

SOFR Presentation

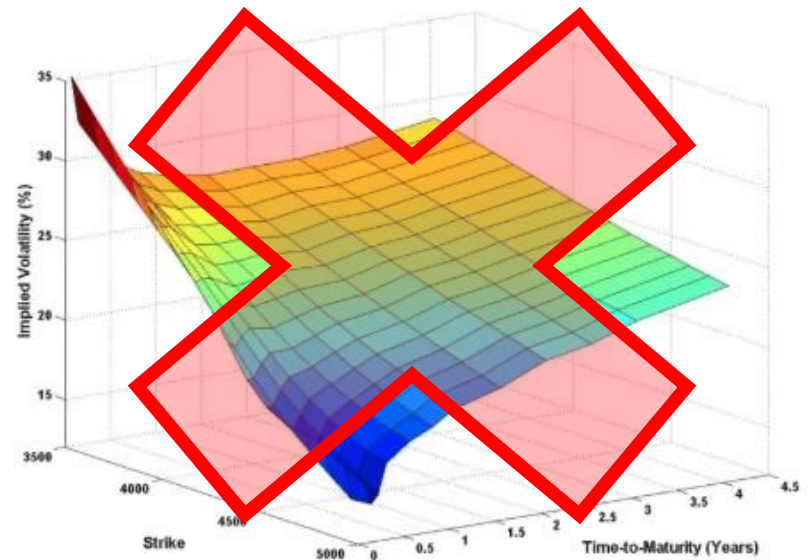
SFBTA 2020 Conference

John Coleman - The Fixed Income Group at R.J. O'Brien
February 2020

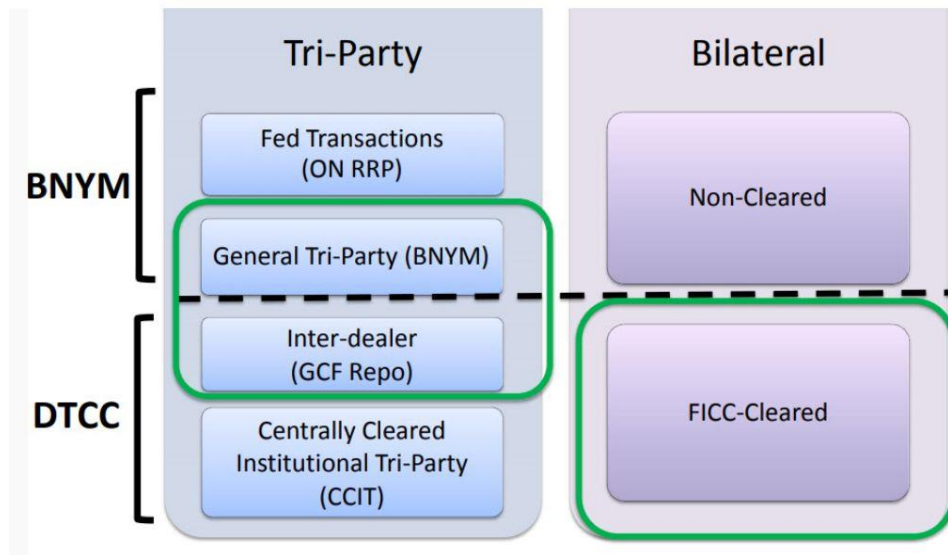


<700 Days til LIBOR is HISTORY: “I Trade Mortgages! Why Do I Care?”

- OAS– no idea. Can’t be calculated with no SOFR
Option Vol Surface
- Overtly Impacted: Resi ARMs, CLOs, Spread Levels for DUS, Freddie K, GPLs, etc. etc. etc.
- “Waste No Crisis!”
Opportunity for those who are ready



“Dude, You Showed Us This Slide Last Year!” Uh, Yeah, SOFR is Still Just Treasury G/C Repo Repackaged



Source: FRBNY

A Hybrid of 'G/C' 'O/N' Rates

- Overnight Treasury G/C Rate
- BoNY Triparty Repo
- GCF/DTCC Repo
- FICC-Cleared Bilateral Repo

“All transactions with rates below the 25th volume-weighted percentile rate within this data set will be removed, to reduce the impact of specials ...” FRBNY

SOFR pub time: (approx.): 8:30 a.m. ET based on the PRIOR day's trading activity

SOFR Is NOT Going Away– LIBOR Is: SOFR Term Rates (EDSF<Go>) & Futures Execution (EMSX)

Bloomberg's EDSF Screen

3-Month SOFR Future		Export To Excel	Settings				
Delayed	02/03/2020	Adjust	Mean Rev.	0.030	Rate		
Start Date	Days Ticker	Last	Rate	6 Mo	1 Yr	2 Yr	
10) 02/05/2020	42 SFRZ9	98.4350 y	1.5650	1.480	1.354	1.209	
11) 03/18/2020	91 SFRH0	98.5000	1.5000	1.433	1.301	1.177	
12) 06/17/2020	91 SFRM0	98.6400	1.3600	1.292	1.188	1.116	
13) 09/16/2020	91 SFRU0	98.7800 y	1.2200	1.162	1.103	1.075	
14) 12/16/2020	91 SFRZ0	98.9000 y	1.1000	1.076	1.049	1.054	
15) 03/17/2021	91 SFRH1	98.9500 y	1.0500	1.039	1.025	1.050	
16) 06/16/2021	91 SFRM1	98.9750 y	1.0250	1.016	1.018	1.053	
17) 09/15/2021	91 SFRU1	98.9950 y	1.0050	1.006	1.022	1.060	
18) 12/15/2021	91 SFRZ1	98.9950 y	1.0050	1.014	1.034	1.070	

