

## Municipals Weekly

## Take advantage of the current environment

Industry Overview

## Key takeaways

- As the market awaits November Fed action, investors should pick and choose bonds in this higher rates and ratios environment.
- Relative to taxable munis, long tax-exempt munis remain attractive given the YTW ratio remains north of 80%.
- State & local govt tax collections totaled \$477bn (SA) in 2Q23, down 7.6% on a y/y basis.

## Market shows its poise waiting for November

August inflation and retail reports reconfirm a macro environment with a strong economy and slowly declining/sticky inflation. Very limited bearishness may persist while investors show poise waiting for November Fed action. Investors should slowly pick and choose bonds in the coming weeks amid a higher rates and somewhat higher ratios environment.

## Long exempts still attractive relative to taxables

Relative to taxable munis, long tax-exempt munis remain attractive given the YTW ratio is still north of 80%. That is despite the current ratio being towards the richer end of its last 12-month (L12M) range.

## Flow of Funds data shows households' holdings grow

The muni market stood at \$4.04tn as of 2Q23 per Flow of Funds data. While US banks' muni holdings fell 3.3% q/q in 2Q23, households & nonprofits' increased 0.7% to \$1.67tn. Mutual funds' holdings fell 0.3% q/q while money market funds' grew 5.8%.

## State and local tax collections fall in 2Q23 y/y

State and local government tax collections totaled \$477bn on a seasonally adjusted basis in 2Q23, down 7.6% on a y/y basis per Census Bureau data, weighed down by individual and corporate tax collections. State collections were down a larger 14.2%.

## Key figures: issuance, returns, spreads &amp; fund flows

**Supply:** MTD issuance through 13 September totals \$13.3bn, up 17% y/y; YTD issuance of \$259.9bn is down 13% y/y. YTD issuance is 87% tax-exempt and 10% taxable; 77% is new money and 23% is refundings. **Returns:** The Muni Master index (UOAO) returned -0.25% for the week ending 13 September, underperforming govies, corporates and taxable munis. The Muni High Yield index (UOHY) returned -0.31%. UOHY is still outperforming UOAO for the YTD (2.45% vs 1.44%). By rating, BBBs' returns were strongest at -0.17%; by sector, Pollution Control's 0.01% is strongest. Taxables' return for the week was 0.41%. **Spreads:** For the week ending 13 September, IG spreads tightened 1bp to 22bp while HY spreads widened 6bp to 189bp. **Flows:** For the week ending 13 September, all municipal bond fund outflows were \$0.2bn; IG outflows were \$0.23bn, while HY inflows were \$0.03bn. Money market fund outflows were \$0.92bn for the week.

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. Refer to important disclosures on page 23 to 24.

12602833

Timestamp: 15 September 2023 07:30AM EDT

15 September 2023

Municipals  
United States

## Table of Contents

Market views & strategies	2
Performance	5
Curve	7
Supply & demand	8
Relative value	11
Trade activity	12
Credit corner	13
Defaults, distress & HY	19
Cross currency equivalent yields	21
Acronyms	21
Research Analysts	25

**Yingchen Li**  
Municipal Research Strategist  
BofAS  
yingchen.li@bofa.com

**Ian Rogow**  
Municipal Research Strategist  
BofAS  
ian.rogow@bofa.com

**John Lombardi**  
Municipal Research Strategist  
BofAS  
jlombardi3@bofa.com

**Sophie Yan**  
Municipal Research Strategist  
BofAS  
sophie.yan@bofa.com

**John Reilly**  
Municipal Research Strategist  
BofAS  
john.reilly2@bofa.com

See Team Page for List of Analysts

## Recent Municipals Research

[Municipals Educational Series: Primer on taxable bonds 07 September 2023](#)

[Municipals Weekly: Ratios at fair value 01 September 2023](#)

[Municipals Weekly: Munis follow Treasuries' lead 25 August 2023](#)

[Monthly Municipal ESG Monitor: July 2023 23 August 2023](#)

[Municipals Weekly: Strong economy a risk to muni yields 18 August 2023](#)

**Exhibit 1: Strategic and tactical views & key forecasts**

Buy long duration high grade bonds, especially 4% coupons

**Strategic views**

- Overweight: (1) 15-30yr part of the curve, particularly 4% coupon bonds; (2) AMT bonds\*
- Neutral: BBBs and high yield
- Underweight: (1) the territories; (2) small private colleges; (3) rural, single-facility hospitals

**Tactical views**

- Position for 10s30s curve flattening and narrower credit spreads in 2H23
- 4% coupon bracket to benefit more in a rally
- Swap long-end muni taxables for long-end tax-exempts

**Key forecasts**

- 2023 issuance to total \$400bn; \$320bn of new money and \$80bn of refundings
- 2023 principal redemptions to total \$402bn and coupon payments \$161bn. Cumulative fund inflows of \$40-\$60bn
- 1/30 slope to fall to 65bp, driven by 10s30s AAA flattening, with slope falling to 50bp range
- 10yr AAA rates to reach 1.65% area; 30yr to 2.20%. 10yr muni/Tsy ratio range of 70%-90% and 30yr 85%-100%
- Muni Master index to return 11.5% in 2023; taxable muni index 12.5%

**Note:** \*If the holder is certain they are not subject to the AMT under current tax law.

**Source:** BofA Global Research

BofA GLOBAL RESEARCH

## Market views & strategies

### Market shows its poise waiting for November

The August CPI report showed no surprise, though PPI was somewhat higher than expected. These, coupled with another strong retail sales report, reconfirm a “strong economy and slowly declining but sticky inflation” macro environment. The Fed is widely expected to hold rates unchanged at the FOMC meeting next week, though August data will likely keep the November rate hike expectation alive; the meeting statement will be telling. Currently, BofA’s economists expect the Fed to hike in November for the last time this cycle. Market pricing of the November rate hike changed little in the past few weeks, continuing to hover slightly below the 50% probability area. Yield curves across fixed income markets are elevated. This fact, together with the macro backdrop and Fed posture, suggests that any rise in yields in the coming weeks will be quite limited. Given this environment, investors are showing relative poise waiting for November.

For munis, any additional yield rise from here would be even smaller. Elevated muni rates and muni/Treasury ratios make tax-exempt munis more attractive. Both institutional and retail investors have been active in the market in the high rates environment. Muni rates moved very little over the past two weeks, though credit spreads continue to narrow. High issuance volume in August was absorbed well without any difficulty.

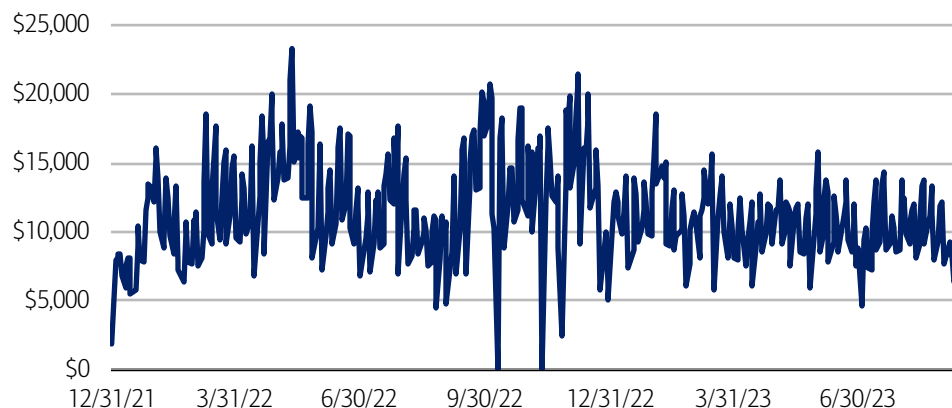
Additionally, the decline of secondary market trading volume in September shows the market is quite poised, despite elevated market yields. Historically – and during this tightening cycle – high secondary market trading volumes correlate well with investors’ stress and thus more selling activity. Exhibit 2 shows that peak secondary volumes in May 2022 occurred when the Fed indicated its first 75bp rate hike to come, which was a surprise to the market. The subsequent decline in volume coincided with a strong summer rally. Rapidly rising volumes in September 2022 coincided with an increasingly hawkish Fed that executed an extra 75bp rate hike.

During 2023, the muni market generally showed little stress except at the beginning of February when the Fed suddenly raised the prospect of a surprisingly longer tightening cycle period, which was contrary to the prior market speculation of a March hike-and-done scenario. Only the regional bank problems in March/April have kept the Fed in an on-and-off mode. The Muni market generally has taken well with this new Fed approach, which is evident in the secondary trading volume after February.

We believe investors should take advantage of the current high rates environment: investors should pick and choose bonds selectively in the coming weeks in anticipation of this tightening cycle’s end after November.

**Exhibit 2: Muni secondary market trading volume since the end of 2021 (\$mn)**

High volume typically correlates with market stress and investors' selling



Source: MSRB, Bloomberg

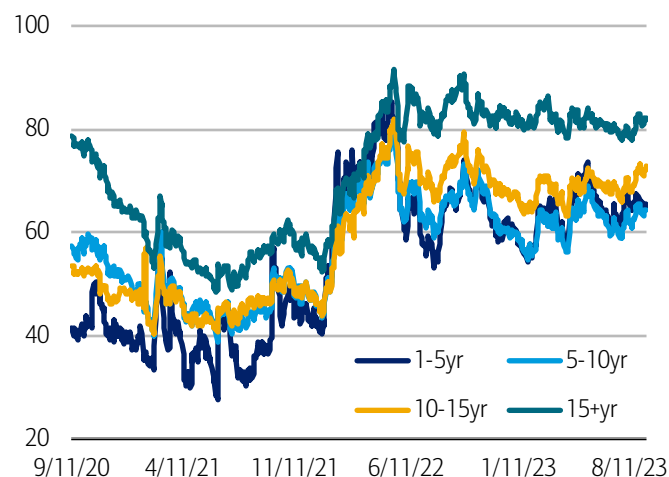
BofA GLOBAL RESEARCH

**Long exempts still attractive relative to long taxables**

Relative to taxable munis, long tax-exempt munis remain attractive given the YTW ratio is still north of 80%; see Exhibit 3, which shows the YTW ratios for the 1-5yr, 5-10yr, 10-15yr and 15+yr maturity buckets. That is despite the current ratio being towards the richer end of its last 12-month (L12M) range. See Exhibit 4. Ratios inside 10yrs, while cheaper than they have been since the end of June, remain relatively rich in the mid-60% range, though are well within neutral levels of their last 12-month range.

**Exhibit 3: Exempt/taxable YTW ratio, by maturity bucket (%)**

Long exempts' ratio is still above 80%

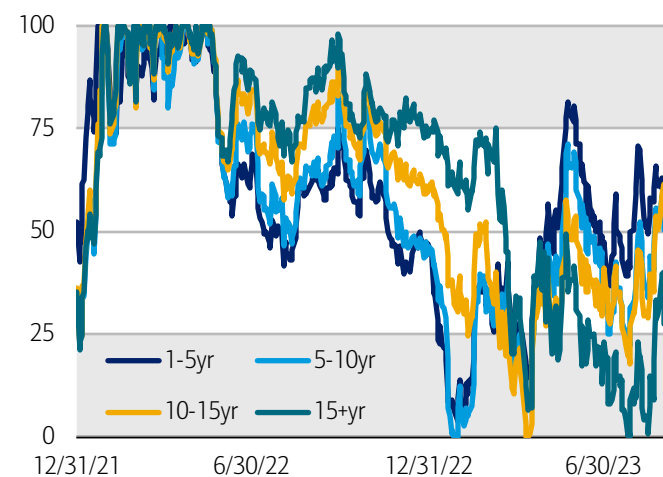


Source: BofA Global Research, ICE Data Indices, LLC

BofA GLOBAL RESEARCH

**Exhibit 4: Daily exempt/taxable YTW ratio as % of its L12M range**

While ratios are neutral, longest maturities' richer than shorter maturities'



Source: BofA Global Research, ICE Data Indices, LLC

BofA GLOBAL RESEARCH

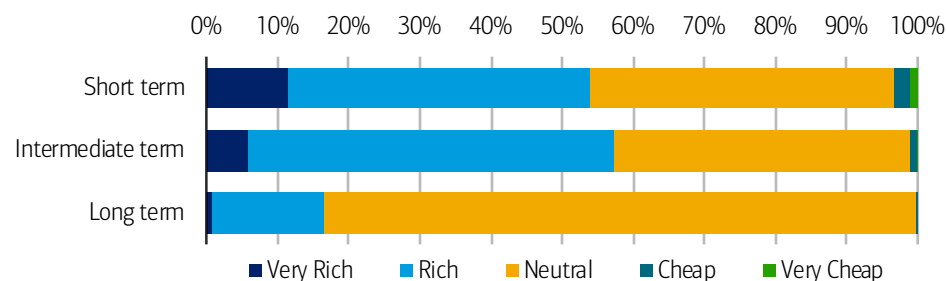
**A focus on large taxable CUSIPs with cheap OAS**

568 of the 4,714 bonds included in the ICE BofA Broad Taxable Municipal Securities Index (TXMB) as of 12 September have been included in the index for the last 3 years with face values of \$100mn or more, for a total face value of \$178.4bn, of which 99.9% remains outstanding. We reviewed these large CUSIPs to identify which have cheap or rich OAS using z-scores. As usual, we consider a z-score to be rich or cheap based on the following: if z-score is >2, then we consider it "very cheap"; if the score is >1 but <2, then we consider it "cheap"; if it falls between -1 and 1, then we consider it "neutral"; if the z-score is <-1 but >-2, then we consider it "rich"; and lastly, if it is <-2, then we consider it "very rich". Our benchmark for short-term (ST) z-scores is the 3-month average; for intermediate (IT) z-scores it is the 1-year average; and for long-term (LT) z-scores, it is the 3-year average.



**Exhibit 5: % of amount outstanding we identified with Rich/Cheap OAS on a ST, IT and LT basis**

Large CUSIPs' OAS spreads skew rich/very rich on ST and IT basis, but neutral on LT basis



Source: BofA Global Research, ICE Data Indices, LLC

BofA GLOBAL RESEARCH

As Exhibit 5 shows, these bonds' OAS is largely neutral on a long-term basis, but skews much more rich on a short and intermediate basis. Still, there are bonds with cheap OAS, at least on a short term basis. In Exhibit 6 below, we show the 30 CUSIPs with both the cheapest and richest spreads based on our short term z-score analysis.

