

**South Florida Bond Trader's Association
Conference:**

**Identifying MBS Risks and Actionable Opportunities
in 2022**

February 2-5, 2022

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Agency MBS Recap of 2021

- Fed MBS Purchases \$1.315 trillion
- US 10 year treasury yields increased by ~60 bps to 1.51%
 - High: ~ 1.74% (03/31/21) | Low: ~ 0.91% (01/04/21)
- Nominal 30 year MBS spreads narrowed by ~ 3 bps to +68 bps
 - FNMA 30 year Current Coupon yield vs 5/10 year treasury blended yield
 - High: ~ 86 bps (02/25/21) | Low: ~ 60 bps (04/30/21)
- FNMA 30 year LIBOR OAS tightened by ~32.4 bps to -3.6 bps
 - FNMA 30 year Current Coupon mortgage LIBOR OAS
 - High: +7.3 bps (02/25/21) | Low: -36.4 bps (01/04/21)
- FNMA 15 year LIBOR OAS tightened by 28.3 bps to -27.7 bps
 - FNMA 15 year Current Coupon mortgage LIBOR OAS
 - High: -3.2 bps (06/18/21) | Low: -56.2 bps (02/04/21)
- Interest rate (swaption) volatility increased 16.4 bps to 79.1 bps
 - USD swaption at the money normal volatility 3 month (OIS) 1M X 10Y
 - High: ~ 91 bps (11/26/21) | Low: 54.4 bps (01/26/21)

Agency MBS Market Macro Trends

- Deteriorating convexity in newly issued MBS pools
 - Increasing GSE conforming limits, thus increasing Average Loan Sizes (~\$346k)
 - Improving borrower FICO scores
 - Higher gross WACs relative to net WAC
 - Declining spread at origination (SATO)

Collateral Vintage Year	Current Coupon by Year	Balance	Wavg Credit Score	SATO	WAOLS	WAOLTV	WAC	WAC Dispersion (Gross WAC - Net WAC)	Max Loan Size
2015	3.5	\$ 211,730,759,516	749	-3	\$ 266,386	77	4.12	0.62	\$ 1,202,925
2016	3	\$ 234,029,419,714	760	-18	\$ 284,319	75	3.67	0.67	\$ 1,202,925
2017	3.5	\$ 174,245,853,217	755	-18	\$ 276,961	77	4.06	0.56	\$ 1,223,475
2018	4	\$ 190,603,776,108	749	-10	\$ 285,676	79	4.64	0.64	\$ 1,307,175
2019	3	\$ 306,009,415,153	758	-15	\$ 314,288	78	3.90	0.90	\$ 1,397,000
2020	2	\$ 702,933,972,082	766	-13	\$ 333,834	73	2.93	0.93	\$ 1,473,000
2021	2	\$ 1,055,536,492,458	761	-13	\$ 346,471	72	2.86	0.86	\$ 1,582,000

GSE (FNMA/FHLMC) Conforming Loan Limit History

Year	Single Family	% Chg (YoY)	Single Family (High Cost Area)	% Chg (YoY)
2022	\$647,200	18%	\$970,800	18%
2021	\$548,250	7%	\$822,375	7%
2020	\$510,400	5%	\$765,600	5%
2019	\$484,350	7%	\$726,525	7%
2018	\$453,100	7%	\$679,650	7%
2017	\$424,100	2%	\$636,150	2%
2016	\$417,000	0%	\$625,500	0%
2015	\$417,000	0%	\$625,500	0%
2014	\$417,000	0%	\$625,500	0%
2013	\$417,000	0%	\$625,500	0%
2012	\$417,000	0%	\$625,500	0%
2011	\$417,000	0%	\$625,500	0%
2010	\$417,000	0%	\$625,500	0%
2009	\$417,000	0%	\$625,500	0%
2008	\$417,000	0%	\$625,500	0%
2007	\$417,000	0%	\$625,500	0%
2006	\$417,000	16%	\$625,500	16%
2005	\$359,650	--	\$539,475	--

Identifying Bank and Non-Bank Servicing Behavior & Impact to MBS Securities

Non-Bank Servicers	Balance	3M CPR
Rocket (Quicken)	20,211,940,268	44.94
Freedom	10,399,792,540	38.91
Fremont	706,612,265	38.76
Pennymac	23,752,541,142	35.92
New Residential	22,856,382,141	34.81
Caliber	10,853,327,353	34.66
Lakeview	18,241,626,598	34.20
loanDepot	3,832,698,953	33.34