SOFR Futures Now Exceed \$1 Trillion

SOFR FUTURES							
1mo SOFR: \$855 Billion Open				3mo SOFR: \$153 Billion Open			
Description	Bid	Ask	Open Int	Description	Bid	Ask	Open Int
1) Spot	1.580	1.580		1) Spot	1.5800	1.5800	
2) Feb20	98.412	98.415	59997	2) Dec19	98.4325	98.4500	59523
3) Mar20	98.440	98.445	38407	3) Mar20	98.5050	98.5100	34880
4) Apr20	98.465	98.475	25720	4) Jun20	98.6350	98.6450	22313
5) May20	98.525	98.535	28590	5) Sep20	98.7700	98.7800	12699
6) Jun20	98.570	98.580	15339	6) Dec20	98.8900	98.9000	14849
7) Jul20	98.605	98.620	2970	7) Mar21	98.9350	98.9400	3140
8) Aug20	98.660	98.675	779	8) Jun21	98.9600	98.9700	3428
9) Sep20	98.685	98.725		9) Sep21	98.9800	98.9900	1686
10) Oct20	98.740	98.765	100	10) Dec21	98.9750	98.9900	1151

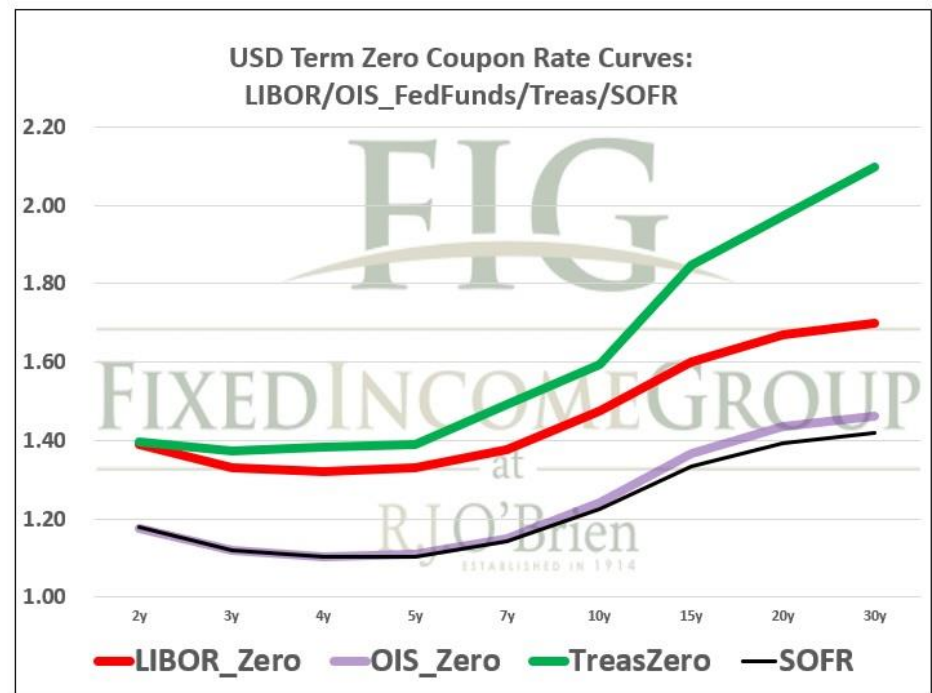
To SEE the SOFR Curve: Annualize LIBOR Swaps, Convert Via OIS Basis Swap, & Then Convert Via OIS:SOFR Basis Swap

Nobody is watching SOFR yet (cuz it's a nightmare to calc):

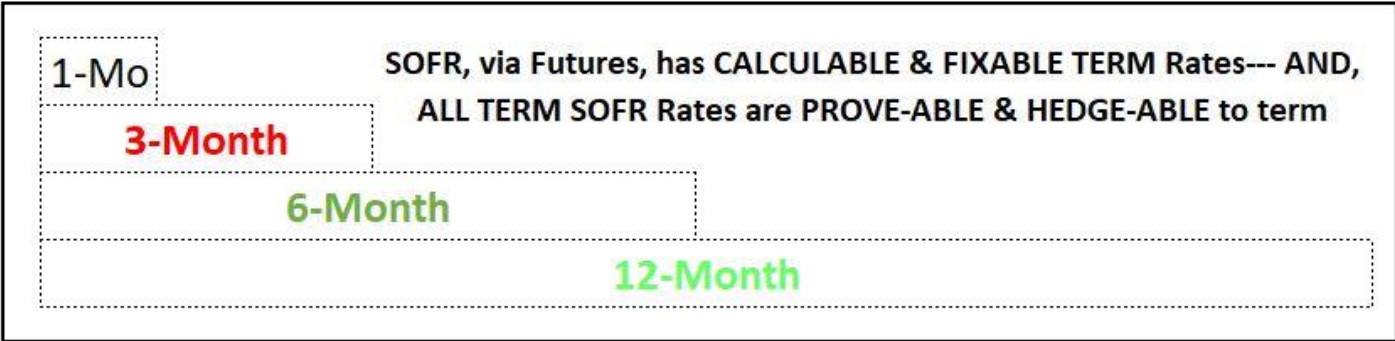
$$100 * (100 * (-L\text{Iswap}/100 + (((1 + (((1 + (((1 + L\text{Iswap}/100 * (360/365)/2)^{(2/4) - 1})^4) - L\text{I_Oisbasis}/10000)/4)^{4-1})/360)^{90-1})^4))) - O\text{IS_SOFRbasis}$$

Things to know (probably):