**Exhibit 6: Large TXMB CUSIPs we identified with the cheapest and richest OAS z-scores on short term basis**

Just \$5.7bn of taxable CUSIPs we consider cheap or very cheap on a short-term basis

30 cheapest CUSIPs						30 richest CUSIPs					
CUSIP	OAS	3 mo min	3 mo avg	3 mo max	Rich/cheap	CUSIP	OAS	3 mo min	3 mo avg	3 mo max	Rich/cheap
68608DCF	63	37	45	63	Very cheap	677632G9	89	89	127	132	Very rich
249174MQ	95	56	62	95	Very cheap	677632G8	55	55	96	100	Very rich
072024NT	123	62	84	124	Very cheap	57421CAW	120	120	150	155	Very rich
92817SXW	77	66	70	77	Very cheap	167486C9	45	45	69	74	Very rich
645913BC	49	2	20	59	Very cheap	75913TGJ	121	121	140	147	Very rich
89602NUN	129	110	116	129	Very cheap	786091AG	52	52	66	75	Very rich
207758KM	79	61	68	80	Very cheap	59334DLS	54	52	96	104	Very rich
235308UL	-54	-201	-153	-52	Very cheap	677632PA	127	127	144	150	Very rich
362848RA	122	103	110	125	Very cheap	576000XQ	84	84	96	102	Very rich
207758KH	71	54	62	73	Very cheap	914639KY	65	64	75	79	Very rich
71781LAP	104	83	93	105	Very cheap	02765UDN	114	113	128	132	Very rich
8371477D	106	91	98	107	Cheap	2350364V	90	88	114	122	Very rich
89602RFM	113	98	107	113	Cheap	20772GF4	72	72	91	100	Very rich
73358WTZ	55	-63	9	56	Cheap	02765UEQ	121	121	135	142	Very rich
864784BK	92	81	86	95	Cheap	73474TAT	92	92	100	105	Very rich
167486VV	237	222	231	237	Cheap	02765UDV	115	114	129	135	Very rich
167486HL	231	217	226	234	Cheap	114894ZW	63	62	102	143	Very rich
373384NZ	46	38	43	47	Cheap	914437US	81	80	101	111	Very rich
167486MK	244	226	237	245	Cheap	49126KLM	139	138	165	170	Very rich
672319CF	57	40	51	58	Cheap	594712UF	-10	-12	46	79	Very rich
231266ML	35	6	25	42	Cheap	594712PP	-1	-3	32	50	Very rich
6499022E	111	71	98	118	Cheap	650009S5	91	91	108	116	Very rich
709221TG	111	99	106	115	Cheap	717883LV	117	116	127	133	Very rich
13063DGD	38	15	29	45	Cheap	914440LJ	99	98	116	126	Very rich
91412GU9	25	-1	15	41	Cheap	02765UCY	122	122	136	149	Very rich
167486MM	255	240	250	256	Cheap	02765UCR	120	119	136	146	Very rich
91412HGF	40	14	30	58	Cheap	917567FQ	83	81	92	98	Very rich
167486PG	245	229	240	246	Cheap	455168GH	107	107	116	120	Very rich
13063BN8	-38	-202	-86	-26	Cheap	915217XA	126	126	136	140	Very rich
20772GG2	50	27	40	57	Cheap	92778LBL	120	119	127	130	Very rich

Note: The cheapest CUSIP by z-score of OAS over last 3 months is 68608DCF, followed by 249174MQ; conversely, the richest is 677632G9 and 677632G8.

Source: BofA Global Research, ICE Data Indices, LLC

BofA GLOBAL RESEARCH

**Muni market stands at \$4.04tn as of 2Q23**

The Fed released updated flow of funds data for 2Q23 on 8 September. The muni market stood at \$4.04tn as of 2Q23, up just \$15.5bn q/q. As Exhibit 7 shows, Brokers & dealers' municipal securities holdings grew the most on a q/q basis in 2Q23, increasing by 41.7% to \$15.5bn. Conversely, Property & casualty insurers' muni holdings fell the most q/q in 2Q23, declining by 3.8% to \$233.7bn. Versus the fourth quarter of 2017 – the last quarter pre-Tax Cuts and Jobs Act – ETFs' holdings have grown the most while

Brokers & dealers' contracted the most; since then, US banks' holdings are down 4.2% to \$548.3bn.

#### Exhibit 7: Change in muni holdings by investor group

2Q23's holdings versus 4Q17's (when TCJA enacted), 1Q20 (start of COVID) and on a y/y & q/q basis

	2Q23 holdings (\$bn)	vs 4Q17	vs 1Q20	vs 2Q22	vs 1Q23
Households & nonprofits	1695.1	-12.4%	-10.7%	5.2%	0.7%
US banks	548.3	-4.2%	3.0%	-8.6%	-3.3%
P&C insurers	233.7	-31.0%	-16.9%	-10.4%	-3.8%
Life insurers	191.1	-3.4%	-11.0%	-6.4%	-2.1%
Money market funds	121.1	-12.4%	-10.7%	3.2%	5.8%
Mutual funds	762.9	10.9%	-3.0%	-7.3%	-0.3%
Closed-end funds	82.2	-8.6%	-8.0%	-4.2%	-1.6%
ETFs	107.2	256.7%	121.6%	19.2%	1.4%
Brokers & dealers	15.5	-41.8%	13.5%	53.1%	41.7%
Rest of the world	108.4	2.5%	0.5%	-0.1%	-2.0%

Source: BofA Global Research, Fed Flow of Funds

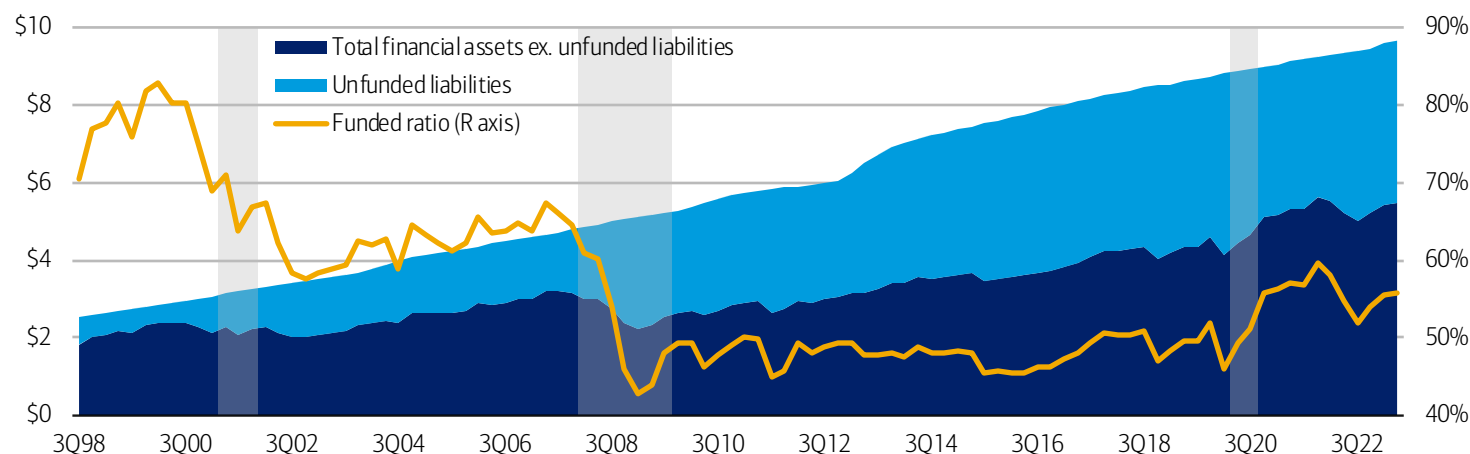
BofA GLOBAL RESEARCH

#### Pension funded ratios increase in 2Q23

Unfunded defined benefit public pension liabilities stood at roughly \$4.2tn in 2Q23, which is a \$11.5bn or 0.3% increase q/q according to Fed Flow data. On a y/y basis, 2Q23's unfunded amounts are \$75.3bn, or 1.8% larger. Funded ratios increased 0.3ppt q/q and 1.1ppt y/y to 55.9% on a projected benefit obligation (PBO) basis – well off the post-financial crisis highs reached in 4Q21 of 59.8%.

#### Exhibit 8: State & local govt defined benefit retirement plans financial assets, unfunded liabilities & funded ratio (3Q98–2Q23) (\$tn)

Funded ratio based on Fed data climbed to 0.3ppt q/q and 1.1ppt y/y to 55.9%



Source: BofA Global Research, Fed Flow of Funds

BofA GLOBAL RESEARCH

As a reminder, the Fed revised its reporting to a PBO basis from an accumulated benefit obligation (ABO) basis in 2Q18; a PBO basis represents the actuarial present value of vested and non-vested benefits and includes assumptions on future employee pay increases while an ABO basis does not take into account future salary increases. Note how the funded ratios derived from the Fed's data compare to 2Q23's 75.8% funded ratio of the Milliman Public Pension Funding Index and Wilshire's 78.2% funded ratio estimate for state pension systems. The difference between the Fed figures and Milliman's and Wilshire's likely has to do with the accounting method and discount rates being employed. Nevertheless, we note that the funded ratio derived from Fed data and from Milliman are directionally consistent.

## Performance

### Exempts underperform this week, but not MTD

Exempt IG underperformed this week, with its -25bp of returns vs govies' 34bp, corporates' 39bp and taxable munis' 41bp. Still, for the MTD, exempt IG's -40bp of

returns is outperforming taxable sectors' returns by 30bp or more. Among the exempt IG rating indexes, BBB performed best this week, with -17bp of total returns; that was roughly 14bp better than AAAs, stretching YTD outperformance to 277bp. Note that over the last 25 weeks, BBBs had the strongest performance in 16. As Exhibit 9 also shows, GOs and revenue bonds performed largely in line this week. Yet, AAA GOs underperformed their revenue bond counterpart by 13bp this week, while AA through BBB GOs outperformed similarly rated revenue bonds by between 3bp to 21bp this week. The Pollution Control sector had the strongest week, and in fact was the only sector with positive returns this week, even if less than 1bp. Still, for the MTD and YTD, the Tobacco sector's returns are strongest.

#### Exhibit 9: Municipal total returns (%) monitor, as of September 2023

While exempt IG underperformed this week, it is outperforming taxable sectors MTD

Index	Ticker	1d	1wk	MTD	1mo	3mo	YTD	1yr
Govt Master	GOA0	0.093	0.338	-0.714	-0.111	-1.489	-0.053	-1.462
Corporate Master	COA0	0.061	0.394	-0.799	0.043	-0.193	2.148	1.839
<b>IG munis</b>	<b>UOA0</b>	<b>0.048</b>	<b>-0.246</b>	<b>-0.399</b>	<b>-0.957</b>	<b>-0.963</b>	<b>1.440</b>	<b>2.609</b>
AAA	UOA1	0.035	-0.306	-0.453	-1.011	-1.297	0.568	1.863
AA	UOA2	0.056	-0.257	-0.411	-0.966	-1.029	1.066	2.424
A	UOA3	0.031	-0.210	-0.361	-0.866	-0.715	2.173	3.209
BBB	UOA4	0.067	-0.170	-0.354	-1.153	-0.715	3.342	3.456
1-3yr	U1A0	0.014	0.037	0.057	0.140	0.430	1.219	1.644
3-7yr	U2A0	0.021	-0.048	-0.125	-0.357	-0.234	0.726	1.354
7-12yr	U3A0	0.037	-0.228	-0.445	-1.001	-0.936	0.721	2.426
12-22yr	U4A0	0.052	-0.332	-0.492	-1.207	-1.219	1.826	3.372
22+yr	U5A0	0.085	-0.453	-0.706	-1.657	-1.951	2.098	3.327
<b>HY munis</b>	<b>UOHY</b>	<b>-0.114</b>	<b>-0.307</b>	<b>-0.338</b>	<b>-0.696</b>	<b>0.223</b>	<b>2.452</b>	<b>2.083</b>
Non-rated	UONR	0.009	-0.160	-0.283	-0.684	0.241	4.002	3.837
<b>General Obligation</b>	<b>UOAG</b>	<b>0.049</b>	<b>-0.249</b>	<b>-0.389</b>	<b>-0.897</b>	<b>-0.960</b>	<b>0.961</b>	<b>2.194</b>
AAA	UGA1	0.026	-0.382	-0.515	-0.969	-1.277	0.199	1.471
AA	UGA2	0.066	-0.238	-0.388	-0.915	-0.944	0.859	2.226
A	UGA3	-0.018	-0.018	-0.097	-0.644	-0.481	1.238	2.483
BBB	UGA4	0.012	-0.108	-0.239	-0.553	0.003	5.692	5.312
State	UOAA	0.035	-0.199	-0.313	-0.731	-0.644	1.180	2.197
Local	UOAB	0.065	-0.307	-0.477	-1.090	-1.324	0.713	2.212
<b>Revenue</b>	<b>UOAR</b>	<b>0.047</b>	<b>-0.245</b>	<b>-0.404</b>	<b>-0.978</b>	<b>-0.964</b>	<b>1.601</b>	<b>2.750</b>
AAA	URA1	0.042	-0.251	-0.409	-1.041	-1.312	0.837	2.150
AA	URA2	0.051	-0.265	-0.422	-0.989	-1.068	1.158	2.513
A	URA3	0.036	-0.227	-0.386	-0.887	-0.736	2.230	3.257
BBB	URA4	0.071	-0.175	-0.363	-1.202	-0.774	2.852	3.150
Airport	UOAV	0.056	-0.241	-0.364	-0.928	-0.619	2.709	3.488
Education	UOAE	0.035	-0.267	-0.444	-1.072	-1.271	1.122	2.501
Health	UOHL	0.141	-0.107	-0.221	-0.757	0.237	0.930	0.531
Hospital	UOAH	0.053	-0.295	-0.496	-1.230	-1.228	1.279	3.004
Industrial Development Rev	UOID	0.055	-0.245	-0.431	-1.037	-0.472	3.467	3.585
Leases, COPs & Appropriations	UOAL	0.052	-0.169	-0.304	-0.785	-0.847	1.066	2.348
Miscellaneous	UOAM	0.033	-0.238	-0.354	-0.883	-1.007	0.823	2.256
Multi-family Housing	UOAU	0.043	-0.299	-0.468	-1.128	-0.995	1.236	1.887
Pollution Control	UOAQ	0.029	0.006	-0.219	-0.634	-0.471	1.152	2.352
Power	UOAP	0.034	-0.151	-0.282	-0.849	-0.835	1.133	2.036
Single-family Housing	UOAS	0.029	-0.165	-0.274	-0.651	-0.638	0.322	1.086
Tax Revenue	UOTX	0.058	-0.293	-0.467	-1.139	-1.211	1.347	2.803
Tobacco	UOTB	0.034	-0.078	-0.161	-0.581	0.174	3.537	3.975
Toll & Turnpike	UOTL	0.031	-0.242	-0.365	-0.951	-0.979	1.857	3.201
Transportation - other	UOAT	0.036	-0.295	-0.496	-0.899	-0.813	2.679	3.289
Utilities - other	UOUT	0.036	-0.131	-0.284	-0.542	-0.328	1.957	2.369
Water & Sewer	UOAW	0.061	-0.257	-0.404	-0.964	-1.187	1.058	2.233
<b>Taxable</b>	<b>TXMB</b>	<b>0.089</b>	<b>0.406</b>	<b>-0.972</b>	<b>0.445</b>	<b>-0.991</b>	<b>2.804</b>	<b>0.340</b>
Build America Bonds	BABS	0.111	0.381	-1.052	0.371	-1.194	2.260	0.075
<b>VRDOs</b>	<b>VRDO</b>	<b>0.007</b>	<b>0.054</b>	<b>0.114</b>	<b>0.312</b>	<b>0.632</b>	<b>1.526</b>	<b>2.107</b>
Daily reset	VRDD	0.005	0.041	0.094	0.298	0.601	1.382	1.883
Weekly reset	VRDW	0.008	0.062	0.126	0.321	0.650	1.605	2.228

