Y 9Mx30Y	3.999 3.142	-85.6	2.941 3.084	14.3	7.65 5.60	0.051	-0.33 38%	-17.8 101	flattener	2.754 3.084	33	118.6 18.7	99 None None	steepener	3.144 3.084	-6	-79.6 20.3	99 -0.33	38%													
9m 2s/3s	9Mx2Y 9Mx3Y	3.437 3.244	-19.3	2.883 2.889	0.6	7.45 7.30	0.677	-0.04 14%	-3.6 16	flattener	2.869 2.889	2	21.3 1.4	99 None None	steepener	2.899 2.889	-1	-18.3 1.6	99 -0.04	14%													
9m 2s/5s	9Mx2Y 9Mx5Y	3.437 3.138	-29.9	2.883 2.946	6.3	7.45 6.79	0.418	-0.12 33%	-6.6 35	flattener	2.816 2.946	13	42.9 6.7	99 None None	steepener	2.946 2.946	0	-29.9 6.3	99 -0.12	33%													
9m 2s/7s	9Mx2Y 9Mx7Y	3.437 3.139	-29.8	2.883 3.011	12.8	7.45 6.57	0.308	-0.18 39%	-7.7 47	flattener	2.791 3.011	22	51.8 9.2	99 None None	steepener	2.971 3.011	4	-33.8 8.8	99 -0.18	39%													
9m 2s/10s	9Mx2Y 9Mx10Y	3.437 3.183	-25.4	2.883 3.101	21.8	7.45 6.24	0.226	-0.24 44%	-8.5 58	flattener	2.761 3.101	34	59.4 12.2	99 None None	steepener	3.011 3.101	9	-34.4 12.8	99 -0.24	44%													
9m 2s/20s	9Mx2Y 9Mx20Y	3.437 3.277	-16.0	2.883 3.219	33.6	7.45 5.83	0.131	-0.33 53%	-8.3 75	flattener	2.729 3.219	49	65.0 15.4	99 None None	steepener	3.049 3.219	17	-33.0 16.6	99 -0.33	53%													
9m 2s/30s	9Mx2Y 9Mx30Y	3.437 3.142	-29.5	2.883 3.084	20.1	7.45 5.60	0.100	-0.39 59%	-8.0 83	flattener	2.704 3.084	38	67.5 17.9	99 None None	steepener	3.064 3.084	2	-31.5 18.1	99 -0.39	59%													
9m 3s/5s	9Mx3Y 9Mx5Y	3.244 3.138	-10.6	2.889 2.946	5.7	7.30 6.79	0.618	-0.08 36%	-3.0 20	flattener	2.836 2.946	11	21.6 5.3	99 None None	steepener	2.946 2.946	0	-10.6 5.7	99 -0.08	36%													
9m 3s/7s	9Mx3Y 9Mx7Y	3.244 3.139	-10.5	2.889 3.011	12.2	7.30 6.57	0.454	-0.14 38%	-4.1 32	flattener	2.811 3.011	20	30.5 7.8	99 None None	steepener	2.961 3.011	5	-15.5 7.2	99 -0.14	38%													
9m 3s/10s	9Mx3Y 9Mx10Y	3.244 3.183	-6.1	2.889 3.101	21.3	7.30 6.24	0.333	-0.19 42%	-4.9 44	flattener	2.781 3.101	32	38.1 10.7	99 None None	steepener	3.001 3.101	10	-16.1 11.3	99 -0.19	42%													
9m 3s/20s	9Mx3Y 9Mx20Y	3.244 3.277	3.3	2.889 3.219	33.0	7.30 5.83	0.194	-0.29 51%	-4.7 61	flattener	2.749 3.219	47	43.7 14.0	99 None None	steepener	3.039 3.219	18	-14.7 15.0	99 -0.29	51%													
9m 3s/30s	9Mx3Y 9Mx30Y	3.244 3.142	-10.2	2.889 3.084	19.5	7.30 5.60	0.148	-0.35 58%	-4.4 70	flattener	2.724 3.084	36	46.2 16.5	99 None None	steepener	3.064 3.084	2	-12.2 17.5	99 -0.35	58%													
9m 5s/7s	9Mx5Y 9Mx7Y	3.138 3.139	0.2	2.946 3.011	6.5	6.79 6.57	0.736	-0.05 30%	-1.1 12	flattener	2.921 3.011	9	8.8 2.5	99 None None	steepener	2.971 3.011	4	-3.8 2.5	99 -0.05	30%													
9m 5s/10s	9Mx5Y 9Mx10Y	3.138 3.183	4.5	2.946 3.101	15.6	6.79 6.24	0.539	-0.11 35%	-1.9 25	flattener	2.891 3.101	21	16.5 5.4	99 None None	steepener	3.001 3.101	10	-5.5 5.6	99 -0.11	35%													
9m 5s/20s	9Mx5Y 9Mx20Y	3.138 3.277	13.9	2.946 3.219	27.3	6.79 5.83	0.314	-0.21 46%	-1.7 43	flattener	2.849 3.219	37	23.1 9.7	99 None None	steepener	3.049 3.219	17	-3.1 10.3	99 -0.21	46%													
9m 5s/30s	9Mx5Y 9Mx30Y	3.138 3.142	0.5	2.946 3.084	13.8	6.79 5.60	0.240	-0.27 54%	-1.4 52	flattener	2.834 3.084	25	24.5 11.2	99 None None	steepener	3.074 3.084	1	-0.5 12.8	99 -0.27	54%													
9m 7s/10s	9Mx7Y 9Mx10Y	3.139 3.183	4.3	3.011 3.101	9.0	6.57 6.24	0.733	-0.05 32%	-0.8 12	flattener	2.981 3.101	12	7.7 3.0	99 None None	steepener	3.051 3.101	5	-0.7 4.0	99 -0.05	32%													
9m 7s/20s	9Mx7Y 9Mx20Y	3.139 3.277	13.8	3.011 3.219	20.8	6.57 5.83	0.427	-0.15 44%	-0.6 31	flattener	2.939 3.219	28	14.2 7.2	99 None None	steepener	3.089 3.219	13	0.8 7.8	99 -0.15	44%													
9m 7s/30s	9Mx7Y 9Mx30Y	3.139 3.142	0.3	3.011 3.084	7.3	6.57 5.60	0.326	-0.21 54%	-0.4 40	flattener	2.914 3.084	17	16.7 9.7	99 None None	steepener	3.114 3.084	-3	3.3 10.3	96 -0.21	54%													
9m 10s/20s	9Mx10Y 9Mx20Y	3.183 3.277	9.4	3.101 3.219	11.8	6.24 5.83	0.583	-0.09 45%	0.2 19	flattener	3.059 3.219	16	6.6 4.2	99 None None	steepener	3.149 3.219	7	2.4 4.8	94 -0.09	45%													
9m 10s/30s	9Mx10Y 9Mx30Y	3.183 3.142	-4.0	3.101 3.084	-1.7	6.24 5.60	0.445	-0.16 56%	0.5 29	flattener	3.034 3.084	5	9.0 6.7	99 None None	steepener	3.174 3.084	-9	5.0 7.3	91 -0.16	56%													
9m 20s/30s	9Mx20Y 9Mx30Y	3.277 3.142	-13.5	3.219 3.084	-13.5	5.83 5.60	0.764	-0.06 64%	0.3 10	flattener	3.194 3.084	-11	2.5 2.5	99 None None	steepener	3.244 3.084	-16	2.5 2.5	79 -0.06	64%													

*The table provides various benchmark curve trades that can be done conditionally in a rally or a selloff for various forwards (1M, 3M, 6M and 9M) and relevant statistics. For example, a given benchmark structure such as 3m 2s/10s can be broken down into a left structure (3Mx2Y) and right structure (3Mx10Y) with the relevant left and right spot rates, ATMF rates, and swaption vols. Fwd risk ratio is the ratio between the annuities of the left swap to the right swap. 1Y beta and 1Y rsq columns indicate the regression stats for regressing the spot curve against the spot rates. Carry on steepener column indicates the 3M slide (i.e. slide) of the specific curve pair for a steepener, except for 1M expiries which will show 1M slide. Trade risk is the 2Y standard deviation of quarterly changes in the weighted yield spread, annualized by multiplying by sqrt(4).

** Trade 1 (Trade 2) is a conditional bull (bear) trade done with receiver (payer) swaptions. In this construction, it will take the vol that is lower and assume it buys that swaption at the ATMF strike. Then, the strike on the other leg is iterated OTM until a risk weighted premium neutral ratio can be found, and the implied yield spread on those strikes is labeled as the "0 Cost Entry" bull (bear) columns. This implied spread is compared with both the current spot curve and the current ATMF curve, and the differences will be labeled in the "Pickup" columns. Lastly, we run two separate regressions for the spot yield curve (Y) against the spot rates (X) for all X coordinates below and above the current ATMF, and record the beta and Rsquared (note these stats will be labeled as "None" if no such points exist). For more details, refer to the footnotes of this report where the historical spread charts and isopremium lines are plotted.

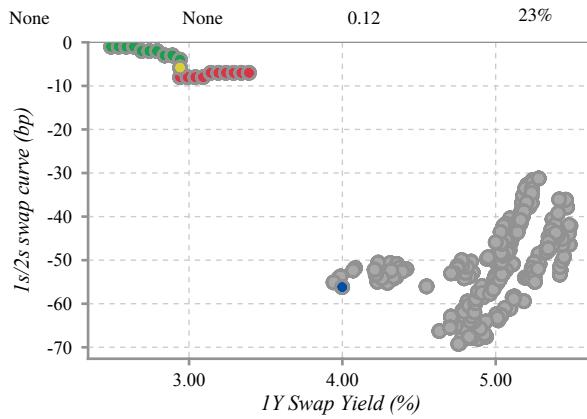
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Derivatives Strategy

Conditional Isopremium Curve Trades Report - 9M Expiry

9m 1s/2s

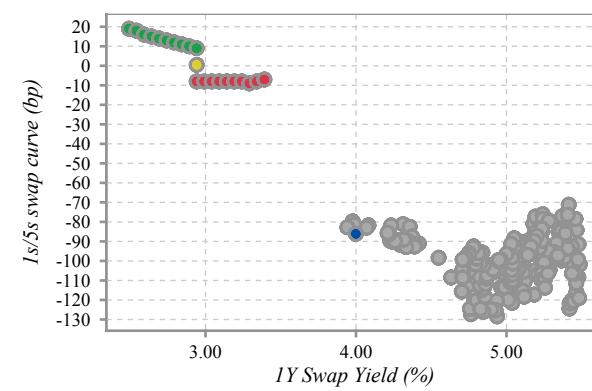
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.65 Beta below ATMF	7.45 Rsq below ATMF	0.51 Beta above ATMF	0.12 Rsq above ATMF	23% Rsq above ATMF



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

9m 1s/5s

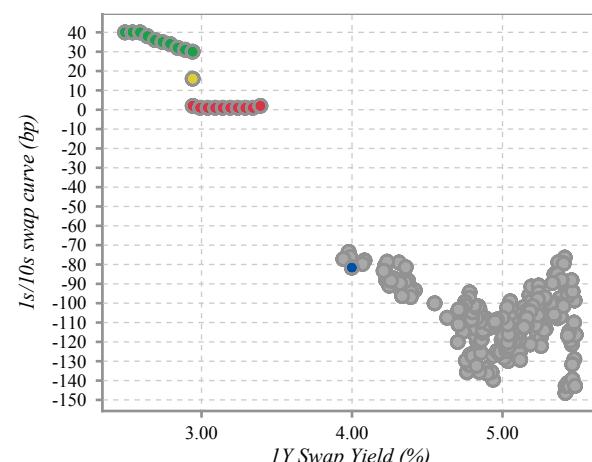
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.65 Beta below ATMF	6.79 Rsq below ATMF	0.21 Beta above ATMF	-0.04 Rsq above ATMF	1% Rsq above ATMF



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

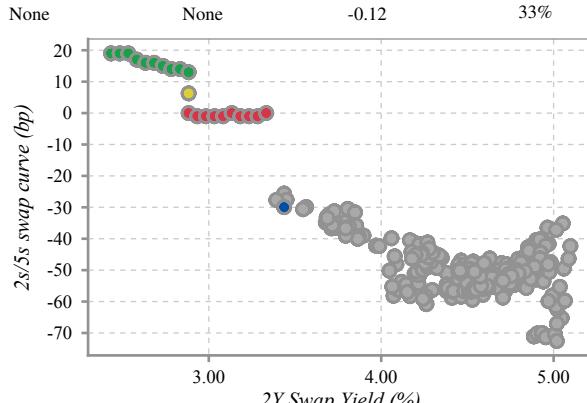
9m 1s/10s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.65 Beta below ATMF	6.79 Rsq below ATMF	0.21 Beta above ATMF	-0.04 Rsq above ATMF	1% Rsq above ATMF



9m 2s/5s

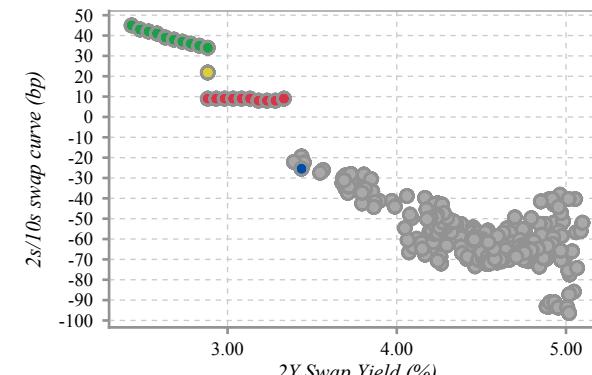
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.45 Beta below ATMF	6.79 Rsq below ATMF	0.42 Beta above ATMF	-0.12 Rsq above ATMF	33% Rsq above ATMF



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

9m 2s/10s

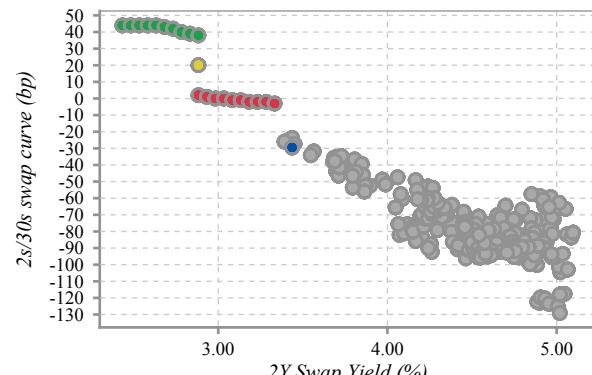
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.45 Beta below ATMF	6.24 Rsq below ATMF	0.23 Beta above ATMF	-0.24 Rsq above ATMF	44% Rsq above ATMF



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

9m 2s/30s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
7.45 Beta below ATMF	5.60 Rsq below ATMF	0.10 Beta above ATMF	-0.39 Rsq above ATMF	59% Rsq above ATMF



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATM

* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus spot 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATM (yellow dot); past 1Y history.

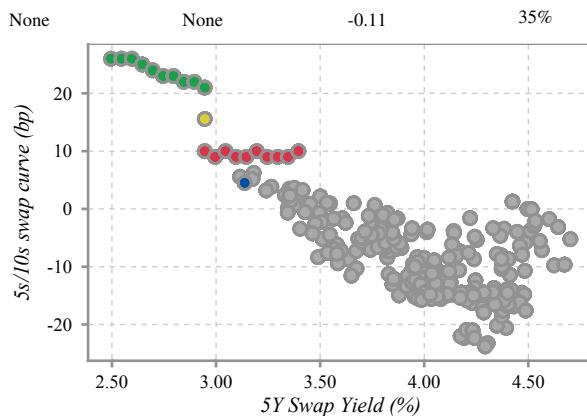
** Premium neutral strike levels are determined by starting at the ATM strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wvol for each leg risk ratio, and two other separate regression stats of beta above and below ATM rates (spot yield curve (Y) against the spot rates (X) for all x coordinates below and above the current ATM); stats will be labeled as "None" if no such points exist. For more details, refer to the footnotes of this report where the full statistics tables are shown.

Derivatives Strategy

Conditional Isopremium Curve Trades Report - 9M Expiry

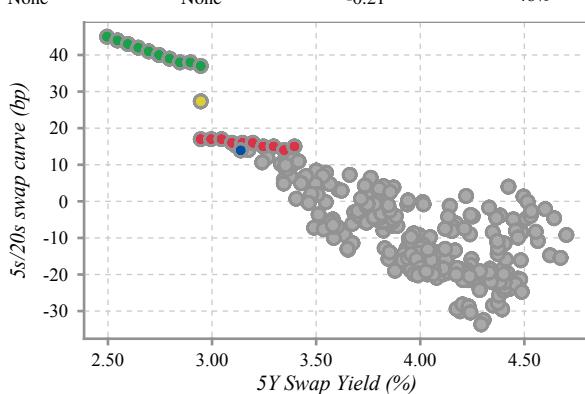
9m 5s/10s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.79	6.24	0.54	-0.11	35%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



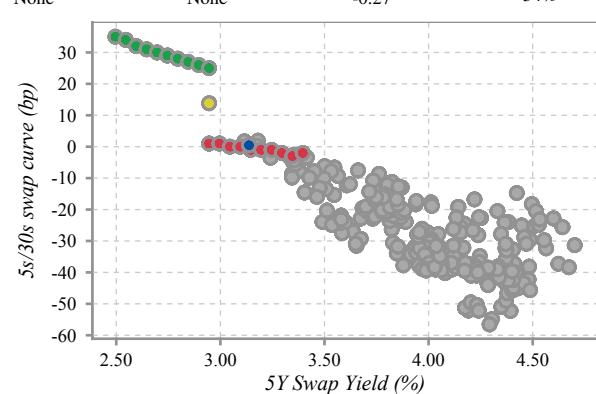
● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.79	5.83	0.31	-0.21	46%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

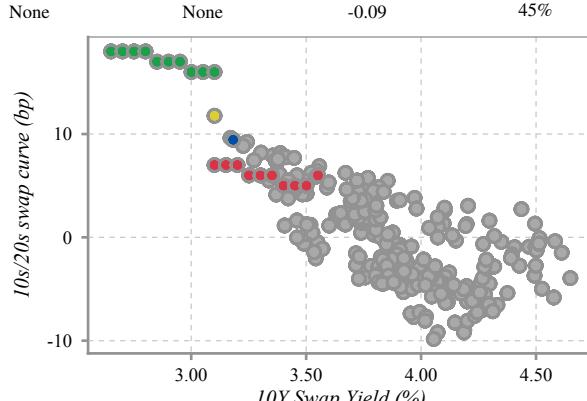
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.79	5.60	0.24	-0.27	54%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

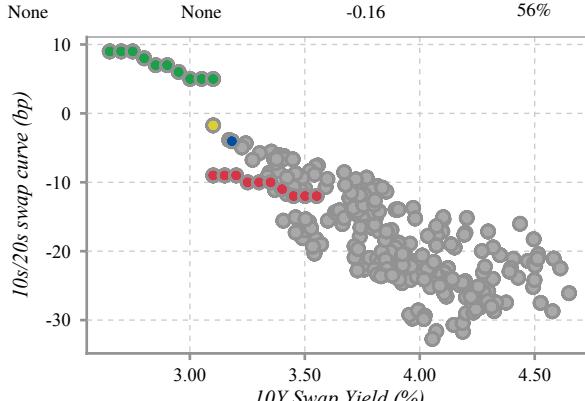
9m 10s/20s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.24	5.83	0.58	-0.09	45%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

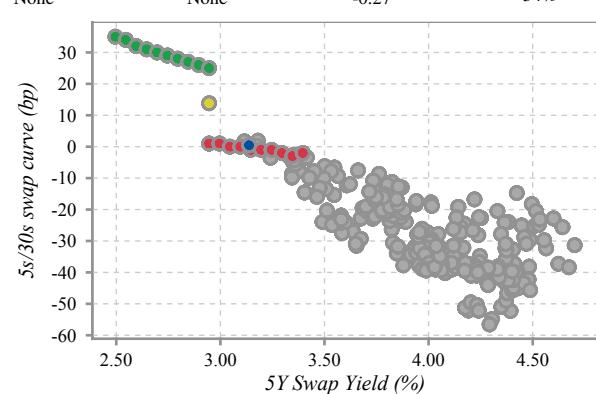
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
6.24	5.60	0.45	-0.16	56%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

9m 10s/30s

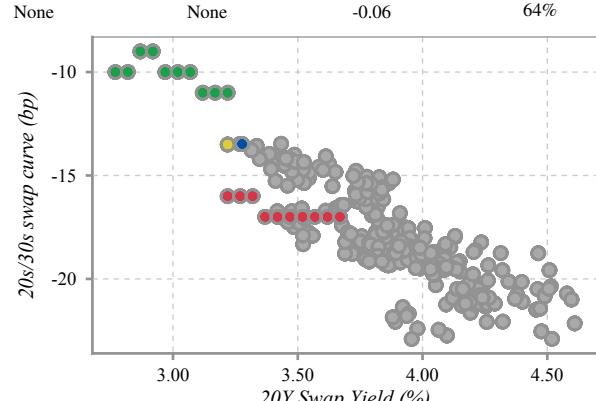
Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
5.83	5.60	0.76	-0.06	64%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

9m 20s/30s

Bpvol Left	Bpvol Right	Fwd Risk Ratio	1Y Beta	1Y Rsq
5.83	5.60	0.76	-0.06	64%
Beta below ATMF	Rsq below ATMF	Beta above ATMF	Rsq above ATMF	



● Historical spread ● Isopremium (Bull) ● Isopremium (Bear)
● Spot ● ATMF

* On the X axis, the chart shows the left spot rate and the Y axis shows the spot swap yield curve. For example, for 1m fwd 2s/5s (or any other fwd such as 3m, 6m, and 9m), spot 2s/5s SOFR swap curve (bp) is shown on the Y axis versus spot 2Y SOFR swap yield (%) on the X axis. Overlaid on this chart are premium neutral entry points into conditional bull (green dots) and bear trades (red dots) with respective expiries (either 1m, 3m, 6m or 9m) with different levels of moneyness (note steeper or flatter directions will depend on which vol is cheaper, as it always will assume buying the cheaper vol) as well as dots corresponding to current spot (blue dot) and current ATM (yellow dot); past 1Y history.
** Premium neutral strike levels are determined by starting at the ATM (ATM) strike on the leg one is buying and backing out the premium neutral strike level for the leg that is being sold for the implied curve level. This exercise is repeated for strike increments of +5bp on the long/buying leg. Also shown are statistics for the 1Y regression of spot yield curve vs spot yields (Beta and R-squared) as well as the wols for each leg risk ratio, and two other separate regression stats of beta above and below ATM rates (spot yield curve (Y) against the spot rates (X) for all coordinates below and above the current ATM); stats will be labeled as "None" if no such points exist. For more details, refer to the footnotes of this report where the full statistics tables are shown.