- Rather SHORT SOFR than Treas
 - Less Curve Roll Up for SOFR
 - Less Carry (more neg carry) for SOFR
- Rather be LONG Treas than SOFR
 - For hedging IO or MSR



LIBOR (TERM: Visible but Questionable) vs. SOFR (TERM: Calculable & Prove-able)



Does SOFR “Work”? Swap Short-Maturity Fannie Mae Floaters to Fixed – OR – Fixed into Floaters (FNMA Descrip: Bloomberg)

FNMA Float 10/30/20 \$**↑100.017** +.001 100.012/100.022 1.599/1.586
At 0:00 -- x -- Source BVAL

FNMA Float 10/30/20 Corp Settings Actions Page 1/12 Security Description: Bond

94 Notes 95 Buy 96 Sell

25) Bond Description	20 Issuer Description	Identifiers
Pages	Issuer Information	Identifiers
1) Bond Info	Name FANNIE MAE	ID Number ZS4078946
2) Addtl Info	Industry Government Owned, No Guarantee (BCL)	CUSIP 3135G0V67
3) Reg/Tax	Security Information	ISIN US3135G0V670
4) Covenants	Mkt Iss Global	Bond Ratings
5) Guarantors	Country US Currency USD	Moody's Aaa
6) Bond Ratings	Rank Unsecured Series	S&P AA+
7) Identifiers	Coupon Type Floating	Fitch AAA
8) Exchanges	Formula 0/N SOFR +7.5000	Composite AA+
9) Inv Parties		
10) Fees, Restrict		

FNMA 2 7/8 10/30/20 \$**↓100.958** -.012 100.935/100.980 1.641/1.582
At 0:00 -- x -- Source BVAL

FNMA 2 7/8 10/30/20 Corp Settings Actions Page 1/12 Security Description: Bor

94 Notes 95 Buy 96 Sell

25) Bond Description	20 Issuer Description	Identifiers
Pages	Issuer Information	Identifiers
1) Bond Info	Name FANNIE MAE	ID Number AV3342087
2) Addtl Info	Industry Government Owned, No Guarantee (BCL)	CUSIP 3135G0U84
3) Reg/Tax	Security Information	ISIN US3135G0U847
4) Covenants	Mkt Iss Global	Bond Ratings
5) Guarantors	Country US Currency USD	Moody's Aaa
6) Bond Ratings	Rank Unsecured Series	S&P AA+
7) Identifiers	Coupon 2.875000 Type Fixed	Fitch AAA
8) Exchanges	Cpn Freq S/A	Composite AA+
9) Inv Parties		
10) Fees, Restrict		

BUY SOFR FUTURES to FIX the Rate on Fannie Floater

Term SOFR from 1-day Futures Returns

1.57757%	1.58435%	1.55959%	1.51941%	1.48271%	1.42060%	1.38625%
1.0013585	1.0040049	1.00788457	1.011902043	1.0150742	1.0215853	1.0281486
1mo	3mo	6mo	FNMA Maturty	12mo	18mo	24mo
1/23/2020	1/23/2020	1/23/2020	1/23/2020	1/23/2020	1/23/2020	1/23/2020
2/22/2020	4/22/2020	7/22/2020	10/30/2020	1/22/2021	7/22/2021	1/22/2022
31	91	182	282	366	547	731

SELL SOFR FUTURES to Swap FN Fixed Rate to Floating

Term SOFR from 1-day Futures Returns

1.57757%	1.58435%	1.55959%	1.51941%	1.48271%	1.42060%	1.38625%
1.0013585	1.0040049	1.00788457	1.011902043	1.0150742	1.0215853	1.0281486
1mo	3mo	6mo	FNMA Maturty	12mo	18mo	24mo
1/23/2020	1/23/2020	1/23/2020	1/23/2020	1/23/2020	1/23/2020	1/23/2020
2/22/2020	4/22/2020	7/22/2020	10/30/2020	1/22/2021	7/22/2021	1/22/2022
31	91	182	282	366	547	731

EITHER WAY, FANNIE trades +7.5 bps to SOFR out to 10/30/20– No Arbitrage (unlike last year)!

Bloomberg BVAL STILL Doesn't Calculate SOFR Correctly Past About a Year. FHLB Float 3/12/21

Term SOFR from 1-day Returns						
1.59046%	1.57557%	1.51966%	1.46345%	1.40388%	1.38207%	1.3445%
1.0012812	1.0039389	1.00768271	1.011138501	1.0142727	1.0155099	1.0255129
1mo	3mo	6mo	9mo	12mo	FHLB	24mo
2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020
3/2/2020	5/2/2020	8/2/2020	11/2/2020	2/2/2021	3/12/2021	2/2/2022
29	90	182	274	366	404	731

SOFR Fixed to 3/12/21 @ 1.382%
Floater Coupon SOFR + 11.5
 → **Yield 1.497%**
 → **Eh, not 1.67% ~ish**

FHLB Float 03/12/21 \$↑100.029 -.001 100.001/100.056 1.694/1.644
 As of 31 Jan -- X -- Source BVAL ??

