

SFBTA 2022

Hedging Through The Libor Transition

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February 2022



Fixed Income Group A Division of RJ O'Brien

SOFR is FINALLY here

- No longer just an idea....RFRs are here
- Statement on LIBOR Transition (Fed, FDIC, Office of Comptroller)
- Big Bang
- SOFR First
- Jan 1, 2022 = NO NEW LIBOR*
 - LIBOR Futures are expected to continue trading until June, 2023
- SEC December 2021 Notice....DISCLAIM or you may be liable

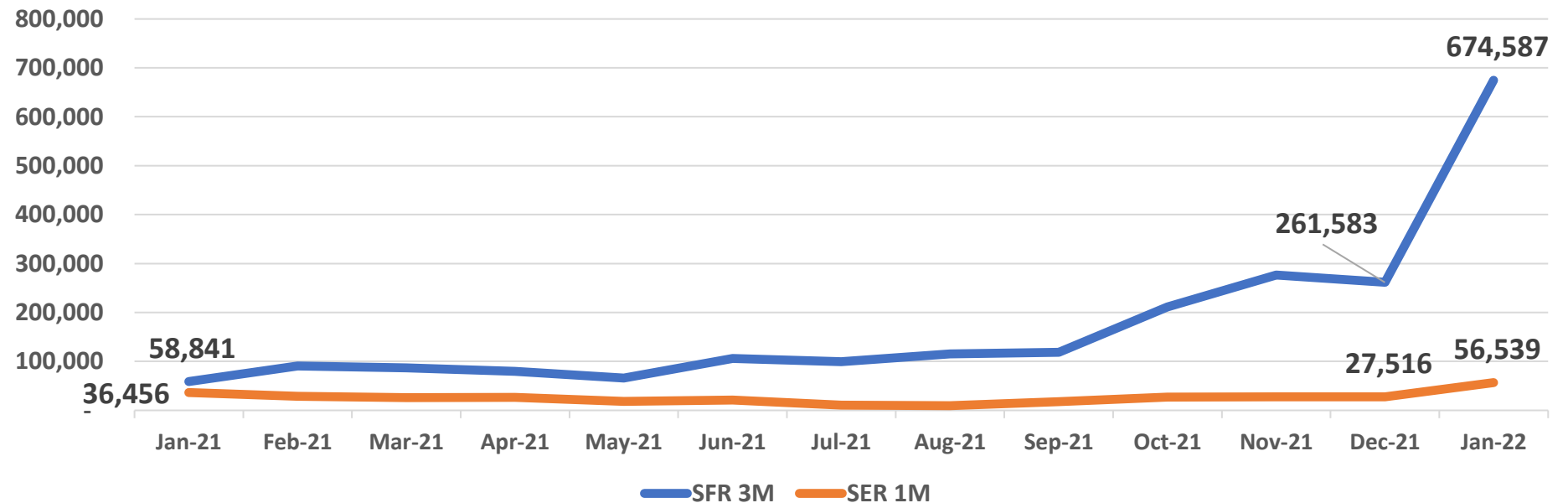
So how are we looking....

- Slow moving freight train
- Momentum is building
- LIBOR is no longer published in GBP, JPY and CHF. Nor USD 1W & 2W
- 83% of GBP risk was versus SONIA (a new high).
- 89% of JPY risk was versus TONA (a record for any RFR!).
- 79% of CHF risk was versus SARON (also a new high).

SOFR Average Daily Volume Growth

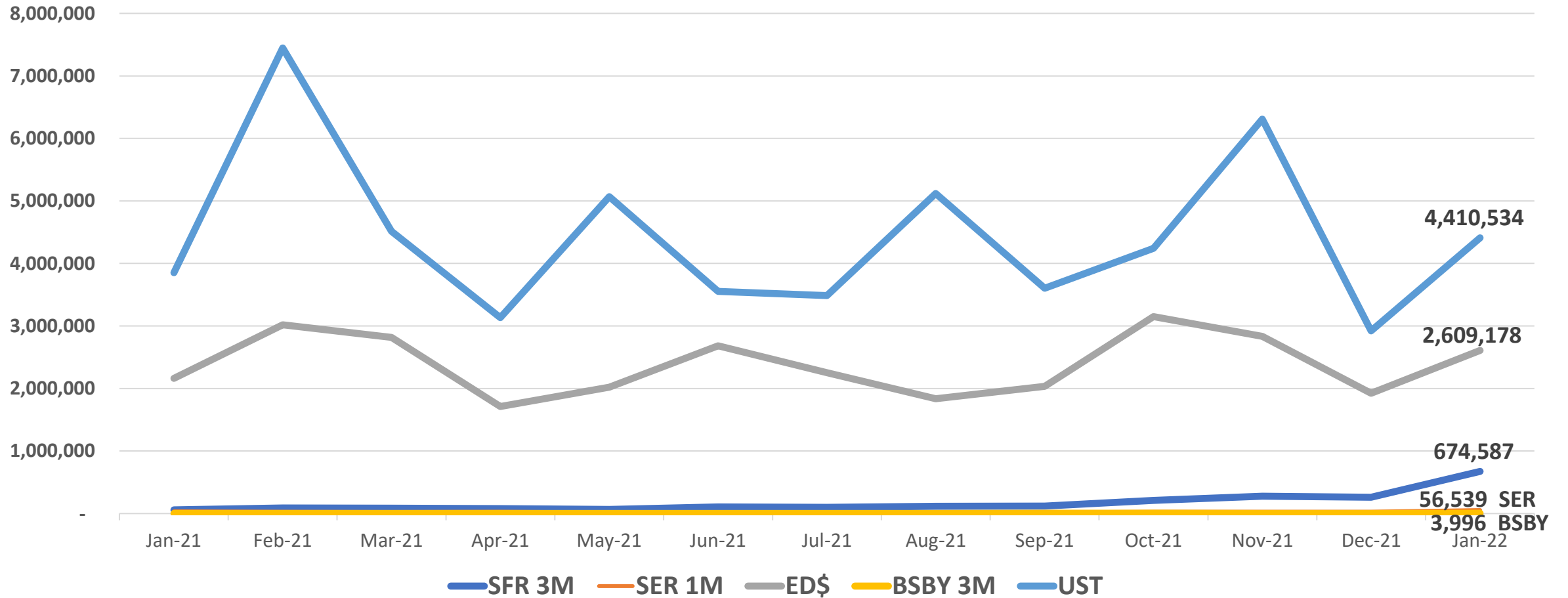
SOFR 1M & 3M Average Daily Volume

Date	AVERAGE DAILY VOLUME	
	SFR 3M	SER 1M
Jan-21	58,841	36,456
Feb-21	90,540	28,685
Mar-21	86,872	25,879
Apr-21	79,719	26,757
May-21	65,901	18,429
Jun-21	106,167	20,950
Jul-21	99,184	10,473
Aug-21	115,292	9,732
Sep-21	118,705	17,665
Oct-21	211,326	27,090
Nov-21	276,561	27,753
Dec-21	261,583	27,516
Jan-22	674,587	56,539



