

CRTx®

Credit Risk Transfer **R**eturn **T**racking Index

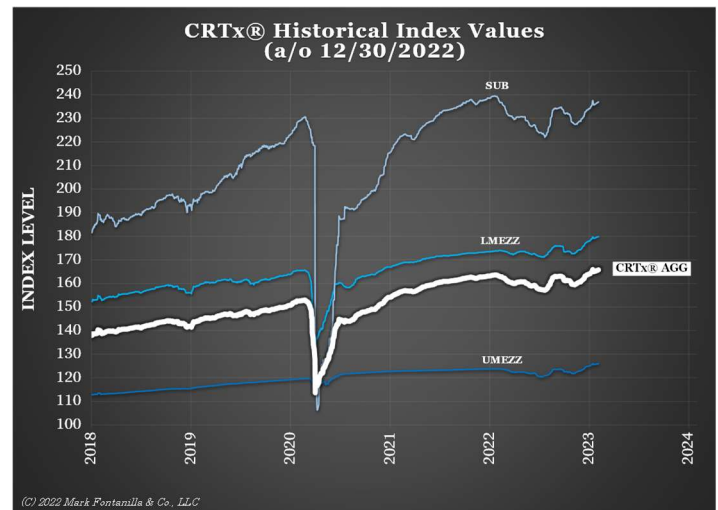
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The CRTx® (the Index) is a fixed income total return index that tracks the aggregate performance generated from a dynamic portfolio of Credit Risk Transfer (CRT) securities that have been issued into the private market by the Government Sponsored Enterprises (GSEs) Fannie Mae (FNMA) and Freddie Mac (FHLMC). Rebalanced monthly, the Index constituent makeup includes a significant and representative proportion of the benchmark GSE CRT securities in circulation at any point in time, spanning the different structural and rating variations within the GSE CRT issuance complex.

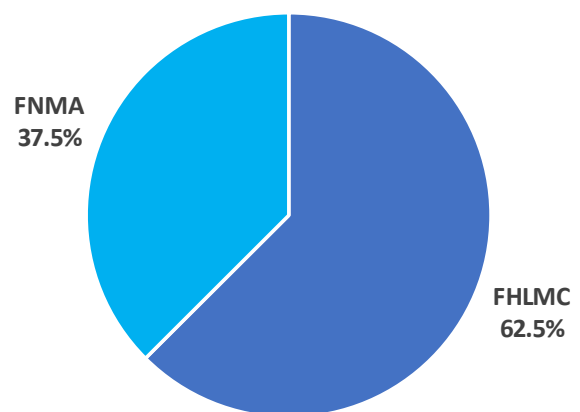
Key features:

The CRTx® provides market participants with a practical cash-based index option for performance benchmarking of GSE CRT investments. As of month-end December 2022:

- Index aggregate market value totaling nearly \$50 billion as of the 12/30/2022 rebalancing.
- The current basket includes 322 active constituent securities comprising the overall benchmark GSE CRT universe.
- Constituent securities span all prevailing primary-issued benchmark CRT tranche types/credit ratings that have been issued into the marketplace.
- The CRTx® is also further divided into several sub-indexes that are grouped according to capital structure position and security issuance vintage.
- In addition to the primary CRTx® Aggregate index and sub-indexes, the CRTx® index suite includes Constrained versions of the CRTx® Aggregate and 1st-level Sub-Indexes, which are regulated investment company (RIC)-accommodative through the use of issuer concentration limits.
- The Index is rebalanced monthly, while accounting for constituent market value changes daily, and bond payments are indexed the day of actual payment.



Sponsor % of CRTx® Mkt Val For 01/2023



CRTx® Factsheet

Inclusion/Exclusion Rules: Included

- FNMA Connecticut Avenue Securities™ (CAS)
- FHLMC Structured Agency Credit Risk (STACR®)
- All rated and unrated tranches, in original form
- All structural attachment points

Excluded

- CRT derivatives, or limited issuance vehicles
- Interest-Only/stripped down floater options
- Modifiable, combinable or other exchange variants
- Single seller, non-public, or special transactions
- Insurance or re-insurance deals

Index Suite:

CRTx® Aggregate – Includes all index-eligible securities.