FHLB Float 03/12/21 Corp Settings Actions Page 1/12 Security Description: BVAL

25) Bond Description 20) Issuer Description

Pages	Issuer Information	Identifiers
1) Bond Info	Name FEDERAL HOME LOAN BANK	ID Number AX6785205
2) Addtl Info	Industry Government Sponsored (BCLASS)	CUSIP 3130AG3Q6
3) Reg/Tax	Security Information	ISIN US3130AG3Q69
4) Covenants	Mkt Iss US Domestic	Bond Ratings
5) Guarantors	Country US Currency USD	Moody's Aaa
6) Bond Ratings	Rank Unsecured Series	S&P AA+
7) Identifiers	Coupon Floating	Composite AA+
8) Exchanges	Formula O/N SOFR +11.5000	Issuance & Trading
9) Inv Parties	Day Cnt ACT/360 Iss Price 100.00000	Issued/Outstanding
10) Fees, Restrict	Maturity 03/12/2021	3,000,000.00 (M) /
11) Schedules	BULLET	

Source: Bloomberg

FHLB 2 3/8 03/12/21 \$↑101.034 +.069 100.987/101.081 1.473/1.388
 As of 31 Jan -- X -- Source BVAL

FHLB 2 3/8 03/12/21 Corp Settings Actions Page 1/12 Security Description: BVAL

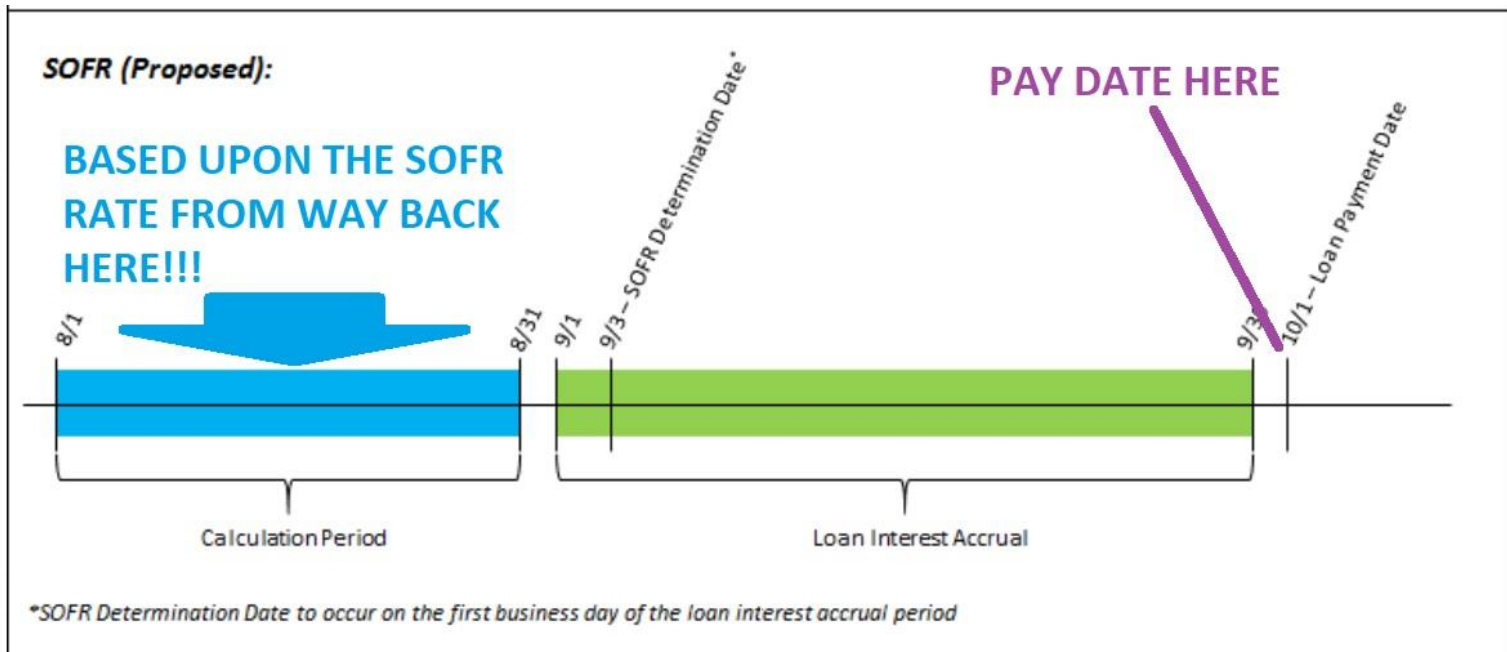
Data not provided by Bloomberg 99) Notes 95) Buy 96) Sell

25) Bond Description 20) Issuer Description

Pages	Issuer Information	Identifiers
1) Bond Info	Name FEDERAL HOME LOAN BANK	ID Number EK0687518
2) Addtl Info	Industry Government Sponsored (BCLASS)	CUSIP 3130A0XD7
3) Reg/Tax	Security Information	ISIN US3130A0XD70
4) Covenants	Mkt Iss US Domestic	Bond Ratings
5) Guarantors	Country US Currency USD	Moody's Aaa
6) Bond Ratings	Rank Unsecured Series	S&P AA+
7) Identifiers	Coupon 2.375000 Type Fixed	Composite AA+
8) Exchanges		
9) Inv Parties		

FHLB Identical-Maturity FIXED Security @ 1.423%
 → Fixed a bit RICH to Swapped SOFR Floater