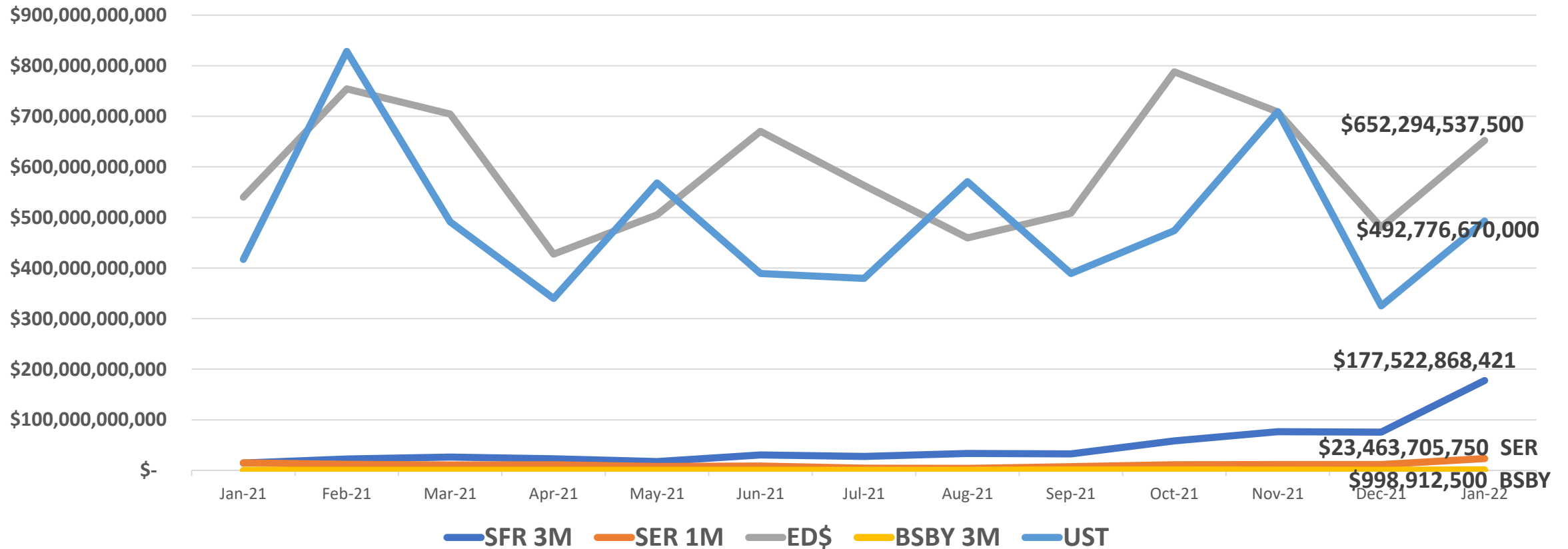
- Clarus OTC volume data
- SOFR Options 50k volume in Jan 2022

SOFR + ED\$ + UST Avg Daily Volume

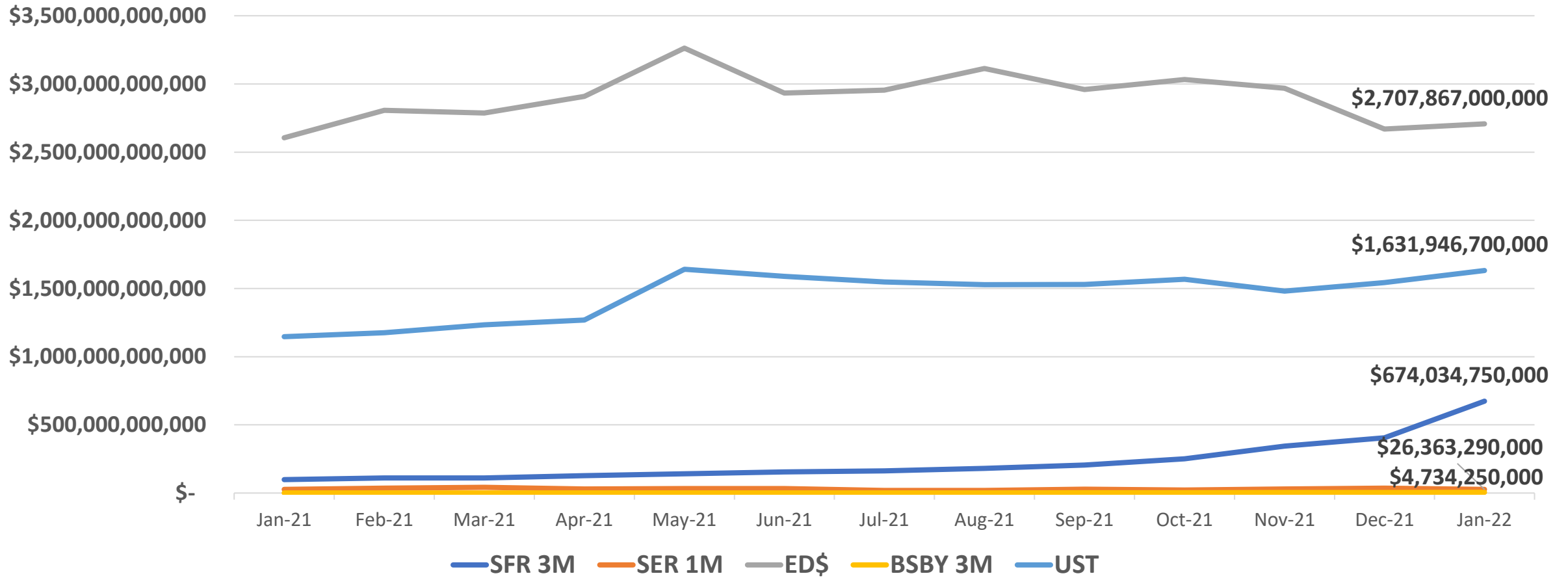


Average Daily Volume – By Notional

SOFR, ED\$, UST Average Daily Volume (by not'l)