Source: ICE Data Indices, LLC

BofA GLOBAL RESEARCH



## IG spreads 1bp tighter w/w; HY spreads 6bp wider

Muni IG spreads tightened 1bp w/w to 22bp and are sitting at the tight of their 52-week range, while muni HY spreads widened 6bp to 189bp and sit at the 48<sup>th</sup> percentile. Non-rated spreads narrowed 2bp to 196bp. GO spreads were flat overall w/w, with A spreads tightening 6bp. Revenue bond spreads were flat w/w overall. Among muni IG revenue bond sectors, Health narrowed 3bp while the Transportation - other sector widened 1bp.

### Exhibit 10: Muni YTW spread monitor as of 13 September 2023

Muni IG spreads tightened 1bp w/w overall while HY spreads widened 6bp

	52wk		T-1wk	T-1d	Current 9/13/23	Change from				Current as % of 52wk range	Price	Yield
	Tights	Wides				Tights	Wides	T-1wk	T-1d			
<b>Investment Grade</b>	<b>22</b>	<b>39</b>	<b>23</b>	<b>22</b>	<b>22</b>	<b>0</b>	<b>-17</b>	<b>-1</b>	<b>0</b>	<b>0</b>	<b>99</b>	<b>3.98</b>
AA	3	17	4	4	4	1	-13	0	0	7	100	3.80
A	52	79	54	52	53	1	-26	-1	1	4	97	4.29
BBB	103	142	107	104	105	2	-37	-2	1	5	91	4.81
<b>High Yield</b>	<b>158</b>	<b>222</b>	<b>183</b>	<b>182</b>	<b>189</b>	<b>31</b>	<b>-33</b>	<b>6</b>	<b>7</b>	<b>48</b>	<b>92</b>	<b>5.65</b>
Non-rated	194	298	198	194	196	2	-102	-2	2	2	63	5.72
<b>General Obligation</b>	<b>-12</b>	<b>1</b>	<b>-10</b>	<b>-11</b>	<b>-10</b>	<b>2</b>	<b>-11</b>	<b>0</b>	<b>1</b>	<b>15</b>	<b>100</b>	<b>3.66</b>
AA	-19	-5	-16	-16	-15	4	-10	1	1	29	99	3.61
A	-15	29	9	1	3	18	-26	-6	2	41	103	3.79
BBB	50	122	66	63	64	14	-58	-2	1	19	95	4.40
State	-30	-12	-28	-29	-28	2	-16	0	1	11	104	3.48
Local	8	19	12	10	11	3	-8	-1	1	27	95	3.87
<b>Revenue</b>	<b>32</b>	<b>51</b>	<b>33</b>	<b>32</b>	<b>33</b>	<b>1</b>	<b>-18</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>98</b>	<b>4.09</b>
AA	12	27	13	12	13	1	-14	0	1	7	100	3.89
A	57	83	58	57	58	1	-25	0	1	4	96	4.34
BBB	108	147	110	108	108	0	-39	-2	0	0	91	4.84
Airport	58	96	59	59	59	1	-37	0	0	3	101	4.35
Education	14	36	15	14	15	1	-21	0	1	5	101	3.91
Health	110	174	153	150	150	40	-24	-3	0	63	90	5.26
Hospital	66	90	67	66	67	1	-23	0	1	4	96	4.43
Industrial Development Rev	78	130	79	78	78	0	-52	-1	0	0	96	4.54
Leases, COPs & Appropriations	-1	18	1	-1	-1	0	-19	-2	0	0	101	3.75
Miscellaneous	1	13	5	3	4	3	-9	-1	1	25	98	3.80
Multi-family Housing	65	90	77	75	76	11	-14	-1	1	44	91	4.52
Pollution Control	30	58	57	53	54	24	-4	-3	1	86	96	4.30
Power	23	39	24	23	23	0	-16	-1	0	0	102	3.99
Single-family Housing	67	89	79	76	77	10	-12	-2	1	45	94	4.53
Tax Revenue	5	25	6	6	6	1	-19	0	0	5	98	3.82
Tobacco	-7	67	-1	-4	-3	4	-70	-2	1	5	100	3.73
Toll & Turnpike	31	50	34	33	34	3	-16	0	1	16	96	4.10
Transportation - other	30	62	31	30	32	2	-30	1	2	6	97	4.08
Utilities - other	60	105	76	74	74	14	-31	-2	0	31	100	4.50
Water & Sewer	3	21	10	10	10	7	-11	0	0	39	101	3.86

**Note:** YTW spread to the ICE BofA AAA US Municipal Securities Index (UOA1).

**Source:** BofA Global Research, ICE Data Indices, LLC

BoFA GLOBAL RESEARCH

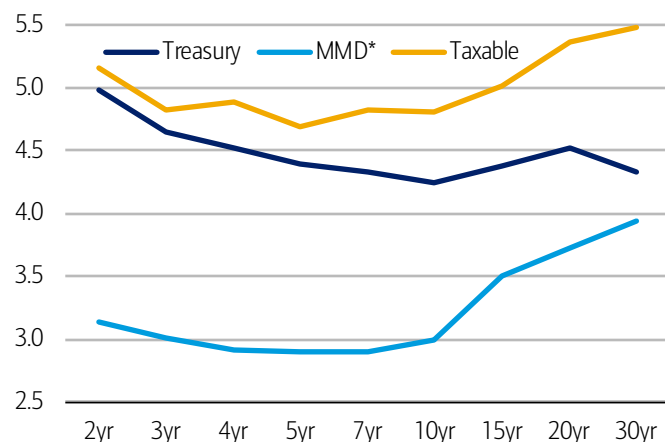
## Curve

### Curve shifts up 2bp w/w on avg and up 19bp m/m

The AAA MMD curve was up 2bp w/w on average, and has cheapened by 19bp m/m. For the week, the 1s5s slope undid some inversion by 2bp w/w to -35bp and is 49bp flatter than it was one year ago; the 5s10s also steepened by 2bp w/w to 10bp and is 24bp flatter than it was one year ago; the 10s20s slope was flat w/w at 73bp and is 14bp steeper than one year ago, while the 20s30s flattened 2bp w/w to 21bp and is 4bp steeper than it was one year ago. Investors should continue to position for a flattener led by the back end.

**Exhibit 11: AAA GO muni, Treasury and taxable yield curves (%)**

On average Tsy and Taxable richened while MMD cheapened w/w



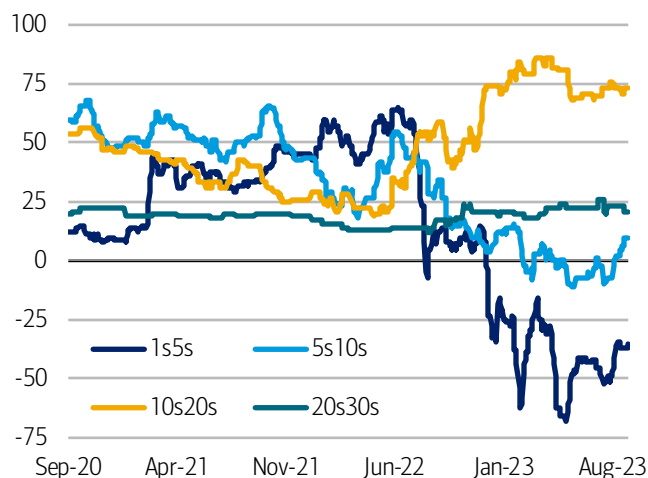
Note: \*MMD AAA GO yield curve. As of 13 September 2023.

Source: BofA Global Research, Refinitiv, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 12: Curve slope (bp)**

The 10s20s was flat w/w; while 20s30s flattened slightly

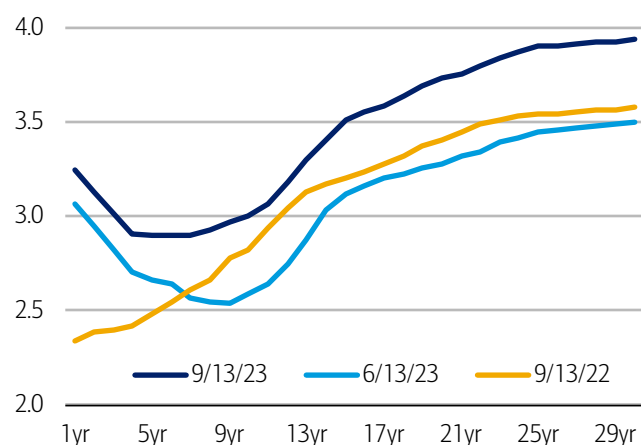


Source: Refinitiv

BofA GLOBAL RESEARCH

**Exhibit 13: AAA GO municipal curve movement (%)**

AAA is cheaper than three months ago across the curve



Source: Refinitiv

BofA GLOBAL RESEARCH

## Supply & demand

**YTD issuance totals \$260bn, down 13% y/y**

MTD issuance as of 13 September 2023 totaled \$13.3bn, up 17% y/y. YTD issuance of \$259.9bn is down 13% y/y. 77% of YTD issuance is new money and 23% is refundings. New money volumes are down 15% y/y while refunding volumes are down 5%.

**Exhibit 14: Issuance summary (\$mn)**

YTD issuance of \$259.9bn is down 13% y/y; new money down 15% y/y and refundings down 6%

	Month-to-date			Year-to-date		
	9/13/23	9/13/22	y/y % Δ	9/13/23	9/13/22	y/y % Δ
<b>Total</b>	<b>13,262.6</b>	<b>11,379.3</b>	<b>17%</b>	<b>259,881.4</b>	<b>299,592.9</b>	<b>-13%</b>
New Money	8,622.5	6,635.0	30%	198,896.7	234,542.2	-15%
Total Refunding	4,640.1	4,744.2	-2%	60,984.8	65,050.7	-6%
Advanced refunding	0.0	0.0	-	1,380.9	2,155.7	-36%
Unknown refunding	4,640.1	3,995.6	16%	56,353.9	57,115.4	-1%
Current & Forward refunding	0.0	748.7	-	3,250.0	5,779.6	-44%
Insured	572.6	377.1	52%	20,686.0	22,083.5	-6%
Fixed Rate	11,491.1	10,199.9	13%	231,626.4	276,430.2	-16%



**Exhibit 14: Issuance summary (\$mn)**

YTD issuance of \$259.9bn is down 13% y/y; new money down 15% y/y and refundings down 6%

	Month-to-date			Year-to-date		
	9/13/23	9/13/22	y/y % Δ	9/13/23	9/13/22	y/y % Δ
Variable Rate Long	1,521.5	639.6	138%	18,627.9	12,094.7	54%
Variable Rate Short	250.0	519.6	-52%	8,616.5	7,968.4	8%
Zero Coupon	0.0	20.2	-100%	352.6	830.1	-58%
Linked Rate	0.0	0.0	-	598.4	1,662.3	-64%
Convertible	0.0	0.0	-	53.7	607.2	-91%
Variable rate no put	-	-	-	-	-	-
Tax Exempt	12,168.5	10,556.2	15%	224,950.7	237,961.3	-5%
Alternate Minimum Tax	615.1	239.6	157%	8,239.2	16,110.7	-49%
Taxable	479.0	583.5	-18%	26,691.5	45,520.8	-41%
General Purpose	4,415.5	5,375.9	-18%	65,444.8	80,101.0	-18%
Utilities	2,987.3	950.7	214%	31,988.9	35,936.4	-11%
Education	1,805.6	1,354.9	33%	73,227.7	72,923.5	0%
Transportation	1,710.3	1,205.8	42%	28,268.7	43,123.7	-34%
Housing	1,502.4	468.9	220%	24,725.7	21,941.3	13%
Healthcare	681.6	590.7	15%	10,011.9	22,811.1	-56%
Public Facilities	130.7	66.8	96%	4,881.3	4,715.2	4%
Development	29.0	258.3	-89%	6,551.1	6,707.5	-2%
Electric Power	0.0	655.6	-100%	12,255.0	9,299.0	32%
Environmental Facilities	0.0	451.7	-	2,526.3	2,034.2	24%
Muni-backed corporates	0.0	0.0	-	3,813.7	11,707.6	-67%

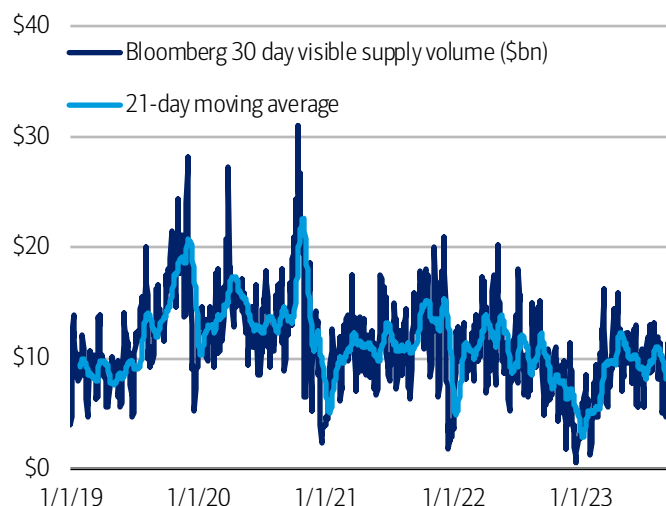
**Note:** Long-term bonds only. Reflects any data revisions by Refinitiv or Bloomberg.