CRTx® Upper Mezzanine – Includes mezzanine securities structured to receive the earliest principal payments, and have the highest credit enhancement, among each respective deal's offered securities.

CRTx® Lower Mezzanine – Includes mezzanine securities that are time/credit trunched between Upper Mezzanine classes and any Subordinate or first-loss classes among each respective deal's offered securities.

CRTx® Subordinate – Includes subordinate securities that are time/credit trunched after the mezzanine classes within each respective deal's offered securities. These are typically unrated and not considered debt for

Annual Vintages – The CRTx® first-level sub-indexes will each be additionally segmented by annual Issue Date vintages starting with 2013/2014 (together listed as "2014") forward.

Constrained Variations – Versions of the CRTx® Aggregate and 1st-level Sub-Indexes that incorporate US Internal Revenue asset diversification qualification requirements for regulated investment company (RIC) classification. Overall, Constrained index variations limit individual non-exempt issuer concentration to no more than 5% of the total Constrained index market value each month.

*** CRTx® Aggregate Index and Sub Index Constituency**

Aggregate	Upper Mezzanine	Lower Mezzanine	Subordinate	LLTV	HLTV
All Index-Eligible FNMA CAS shelf and FHLMC STACR shelf At-Issuance Classes	<u>FNMA CAS Shelf:</u> M1 Classes	<u>FNMA CAS Shelf:</u> M2 Classes	<u>FNMA CAS Shelf:</u> All B Classes	All Index-Eligible FNMA CAS shelf and FHLMC STACR shelf At-Issuance Classes from deals referencing Low Loan to Value (LLTV) loans	All Index-Eligible FNMA CAS shelf and FHLMC STACR shelf At-Issuance Classes from deals referencing High Loan to Value (HLTV) loans
	<u>FHLMC STACR Shelf:</u> M1 Classes (in M1/M2 structures) M1/M2 Classes (in M1/M2/M3 structures)	<u>FHLMC STACR Shelf:</u> M2 Classes (in M1/M2 structures) M3 Classes (in M1/M2/M3 structures)	<u>FHLMC STACR Shelf:</u> All B Classes		
	Vintage Sub Index constituency determined by deal/security closing year (except 2013/2014 which are grouped as "2014").				
RNI™ (Rolling New Issues) versions of the standard CRTx® Aggregate and Sub-Indexes have dynamic constituent baskets made up exclusively of the most recently issued securities within a "rolling" 12-month look-back window.					

Market Pricing Protocols: Calendar – The Index will follow the US bond market trading day and holiday schedule as publicly released by the Securities Industry and Financial Markets Associations (SIFMA).

Timing – Market prices will be taken on each market trading as of the end of the day

Sources – Market prices will be obtained from a well-established third-party pricing source (CRTx® security prices are powered by Refinitiv, an LSEG (London Stock Exchange Group) business).

Month-End Marking – For month end valuation, and subsequently for starting values in the the following month, market prices will be taken as of the last business day of the month.

Bid/Offer Price – The Index utilizes market bid-side prices.

Settlement – For Index calculations, cash settlement (T+0) is utilized in order to emulate practical entry or exit of investment into or out of the Index on any day. Since observed security market prices from a third-party source(s) will reflect the prevailing GSE CRT settlement date convention (T+3 prior to 9/5/2017, T+2 on 9/5/2017 and forward), each constituent's market price will be carry-adjusted for return calculations by discounting back from the prevailing settlement date to the day of valuation.

Rebalancing Protocols:

Frequency – The Index is rebalanced monthly, on the last business day of the month.

Security Eligibility Date - Security inclusion for rebalancing is determined as of the last business day of the month prior to each respective index calculation month.

Newly Issued Securities - Become eligible for Index inclusion consideration on their Issue Date (where coupon interest first begins accruing).