Derivatives Strategy

Volatility Fair Value Model Report

Structure	Coefficients						Model Info.	Drivers Pt. 1	Current and Projected Bpvol					Drivers Pt. 2			
	Intercept	ATMF	Fed b/s	Log of market depth	2Y Real rates	Fwd guidance	Intercept Shift		Rsq	Std. Err.	Cur. ATMF	Cur. Bpvol	Modeled Ref. Vol	Modeled Deviation	Fair Value	Residual	
6Mx1Y	-1.42	-0.75	0.09	-2.70	0.12	-0.05	-0.35	0.77	0.89	3.13	7.58	5.63	0.49	6.12	1.47	Fed b/s (\$tn)	7.17
1Yx1Y	-1.83	-0.43	0.19	-2.25	0.19	-0.04	-0.19	0.88	0.65	2.85	7.70	5.38	1.49	6.87	0.83	Market depth (\$bn)	0.25
2Yx1Y	-1.67	-0.16	0.20	-1.66	0.11	-0.04	-0.48	0.92	0.45	2.84	7.07	5.37	1.28	6.65	0.42	2Y Real rates (%)	1.39
3Yx1Y	-1.70	0.04	0.18	-1.25	0.02	-0.03	-0.52	0.92	0.37	2.92	6.69	5.44	0.97	6.41	0.29	Fwd guidance (# months)	0.00
5Yx1Y	-1.46	0.12	0.10	-0.87	-0.06	-0.02	-0.39	0.91	0.27	3.11	6.39	5.61	0.40	6.01	0.37	Intcpt Shift	1.00
10Yx1Y	-0.51	-0.28	0.06	-0.34	-0.03	-0.01	0.03	0.81	0.16	3.44	5.77	5.93	-0.60	5.34	0.43		
6Mx2Y	-1.17	-0.61	0.12	-2.45	0.21	-0.05	-0.50	0.86	0.68	2.97	7.59	5.49	1.08	6.56	1.03		
1Yx2Y	-1.55	-0.33	0.17	-2.00	0.18	-0.04	-0.37	0.91	0.52	2.85	7.36	5.38	1.39	6.77	0.59		
2Yx2Y	-1.67	-0.07	0.19	-1.45	0.09	-0.03	-0.50	0.92	0.41	2.88	6.83	5.40	1.12	6.52	0.31		
3Yx2Y	-1.80	0.13	0.15	-1.16	-0.02	-0.02	-0.52	0.91	0.35	2.97	6.53	5.48	0.77	6.24	0.28		
5Yx2Y	-1.39	0.10	0.09	-0.80	-0.06	-0.02	-0.35	0.91	0.25	3.14	6.22	5.64	0.27	5.91	0.30		
10Yx2Y	-0.43	-0.31	0.05	-0.30	-0.03	-0.01	0.04	0.80	0.16	3.46	5.66	5.96	-0.71	5.25	0.41		
6Mx3Y	-1.12	-0.54	0.13	-2.23	0.20	-0.05	-0.52	0.89	0.57	2.94	7.44	5.46	1.12	6.58	0.86		
1Yx3Y	-1.66	-0.25	0.18	-1.82	0.14	-0.04	-0.42	0.92	0.45	2.87	7.17	5.40	1.24	6.64	0.53		
2Yx3Y	-1.91	0.03	0.18	-1.36	0.05	-0.02	-0.51	0.93	0.37	2.92	6.69	5.44	0.91	6.35	0.34		
3Yx3Y	-1.93	0.18	0.14	-1.11	-0.04	-0.02	-0.49	0.92	0.33	3.01	6.43	5.52	0.60	6.12	0.31		
5Yx3Y	-1.38	0.07	0.09	-0.76	-0.06	-0.02	-0.32	0.91	0.23	3.18	6.13	5.67	0.15	5.82	0.31		
10Yx3Y	-0.37	-0.33	0.05	-0.28	-0.04	-0.01	0.03	0.80	0.15	3.47	5.56	5.97	-0.82	5.15	0.41		
6Mx5Y	-2.00	-0.20	0.17	-1.76	0.08	-0.02	-0.44	0.92	0.42	2.97	6.92	5.48	0.74	6.22	0.70		
1Yx5Y	-2.23	-0.02	0.18	-1.46	0.06	-0.01	-0.41	0.93	0.36	2.94	6.70	5.46	0.73	6.19	0.51		
2Yx5Y	-2.15	0.11	0.16	-1.18	0.00	-0.01	-0.44	0.92	0.32	3.01	6.43	5.51	0.55	6.06	0.37		
3Yx5Y	-1.88	0.11	0.13	-0.97	-0.03	-0.01	-0.39	0.92	0.27	3.09	6.24	5.59	0.34	5.92	0.31		
5Yx5Y	-1.32	-0.02	0.10	-0.64	-0.05	-0.01	-0.24	0.90	0.21	3.24	5.98	5.73	-0.07	5.65	0.32		
10Yx5Y	-0.26	-0.38	0.04	-0.24	-0.03	-0.01	0.00	0.81	0.15	3.48	5.37	5.98	-1.01	4.97	0.40		
6Mx7Y	-2.28	-0.11	0.18	-1.56	0.04	-0.01	-0.44	0.92	0.38	3.03	6.66	5.53	0.46	5.99	0.67		
1Yx7Y	-2.39	0.01	0.19	-1.30	0.03	-0.01	-0.38	0.93	0.33	3.01	6.49	5.52	0.48	6.00	0.49		
2Yx7Y	-2.17	0.07	0.17	-1.04	0.00	-0.01	-0.36	0.92	0.29	3.08	6.27	5.58	0.33	5.91	0.36		
3Yx7Y	-1.82	0.04	0.14	-0.86	-0.03	-0.01	-0.29	0.91	0.25	3.15	6.10	5.65	0.14	5.79	0.31		
5Yx7Y	-1.20	-0.10	0.10	-0.57	-0.04	-0.01	-0.16	0.88	0.19	3.29	5.87	5.79	-0.24	5.54	0.32		
10Yx7Y	-0.23	-0.42	0.04	-0.22	-0.02	-0.01	0.03	0.83	0.14	3.46	5.26	5.96	-1.10	4.87	0.39		
6Mx10Y	-2.39	-0.14	0.21	-1.24	0.04	0.00	-0.37	0.90	0.36	3.11	6.29	5.61	0.12	5.73	0.57		
1Yx10Y	-2.30	-0.08	0.21	-1.01	0.04	0.00	-0.27	0.91	0.31	3.11	6.20	5.61	0.17	5.78	0.42		
2Yx10Y	-1.94	-0.07	0.18	-0.80	0.02	0.00	-0.21	0.90	0.26	3.17	6.05	5.67	0.07	5.73	0.32		
3Yx10Y	-1.58	-0.12	0.15	-0.65	0.00	-0.01	-0.15	0.89	0.23	3.24	5.92	5.73	-0.11	5.62	0.30		
5Yx10Y	-1.00	-0.22	0.10	-0.45	-0.02	-0.01	-0.05	0.86	0.19	3.35	5.71	5.84	-0.45	5.39	0.32		
10Yx10Y	-0.22	-0.48	0.05	-0.19	0.00	-0.01	0.08	0.86	0.13	3.41	5.10	5.91	-1.18	4.72	0.38		
6Mx30Y	-1.96	-0.42	0.26	-0.77	0.07	0.01	-0.10	0.83	0.40	3.09	5.65	5.59	-0.33	5.26	0.39		
1Yx30Y	-1.85	-0.38	0.25	-0.59	0.08	0.00	0.00	0.85	0.33	3.08	5.57	5.58	-0.28	5.30	0.27		
2Yx30Y	-1.50	-0.38	0.22	-0.42	0.07	0.00	0.11	0.84	0.28	3.07	5.50	5.57	-0.34	5.24	0.27		
3Yx30Y	-1.29	-0.39	0.19	-0.30	0.06	0.00	0.18	0.83	0.25	3.06	5.40	5.57	-0.45	5.12	0.28		
5Yx30Y	-1.02	-0.41	0.14	-0.18	0.06	0.00	0.26	0.81	0.20	3.03	5.26	5.53	-0.65	4.89	0.37		
10Yx30Y	-0.60	-0.52	0.07	-0.04	0.07	0.00	0.32	0.81	0.15	2.82	4.71	5.35	-1.07	4.28	0.43		

Note: Statistics from regressing* deviations of normal bp volatility (in bp/day) from reference volatility** against yields (%), natural log of duration weighted market depth*** (\$bn), 2Y real rates (2Y swap rates minus 2Y inflation swap) (%), intercept shift (a time series of values of 0 before 11/1/2023 and values of 1s after) (%), Fed balance sheet size (\$tn), and forward guidance (in # of months). Fair value is the sum of modeled reference volatility and modeled deviation. Residual is calculated as the current value of implied volatility minus fair value of implied volatility based on spot drivers. For more details, please refer to our Interest Rate Derivatives 2024 Mid-Year Outlook.

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

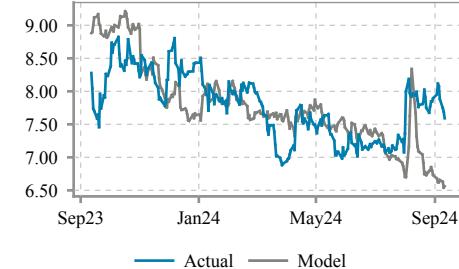
** Reference volatility calculated as yield vol times yields divided by square root of 251. Yield vol is modeled as 24.6 plus 124.9 times exponential of minus 1.1 times yields. The fit is done over 10 years using 3M, 6M, 9M, 1Y, 2Y, 3Y, 5Y, 10Y expiry and 2Y, 3Y, 5Y, 7Y, 10Y and 30Y tails.

*** 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.

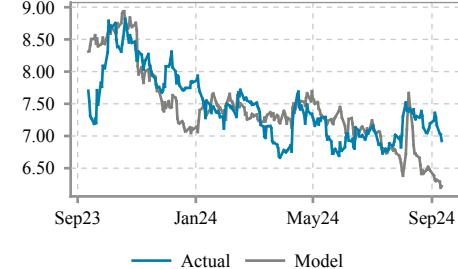
Derivatives Strategy

Volatility Fair Value Model Report

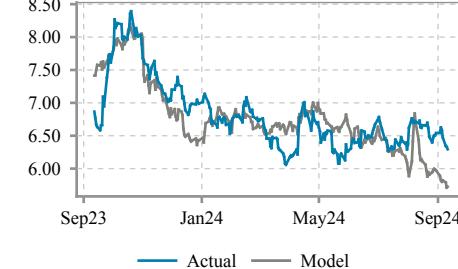
6Mx2Y Vol - Actual vs. Model



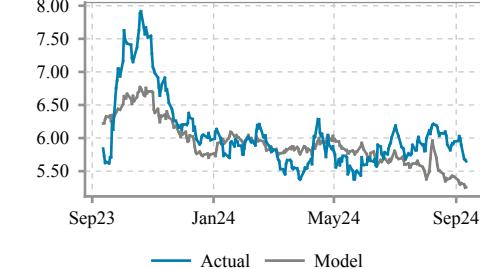
6Mx5Y Vol - Actual vs. Model



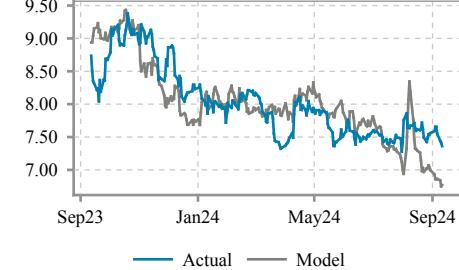
6Mx10Y Vol - Actual vs. Model



6Mx30Y Vol - Actual vs. Model



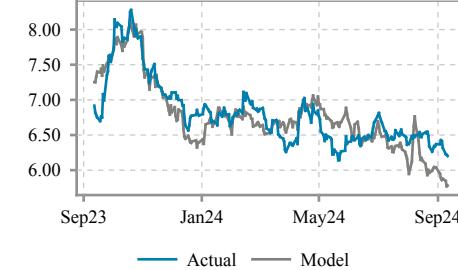
1Yx2Y Vol - Actual vs. Model



1Yx5Y Vol - Actual vs. Model



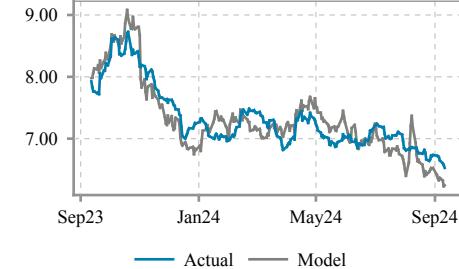
1Yx10Y Vol - Actual vs. Model



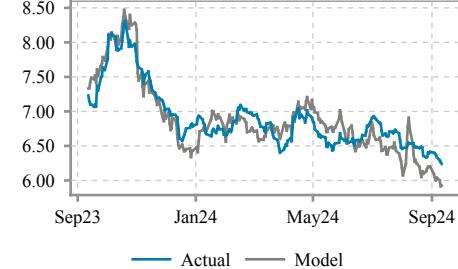
1Yx30Y Vol - Actual vs. Model



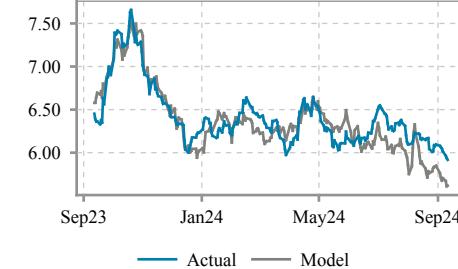
3Yx2Y Vol - Actual vs. Model



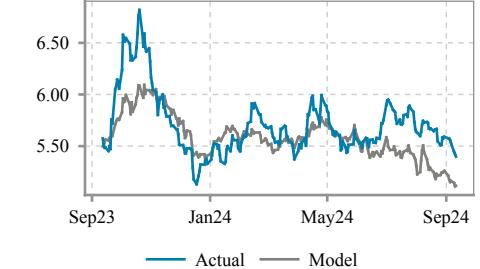
3Yx5Y Vol - Actual vs. Model



3Yx10Y Vol - Actual vs. Model



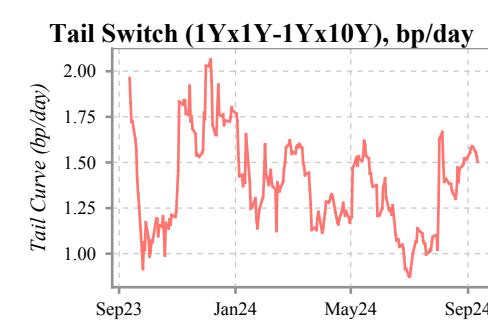
3Yx30Y Vol - Actual vs. Model



Derivatives Strategy

Swaption Volatility Curve Fair Value Model Report

Vol Curve	6M Regression Stats						1Y Regression Stats							
	Expy Crv Beta	Tail Crv Beta	Intcpt	Rsq	Cur. Vol Crv	Fair Value	Residual	Expy Crv Beta	Tail Crv Beta	Intcpt	Rsq	Cur. Vol Crv	Fair Value	Residual
6Mx1Y-1Yx30Y	0.13	1.98	-1.74	66%	2.02	1.50	0.52	-0.02	1.76	-1.13	68%	2.02	1.47	0.55
6Mx1Y-9Mx30Y	0.01	1.98	-1.51	67%	1.98	1.49	0.49	-0.12	1.81	-1.00	67%	1.98	1.49	0.49
6Mx1Y-6Mx30Y	0.25	1.65	-1.50	72%	1.93	1.47	0.46	-0.27	1.91	-0.79	65%	1.93	1.55	0.38
9Mx1Y-5Yx2Y	0.64	0.86	-1.42	67%	1.44	1.11	0.32	0.22	0.98	-0.79	71%	1.44	1.11	0.33
9Mx1Y-3Yx5Y	0.50	1.07	-1.48	71%	1.41	1.10	0.31	-0.02	1.23	-0.72	69%	1.41	1.11	0.30
9Mx1Y-5Yx3Y	0.69	0.84	-1.38	70%	1.52	1.21	0.31	0.26	0.98	-0.76	75%	1.52	1.22	0.30
9Mx1Y-2Yx5Y	0.33	1.15	-1.46	67%	1.22	0.91	0.31	-0.17	1.31	-0.71	65%	1.22	0.92	0.30
9Mx1Y-5Yx1Y	0.72	0.81	-1.65	65%	1.27	0.97	0.30	0.21	1.00	-0.93	68%	1.27	0.98	0.29
9Mx1Y-3Yx7Y	0.52	1.03	-1.29	74%	1.55	1.26	0.29	0.10	1.16	-0.67	76%	1.55	1.26	0.28
9Mx1Y-2Yx7Y	0.33	1.15	-1.28	71%	1.38	1.10	0.28	-0.07	1.27	-0.67	73%	1.38	1.10	0.28
9Mx1Y-5Yx5Y	0.77	0.80	-1.29	75%	1.67	1.39	0.28	0.33	0.99	-0.70	80%	1.67	1.42	0.26
9Mx1Y-3Yx10Y	0.53	0.98	-1.03	76%	1.74	1.47	0.26	0.25	1.07	-0.61	85%	1.74	1.48	0.26
9Mx1Y-2Yx10Y	0.33	1.16	-1.03	77%	1.60	1.35	0.25	0.07	1.21	-0.61	83%	1.60	1.34	0.26
9Mx1Y-5Yx7Y	0.78	0.76	-1.12	77%	1.79	1.52	0.26	0.41	0.91	-0.62	85%	1.79	1.54	0.24
9Mx1Y-3Yx15Y	0.62	0.88	-0.82	80%	1.95	1.70	0.25	0.36	0.99	-0.47	88%	1.95	1.71	0.24
9Mx1Y-1Yx7Y	0.09	1.15	-0.99	72%	1.16	0.92	0.24	-0.19	1.21	-0.52	75%	1.16	0.92	0.24
6Mx2Y-3Yx15Y	0.31	1.25	-0.76	66%	1.89	1.71	0.18	0.30	0.94	-0.34	69%	1.89	1.65	0.24
9Mx1Y-2Yx15Y	0.44	1.04	-0.86	81%	1.80	1.56	0.24	0.17	1.15	-0.49	87%	1.80	1.57	0.23
6Mx2Y-2Yx15Y	0.13	1.41	-0.80	67%	1.74	1.57	0.17	0.11	1.10	-0.36	66%	1.74	1.51	0.23
9Mx1Y-5Yx10Y	0.79	0.71	-0.90	79%	1.94	1.70	0.24	0.52	0.81	-0.51	89%	1.94	1.72	0.22
6Mx2Y-5Yx10Y	0.48	1.08	-0.84	65%	1.88	1.71	0.16	0.46	0.77	-0.38	71%	1.88	1.66	0.22
9Mx1Y-3Yx30Y	0.77	0.71	-0.55	85%	2.25	2.01	0.25	0.55	0.91	-0.36	91%	2.25	2.06	0.20
6Mx2Y-3Yx30Y	0.46	1.08	-0.49	72%	2.19	2.02	0.17	0.48	0.86	-0.23	77%	2.19	2.00	0.20
9Mx1Y-5Yx15Y	0.85	0.63	-0.65	82%	2.17	1.95	0.22	0.60	0.75	-0.31	91%	2.17	1.98	0.20
6Mx2Y-5Yx15Y	0.54	1.00	-0.59	68%	2.11	1.97	0.15	0.54	0.70	-0.18	75%	2.11	1.92	0.19
9Mx1Y-10Yx2Y	1.17	0.23	-0.81	85%	1.99	1.80	0.20	0.87	0.33	-0.37	94%	1.99	1.80	0.19
6Mx2Y-10Yx2Y	0.86	0.60	-0.76	68%	1.93	1.81	0.12	0.81	0.28	-0.24	82%	1.93	1.74	0.19
6Mx3Y-3Yx15Y	0.42	0.92	-0.60	66%	1.74	1.60	0.14	0.39	0.69	-0.24	74%	1.74	1.55	0.19
9Mx1Y-9Mx7Y	0.10	0.91	-0.70	72%	1.08	0.86	0.22	-0.20	1.08	-0.35	78%	1.08	0.90	0.18
1Yx2Y-10Yx30Y	1.23	-0.52	1.18	74%	2.65	2.78	-0.13	1.35	-0.42	0.86	96%	2.65	2.83	-0.18
9Mx1Y-10Yx3Y	1.18	0.22	-0.73	85%	2.09	1.89	0.20	0.88	0.34	-0.31	94%	2.09	1.91	0.18
9Mx1Y-2Yx30Y	0.64	0.84	-0.58	87%	2.15	1.92	0.23	0.36	1.08	-0.35	91%	2.15	1.97	0.18
6Mx2Y-10Yx3Y	0.87	0.59	-0.67	69%	2.03	1.90	0.13	0.82	0.30	-0.18	82%	2.03	1.85	0.18
6Mx2Y-2Yx30Y	0.33	1.21	-0.52	74%	2.09	1.93	0.16	0.29	1.04	-0.22	74%	2.09	1.91	0.18
6Mx3Y-2Yx15Y	0.24	1.08	-0.64	68%	1.58	1.46	0.12	0.20	0.85	-0.27	69%	1.58	1.40	0.18



* Fair value is defined as the regression of the swaption volatility curve (which is the difference between two swaption implied volatilities, units in bp/day) regressed against the tail curve and expiry curve. The tail curve is defined as the (1Yx1Y minus 1Yx10Y) swaption implied bp-volatility and the expiry curve is defined as the (1Yx1Y minus 10Yx1Y) swaption implied bp-volatility. Results are sorted by the most mispricing in the residual from the 1Y regression stats.

Derivatives Strategy

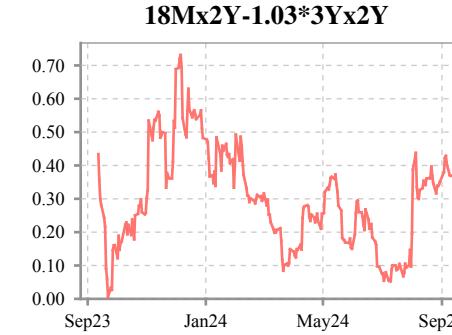
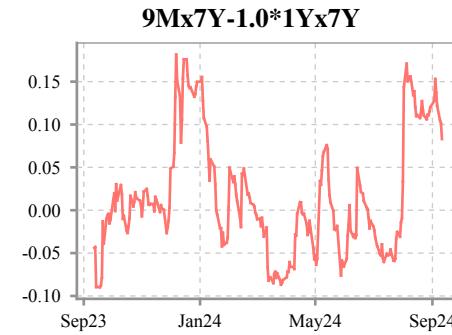
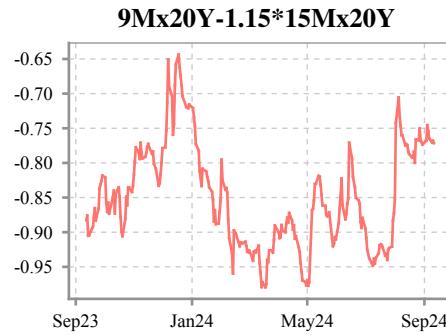
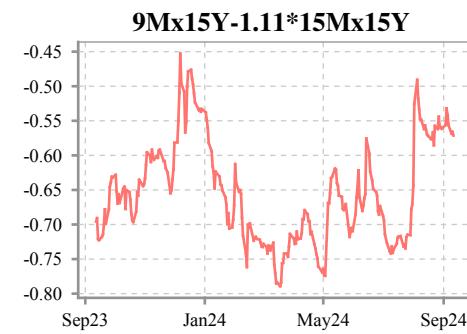
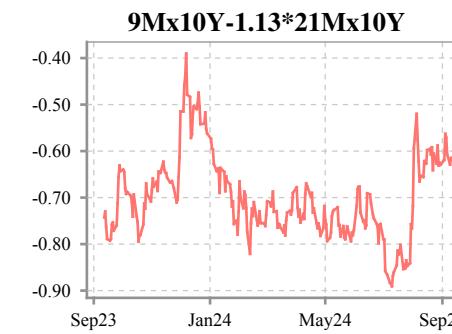
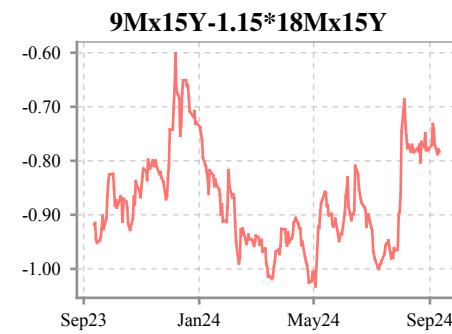
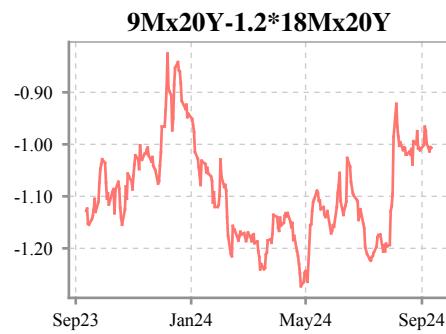
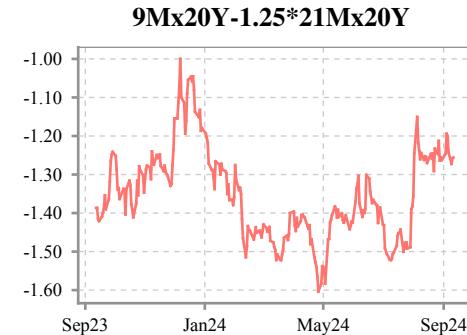
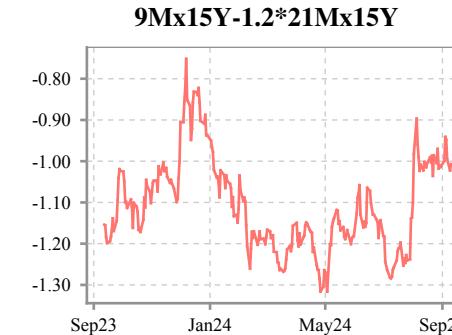
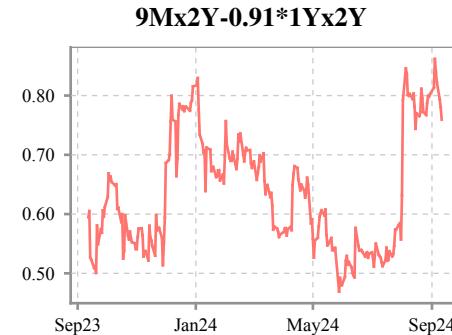
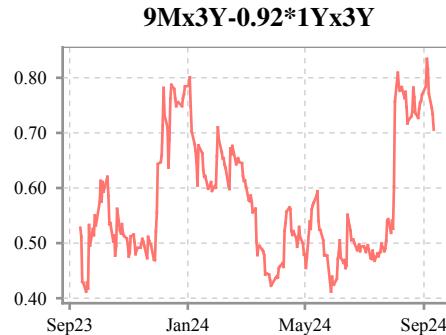
Swaption Volatility Weighted Expiry Switch Report