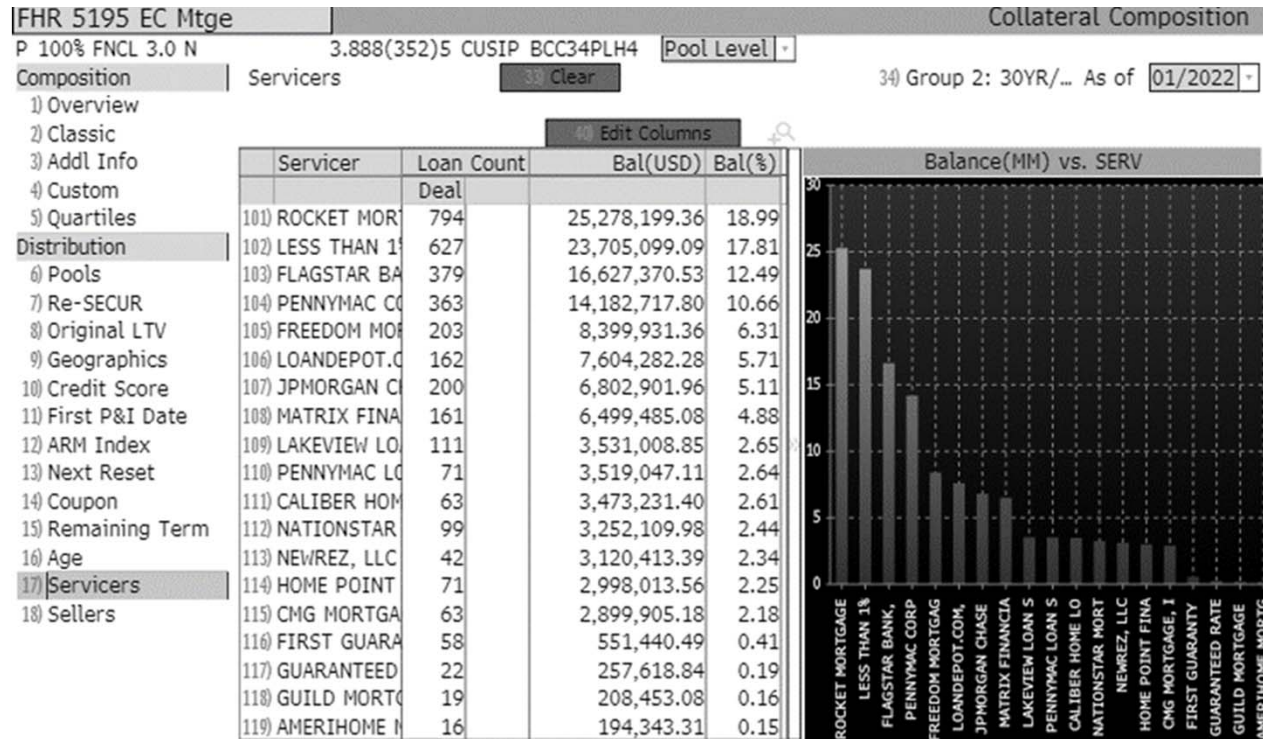
Bank Servicers	Balance	3M CPR
JPM Chase	33,007,363,761	30.69
Truist	15,610,103,366	30.54
Wells Fargo	69,717,443,038	30.34
US Bank	13,801,210,362	29.39
Huntington	2,522,294,656	27.95
PNC Bank	10,047,913,012	27.06
BMO Harris	195,161,073	19.81
M & T Bank	1,428,608,634	19.23

*Security: FNCL 3

*Data as of Dec-21 factor

Collateral Composition Detail: Servicer Data

{CLC <GO>}



Where are the opportunities in MBS in 2022?

- Lower payups vs TBA for collateral where better convexity (prepayment protection) attributes are available:
 - Lower current/maximum Loan Balance
 - Investor
 - Geography (e.g. NY, FL)
 - Re-Performing
 - HFA
- Focus on structure (CMOs) over specified pools.
- Lower coupon Agency CMOs which have reached maximum duration extension.
- In order to identify maximum extension risk, which in many cases will be greater than +300 bps scenarios, we can stress test Agency CMO structures at 6 CPR to represent the floor for prepayments.

FNR 20-95 KP Mtge										Actions		Export		Settings		Yield Table				
100% FNMJCK 1.5 N										2.547 (342)14		CUSIP 3136BDNK0		Pool Level		As of 01/2022				
1/2022	178P	5.1C	0.0B	Traits		PAC		Coupon		1.25% Maturity		1/25/51		CA	70% 2020		100%			
3Mo	263	7.0	0.1	12/30/2020		5,000,000		LTV/HLTV		65/57 Accrual		1/1-1/31		WA	11%					
6Mo	315	7.5	0.0	01/25/2022		4,680,496		MAXLS		1,125,000		Next Pay		2/25/22	NJ	8%				
12Mo	297	5.3	0.0	Factor		0.93609925		WACLS		629,601		Collar		171-261	VA	5%				
Life	294	4.9	--	# Loans		1,663														
										Price-to-Yield										
Settle		01/20/22		Base Case		+300bps		6 CPR Test		BAM 1YR PROJ		BAM 3YR PROJ		BAM LT PROJ		-300 MED				
Vary		0		114 PSA		78 PSA		6 CPR		5.5 CPR		6 CPR		7 CPR						
Price		94-24+		2.1697		2.0151		2.1298		2.0948		2.1298		2.1923						
Avg Life				6.26		7.58		6.56		6.84		6.56		6.11						
Mod Duration				5.68		6.84		5.93		6.18		5.93		5.53						
Prin Win				2/22-8/50		2/22-8/50		2/22-8/50		2/22-8/50		2/22-8/50		2/22-8/50						
I Spread				50		28		44		38		44		54						
Jan22	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	GOVT(I)	6M	1Y	2Y	3Y	5Y	7Y	10Y	30Y
178P	317	304	382	233	543	221	271	127	348	227	440	12:02	0.28	0.48	0.97	1.27	1.56	1.73	1.78	2.12
5.1C	8.4	7.5	8.7	4.8	10.1	3.7	4.0	1.6	3.7	2.0	2.9	Disc	30/360	5Y	98-17¼	7Y	97-22+			

Source: Bloomberg, FNMA, Freddie Mac

Discounted CMO Structures with Nearly Fully Extended Duration Relative Value Analysis

Discounted Agency CMO vs 15y Pool		
Security	FNR 20-95 KP	FN MA4535
Type	Deep Discount PAC CMO	15Y FNMA Pool
Coupon	1.25	1.5
Base Case A/L	6.26	5.55
+300 A/L	7.58	6.14
@6 CPR A/L	6.56	5.90
Yield (Base)	2.16	1.74
I Spread (Base)	+50 bps	+14 bps
I-Spread (6CPR)	+44 bps	+9 bps
BAM LOAS	+20 bps	-14 bps
\$ Price	94-24+	98-21+

Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

FHR 5195 EC: 1.5 Coupon x FNCL 3.0 N New Issue PAC CMO

Enter all values and hit <GO>

FHR 5195 EC Mtge										Actions		Export		Settings		Yield Table					
P 100% FNCL 3.0 N										3,888(352)5		CUSIP BCC34PLH4		Pool Level		As of 01/2022					
1/2022	1534P14.9C	0.0B	Traits		EXCH,AD,PAC	Coupon	1.5%	Maturity	--	CA	19%	2021	100%								
3Mo	1765	13.7	0.0	01/31/2022		105,112,000	LTV/HLTV	77/77	Accrual	1/1-1/31	TX	7%	2020	0%							
6Mo	--	--	--	01/31/2022		105,112,000	MAXLS	1,025,000	Next Pay	2/25/22	AZ	6%									
12Mo	--	--	--	Factor		1.0	WACLS	312,205	Collar	235-335	FL	5%									
Life	--	--	--	# Loans		3,524															
										Price-to-Yield											
Settle	01/31/22	0 MED		+300 MED		+200 MED		+100 MED		-100 MED		-200 MED		-300 MED							
Vary	0	209 PSA		107 PSA		114 PSA		142 PSA		421 PSA		731 PSA		851 PSA							
Price	97-31 ³ / ₈	2.0057		1.8497		1.8606		1.9042		2.0211		2.1988		2.2890							
Avg Life	4.07		6.02		5.82		5.16		3.95		2.91		2.56								
Mod Duration	3.84		5.58		5.41		4.82		3.72		2.77		2.45								
Prin Win	Date	2/22-12/30		2/22-1/35		2/22-8/34		2/22-4/33		2/22-11/32		2/22-3/41		2/22-3/38							
I Spread	57		21		24		33		60		93		112								
Jan22	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	GOVT(I)	6M	1Y	2Y	3Y	5Y	7Y	10Y	30Y	
1534P	--	--	--	--	--	--	--	--	--	--	--	14:59	0.35	0.55	1.00	1.29	1.56	1.71	1.76	2.07	
14.9C	--	--	--	--	--	--	--	--	--	--	--	Disc	30/360	3Y	99-17	5Y	98-17+				

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Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

SUM <go> (Tranche Summary) | 79% PAC's | 21% Supports | 245 PSA Pricing Speed | PAC Band 235-335 PSA

- Origination Year: 2021
- 18.99% Rocket Mortgage Serviced
- >75% Non-Bank Serviced
- Wtd. Orig Loan Size: \$362,000
- Gross WAC Dispersion: 88 bps

FHR 5195 EC Mtge								Deal Summary		
P 100% FNCL 3.0 N		3.888(352)5		CUSIP BCC34PLH4		Pool Level -		Group 2: 30YR/3.0/FNMA/G2		
Orig Amt	133,105,573	Orig Speed		245 PSA						
Priced	MIXED	1 mo Hist		1,533.82 PSA		01/01/2022				
Dated	01/01/2022	Default		209 PSA		B.Median		Orig 01/01/2022		
Settled	01/31/2022	PAC %		SUP/PAC %		SUP % Other %		WAC -- 3.8877		
First Pay	02/25/2022	Orig		79.0		21.0		WAM -- 29y 04m		
01/22 Amt	133,105,573	Curr		79.0		21.0		Age -- 00y 05m		
CF	Class	Tranche Description	Cpn	Orig Mtg	Curr(000)	Original(000)	Factor	OWAL	Curr Band	As Of
1)	Y E	AD, PAC	3.000	--	105,112	105,112	1.0000	--	235-335	01/22
2)	Y EA	EXCH, AD, PAC	1.000	--	105,112	105,112	1.0000	--	235-335	01/22
3)	Y EB	EXCH, AD, PAC	1.250	--	105,112	105,112	1.0000	--	235-335	01/22
4)	Y EC	EXCH, AD, PAC	1.500	--	105,112	105,112	1.0000	--	235-335	01/22
5)	Y ED	EXCH, AD, PAC	1.750	--	105,112	105,112	1.0000	--	235-335	01/22
6)	Y EG	EXCH, AD, PAC	2.000	--	105,112	105,112	1.0000	--	235-335	01/22
7)	Y EH	EXCH, AD, PAC	2.250	--	105,112	105,112	1.0000	--	235-335	01/22
8)	Y EI	EXCH, IO, NTL, PAC	3.000	--	70,075	70,075	1.0000	--	235-335	01/22
9)	Y EJ	EXCH, AD, PAC	2.500	--	105,112	105,112	1.0000	--	235-335	01/22
10)	Y EK	EXCH, AD, PAC	2.750	--	105,112	105,112	1.0000	--	235-335	01/22
11)	Y EZ	Z, AD, PAC	3.000	--	1	1	1.0000	--	212-335	01/22
12)	Y ZE	Z, SUP	3.000	--	27,993	27,993	1.0000	--	--	--

Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

FHR 5195 EC – New Issue PAC CMO

Underlying Collateral Cohort Prepayment History for FNCL 3 N (0-30 mo. seasoning)