**Source:** BofA Global Research, Refinitiv, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 15: Bloomberg 30-day visible supply (\$bn)**

30-day visible supply was \$7.9bn as of 13 September 2023



**Note:** Data as of 13 September 2023.

**Source:** Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 16: 2023 gross issuance, redemption forecasts vs actuals (\$bn)**

Gross issuance forecast of \$400bn vs \$564bn of prin. & cpn. redemptions

Month	Issuance		Prin. & cpn redemptions	
	Forecast	Actual	Forecast	Actual
January	\$23	\$23	\$42	\$39
February	20	20	45	42
March	32	32	39	36
April <sup>1</sup>	29	33	32	29
May	33	27	45	45
June	43	38	65	64
July	31	27	59	59
August	36	38	62	65
September	34	13*	37	
October	45		40	
November	34		41	
December	39		56	

**Note:** Totals may not add up due to rounding. Data as of 13 September 2023. January-March data are actuals. <sup>1</sup>Monthly issuance forecasts revised from April onward.

**Source:** BofA Global Research, Refinitiv, Bloomberg

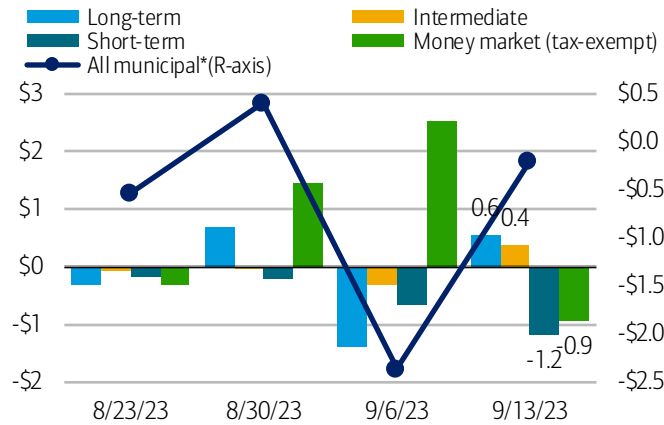
BofA GLOBAL RESEARCH

**Mutual fund outflows total \$0.2bn; ETF inflows \$1.01bn**

Mutual fund flows were negative this week, with outflows totaling \$0.2bn, coming mostly from short-term funds. There were \$0.23bn of outflows from investment grade funds and \$0.03bn of inflows into high yield funds. YTD, investment grade outflows total \$10.6bn versus \$0.4bn of inflows into high yield. ETF fund flows were positive for the week, totaling almost \$1.01bn. Overall, our flow strength indicator measured by the 2-year trailing z-score suggests this week's flow strength was normal.

**Exhibit 17: Flows by maturity brackets (\$bn)**

Muni outflows of \$0.2bn, money market outflows of \$0.92bn



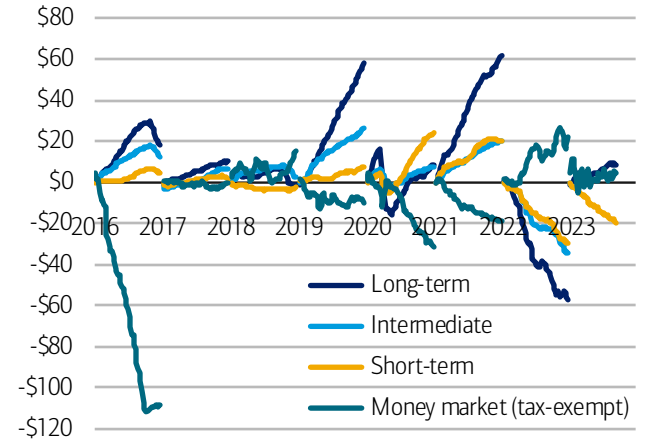
**Note:** ETFs included. All Municipal = LT+INT+ST. Data includes both weekly and monthly reporting funds as of 13 September 2023.

**Source:** Refinitiv Lipper

BofA GLOBAL RESEARCH

**Exhibit 18: YTD cumulative flows (\$bn)**

2023 flow: LT: \$8.7bn, INT: \$1.2bn, ST: -\$20.1bn, MM: \$4.8bn



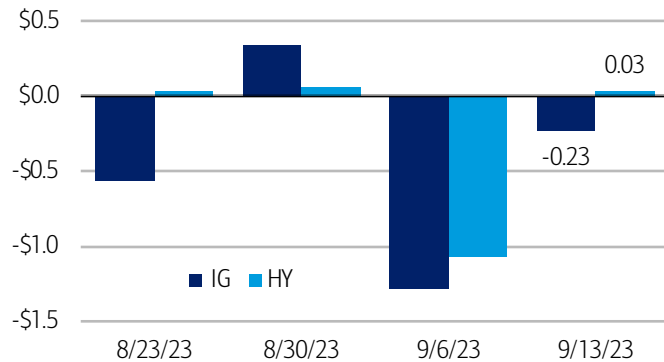
**Note:** ETFs included. Data includes both weekly and monthly reporting funds as of 13 Sept 2023.

**Source:** Refinitiv Lipper

BofA GLOBAL RESEARCH

**Exhibit 19: IG vs HY muni fund flows (\$bn)**

IG outflows of \$0.23bn vs \$0.03bn of HY inflows for the wk of 13 Sept



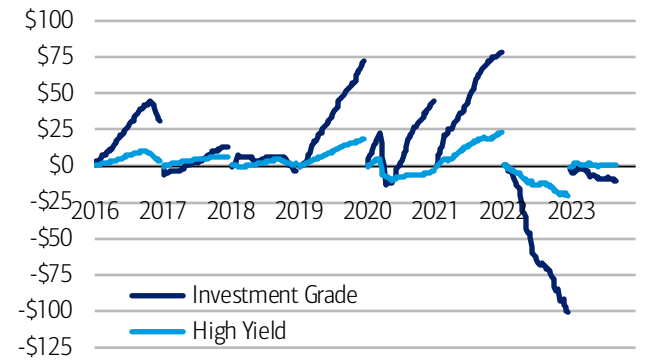
**Note:** ETFs included. Data includes both weekly and monthly reporting funds as of 13 Sept 2023.

**Source:** Refinitiv Lipper

BofA GLOBAL RESEARCH

**Exhibit 20: Year-to-date cumulative flows (\$bn)**

2023 flow: IG: -\$10.6bn, HY: \$0.4bn



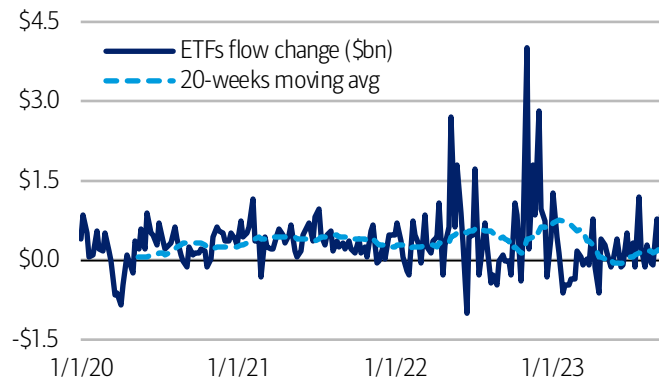
**Note:** ETFs included. Data includes both weekly and monthly reporting funds as of 13 Sept 2023.

**Source:** Refinitiv Lipper

BofA GLOBAL RESEARCH

**Exhibit 21: Municipal ETF fund flows (\$bn)**

ETF inflows were \$1.01bn for the week of 13 Sept 2023



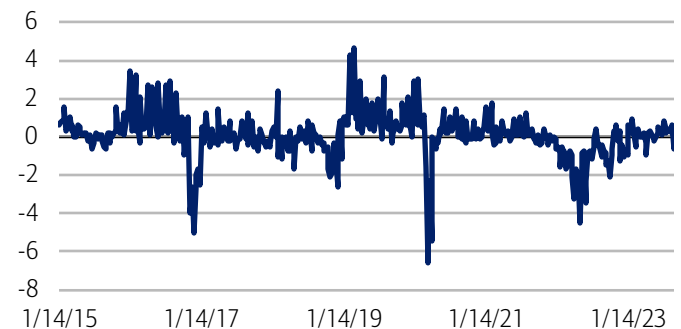
**Note:** ETFs included. Data includes both weekly and monthly reporting funds as of 13 Sept 2023.

**Source:** Refinitiv Lipper

BofA GLOBAL RESEARCH

**Exhibit 22: Flow strength indicator**

Flow strength was Normal with 0.37 z-score for the week of 13 Sept



**Note:** The flow strength indicator is measured by 2-year trailing z-score (a positive or negative number does not necessarily suggest buying or selling). ETFs included. Data includes both weekly and monthly reporting funds as of 13 Sept 2023.

**Source:** Refinitiv Lipper

BofA GLOBAL RESEARCH

## Relative value

### Ratios neutral, curves largely flat on a long-term basis

We screen the muni market for parts of the curve, sectors and ratings that are rich or cheap. While muni/Treasury ratios are Cheap at the 10yr on a short-term basis, they are Neutral otherwise. Meanwhile, the 10s30s slope is Steep while the other slopes are Flat on a long-term basis. On a short-term basis, slopes are mostly Steep.

#### Exhibit 23: Rich/cheap analysis of MMD\*/Treasury ratios as of 13 September 2023

The muni market is Neutral on a ST and LT basis

Maturity	Current Tsy	Muni/Tsy	MMD R/C (short-term)	3 mo. max	3 mo. min	3 mo. avg	MMD R/C (long-term)	3 year max	3 year min	3 year avg
3yr	4.653%	64.7%	Neutral	67.9%	59.2%	63.9%	Neutral	130.7%	26.7%	64.7%
5yr	4.389%	66.1%	Neutral	68.4%	60.2%	64.9%	Neutral	96.4%	39.3%	64.1%
10yr	4.245%	70.7%	Cheap	71.7%	62.9%	67.4%	Neutral	131.8%	54.7%	76.2%
30yr	4.333%	90.9%	Neutral	92.4%	85.6%	89.1%	Neutral	115.4%	63.5%	87.8%

**Note:** \*MMD AAA GO yield curve. R/C = Rich/Cheap Note the benchmark for short-term is the 3-month average and for long-term is the 3-year average. Rich/cheap is based on z-scores: if z-score is >2, then "Very Cheap"; if >1 but <2, then "Cheap"; if between -1 and 1, then "Neutral"; if <-1 but >-2, then "Rich"; if <-2, then "Very Rich".

**Source:** BofA Global Research, Refinitiv, Bloomberg

BofA GLOBAL RESEARCH

#### Exhibit 24: Rich/cheap analysis of MMD\* slopes (bp) as of 13 September 2023

The 10s30s curve is Steep on a LT basis while the rest are Flat on a LT basis

Slope	Current slope	Slope S/F (short-term)	3 mo. max	3 mo. min	3 mo. avg	Slope S/F (long-term)	3 year max	3 year min	3 year avg
1s5s	-37	Steep	-34	-52	-43	Flat	65	-68	14
1s10s	-27	Steep	-27	-62	-45	Flat	120	-74	47
10s30s	94	Neutral	99	90	95	Steep	108	32	67
1s30s	67	Steep	67	33	49	Flat	170	26	114

**Note:** \*MMD AAA GO yield curve. S/F = Steep/Flat Note the benchmark for short-term is the 3-month average and for long-term is the 3-year average. Rich/cheap is based on z-scores: if z-score is >2, then "Very Cheap"; if >1 but <2, then "Cheap"; if between -1 and 1, then "Neutral"; if <-1 but >-2, then "Rich"; if <-2, then "Very Rich".

**Source:** BofA Global Research, Refinitiv, Bloomberg

BofA GLOBAL RESEARCH

## OAS

At the 7-12yr part of the curve, AA Utilities' OAS is Very Cheap, while AAA and Single-A Utilities', Single-A Power's and BBB Hospital's and are Cheap. At the 22+yr part of the curve, AAA Higher Education is Very Cheap, while AAA Local GOs, Single A Health and Industrial Development Revenue, and BBB Health are Cheap.