Expy Switch	Vol1	Vol2	Vol1 Cur	Vol2 Cur	3M Beta	3M Wtd Expy Switch	3M Mean	3M Residual	3M Rsq	6M Beta	6M Wtd Expy Switch	6M Mean	6M Residual	6M Rsq	1Y Beta	1Y Wtd Expy Switch	1Y Mean	1Y Residual	1Y Mean
9Mx3Y-1Yx3Y	9Mx3Y	1Yx3Y	7.30	7.17	1.45	-3.09	-3.29	0.20	57%	0.95	0.48	0.32	0.16	70%	0.92	0.71	0.57	0.13	95%
9Mx2Y-1Yx2Y	9Mx2Y	1Yx2Y	7.45	7.36	1.63	-4.58	-4.81	0.23	72%	1.04	-0.17	-0.34	0.17	79%	0.91	0.76	0.63	0.12	96%
9Mx15Y-21Mx15Y	9Mx15Y	21Mx15Y	6.05	5.89	0.66	2.15	2.21	-0.06	51%	0.91	0.67	0.61	0.05	76%	1.20	-1.01	-1.11	0.10	95%
9Mx20Y-21Mx20Y	9Mx20Y	21Mx20Y	5.83	5.66	0.74	1.65	1.71	-0.05	55%	0.96	0.40	0.34	0.06	74%	1.25	-1.26	-1.35	0.10	94%
9Mx20Y-18Mx20Y	9Mx20Y	18Mx20Y	5.83	5.70	0.82	1.16	1.20	-0.03	65%	1.00	0.12	0.06	0.06	81%	1.20	-1.01	-1.09	0.09	96%
9Mx15Y-18Mx15Y	9Mx15Y	18Mx15Y	6.05	5.93	0.75	1.60	1.64	-0.04	61%	0.94	0.46	0.41	0.05	81%	1.15	-0.78	-0.87	0.09	97%
9Mx10Y-21Mx10Y	9Mx10Y	21Mx10Y	6.24	6.08	0.61	2.54	2.60	-0.06	54%	0.98	0.30	0.24	0.06	85%	1.13	-0.62	-0.70	0.08	97%
9Mx15Y-15Mx15Y	9Mx15Y	15Mx15Y	6.05	5.97	0.82	1.18	1.21	-0.03	70%	0.95	0.36	0.31	0.05	85%	1.11	-0.57	-0.65	0.08	98%
9Mx20Y-15Mx20Y	9Mx20Y	15Mx20Y	5.83	5.72	0.87	0.84	0.85	-0.02	74%	1.02	-0.01	-0.07	0.06	86%	1.15	-0.77	-0.85	0.08	98%
9Mx7Y-1Yx7Y	9Mx7Y	1Yx7Y	6.57	6.49	0.86	0.98	0.98	0.00	60%	0.94	0.47	0.41	0.06	85%	1.00	0.08	0.02	0.07	98%
18Mx2Y-3Yx2Y	18Mx2Y	3Yx2Y	7.10	6.53	0.39	4.53	4.63	-0.10	61%	0.80	1.90	1.87	0.03	73%	1.03	0.37	0.30	0.07	92%
9Mx15Y-1Yx15Y	9Mx15Y	1Yx15Y	6.05	6.00	0.86	0.85	0.87	-0.01	77%	0.95	0.32	0.28	0.05	87%	1.07	-0.36	-0.43	0.07	98%
9Mx10Y-18Mx10Y	9Mx10Y	18Mx10Y	6.24	6.13	0.69	2.01	2.05	-0.04	63%	1.01	0.08	0.02	0.06	89%	1.09	-0.46	-0.53	0.07	98%
9Mx20Y-1Yx20Y	9Mx20Y	1Yx20Y	5.83	5.75	0.91	0.62	0.62	-0.01	81%	1.02	-0.04	-0.09	0.06	90%	1.11	-0.53	-0.60	0.07	98%
1Yx30Y-3Yx30Y	1Yx30Y	3Yx30Y	5.57	5.40	0.94	0.52	0.58	-0.06	75%	1.09	-0.33	-0.34	0.01	83%	1.33	-1.60	-1.53	-0.07	84%
18Mx3Y-3Yx3Y	18Mx3Y	3Yx3Y	6.94	6.43	0.48	3.86	3.95	-0.09	71%	0.85	1.45	1.43	0.03	79%	1.06	0.13	0.07	0.06	94%
9Mx30Y-15Mx30Y	9Mx30Y	15Mx30Y	5.60	5.55	0.93	0.42	0.42	0.00	84%	1.07	-0.34	-0.39	0.05	94%	1.14	-0.73	-0.79	0.06	98%
15Mx30Y-3Yx30Y	15Mx30Y	3Yx30Y	5.55	5.40	0.95	0.43	0.48	-0.05	83%	1.09	-0.32	-0.32	0.01	88%	1.28	-1.35	-1.29	-0.06	88%
9Mx10Y-15Mx10Y	9Mx10Y	15Mx10Y	6.24	6.16	0.76	1.57	1.59	-0.03	70%	1.02	-0.04	-0.09	0.05	92%	1.06	-0.30	-0.36	0.06	99%
18Mx2Y-2Yx2Y	18Mx2Y	2Yx2Y	7.10	6.83	0.47	3.86	3.95	-0.09	67%	0.81	1.54	1.52	0.02	85%	0.95	0.60	0.55	0.06	98%
9Mx30Y-1Yx30Y	9Mx30Y	1Yx30Y	5.60	5.57	0.93	0.41	0.40	0.01	89%	1.04	-0.22	-0.26	0.05	96%	1.08	-0.42	-0.48	0.05	99%
9Mx30Y-18Mx30Y	9Mx30Y	18Mx30Y	5.60	5.53	0.91	0.55	0.56	-0.01	76%	1.08	-0.39	-0.44	0.05	90%	1.20	-1.04	-1.10	0.05	97%
1Yx10Y-2Yx10Y	1Yx10Y	2Yx10Y	6.20	6.05	0.79	1.43	1.46	-0.03	86%	0.96	0.41	0.38	0.03	92%	1.13	-0.61	-0.66	0.05	97%
18Mx30Y-3Yx30Y	18Mx30Y	3Yx30Y	5.53	5.40	0.96	0.34	0.38	-0.04	89%	1.08	-0.30	-0.31	0.01	93%	1.23	-1.09	-1.04	-0.05	91%
9Mx10Y-1Yx10Y	9Mx10Y	1Yx10Y	6.24	6.20	0.82	1.18	1.20	-0.02	77%	1.02	-0.09	-0.14	0.04	94%	1.03	-0.14	-0.18	0.05	99%
9Mx30Y-21Mx30Y	9Mx30Y	21Mx30Y	5.60	5.52	0.86	0.85	0.89	-0.03	66%	1.07	-0.33	-0.38	0.05	84%	1.27	-1.38	-1.43	0.05	94%
15Mx3Y-21Mx3Y	15Mx3Y	21Mx3Y	7.05	6.80	0.50	3.63	3.71	-0.08	52%	0.89	1.02	0.98	0.04	86%	0.98	0.41	0.35	0.05	98%
21Mx2Y-3Yx2Y	21Mx2Y	3Yx2Y	6.95	6.53	0.66	2.64	2.70	-0.05	92%	0.93	0.87	0.84	0.03	90%	1.07	-0.04	-0.09	0.05	96%
9Mx5Y-1Yx5Y	9Mx5Y	1Yx5Y	6.79	6.70	0.96	0.38	0.34	0.04	64%	1.06	-0.31	-0.40	0.09	91%	0.98	0.24	0.19	0.05	99%
18Mx3Y-2Yx3Y	18Mx3Y	2Yx3Y	6.94	6.69	0.56	3.20	3.28	-0.08	77%	0.85	1.22	1.20	0.02	89%	0.97	0.43	0.38	0.05	98%
9Mx30Y-2Yx30Y	9Mx30Y	2Yx30Y	5.60	5.50	0.80	1.19	1.24	-0.06	57%	1.05	-0.19	-0.24	0.04	79%	1.31	-1.61	-1.65	0.04	92%
1Yx20Y-2Yx20Y	1Yx20Y	2Yx20Y	5.75	5.64	0.89	0.75	0.78	-0.03	84%	0.96	0.33	0.31	0.02	88%	1.18	-0.91	-0.95	0.04	96%
18Mx2Y-21Mx2Y	18Mx2Y	21Mx2Y	7.10	6.95	0.67	2.43	2.48	-0.05	83%	0.92	0.70	0.68	0.03	95%	0.98	0.31	0.27	0.04	99%
1Yx10Y-21Mx10Y	1Yx10Y	21Mx10Y	6.20	6.08	0.85	1.05	1.07	-0.02	91%	0.98	0.23	0.21	0.03	95%	1.10	-0.50	-0.54	0.04	98%
1Yx15Y-2Yx15Y	1Yx15Y	2Yx15Y	6.00	5.85	0.84	1.10	1.14	-0.03	85%	0.98	0.27	0.25	0.02	91%	1.17	-0.84	-0.88	0.04	97%

Note: * Expiry switches (or calendar spreads) are the difference between two points on the swaption implied volatility surface where the tenor is held constant but the expiration is mismatched. In this construction, a time series of one of the points on the surface is regressed against the other using 3M, 6M, and 1Y history. The beta of this regression is used to weight one against the other and the result is the weighted expiry switch. The attractiveness of such a trade is determined by the mispricing between the current weighted expiry switch value against its respect 3M, 6M, or 1Y averages (also known as the mispricing or residual). The ones with the highest absolute residuals are most attractive and this table is sorted as such.

Derivatives Strategy

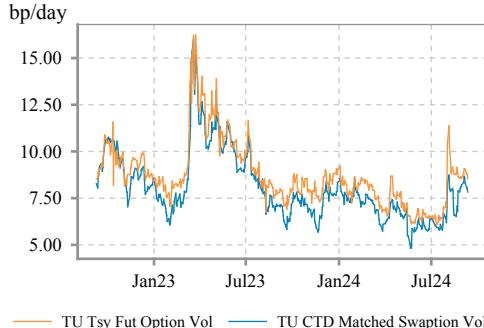
Swaption Volatility Weighted Expiry Switch Report



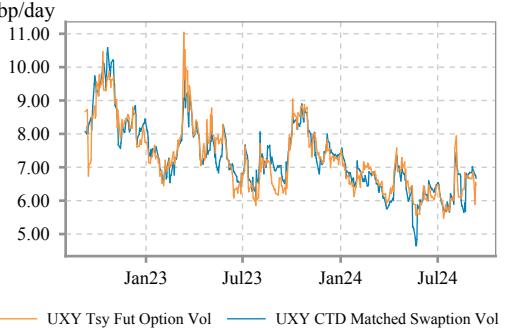
Derivatives Strategy

Treasury Future Options vs. CTD Matched Swaption Report

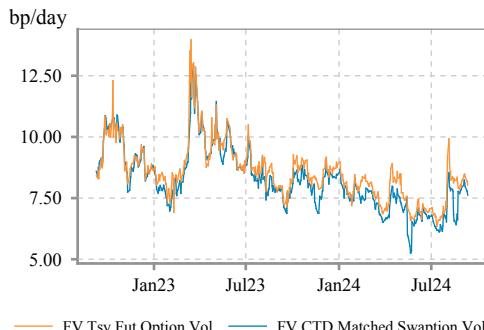
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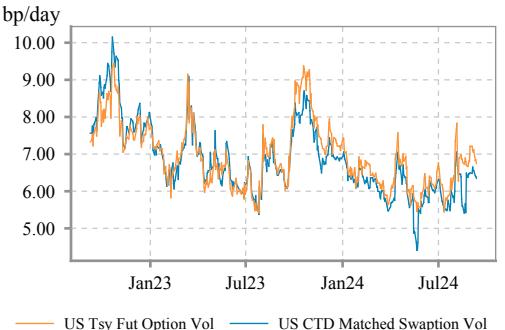
Ultra-10 year note contract (UXY)



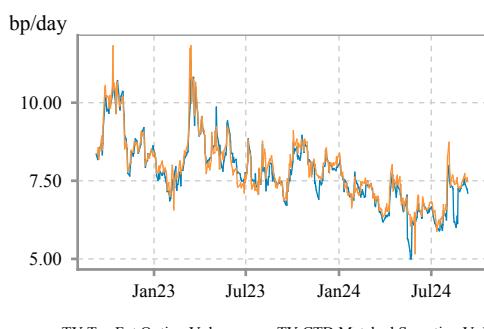
5-year note contract (FV)



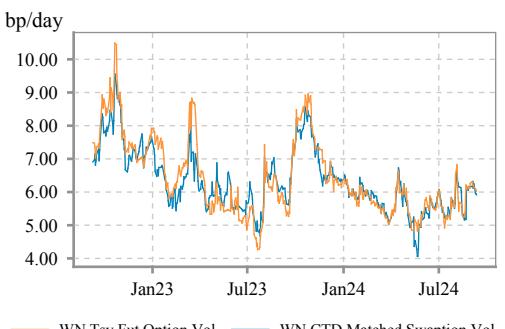
“Classic” Bond contract (US)



10-year note contract (TY)



Ultra-long bond contract (WN)



This report computes rolling implied volatilities of a swaption whose expiration corresponds to the expiration of a Treasury future option and whose tenor corresponds with the Treasury future option's CTD's maturity date. Data included are for the front month TU, FV, TY, UXY, US, and WN contracts. 6M and 1Y regressions are performed by regressing the Treasury future option implied volatilities (Y variable in regression) against the implied volatility of the corresponding CTD matched swaption described above (X variable). These CTD matched swaptions account for any daily changes in the CTD or for roll cycles. Both units of Treasury future option vol and the CTD matched swaption vol are in bp/day. Contracts are assumed to be rolled 10 days before option expiry.

Derivatives Strategy

Treasury Future Options vs. CTD Matched Swaption Report

6M Regression Stats

	Intercept	Beta	Rsq	StdErr	Curr CTD Matched Swpn Vol	Curr Tsy Fut Impl Vol	Fair Val.	Residual
TU	-0.02	1.12	0.77	0.53	7.83	8.54	8.78	-0.24
FV	1.17	0.91	0.69	0.40	7.62	8.03	8.12	-0.08
TY	1.76	0.78	0.63	0.34	7.10	7.48	7.28	0.20
UXY	2.16	0.67	0.61	0.29	6.67	6.47	6.63	-0.16
US	1.63	0.79	0.65	0.29	6.35	6.75	6.67	0.08
WN	1.64	0.71	0.71	0.23	5.91	6.02	5.86	0.17

1Y Regression Stats

	Intercept	Beta	Rsq	StdErr	Curr CTD Matched Swpn Vol	Curr Tsy Fut Impl Vol	Fair Val.	Residual
TU	1.10	0.96	0.73	0.48	7.83	8.54	8.61	-0.07
FV	1.47	0.87	0.78	0.34	7.62	8.03	8.06	-0.03
TY	1.23	0.86	0.83	0.29	7.10	7.48	7.31	0.17
UXY	0.79	0.89	0.86	0.29	6.67	6.47	6.73	-0.26
US	0.18	1.03	0.90	0.28	6.35	6.75	6.73	0.02
WN	-0.22	1.04	0.91	0.28	5.91	6.02	5.95	0.07

6M Treasury Future Option Implied Volatility Stats

	TU	FV	TY	UXY	US	WN
mean	7.4	7.5	6.9	6.3	6.3	5.6
std	1.1	0.7	0.6	0.5	0.5	0.4
min	6.0	6.3	5.2	5.5	5.4	4.8
25%	6.5	6.9	6.5	6.0	5.9	5.3
50%	7.0	7.3	6.8	6.3	6.2	5.6
75%	8.3	8.2	7.4	6.7	6.8	5.9
max	11.4	9.9	8.7	7.9	7.8	6.8
z-score	1.0	0.7	1.0	0.3	0.8	1.0

1Y Treasury Future Option Implied Volatility Stats

	TU	FV	TY	UXY	US	WN
mean	7.8	7.9	7.3	6.8	6.8	6.1
std	0.9	0.7	0.7	0.8	0.9	0.9
min	6.0	6.3	5.2	5.5	5.4	4.8
25%	6.9	7.2	6.8	6.2	6.2	5.5
50%	7.8	8.0	7.3	6.7	6.7	5.9
75%	8.5	8.4	7.8	7.2	7.2	6.3
max	11.4	9.9	9.1	9.0	9.4	9.0
z-score	0.9	0.2	0.2	-0.5	-0.1	-0.1

6M CTD Matched Swaption Implied Volatility Stats

	TU	FV	TY	UXY	US	WN
mean	6.6	7.0	6.6	6.2	5.9	5.6
std	0.9	0.7	0.6	0.5	0.5	0.5
min	4.8	5.3	5.0	4.7	4.4	4.1
25%	6.0	6.6	6.2	5.9	5.6	5.3
50%	6.4	6.8	6.6	6.2	5.9	5.5
75%	6.9	7.5	7.1	6.7	6.4	5.9
max	8.7	8.5	8.0	7.4	7.1	6.7
z-score	1.4	1.0	0.8	0.8	0.8	0.7

1Y CTD Matched Swaption Implied Volatility Stats

	TU	FV	TY	UXY	US	WN
mean	6.9	7.4	7.1	6.8	6.4	6.1
std	0.8	0.7	0.8	0.8	0.8	0.9
min	4.8	5.3	5.0	4.7	4.4	4.1
25%	6.3	6.8	6.6	6.2	5.9	5.5
50%	6.9	7.5	7.2	6.7	6.3	5.9
75%	7.6	7.9	7.6	7.3	6.9	6.4
max	8.7	8.9	9.0	8.9	8.7	8.6
z-score	1.1	0.3	0.0	-0.1	-0.1	-0.2

This report computes rolling implied volatilities of a swaption whose expiration corresponds to the expiration of a Treasury future option and whose tenor corresponds with the Treasury future option's CTD's maturity date. Data included are for the front month TU, FV, TY, UXY, US, and WN contracts. 6M and 1Y regressions are performed by regressing the Treasury future option implied volatilities (Y variable in regression) against the implied volatility of the corresponding CTD matched swaption described above (X variable). These CTD matched swaptions account for any daily changes in the CTD or for roll cycles. Both units of Treasury future option vol and the CTD matched swaption vol are in bp/day. Contracts are assumed to be rolled 10 days before option expiry.

Derivatives Strategy

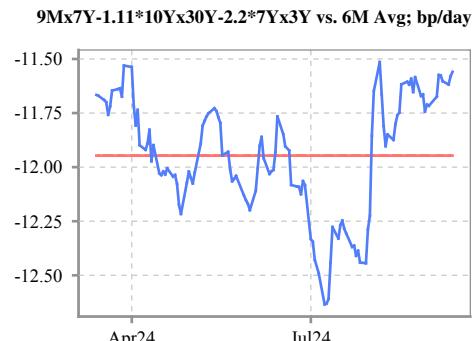
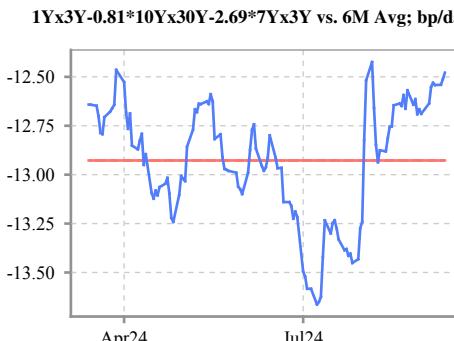
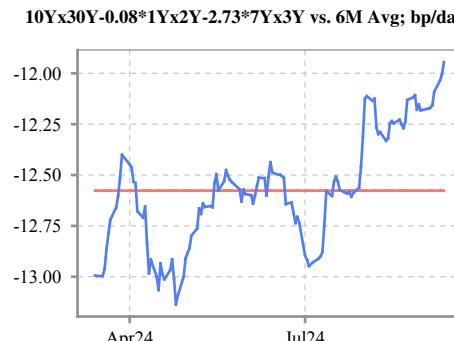
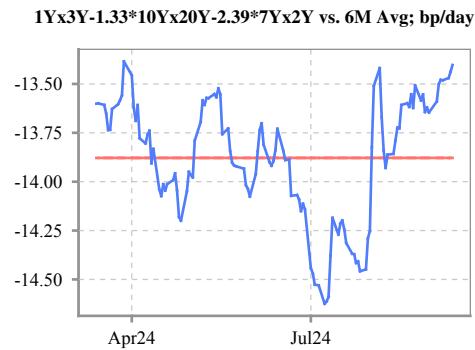
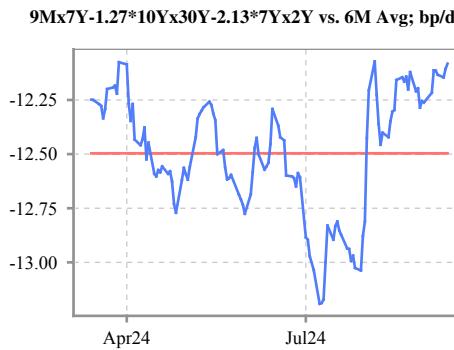
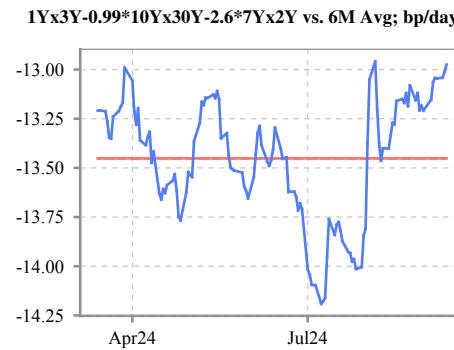
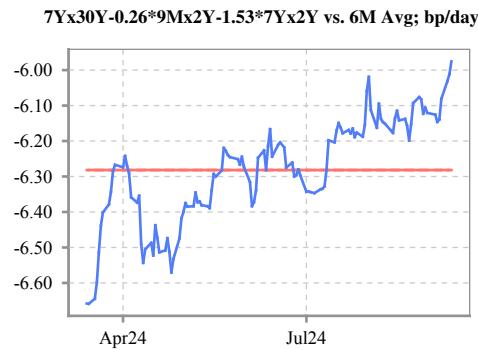
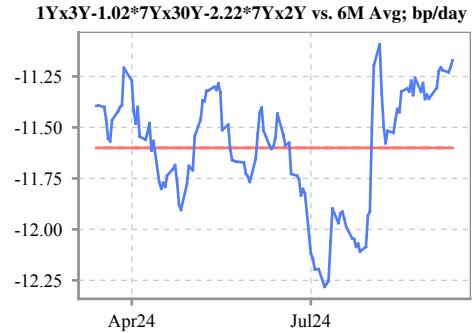
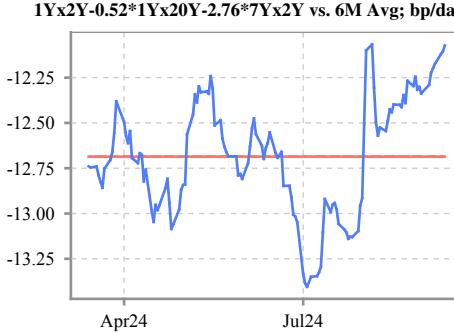
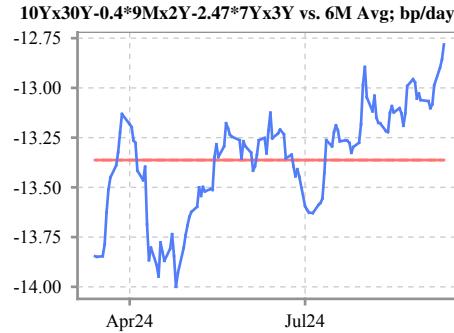
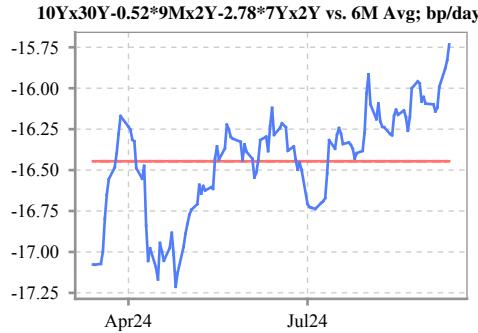
Weighted “Level” and “Curve” Neutral Swaption Butterfly Mispricing Report