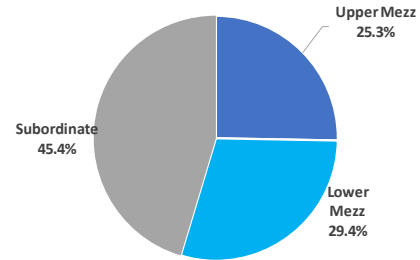
Principal and Coupon Payments - Security payments become part of the Index Value and return calculations during the month of payment, on the day actually paid. These bond payments do not get reinvested for the remainder of the month in which they are received, but effectively get reinvested in the Index for the following month, as part of the that next month's starting Index Value.

* See CRTx® Rules and Guidelines for specific methods, determinations, and calculations

CRTx® Index Performance and Constituency Metrics (as of December 2022 Month-End)

CRTx® Mkt Val Breakdown: 1/2023 Basket				
Deal Yr	Aggregate	UMEZZ	LMEZZ	SUB
All	100.0%	25.3%	29.4%	45.4%
2022	40.3%	21.6%	10.2%	8.6%
2021	22.6%	3.7%	7.8%	11.1%
2020	10.6%	0.0%	2.7%	7.9%
2019	6.3%	0.0%	0.5%	5.8%
2018	5.9%	0.0%	1.4%	4.5%
2017	5.8%	0.0%	1.4%	4.4%
2016	3.7%	0.0%	1.8%	1.9%
2015	2.2%	0.0%	1.0%	1.2%
<=2014	2.5%	0.0%	2.5%	0.0%

Sub Index % of CRTx® Mkt Val For 01/2023



CRTx® AGG									
MONTH END CLOSINGS			BEGINNING MONTH BASKET						
Calculation	Month	INDEX VALUE	Month to Date Total Return	# of Constituents	Beg Month UPB	Beg Month Total \$ Market Value	W Avg Adj	WTD Avg	
							Beg Month Security Mkt Value	Current Coupon	WTD Avg Cpn Margin
Feb-2020	152.31	-0.16%	232	50,375,851,983	53,580,028,930	106.36	5.20	354	
Mar-2020	113.64	-25.39%	240	52,372,791,379	55,277,944,042	105.55	5.11	348	
Apr-2020	123.83	8.97%	234	52,342,281,038	40,769,683,770	77.89	4.45	351	
May-2020	132.53	7.03%	229	50,951,320,646	42,820,320,693	84.04	4.03	355	
Jun-2020	144.50	9.04%	218	48,983,309,963	43,695,592,838	89.21	3.77	360	
Jul-2020	143.94	-0.39%	214	46,718,914,995	45,227,362,482	96.81	3.83	365	
Aug-2020	146.37	1.69%	217	46,681,772,649	44,843,108,762	96.06	3.87	370	
Sep-2020	147.99	1.11%	217	46,076,349,850	44,862,684,449	97.37	3.92	374	
Oct-2020	148.99	0.68%	220	45,735,370,315	44,865,412,741	98.10	3.90	375	
Nov-2020	151.26	1.52%	224	46,269,817,211	45,566,172,083	98.48	3.93	378	
Dec-2020	154.14	1.91%	228	46,924,624,650	46,772,793,230	99.68	3.93	378	
Jan-2021	155.99	1.20%	230	47,148,362,895	47,722,154,982	101.22	3.92	377	
Feb-2021	156.91	0.59%	232	47,277,423,099	48,281,726,799	102.12	3.90	377	
Mar-2021	156.58	-0.21%	235	47,729,907,668	48,857,887,219	102.36	3.87	376	
Apr-2021	158.53	1.25%	236	47,872,554,649	48,747,702,476	101.83	3.87	378	
May-2021	159.34	0.51%	238	47,615,037,767	48,936,401,435	102.78	3.89	380	
Jun-2021	160.42	0.68%	235	46,556,670,751	47,976,744,707	103.05	3.90	382	
Jul-2021	160.88	0.29%	239	46,213,562,998	47,807,083,563	103.45	3.91	383	
Aug-2021	161.28	0.25%	242	46,542,264,071	48,139,580,923	103.43	3.91	383	
Sep-2021	162.16	0.55%	240	45,645,024,894	47,210,049,253	103.43	3.93	385	
Oct-2021	162.45	0.18%	243	44,395,832,151	46,008,939,674	103.63	3.93	385	
Nov-2021	162.69	0.15%	250	46,136,808,535	47,705,750,833	103.40	3.92	384	
Dec-2021	163.17	0.30%	253	44,428,702,439	45,850,865,730	103.20	3.97	389	
Jan-2022	163.27	0.06%	264	46,303,372,955	47,721,518,712	103.06	3.92	383	
Feb-2022	161.64	-1.00%	272	48,187,246,457	49,476,212,584	102.68	3.86	378	
Mar-2022	159.97	-1.04%	280	48,758,202,585	49,320,610,808	101.15	3.93	380	
Apr-2022	160.67	0.44%	285	50,947,780,611	50,882,869,681	99.87	4.14	386	
May-2022	159.01	-1.03%	291	53,065,956,573	53,054,131,960	99.98	4.34	386	
Jun-2022	157.45	-0.98%	297	54,707,014,476	53,912,547,204	98.55	4.66	388	
Jul-2022	157.87	0.27%	305	54,305,816,176	52,723,290,518	97.09	5.21	399	
Aug-2022	162.94	3.21%	311	52,868,638,801	51,179,435,509	96.81	5.87	406	
Sep-2022	161.27	-1.03%	316	52,267,272,868	51,923,167,525	99.34	6.34	407	
Oct-2022	159.63	-1.01%	325	54,074,843,112	52,881,044,458	97.79	6.64	407	
Nov-2022	160.61	0.61%	325	53,282,606,013	51,262,793,323	96.21	7.30	410	
Dec-2022	163.97	2.09%	323	52,834,998,700	50,794,605,389	96.14	7.80	410	
Jan-2023			322	50,991,575,501	49,607,620,170	97.29	8.22	414	