Freddie K-F73 – SOFR FLOATER– Structure Indicative of Challenges

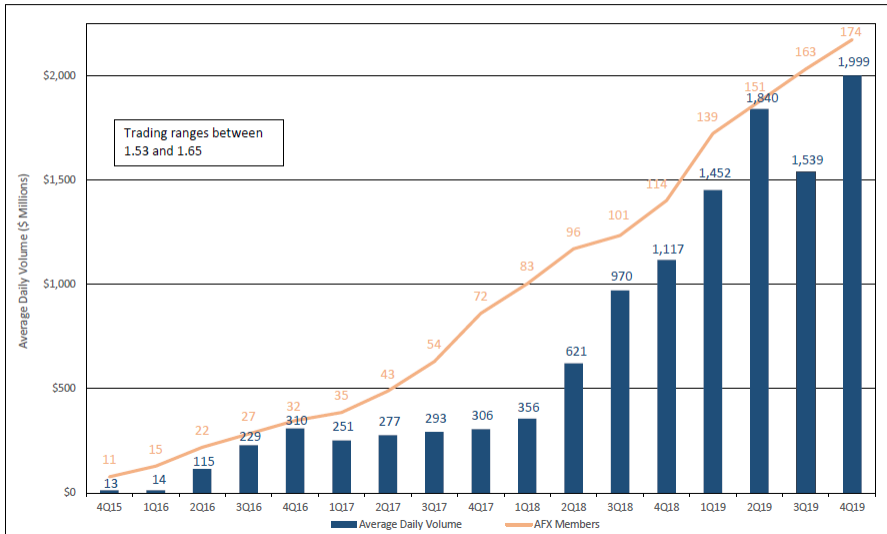


Will Trade Like a 1mo-Fixed into Forward Floater (adds price vol)

© Freddie Mac

Growing AMERIBOR: Trades \$2bb per Day. Shrinking LIBOR: Trades \$500mm per Day.

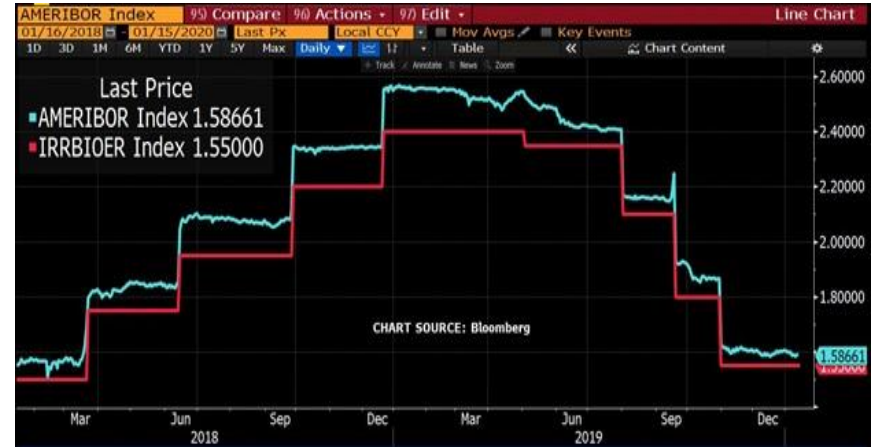
Average Daily Outstanding Volume and AFX Membership Growth
Total All Products
As of January 1st, 2019



Transaction Records
Daily: \$3.04 bln
Weekly: \$13.02 bln
Monthly: \$46.70 bln

*In addition to the 174 AFX Members, there are more than 1,000 downstream banks through AFX's correspondent bank lending program.
The American Financial Exchange opened on December 11, 2015

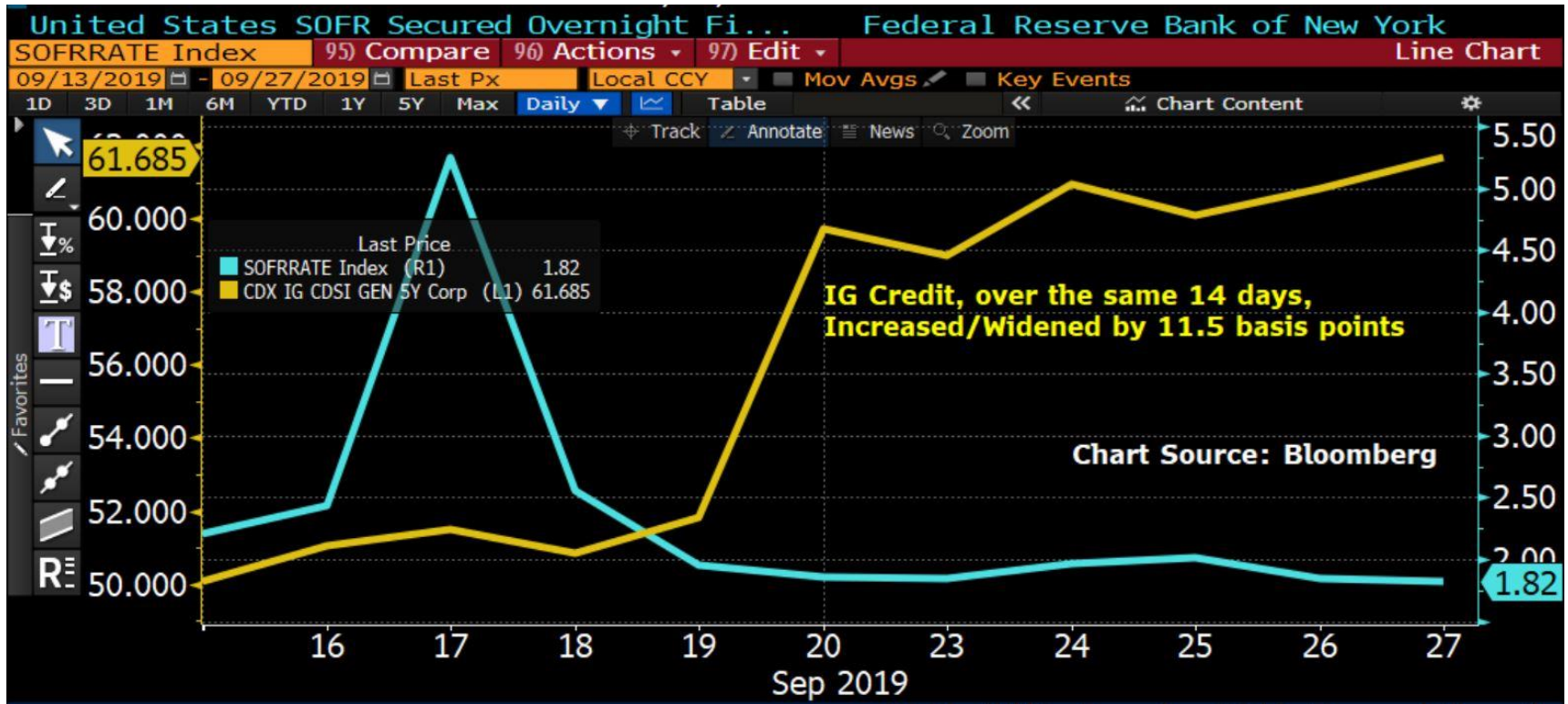
AMERIBOR (Green) versus IOER (Red)