Open Interest by Notional (as of EOM)



Yet, Libor still in use

- Libor product still listed & can still use Libor futures.
- June 2023, Libor going away. Market will change slowly over next 12-14 months as we near June 2023
- All Fannie/Freddie issuance are SOFR by now. CMBS deals are SOFR-based, still frequently hedged with Libor
 - SOFR, Libor, UST are the three choices.
- Can Agency CMBS dealers use SOFR today? Yes. It's the only zero-basis option. But liquidity is still growing, so cost efficiency may be a barrier

Trading a 10yr LIBOR Swap is about 25% LIBOR and 75% SOFR, *Right Now!*

6/30/2022 12/31/2022 6/30/2023 12/31/2023 6/30/2024 12/31/2024 6/30/2025 12/31/2025 6/30/2026 12/31/2026 6/30/2027 12/31/2027 6/30/2028 12/31/2028 6/30/2029 12/31/2029 6/30/2030 12/31/2030 6/30/2031 12/31/2031 2/1/2032

LIBOR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR SOFR

ISDA Fallback Rates -> Official Spread Adjustments between Adjusted Reference Rates and IBOR Rates -> USD LIBOR

Tenor	Calculation Date	Original IBOR Rate	Record Day	Spread Adjustments
1) 0/N	01/31/22		02/02/22	0.00644
2) 1W	02/01/22		02/01/22	0.03839
3) 1M	02/01/22		02/01/22	0.11448
4) 2M	02/01/22		02/01/22	0.18456
5) 3M	02/01/22		02/01/22	0.26161
6) 6M	02/01/22		02/01/22	0.42820
7) 1Y	02/01/22		02/01/22	0.71513

Source: Bloomberg

Open Market Levels (2/1/22)

3mo LI/SOFR Futures Implied Forward Fallback Spreads	
March'22	0.085
June'22	0.099
Sep'22	0.12
Dec'22	0.184
March'23	0.155
June'23	0.191
Sep'23	0.254
Dec'23	0.259

***3mo SOFR -3mo ED\$ futs

FHMS K132 A2 Mtge - Freddie CMBS issuance off SOFR

Note: Projections start with payment on 2/25/22

FHMS K132 A2 Mtge 91) Export 92) Sheets 99) Settings Super Yield Ta

US CMBS : FREDDIE 3.125(115)6 CUSIP 3137H3EVO 95 Buy 96 Sell

Cutoff 1,210,028,666 LTV 63.5 30D 0.00 AZ 9.76% CA 23.71% 1mCPR -- Tape Date 01/25/2022
 Current 1,209,987,000 DSCR 2.2 60D 0.00 HCare 1.65% MobH... 2.63% 6mCPR -- 1st Proj 02/25/2022
 CumAser 0 DYLD 7.9 90+D 0.00 12mCPR -- Daycount 30/360

Settle 02/01/2022 No UW Assump Cashflows Return to SYT

Analytics 1

Orig Bal 896,036,000 Your Orig Bal 896,036,000 Show All Projections
 Prev Bal 896,036,000 Accr 0.0000 for 0 days, Start 2/... Frequency Monthly

Bond Table	Bond Graph	Collat Table	Collat Graph	All Tranches
1.	Coupon	Interest	Principal	Cashflow
2.	3/25/22	2.023	1,510,567	0
3.	4/25/22	2.023	1,510,567	0
4.	5/25/22	2.023	1,510,567	0
5.	6/25/22n	2.023	1,510,567	0
6.	7/25/22	2.023	1,510,567	0
7.	8/25/22	2.023	1,510,567	0
8.	9/25/22n	2.023	1,510,567	0
9.	10/25/22	2.023	1,510,567	0
10.	11/25/22	2.023	1,510,567	0
11.	12/25/22n	2.023	1,510,567	0
12.	1/25/23	2.023	1,510,567	0
112.	5/25/31n	2.023	1,510,567	0
113.	6/25/31	2.023	1,510,567	0
114.	7/25/31	2.023	1,510,567	50,778,019
115.	8/25/31	2.023	1,424,964	845,257,981
116.	Totals		172,119,035	896,036,000

1,068,155,035

Px (32nd) 99-05 2.1142

Average Life 9.56
 Modified Duration 8.62
 Principal Window 07/31-08/31
 Spread I 27.6