Vol Left	Vol Belly	Vol Right	6M Left Wt	6M Right Wt	6M Wtd Vol Fly Cur.	6M Mean	6M Mispricing	50/50 Wtd Fly 6M Rsg	1Y Left Wt	1Y Right Wt	1Y Wtd Vol Fly Cur.	1Y Mean	1Y Mispricing	50/50 Wtd Fly 1Y Rsg
9Mx2Y	10Yx30Y	7Yx2Y	0.52	2.78	-15.73	-16.45	0.71	61%	-0.43	1.75	-2.49	-2.97	0.48	78%
9Mx2Y	10Yx30Y	7Yx3Y	0.40	2.47	-12.78	-13.36	0.58	63%	-0.41	1.61	-1.69	-2.09	0.40	80%
1Yx20Y	1Yx2Y	7Yx2Y	0.52	2.76	-12.07	-12.69	0.61	64%	0.08	2.85	-10.08	-10.46	0.38	69%
7Yx30Y	1Yx3Y	7Yx2Y	1.02	2.22	-11.17	-11.60	0.43	71%	-0.83	2.97	-6.35	-6.70	0.35	87%
9Mx2Y	7Yx30Y	7Yx2Y	0.26	1.53	-5.98	-6.28	0.31	61%	-0.34	1.48	-1.20	-1.53	0.33	83%
10Yx30Y	1Yx3Y	7Yx2Y	0.99	2.60	-12.97	-13.45	0.48	76%	-0.44	2.78	-7.29	-7.62	0.33	88%
10Yx30Y	9Mx7Y	7Yx2Y	1.27	2.13	-12.08	-12.50	0.41	73%	-0.28	2.53	-7.17	-7.49	0.32	87%
10Yx20Y	1Yx3Y	7Yx2Y	1.33	2.39	-13.40	-13.88	0.48	75%	-0.15	2.82	-8.88	-9.20	0.31	87%
7Yx30Y	9Mx5Y	7Yx3Y	1.26	2.67	-15.26	-15.81	0.55	76%	-0.87	2.92	-5.96	-6.26	0.29	87%
1Yx2Y	10Yx30Y	7Yx3Y	0.08	2.73	-11.94	-12.58	0.63	60%	-0.49	1.65	-1.42	-1.70	0.28	86%
10Yx30Y	1Yx3Y	7Yx3Y	0.81	2.69	-12.48	-12.93	0.45	75%	-0.62	2.82	-6.50	-6.79	0.28	88%
10Yx30Y	9Mx7Y	7Yx3Y	1.11	2.20	-11.56	-11.95	0.39	73%	-0.46	2.57	-6.38	-6.66	0.28	87%
9Mx20Y	1Yx2Y	7Yx2Y	0.75	2.25	-10.42	-10.93	0.50	65%	0.36	2.18	-7.67	-7.95	0.27	65%
1Yx2Y	9Mx30Y	7Yx2Y	0.53	2.42	-12.75	-13.29	0.54	62%	0.31	1.50	-5.64	-5.90	0.27	74%
10Yx20Y	1Yx3Y	7Yx3Y	1.15	2.50	-12.97	-13.42	0.45	75%	-0.32	2.88	-8.26	-8.53	0.26	86%
10Yx30Y	9Mx10Y	7Yx2Y	0.86	2.06	-10.08	-10.43	0.35	77%	-0.37	2.30	-5.72	-5.97	0.25	89%
7Yx30Y	1Yx5Y	7Yx2Y	0.65	1.94	-8.12	-8.38	0.26	74%	-0.81	2.77	-5.72	-5.97	0.25	90%
1Yx30Y	9Mx5Y	7Yx2Y	0.81	2.01	-9.66	-10.15	0.49	66%	0.22	2.20	-7.56	-7.81	0.25	66%
7Yx20Y	1Yx5Y	7Yx2Y	0.85	1.75	-8.08	-8.33	0.25	73%	-0.73	2.83	-6.38	-6.62	0.24	88%
10Yx20Y	9Mx10Y	7Yx2Y	1.11	1.88	-10.25	-10.59	0.34	77%	-0.27	2.30	-6.22	-6.45	0.23	88%
7Yx30Y	9Mx10Y	7Yx3Y	0.82	1.83	-8.68	-8.98	0.30	72%	-0.75	2.57	-5.02	-5.25	0.23	88%
10Yx30Y	1Yx5Y	7Yx2Y	0.58	2.18	-9.02	-9.31	0.29	78%	-0.54	2.55	-5.95	-6.18	0.23	90%
7Yx30Y	1Yx7Y	7Yx2Y	0.59	1.71	-6.69	-6.90	0.21	72%	-0.74	2.58	-5.09	-5.32	0.23	90%
9Mx20Y	1Yx2Y	7Yx3Y	0.67	2.43	-10.80	-11.30	0.49	66%	0.38	2.18	-7.66	-7.89	0.23	63%
1Yx2Y	9Mx30Y	7Yx3Y	0.47	2.40	-12.03	-12.51	0.48	64%	0.33	1.45	-5.37	-5.60	0.22	75%
9Mx2Y	9Mx30Y	7Yx2Y	0.66	1.78	-9.90	-10.19	0.29	65%	0.39	1.43	-5.82	-6.04	0.22	81%
10Yx30Y	9Mx10Y	7Yx3Y	0.70	2.14	-9.64	-9.97	0.32	77%	-0.54	2.35	-5.02	-5.24	0.22	89%
10Yx20Y	1Yx5Y	7Yx2Y	0.79	2.06	-9.32	-9.61	0.28	78%	-0.42	2.58	-6.69	-6.90	0.21	89%
7Yx30Y	1Yx5Y	7Yx3Y	0.47	2.09	-8.00	-8.24	0.25	74%	-1.04	2.88	-4.98	-5.19	0.21	90%
10Yx30Y	1Yx7Y	7Yx2Y	0.50	1.93	-7.38	-7.61	0.23	78%	-0.53	2.37	-5.13	-5.34	0.21	90%
1Yx20Y	1Yx3Y	7Yx2Y	0.56	2.02	-8.10	-8.50	0.40	60%	0.47	1.87	-6.65	-6.86	0.21	68%
9Mx3Y	9Mx30Y	7Yx2Y	0.72	1.52	-8.72	-8.96	0.24	64%	0.42	1.34	-5.44	-5.65	0.21	80%
10Yx15Y	1Yx5Y	7Yx2Y	0.96	1.94	-9.53	-9.82	0.28	77%	-0.33	2.60	-7.17	-7.37	0.21	88%
10Yx30Y	9Mx5Y	3Yx20Y	0.82	1.91	-7.60	-7.92	0.32	67%	-0.59	2.12	-2.14	-2.35	0.20	83%
10Yx30Y	9Mx7Y	5Yx10Y	0.86	1.56	-6.40	-6.61	0.21	62%	-0.70	2.26	-3.01	-3.21	0.20	86%

To calculate the weights, a 6M or 1Y empirical regression is used of the 50/50 weighted volatility fly regressed against the belly vol and the difference in the wing vols so that the weights are constructed to be “level” and “curve” neutral: left weight = $(0.5 \cdot \text{beta_vol_curve}) / (1 - \text{beta_vol_level})$ and right weight = $(0.5 + \text{beta_vol_curve}) / (1 - \text{beta_vol_level})$, where beta_vol_level and beta_vol_curve are calculated from the 6M or 1Y regressions described previously. The residual/mispricing is the difference of the current weighted spread with the 6M or 1Y avg of the weighted spread. The weighted vol spread will be bought if the current weighted volatility is less than the historical average of the weighted vol spread. Structures are sorted by highest absolute 6M mispricing. Units of volatility are in bp/day for each swaption structure.

Derivatives Strategy

Weighted “Level” and “Curve” Neutral Swaption Butterfly Mispricing Report

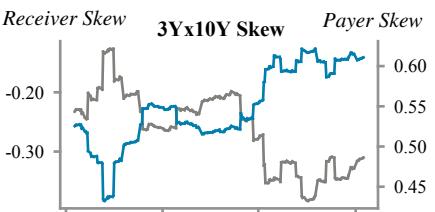
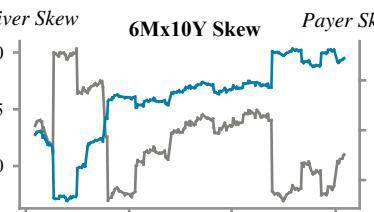


To calculate the weights, a 6M or 1Y empirical regression is used of the 50/50 weighted volatility fly regressed against the belly vol and the difference in the wing vols so that the weights are constructed to be “level” and “curve” neutral: left weight = $(0.5 \cdot \text{beta_vol_curve}) / (1 - \text{beta_vol_level})$ and right weight = $(0.5 + \text{beta_vol_curve}) / (1 - \text{beta_vol_level})$, where beta_vol_level and beta_vol_curve are calculated from the 6M or 1Y regressions described previously. The residual/mispricing is the difference of the current weighted spread with the 6M or 1Y avg of the weighted spread. The weighted vol spread will be bought if the current weighted volatility is less than the historical average of the weighted vol spread. Structures are sorted by highest absolute 6M mispricing. Units of volatility are in bp/day for each swaption structure.

Derivatives Strategy

Skew FV Model Report

Structure	ATM - 100bp ATM+						Expected decrease in implied volatility for -100bp move				Expected increase in implied volatility for +100bp move			
	ATMF rate	ATM bp vol	Vol	100bp vol	Rec. Skew	Pay. Skew	Skew Impl.	Lognormal	Parametrized	Empirical	Skew Impl.	Lognormal	Parametrized	Empirical
3Mx2Y	3.15	7.87	9.67	7.75	1.80	-0.12	3.60	-2.50	-0.89	2.12	-0.24	2.50	1.26	0.00
3Mx5Y	3.03	7.23	8.68	7.65	1.46	0.43	2.91	-2.39	-0.85	1.61	0.85	2.39	1.22	1.54
3Mx10Y	3.13	6.47	7.25	7.57	0.78	1.10	1.56	-2.07	-0.89	1.31	2.20	2.07	1.25	1.23
3Mx30Y	3.11	5.81	6.60	7.03	0.79	1.23	1.58	-1.87	-0.88	1.00	2.46	1.87	1.25	1.80
6Mx2Y	2.97	7.59	8.84	7.40	1.25	-0.19	2.50	-2.55	-0.82	1.13	-0.38	2.55	1.20	-0.12
6Mx5Y	2.97	6.92	7.75	7.30	0.83	0.37	1.65	-2.33	-0.82	0.70	0.75	2.33	1.20	0.79
6Mx10Y	3.11	6.29	6.77	7.14	0.48	0.85	0.95	-2.03	-0.88	0.61	1.70	2.03	1.25	0.63
6Mx30Y	3.09	5.65	5.99	6.65	0.34	1.00	0.68	-1.83	-0.87	0.20	2.01	1.83	1.24	1.58
1Yx2Y	2.85	7.36	8.10	7.31	0.74	-0.05	1.48	-2.59	-0.78	0.39	-0.10	2.59	1.16	-0.10
1Yx5Y	2.94	6.70	7.08	7.04	0.38	0.34	0.76	-2.28	-0.81	0.02	0.68	2.28	1.19	0.71
1Yx10Y	3.11	6.20	6.32	6.87	0.12	0.67	0.23	-2.00	-0.88	-0.29	1.33	2.00	1.25	1.09
1Yx30Y	3.08	5.57	5.62	6.31	0.06	0.75	0.12	-1.81	-0.86	-0.60	1.50	1.81	1.24	1.57
3Yx2Y	2.97	6.53	6.35	7.00	-0.18	0.47	-0.36	-2.20	-0.82	-0.64	0.94	2.20	1.20	0.84
3Yx5Y	3.09	6.24	6.06	6.70	-0.17	0.46	-0.35	-2.02	-0.87	-0.52	0.93	2.02	1.24	0.70
3Yx10Y	3.24	5.92	5.78	6.40	-0.14	0.49	-0.28	-1.83	-0.93	-0.67	0.97	1.83	1.29	0.91
3Yx30Y	3.06	5.40	5.25	5.90	-0.15	0.50	-0.30	-1.76	-0.86	-0.78	1.00	1.76	1.23	1.19
5Yx2Y	3.14	6.22	5.97	6.66	-0.24	0.44	-0.48	-1.98	-0.89	-0.72	0.88	1.98	1.26	0.63
5Yx5Y	3.24	5.98	5.74	6.43	-0.24	0.45	-0.47	-1.85	-0.93	-0.68	0.89	1.85	1.28	0.58
5Yx10Y	3.35	5.71	5.47	6.19	-0.25	0.48	-0.50	-1.71	-0.97	-0.69	0.96	1.71	1.32	0.69
5Yx30Y	3.03	5.26	5.05	5.69	-0.21	0.44	-0.41	-1.74	-0.84	-0.64	0.88	1.74	1.22	0.87



* Receiver skew is defined as A-100 bp vol minus A+0 bp vol. Payer skew is defined as A+100 bp vol minus A+0 bp vol.

**Expected decline in implied volatility (bp/day) under current skew is the implied volatility decrease implied by the skew in -100bp scenario is estimated as A+0/A-100 receiver skew times two. Expected decline in implied volatility (bp/day) under current skew is the implied volatility increase implied by the skew in +100bp scenario is estimated as A+0/A+100 receiver skew times two.

Lognormal assumes a perfect lognormal assumption where the current yield vol is assumed to remain constant, and therefore expected change in implied volatility is calculated as yield vol / sqrt(251).

† Parametrized scenario assumes yield vols follow the form of 26.5 plus 120.73 exp (minus 1.11 times yields) as outlined in our 2023 Mid Year Outlook. From this we recalculate yield vols and then bp vols at a 100bp lower yield for receiver skews (100bp higher yield for payer skews).

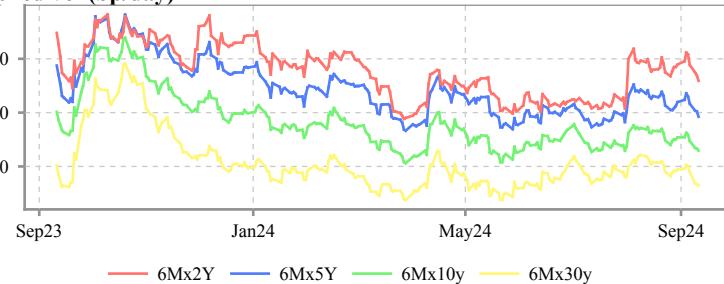
†† Empirical scenario uses the vol-rate relationship from a "down" / "up" beta to determine to rise in implied volatility for -100bp / +100bp move in rates for receiver / payer skews respectively. "Down" / "up" beta is calculated as 3-month beta of rolling weekly changes in implieds versus weekly changes in the underlying forward rate, using only observations where the latter was negative / positive, respectively.

Derivatives Strategy

SOFR Short Gamma Returns Model Report

	Coefficient				1-Month ahead projection (bp/notional)			
	6mx2y	6mx5y	6mx10y	6mx30y	6mx2y	6mx5y	6mx10y	6mx30y
Ex-ante implied vol (bp/day)	25.1	66.5	134.0	246.3	7.6	6.9	6.3	5.6
Monthly chg in market depth (\$mm)	0.1	0.1	0.1	0.6	0.0	0.0	0.0	0.0
Ex-ante 2-yr real yields (%)	29.0	83.2	65.5	-43.6	1.6	1.6	1.6	1.6
Ex-ante Fed expectations (%)	9.9	-12.4	-6.9	83.9	-2.2	-2.2	-2.2	-2.2
const	-242.2	-672.4	-1022.7	-1235.5				
R-squared	83%	83%	83%	73%				
Standard Error	5.0	9.4	15.4	36.5				
Projection					-27.5	-52.1	-59.9	-99.0
Normalized Projection					-5.5	-5.5	-3.9	-2.7

Implied vol (bp/day)



Fed expectations (%)



Duration weighted market depth (\$mm)



2-yr real yields (%)



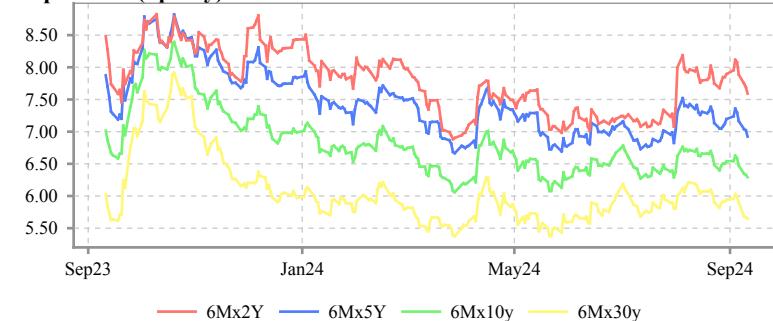
Note: Short gamma returns are short ATMF straddles, initiated daily (i.e., we consider overlapping trades), and held for one month with daily delta rebalancing, assuming zero transaction costs. All variables are ex-ante apart from monthly change in market depth. 2-year real yields are defined as 2Y UST minus 2Y inflation swap. Fed expectations are defined as 12Mx1M OIS minus 1M OIS rate. Market depth is the top 3 bids/offers in a given sector, averaged daily between 8:30am and 10:30am. 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. Normalized projection is Projection divided by Standard Error. Regression period is six months.

Derivatives Strategy

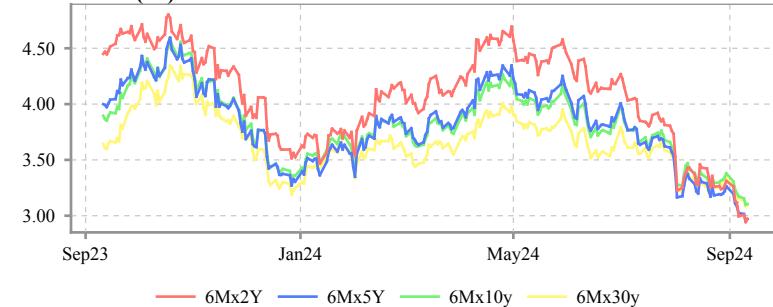
SOFR Short Gamma Returns with SPX Driver Model Report

	Coefficient				1-Month ahead projection (bp/notional)			
	6mx2y	6mx5y	6mx10y	6mx30y	6mx2y	6mx5y	6mx10y	6mx30y
Ex-ante implied vol (bp/day)	23.3	54.5	122.6	206.6	7.6	6.9	6.3	5.6
Pct chg in SP (%)	1.0	2.3	3.0	7.3	0.0	0.0	0.0	0.0
Ex-ante ATMF (%)	30.1	29.0	20.3	103.3	3.0	3.0	3.1	3.1
Ex-ante 1st/5th OIS curve (%)	-29.3	-31.9	-19.1	-46.8	-1.4	-1.4	-1.4	-1.4
const	-331.3	-534.9	-895.6	-1628.5				
R-squared	79%	81%	85%	68%				
Standard Error	5.6	9.8	14.5	39.5				
Projection					-24.2	-28.1	-35.0	-77.4
Normalized Projection					-4.3	-2.9	-2.4	-2.0

Implied vol (bp/day)



ATMF rate (%)



SPX levels and monthly returns



1st/5th OIS curve (%)



Note: Short gamma returns are rolling monthly returns of short ATMF straddles, assuming options are rolled each month with daily delta hedging and no transaction costs. All variables are ex-ante apart from changes in SPX returns, which use current levels. Regression period is six months. The 1st/5th OIS curve is defined as the 15Mx3M minus 3Mx3M OIS rate. Projection assumes SPX is unchanged. Normalized projection is projection divided by the standard error.

Derivatives Strategy

Lognormal Short Gamma Returns Projection Report

Excess return calculations

	Short normal delta-hedged straddle returns* (bp/ notl)	Change in ATMF (%)	Ex-Ante percent yield vol	Ex-Ante bpvol vega	Rate driven return** (bp/ notl)	Residual short gamma return*** adj. for rates (bp/ notl)
6Mx2Y	5.18	-0.21	26.34	16.50	5.68	-0.50
6Mx5Y	23.52	-0.22	28.01	38.93	15.06	8.46
6Mx10Y	52.51	-0.19	26.13	70.84	22.45	30.06
6Mx30Y	119.18	-0.15	24.83	151.28	35.22	83.96

* Assumes daily delta hedging to a normal delta, and no transaction costs.

** Rate driven returns estimated as the change in ATMF rate * the ex-ante implied yield volatility / 15.84 * ATMF vega with respect to a 1 bp/day move in implieds.

*** Excess residual return defined as delta hedged return minus rate driven returns.

Projected excess returns*

	Coefficient				Current drivers			
	6Mx2Y	6Mx5Y	6Mx10Y	6Mx30Y	6Mx2Y	6Mx5Y	6Mx10Y	6Mx30Y
1M chg market depth**	0.7	1.0	1.4	2.3	0.0	0.0	0.0	0.0
Ex-ante percent yield vol (%)	4.7	7.9	14.3	24.9	26.9	27.6	25.1	23.3
Ex-ante constant maturity 1st/5th SOFR curve (bp)	0.3	0.1	0.0	-0.7	-94.5	-94.5	-94.5	-94.5
const	-119.0	-247.2	-424.7	-757.7				
Std. Err.	13.1	26.0	37.0	69.2				
R2	34%	26%	25%	21%				
1 Month Ahead Projection					-19.0	-39.8	-64.7	-110.0
Normalized Projection***					-1.4	-1.5	-1.8	-1.6

* We model excess residual returns calculated from the table above.

** 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.

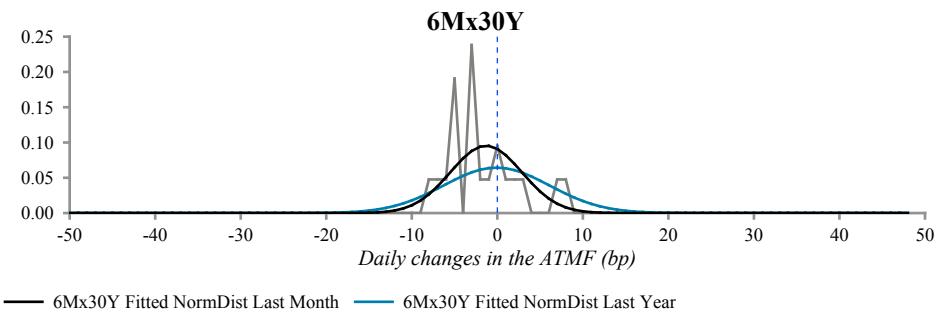
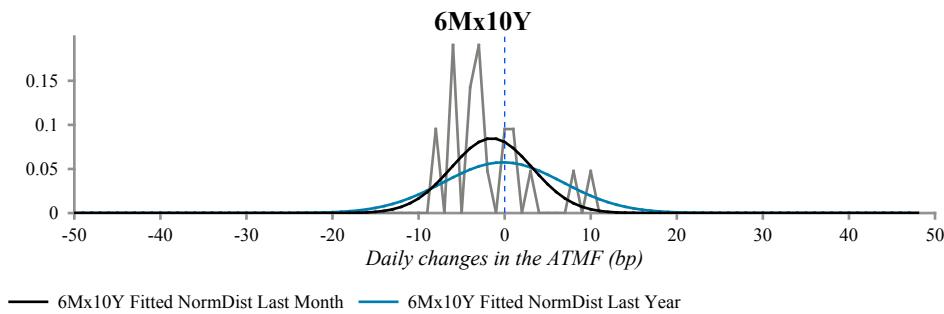
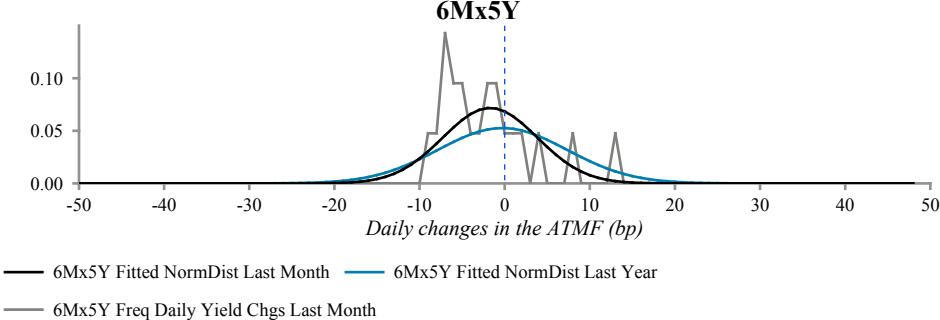
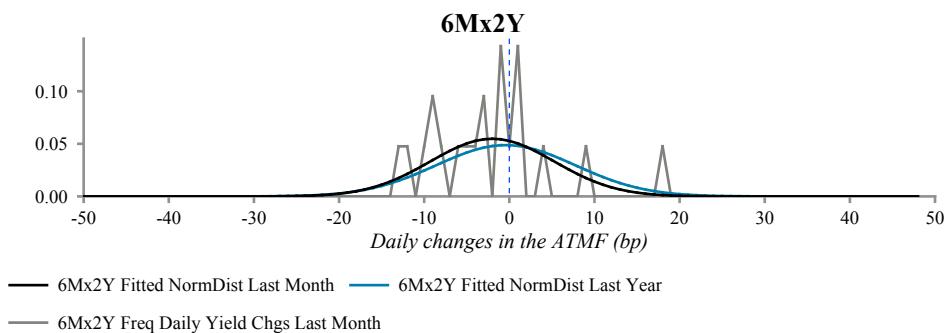
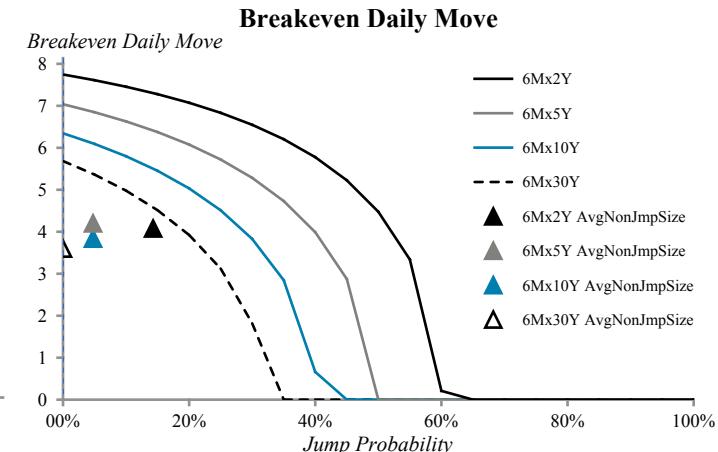
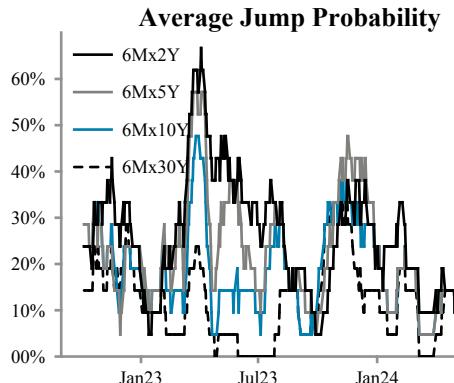
*** Normalized projection is the 1-month ahead projection divided by the standard error.

Source: J.P. Morgan, BrokerTec

Derivatives Strategy

SOFR Jump Risk Report

	6Mx2Y	6Mx5Y	6Mx10Y	6Mx30Y
Current Implied Vol (bp/day)	7.75	7.04	6.35	5.68
Average jump size (bp/day)	14.31	13.45	10.15	-inf
Average jump prob*	0.14	0.05	0.05	0.00
Average non-jump size** (bp/day)	4.08	4.20	3.84	3.60
Average non-jump prob	0.86	0.95	0.95	1.00
Implied vol from jumps (bp/day)	6.59	5.04	4.35	



* Average jump probability is based on a jump size of 10bp. Jump size is calculated on absolute value of yield changes for all.