FNCL 3 N Mtge		Export		Paydown Information													
100% FNCL 3.0 N		3.781(337)18 CUSIP		Pool Level -													
Summary	Paydown	Collateral	Performance														
Curr Collat (M)	318,347,462	Net Cpn	3.0000	WALA	18	Orig Bal	615,581,801,447										
Orig Collat (M)	615,581,801	WAC	3.7807	WAM	337	Remain Bal	318,347,462,375										
Pool Factor	0.517148918			# of Pools	18743												
		CPR					VPR					Buyout CPR					
Date	1M	3M	6M	12M	Life	1M	3M	6M	12M	Life	1M	3M	6M	12M	Life		
01/2022	25.49	28.73	31.11	35.93	10.48	24.87	28.29	30.71	35.53	6.38	0.80	0.56	0.48	0.40	0.00		
12/2021	28.86	32.02	32.66	37.87	10.37	28.49	31.70	32.31	37.49	6.25	0.51	0.43	0.43	0.38	0.00		
11/2021	32.33	34.17	33.24	39.01	10.24	32.05	33.87	32.92	38.63	6.08	0.39	0.41	0.39	0.38	0.00		
10/2021	35.10	34.06	34.40	40.10	10.07	34.85	33.76	34.08	39.71	5.87	0.38	0.41	0.40	0.39	0.00		
09/2021	35.34	33.70	37.37	40.59	9.87	35.03	33.38	37.06	40.18	5.64	0.46	0.43	0.39	0.40	0.00		
08/2021	31.78	32.53	39.41	40.67	9.66	31.51	32.24	39.13	40.25	5.40	0.38	0.38	0.36	0.42	0.00		
07/2021	33.96	34.83	41.33	40.68	9.49	33.65	34.54	41.08	40.28	5.19	0.45	0.39	0.33	0.41	0.00		
06/2021	31.82	40.86	43.21	40.22	9.29	31.61	40.62	42.95	39.84	4.96	0.30	0.35	0.34	0.38	0.00		
05/2021	38.53	45.59	44.58	39.53	9.11	38.25	45.38	44.30	39.17	4.74	0.42	0.33	0.37	0.36	0.00		
04/2021	50.66	47.18	45.41	38.41	8.86	50.49	47.02	45.12	38.08	4.45	0.32	0.27	0.39	0.33	0.00		
03/2021	46.91	45.46	43.67	35.73	8.47	46.76	45.26	43.35	35.42	4.01	0.26	0.33	0.42	0.31	0.00		
02/2021	43.76	43.55	41.92	32.82	8.11	43.63	43.28	41.55	32.53	3.60	0.22	0.40	0.49	0.29	0.00		
01/2021	45.69	43.58	40.04	29.87	7.79	45.40	43.25	39.66	29.59	3.23	0.51	0.51	0.49	0.28	0.00		
12/2020	41.10	41.81	37.09	26.58	7.44	40.80	41.47	36.76	26.34	2.84	0.48	0.51	0.42	0.24	0.00		
11/2020	43.87	40.26	34.05	23.67	7.14	43.55	39.87	33.75	23.47	2.49	0.54	0.58	0.36	0.20	0.00		
10/2020	40.43	36.30	30.54	20.45	6.79	40.11	35.97	30.31	20.29	2.10	0.52	0.47	0.28	0.16	0.00		
09/2020	36.24	32.01	26.71	17.43	6.49	35.80	31.76	26.53	17.32	1.74	0.67	0.33	0.21	0.12	0.00		

Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

Dynamic Prepayment Vector Analysis Identifies Potential Whipsaw Risk

Multiple Prepayment Vectors as shown below provides varying degrees of support tranche erosion or extinguishment.

- V1 #SHOCK1 CPR: 10:12S 6.
- V2 #SHOCK2 CPR: 20:12S 6.
- V3 #SHOCK3 CPR: 30:12S 6.
- V4 #SHOCK4 CPR: 40:12S 6.
- V5 #SHOCK5 CPR: 50:12S 6.

Ex. V3 = Initial Payment Sequence of 30CPR for 12mo followed by a terminal (Life) speed of 6 CPR.

Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

FHR 5195 EC: Dynamic Prepayment Vector Analysis

FHR 5195 EC Mtge										Actions		Export		Settings		Yield Table				
P 100% FNCL 3.0 N										3.888(352)5		CUSIP BCC34PLH4		Pool Level		As of 01/2022				
1/2022	1534P	14.9C	0.0B	Traits	EXCH,AD,PAC	Coupon	1.5%	Maturity	--	CA	19%	2021	100%							
3Mo	1765	13.7	0.0	01/31/2022	105,112,000	LTV/HLTV	77/77	Accrual	1/1-1/31	TX	7%	2020	0%							
6Mo	--	--	--	01/31/2022	105,112,000	MAXLS	1,025,000	Next Pay	2/25/22	AZ	6%									
12Mo	--	--	--	Factor	1.0	WACLS	312,205	Collar	235-335	FL	5%									
Life	--	--	--	# Loans	3,524															
										1) Price-to-Yield										
Settle	01/31/22			0 MED	+300 MED															
Vary	0			209 PSA	107 PSA															
Price	97-31 ³ / ₈			2.0054	1.8495															
Avg Life				4.07	6.02															
Mod Duration				3.84	5.58															
Prin Win				2/22-12/30	2/22-1/35															
I Spread				57	21															
Jan22	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	GOVT(I)	6M	1Y	2Y	3Y	5Y	7Y	10Y	30Y
1534P	--	--	--	--	--	--	--	--	--	--	--	13:29	0.35	0.55	1.00	1.29	1.56	1.71	1.76	2.07
14.9C	--	--	--	--	--	--	--	--	--	--	--	Disc	30/360	3Y	99-17	5Y	98-17+			

Source: Bloomberg

Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

Consequences of Whipsaw Risk on Total Return

- Assuming no WSR:
The market value volatility in a +300 bps scenario implies a 6.02 year Average Life and a -16.4% market value change.

- Assuming WSR takes place:
The Average Life may extend out to 8 or 9 years, implying a -24% to -27% market value change for a +300 bps scenario.

PG. 1 OF 16

FFIEC HIGH RISK SECURITY TEST

Ident BCC34PLH4 **FHR 5195 EC** 1.5% LEGAL MTY N/A CMO: EXCH, AD, PAC

collateral: 100% FNCL 3 N WAC:3.888 WAM:352 AGE:5 (1/22)

ASSUMPTIONS						Source (for your records)					
1/31/22											
Bid/Ask P: 97-31+ 97-31+ PRC						CUSTOM					
Prepay Base : 209 PSA						B. Median 209					
" 300BP : 851down 107up						D. TABLE 851 107					

detail? Interpolate NCUA?