CRTx® Monthly and Annual Total Returns (as of December 2022 Month-End)

CRTx® Aggregate													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2015	1.37%	2.79%	-0.13%	1.48%	-0.17%	-0.67%	-0.09%	-0.32%	-0.15%	0.77%	0.20%	-0.32%	4.81%
2016	-1.50%	-0.99%	3.37%	2.48%	0.59%	0.09%	2.30%	1.19%	1.16%	-0.38%	0.50%	1.39%	10.57%
2017	1.73%	0.44%	0.69%	1.80%	1.18%	1.08%	1.13%	-0.85%	-0.26%	0.93%	0.33%	1.96%	10.60%
2018	1.54%	-0.26%	-0.21%	0.85%	0.34%	0.10%	0.71%	0.67%	0.49%	-0.28%	-0.38%	-0.79%	2.79%
2019	1.82%	0.67%	0.02%	1.01%	-0.19%	0.27%	0.64%	-0.22%	0.65%	0.34%	0.48%	0.65%	6.30%
2020	1.21%	-0.16%	-25.39%	8.97%	7.03%	9.04%	-0.39%	1.69%	1.11%	0.68%	1.52%	1.91%	2.28%
2021	1.20%	0.59%	-0.21%	1.25%	0.51%	0.68%	0.29%	0.25%	0.55%	0.18%	0.14%	0.30%	5.87%
2022	0.06%	-1.00%	-1.04%	0.44%	-1.03%	-0.98%	0.27%	3.21%	-1.03%	-1.01%	0.61%	2.09%	0.48%