** Average non-jump size is calculated over the past month, and is shown at the jump probability from the past month.

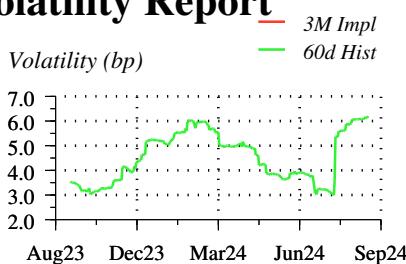
*** Breakeven daily move is calculated using the relationship implied variance = average jump size * average jump size * jump probability + average non-jump size * average non-jump size * (1-jump probability), and solving for the average non-jump size for the current implied volatility level.

† Normal distribution is fitted using the mean and standard deviation of daily changes from the respective time periods.

Short-Dated SOFR Swaption Volatility Report

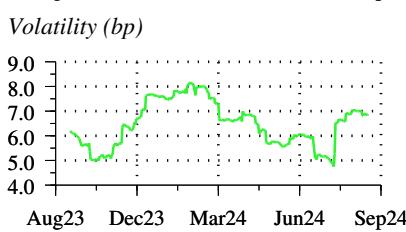
Options on 1yr Swaps

Mat	Implied Vol.		5d		20d		Historical BP Vol.		
	%	bp	Chg	Chg	10d	20d	60d		
1m	30.74	7.38	-1.50	0.17	5.41	5.92	6.20		
3m	34.74	7.61	-0.87	0.03	*1dc	1wc	2wc		
6m	38.40	7.58	-0.62	-0.08	5.92	4.38	4.70		
12m	42.77	7.70	-0.30	-0.22					



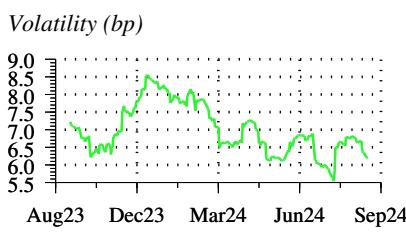
Options on 2yr Swaps

Mat	Implied Vol.		5d		20d		Historical BP Vol.		
	%	bp	Chg	Chg	10d	20d	60d		
1m	36.60	7.68	-1.65	-0.74	5.78	6.67	6.88		
3m	39.57	7.87	-0.84	-0.58	*1dc	1wc	2wc		
6m	40.45	7.59	-0.53	-0.40	6.67	4.81	4.93		
12m	40.96	7.36	-0.30	-0.35					



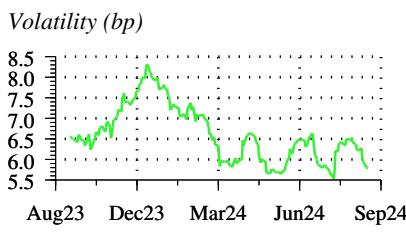
Options on 5yr Swaps

Mat	Implied Vol.		5d		20d		Historical BP Vol.		
	%	bp	Chg	Chg	10d	20d	60d		
1m	35.11	6.85	-1.28	-1.00	4.38	5.50	6.21		
3m	37.80	7.23	-0.65	-0.73	*1dc	1wc	2wc		
6m	36.97	6.92	-0.43	-0.49	5.50	3.80	3.64		
12m	36.09	6.70	-0.27	-0.38					



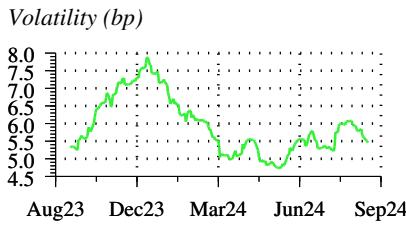
Options on 10yr Swaps

Mat	Implied Vol.		5d		20d		Historical BP Vol.		
	%	bp	Chg	Chg	10d	20d	60d		
1m	29.79	5.94	-0.94	-0.91	3.83	4.68	5.78		
3m	32.74	6.47	-0.47	-0.65	*1dc	1wc	2wc		
6m	32.11	6.29	-0.33	-0.44	4.68	3.56	3.06		
12m	31.62	6.20	-0.23	-0.34					

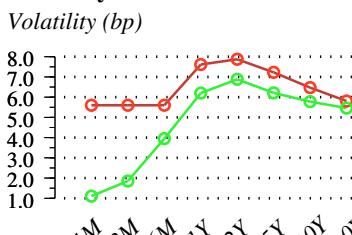


Options on 30yr Swaps

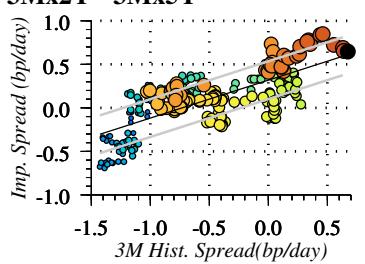
Mat	Implied Vol.		5d		20d		Historical BP Vol.		
	%	bp	Chg	Chg	10d	20d	60d		
1m	26.61	5.26	-0.80	-0.80	3.58	4.18	5.46		
3m	29.56	5.81	-0.46	-0.64	*1dc	1wc	2wc		
6m	28.92	5.65	-0.38	-0.52	4.18	3.66	2.84		
12m	28.64	5.57	-0.31	-0.46					



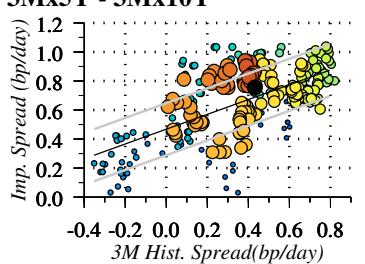
Maturity Structure of 3M Vol.



3Mx2Y - 3Mx5Y



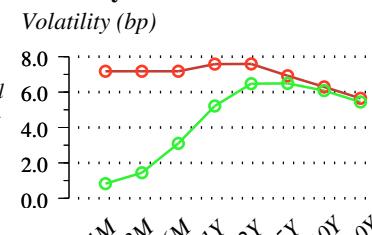
3Mx5Y - 3Mx10Y



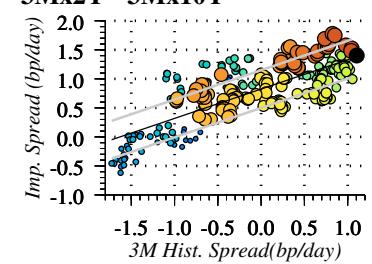
Hist Vol. Implied Vol.

Mat/Und	hold	curr	hold	curr
3mx1y	3.61	6.20	4.61	7.61
3mx2y	4.78	6.88	5.33	7.87
3mx5y	5.55	6.21	5.65	7.23
3mx10y	5.58	5.78	5.55	6.47
3mx30y	5.20	5.46	5.18	5.81

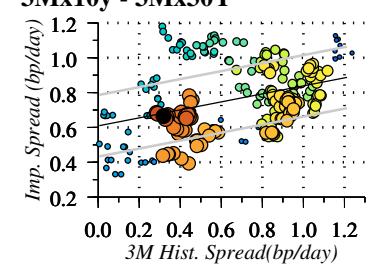
Maturity Structure of 6M Vol.



3Mx2Y - 3Mx10Y



3Mx10y - 3Mx30Y



1.Historical BP Vol. is calculated the 10-day, 20-day, and 60-day standard deviations of daily spot SOFR rate changes on the tenor specified in the table.

2.Regression of difference in 3M implieds vs difference in 3M historicals.

3.*One-month realized BP Vol. over 1-day, 1-week and 2-week change.

SOFR Receiver Swaption 3M Carry Report

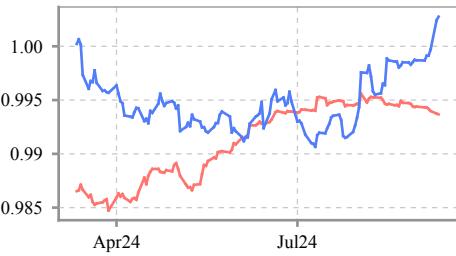
CCY	Mat	3M Carry A+0 (bp of yield)										3M Carry A+25 (bp of yield)										3M Carry A-25 (bp of yield)										3M Carry A+0 (prct of inv. premium)									
		1y	2y	3y	4y	5y	6y	10y	20y	30y	1y	2y	3y	4y	5y	6y	10y	20y	30y	1y	2y	3y	4y	5y	6y	10y	20y	30y	1y	2y	3y	4y	5y	6y	10y	20y	30y				
USD	6m	-0.6	-0.4	-0.3	-0.2	-0.1	0.0	0.0	0.0	0.0	-0.9	-0.7	-0.5	-0.3	-0.2	-0.1	-0.1	0.0	0.0	-0.3	-0.2	-0.1	-0.1	0.0	0.0	-0.1	0.1	0.0	-128.1	-100.9	-93.2	-90.2	-89.0	-98.5	-45.8	-85.0	-78.3				
	9m	-1.1	-0.8	-0.6	-0.4	-0.2	-0.1	0.0	0.0	0.0	-1.4	-1.0	-0.8	-0.6	-0.4	-0.3	-0.1	0.0	0.0	-0.8	-0.5	-0.3	-0.2	-0.1	0.0	-0.3	0.1	0.0	-72.3	-64.7	-62.9	-63.6	-65.6	-73.0	-124.6	-53.8	6.3				
	1y	-1.2	-0.9	-0.6	-0.4	-0.3	-0.2	-0.1	0.0	0.0	-1.5	-1.1	-0.8	-0.6	-0.5	-0.3	-0.2	-0.1	-0.1	-0.9	-0.6	-0.4	-0.2	-0.1	0.0	-0.3	0.1	0.1	-43.5	-42.1	-40.4	-41.0	-43.8	-48.5	-72.0	-28.6	-148.5				
	2y	0.1	0.0	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	0.2	0.1	0.0	0.0	0.0	0.0	-0.3	0.1	0.0	2.4	0.9	-2.0	-6.2	-11.0	-15.6	-26.8	-164.5	-36.6					
	3y	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	0.1	0.0	0.0	0.0	0.0	-0.2	0.0	-0.1	-0.6	-3.7	-3.5	-3.9	-4.2	-6.3	-11.5	-28.9	-21.9					
	4y	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-4.6	-4.5	-5.1	-5.6	-6.1	-5.7	-6.0	-14.5	-12.8					
	5y	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-2.9	-2.9	-3.2	-3.7	-4.0	-3.8	-4.3	-10.2	-9.4					
	6m	-18.1	-14.2	-12.3	-11.4	-10.6	-9.4	-8.4	-7.6	-7.3	-22.8	-16.5	-13.8	-12.5	-11.3	-9.6	-8.0	-7.0	-6.6	-13.6	-11.2	-10.0	-9.3	-8.7	-7.9	-9.6	-6.5	-6.2	-61.2	-46.5	-41.8	-39.4	-37.9	-35.4	-33.7	-31.9	-31.5				
	9m	-13.0	-10.1	-8.6	-8.1	-7.6	-6.8	-6.2	-5.9	-5.7	-15.2	-11.2	-9.4	-8.6	-7.9	-6.8	-5.9	-5.5	-5.3	-10.6	-8.6	-7.4	-7.0	-6.7	-6.1	-6.8	-5.4	-5.2	-35.8	-27.3	-24.2	-23.0	-22.3	-20.9	-20.2	-19.9	-20.0				
	1y	-9.7	-7.5	-6.5	-6.2	-5.8	-5.2	-4.8	-4.6	-4.6	-10.7	-8.2	-6.9	-6.5	-6.0	-5.2	-4.4	-4.3	-4.3	-8.4	-6.6	-5.8	-5.5	-5.3	-4.9	-5.2	-4.4	-4.3	-22.9	-17.7	-16.0	-15.4	-14.9	-13.9	-13.4	-13.5	-13.8				
GBP	2y	-4.0	-3.4	-3.1	-3.0	-2.8	-2.5	-2.2	-2.4	-2.6	-4.2	-3.5	-3.1	-3.0	-2.7	-2.3	-2.0	-2.2	-2.4	-3.7	-3.2	-3.0	-2.9	-2.7	-2.5	-2.3	-2.6	-6.9	-6.1	-5.7	-5.5	-5.2	-4.8	-4.5	-5.1	-5.6					
	3y	-2.3	-2.2	-1.9	-1.7	-1.4	-1.1	-1.2	-1.5	-1.7	-2.4	-2.3	-1.9	-1.6	-1.2	-0.9	-0.9	-1.3	-1.6	-2.2	-2.2	-1.9	-1.7	-1.5	-1.2	-0.9	-1.6	-1.8	-3.5	-3.4	-3.0	-2.6	-2.3	-2.0	-2.7	-3.2					
	4y	-1.1	-0.6	-0.3	-0.3	-0.3	-0.4	-0.9	-1.1	-1.0	-0.5	-0.1	-0.1	-0.0	-0.2	-0.8	-0.9	-1.1	-0.7	-0.4	-0.4	-0.4	-0.5	-0.4	0.0	-1.0	-1.1	-1.5	-0.8	-0.4	-0.5	-0.5	-0.4	-0.6	-1.5	-1.8					
	5y	0.0	0.3	0.3	0.4	0.4	0.2	-0.1	-0.6	-0.7	0.1	0.4	0.4	0.6	0.4	0.1	-0.5	-0.6	-0.1	0.2	0.1	0.2	0.2	0.0	0.4	-0.8	-0.7	-0.8	0.0	0.4	0.4	0.6	0.6	0.3	-0.2	-0.9	-1.1				
	6m	-15.2	-11.7	-9.5	-8.5	-8.1	-7.3	-6.6	-6.3	-6.2	-21.9	-14.3	-10.7	-9.1	-8.3	-7.0	-6.0	-5.7	-5.6	-9.3	-8.1	-7.0	-6.5	-6.2	-5.7	-7.0	-4.9	-4.9	-73.5	-53.0	-43.9	-40.1	-37.6	-34.8	-32.8	-32.3	-32.2				
EUR	9m	-11.2	-7.8	-6.5	-5.9	-5.7	-5.2	-4.9	-5.0	-4.9	-13.8	-8.5	-6.7	-5.8	-5.5	-4.9	-4.4	-4.6	-4.6	-8.3	-6.4	-5.5	-5.1	-5.0	-4.7	-4.9	-4.3	-4.3	-42.2	-28.1	-24.0	-22.2	-21.2	-20.1	-19.6	-20.5	-20.6				
	1y	-6.8	-5.0	-4.5	-4.1	-3.9	-3.7	-3.6	-4.1	-4.2	-7.5	-5.0	-4.3	-3.8	-3.6	-3.3	-3.1	-3.8	-4.0	-5.7	-4.5	-4.2	-3.8	-3.7	-3.5	-3.3	-3.8	-3.8	-22.0	-15.6	-14.2	-13.2	-12.5	-12.2	-12.2	-14.6	-15.1				
	2y	-0.7	-1.1	-1.3	-1.3	-1.4	-1.5	-1.7	-2.4	-2.5	-0.3	-0.8	-1.0	-1.0	-1.1	-1.1	-1.4	-2.3	-2.4	-0.9	-1.2	-1.4	-1.4	-1.5	-1.6	-1.1	-2.4	-2.5	-1.5	-2.5	-2.9	-3.1	-3.3	-3.5	-4.2	-6.2	-6.5				
	3y	-1.0	-1.0	-1.0	-1.0	-1.1	-1.1	-1.3	-1.9	-2.0	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-1.1	-1.8	-1.9	-1.1	-1.1	-1.1	-1.2	-1.2	-0.8	-1.9	-1.9	-2.0	-1.9	-1.9	-2.0	-2.1	-2.1	-2.6	-4.1	-4.3					
	4y	-0.5	-0.5	-0.5	-0.5	-0.6	-0.7	-0.9	-1.5	-1.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.5	-0.7	-1.4	-1.5	-0.7	-0.6	-0.6	-0.7	-0.7	-0.8	-0.5	-1.5	-1.5	-0.9	-0.8	-0.9	-1.0	-1.0	-1.2	-1.7	-2.9	-3.0				
	5y	-0.3	-0.4	-0.3	-0.3	-0.4	-0.4	-0.8	-1.3	-1.3	-0.1	-0.2	-0.2	-0.1	-0.1	-0.3	-0.6	-1.2	-1.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.6	-0.3	-1.3	-1.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.7	-1.3	-2.2	-2.3				
	6m	-28.4	-15.8	-11.0	-8.4	-6.6	-4.2	-2.3	-1.3	-1.3	-3.57	-3.39	-3.32	-3.28	-3.26	-3.27	-3.36	-3.56	-3.56	-110	-113	-110	-106	-102	-97	-91	-88	-85	-17.6	-9.8	-6.8	-5.2	-3.9	-2.2	-1.3	-1.1	-0.9	-0.8	-0.7		
	9m	-17.6	-9.8	-6.8	-5.2	-3.9	-2.2	-0.8	-0.5	-0.6	-3.39	-3.29	-3.25	-3.23	-3.25	-3.35	-3.56	-3.55	-112	-113	-109	-106	-103	-98	-93	-90	-87	-1.2	-0.7	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1			
	1y	-9.8	-5.6	-3.8	-2.8	-2.0	-0.7	0.2	0.1	-0.2	-3.29	-3.24	-3.21	-3.20	-3.20	-3.24	-3.35	-3.56	-113	-113	-108	-105	-102	-98	-93	-90	-87	-1.2	-0.7	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1			
GBP	2y	-1.2	-0.8	-0.4	0.2	0.6	1.2	1.5	0.7	0.3	3.18	3.17	3.16	3.18	3.20	3.27	3.40	3.58	3.56	113	110	106	104	102	99	95	92	89	-1.2	-0.8	-0.4	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1		
	3y	-0.3	0.1	0.6	1.1	1.5	1.9	1.8	0.8	0.4	3.15	3.16	3.17	3.21	3.25	3.34	3.47	3.62	3.57	110	108	104	102	100	97	94	90	88	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1		
	4y	0.5	1.1	1.6	1.9	2.1	2.3	1.9	0.8	0.4	3.16	3.18	3.22	3.27	3.32	3.43	3.55	3.65	3.59	106	103	99	98	97	95	92	89	86	0.5	1.1	1.6	1.9	2.1	2.3	1.9	0.8	0.4	3.16	3.17		
	5y	1.8	2.2	2.4	2.6	2.5	1.9	0.8	0.3	0.3	3.21	3.26	3.31	3.37	3.42	3.52	3.62	3.68	3.60	103	100	96	95	94	93	91	87	84	1.8	2.2	2.4	2.6	2.5	1.9	0.8	0.3	0.3	3.21	3.22		
	6m	-29.1	-13.8	-8.1	-5.8	-4.3	-2.6	-1.5	-1.5	-1.5	2.17	2.08	2.09	2.12	2.15	2.22	2.32	2.37	2.19	77	81	80	79	77	75	72	70	69	-29.1	-13.8	-8.1	-5.8	-4.3	-2.6	-1.5	-1.5	-1.5	2.17	2.08		
EUR	9m	-15.2	-6.0	-3.2	-1.9	-1.1	-0.4	0.1	-0.7	-0.8	2.02	2.02	2.06	2.10	2.14	2.22	2.32	2.36	2.19	80	84	82	80	79	77	74	71	70	-15.2	-6.0	-3.2	-1.9	-1.1	-0.4	-0.1	-0.7	-0.8	2.02	2.06		
	1y	-5.9	-1.0	0.0	0.5	0.8	1.0	1.1	-0.1	-0.4	1.96	2.01	2.06	2.11	2.15	2.23	2.33	2.36	2.18	82	85	83	81	79	77	75	72	71	-5.9	-1.0	0.0	0.5	0.8	1.0	1.1	-0.1	-0.4	1.96	2.0		

Derivatives Strategy

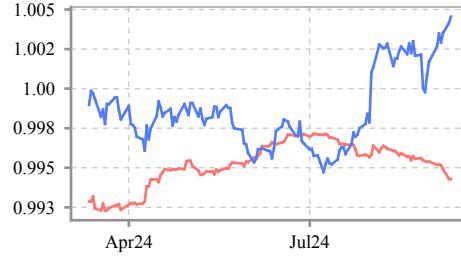
Swaption Triad Correlation Report

Structures	dep	Y vol	X1 vol	X2 vol	Beta X1	Beta X2	Standard Error	Implied corr from relationship	Realized Correlation			Fair Value			Mispicing			w1	w2	Notl wt 1	Notl wt 2
									Current Realized	Past 1Y min	Past 1Y max	Fair value using current realized	Fair value using Past 1y min	Fair value using Past 1y max	Mispicing using current realized	Mispicing using Past 1Y min	Mispicing using Past 1Y max				
6Mx2Y/6Mx5Y/6Mx10Y	10Y	6.33	7.69	7.02	-0.49	1.45	0.68	1.02	0.96	0.92	0.98	6.68	6.91	6.55	0.35	0.58	0.22	0.51	-1.45	2.25	-2.68
6Mx2Y/6Mx10Y/6Mx5Y	5Y	7.02	7.69	6.33	0.37	0.65	0.45	1.04	0.89	0.78	0.94	6.75	6.57	6.85	0.27	0.45	0.17	-0.37	-0.65	-0.89	-0.35
6Mx5Y/6Mx10Y/6Mx2Y	2Y	7.69	7.02	6.33	2.45	-1.48	1.18	1.01	0.98	0.95	0.99	8.40	8.82	8.18	0.70	1.13	0.49	-2.47	1.55	-1.03	0.35
6Mx2Y/6Mx5Y/6Mx30Y	30Y	5.67	7.69	7.02	-0.79	1.67	1.37	1.01	0.96	0.92	0.98	6.31	6.75	6.05	0.63	1.08	0.38	0.81	-1.65	8.08	-6.87
6Mx2Y/6Mx30Y/6Mx5Y	5Y	7.02	7.69	5.67	0.53	0.50	0.75	1.04	0.79	0.57	0.88	6.60	6.20	6.75	0.42	0.82	0.28	-0.53	-0.51	-1.27	-0.12
6Mx5Y/6Mx30Y/6Mx2Y	2Y	7.69	7.02	5.67	1.74	-0.79	1.36	1.03	0.92	0.80	0.95	8.44	9.17	8.22	0.74	1.48	0.53	-1.73	0.83	-0.72	0.08
6Mx2Y/6Mx10Y/6Mx30Y	30Y	5.67	7.69	6.33	-0.26	1.20	0.69	0.99	0.89	0.78	0.94	5.95	6.21	5.80	0.28	0.54	0.13	0.25	-1.19	2.53	-2.67
6Mx2Y/6Mx30Y/6Mx10Y	10Y	6.33	7.69	5.67	0.23	0.80	0.56	0.97	0.79	0.57	0.88	6.09	5.79	6.20	0.24	0.54	0.13	-0.23	-0.80	-1.02	-0.35
6Mx10Y/6Mx30Y/6Mx2Y	2Y	7.69	6.33	5.67	3.43	-2.52	2.15	1.00	0.98	0.93	0.99	8.51	9.98	8.26	0.82	2.29	0.56	-3.29	2.42	-0.74	0.24
6Mx5Y/6Mx10Y/6Mx30Y	30Y	5.67	7.02	6.33	-0.74	1.70	0.52	0.99	0.98	0.95	0.99	5.78	6.00	5.68	0.11	0.33	0.00	0.71	-1.68	2.96	-3.77
6Mx5Y/6Mx30Y/6Mx10Y	10Y	6.33	7.02	5.67	0.46	0.56	0.30	0.95	0.92	0.80	0.95	6.28	6.08	6.33	0.05	0.25	0.00	-0.46	-0.55	-0.85	-0.24
6Mx10Y/6Mx30Y/6Mx5Y	5Y	7.02	6.33	5.67	2.05	-1.08	0.63	0.99	0.98	0.93	0.99	7.10	7.58	7.02	0.08	0.55	0.00	-2.02	1.02	-1.09	0.24

imp corr 6Mx15Y/6Mx30Y/6Mx2Y vs corr 6Mx15Y/6Mx30Y/6Mx2Y

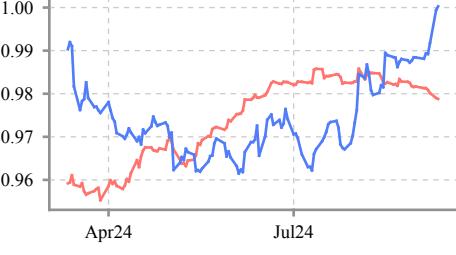


imp corr 6Mx7Y/6Mx10Y/6Mx2Y vs corr 6Mx7Y/6Mx10Y/6Mx2Y



Implied correlation
Realized correlation

imp corr 6Mx10Y/6Mx30Y/6Mx2Y vs corr 6Mx10Y/6Mx30Y/6Mx2Y



imp corr 6Mx7Y/6Mx15Y/6Mx2Y vs corr 6Mx7Y/6Mx15Y/6Mx2Y



imp corr 6Mx7Y/6Mx30Y/6Mx2Y vs corr 6Mx7Y/6Mx30Y/6Mx2Y



For each structure, the dependent leg refers to the last leg of the trade, for which we refer to its vol as 'Yvol'. For the first two legs in each structure, we refer to them as X1 and X2 and their vols as 'X1 Vol' and 'X2 Vol', respectively. Betas are calculated by regressing the past three months of daily changes in the sofr rate of the dependent leg against the past three months of daily changes of the sofr rate in two other legs of the triad.

Implied correlation is defined as dep. leg implied vol squared, minus beta of the first leg squared x first leg implied vol squared, minus beta of second leg squared x second leg implied vol squared, minus the standard error of the regression squared, all divided by 2 x beta of first leg x implied vol of first leg x beta of second leg x implied vol of second leg.