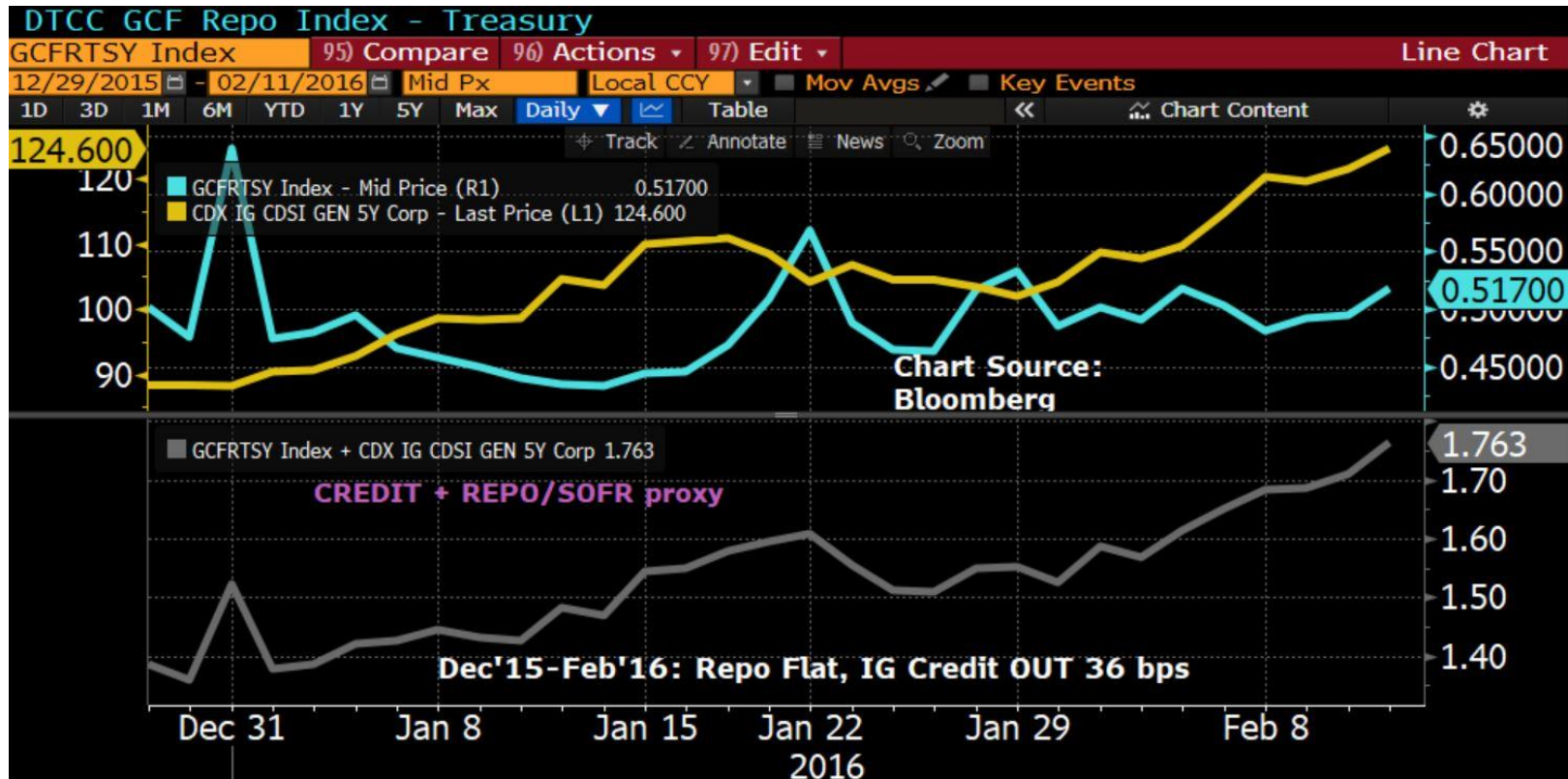
AMERIBOR May Be Best Choice For CLO Benchmark Replacement



SOFR is U.S Govt Credit. In Stress, SOFR Rates *DECLINE*
 While Rates & Risk to Lenders/Security-Holders *INCREASE*
 (Bogus scaling due to SOFR spike on 9/17/19)