CRTx® Upper Mezzanine													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2015	0.47%	0.98%	0.33%	0.43%	-0.06%	-0.33%	0.49%	0.11%	-0.13%	0.57%	-0.17%	0.00%	2.72%
2016	-0.16%	0.14%	0.58%	0.62%	0.57%	0.22%	0.40%	0.46%	0.25%	-0.13%	0.11%	0.30%	3.41%
2017	0.33%	0.28%	0.30%	0.25%	0.30%	0.34%	0.36%	-0.06%	0.16%	0.21%	0.13%	0.28%	2.92%
2018	0.63%	-0.30%	0.15%	0.23%	0.29%	0.24%	0.23%	0.27%	0.29%	0.13%	0.07%	0.04%	2.29%
2019	0.53%	0.31%	0.28%	0.37%	0.22%	0.23%	0.29%	0.14%	0.19%	0.27%	0.19%	0.20%	3.27%
2020	0.24%	0.18%	-2.56%	1.50%	1.01%	1.39%	0.48%	0.14%	0.13%	0.21%	0.14%	0.17%	3.01%
2021	0.09%	0.07%	0.03%	0.06%	0.07%	0.07%	0.04%	0.11%	0.07%	0.08%	0.10%	0.03%	0.82%
2022	0.03%	-0.23%	-0.86%	-0.03%	-0.54%	-0.98%	0.36%	2.12%	-0.78%	-0.64%	0.98%	1.60%	0.98%

CRTx® Lower Mezzanine													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2015	2.23%	4.45%	-0.55%	2.44%	-0.60%	-1.13%	-0.80%	-0.73%	-0.14%	0.89%	0.58%	-0.47%	6.18%
2016	-2.61%	-1.72%	5.85%	3.76%	0.52%	-0.07%	3.64%	1.40%	1.38%	-0.75%	0.69%	1.91%	14.58%
2017	2.32%	0.09%	0.86%	2.48%	1.59%	0.71%	1.46%	-1.15%	-0.01%	1.00%	-0.07%	2.33%	12.17%
2018	1.45%	-0.29%	0.08%	0.86%	0.35%	-0.01%	0.77%	0.61%	0.50%	-0.40%	-0.52%	-0.99%	2.41%
2019	2.22%	0.63%	-0.12%	0.86%	-0.37%	-0.20%	0.39%	-0.53%	0.68%	0.42%	0.54%	0.42%	5.02%
2020	0.97%	-0.26%	-23.03%	12.76%	7.05%	4.46%	-1.21%	2.27%	0.78%	0.43%	1.01%	0.94%	1.91%
2021	0.68%	0.51%	0.08%	0.75%	0.34%	0.32%	0.10%	0.19%	0.35%	0.14%	0.19%	0.16%	3.87%
2022	0.16%	-0.15%	-0.52%	0.56%	-0.59%	-0.62%	0.49%	2.15%	-1.50%	-0.40%	0.93%	2.14%	2.61%

CRTx® Subordinate													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2015			0.97%	1.00%	9.91%	4.88%	3.27%	0.55%	-0.84%	1.56%	-1.54%	-1.82%	18.83%
2016	-0.75%	-3.66%	-0.61%	4.08%	1.72%	1.04%	1.47%	4.63%	5.26%	2.26%	0.98%	2.14%	19.82%
2017	2.91%	4.90%	0.87%	2.00%	1.04%	6.69%	1.11%	-0.97%	-3.30%	2.42%	3.60%	3.61%	27.45%
2018	4.18%	0.06%	-2.71%	1.99%	0.34%	0.49%	1.23%	1.72%	0.76%	-0.26%	-0.34%	-0.92%	6.57%
2019	1.48%	1.30%	0.40%	2.50%	0.18%	2.46%	2.13%	0.73%	0.93%	0.07%	0.45%	1.79%	15.37%
2020	2.54%	0.06%	-42.81%	-3.36%	10.22%	34.28%	2.38%	0.14%	2.30%	1.48%	3.18%	4.76%	-3.45%
2021	2.66%	0.86%	-0.88%	2.49%	0.89%	1.46%	0.67%	0.36%	0.93%	0.26%	0.09%	0.51%	10.74%
2022	-0.06%	-2.12%	-1.63%	0.46%	-1.67%	-1.34%	0.02%	4.61%	-0.82%	-1.68%	0.18%	2.35%	-1.89%

For information on CRTx® licensing requirements, data usage, and redistribution of the CRTx® suite of indexes, please contact:

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