#### Exhibit 25: Rich/cheap analysis of 7-12yr indexes' OAS (bp)

AA Utilities' current OAS of 79bp at 7-12yrs is currently Very Cheap against its 3yr OAS average of 8bp

Sector	Current OAS				Rich/cheap analysis				3yr OAS average			
	AAA	AA	A	BBB	AAA	AA	A	BBB	AAA	AA	A	BBB
Airports		30	17	37		N	N	N		36	37	72
Higher Education	-16	-17	28		R	R	N		-6	0	46	
GO Local	-9	-2	34	98	N	R	N	N	0	12	48	127
GO State	-14	-19	47	0	N	R	N	R	-4	0	45	120
Health		15	95	141		N	N	N		24	71	109
Hospital		14	31	158		N	N	C		21	46	103
IDR		27	54	74		N	N	N		44	57	87
Leases COPS & Appr.		1	23	137		N	R	N		14	40	117
Pollution Control	-8		73		N		N		0		79	
Power	-18	-13	57		N	N	C		0	-1	27	
Tax Revenues	-5	-3	39	104	N	N	VR	N	8	10	57	131
Tobacco			12				R				53	
Toll & Turnpike		16	4	80		N	N	N		24	25	86
Transportation - Other	-3	3	46	0	N	N	N	VR	7	18	71	99
Utilities - Other	0	79	81		C	VC	C		-3	8	44	
Water & Sewer	-22	-19	-1	67	R	R	N	VR	-1	-3	19	114

**Note:** Data as of 12 September 2023. Only includes non-prerefunded bonds. Benchmark is 3-yr avg.

**Source:** ICE Data Indices, LLC

BofA GLOBAL RESEARCH



**Exhibit 26: Rich/cheap analysis of 22yr+ indexes' OAS (bp)**

AAA Higher Education's current OAS of 52bp at 22yr+ is currently Cheap against its 3yr OAS average of 22bp

Sector	Current OAS				Rich/cheap analysis				3yr OAS average			
	AAA	AA	A	BBB	AAA	AA	A	BBB	AAA	AA	A	BBB
Airports		30	16	-9		N	N	N		31	33	29
Higher Education	52	-6	26	103	VC	N	N	N	22	-4	26	81
GO Local	10	10	16	48	C	N	N	N	-9	4	28	94
GO State	-4	-15		0	N	N		R	-25	-16		100
Health		-37	75	178		N	C	C		-7	38	107
Hospital		19	34	84		N	N	N		9	29	60
IDR			82	76			C	N			53	75
Leases COPS & Appr.	7	-2	29	39	N	N	N	N	-5	-1	36	58
Pollution Control			25				N				15	
Power		-7	8	45		N	N	N		-4	20	51
Tax Revenues	15	9	43	65	N	N	N	N	9	8	57	84
Tobacco				91				N				83
Toll & Turnpike			13	22			N	N			17	50
Transportation - Other		0	14	66		N	N	N		16	46	57
Utilities - Other		10	30	0		N	N	VR	-8	-6	25	67
Water & Sewer	-10	-8	3		N	N	N		-17	-11	5	

**Note:** Data as of 12 September 2023. Only includes non-prerefunded bonds. Benchmark is 3-yr avg.

**Source:** ICE Data Indices, LLC

BofA GLOBAL RESEARCH

**MWIs remain in the underpriced space**

Our market width indicator (MWI) – which measures muni sectors' recent market momentum by calculating the percentage of a sectors' CUSIPs whose current yields-to-worst are below their moving 20-week average – shows that most sectors' MWIs fell slightly w/w, with the ETM and Industrial Development Revenue sectors' decreasing the most. The Health sector's MWI is the highest.

**Exhibit 27: MWIs – sector momentum (%) as of 12 September 2023**

Most the sectors had small decreases in the underpriced space over the past week

Sector	MWI	w/w Δ	Sector	MWI	w/w Δ
<b>U0A0 Index</b>	<b>0.8%</b>	<b>0.0%</b>	Miscellaneous	1.2%	-0.8%
ETM	1.2%	-1.1%	Multi-Family Housing	1.3%	0.6%
GO - Local	0.3%	-0.1%	Pollution Control	2.3%	-0.3%
GO - State	0.5%	-1.0%	Power	0.6%	-0.4%
Pre-Re	0.2%	-0.6%	Single Family Housing	0.0%	-0.3%
Airport	1.6%	-0.1%	Tax revenue	0.7%	-0.6%
Education	0.7%	0.0%	Tobacco	2.4%	0.0%
Health	26.7%	3.6%	Toll & Turnpike	0.6%	-0.2%
Hospitals	1.0%	-0.2%	Transportation	0.3%	0.0%
Industrial Development Rev	3.4%	-3.2%	Utilities - Other	0.3%	-0.3%
Leasing COPS & Appropriations	0.6%	0.1%	Water & Sewer	0.8%	-0.3%

**Source:** BofA Global Research, ICE Data Indices, LLC

BofA GLOBAL RESEARCH

**Trade activity****Most actively traded CUSIPs for the week**

The most actively traded CUSIP over the last week by total volume and number of trades was 13063D5S3, totaling \$358.8mn and 1,002 trades. These are newly-issued California GO refunding bonds due in 2043.

**Exhibit 28: Most actively traded muni CUSIPs over the week ending 13 September 2023**

13063D5S3 was the most frequently traded CUSIP. <sup>1</sup>Last trade

CUSIP	Short name	ST	Coupon	Maturity	Issue	Price <sup>1</sup>	Yield <sup>1</sup>	Size <sup>1</sup> (000s)	Spread	# of trades	Volume (\$mn)
13063D5S3	CALIFORNIA ST-REF	CA	4.000	09/01/43	09/14/23	98.242	4.13	30	47	1002	358.8
13063D5F1	CALIFORNIA ST	CA	5.250	09/01/53	09/14/23	110.012	4.02	400	111	516	313.9
13032UH68	CA HLTH FACS AUTH-A	CA	5.000	08/15/33	09/27/23	115.145	3.20	5M+	28	68	150.6
594654UR4	MICHIGAN ST HSG DEV-B	MI	5.000	06/01/54	09/27/23	100.375	4.95	100	207	381	97.0
38546WEQ9	GRAND FORKS-A-REV	ND	5.000	12/01/53	09/19/23	101.000	4.87	125	90	93	89.4
677632Q61	OHIO ST UNIV-B	OH	5.000	12/01/33	09/26/23	114.520	3.24	15	33	35	86.6
594654UQ6	MICHIGAN ST HSG DEV-B	MI	4.950	12/01/48	09/27/23	100.300	4.91	1000	203	211	82.8



**Exhibit 28: Most actively traded muni CUSIPs over the week ending 13 September 2023**13063D5S3 was the most frequently traded CUSIP. <sup>1</sup>Last trade

CUSIP	Short name	ST	Coupon	Maturity	Issue	Price <sup>1</sup>	Yield <sup>1</sup>	Size <sup>1</sup> (000s)	Spread	# of trades	Volume (\$mn)
20775DTS1	CT HLTH&EDU FACS AUTH	CT	2.000	07/01/42	07/01/16	100.000	--	5M+	0	12	59.5
677632Q95	OHIO ST UNIV-C	OH	5.250	12/01/46	09/26/23	109.023	4.11	155	26	41	57.8
491309DL1	KY HSG CORP-REF-A	KY	4.875	01/01/54	10/05/23	102.200	--	50	170	438	53.9
677632Q79	OHIO ST UNIV-B	OH	5.000	12/01/34	09/26/23	113.807	3.32	100	29	20	43.7
585488YU7	MELISSA ISD	TX	4.250	02/01/53	09/01/23	95.472	4.53	3250	62	90	41.5
83756C5U5	SD HSG DEV AUTH-D-REF	SD	4.800	11/01/48	10/04/23	100.000	4.80	25	193	190	38.9
38611TAC1	GRAND PARKWAY-B	TX	5.250	10/01/51	08/01/13	100.061	3.79	100	36	29	37.4
79766DMC0	SAN FRANCISCO APRT-A	CA	4.000	05/01/49	02/07/19	90.509	4.64	10	78	25	37.2
64966LLS8	NYC-ADJ-1-SUBSER I-2	NY	2.400	03/01/40	03/25/14	100.000	--	1700	0	14	36.5
4387013V4	HONOLULU CO -REV	HI	4.500	07/01/53	09/27/23	98.290	4.61	800	64	39	35.1
836895FL1	SC ST ASSN GOV-B-COPS	SC	5.000	03/01/24	09/21/23	100.612	3.60	2590	29	15	33.8
677632P39	OHIO ST UNIV-A-1-REF	OH	3.350	06/01/43	04/20/23	100.000	--	3000	0	8	33.3
828641ZF0	SIMI VLY UNIF SD -D	CA	5.250	08/01/51	09/27/23	107.711	4.09	2000	14	16	33.1

Source: Bloomberg

BofA GLOBAL RESEARCH

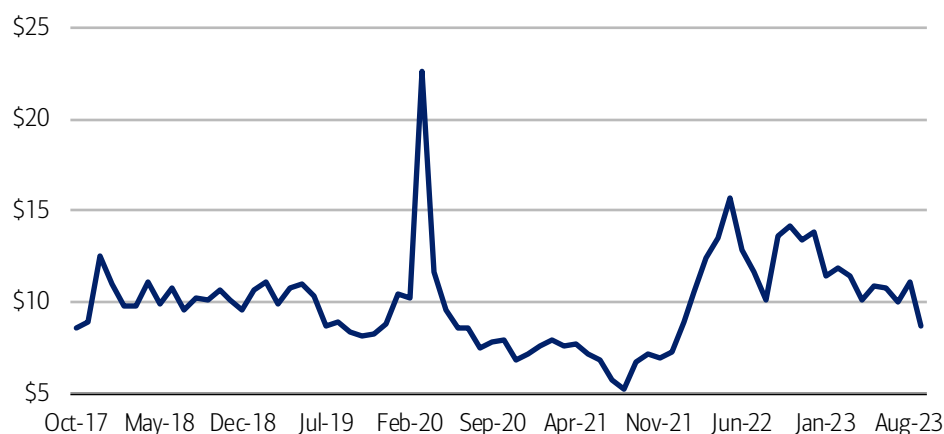
**Sep-23's avg daily secondary trading at \$8.7bn**

Current data shows September's average daily secondary trading volume at \$8.7bn.

While daily trading data is subject to revision over the course of the month, should this level hold it would be the lowest since Dec-21's \$7.3bn. As it stands, Sep-23's average is down 21.5% m/m and 36.3% y/y. For the month-to-date, data shows that just \$69.5bn of muni bond par value traded.

**Exhibit 29: Daily avg secondary trading volume (\$bn; as of 13 September 2023)**

Early Sep-23 daily avg volume of \$8.7bn lowest since Dec-21



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

**Credit corner****Rating activity****S&P's August upgrades exceed downgrades 4.9 to 1**

S&P's August rating activity was exceedingly-positive, with 69 ratings upgraded vs 14 downgraded, for an upgrade to downgrade ratio of 4.9 to 1. That is the highest monthly upgrade-to-downgrade ratio since March 2022's 19.0 to 1, and marks the third month in 2023 in which the ratio exceeded 4 to 1. Local governments again accounted for the most upgrades with 45, but also the most downgrades, with 6. For outlook revisions, S&P revised 34 outlooks to stable, 10 to positive, but 15 to negative. August marks the fifth straight month, and 11th month in the last 14 in which negative outlook revisions outnumbered those to positive. Still, unfavorable outlook and CreditWatch changes were outpaced by favorable changes during the month – 31 unfavorable vs 39 favorable.

When combined with July activity, we see a to-date 3Q23 upgrade to downgrade ratio of 4.1 to 1. For the YTD through August, we see a ratio of 3.4 to 1. As noted in our



[Municipals Year Ahead 2023](#), we expect 2023 rating activity to stay skewed to the positive, though we look for upgrade to downgrade ratios to moderate as 2023 closes.

## State and local governments

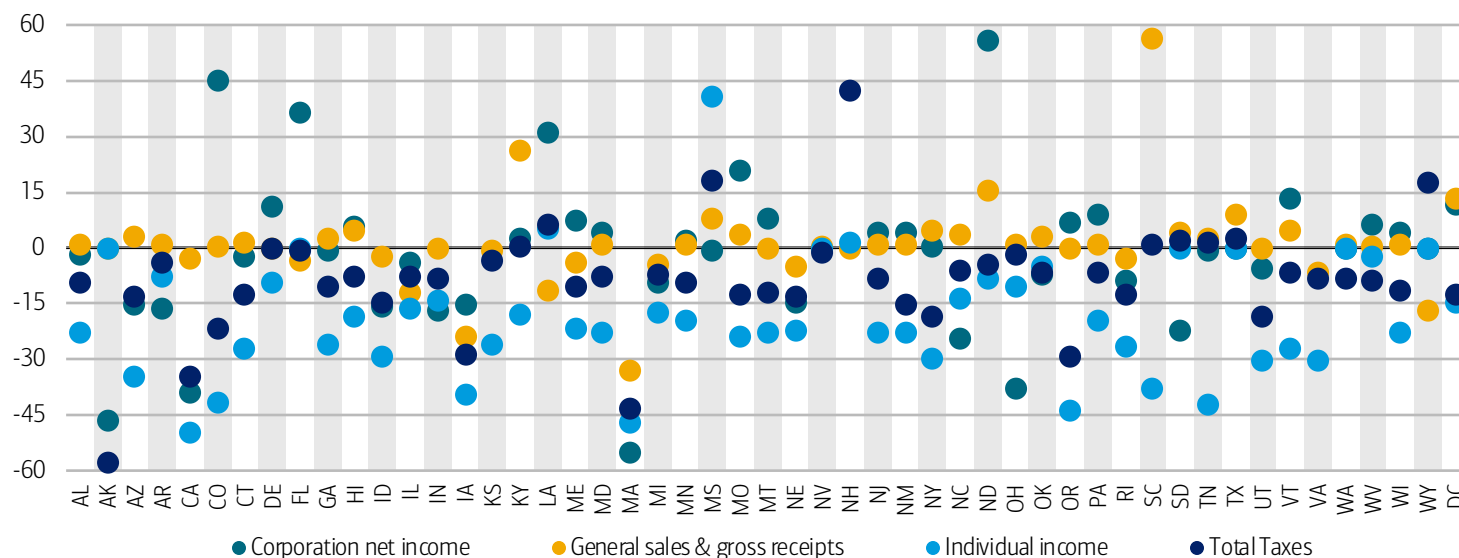
### State and local government tax collections fell 7.6% y/y in 2Q23

The US Census Bureau released 2Q23 state and local tax collections on 14 September. In total, state and local government tax collections across the four largest tax categories (property, individual income, corporation net income and sales receipts) totaled \$476.6bn on a seasonally adjusted basis in 2Q23, down 7.6% on a y/y basis. While property tax collections were up 5.2% vs 2Q22, individual income tax collections were down 28.2%, corporation income tax collections were down 4.6% and sales tax collections were down 0.3%. Over the four quarters ending 2Q23, state and local government tax collections totaled \$1.96tn, or 0.8% lower than the four quarter total ending 3Q22. Like other data, this Census data suggests that state and local tax collections already peaked.