Tsy BP Shift	Test#1				Tsy Sprd	Security		Test #2		Test #3	
	PSA	WAL	MAX WAL	Mty		Yield	Price	WAL	Change	Prc	Change
-300	851	2.56		2.56	183	0.000	103-23	-1.51	-6.0	5.9%	17%
-200	731	2.91		2.91	74	0.000	104-08	-1.16	-6.0	6.4%	17%
-100	421	3.95		3.95	57	0.989	101-27	-0.12	-6.0	4.0%	17%
0	209	4.07	10	4.07	57	2.006	97-31	n/a		0.0%	
+100	142	5.16		5.16	57	3.143	92-12	1.09	+4.0	-5.7%	17%
+200	114	5.82		5.82	57	4.195	86-21	1.76	+4.0	-11.5%	17%
+300	107	6.02		6.02	57	5.210	81-28	1.95	+4.0	-16.4%	17%

Scan? Preliminary cashflows based upon dealer representations. PROSPECTUS UNAVAILABLE.

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
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Identifying and Evaluating Whipsaw Risk in New Issue PAC CMO's

WSR - "Whipsaw Risk" Defined: Extending PAC CMO duration BEYOND +300bp scenario as elevated prepayments erode the support classes. Increases the probability of becoming a "broken PAC" CMO structure.

WSR is inherent in new issue PAC structures with support classes.

WSR is highest in an environment of high prepayments for an extended period (e.g. 12 months), followed by a dramatic slowdown in prepayments.

WSR is highest for deals with low support vs PAC percentages.

Narrowing PAC bands (eroding support tranches) increase WSR

Prepayments in excess of the new issue pricing PSA speed (shown on SUM page) accelerate PAC band erosion and thus WSR

Out of the Money collateral – No Refinancing Incentive generally prepay slower reflecting primarily housing turnover (sales) driven prepayments.

OTM collateral in new issue PACs' will have REDUCED WSR.

Example: if collateral coupon is FNCL 2.5 (3.25 GWAC) vs 30yr FRM rate at 3.50 WSR will be lower

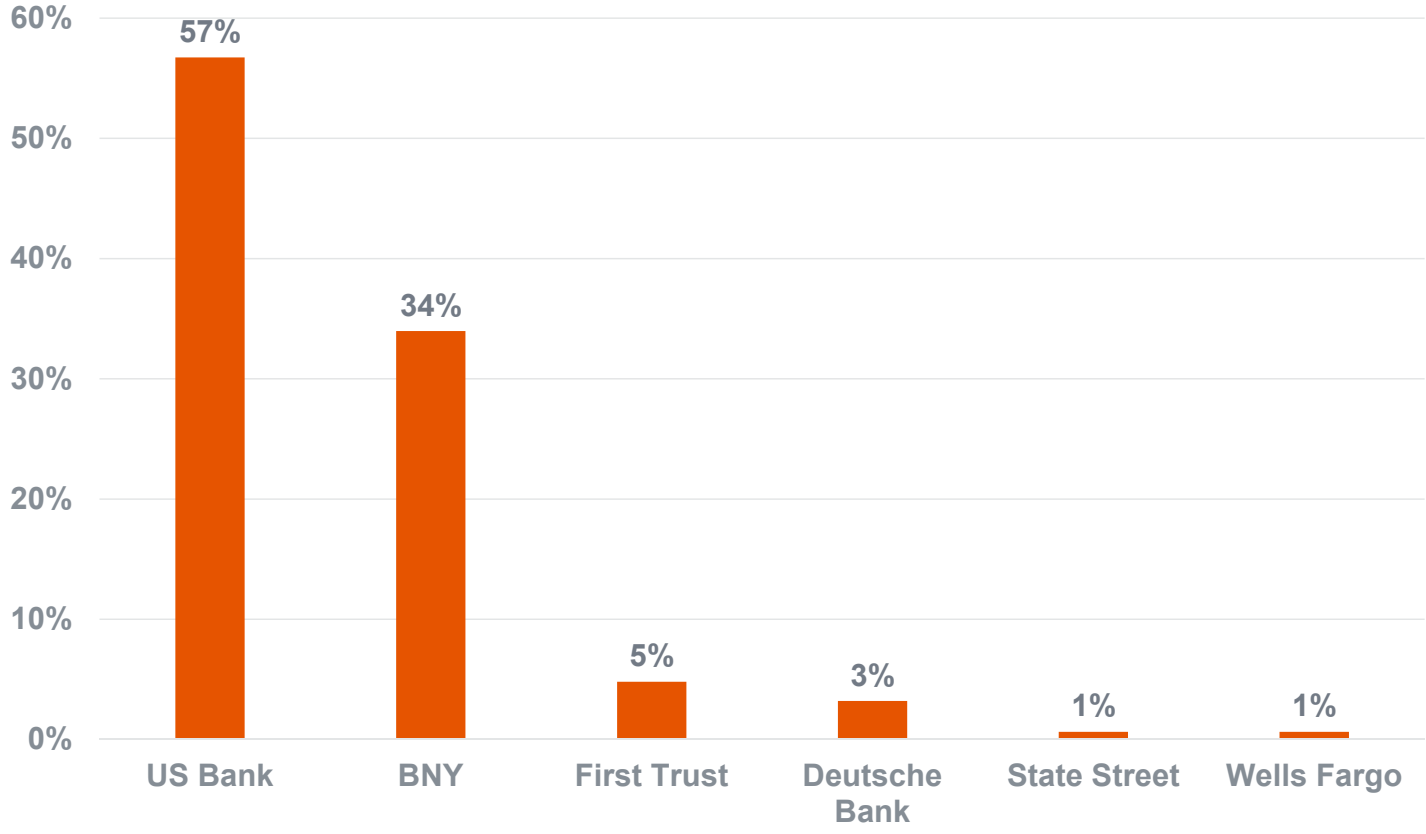
WSR is generally non-existent for the following CMO structures:

- Sequential
- VADM
- PT (Pass through) Structure
- "Broken PAC" (no support bonds remaining)
- Last Cashflow tranches

Investors need to consider WSR when evaluating risk adjusted returns in structured MBS products.