GOVT(I) 13:25 6M 0.42 1Y 0.74 2Y 1.09 3Y 1.34 5Y 1.64 7Y 1.80 10Y 1.84 30Y 2.16 7Y 97.264 10Y 95.831 30/360

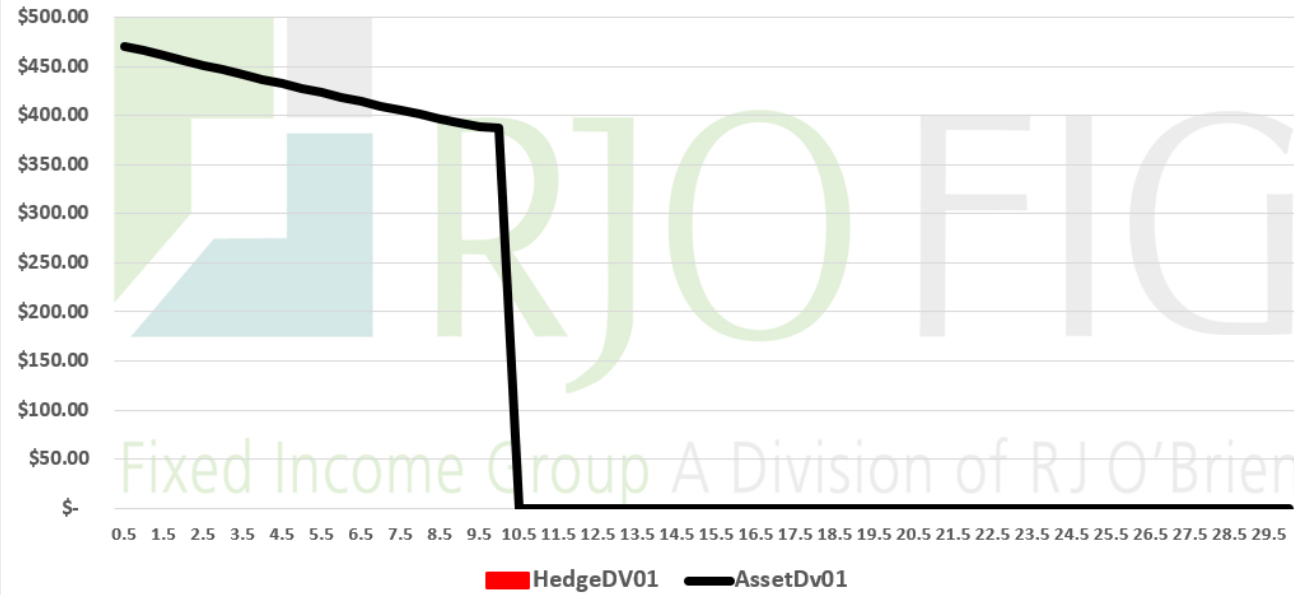
FHMS K132 A2 Mtge

Cusip	short name	risk mid	Mid Mod Dur Dur Adj Mid	total dv'01	N Sprd Bid
X Mtge		10	10	\$0.00	
\$10,000,000 3137H3EV0 Mtge	FHMS K132 A2	8.52538089	8.616429745	\$8,525.38	31.79375

Rate Hedge %	0.00%
Net DV'01	\$ 8,525.38
Asset DV'01	\$ 8,525.38
Hedge DV'01	\$ -

RATE EXPOSURE		
Actual	Future	Best Fit
0	WNH2 (30y)	0
0	USH2 (15y)	0
0	CNPH2 (10y)	-91
0	LIBH22 (7y)	0
0	CFPH2 (5y)	0
0	LICH22 (3y)	0
0	LITH22 (2y)	0