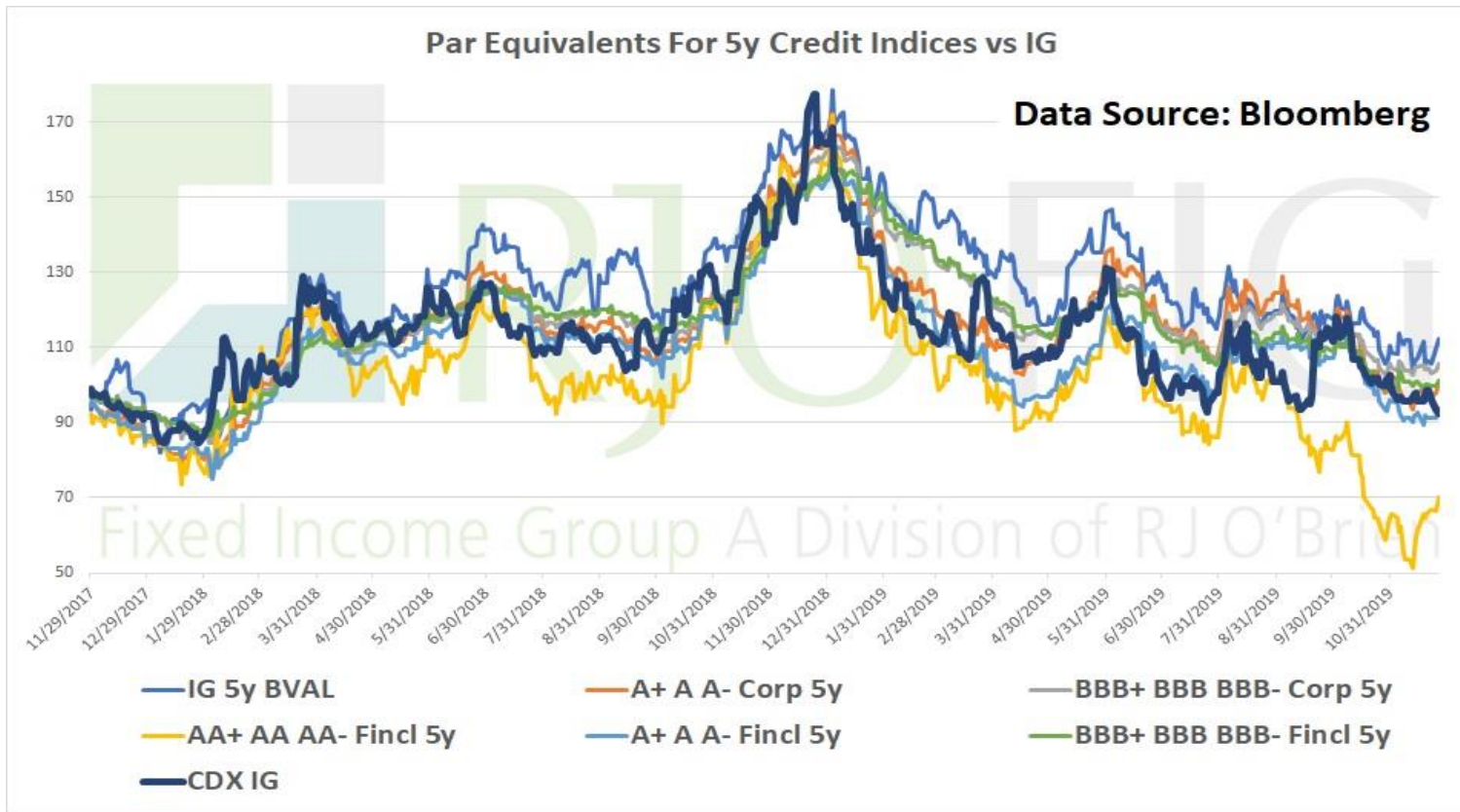
In Extreme Duress, CREDIT often Eclipses Rate



IG Credit, Across Credit Slices, Is HIGHLY Correlated

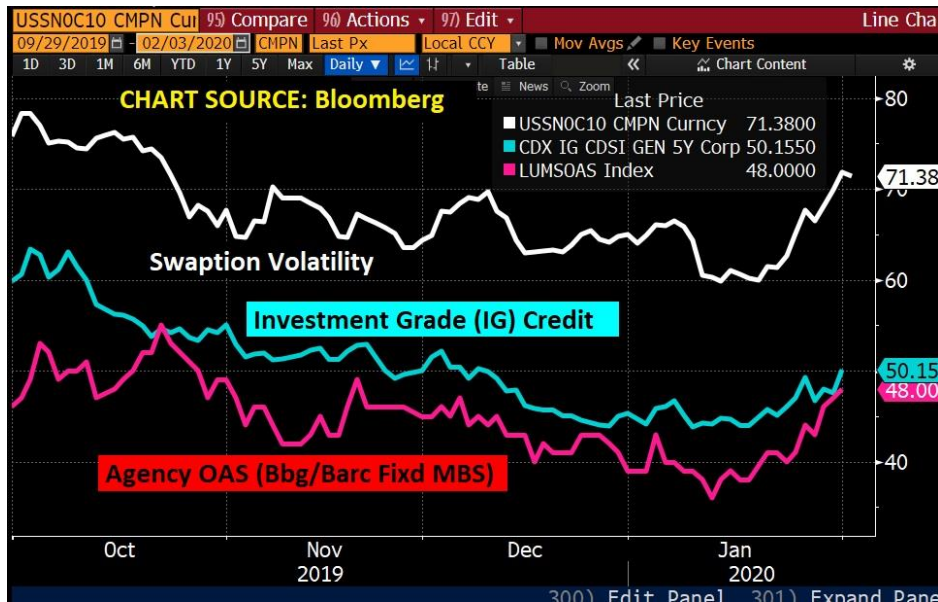
Correlations between ALL selected credit indices are meaningful.