State tax collections contracted \$65.9bn, or 14.2% y/y to \$398.9bn in total in 2Q23, per the data. General sales and gross receipts taxes of \$124.0bn increased \$987mn, or 0.8%; individual income decreased by \$59.5bn, or 30.7% to \$134.0bn; corporation net income tax collections of \$49.1bn were down \$5.0bn, or 9.2%; motor fuels collections of \$15.4bn were up \$834mn, or 5.7%; tobacco products revenues of \$4.4bn fell \$323mn, or 6.9%; and, severance tax collections of \$5.7bn fell by \$2.8bn, or 33.0%. Exhibit 30 shows that just 10 states' tax collections grew in 2Q23 on a y/y basis, led by NH's nearly 43% increase; AK's declined the most, down almost 58% per Census Bureau data.

#### Exhibit 30: Y/y percent (%) change in states' tax collections (2Q23 vs 2Q22)

Just 10 states' tax collections increased y/y in 2Q23, led by NH's 43% growth; AK's declined the most y/y on back of lower severance tax collections



**Note:** For ease of viewing, corporation net income collections for KS (+89.5%), SC (+122.4%), VA (+89.4%) and NH (+76.1%) intentionally omitted.

**Source:** US Census Bureau

BoFA GLOBAL RESEARCH

This data is consistent with our own surveys of 2Q state collections, noting previously that Apr-23 was a decidedly negative month; May-23 and June were also both modestly negative months. As we mentioned in our [last Weekly](#), Jul-23 is an up month on median, with collections growing 2.5% vs Jul-22. August is proving to be a mixed month, at least among the earliest-19 reporting states. For August, we see overall collections down 1.1% on median y/y; personal income collections are down 2.0% y/y on median, while sales collections are up 1.2% and corporation collections are up 7.6%.

A couple of notable highlights from the early August data:

- Based on the state comptroller's data, CA's revenues increased 5.5% y/y in August. That marks the first month of y/y growth since Aug-22's 1.1% y/y growth.
- TX collected \$9.3bn in oil and natural gas production taxes over the 12-mos ending in August, which is down 13% vs the 12-mo period ending Aug-22. OK collected \$1.6bn, which is down 6% vs the 12-mo period ending Aug-22. The data continues to show the peak in these collections came in in 1Q23.

### Moody's shifts PA's outlook to positive from stable

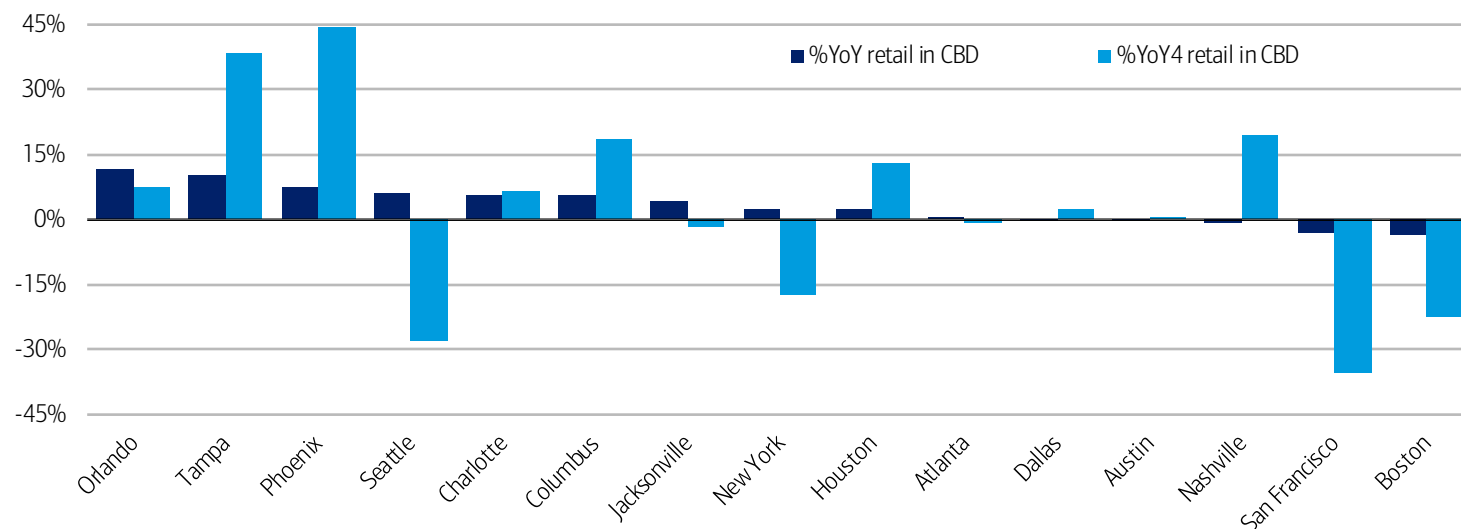
Moody's shifted its outlook on Pennsylvania's issuer and GO ratings – as well as outlooks on the commonwealth's appropriation debt, its school district intercept program, its general municipal pension system state aid and Pennsylvania Turnpike Commission, among others – to positive from stable on 8 September. PA's rating was affirmed at Aa3. Per Moody's, the positive outlook on these ratings is based on the "significant increase in budget reserves over the past three fiscal years to levels consistent with higher rated peers." Moody's expects that "core rainy day reserves will remain near current levels due to sound budget management and continued steady revenue growth." Since FY20, PA has set aside over \$5bn in its budget stabilization fund, which amounts to almost 13% of general fund revenues, per the commonwealth's FY24 budget.

### Bank of America Institute: CBD spending lower in northern and western US

The [Bank of America Institute's 6 September Consumer Morsel report](#) uses internal debit and credit card data to track consumer spending in central business districts (CBDs) in select large cities. They find that CBDs "in the northern and western US continue to see consumer spending below pre-pandemic levels." For example, they note that "New York, Boston, San Francisco and Seattle saw large drops in spending in their CBDs relative to four years ago, highlighting the lasting impact of the pandemic," while "cities mainly in the southern US have seen big rises in spending in their CBDs, although the experience is varied." On New York and Seattle, however, the Institute's data shows "a glimmer in ...that the situation is not continuing to deteriorate"; as Exhibit 31 shows, spending is up in New York's CBD 2.6% y/y and 6.0% in Seattle.

#### Exhibit 31: Total retail spending per household as measured by Bank of America debit and credit card data in select central business districts as of July 2023 (%YoY, 3-month moving average)

Cities with net population loss in 2Q 2023 have spending growth still well below 2019



Source: Bank of America Institute

BofA GLOBAL RESEARCH

### Real median household income falls nearly 5% y/y in the Midwest

The Census Bureau's annual report on income in the US shows that median income in 2022 fell 2.3% y/y when accounting for inflation and the cost of living to \$74,580, from

\$76,330 in 2021. However, the report also shows that median incomes are highest in the West at \$82,890, or about 21% higher than the South's median income of \$68,230. The Northeast's median income of \$80,360 is second highest according to Census data, despite its 3.8% y/y decline. While all regions' median income fell y/y, the South's decline was smallest at just 0.1% while the Midwest's was largest at 4.7%; the West's real median income fell 3.2% y/y in 2022. Census data also showed the official poverty rate in 2022 at 11.5% - not significantly different than the rate in 2011. Poverty rates are highest in the South at 13.1%, followed by the Northeast at 10.8%, the West at 10.7% and the Midwest at 9.8%. By state, the highest poverty rates are in NM (18.2%), MS (17.8%), LA (16.9%) and AR (15.9%), while lowest in UT and NH (each 7.1%), MN (7.7%) and WI (8.0%). Lastly, Census data showed 7.9% of people in the US had no health insurance during the 2022 calendar year, down from 8.3% in 2021. Uninsured rates were highest in the South (11.1%) while lowest in the Northeast and Midwest (each at 5.1%). The West's uninsured rate in 2022 was 7.0%. The Midwest has the highest percentage of individuals with private health insurance (70.4%), followed by the Northeast (66.9%), while the Northeast had the highest percentage with public health insurance (38.7%), followed by the West (38.1%).

### **FOMB officials: PREPA plan unlikely to materially change, on confirmation track**

At the FOMB's 41<sup>st</sup> public meeting, FOMB officials suggested that PREPA's third amended plan of adjustment is unlikely to change in any substantial way given that sufficient impaired creditors support the plan under bankruptcy law for confirmation. Said the FOMB's chairman: "We still want the plan to be as consensual as possible so we are hopeful that most creditors will in the end agree, but we have impaired consenting classes, so we are on track, I believe, towards confirmation." Judge Swain recently set 4 March 2024 through 15 March 2024 for confirmation hearings. See our [last Weekly](#) for a discussion on the plan of adjustment's key terms. Otherwise, we highlight: (a) TSA balances of \$8.4bn as of 1 September that were down \$296mn w/w; and, (b) FY24 General Fund collections through 1 September of \$1.9bn that were up some 18.6% vs collections over the same period in FY23.

### **Chicago faces a \$538mn budget gap for FY24**

Chicago's budget forecast was released on Wednesday and projects a \$62mn surplus for FY23 but a \$538mn budget gap for FY24 driven by "several factors, including rising personnel, pension, and contractual costs, as well as the cost to care for new migrants arriving to the city." FY24 revenues are projected to decrease 0.5% y/y or \$27.9mn to \$5.459bn while expenditures of \$5.997bn are projected, up 9.3% y/y. Personnel expenditures are expected to grow by more than \$214.4mn in 2024, totaling \$3.4bn. Pension payments will total \$835.1mn in FY24. "The 2023 budget will mark the fifth year for the City's Police and Fire Pensions, and the third year for the Municipal and Laborers Pension Funds that contributions will reflect an actuarially- calculated statutorily required contribution. 2024 will also mark the second year in which the City will pay additional payments towards each of the four pensions to reduce the long-term collective liability." Budget shortfalls are also currently projected for FY25 and FY26 in the amounts of \$986mn and \$1.2bn, respectively, under Chicago's base case scenario.

### **State & local payrolls recovery falls to 80% as of Aug-23**

The US added 187,000 jobs in August, and the unemployment rate increased to 3.8%, per the Bureau of Labor Statistic's August jobs report. June's payroll increase was revised down by 80,000 while July's estimate was revised down by 30,000. In August, state and local government payrolls fell by 2,000 m/m in the aggregate (state payrolls were flat m/m while local payrolls declined 2,000 m/m), marking the second straight month of declines based on revised data. Both state and local government education jobs declined during the month, while non-education jobs increased. Overall, state and local governments' nonfarm payroll recovery of jobs lost during the peak of the COVID crisis is 80%, with local governments' recovery at 83.2% and state governments at 64.6%. On a combined basis, state and local government education payrolls recovered



70.4% of jobs lost – lower than the 97.2% for non-education. As it stands, Aug-23's education payrolls equal 97.3% of February 2020's and non-education equals 99.9%.

### **NYC's Monthly Economic and Fiscal Outlook report released for August**

NYC's comptroller released his monthly "By the Numbers" newsletter recently. Per the report, Wall Street profits YTD are down 6.1% y/y, at \$12.5bn, with 2Q23 profits across New York Stock Exchange firms totaling \$5.5bn, down 20% from \$6.9bn in 1Q23. Retail space remains a concern across the city. Since the onset of the pandemic "retail asking rents have fallen by roughly 6% in the outer boroughs and by 16% in Manhattan, with almost all of the drop occurring in 2020. But in "real" terms (after adjusting for inflation) rents are still drifting lower and are down roughly 20% in the outer boroughs and 30% in Manhattan," per the comptroller. Recent data from the NY State Department of Taxation and Finance provides a look at NYC Personal Income Tax (PIT) filing by tax bracket in 2021, updated from previous data provided in April 2023. The total Adjusted Gross Income (AGI) in 2021 was \$63.4bn, or up 15.4% vs 2020. AGI from filers in the "over \$25mn" income bracket, 973 New Yorkers, was up 49.5% from 2020, to \$90.1bn.

## **Healthcare**

### **Moody's FY22 medians highlight the challenging expense environment**

Moody's FY22 not-for-profit healthcare sector medians highlight weakening operating performance amid a tough expense environment and lower liquidity levels as pandemic era loans were paid back and federal aid dried up. Operating performance for HY credits fell off more sharply than IG credits, widening the credit gap. Overall, the median expense growth rate was 8.9% in FY22, up from 8.6% in FY21. Meanwhile, FY22 median revenue growth fell to 5.1% from 11.3% in FY21. It's important to note that FY21's large revenue growth was boosted by volume recovery and federal aid. The median operating margin decreased to -0.3% in FY22, dropping from 3.2% the year prior. Liquidity dropped to pre-pandemic levels at 206 median days cash on hand from 264 days "amid cash losses and demanding expenses." As a result, leverage increased as median cash to debt fell below 200% for the first time since FY19. Median debt to cash flow hit a five-year high of 3.6x in FY22 given the weaker operating performance. In terms of volume, the median total admission growth rate was low at 0.4%. Median inpatient admissions declined as outpatient levels were at a five-year high. "While the industry shows signs of stabilizing in 2023, the labor environment will remain challenging," per Moody's.

### **Labor market "may have permanently turned a corner" – Fitch**

"The U.S. hospitals and ambulatory healthcare services labor market may have permanently turned a corner as wage growth is slowing while payrolls continue to rise," according to Fitch. Through July, average hourly earnings growth for hospital employees has slowed for three consecutive months and four months for ambulatory healthcare services employees. Meanwhile, hospital and ambulatory healthcare services payrolls have risen for 19 and 31 consecutive months, respectively. "If labor market improvements are sustained and COVID hospitalizations remain at a level that does not create a surge in demand for nurses or disruption of surgical volumes, health systems should be able to manage through expense challenges over the next few years to improve profitability gradually." Healthcare and social assistance job openings have dropped from March 2022's peak of 9.3% to 7% in July 2023. At the same time, job quits recently peaked at 2.9% in May 2023 and dropped to 2.3% in July 2023.