Interest Rate (DV'01) Risk & Rate Hedge Coverage



Residual Curve Exposure

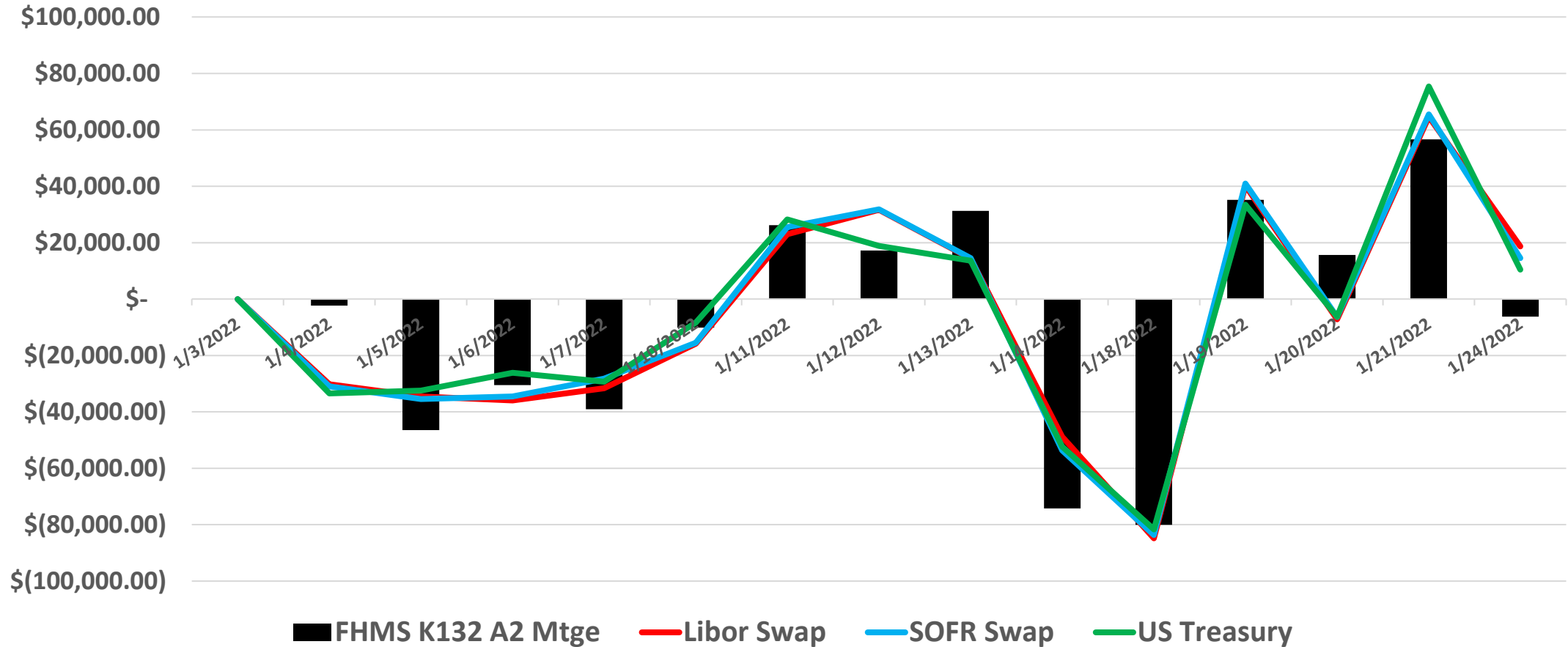


Hedge Performance - FHMS K132 A2 Mtge

10MM Not'l	FHMS K132 A2 Mtge			
	-92	-91	-67	
	Libor Swap	SOFR Swap	US Treasury	CHG NET 1D
CHG NET 1D	CNP2 Comdty	YIYH22 Comdty	UXYH2 Comdty	FHMS K132 A2 Mtge
1/3/2022	\$ -	\$ -	\$ -	
1/4/2022	\$ 30,187.50	\$ 30,940.00	\$ 33,500.00	\$ (2,343.75)
1/5/2022	\$ 34,500.00	\$ 35,490.00	\$ 32,453.13	\$ (46,484.38)
1/6/2022	\$ 35,937.50	\$ 34,580.00	\$ 26,171.88	\$ (30,468.75)
1/7/2022	\$ 31,625.00	\$ 28,210.00	\$ 29,312.50	\$ (39,062.50)
1/10/2022	\$ 15,812.50	\$ 15,470.00	\$ 8,375.00	\$ (10,156.25)
1/11/2022	\$ (23,000.00)	\$ (25,480.00)	\$ (28,265.63)	\$ 26,171.88
1/12/2022	\$ (31,625.00)	\$ (31,850.00)	\$ (18,843.75)	\$ 17,187.50
1/13/2022	\$ (14,375.00)	\$ (14,560.00)	\$ (13,609.38)	\$ 31,250.00
1/14/2022	\$ 48,875.00	\$ 53,690.00	\$ 52,343.75	\$ (74,218.75)
1/18/2022	\$ 84,812.50	\$ 83,720.00	\$ 81,656.25	\$ (80,078.13)
1/19/2022	\$ (40,250.00)	\$ (40,950.00)	\$ (33,500.00)	\$ 35,156.25
1/20/2022	\$ 7,187.50	\$ 6,370.00	\$ 6,281.25	\$ 15,625.00
1/21/2022	\$ (64,687.50)	\$ (65,520.00)	\$ (75,375.00)	\$ 56,640.63
1/24/2022	\$ (18,687.50)	\$ (14,560.00)	\$ (10,468.75)	\$ (6,250.00)
Jan 2022 Hedge P/L	\$ 96,312.50	\$ 95,550.00	\$ 90,031.25	\$ (107,031.25)
Hedge Variation	\$ (10,718.75)	\$ (11,481.25)	\$ (17,000.00)	

	ticks of variation (32nds)		
	Libor Swap	SOFR Swap	US Treasury
1/3/2022	-	-	-
1/4/2022	8.91	9.15	9.97
1/5/2022	(3.84)	(3.52)	(4.49)
1/6/2022	1.75	1.32	(1.38)
1/7/2022	(2.38)	(3.47)	(3.12)
1/10/2022	1.81	1.70	(0.57)
1/11/2022	1.02	0.22	(0.67)
1/12/2022	(4.62)	(4.69)	(0.53)
1/13/2022	5.40	5.34	5.65
1/14/2022	(8.11)	(6.57)	(7.00)
1/18/2022	1.52	1.17	0.51
1/19/2022	(1.63)	(1.85)	0.53
1/20/2022	7.30	7.04	7.01
1/21/2022	(2.58)	(2.84)	(6.00)
1/24/2022	(7.98)	(6.66)	(5.35)
	(3.43)	(3.67)	(5.44)

FHMS K 132 A2 vs Hedge Instruments (10MM Not'I)



FN BS1882 Mtge - Fannie CMBS issuance off SOFR

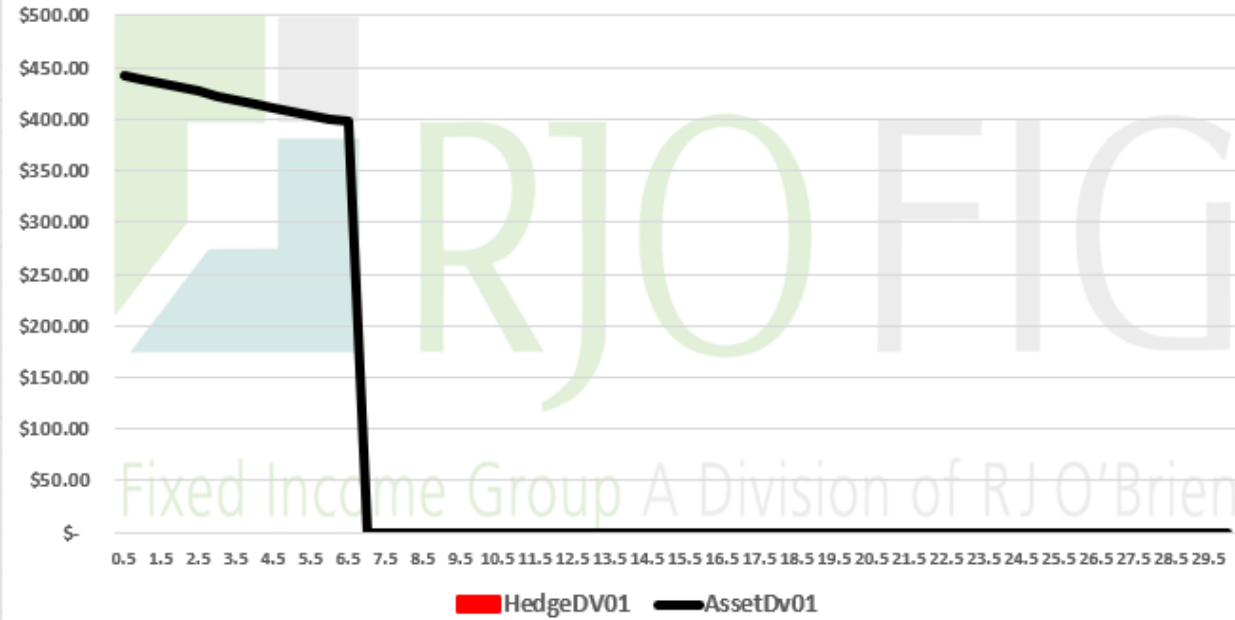
FN BS1882 Mtge		Scenarios	Stratify	Actions	Export	Settings	Yield Table	
US POOL		3.260(75)9	CUSIP 3140LCCU3	Pool Level	As of 01/2022			
1/2022	CPR VPR CDR SEV	30D 60+ 90+	Bkpr Frcl REO	CumLoss	1st Proj 3/25/2022	Day Count ACT/36..		