GNMA REMIC/CMO Early Redemption Analysis

GNR Trustee Call Trends 1994-2006: Data based on 312 total Deals called



Call Analysis: GNR 1994-2006 Deals

Deal Year	Gross WAC per Issue Year	# of Deals Issued	# of Deals Called	# of Deals Called by US Bank	# of Deals Called by BNY	# of Deals Called by DBT	# of Deals Called by SS	# of Deals Called by FTC	# of Deals Called by WFC
1994	8.08	7	7	0	4	2	0	1	0
1995	8.21	10	9	0	5	1	0	3	0
1996	7.71	26	24	16	1	0	0	7	0
1997	8.10	20	19	13	3	0	0	3	0
1998	7.13	26	25	24	0	0	0	1	0
1999	7.96	49	43	36	2	5	0	0	0
2000	8.39	38	36	29	5	2	0	0	0
2001	7.36	65	61	25	35	0	1	0	0
2002	6.97	94	67	29	37	0	1	0	0
2003	5.88	115	14	1	13	0	0	0	0
2004	5.29	109	3	2	1	0	0	0	0
2005	5.66	98	3	1	0	0	0	0	2
2006	6.19	69	1	1	0	0	0	0	0
Total		726	312	177	106	10	2	15	2

**Gross WAC methodology: Calculated by Weighted Average WAC weighted by Orig Balance of each deal at Issuance.*

Example of Called/Early Redemption GNR CMO in 9/2021

GNR 2003-15 PZ Mtge		Export		Paydown Information			
100% G2SF 5.5 S		6.261(122)224 CUSIP 38373Y5N0		Pool Level ▾			
Summary		Paydown		Collateral		Performance	
Tranche Z,SCH		Coupon 5.5		WALA 224		Issue 02/01/2003	
		WAC 6.2610		WAM 122		Maturity 02/20/2033	
		Orig Bal 8,500,000		Day Count 30/360		Pay Delay 19 days	
Date	Factor	Coupon	Principal	Interest	Balance	Cashflow	
Total			8,500,000	6,318,677		14,818,677	
1) 09/20/2021	0.000000000	5.50000	828,433.80	3,796.99	0.00	832,230.79	
2) 08/20/2021	0.097462800	5.50000	19,800.86	3,887.74	828,433.80	23,688.60	
3) 07/20/2021	0.099792313	5.50000	20,239.06	3,980.50	848,234.66	24,219.56	
4) 06/21/2021	0.102173379	5.50000	20,346.61	4,073.76	868,473.72	24,420.37	
5) 05/20/2021	0.104567098	5.50000	15,400.89	4,144.35	888,820.33	19,545.24	
6) 04/20/2021	0.106378967	5.50000	24,860.12	4,258.29	904,221.22	29,118.41	
7) 03/22/2021	0.109303687	5.50000	18,823.86	4,344.57	929,081.34	23,168.43	
8) 02/22/2021	0.111518259	5.50000	23,602.55	4,452.74	947,905.20	28,055.29	
9) 01/20/2021	0.114295029	5.50000	19,309.68	4,541.25	971,507.75	23,850.93	
10) 12/21/2020	0.116566756	5.50000	23,770.97	4,650.20	990,817.43	28,421.17	
11) 11/20/2020	0.119363341	5.50000	14,544.87	4,716.86	1,014,588.40	19,261.73	
12) 10/20/2020	0.121074502	5.50000	16,472.07	4,792.36	1,029,133.27	21,264.43	
13) 09/21/2020	0.123012393	5.50000	18,241.32	4,875.96	1,045,605.34	23,117.28	
14) 08/20/2020	0.125158431	5.50000	28,620.95	5,007.14	1,063,846.66	33,628.09	
15) 07/20/2020	0.128525601	5.50000	38,158.73	5,182.04	1,092,467.61	43,340.77	
16) 06/22/2020	0.133014864	5.50000	35,305.60	5,343.85	1,130,626.34	40,649.45	
17) 05/20/2020	0.137168464	5.50000	12,980.61	5,403.35	1,165,931.94	18,383.96	

- Call Price: 100-00
- Deal call factor: 0.010
- Gross WAC: 6.26%
- Trustee: US Bank

Calculating Deal Factor on GNR Securities Likely to be Called

DES <GO>, Click on Deal Summary Tab

GNR 2003-69 B Mtge		Send	Page 4/4 Security Description			
100% GNSF 7.0 S		7.500(105)243	CUSIP 38374BZK2	Pool Level	Buy	Sell
1 Bond Summary		2 Group Summary		3 Comments		4 Deal Summary
Classic		Speeds				
Description	1M CPR	1M PSA	Bonds	Bonds Bal(MM)	Group Bal(MM)	
All Collateral			R, RA		11.55	
1) Group 1: 30YR/7.0/GNMA/G1	14.14	235.73	B, FB, SB	9.85	9.85	
2) Group 2: 30YR/6.5/GNMA/G2	5.65	94.12	C, DA, DM, DT, DZ...	0.13	0.13	
3) Group 3: 30YR/7.5/GNMA/G3	5.75	95.84	D, FD, SD	0.13	0.13	
4) Group 4: 30YR/7.0/GNMA/G4	5.83	97.12	FG, G, SG	1.44	1.44	
Total Original Deal Balance: \$ 1,151,547,293				Total Remaining Deal Balance: \$ 11,550,000		

- Call factor: 0.01
- Deal factor: 0.01002 (11,550,000 / 1,151,547,293)
- Gross WAC: 7.50%
- Trustee: BNY
- What dollar price would the underlying collateral (GNSF 7) trade in the open market?