	A+ A A- Corp 5y	BBB+ BBB Corp 5y	AA+ AA AA- Fincl 5y	A+ A A- Fincl 5y	BBB+ BBB BBB- Fincl 5y	CDX IG
IG 5y BVAL	0.93	0.97	0.81	0.92	0.96	0.85
A+ A A- Corp 5y	1.00	0.96	0.86	0.98	0.93	0.87
BBB+ BBB Corp 5y	0.97	1.00	0.81	0.96	0.99	0.86
AA+ AA AA- Fincl 5y	0.81	0.86	1.00	0.88	0.81	0.87
A+ A A- Fincl 5y	0.92	0.98	0.96	1.00	0.94	0.89
BBB+ BBB BBB- Fincl 5y	0.96	0.93	0.99	0.81	1.00	0.85
CDX IG	0.85	0.87	0.86	0.87	0.89	1.00



WHY IG Credit Vs Mortgage Risk?

Think: “Credit-Less Benchmark” Needs It Added

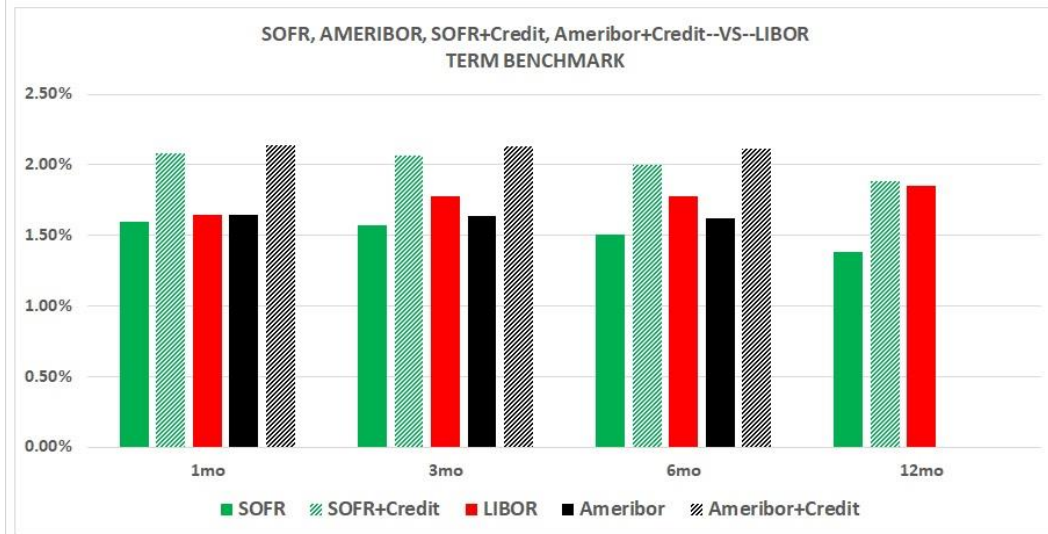


- Resi Mortgage OAS Influencers:
 - Credit
 - Volatility
- Since SOFR is Treasury Credit and Ameribor is Fed-Wrapped Bank Credit, non-bank warehouse lines will adjust to:
 - {Benchmark} + {Credit} + X
- Any Institution Can TRADE IG Credit as a Futures Contract

Whether SOFR, AMERIBOR or Treasury— CREDIT Must Be Monitored & Traded A La Carte

SPOT TERM Rates Forward					Funding Spread Equivalents to LIBOR+100bps:				
	1mo	3mo	6mo	12mo		1mo	3mo	6mo	12mo
SOFR	1.5916%	1.5737%	1.5054%	1.3850%	LIBOR+100	2.64525%	2.77713%	2.77925%	2.84713%
SOFR+Credit	2.0817%	2.0662%	2.0000%	1.8832%	SOFR+Credit	+0.56357%	+0.71095%	+0.77921%	+0.96397%
LIBOR	1.6453%	1.7771%	1.7793%	1.8471%	Ameribor+Credit	+0.51004%	+0.64844%	+0.6655%	
Ameribor	1.6445%	1.6364%	1.6192%						
Ameribor+Credit	2.1352%	2.1287%	2.1137%						

2/3/2020 15:48



Term SOFR from 1-day Returns						
1mo	3mo	6mo	9mo	12mo	FHLB	24mo
1.59164%	1.57373%	1.50543%	1.44546%	1.38497%	1.36303%	1.23592%
1.0012822	1.0039343	1.00761081	1.01100153	1.014081	1.015296	1.025096
2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020
3/2/2020	5/2/2020	8/2/2020	11/2/2020	2/2/2021	#####	2/2/2022
29	90	182	274	366	404	731

Term SOFR+Credit from 1-day Returns						
1mo	3mo	6mo	9mo	12mo	18mo	24mo
2.08168%	2.06618%	2.00004%	1.94192%	1.88316%	1.79506%	1.74061%
1.0016769	1.0051655	1.01011129	1.0147802	1.019145	1.027275	1.035344
2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020	2/3/2020
3/2/2020	5/2/2020	8/2/2020	11/2/2020	2/2/2021	8/2/2021	2/2/2022
29	90	182	274	366	547	731

Term AMERIBOR from 1-day Returns						
1mo	3mo	6mo	9mo			
1.64451%	1.63644%	1.61918%	1.58258%			
1.0013247	1.0040911	1.00818587	1.0120452			
1/31/2020	1/31/2020	1/31/2020	1/31/2020			
2/28/2020	4/29/2020	7/30/2020	10/30/2020			
29	90	182	274			

Term AMERIBOR+Credit from 1-day Returns						
1mo	3mo	6mo	9mo			
2.13521%	2.12869%	2.11375%	2.07935%			
1.00172	1.0053217	1.01068616	1.01582614			
1/31/2020	1/31/2020	1/31/2020	1/31/2020			
2/28/2020	4/29/2020	7/30/2020	10/30/2020			
29	90	182	274			

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