Fair value is defined as sqrt(first leg implied vol squared x beta of first leg squared, plus second leg implied vol squared x beta of second leg squared, plus standard error of regression squared, plus 2 x first leg implied vol squared x beta of first leg x second leg implied vol x beta of second leg x correlation of past three months daily changes in sofr rate between first and second leg).

Derivatives Strategy

Vol-Rate Correlation Report

	Current Rate	Aged Rate	Swaption Premium	Aged Swaption Premium	bpvega	Emp. Beta	Log Beta	Avg Beta	Swap Overlay (\$mn)	1m Carry Swaption notional (\$)	1m carry swap overlay (\$)
3Mx2Y	3.15	3.24	94.44	104.69	11.99	0.00	2.50	1.25	7.61		
3Mx3Y	3.06	3.11	137.60	152.11	17.72	1.01	2.54	1.78	10.84		
3Mx5Y	3.03	3.06	207.47	229.32	28.71	1.54	2.39	1.96	12.57		
3Mx7Y	3.07	3.09	269.80	298.90	39.05	0.89	2.25	1.57	9.93		
3Mx10Y	3.13	3.15	344.91	383.37	53.30	1.23	2.07	1.65	10.38		
3Mx15Y	3.23	3.24	463.78	515.47	74.04	1.59	1.94	1.77	11.14		
3Mx30Y	3.11	3.12	695.46	773.09	119.78	1.80	1.87	1.83	11.57		
6Mx2Y	2.97	3.02	126.99	134.73	16.73	-0.12	2.55	1.22	10.44		
6Mx3Y	2.94	2.97	183.65	194.94	24.70	0.34	2.53	1.43	12.30		
6Mx5Y	2.97	2.99	276.82	293.71	39.98	0.79	2.33	1.56	14.05		
6Mx7Y	3.03	3.03	362.16	385.02	54.39	0.19	2.20	1.20	10.64		
6Mx10Y	3.11	3.11	466.96	497.24	74.20	0.63	2.03	1.33	11.80		
6Mx15Y	3.21	3.22	627.86	668.68	103.06	1.18	1.90	1.54	13.63		
6Mx30Y	3.09	3.10	941.86	1002.74	166.76	1.58	1.83	1.70	15.09		
1Yx2Y	2.85	2.86	172.96	176.81	23.50	-0.10	2.59	1.24	15.28		
1Yx3Y	2.87	2.88	249.31	254.92	34.77	0.48	2.50	1.49	18.32		
1Yx5Y	2.94	2.94	377.23	386.46	56.30	0.71	2.28	1.49	19.06		
1Yx7Y	3.01	3.01	496.36	508.81	76.47	1.05	2.15	1.60	20.43		
1Yx10Y	3.11	3.10	647.20	663.84	104.38	1.09	2.00	1.54	19.62		
1Yx15Y	3.21	3.21	869.69	891.90	144.88	1.11	1.87	1.49	18.91		
1Yx30Y	3.08	3.08	1305.07	1340.07	234.51	1.57	1.81	1.69	21.43		
3Yx2Y	2.97	2.96	251.50	252.40	38.54	0.84	2.20	1.52	35.25		
3Yx3Y	3.01	3.01	365.18	366.55	56.82	0.84	2.14	1.49	33.79		
3Yx5Y	3.09	3.08	572.51	574.69	91.76	0.70	2.02	1.36	30.40		
3Yx7Y	3.15	3.15	759.72	762.68	124.47	0.78	1.94	1.36	30.17		
3Yx10Y	3.24	3.23	1003.28	1007.30	169.56	0.91	1.83	1.37	30.18		
3Yx15Y	3.29	3.29	1339.54	1344.75	235.02	0.99	1.73	1.36	29.90		
3Yx30Y	3.06	3.06	2062.70	2071.65	382.12	1.19	1.76	1.48	32.53		
5Yx2Y	3.14	3.14	290.46	290.59	46.73	0.63	1.98	1.31	36.76		
5Yx3Y	3.18	3.17	422.47	422.67	68.87	0.63	1.93	1.28	35.96		
5Yx5Y	3.24	3.23	664.39	664.70	111.13	0.58	1.85	1.21	34.08		
5Yx7Y	3.29	3.29	884.43	884.85	150.75	0.69	1.78	1.24	34.69		
5Yx10Y	3.35	3.34	1171.00	1171.58	204.92	0.69	1.71	1.20	33.52		
5Yx15Y	3.34	3.34	1556.52	1557.30	284.05	0.76	1.64	1.20	33.66		
5Yx30Y	3.03	3.03	2441.17	2442.53	464.49	0.87	1.74	1.31	36.90		

Notes: "swap overlay" is calculated as the average of the up-beta (beta of weekly changes in swaption bpvol versus the swaption bpvol multiplied by the weekly change in sofr rate, restricted to the days where the change in the sofr rate was positive) and yield volatility, multiplied by the swaption bpvega, divided by the swap PVBP.

"Im carry swaption notional" is calculated as -1 times the difference between the aged ATMF swaption premium and ATMF swaption premium, multiplied by 100mn, divided by 100. Swaption carry is shown for a short swaption position.

"Im carry swap overlay" is calculated as the difference between the aged rate and current rate, multiplied by the average of the up-beta and yield volatility, multiplied by the swaption bpvega times 10, divided by the swap PVBP times 100, multiplied by the swap PVBP, multiplied by 100mn, divided by 100. Swap carry is shown for a short swap position.

Derivatives Strategy

Long PC1 trades (expiry 6M)

6M Implied Principal Components

	2Y	3Y	5Y	7Y	10Y	20Y	30Y
PC1	7.14	7.18	6.99	6.60	6.16	5.31	4.91
PC2	2.83	1.71	0.24	-0.58	-1.33	-2.39	-2.80

6M Implied PC1 Volatility Time Series (bp/day)



Long PC1 trades (expiry 6M)

Tenor 1	Tenor 2	Vega Weight 1	Vega Weight 2	Notional 1 (\$ millions)	Notional 2 (\$ millions)	Theta 1(% of notional)	Theta 2(% of notional)	Carry 1 (\$ thousands)	Carry 2 (\$ thousands)	Net Carry (\$ thousands)	Multiplier	Adj. Notional 1 (\$ millions)	Adj. Notional 2 (\$ millions)	Adj. Net Carry (\$ thousands)	Vol Spread (bp/day)	Vol Spread 6M Z-Score
2Y	20Y	1	-1.08	100	-14	-0.11	-0.66	-108	94	-14	4.271	427	-61	-61	1.24	1.84
2Y	30Y	1	-0.76	100	-8	-0.11	-0.83	-108	63	-46	1.865	187	-14	-85	3.41	1.54
2Y	5Y	-1	128.82	-100	5375	-0.11	-0.23	108	-12613	-12505	0.007	-1	39	-90	896.77	-0.23
2Y	7Y	-1	21.04	-100	646	-0.11	-0.31	108	-2013	-1905	0.049	-5	32	-94	133.92	-0.51
2Y	3Y	-1	2.69	-100	181	-0.11	-0.16	108	-282	-174	0.543	-54	98	-94	12.55	0.38
2Y	10Y	-1	3.75	-100	84	-0.11	-0.41	108	-347	-239	0.402	-40	34	-96	16.08	-1.45
3Y	5Y	-1	47.94	-100	2964	-0.16	-0.23	156	-6956	-6800	0.020	-2	58	-133	329.10	-0.24
3Y	20Y	1	-0.40	100	-8	-0.16	-0.66	-156	52	-104	1.294	129	-10	-134	5.13	0.96
3Y	30Y	1	-0.28	100	-4	-0.16	-0.83	-156	35	-121	1.130	113	-5	-137	5.94	0.83
3Y	7Y	-1	7.83	-100	356	-0.16	-0.31	156	-1110	-955	0.146	-15	52	-139	45.17	-0.61
3Y	10Y	-1	1.40	-100	47	-0.16	-0.41	156	-191	-36	4.158	-416	194	-149	1.31	-1.98
5Y	7Y	1	-0.16	100	-12	-0.23	-0.31	-235	37	-197	1.081	108	-13	-213	5.92	-0.19
5Y	30Y	1	-0.01	100	0	-0.23	-0.83	-235	1	-233	0.920	92	0	-215	6.99	-0.22
5Y	20Y	1	-0.01	100	0	-0.23	-0.66	-235	2	-233	0.922	92	0	-215	6.97	-0.22
5Y	10Y	1	-0.03	100	-2	-0.23	-0.41	-235	6	-228	0.941	94	-1	-215	6.84	-0.21
7Y	30Y	1	-0.04	100	-1	-0.31	-0.83	-312	10	-302	1.011	101	-1	-305	6.53	-0.41
7Y	20Y	1	-0.05	100	-2	-0.31	-0.66	-312	15	-297	1.026	103	-2	-305	6.42	-0.41
7Y	10Y	1	-0.18	100	-13	-0.31	-0.41	-312	54	-258	1.182	118	-15	-305	5.60	-0.35
10Y	20Y	1	-0.29	100	-17	-0.41	-0.66	-411	112	-300	1.379	138	-23	-413	4.61	-0.75
10Y	30Y	1	-0.20	100	-9	-0.41	-0.83	-411	74	-337	1.242	124	-11	-418	5.19	-0.73
20Y	30Y	1	-0.70	100	-53	-0.66	-0.83	-664	441	-222	3.589	359	-191	-798	2.00	-0.64

Footnotes:

*Vega weights chosen to create a long exposure to PC1 volatility while hedging out PC2 volatility

**Carries are calculated over a 1 month period

***Multiplier is calculated as root-mean-square of the PC1 loadings divided by PC1 exposure

†Adjusted notional is calculated as notional times multiplier; similar for adjusted carry

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

Long PC1 trades (expiry 1Y)

1Y Implied Principal Components

	2Y	3Y	5Y	7Y	10Y	20Y	30Y
PC1	6.89	6.83	6.68	6.38	6.04	5.23	4.84
PC2	2.67	1.65	0.37	-0.48	-1.30	-2.30	-2.69

1Y Implied PC1 Volatility Time Series (bp/day)



Long PC1 trades (expiry 1Y)

Tenor 1	Tenor 2	Vega Weight 1	Vega Weight 2	Notional 1 (\$ millions)	Notional 2 (\$ millions)	Theta 1(% of notional)	Theta 2(% of notional)	Carry 1 (\$ thousands)	Carry 2 (\$ thousands)	Net Carry (\$ thousands)	Multiplier	Adj. Notional 1 (\$ millions)	Adj. Notional 2 (\$ millions)	Adj. Net Carry (\$ thousands)	Vol Spread (bp/day)	Vol Spread 6M Z-Score
2Y	30Y	1	-0.74	100	-7	-0.07	-0.54	-67	40	-27	1.877	188	-14	-51	3.28	-0.04
2Y	20Y	1	-1.04	100	-14	-0.07	-0.39	-67	54	-13	4.234	423	-58	-56	1.40	0.31
2Y	5Y	-1	46.84	-100	1958	-0.07	-0.15	67	-2862	-2794	0.020	-2	40	-57	308.77	-1.53
2Y	3Y	-1	2.54	-100	172	-0.07	-0.09	67	-159	-92	0.616	-62	106	-57	10.94	-1.35
2Y	7Y	-1	26.79	-100	824	-0.07	-0.19	67	-1582	-1515	0.038	-4	32	-58	167.46	-1.58
2Y	10Y	-1	3.53	-100	80	-0.07	-0.26	67	-210	-143	0.432	-43	34	-62	14.52	-1.53
3Y	30Y	1	-0.29	100	-4	-0.09	-0.54	-93	23	-69	1.179	118	-5	-82	5.59	-0.95
3Y	20Y	1	-0.41	100	-8	-0.09	-0.39	-93	31	-61	1.367	137	-11	-84	4.86	-0.85
3Y	5Y	-1	18.43	-100	1139	-0.09	-0.15	93	-1664	-1572	0.053	-5	61	-84	117.20	-1.53
3Y	7Y	-1	10.54	-100	479	-0.09	-0.19	93	-920	-828	0.104	-10	50	-86	61.59	-1.59
3Y	10Y	-1	1.39	-100	46	-0.09	-0.26	93	-122	-30	3.661	-366	169	-109	1.41	-1.06
5Y	7Y	1	-0.57	100	-42	-0.15	-0.19	-146	81	-65	2.025	202	-85	-132	3.02	-1.42
5Y	10Y	1	-0.08	100	-4	-0.15	-0.26	-146	11	-135	1.000	100	-4	-135	6.28	-1.51
5Y	30Y	1	-0.02	100	0	-0.15	-0.54	-146	2	-144	0.943	94	0	-136	6.66	-1.52
5Y	20Y	1	-0.02	100	-1	-0.15	-0.39	-146	3	-143	0.948	95	-1	-136	6.62	-1.52
7Y	10Y	1	-0.13	100	-10	-0.19	-0.26	-192	26	-166	1.130	113	-11	-188	5.71	-1.56
7Y	30Y	1	-0.03	100	-1	-0.19	-0.54	-192	5	-187	1.009	101	-1	-189	6.37	-1.56
7Y	20Y	1	-0.04	100	-2	-0.19	-0.39	-192	7	-185	1.020	102	-2	-189	6.30	-1.56
10Y	30Y	1	-0.21	100	-9	-0.26	-0.54	-265	50	-214	1.238	124	-12	-265	5.05	-1.51
10Y	20Y	1	-0.30	100	-17	-0.26	-0.39	-265	68	-197	1.381	138	-24	-272	4.52	-1.53
20Y	30Y	1	-0.71	100	-54	-0.39	-0.54	-394	292	-103	3.515	351	-191	-361	1.80	-1.26

Footnotes:

*Vega weights chosen to create a long exposure to PC1 volatility while hedging out PC2 volatility

**Carries are calculated over a 1 month period

***Multiplier is calculated as root-mean-square of the PC1 loadings divided by PC1 exposure

†Adjusted notional is calculated as notional times multiplier; similar for adjusted carry

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

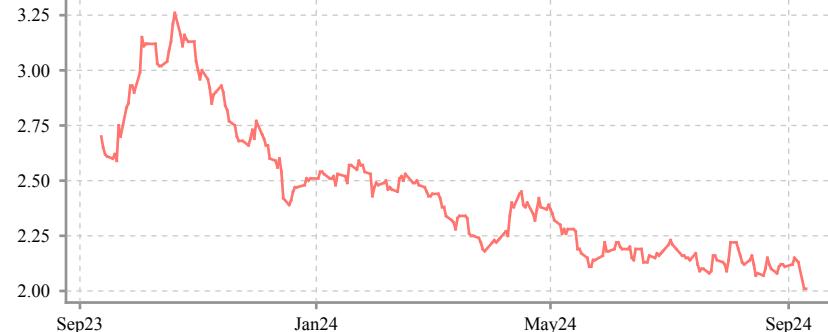
Derivatives Strategy

Long PC2 trades (expiry 6M)

6M Implied Principal Components

	2Y	3Y	5Y	7Y	10Y	20Y	30Y
PC1	7.14	7.18	6.99	6.60	6.16	5.31	4.91
PC2	2.83	1.71	0.24	-0.58	-1.33	-2.39	-2.80

6M Implied PC2 Volatility Time Series (bp/day)



Long PC2 trades (expiry 6M)

Tenor 1	Tenor 2	Vega Weight 1	Vega Weight 2	Notional 1 (\$ millions)	Notional 2 (\$ millions)	Theta 1(% of notional)	Theta 2(% of notional)	Carry 1 (\$ thousands)	Carry 2 (\$ thousands)	Net Carry (\$ thousands)	Multiplier	Adj. Notional 1 (\$ millions)	Adj. Notional 2 (\$ millions)	Adj. Net Carry (\$ thousands)	Vol Spread (bp/day)	Vol Spread 6M Z-Score

Footnotes:

*Vega weights chosen to create a long exposure to PC2 volatility while hedging out PC1 volatility

**Carries are calculated over a 1 month period

***Multiplier is calculated as root-mean-square of the PC2 loadings divided by PC2 exposure

†Adjusted notional is calculated as notional times multiplier; similar for adjusted carry

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

Long PC2 trades (expiry 1Y)

1Y Implied Principal Components

	2Y	3Y	5Y	7Y	10Y	20Y	30Y
PC1	6.89	6.83	6.68	6.38	6.04	5.23	4.84
PC2	2.67	1.65	0.37	-0.48	-1.30	-2.30	-2.69

1Y Implied PC2 Volatility Time Series (bp/day)



Long PC2 trades (expiry 1Y)

Tenor 1	Tenor 2	Vega Weight 1	Vega Weight 2	Notional 1 (\$ millions)	Notional 2 (\$ millions)	Theta 1(% of notional)	Theta 2(% of notional)	Carry 1 (\$ thousands)	Carry 2 (\$ thousands)	Net Carry (\$ thousands)	Multiplier	Adj. Notional 1 (\$ millions)	Adj. Notional 2 (\$ millions)	Adj. Net Carry (\$ thousands)	Vol Spread (bp/day)	Vol Spread 6M Z-Score
3Y	10Y	1	-1.10	100	-37	-0.09	-0.26	-93	97	4	23.903	2390	-877	104	0.38	0.64
2Y	10Y	1	-1.09	100	-25	-0.07	-0.26	-67	65	-2	2.818	282	-69	-6	0.63	0.69
3Y	7Y	1	-1.04	100	-47	-0.09	-0.19	-93	90	-2	5.485	549	-258	-12	0.46	0.74
2Y	7Y	1	-1.03	100	-32	-0.07	-0.19	-67	61	-7	2.024	202	-64	-13	0.71	0.76
2Y	5Y	1	-0.97	100	-40	-0.07	-0.15	-67	59	-8	1.987	199	-80	-16	0.88	0.78
2Y	3Y	1	-0.99	100	-67	-0.07	-0.09	-67	62	-5	3.191	319	-214	-16	0.26	0.78
2Y	20Y	-1	1.35	-100	18	-0.07	-0.39	67	-70	-3	6.606	-661	117	-18	0.37	-0.66
3Y	5Y	1	-0.98	100	-60	-0.09	-0.15	-93	88	-5	5.223	522	-315	-24	0.63	0.78
3Y	20Y	-1	1.36	-100	26	-0.09	-0.39	93	-104	-12	2.133	-213	56	-25	0.63	-0.60
2Y	30Y	-1	1.52	-100	15	-0.07	-0.54	67	-82	-15	1.844	-184	28	-28	1.09	-0.85
3Y	30Y	-1	1.54	-100	23	-0.09	-0.54	93	-123	-30	1.158	-116	26	-35	1.36	-0.82
5Y	20Y	-1	1.39	-100	44	-0.15	-0.39	146	-173	-27	1.479	-148	65	-39	1.28	-0.41
10Y	20Y	-1	1.24	-100	72	-0.26	-0.39	265	-284	-20	2.155	-216	155	-43	0.91	-0.30
7Y	20Y	-1	1.31	-100	56	-0.19	-0.39	192	-221	-29	1.592	-159	89	-47	1.05	-0.37
5Y	30Y	-1	1.57	-100	38	-0.15	-0.54	146	-203	-57	0.926	-93	35	-53	2.03	-0.70
7Y	30Y	-1	1.48	-100	48	-0.19	-0.54	192	-260	-68	0.991	-99	48	-67	1.75	-0.70
10Y	30Y	-1	1.40	-100	62	-0.26	-0.54	265	-334	-69	1.216	-122	76	-84	1.57	-0.72
5Y	10Y	-1	1.13	-100	61	-0.15	-0.26	146	-161	-15	6.529	653	397	96	0.26	0.41
7Y	10Y	-1	1.06	-100	78	-0.19	-0.26	192	-206	-14	7.380	-738	575	-103	0.08	-0.38
20Y	30Y	-1	1.13	-100	86	-0.39	-0.54	394	-463	-69	3.454	-345	298	-238	0.53	-1.22
5Y	7Y	-1	1.06	-100	78	-0.15	-0.19	146	-150	-4	106.637	-10664	8323	-401	0.17	-0.46

Footnotes:

*Vega weights chosen to create a long exposure to PC2 volatility while hedging out PC1 volatility

**Carries are calculated over a 1 month period

***Multiplier is calculated as root-mean-square of the PC2 loadings divided by PC2 exposure

†Adjusted notional is calculated as notional times multiplier; similar for adjusted carry

‡For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

Top long PC1 relative value trades, expiry 6M

Tenor Pair 1	Vega Weight 1	Vega Weight 2	Vol Spread 1 (bp/day)	Tenor Pair 2	Vega Weight 3	Vega Weight 4	Vol Spread 2 (bp/day)	3M Slope	3M Intercept	3M R^2 (%)	3M Residual (bp/day)	3M Std. Error	6M Slope	6M Intercept	6M R^2 (%)	6M Residual (bp/day)	6M Std. Error	Beta 1 Stdev	Average R^2 (%)
3Y / 20Y	1.00	-0.40	5.13	7Y / 30Y	1.00	-0.04	6.53	1.27	-3.47	62	0.33	0.13	0.87	-0.85	62	0.30	0.06	0.15	62
3Y / 20Y	1.00	-0.40	5.13	7Y / 20Y	1.00	-0.05	6.42	1.29	-3.47	62	0.33	0.13	0.89	-0.86	62	0.30	0.06	0.15	62
3Y / 30Y	1.00	-0.28	5.94	7Y / 30Y	1.00	-0.04	6.53	1.37	-3.31	67	0.32	0.12	0.99	-0.80	69	0.29	0.06	0.14	68
3Y / 30Y	1.00	-0.28	5.94	7Y / 20Y	1.00	-0.05	6.42	1.39	-3.30	67	0.32	0.13	1.01	-0.81	69	0.29	0.06	0.15	68
3Y / 20Y	1.00	-0.40	5.13	7Y / 10Y	1.00	-0.18	5.60	1.48	-3.46	66	0.32	0.14	1.03	-0.93	65	0.29	0.07	0.17	65
3Y / 30Y	1.00	-0.28	5.94	7Y / 10Y	1.00	-0.18	5.60	1.59	-3.26	71	0.31	0.13	1.16	-0.87	72	0.28	0.07	0.16	71
2Y / 20Y	1.00	-1.08	1.24	3Y / 30Y	1.00	-0.28	5.94	0.96	-4.75	83	0.26	0.06	0.72	-3.29	59	0.28	0.05	0.08	71
3Y / 20Y	1.00	-0.40	5.13	5Y / 30Y	1.00	-0.01	6.99	1.16	-3.24	75	0.27	0.09	0.84	-1.02	72	0.27	0.05	0.12	74
3Y / 20Y	1.00	-0.40	5.13	5Y / 20Y	1.00	-0.01	6.97	1.16	-3.24	75	0.27	0.09	0.84	-1.02	72	0.27	0.05	0.12	74
3Y / 20Y	1.00	-0.40	5.13	5Y / 10Y	1.00	-0.03	6.84	1.18	-3.21	76	0.27	0.09	0.86	-1.02	72	0.27	0.05	0.13	74
3Y / 30Y	1.00	-0.28	5.94	5Y / 30Y	1.00	-0.01	6.99	1.24	-2.96	79	0.26	0.08	0.94	-0.90	78	0.26	0.05	0.12	79
3Y / 30Y	1.00	-0.28	5.94	5Y / 20Y	1.00	-0.01	6.97	1.24	-2.95	79	0.26	0.08	0.94	-0.90	78	0.26	0.05	0.12	79
3Y / 20Y	1.00	-0.40	5.13	5Y / 7Y	1.00	-0.16	5.92	1.35	-3.15	77	0.26	0.10	0.99	-1.02	73	0.26	0.05	0.14	75
3Y / 30Y	1.00	-0.28	5.94	5Y / 10Y	1.00	-0.03	6.84	1.26	-2.92	80	0.25	0.08	0.96	-0.90	79	0.25	0.05	0.12	79
3Y / 30Y	1.00	-0.28	5.94	5Y / 7Y	1.00	-0.16	5.92	1.44	-2.84	81	0.24	0.09	1.11	-0.89	79	0.25	0.05	0.13	80
2Y / 20Y	1.00	-1.08	1.24	3Y / 20Y	1.00	-0.40	5.13	1.02	-4.24	87	0.23	0.05	0.81	-3.17	66	0.25	0.05	0.06	76
2Y / 7Y	-0.05	1.00	6.37	3Y / 20Y	1.00	-0.40	5.13	0.43	4.35	55	-0.21	0.05	0.66	3.23	57	-0.25	0.05	0.07	56
3Y / 7Y	-0.13	1.00	5.77	3Y / 20Y	1.00	-0.40	5.13	0.35	4.15	47	-0.20	0.05	0.57	3.08	52	-0.24	0.05	0.07	49
3Y / 5Y	-0.02	1.00	6.86	3Y / 20Y	1.00	-0.40	5.13	0.63	3.84	74	-0.19	0.05	0.83	2.84	71	-0.24	0.05	0.07	72
2Y / 7Y	-0.05	1.00	6.37	3Y / 30Y	1.00	-0.28	5.94	0.44	3.97	60	-0.20	0.05	0.65	2.72	64	-0.24	0.04	0.07	62
2Y / 5Y	-0.01	1.00	6.96	3Y / 20Y	1.00	-0.40	5.13	0.64	3.87	75	-0.19	0.05	0.84	2.87	71	-0.24	0.05	0.07	73
3Y / 7Y	-0.13	1.00	5.77	3Y / 30Y	1.00	-0.28	5.94	0.36	3.82	52	-0.19	0.04	0.57	2.62	60	-0.23	0.04	0.07	56
2Y / 5Y	-0.01	1.00	6.96	3Y / 30Y	1.00	-0.28	5.94	0.63	3.37	79	-0.18	0.04	0.82	2.31	78	-0.23	0.04	0.07	78
3Y / 5Y	-0.02	1.00	6.86	3Y / 30Y	1.00	-0.28	5.94	0.62	3.35	78	-0.18	0.04	0.81	2.29	77	-0.22	0.04	0.07	78
2Y / 30Y	1.00	-0.76	3.41	3Y / 30Y	1.00	-0.28	5.94	1.06	-3.12	92	0.20	0.04	0.91	-2.17	83	0.20	0.04	0.05	87
2Y / 10Y	-0.27	1.00	4.28	5Y / 30Y	1.00	-0.01	6.99	0.18	3.23	10	-0.23	0.07	0.47	1.22	51	-0.20	0.04	0.10	31
2Y / 10Y	-0.27	1.00	4.28	5Y / 20Y	1.00	-0.01	6.97	0.18	3.24	10	-0.23	0.07	0.47	1.22	51	-0.20	0.04	0.10	31
2Y / 10Y	-0.27	1.00	4.28	5Y / 10Y	1.00	-0.03	6.84	0.18	3.28	9	-0.23	0.07	0.47	1.25	51	-0.20	0.04	0.10	30
2Y / 10Y	-0.27	1.00	4.28	3Y / 5Y	-0.02	1.00	6.86	0.19	3.17	11	-0.23	0.07	0.48	1.18	52	-0.20	0.04	0.10	31
2Y / 5Y	-0.01	1.00	6.96	2Y / 10Y	-0.27	1.00	4.28	0.55	4.54	10	0.07	0.21	1.10	2.06	52	0.19	0.10	0.18	31