GNMA Call Risk Example: Deal: GNR 2003-69 SB | Tranche: IO, INV, NTL, PT

GNR 2003-69 SB Mtge		Export		Paydown Information			
100% GNSF	7.0 S	7.500	(105)243	CUSIP	38374BYY3	Pool Level ▾	
Group 1 Loans							
Summary	Paydown	Collateral	Performance				
Tranche	IO,INV,NTL,PT	Coupon	6.49371	WALA	243	Issue	08/16/2003
		WAC	7.5000	WAM	105	Maturity	08/16/2033
		Orig Bal	1,000,000,000	Day Count	30/360	Pay Delay	0 days
Date	Factor	Coupon	Principal	Interest	Balance	Cashflow	
Total			0	88,525,808		88,525,808	
02/16/2022		6.49371					
1) 01/18/2022	0.009847392	6.49250	0.00	54,336.80	9,847,391.95	54,336.80	
2) 12/16/2021	0.010042996	6.51087	0.00	55,348.07	10,042,996.49	55,348.07	
3) 11/16/2021	0.010201046	6.51412	0.00	56,242.21	10,201,046.07	56,242.21	
4) 10/18/2021	0.010360670	6.51537	0.00	57,314.96	10,360,670.21	57,314.96	
5) 09/16/2021	0.010556263	6.50450	0.00	58,295.52	10,556,262.70	58,295.52	
6) 08/16/2021	0.010754804	6.50887	0.00	59,297.77	10,754,804.22	59,297.77	
7) 07/16/2021	0.010932362	6.52537	0.00	60,307.76	10,932,361.54	60,307.76	
AGENCY	Desc IO, INV, NTL, ... 1st Settle			08/29/2003	Maturity	08/16/2033	7.500(105)243
Trade Numbers							
Original Face	USD	1,000,000,000.00		Jan'22 Coupon	6.49371%		
x Jan'22 Factor		0.0098473920		Payment Frequency	Monthly		
= Current Face	USD	9,847,391.95		Accrual Period	01/16/2022 - 02/15/2022		
Principal Value	USD	57,699.56		Next Payment Date	02/16/2022 (0day delay)		
+ Accrued (4days)	USD	7,105.12		Accrued Transparency	<input checked="" type="checkbox"/>		
= Total	USD	64,804.68					

Coupon Formula: $(-1 \times \text{US0001M}) + 660.0\text{BP}$. FLOOR:0.000%, CAP:6.600%

ICE/IDC Pricing: 0-18.75

Expansion of Trustees Calling Seasoned GNMA CMO REMICs

- Historically the primary trustee calling GNMA REMICs has been US Bank, but recently Bank of New York (BNY) has become the dominant trustee calling GNMA deals.
- As of December 2021, BNY called approximately 106 GNMA REMICs 2004 and later vintage.
- Majority of all GNMA REMICs called to date were 2004 and later vintage.
- Call analysis involves identification of:
 - The current deal factor
 - Deal vintage year
 - Deal gross WAC
 - Market Price of Tranche
 - Average life
- Re-REMIC call analysis requires the identification of the underlying REMIC tranches in the Re-REMIC deal
 - For example, a 2008 Re-REMIC may be backed by callable 2003 and earlier GNMA REMIC deals.
- IDC/ICE pricing generally DOES NOT reflect a bond that is imminently or currently callable.

LIBOR Transition to Alternative Benchmark: Impact on Securitized Products

Fixed Rate Securitized Asset Projected Spread Benchmark Transition

N Spread transitioning to P Spread or J Spread

- N Spread – The conventional yield spread to the swap curve
- P Spread – The conventional yield spread to the risk-free rate-based swap curve (e.g. SOFR), using nominal maturity points on the curve and a linear interpolation method between benchmarks.
- J Spread – The conventional spread yield spread to an interpolated point on the yield curve that matches the bonds WAL , given the prepay assumption and price

Securitized Asset Applications > 2 years A/L currently using N Curve	Potential Transition to :	Current:
<ul style="list-style-type: none"> • Agency CMBS <ul style="list-style-type: none"> – Freddie Mac ACMBS, – Fannie Mae ACMBS, – Ginnie Mae Project Loans 	P	N
<ul style="list-style-type: none"> • Non-Agency CMBS 	P or possibly J	N
<ul style="list-style-type: none"> • ABS (Asset-Backed Securities) 	P or possibly J	N