## **Airports**

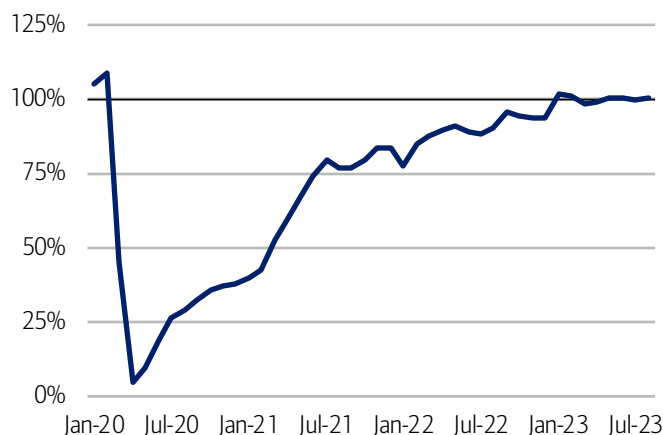
### **Air travel passenger levels remain stable at full recovery in August**

The air travel recovery remained stable in August with travelers coming in at 100.5% of 2019 levels. August saw 75.1 million travelers versus 74.8 million travelers in August 2019. With 67.3 million travelers in August 2022, the number of travelers was up 11.6% y/y. Checkpoint growth was -5.5% m/m with the 12-month rolling average recovery level continuing its climb and improving 1ppt to 98%. At this time last year, the recovery was 10ppt lower at 90.1%. For the YTD, passenger levels are up 0.2% compared to 2019 and

14.4% versus last year. Monthly recoveries have been at least 98.7% since the start of the year, with five out of the last eight months above 100%.

#### Exhibit 32: Monthly TSA checkpoint travel numbers versus 2019

August 2023 air travelers 100.5% of 2019 levels

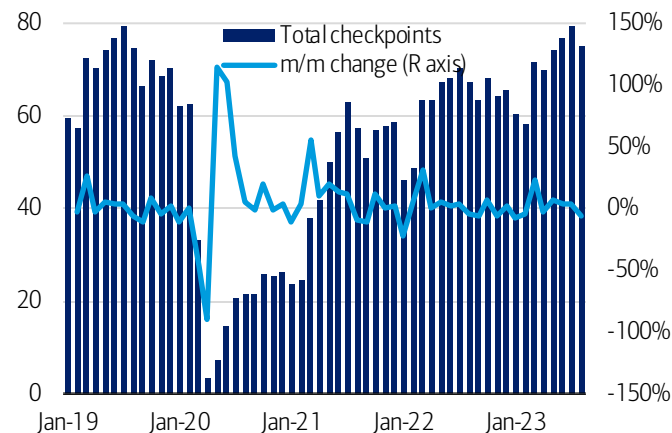


Source: Transportation Security Administration

BofA GLOBAL RESEARCH

#### Exhibit 33: Monthly TSA checkpoint travel numbers (millions)

August checkpoints down 5.5% m/m but up 11.6% y/y



Source: Transportation Security Administration

BofA GLOBAL RESEARCH

## Water & sewer

### Fitch says the Water & Sewer sector is prepared for a recession

After managing a global pandemic “remarkably well”, US water and sewer (W&S) utilities “appear to be on solid footings as the broader economy inches closer to recession,” per Fitch. Fitch’s economists believe a recession is still possible in late-2023 or early-2024 given slower economic growth and persistent inflation. Still, most W&S utilities show sustained operating revenue growth and strong liquidity. Median days cash on hand for retail systems improved to over 600 days while wholesale systems experienced a drop, but the median remains over 500 days. Leverage improved for retail systems but jumped notably for wholesale systems. “Given the AA+ median rating across the portfolio, most issuers...retain headroom and most ratings are not imminently pressured.”

## Public power

### Moody’s compares Hawaiian Electric to PG&E

While Hawaiian Electric’s situation is reminiscent of Pacific Gas & Electric’s (PG&E), “there are similarities and differences between the two utilities in key areas,” per a 8 September Moody’s report. First, as we’ve discussed before, Hawaii does not have a precedent of applying inverse condemnation to utilities. California does, which makes utilities in the state particularly vulnerable to wildfire liabilities. In a worst-case scenario, Hawaiian Electric’s potential liabilities (est. \$4-\$6bn of potential wildfire liabilities vs \$2.4bn book equity) relative to its equity base could be similar to PG&E’s (\$30bn of potential wildfire liabilities vs \$20bn book equity). Both Hawaiian Electric and PG&E Corporation (PCG, parent) operate as single-state utilities with little regulatory, geographic, or operational diversity, leading them to suspend their dividends and draw on their bank facilities. Hawaiian Electric’s debt is unsecured, as was PCG’s and despite the lack of security, PCG debtholders did not lose any value through bankruptcy. “This could be an argument in favor of debtholders at Hawaiian Electric in case of a restructuring event.” Through the bankruptcy reorganization, some of PG&E’s debt was redeemed and some was refinanced as first mortgage bonds. Lastly, Hawaiian Electric does not have a troubled safety record compared to PG&E. Therefore, “regulatory support in the form of cost recovery may be more likely for Hawaiian Electric than it was for PG&E before its 2019 bankruptcy.” We note that multiple investigations into the cause of the wildfires are ongoing. Therefore, any resolution could take some time.

## Defaults, distress & HY

### 23% of UOHY upgraded YTD vs 8% downgraded

Here, we examine ratings changes YTD on bonds in the ICE BofA US Municipal High Yield Securities Index (UOHY). We use only changes in average rating (as calculated by ICE, based on an average of Moody's, S&P and Fitch). Additionally, we examine only uninsured bonds to remove effects of insurance on ratings and only bonds that were in UOHY on both 11 September 2023 and 31 December 2022. Our uninsured sample of bonds represents \$41.3bn in outstanding debt.

From our sample, we find that 22.8% of the total outstanding debt was upgraded, compared to 7.9% that was downgraded and 69.4% that had no change in average rating for the YTD. Exhibit 34 shows the results by sector, along with the total debt outstanding and weighted average rating of the sample of bonds. We find that the Local GO, Utilities - other, Transportation and Industrial Development Revenue sectors had the greatest proportion of upgrades in the below investment grade space YTD. Conversely, the Hospital, Multi-Family Housing, Industrial Development Revenue and Healthcare sectors had the greatest proportion of downgrades. Note that the Local GO sector, driven by the Chicago Board of Education, accounted for 61% of overall upgrades while the hospital sector itself accounted for roughly 50% of overall downgrades in UOHY thus far in 2023. Also notable among the upgrades is airline bonds, which together accounted for nearly 32% of upgrades (United Airlines: 19.5%; American Airlines: 11.1%; Delta Air Lines: 0.7%; Learjet Inc: 0.2%).

#### Exhibit 34: Percent (%) of debt outstanding (\$mn) based on change in avg rating for YTD, by sector: high yield vs investment grade

Almost 23% of outstanding debt in UOHY was upgraded YTD vs 7% for UOA0

Sector	High yield (UOHY)					Investment grade (UOA0)				
	Upgrade	No change	Downgrade	Amt out	Avg rating	Upgrade	No change	Downgrade	Amt out	Avg rating
AIR	7.6	92.4	-	1,377.0	BB1	3.1	96.9	-	51,006.5	A1
EDU	1.4	93.9	4.7	6,197.4	BB2	4.1	92.5	3.4	51,585.0	AA3
ETM	-	-	-	-	-	2.6	69.7	27.6	4,746.3	AA2
GO-L	95.8	4.2	-	6,074.2	BB1	1.5	95.8	2.7	97,134.1	AA2
GO-S	-	100.0	-	21.7	BB2	11.6	88.2	0.2	123,745.4	AA2
HLTH	2.5	88.2	9.3	4,064.2	BB2	0.8	98.6	0.6	4,177.3	A3
HOSP	0.2	76.2	23.5	6,984.5	BB3	2.5	92.7	4.9	97,229.2	A1
IDR	32.5	58.1	9.4	9,226.2	BB3	15.1	79.0	5.9	12,882.7	BBB1
LCA	1.3	94.3	4.5	2,741.5	BB3	4.9	94.8	0.3	31,343.8	AA3
MISC	16.9	83.1	-	1,494.1	BB2	3.5	95.1	1.5	7,240.8	AA2
MFH	14.8	65.2	19.9	113.0	B1	2.8	95.1	2.1	16,240.0	AA3
PC	-	-	-	-	-	-	100.0	-	7,399.4	A2
PWR	-	100.0	-	51.2	CC	-	99.7	0.3	35,792.7	AA3
PRE-RE	-	100.0	-	71.1	BB2	8.1	88.7	3.2	25,147.8	AA2
SFH	-	-	-	-	-	1.8	96.2	2.0	12,093.3	AA1
TAX	2.4	97.6	-	1,822.2	BB2	3.6	96.2	0.1	124,681.8	AA1
TBCO	-	100.0	-	1,678.1	B2	1.1	98.9	-	6,815.5	A3
T&T	-	100.0	-	24.2	BB1	19.5	80.5	-	53,592.3	A1
TRAN	42.5	57.5	-	24.6	BB2	24.5	75.5	-	59,474.1	A1
UTL	52.3	47.7	-	239.0	BB3	7.8	92.2	-	38,859.0	A2
W&S	-	100.0	-	3.8	BB2	1.7	98.1	0.2	64,137.3	AA2
<b>Total</b>	<b>22.8</b>	<b>69.4</b>	<b>7.9</b>	<b>42,208.1</b>	<b>BB3</b>	<b>6.7</b>	<b>91.8</b>	<b>1.4</b>	<b>925,324.5</b>	<b>AA3</b>

Note: Data as of 11 September 2023. See sector definitions in Exhibit 40.

Source: BofA Global Research, ICE Data Indices, LLC, Bloomberg

BofA GLOBAL RESEARCH

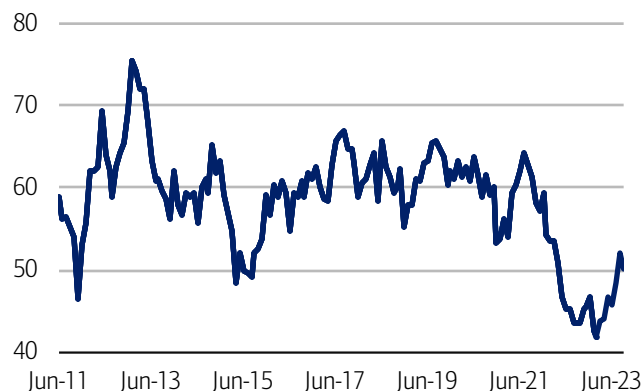
Exhibit 34 also shows a breakdown of YTD rating changes in the ICE BofA Muni Master Index (UOA0); in total, we find that just 1.4% of outstanding debt was downgraded, 6.7% was upgraded and 91.8% had no change in average rating. So, while upgrades outpaced downgrades in UOA0 YTD, it's done so at a materially lower rate than in high yield. We remain neutral on HY and expect that defaults and bankruptcies will remain low for the foreseeable future.

## Tracking: material credit events and Ch. 9 filings

For the week ending 13 September, our tracking of those Moody's-defined material credit events (MCEs) shows 19 postings, up 2 on a w/w basis, with the MTD total of 39 as of 13 September. See Exhibit 35. Meanwhile, we note there were no new Chapter 9 bankruptcy petitions filed for the week ending on 13 September and, as a result, it has been 113 days since the last bankruptcy petition was filed by Hazel Hawkins Memorial Hospital on 23 May 2023. As Exhibit 36 shows, since July 1987, the period between Chapter 9 bankruptcy filings exceeded 100 calendar days on only 38 other occasions.

### Exhibit 35: 6-mo mov avg of material credit events posted to EMMA

Filings posted to EMMA in Sep MTD have matched Sep 2022 totals



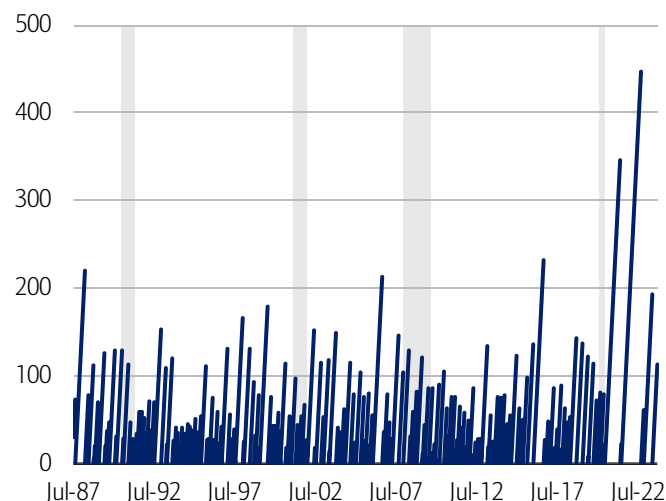
Note: Data as of 13 September 2023. Material credit events (MCE) reflect: 1. Bankruptcy, insolvency, receivership or similar event, 2. Financial obligation-event reflecting financial difficulties, 3. Nonpayment related default, 4. Principal/interest payment delinquency, 5. Unscheduled draw on credit enhancement reflecting financial difficulties, and 6. Unscheduled draw on debt service reserve reflecting financial difficulties.