1M	0	-- --	0.0 0.0 0.0	-- --	Freq Monthly Delay --	Created 04/01/2021		
1) Price-to-Yield		Cashflows		30) Table		31) Graph		
Scenario 1		1) Bond Flow		12) Collateral Flow		32) Close Report		
Settle	02/04/2022	Orig Bal	11,425,000 USD	Your Orig Bal	11,425,000			
Prepay	0 CPY	Prev Bal	11,425,000	Your Prev Bal	11,425,000			
Default	0 CDR	Accrued 0.0125 for 3 days, Start 02/01/22, Delay 24, WAL 5.861						
Vary	0	Show precise amount Monthly						
		Dates	Balance	Sched	Unsched	Interest	Penalty	
		Totals		11,425,000	0	1,008,301	0	
Price	98-09 ³ / ₄		1.8153					
		1.	03/25/2022	11,425,000	0	13,329	0	
		2.	04/25/2022	11,425,000	0	14,757	0	
		3.	05/25/2022	11,406,253	18,747	14,281	0	
		4.	06/25/2022	11,388,488	17,765	14,733	0	
		5.	07/25/2022	11,369,641	18,846	14,236	0	
		6.	08/25/2022	11,351,773	17,868	14,686	0	
		7.	09/25/2022	11,333,855	17,918	14,663	0	
		8.	10/25/2022	11,314,861	18,995	14,167	0	
		9.	11/25/2022	11,296,839	18,022	14,615	0	
		10.	12/25/2022	11,277,744	19,095	14,121	0	
		11.	01/25/2023	11,259,618	18,126	14,567	0	
		12.	02/25/2023	11,241,441	18,177	14,544	0	
		13.	03/25/2023	11,220,159	21,282	13,115	0	
		14.	04/25/2023	11,201,872	18,288	14,493	0	
		15.	05/25/2023	11,182,518	19,353	14,002	0	
		16.	06/25/2023	11,164,125	18,393	14,444	0	
		17.	07/25/2023	11,144,669	19,456	13,955	0	
		18.	08/25/2023	11,126,170	18,499	14,395	0	
		19.	09/25/2023	11,107,618	18,551	14,371	0	
		20.	10/25/2023	11,088,009	19,609	13,885	0	
		21.	11/25/2023	11,069,350	18,659	14,322	0	
		22.	12/25/2023	11,049,637	19,713	13,837	0	
		23.	01/25/2024	11,030,871	18,766	14,272	0	
		24.	02/25/2024	11,012,052	18,819	14,248	0	
		25.	03/25/2024	10,991,186	20,866	13,306	0	
		26.	04/25/2024	10,972,255	18,930	14,197	0	
		27.	05/25/2024	10,952,278	19,977	13,715	0	
		28.	06/25/2024	10,933,239	19,040	14,147	0	
		29.	07/25/2024	10,913,156	20,083	13,667	0	
		30.	08/25/2024	10,894,000	19,146	14,186	0	
		70.	12/25/2027	10,059,179	22,397	12,602	0	
Avg Life	5.86	71.	01/25/2028	10,037,633	21,547	12,993	0	
Mod Duration	5.55	72.	02/25/2028	10,016,025	21,607	12,965	0	
Prin Win	Date 5/22-4/28	73.	03/25/2028	9,992,544	23,482	12,103	0	
I Spread	14	74.	04/25/2028	0	9,992,544	12,907	0	
GOVT 13:01 6M 0.47 1Y 0.74 2Y 1.16 3Y 1.37 5Y 1.61 7Y 1.75 10Y 1.79 30Y 2.12 Disc 30/360		5Y 99-14 ³ / ₄ 7Y 100-00						