Footnotes:

*Vega weights chosen to create a long exposure to PC1 volatility while hedging out PC2 volatility

**Regression statistics obtained by regressing historical time series of vol spreads of trade 1 onto those of trade 2, with vega weights fixed

***Beta 1 Stdev calculated as standard deviation of set of daily betas obtained from regressions ranging from 3M to 6M lookback window

†Average R^2 calculated as average of 3M R^2 and 6M R^2

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

Top long PC1 relative value trades, expiry 1Y

Tenor Pair 1	Vega Weight 1	Vega Weight 2	Vol Spread 1 (bp/day)	Tenor Pair 2	Vega Weight 3	Vega Weight 4	Vol Spread 2 (bp/day)	3M Slope	3M Intercept	3M R^2 (%)	3M Residual (bp/day)	3M Std. Error	6M Slope	6M Intercept	6M R^2 (%)	6M Residual (bp/day)	6M Std. Error	Beta 1 Stdev	Average R^2 (%)
2Y / 7Y	-0.04	1.00	6.25	3Y / 20Y	1.00	-0.41	4.86	0.39	4.59	8	-0.22	0.17	0.82	2.45	52	-0.17	0.07	0.23	30
2Y / 20Y	1.00	-1.04	1.40	3Y / 20Y	1.00	-0.41	4.86	1.08	-4.08	43	0.21	0.16	0.84	-2.85	55	0.16	0.07	0.19	49
3Y / 5Y	-0.05	1.00	6.36	3Y / 20Y	1.00	-0.41	4.86	0.63	3.49	23	-0.19	0.15	0.94	1.94	66	-0.15	0.06	0.19	44
2Y / 7Y	-0.04	1.00	6.25	3Y / 30Y	1.00	-0.29	5.59	0.59	3.16	19	-0.19	0.16	0.84	1.73	61	-0.15	0.06	0.18	40
2Y / 5Y	-0.02	1.00	6.59	3Y / 20Y	1.00	-0.41	4.86	0.66	3.58	24	-0.19	0.15	0.98	2.00	66	-0.15	0.06	0.20	45
3Y / 7Y	-0.09	1.00	5.84	3Y / 30Y	1.00	-0.29	5.59	0.53	3.07	17	-0.19	0.15	0.77	1.66	59	-0.14	0.06	0.18	38
3Y / 5Y	-0.05	1.00	6.36	3Y / 30Y	1.00	-0.29	5.59	0.79	2.11	37	-0.16	0.13	0.94	1.23	74	-0.13	0.05	0.15	56
2Y / 30Y	1.00	-0.74	3.28	3Y / 30Y	1.00	-0.29	5.59	0.95	-2.22	48	0.17	0.13	0.88	-1.79	70	0.13	0.05	0.13	59
2Y / 5Y	-0.02	1.00	6.59	3Y / 30Y	1.00	-0.29	5.59	0.82	2.15	38	-0.16	0.13	0.98	1.26	74	-0.13	0.05	0.15	56
2Y / 30Y	1.00	-0.74	3.28	3Y / 20Y	1.00	-0.41	4.86	1.10	-2.22	61	0.15	0.11	0.99	-1.64	78	0.12	0.05	0.13	69
5Y / 30Y	1.00	-0.02	6.66	20Y / 30Y	1.00	-0.71	1.80	2.41	2.40	63	-0.07	0.24	3.37	0.70	69	-0.09	0.21	0.52	66
5Y / 20Y	1.00	-0.02	6.62	20Y / 30Y	1.00	-0.71	1.80	2.39	2.40	63	-0.07	0.24	3.34	0.70	68	-0.09	0.21	0.52	66
3Y / 5Y	-0.05	1.00	6.36	20Y / 30Y	1.00	-0.71	1.80	2.39	2.14	65	-0.07	0.23	3.26	0.59	70	-0.09	0.19	0.49	68
2Y / 20Y	1.00	-1.04	1.40	3Y / 10Y	-1.00	1.39	1.41	-0.84	2.59	88	0.00	0.04	-0.90	2.76	60	-0.09	0.07	0.07	74
2Y / 10Y	-0.28	1.00	4.12	3Y / 10Y	-1.00	1.39	1.41	0.76	3.12	87	-0.07	0.04	0.82	3.06	70	-0.09	0.05	0.04	79
2Y / 5Y	-0.02	1.00	6.59	20Y / 30Y	1.00	-0.71	1.80	2.44	2.28	64	-0.07	0.23	3.36	0.64	70	-0.09	0.20	0.51	67
7Y / 30Y	1.00	-0.03	6.37	20Y / 30Y	1.00	-0.71	1.80	2.74	1.51	82	-0.07	0.17	3.44	0.27	79	-0.08	0.16	0.39	81
7Y / 20Y	1.00	-0.04	6.30	20Y / 30Y	1.00	-0.71	1.80	2.70	1.51	81	-0.07	0.17	3.40	0.27	79	-0.08	0.16	0.39	80
5Y / 10Y	1.00	-0.08	6.28	20Y / 30Y	1.00	-0.71	1.80	2.20	2.40	59	-0.07	0.24	3.14	0.73	67	-0.08	0.20	0.51	63
2Y / 7Y	-0.04	1.00	6.25	20Y / 30Y	1.00	-0.71	1.80	2.79	1.31	83	-0.07	0.16	3.43	0.17	81	-0.08	0.15	0.36	82
7Y / 10Y	1.00	-0.13	5.71	20Y / 30Y	1.00	-0.71	1.80	2.37	1.51	78	-0.06	0.16	3.04	0.32	78	-0.07	0.15	0.36	78
3Y / 7Y	-0.09	1.00	5.84	20Y / 30Y	1.00	-0.71	1.80	2.70	1.06	84	-0.06	0.15	3.25	0.07	82	-0.07	0.14	0.33	83
3Y / 30Y	1.00	-0.29	5.59	5Y / 30Y	1.00	-0.02	6.66	0.48	2.36	40	0.04	0.08	0.76	0.44	76	0.06	0.04	0.11	58
3Y / 30Y	1.00	-0.29	5.59	5Y / 20Y	1.00	-0.02	6.62	0.48	2.35	41	0.04	0.08	0.77	0.45	76	0.06	0.04	0.11	58
3Y / 30Y	1.00	-0.29	5.59	5Y / 10Y	1.00	-0.08	6.28	0.53	2.24	43	0.04	0.08	0.82	0.40	77	0.06	0.04	0.11	60
3Y / 30Y	1.00	-0.29	5.59	5Y / 7Y	1.00	-0.57	3.02	1.26	1.75	61	0.04	0.13	1.73	0.33	86	0.06	0.06	0.18	74
3Y / 20Y	1.00	-0.41	4.86	5Y / 30Y	1.00	-0.02	6.66	0.37	2.34	25	0.04	0.08	0.68	0.27	68	0.06	0.04	0.13	47
3Y / 20Y	1.00	-0.41	4.86	5Y / 20Y	1.00	-0.02	6.62	0.38	2.32	26	0.04	0.08	0.68	0.27	68	0.06	0.04	0.13	47
3Y / 20Y	1.00	-0.41	4.86	5Y / 10Y	1.00	-0.08	6.28	0.42	2.19	28	0.04	0.09	0.73	0.22	69	0.06	0.04	0.13	49
3Y / 20Y	1.00	-0.41	4.86	5Y / 7Y	1.00	-0.57	3.02	1.09	1.52	48	0.05	0.15	1.57	0.06	80	0.06	0.07	0.20	64

Footnotes:

*Vega weights chosen to create a long exposure to PC1 volatility while hedging out PC2 volatility

**Regression statistics obtained by regressing historical time series of vol spreads of trade 1 onto those of trade 2, with vega weights fixed

***Beta 1 Stdev calculated as standard deviation of set of daily betas obtained from regressions ranging from 3M to 6M lookback window

†Average R^2 calculated as average of 3M R^2 and 6M R^2

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

Top long PC2 relative value trades, expiry 6M

Tenor Pair 1	Vega Weight 1	Vega Weight 2	Vol Spread 1 (bp/day)	Tenor Pair 2	Vega Weight 3	Vega Weight 4	Vol Spread 2 (bp/day)	3M Slope	3M Intercept	3M R^2 (%)	3M Residual (bp/day)	3M Std. Error	6M Slope	6M Intercept	6M R^2 (%)	6M Residual (bp/day)	6M Std. Error	Beta 1 Stdev	Average R^2 (%)
2Y / 30Y	-1.00	1.56	1.17	7Y / 20Y	-1.00	1.37	1.39	2.74	-2.57	53	-0.08	0.33	1.62	-0.74	58	-0.35	0.13	0.28	56
2Y / 30Y	-1.00	1.56	1.17	5Y / 30Y	-1.00	1.64	2.28	1.38	-1.86	49	-0.11	0.18	0.84	-0.40	56	-0.35	0.07	0.13	53
2Y / 30Y	-1.00	1.56	1.17	5Y / 20Y	-1.00	1.47	1.72	2.28	-2.75	73	0.00	0.18	1.35	-0.85	68	-0.30	0.08	0.27	70
3Y / 30Y	-1.00	1.61	1.61	7Y / 30Y	-1.00	1.52	1.91	1.24	-0.59	44	-0.18	0.18	1.03	-0.09	69	-0.27	0.06	0.04	56
3Y / 20Y	-1.00	1.44	1.06	7Y / 20Y	-1.00	1.37	1.39	1.95	-1.59	47	-0.06	0.27	1.14	-0.27	53	-0.26	0.10	0.19	50
3Y / 30Y	-1.00	1.61	1.61	7Y / 20Y	-1.00	1.37	1.39	2.49	-1.80	69	-0.05	0.21	1.74	-0.59	79	-0.23	0.08	0.19	74
3Y / 30Y	-1.00	1.61	1.61	5Y / 30Y	-1.00	1.64	2.28	1.27	-1.20	65	-0.07	0.12	0.91	-0.23	77	-0.23	0.04	0.09	71
2Y / 10Y	1.00	-1.11	0.69	7Y / 10Y	-1.00	1.08	0.10	-4.72	1.16	86	-0.01	0.25	-3.23	0.78	55	0.23	0.27	0.54	70
2Y / 10Y	1.00	-1.11	0.69	5Y / 10Y	-1.00	1.16	0.33	-2.75	1.61	85	-0.02	0.15	-1.82	1.05	53	0.23	0.16	0.34	69
3Y / 20Y	-1.00	1.44	1.06	5Y / 20Y	-1.00	1.47	1.72	1.69	-1.87	71	0.01	0.14	0.97	-0.39	64	-0.22	0.07	0.20	67
2Y / 20Y	-1.00	1.40	0.64	7Y / 10Y	-1.00	1.08	0.10	4.40	0.32	83	-0.12	0.25	3.82	0.47	75	-0.21	0.20	0.21	79
2Y / 20Y	-1.00	1.40	0.64	5Y / 10Y	-1.00	1.16	0.33	2.58	-0.10	83	-0.11	0.15	2.19	0.13	75	-0.21	0.11	0.13	79
2Y / 20Y	-1.00	1.40	0.64	5Y / 7Y	-1.00	1.08	0.22	6.91	-0.80	83	-0.09	0.40	5.66	-0.40	74	-0.21	0.30	0.43	79
2Y / 30Y	-1.00	1.56	1.17	7Y / 10Y	-1.00	1.08	0.10	4.21	0.97	74	-0.22	0.32	4.33	0.94	75	-0.20	0.23	0.07	75
2Y / 30Y	-1.00	1.56	1.17	5Y / 10Y	-1.00	1.16	0.33	2.47	0.57	75	-0.21	0.18	2.50	0.54	76	-0.20	0.13	0.03	75
2Y / 30Y	-1.00	1.56	1.17	5Y / 7Y	-1.00	1.08	0.22	6.65	-0.12	75	-0.19	0.49	6.54	-0.09	77	-0.20	0.33	0.07	76
3Y / 30Y	-1.00	1.61	1.61	5Y / 20Y	-1.00	1.47	1.72	1.95	-1.74	85	-0.01	0.11	1.40	-0.61	86	-0.19	0.05	0.16	85
3Y / 10Y	1.00	-1.14	0.31	5Y / 7Y	-1.00	1.08	0.22	-5.78	1.61	88	-0.03	0.28	-3.92	1.02	61	0.16	0.28	0.65	75
3Y / 10Y	1.00	-1.14	0.31	7Y / 10Y	-1.00	1.08	0.10	-3.72	0.68	90	0.00	0.16	-2.74	0.43	67	0.15	0.17	0.36	78
3Y / 10Y	1.00	-1.14	0.31	5Y / 10Y	-1.00	1.16	0.33	-2.17	1.03	89	-0.01	0.10	-1.55	0.66	65	0.15	0.10	0.22	77
2Y / 20Y	-1.00	1.40	0.64	3Y / 30Y	-1.00	1.61	1.61	1.16	-1.32	88	0.09	0.06	0.83	-0.55	76	-0.15	0.04	0.10	82
2Y / 20Y	-1.00	1.40	0.64	3Y / 5Y	1.00	-0.98	0.63	-1.91	2.02	91	-0.18	0.08	-1.49	1.72	56	-0.14	0.12	0.12	74
3Y / 20Y	-1.00	1.44	1.06	7Y / 10Y	-1.00	1.08	0.10	3.39	0.86	84	-0.13	0.19	3.36	0.86	82	-0.13	0.14	0.02	83
3Y / 20Y	-1.00	1.44	1.06	5Y / 10Y	-1.00	1.16	0.33	1.99	0.53	84	-0.12	0.11	1.94	0.56	83	-0.13	0.08	0.02	84
3Y / 20Y	-1.00	1.44	1.06	5Y / 7Y	-1.00	1.08	0.22	5.36	-0.02	85	-0.10	0.30	5.07	0.07	84	-0.13	0.20	0.10	84
2Y / 10Y	1.00	-1.11	0.69	2Y / 30Y	-1.00	1.56	1.17	-0.95	1.95	83	-0.15	0.06	-0.65	1.33	56	0.13	0.05	0.10	70
3Y / 30Y	-1.00	1.61	1.61	7Y / 10Y	-1.00	1.08	0.10	3.20	1.53	67	-0.23	0.29	3.88	1.35	71	-0.12	0.23	0.27	69
3Y / 30Y	-1.00	1.61	1.61	5Y / 10Y	-1.00	1.16	0.33	1.88	1.21	68	-0.22	0.17	2.26	0.98	73	-0.12	0.12	0.15	71
5Y / 30Y	-1.00	1.64	2.28	10Y / 30Y	-1.00	1.41	1.68	0.96	0.85	55	-0.19	0.11	1.36	0.09	87	-0.11	0.05	0.14	71
5Y / 30Y	-1.00	1.64	2.28	10Y / 20Y	-1.00	1.27	1.20	1.67	0.47	51	-0.20	0.21	2.42	-0.51	85	-0.11	0.09	0.26	68

Footnotes:

*Vega weights chosen to create a long exposure to PC1 volatility while hedging out PC2 volatility

**Regression statistics obtained by regressing historical time series of vol spreads of trade 1 onto those of trade 2, with vega weights fixed

***Beta 1 Stdev calculated as standard deviation of set of daily betas obtained from regressions ranging from 3M to 6M lookback window

†Average R^2 calculated as average of 3M R^2 and 6M R^2

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

Top long PC2 relative value trades, expiry 1Y

Tenor Pair 1	Vega Weight 1	Vega Weight 2	Vol Spread 1 (bp/day)	Tenor Pair 2	Vega Weight 3	Vega Weight 4	Vol Spread 2 (bp/day)	3M Slope	3M Intercept	3M R^2 (%)	3M Residual (bp/day)	3M Std. Error	6M Slope	6M Intercept	6M R^2 (%)	6M Residual (bp/day)	6M Std. Error	Beta 1 Stdev	Average R^2 (%)
2Y / 30Y	-1.00	1.52	1.09	10Y / 20Y	-1.00	1.24	0.91	2.03	-0.59	42	-0.17	0.31	2.26	-0.82	60	-0.15	0.17	0.25	51
2Y / 30Y	-1.00	1.52	1.09	7Y / 10Y	-1.00	1.06	0.08	3.26	1.07	52	-0.23	0.41	4.55	0.87	69	-0.13	0.28	0.41	60
3Y / 30Y	-1.00	1.54	1.36	10Y / 20Y	-1.00	1.24	0.91	2.13	-0.45	54	-0.13	0.25	2.22	-0.54	68	-0.12	0.14	0.19	61
2Y / 30Y	-1.00	1.52	1.09	7Y / 20Y	-1.00	1.31	1.05	2.11	-1.04	79	-0.07	0.14	1.88	-0.75	81	-0.12	0.08	0.10	80
2Y / 30Y	-1.00	1.52	1.09	5Y / 10Y	-1.00	1.13	0.26	1.89	0.83	53	-0.22	0.23	2.60	0.54	70	-0.12	0.15	0.22	62
3Y / 30Y	-1.00	1.54	1.36	7Y / 10Y	-1.00	1.06	0.08	2.87	1.35	48	-0.21	0.39	4.13	1.15	67	-0.11	0.26	0.40	57
2Y / 30Y	-1.00	1.52	1.09	5Y / 20Y	-1.00	1.39	1.28	1.65	-0.96	85	-0.07	0.09	1.52	-0.74	86	-0.11	0.05	0.06	85
2Y / 30Y	-1.00	1.52	1.09	5Y / 7Y	-1.00	1.06	0.17	4.86	0.45	55	-0.21	0.56	6.55	0.06	71	-0.11	0.38	0.53	63
3Y / 30Y	-1.00	1.54	1.36	7Y / 20Y	-1.00	1.31	1.05	2.06	-0.74	90	-0.05	0.09	1.80	-0.42	88	-0.10	0.06	0.10	89
3Y / 30Y	-1.00	1.54	1.36	5Y / 10Y	-1.00	1.13	0.26	1.66	1.14	49	-0.21	0.22	2.36	0.86	68	-0.10	0.15	0.22	59
3Y / 30Y	-1.00	1.54	1.36	5Y / 20Y	-1.00	1.39	1.28	1.57	-0.61	92	-0.05	0.06	1.44	-0.39	91	-0.09	0.04	0.06	92
3Y / 30Y	-1.00	1.54	1.36	5Y / 7Y	-1.00	1.06	0.17	4.29	0.81	51	-0.20	0.54	5.95	0.41	70	-0.09	0.36	0.51	60
5Y / 30Y	-1.00	1.57	2.03	10Y / 20Y	-1.00	1.24	0.91	2.34	-0.05	79	-0.06	0.16	2.15	0.15	83	-0.08	0.09	0.13	81
5Y / 30Y	-1.00	1.57	2.03	7Y / 10Y	-1.00	1.06	0.08	2.12	2.06	31	-0.19	0.41	3.36	1.85	57	-0.08	0.26	0.39	44
7Y / 30Y	-1.00	1.48	1.75	10Y / 20Y	-1.00	1.24	0.91	2.15	-0.17	90	-0.03	0.09	1.86	0.12	88	-0.07	0.06	0.12	89
2Y / 30Y	-1.00	1.52	1.09	10Y / 30Y	-1.00	1.40	1.57	1.05	-0.40	42	-0.17	0.16	1.50	-1.21	65	-0.07	0.10	0.18	54
2Y / 30Y	-1.00	1.52	1.09	3Y / 10Y	1.00	-1.10	0.38	-1.22	1.75	57	-0.20	0.14	-1.67	1.79	73	-0.07	0.09	0.15	65
2Y / 20Y	-1.00	1.35	0.37	7Y / 20Y	-1.00	1.31	1.05	1.44	-1.07	55	-0.06	0.17	1.50	-1.14	75	-0.07	0.08	0.09	65
7Y / 30Y	-1.00	1.48	1.75	20Y / 30Y	-1.00	1.13	0.53	2.80	0.28	91	-0.03	0.11	3.18	-0.01	76	0.06	0.16	0.15	83
7Y / 20Y	-1.00	1.31	1.05	20Y / 30Y	-1.00	1.13	0.53	1.49	0.28	74	-0.03	0.11	1.87	-0.01	52	0.06	0.16	0.15	63
5Y / 30Y	-1.00	1.57	2.03	20Y / 30Y	-1.00	1.13	0.53	3.07	0.44	80	-0.05	0.20	3.68	0.00	70	0.06	0.22	0.23	75
5Y / 30Y	-1.00	1.57	2.03	7Y / 20Y	-1.00	1.31	1.05	1.98	-0.04	100	-0.01	0.02	1.65	0.37	95	-0.06	0.03	0.12	97
3Y / 20Y	-1.00	1.36	0.63	10Y / 20Y	-1.00	1.24	0.91	1.08	-0.23	24	-0.13	0.25	1.66	-0.82	59	-0.06	0.13	0.27	41
2Y / 30Y	-1.00	1.52	1.09	3Y / 20Y	-1.00	1.36	0.63	1.39	0.26	96	-0.04	0.04	1.33	0.32	97	-0.06	0.02	0.04	96
2Y / 30Y	-1.00	1.52	1.09	3Y / 7Y	1.00	-1.04	0.46	-1.68	2.06	50	-0.20	0.22	-2.32	2.21	65	-0.06	0.15	0.25	58
2Y / 20Y	-1.00	1.35	0.37	7Y / 10Y	-1.00	1.06	0.08	3.08	0.27	68	-0.14	0.27	4.01	0.12	77	-0.06	0.20	0.32	73
2Y / 20Y	-1.00	1.35	0.37	5Y / 20Y	-1.00	1.39	1.28	1.22	-1.14	68	-0.05	0.11	1.23	-1.16	82	-0.06	0.05	0.04	75
2Y / 20Y	-1.00	1.35	0.37	5Y / 10Y	-1.00	1.13	0.26	1.77	0.05	70	-0.13	0.15	2.28	-0.16	77	-0.06	0.11	0.17	73
10Y / 30Y	-1.00	1.40	1.57	20Y / 30Y	-1.00	1.13	0.53	2.54	0.21	100	0.00	0.01	2.63	0.12	82	0.05	0.11	0.05	91
10Y / 20Y	-1.00	1.24	0.91	20Y / 30Y	-1.00	1.13	0.53	1.30	0.21	100	0.00	0.01	1.39	0.12	57	0.05	0.11	0.05	78

Footnotes:

*Vega weights chosen to create a long exposure to PC1 volatility while hedging out PC2 volatility

**Regression statistics obtained by regressing historical time series of vol spreads of trade 1 onto those of trade 2, with vega weights fixed

***Beta 1 Stdev calculated as standard deviation of set of daily betas obtained from regressions ranging from 3M to 6M lookback window

†Average R^2 calculated as average of 3M R^2 and 6M R^2

††For details on our methodology for trading Principal Factor Volatility, see [Trading Principal Factor Volatility](#).