Source: EMMA

BoFA GLOBAL RESEARCH

### Exhibit 36: Calendar days since last Chapter 9 petition filed

113 days since Hazel Hawkins Memorial Hosp. filed Ch. 9 petition



Source: BoFA Global Research, PACER, US Courts

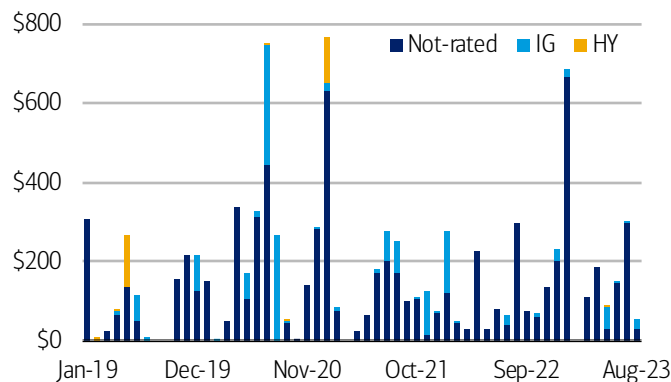
BoFA GLOBAL RESEARCH

## YTD default & distress through August

As we discussed in our [1 September Municipals Weekly](#), first-time payment defaults totaled \$54mn in August, bringing the YTD total to \$1.6bn, up 50% y/y. First-time distressed debt (when the first distressed event that is not a default happens) totaled \$22mn in August; as a result, the YTD totals \$1.8bn, which is up 8% y/y. The total cumulative first-time distressed debt since 2019 totals \$13.7bn; of that, 37% defaulted while 17% exited distressed status.

### Exhibit 37: Monthly first-time defaults (\$mn) by avg rating at issue

First-time defaults total \$54mn in Aug; YTD-23 totals \$1.58bn, up 50% y/y



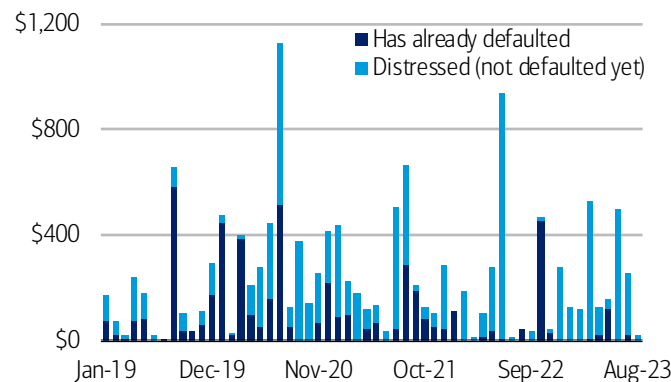
Note: We may revise data if Bloomberg revises its data.

Source: BoFA Global Research, Bloomberg

BoFA GLOBAL RESEARCH

### Exhibit 38: Monthly first-time distressed debt (\$mn)

First-time distress \$22mn in Aug; YTD-23 totals \$1.8bn, up 8.1% y/y



Note: We may revise data if Bloomberg revises its data.

Source: BoFA Global Research, Bloomberg

BoFA GLOBAL RESEARCH

Going forward, we expect defaults emanating from this distress to be concentrated in the Nursing Home, Hospital, Student Housing and the Industrial Development sectors.

We expect defaults to tick up some in 2023, with our original estimate for the year at \$1.7bn-\$2.1bn. With August's data and earlier months' revisions, 2023 defaults could possibly finish above \$2.0bn. The Nursing Home/Senior Living sector continues to default in 2023, as we projected earlier. Although its default speed slowed since 3Q22, we remain cautious view for this sector.

## Cross currency equivalent yields

Taxable munis look attractive for most countries on a cross-currency equivalent basis, with only a few exceptions: 5yr taxable munis are less attractive for the United Kingdom; 5yr and 10yr taxable munis are less attractive for Italy, Spain, Japan and South Korea.

### Exhibit 39: Cross currency equivalent yields as of 14 Sept 2023

Taxable munis are generally attractive for foreign investors with a few exceptions

Country	Government bond yield (in investor country's currency)			Cross currency equivalent yield*						Can foreign investors buy?					
	5 yr	10 yr	30 yr	US Treasury			US AAA taxable muni			US Treasury			US AAA taxable muni		
				5 yr (4.417)	10 yr (4.091)	30 yr (4.382)	5 yr (4.69)	10 yr (4.81)	30 yr (5.48)	5 yr	10 yr	30 yr	5 yr	10 yr	30 yr
Canada	3.937	3.684	3.523	4.188	3.862	4.253	4.460	4.581	5.345	Yes	Yes	Yes	Yes	Yes	Yes
United Kingdom	4.475	4.275	4.603	4.542	4.214	4.355	4.413	4.935	5.452	Yes				Yes	Yes
France	2.980	3.121	3.580	2.985	2.658	3.757	3.255	3.373	4.824	Yes		Yes	Yes	Yes	Yes
Germany	2.611	2.588	2.720	2.985	2.658	3.757	3.255	3.373	4.824	Yes	Yes	Yes	Yes	Yes	Yes
Italy	3.858	4.333	4.812	2.985	2.658	3.757	3.255	3.373	4.824						Yes
Spain	3.287	3.635	4.151	2.985	2.658	3.757	3.255	3.373	4.824						Yes
Portugal	2.982	3.283	3.805	2.985	2.658	3.757	3.255	3.373	4.824	Yes			Yes	Yes	Yes
Netherlands	2.851	2.923	2.955	2.985	2.658	3.757	3.255	3.373	4.824	Yes		Yes	Yes	Yes	Yes
Switzerland	0.965	0.966	0.925	2.985	2.658	3.757	3.255	3.373	4.824	Yes	Yes	Yes	Yes	Yes	Yes
Japan	0.272	0.706	1.671	-0.008	-0.329	2.528	0.258	0.376	3.538			Yes			Yes
Australia	3.859	4.111	4.491	4.290	3.963	4.580	4.563	4.683	5.680	Yes		Yes	Yes	Yes	Yes
South Korea	3.820	3.900	3.729	2.680	2.358	3.925	2.951	3.072	4.994			Yes			Yes
China	2.431	2.625	2.942	5.196	4.870	4.595	5.470	5.588	5.698	Yes	Yes	Yes	Yes	Yes	Yes
Taiwan	1.134	1.210	1.570	1.888	1.566	3.722	2.157	2.276	4.776	Yes	Yes	Yes	Yes	Yes	Yes
Singapore	3.146	3.225	3.051	3.773	3.449	4.213	4.045	4.165	5.298	Yes	Yes	Yes	Yes	Yes	Yes

**Note:** Cross currency equivalent yield is the yield for an international buyer to purchase US bond in dollar and convert back to its own country's currency.

**Source:** BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

## Acronyms

### Exhibit 40: Common acronyms used in our Municipals reports

This list is subject to change

Acronym	Definition	Acronym	Definition	Acronym	Definition
1Q	First Quarter	HOSP	Hospital	PA	Pennsylvania
2Q	Second Quarter	HY	High Yield	PC	Pollution Control
3Q	Third Quarter	IA	Iowa	PL	Plains
4Q	Fourth Quarter	ICE	Intercontinental Exchange	PPFI	Milliman's Public Pension Funding Index
AIR	Airport	ICMA	International Capital Market Association	Ppt	Percentage point
AK	Alaska	ID	Idaho	PR	Puerto Rico
AL	Alabama	IDR	Industrial Development Revenue	PRE-RE	Pre-refunded
AMT	Alternative Minimum Tax	IG	Investment Grade	PREPA	Puerto Rico Electric Power Authority
Apr	April	IL	Illinois	PROMESA	Puerto Rico Oversight, Management, and Economic Stability Act
AR	Arkansas	IN	Indiana	PWR	Power
ARPA	American Rescue Plan Act	INT	Intermediate term	Q/Q	Quarter-over-quarter
Aug	August	Jan	January	QTD	Quarter-to-date
Avg	Average	Jun	June	R	Rich
AZ	Arizona	KS	Kansas	RI	Rhode Island
BEA	Bureau of Economic Analysis	KY	Kentucky	RM	Rocky Mountain
BLS	Bureau of Labor Statistics	LA	Louisiana	S&L	State and Local
BofA	Bank of America	LCA	Leases, COPs & Appropriations	S&P	Standard & Poor's
Bp	Basis points	LT	Long term	SC	South Carolina
BTN	Back-to-Normal Index	M	Mideast	SD	South Dakota
C	Cheap	M/M	Month-over-month	SE	Southeast
CA	California	MA	Massachusetts	Sep	September
CARES	Coronavirus Aid, Relief, and Economic Security Act	Mar	March	SFH	Single Family Housing



**Exhibit 40: Common acronyms used in our Municipals reports**

This list is subject to change

Acronym	Definition	Acronym	Definition	Acronym	Definition
CB	Census Bureau	MD	Maryland	ST	Short term
CO	Colorado	ME	Maine	SA	Seasonally adjusted
COPs	Certificates of Participation	MFH	Multi-Family Housing	T&T	Toll & Turnpike
CPI	Consumer Price Index	MI	Michigan	TAX	Tax Revenue
CT	Connecticut	MISC	Miscellaneous	TBCO	Tobacco
CUSIP	Committee on Uniform Security Identification Procedures	MMD	Municipal Market Data	TEU	Twenty-Foot Equivalent Units
DC	District of Columbia	MN	Minnesota	TN	Tennessee
DE	Delaware	MO	Missouri	TRAN	Transportation - other
Dec	December	MS	Mississippi	TSA	For Puerto Rico, Treasury Single Account; otherwise, Transportation Security Administration
EAI	Puerto Rico Economic Activity Index	MSA	Metropolitan Statistical Area	TX	Texas
EDU	Education	MT	Montana	US	United States
ESG	Environmental, Social, Governance	MTD	Month-to-date	USVI	US Virgin Islands
ETF	Exchange Traded Fund	N	Neutral	UT	Utah
ETM	Escrowed to Maturity	NASBO	National Association of State Budget Officers	UTL	Utilities - other
Feb	February	NC	North Carolina	VA	Virginia
Fed	Federal Reserve	ND	North Dakota	VC	Very Cheap
FEMA	Federal Emergency Management Agency	NE	Nebraska	VPI	Value of construction put in place
FL	Florida	NED	New England	VR	Very Rich
FOMB	Financial Oversight & Management Board for Puerto Rico	NH	New Hampshire	VRDO	Variable Rate Demand Obligation
FW	Far West	NJ	New Jersey	VT	Vermont
FY	Fiscal year	NM	New Mexico	W&S	Water & Sewer
GA	Georgia	Nov	November	W/W	Week-over-week
GDP	Gross Domestic Product	NV	Nevada	WA	Washington
GL	Great Lakes	NY	New York	WI	Wisconsin
GO	General Obligation	OAS	Option Adjusted Spread	WV	West Virginia
GO-L	Local GO	Oct	October	WY	Wyoming
GO-S	State GO	OH	Ohio	Y/Y	Year-over-year
Govt	Government	OK	Oklahoma	YTD	Year-to-date
HI	Hawaii	OR	Oregon	YTM	Yield to Maturity
HLTH	Healthcare	P&C	Property & Casualty insurance company	YTW	Yield to Worst

Source: BofA Global Research

BofA GLOBAL RESEARCH



# Disclosures

## Important Disclosures

BoFA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible. BoFA Securities fixed income analysts regularly interact with sales and trading desk personnel in connection with their research, including to ascertain pricing and liquidity in the fixed income markets.

## Other Important Disclosures

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BoFA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

This report may refer to fixed income securities or other financial instruments that may not be offered or sold in one or more states or jurisdictions, or to certain categories of investors, including retail investors. Readers of this report are advised that any discussion, recommendation or other mention of such instruments is not a solicitation or offer to transact in such instruments. Investors should contact their BoFA Securities representative or Merrill Global Wealth Management financial advisor for information relating to such instruments.

Rule 144A securities may be offered or sold only to persons in the U.S. who are Qualified Institutional Buyers within the meaning of Rule 144A under the Securities Act of 1933, as amended. SECURITIES OR OTHER FINANCIAL INSTRUMENTS DISCUSSED HEREIN MAY BE RATED BELOW INVESTMENT GRADE AND SHOULD THEREFORE ONLY BE CONSIDERED FOR INCLUSION IN ACCOUNTS QUALIFIED FOR SPECULATIVE INVESTMENT.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

The securities or other financial instruments discussed in this report may be traded over-the-counter. Retail sales and/or distribution of this report may be made only in states where these instruments are exempt from registration or have been qualified for sale.

Officers of BoFA or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

This report, and the securities or other financial instruments discussed herein, may not be eligible for distribution or sale in all countries or to certain categories of investors, including retail investors.

Refer to [BoFA Global Research policies relating to conflicts of interest](#).

**"BoFA Securities" includes BoFA Securities, Inc. ("BoFA") and its affiliates. Investors should contact their BoFA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BoFA Securities" is a global brand for BoFA Global Research.**

### Information relating to Non-US affiliates of BoFA Securities and Distribution of Affiliate Research Reports:

BoFA and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BoFASE (France): BoFA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BoFA Securities Europe SA ("BoFASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no. 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BoFASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BoFASE's share capital can be found at [www.bofam.com/BoFASEdisclaimer](http://www.bofam.com/BoFASEdisclaimer); BoFA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BoFA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BoFA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Investment Industry Regulatory Organization of Canada; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BoFA Japan: BoFA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BoFA India: BoFA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BoFASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BoFA Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BoFA India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to "Wholesale" clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BoFA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BoFA Securities entities, including BoFA Europe and BoFASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BoFA Securities group. You may be contacted by a different BoFA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclaimers](#) for further information.

This information has been prepared and issued by BoFA and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BoFA and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BoFA and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security

discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

#### General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

#### Copyright and General Information:

Copyright 2023 Bank of America Corporation. All rights reserved. iQdatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS or any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.



# Research Analysts

**Yingchen Li**  
Municipal Research Strategist  
BofAS  
[yingchen.li@bofa.com](mailto:yingchen.li@bofa.com)

**Ian Rogow**  
Municipal Research Strategist  
BofAS  
[ian.rogow@bofa.com](mailto:ian.rogow@bofa.com)

**John Lombardi**  
Municipal Research Strategist  
BofAS  
[jlombardi3@bofa.com](mailto:jlombardi3@bofa.com)

**Sophie Yan**  
Municipal Research Strategist  
BofAS  
[sophie.yan@bofa.com](mailto:sophie.yan@bofa.com)

**John Reilly**  
Municipal Research Strategist  
BofAS  
[john.reilly2@bofa.com](mailto:john.reilly2@bofa.com)