FN BS1882 Mtge

Cusip	short name	risk mid	Mid Mod Dur Dur Adj Mid	total dv'01	N Sprd Bid
	X Mtge		10	\$0.00	
\$10,000,000	3140LCCU3 Mtge	FN BS1882	5.549601445	\$5,449.12	13.20885

Rate Hedge %	0.00%	
Net DV'01	\$ 5,449.12	
Asset DV'01	\$ 5,449.12	
Hedge DV'01	\$ -	
Credit Hedge%	0.00%	
Net CR'01	\$ 5,387.17	
Asset CR'01	\$ 5,387.17	
Hedge CR'01	\$ -	
RATE EXPOSURE		
Actual	Future	Best Fit
0	WNH2 (30y)	0
0	USH2 (15y)	0
0	CNPH2 (10y)	0
0	LIBH22 (7y)	0
0	CFPH2 (5y)	-113
0	LICH22 (3y)	0
0	LITH22 (2y)	0

Interest Rate (DV'01) Risk & Rate Hedge Coverage



Residual Curve Exposure

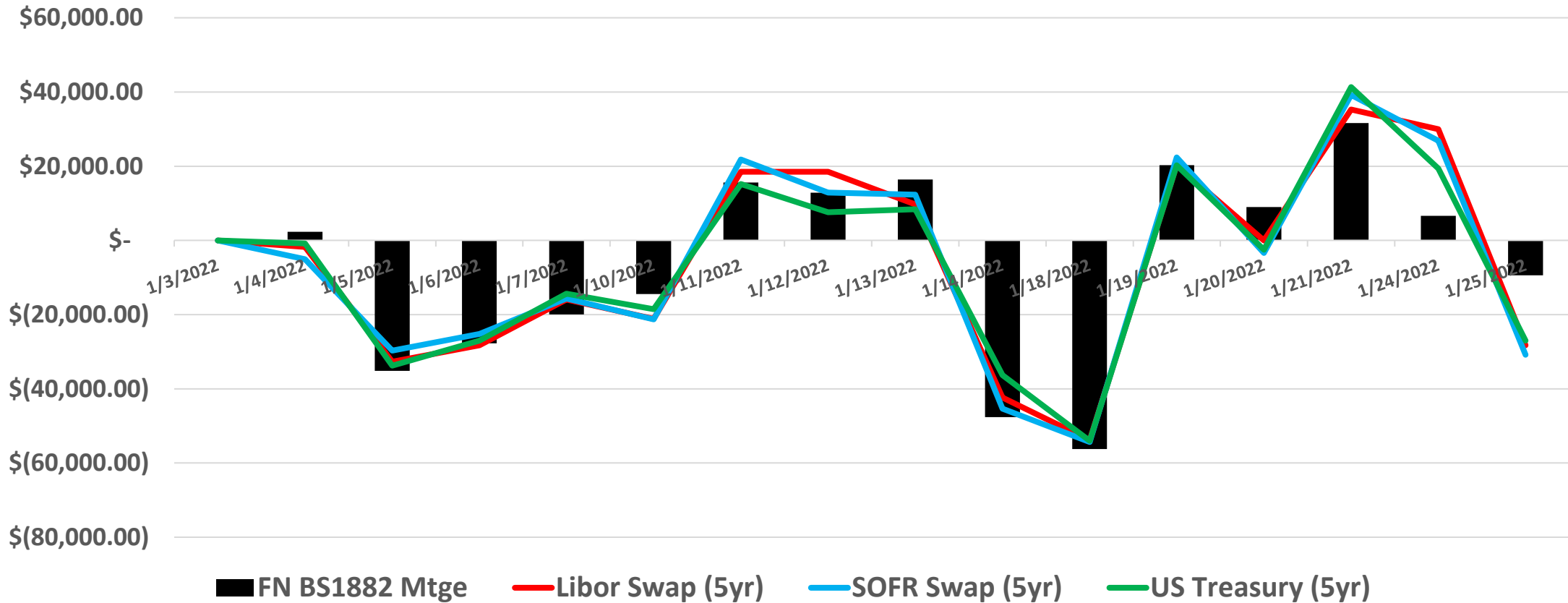


Hedge Performance – FN BS1882 Mtge

10MM Not'l	FN BS1882 Mtge			
	-113	-112	-108	
	Libor Swap (5yr)	SOFR Swap (5yr)	US Treasury (5yr)	CHG NET 1D
CHG NET 1D	CFPH2 Comdty	YIWH22 Comdty	FVH2 Comdty	FN BS1882 Mtge
1/3/2022	\$ -	\$ -	\$ -	\$ -
1/4/2022	\$ 1,765.63	\$ 5,040.00	\$ 843.75	\$ 2,343.75
1/5/2022	\$ 32,664.06	\$ 29,680.00	\$ 33,750.00	\$ (35,156.25)
1/6/2022	\$ 28,250.00	\$ 25,200.00	\$ 27,000.00	\$ (27,734.38)
1/7/2022	\$ 15,890.63	\$ 15,680.00	\$ 14,343.75	\$ (19,921.88)
1/10/2022	\$ 21,187.50	\$ 21,280.00	\$ 18,562.50	\$ (14,453.13)
1/11/2022	\$ (18,539.06)	\$ (21,840.00)	\$ (15,187.50)	\$ 15,625.00
1/12/2022	\$ (18,539.06)	\$ (12,880.00)	\$ (7,593.75)	\$ 12,890.63
1/13/2022	\$ (9,710.94)	\$ (12,320.00)	\$ (8,437.50)	\$ 16,406.25
1/14/2022	\$ 42,375.00	\$ 45,360.00	\$ 36,281.25	\$ (47,656.25)
1/18/2022	\$ 53,851.56	\$ 54,320.00	\$ 54,000.00	\$ (56,250.00)
1/19/2022	\$ (20,304.69)	\$ (22,400.00)	\$ (20,250.00)	\$ 20,312.50
1/20/2022	\$ -	\$ 3,360.00	\$ 2,531.25	\$ 8,984.38
1/21/2022	\$ (35,312.50)	\$ (39,200.00)	\$ (41,343.75)	\$ 31,640.63
1/24/2022	\$ (30,015.63)	\$ (26,880.00)	\$ (19,406.25)	\$ 6,640.63
1/25/2022	\$ 28,250.00	\$ 30,800.00	\$ 27,000.00	\$ (9,375.00)
Jan 2022 Hedge P/L	\$ 91,812.50	\$ 95,200.00	\$ 102,093.75	\$ (95,703.13)
Hedge Variation	\$ (3,890.63)	\$ (503.13)	\$ 6,390.63	

	ticks of variation (32nds)		
	Libor Swap	SOFR Swap	US Treasury
1/3/2022	-	-	-
1/4/2022	1.32	2.36	1.02
1/5/2022	(0.80)	(1.75)	(0.45)
1/6/2022	0.17	(0.81)	(0.24)
1/7/2022	(1.29)	(1.36)	(1.79)
1/10/2022	2.16	2.18	1.32
1/11/2022	(0.93)	(1.99)	0.14
1/12/2022	(1.81)	0.00	1.70
1/13/2022	2.14	1.31	2.55
1/14/2022	(1.69)	(0.73)	(3.64)
1/18/2022	(0.77)	(0.62)	(0.72)
1/19/2022	0.00	(0.67)	0.02
1/20/2022	2.88	3.95	3.69
1/21/2022	(1.18)	(2.42)	(3.11)
1/24/2022	(7.48)	(6.48)	(4.09)
1/25/2022	6.04	6.86	5.64
	(1.25)	(0.16)	2.05

FN BS1882 vs Hedge Instruments (10MM Not'I)