Derivatives Strategy

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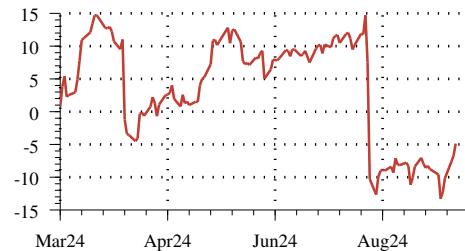
Volatility Total Return Report

Returns from short straddle positions

Returns	1-day	1-wk	1-mo	Monthly return stats								
				Sharp	Imp	6M Avg	Vol	I. vol	Beta	Rsqr(%)		
Theta	Ret	Ret	Ret	Avg	Min	Max	Stdev	Ratio				
6M2Y	-26.1	1.9	8.4	4.4	-0.8	-24.5	20.9	11.7	-0.1	N/A	N/A	10.1
6M5Y	-56.8	4.6	19.3	22.5	1.5	-39.5	40.3	21.8	0.1	N/A	N/A	5.2
6M10Y	-95.9	4.3	28.9	43.7	4.0	-67.7	64.2	35.6	0.1	N/A	N/A	-5.3
6M30Y	-193.4	6.9	70.8	108.8	3.7	-106.4	117.3	65.8	0.1	N/A	N/A	-5.4
3Y10Y	-33.6	4.6	25.1	48.9	4.2	-104.5	90.8	45.2	0.1	N/A	N/A	-58.0
Back ED	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A
Back E1	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A
Back E2	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A
FRNT FV	-65.2	1.5	17.2	31.3	10.4	-34.7	47.2	24.0	0.4	8.1	7.5	1.6
FRNT TY	-95.2	2.1	19.7	32.4	11.0	-50.9	75.2	34.1	0.3	7.2	6.6	9.8

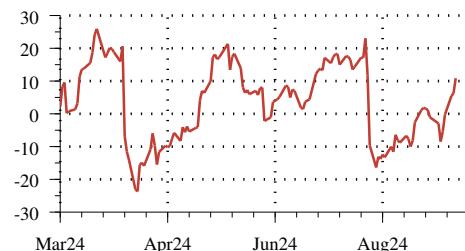
6Mx2Y

Cumulative total return; bp of notional



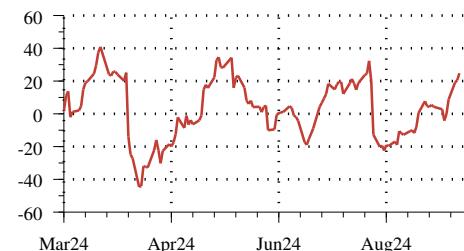
6Mx5Y

Cumulative total return; bp of notional



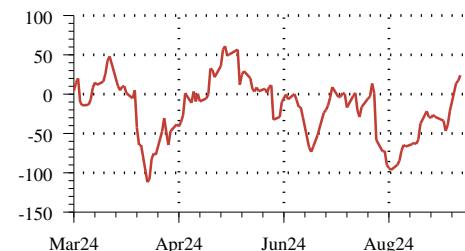
6Mx10Y

Cumulative total return; bp of notional



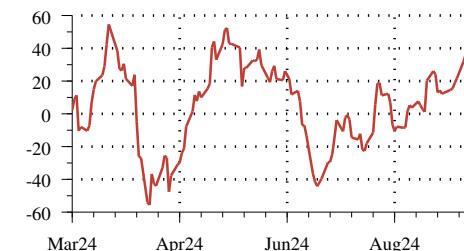
6Mx30Y

Cumulative total return; bp of notional



3Yx10Y

Cumulative total return; bp of notional



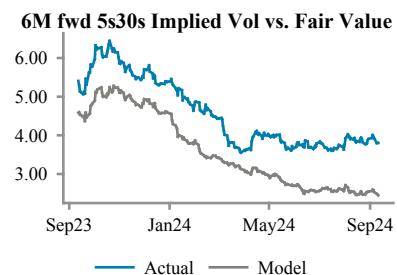
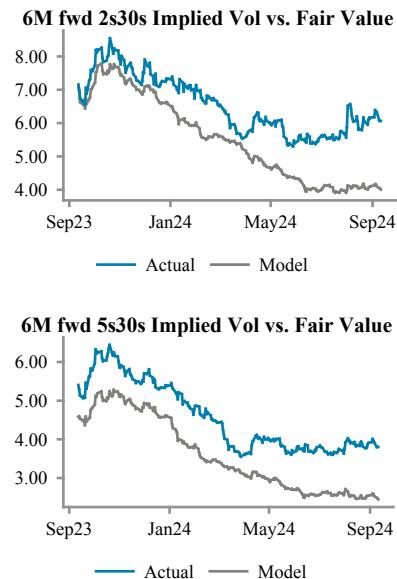
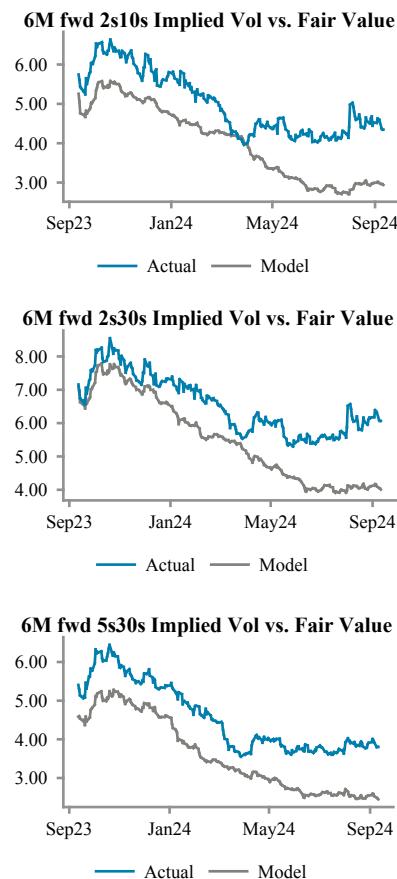
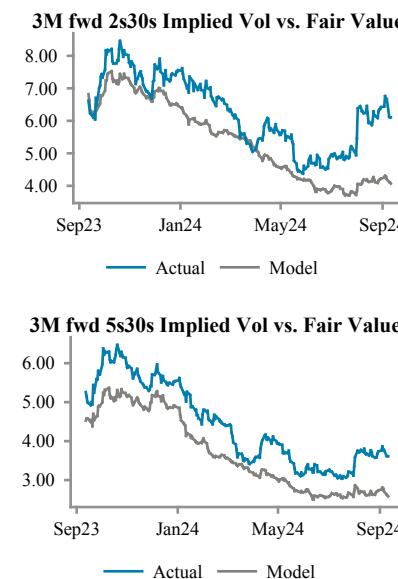
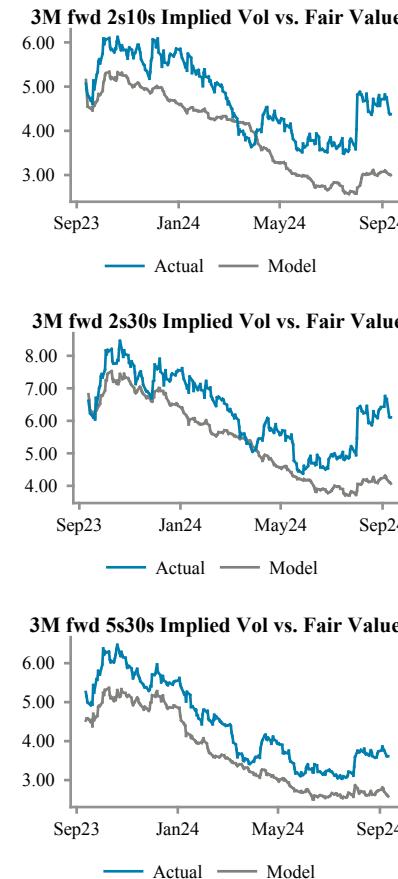
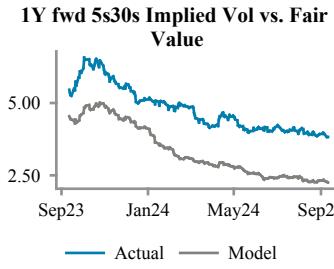
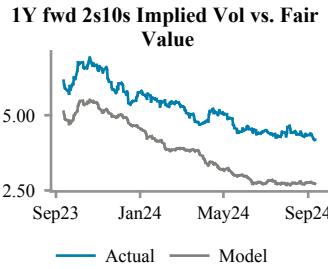
Derivatives Strategy

YCSO Vol Relative Value Report

Curve	Curve-yield beta	Std. Err.	Actual YCSO Vol	Fair Value	Residual	Rsq	Curve-yield beta stddev
3M fwd 2s5s	-0.12	3.68	2.81	1.90	0.92	23 %	0.03
3M fwd 2s10s	-0.24	5.20	4.38	3.00	1.38	37 %	0.02
3M fwd 2s30s	-0.38	6.11	6.11	4.07	2.04	52 %	0.02
3M fwd 5s10s	-0.12	1.94	1.91	1.28	0.62	52 %	0.00
3M fwd 5s30s	-0.26	3.44	3.61	2.58	1.03	62 %	0.02
3M fwd 10s30s	-0.14	1.73	2.10	1.37	0.73	65 %	0.01
6M fwd 2s5s	-0.14	3.34	2.77	1.85	0.92	36 %	0.02
6M fwd 2s10s	-0.26	4.84	4.35	2.94	1.41	47 %	0.02
6M fwd 2s30s	-0.40	5.82	6.07	4.00	2.06	59 %	0.01
6M fwd 5s10s	-0.12	1.85	2.01	1.22	0.79	56 %	0.00
6M fwd 5s30s	-0.26	3.30	3.80	2.45	1.36	65 %	0.01
6M fwd 10s30s	-0.14	1.65	2.20	1.29	0.91	68 %	0.01
9M fwd 2s5s	-0.15	3.07	2.73	1.78	0.95	44 %	0.02
9M fwd 2s10s	-0.27	4.57	4.28	2.86	1.42	52 %	0.02
9M fwd 2s30s	-0.40	5.60	5.90	3.91	1.99	62 %	0.02
9M fwd 5s10s	-0.12	1.77	2.08	1.17	0.91	57 %	0.00
9M fwd 5s30s	-0.25	3.18	3.85	2.35	1.50	66 %	0.01
9M fwd 10s30s	-0.14	1.58	2.22	1.23	0.98	70 %	0.01
1Y fwd 2s5s	-0.15	2.84	2.71	1.68	1.03	46 %	0.02
1Y fwd 2s10s	-0.26	4.31	4.18	2.72	1.46	53 %	0.02
1Y fwd 2s30s	-0.39	5.37	5.74	3.76	1.98	62 %	0.02
1Y fwd 5s10s	-0.11	1.69	2.12	1.11	1.01	57 %	0.00
1Y fwd 5s30s	-0.24	3.06	3.83	2.25	1.57	66 %	0.01
1Y fwd 10s30s	-0.13	1.52	2.23	1.19	1.04	70 %	0.01

Front end bp vol (bp/day)

	2024-09-11
3Mx2Y bpvol	7.87
6Mx2Y bpvol	7.59
9Mx2Y bpvol	7.45
1Yx2Y bpvol	7.36



* Curve-yield beta is defined as the beta of weekly changes of curve against weekly changes in the front end yield (we use 2Y swap rates) for a 6M regression period. For example, for a 6M fwd 2s/10s structure, we would regress weekly changes of the 6M fwd 2s10s curve against weekly changes in 6Mx2Y swap yields. Std. Err. is the standard error of this regression. Curve-yield beta stddev is the 6M standard deviation of the beta to gauge the stability of the regression beta.

** Front end bp vol is the implied vol of a 2Y tenor swaption, where the expiry of the swaption corresponds with the expiry of the YCSO. For example, for a 1Y fwd 5s30s structure, the front end yield bp vol would be the 1Yx2Y swaption vol (bp/day).

*** Fair value is calculated as square root of square of the beta times the squared volatility of 2-year yields, plus the square of the 1-day standard error of the regression.

Derivatives Strategy

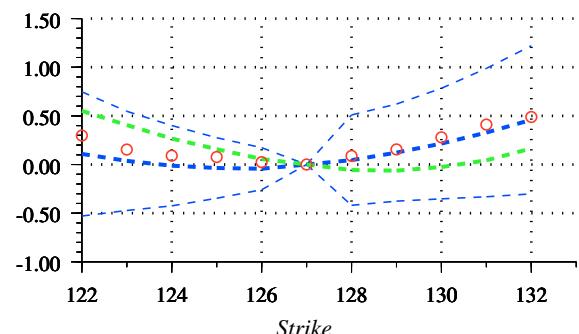
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December 2024 Treasury Bond

Strike	Actual	Model	Avg.	Vega	Act.-Mod.	Act.-Avg.	Z-Score
122 P	0.30	0.11	0.55	11.0	0.19	-0.25	0.59
123 P	0.15	0.04	0.41	12.1	0.12	-0.25	0.46
124 P	0.09	-0.01	0.27	13.0	0.10	-0.18	0.50
125 P	0.08	-0.04	0.16	13.7	0.11	-0.08	0.72
126 P	0.02	-0.04	0.06	14.1	0.07	-0.03	0.62
128 C	0.09	0.05	-0.06	14.1	0.04	0.15	0.19
129 C	0.16	0.12	-0.06	13.7	0.03	0.22	0.13
130 C	0.28	0.22	-0.03	13.0	0.06	0.30	0.22
131 C	0.41	0.33	0.04	12.2	0.08	0.37	0.25
132 C	0.49	0.46	0.17	11.3	0.03	0.32	0.08

Dec 24 Bond futures @ 126-25; ATM imp. vol. = 12.36%; Vol. beta = 0.4193;

Skew (price vol above ATM)



1. Our model takes into account the following factors over the last 3 years to explain the skew:

- The number of business days to option expiration.
- The level of the J.P. Morgan Emerging Markets Bond Index (EMBI).
- The price of the underlying future.
- The 'volatility beta', which represents how much at-the-money implied volatility changes with changes in the level of the underlying futures. It is computed using the last 20 business days of data.
- Volatility of implied volatility over the last 60 business days.

2. The average skew is computed using the last 125 business days of data.

3. The model rolls to the next contract 5 business days before option expiration.

4. Vega is the change in the option price (in ticks) due to a 1% change in implied volatility.

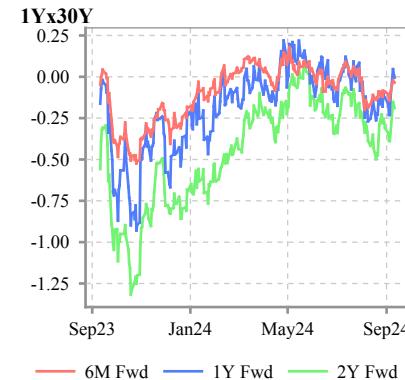
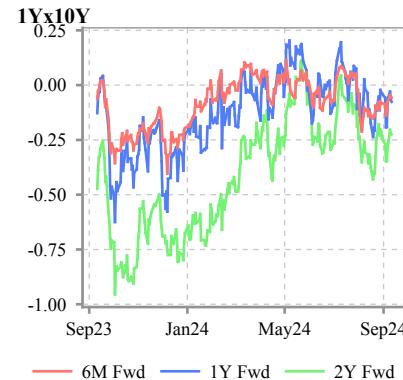
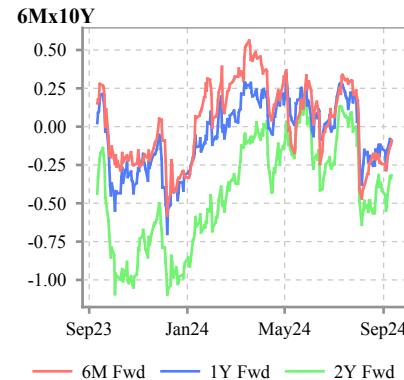
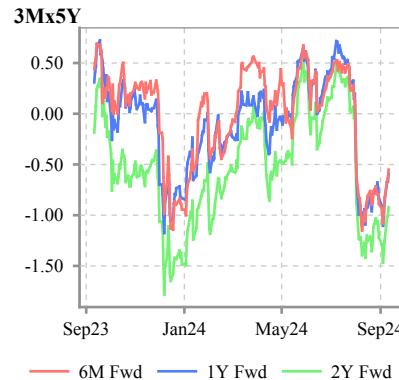
○ Actual
- - Model
- - - Model +/- 2s.d.

- - - Average
- - - Model +/- 2s.d.

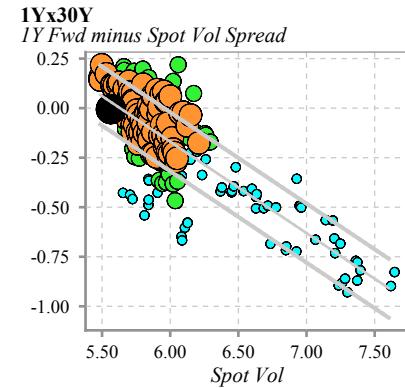
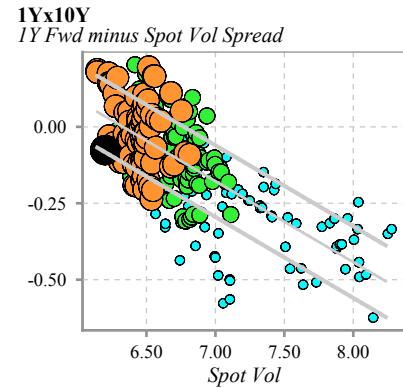
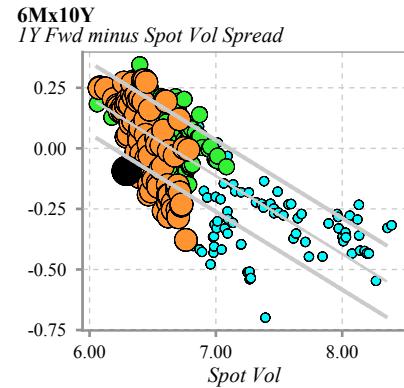
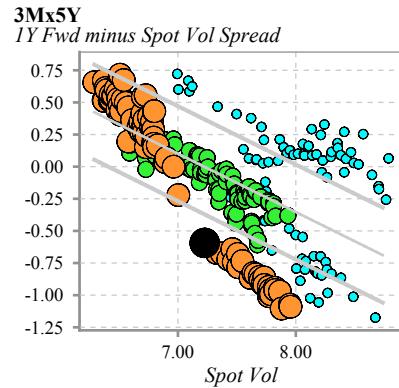
Derivatives Strategy

Long Dated Forward Volatility Report

Forward minus Spot Volatility Spreads



1Y Forward minus Spot Volatility Spread vs. Spot Vol



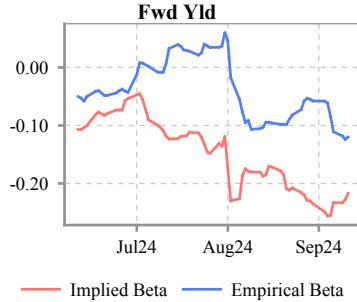
Richness/Cheapness of Forward Vol					
Forward	Spot	2Y Beta (Fwd vs. Spot)	Fwd/Spot Sprd *(dbp)	2Y Avg (dbp)	2Y Z-score
1Yx5Yx30Y	5Yx30Y	0.96	0.1	-0.1	1.5
6Mx6Mx10Y	6Mx10Y	0.60	2.4	2.7	-1.0
1Yx6Mx10Y	6Mx10Y	0.55	2.7	2.9	-1.0
6Mx5Yx10Y	5Yx10Y	0.86	0.7	0.7	0.9
1Yx5Yx5Y	5Yx5Y	0.75	1.4	1.3	0.8
6Mx1Yx10Y	1Yx10Y	0.75	1.5	1.6	-0.6
1Yx1Yx10Y	1Yx10Y	0.62	2.3	2.4	-0.6
6Mx5Yx5Y	5Yx5Y	0.82	1.0	1.0	0.4

*Beta Weighted, vols are in dbp

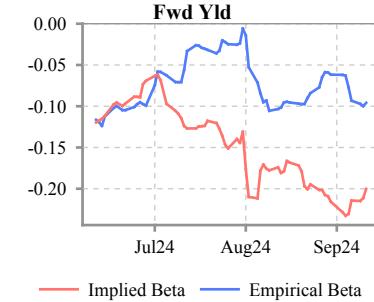
Derivatives Strategy

Synthetic Conditional Curve Trade Report

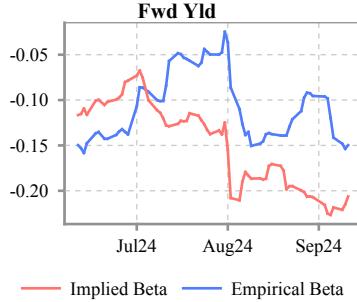
Beta of 3m Fwd 2s/10s Crv vs. 3mx10y



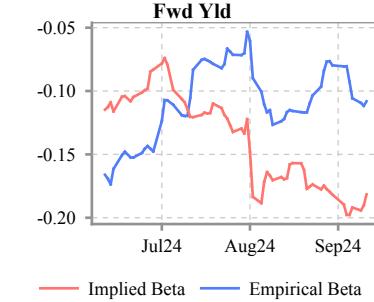
Beta of 3m Fwd 3s/10s Crv vs. 3mx10y



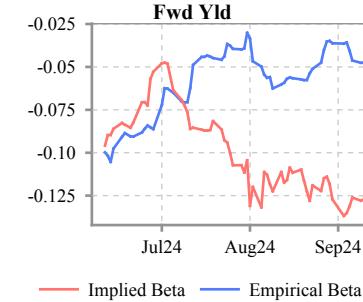
Beta of 6m Fwd 2s/10s Crv vs. 6mx10y



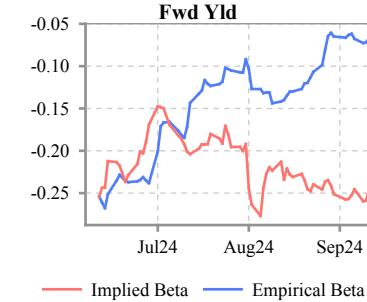
Beta of 6m Fwd 3s/10s Crv vs. 6mx10y



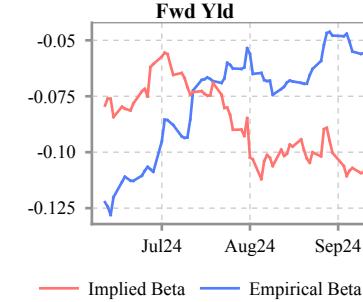
Beta of 3m Fwd 5s/10s Crv vs. 3mx10y



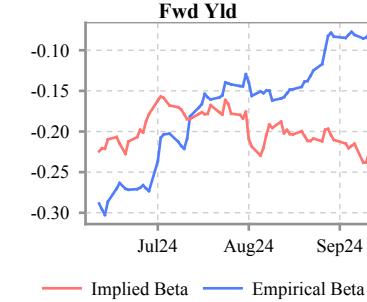
Beta of 3m Fwd 5s/30s Crv vs. 3mx10y



Beta of 6m Fwd 5s/10s Crv vs. 6mx10y



Beta of 6m Fwd 5s/30s Crv vs. 6mx10y



Desired Trade							Replacement for Left Leg					Net Premium					
Expiry	Left	Right	Type	Bpvol(L)	Bpvol (R)	Left Notl	Right Notl	Net Premium	Expiry	YCSO	Imp Vol	Beta (Left)	Notional	Type	Premium	Modified trade	Fwd Sprd Eq (bp)
3m	2y	5Y	REC	7.87	7.23	-100	43.9	\$-16953	3m	10s/30s	2.1	-0.14	-1398	Cap	5.5	\$(310851)	-15.6
3m	2y	7Y	REC	7.87	6.91	-100	31.8	\$-43641	3m	10s/30s	2.1	-0.14	-1398	Cap	5.5	\$(337539)	-16.9
3m	2y	10Y	REC	7.87	6.47	-100	23.3	\$-70980	3m	10s/30s	2.1	-0.14	-1398	Cap	5.5	\$(364878)	-18.3
3m	2y	30Y	REC	7.87	5.81	-100	10.3	\$-112276	3m	10s/30s	2.1	-0.14	-1398	Cap	5.5	\$(406175)	-20.4
3m	3y	10Y	REC	7.77	6.47	-100	34.3	\$-95665	3m	10s/30s	2.1	-0.14	-2030	Cap	5.5	\$(519833)	-17.7
3m	5y	10Y	REC	7.23	6.47	-100	53.0	\$-123117	3m	10s/30s	2.1	-0.15	-3082	Cap	5.5	\$(774356)	-17.1
3m	5y	30Y	REC	7.23	5.81	-100	23.6	\$-217225	3m	10s/30s	2.1	-0.15	-3082	Cap	5.5	\$(868463)	-19.1
6m	2y	5Y	REC	7.59	6.92	-100	43.9	\$-26946	6m	10s/30s	2.2	-0.14	-1443	Cap	8.4	\$(607064)	-30.4
6m	2y	7Y	REC	7.59	6.66	-100	31.8	\$-58663	6m	10s/30s	2.2	-0.14	-1443	Cap	8.4	\$(638781)	-32.0
6m	2y	10Y	REC	7.59	6.29	-100	23.3	\$-90700	6m	10s/30s	2.2	-0.14	-1443	Cap	8.4	\$(670817)	-33.6
6m	2y	30Y	REC	7.59	5.65	-100	10.4	\$-146702	6m	10s/30s	2.2	-0.14	-1443	Cap	8.4	\$(726820)	-36.4
6m	3y	10Y	REC	7.44	6.29	-100	34.4	\$-114940	6m	10s/30s	2.2	-0.14	-2057	Cap	8.4	\$(928979)	-31.5
6m	5y	10Y	REC	6.92	6.29	-100	53.1	\$-145135	6m	10s/30s	2.2	-0.15	-3078	Cap	8.4	\$(1353066)	-29.8
6m	5y	30Y	REC	6.92	5.65	-100	23.6	\$-272624	6m	10s/30s	2.2	-0.15	-3078	Cap	8.4	\$(1480555)	-32.6

+Conditional trades in which the short end receiver swaption leg in a bull flattener is replaced with 1-look matched expiry caps on the 10s/30s curve. Seeks to take advantage of the richness of curve options as well as the fact that the 10s/30s curve is well correlated (with a negative beta) to front end swap yields.

*Implied beta is calculated as 1-(3mx2y/3mx10y) implied bpvol ratio for 3m fwd 2s/10s plot.

*Empirical beta is calculated as 3m beta between 3m fwd 2s/10s curve v.s 3mx10y fwd swap yield for 3m fwd 2s/10s plot.

** Beta(Left) is calculated as 6m beta between weekly change of the YCSO underlying's forward spread v.s weekly change of desired trade's left leg forward rate.

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