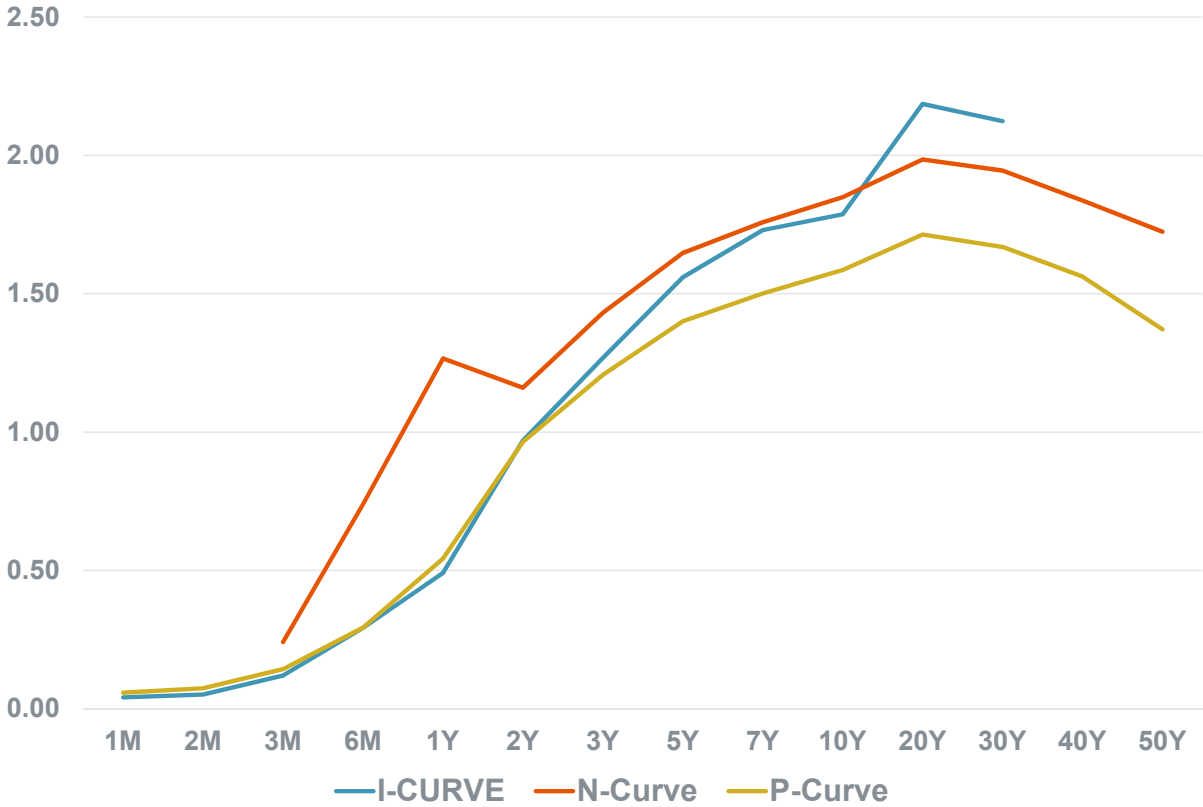
Fixed Rate Securitized Asset Projected Spread Benchmark Transition

E Spread transitioning to R Spread

- E Spread – The cash flow spread to the Eurodollar spot curve. The E Spread is calculated on a semi-annual 30/360 day count basis with pay dates adjusted to actual business days where applicable.
- R Spread – The cashflow spread to the risk-free rate-based spot curve, using a smooth forward/piecewise quadratic spot curve interpolation method, a zero/spot rate type, and an ACT/365 day count convention. The compound frequency is simple for the first year and semiannual afterwards.

Securitized Asset Applications < 2 years A/L currently using E Curve	Potential Transition to:	Current:
<ul style="list-style-type: none"> • Agency CMBS <ul style="list-style-type: none"> • Freddie Mac ACMBS, • Fannie Mae ACMBS, • Ginnie Mae Project Loans 	R	E
<ul style="list-style-type: none"> • Non-Agency CMBS 	R	E
<ul style="list-style-type: none"> • ABS (Asset-Backed Securities) 	R	E

Securitized Products Benchmark Curve Comparison



Source: Bloomberg

Converting Legacy LIBOR Floating Rate Securitized Assets to SOFR Alternative Benchmark

Official Spread Adjustments Between Alternative Reference Rates & US\$ LIBOR:

O/N - fixed at 0.00644%

3M - fixed at 0.26161%

1W - fixed at 0.03839%

6M - fixed at 0.42826%

1M - fixed at 0.11448%

1Y - fixed at 0.71513%

2M - fixed at 0.18456%

Permanently fixed as of 5th March 2021

Converting Legacy LIBOR Floating Rate Securitized Assets to SOFR Alternative Benchmark

Official Adjusted Reference Rates

Tenor	Calculation Date	Adjusted Reference Rate
O/N	1/25/2022	0.0500
1W	1/25/2022	0.0407
1M	1/24/2022	0.0497
2M	1/24/2022	0.0497
3M	1/25/2022	0.0496
6M	1/24/2022	0.0495
1Y	1/25/2022	0.0373

Example of Conversion of 1M US\$ LIBOR to 1M SOFR Fallback Rate

- **Stated Margin: 1mo US\$ LIBOR +45bp**

- **Conversion to SOFR:**

Reference Rate (0.0497) +
Spread Adjustment (0.1144) +

Adjusted 1M SOFR Fallback Rate (0.1641)

- **Adjusted Stated Margin:**

Adjusted 1M SOFR Fallback Rate (0.1641) +
45 bps

Adjusted Security Coupon after LIBOR to
SOFR Conversion = **0.61**

- **LIBOR Lifetime Cap: 6.5%**

- Though guidance has not been issued to date, we expect rate caps to likely be adjusted lower by the fallback spread (e.g. 11.44 bps)

FHR 4248 FL Mtge		Floating Rate Coupon Graph	
100% FGLMC 5.0 S	5.504(138)210	CUSIP	3137B4UR5
Factor	0.12872221000	CMO	Last Coupon 0.556%
			Maturity 05/15/2041
Coupon Graph	Forward Rates	Benchmark Fallback	

Fallback Defined	Yes
No Fallback Reason	--
ARRC Language	Yes Partial ARRC
Benchmark Ticker	SOFRRATE
Fallback Triggers	
Permanent Cessation	Alternate Benchmark
Permanent Cessation	Alternate Rate Methodology

See [IBOR <GO>](#) for more detailed information.

Note: IBOR is a premium function and requires a subscription to the Global IBOR Fallback Language offering. Please contact your Bloomberg representative for more details.

US0001M	0.10863
Projected Coupon Rate (%)	0.559

Coupon	1.0000 * US0001M + 0.450%
Cap	6.500% when Index = 6.050%
Floor	0.450% when Index = 0.000%

Source: Fed.gov, ARRC

Are Fixed Fallback Spread Adjustments Fully Reflective of Risk in Times of Market Distress?

TED Spread: 3M US\$ LIBOR Rate – 3M Treasury Bill Yield



Source: Bloomberg

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