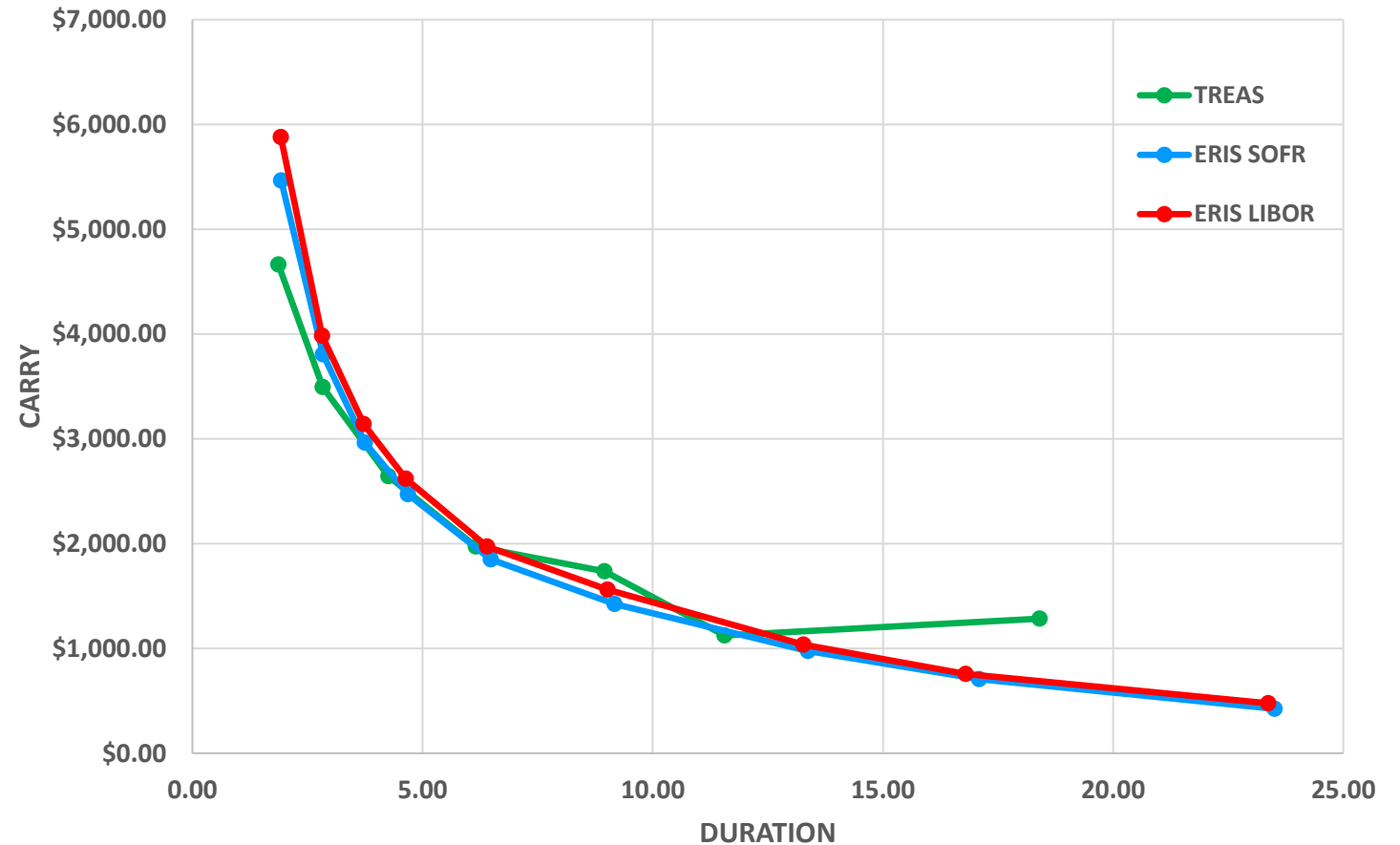
Carry Risk

TICKER	30D CARRY	DV'01	DURA	30D CARRY PER \$1k DV'01
2yr UST	\$189.28	\$40.57	1.87	\$4,665.19
3yr UST	\$222.61	\$63.68	2.83	\$3,495.68
5yr UST	\$133.37	\$50.45	4.26	\$2,643.61
7yr UST	\$155.82	\$78.93	6.16	\$1,974.19
10yr UST	\$221.56	\$127.60	8.95	\$1,736.32
18yr UST	\$202.55	\$180.04	11.56	\$1,125.04
25yr UST	\$444.52	\$345.90	18.40	\$1,285.11

2yr SOFR	\$107.67	\$19.70	1.93	\$5,465.48
3yr SOFR	\$111.06	\$29.17	2.84	\$3,807.34
4yr SOFR	\$114.28	\$38.55	3.75	\$2,964.46
5yr SOFR	\$118.52	\$47.93	4.68	\$2,472.77
7yr SOFR	\$122.56	\$66.19	6.48	\$1,851.64
10yr SOFR	\$132.22	\$92.74	9.17	\$1,425.71
15yr SOFR	\$131.21	\$134.42	13.37	\$976.12
20yr SOFR	\$121.21	\$171.15	17.09	\$708.21
30yr SOFR	\$101.57	\$238.19	23.51	\$426.42

2yr LIBOR	\$114.95	\$19.55	1.92	\$5,879.80
3yr LIBOR	\$115.21	\$28.91	2.82	\$3,985.13
4yr LIBOR	\$120.01	\$38.19	3.72	\$3,142.45
5yr LIBOR	\$124.44	\$47.47	4.64	\$2,621.45
7yr LIBOR	\$129.14	\$65.45	6.40	\$1,973.11
10yr LIBOR	\$142.91	\$91.55	9.02	\$1,561.00
15yr LIBOR	\$137.68	\$132.66	13.27	\$1,037.84
20yr LIBOR	\$127.92	\$168.84	16.80	\$757.64
30yr LIBOR	\$112.11	\$234.59	23.37	\$477.90

30 DAY CARRY PER \$1K DV'01



- If taking basis risk, consider where you'd want to be long/short
- Caution, huge variation if short for 1hr vs days/weeks/months.
- Carry eats away beyond bid/ask spread

Bid/Ask Slippage (on \$1,000 DV'01)

TICKER	BID/ASK	DV'01	DURA	BID ASK PER \$1k DV'01
2yr UST	\$3.91	\$40.58	1.87	\$96.27
3yr UST	\$3.91	\$63.69	2.83	\$61.33
5yr UST	\$7.81	\$50.44	4.26	\$154.90
7yr UST	\$15.63	\$78.88	6.16	\$198.09
10yr UST	\$15.63	\$127.56	8.95	\$122.49
2yr SOFR	\$10.00	\$19.70	1.93	\$507.61
3yr SOFR	\$25.00	\$29.17	2.84	\$857.04
4yr SOFR	\$30.00	\$38.55	3.75	\$778.21
5yr SOFR	\$20.00	\$47.93	4.68	\$417.28
7yr SOFR	\$80.00	\$66.19	6.48	\$1,208.64
10yr SOFR	\$80.00	\$92.74	9.17	\$862.63
2yr LIBOR	\$10.00	\$19.55	1.92	\$511.51
3yr LIBOR	\$12.00	\$28.91	2.82	\$415.08
4yr LIBOR	\$25.00	\$38.19	3.72	\$654.62
5yr LIBOR	\$20.00	\$47.47	4.64	\$421.32
7yr LIBOR	\$40.00	\$65.45	6.40	\$611.15
10yr LIBOR	\$50.00	\$91.55	9.02	\$546.15

Off SEF Swaps

- For many hedgers, a portion of underlying risk requires a higher degree of customization than is available in futures
- Plain vanilla swaps are often traded on SEF, but customized details, even using SOFR, can allow (or require) off SEF trading
- If you only have 2-3 bank relationships for swaps, you might not necessarily get the best pricing on these off SEF transactions
- RJO/FIG now offers execution in cleared OTC interest rate swaps, adding value especially in off SEF positions, as a non bank trading partner
- Mark Donlon's team provides access to a much wider pool of liquidity through a network of 20+ dealers, ensuring tight execution and anonymity

Exchange & Clearing Microstructure

- Market efficiency & deeper liquidity available with market makers & cross-margining
- Ameribor is at Cboe. Layoff for market makers is at CME. Double margined on Ameribor (Cboe) & FF/SOFR (CME) for layoff.
- No inter-exchange to layoff risk with margin efficiency
- Affecting Ameribor liquidity
- BSBY & other CSRs have cross margin with SOFR/BSBY/FF/Treasuries/LIBOR at CME
- As markets develop, there will be liquidity for products in cross-margin markets. Lack of liquidity for products on an exchange without cross-margin ability.

What's on deck for 2022:

- BSBY swap futures
- TBA Futures
- 20yr UST Future – Coming March 7, 2022

Questions?

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