

US Rates Watch

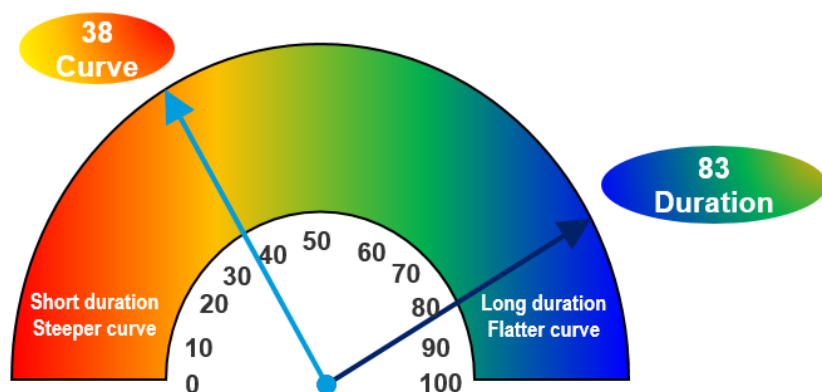
Historic back-end UST fund inflows but curve remains biased to steepen

Supply & demand test

This week's Treasury Quarterly Refunding announcement has garnered incredible focus from clients as auction performance is scrutinized for shifts in demand. While dealer participation has shown a modest pickup, levels remain muted historically (Exhibit 53). Asset managers & investment funds, key components of the UST bid, have shown strong support in our weekly flows data. Last week, there were historic inflows to long term UST funds while asset managers continue to grow long duration positioning in futures. Our futures positioning proxy suggests the curve remains more biased to steepen with the largest concentration of out of the money longs at the back end.

Exhibit 1: Curve-o-meter

CTAs and hedge funds are in steepeners, speculators excluding leveraged funds are long



Source: BoFA Global Research, Note: dials show 5y percentiles for the average non-commercial ex leverage funds & proxy of futures positioning for duration and the average of CTA betas and our proxy for futures positioning for the curve.

BoFA GLOBAL RESEARCH

Bias more mixed but suggests further bear steepening

Our futures positioning proxy (for construction details see: [Gauging positioning in Treasury Futures](#)) shows more dispersion of money-ness across the curve vs recent weeks. Positioning across the front-end and belly of the curve show that longs are more mixed and not as prone to covering while shorts are more out of the money (Exhibit 11). The strongest bias for rates to sell off remains at the back end (Exhibit 12) which leaves the curve vulnerable to further bear steepening ahead of refunding (see: [November refunding preview](#)). On the week through Thursday, open interest increased with more shorts vs longs created. Shorts were destroyed largely at the back end while longs were destroyed at the front end, perhaps reflecting curve steepeners getting closed.

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

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 18 to 19.

Timestamp: 30 October 2023 05:00AM EDT

12618697

30 October 2023

Rates Research
United States

Meghan Swiber, CFA
Rates Strategist
BoFA
+1 646 855 9877
meghan.swiber@bofa.com

Anna (Caiyi) Zhang
Rates Strategist
BoFA
+1 917 826 5142
cai.yi.zhang@bofa.com

US Rates Research
BoFA
+1 646 855 8846

[See Team Page for List of Analysts](#)

UST= Treasury security

CTA= Commodity trading advisor

OTM= out of the money

ITM=in the money

ED= Eurodollars

TIC=Treasury International Capital

QT= quantitative tightening

MoF= ministry of finance

RRP = reverse repo program

SFR = SOFR futures contract

TU = Treasury 2Y futures contract

FV = Treasury 5Y contract

TY = Treasury 10Y contract

UXY = Treasury ultra 10Y contract

US = Treasury 20Y contract

WN = Treasury 30Y contract

TGA= Treasury General Account

TR FI funds = Total return fixed income funds

PPTS = percentage points

JGB = Japanese government bonds

FoF = flow of funds

Asset manager longs continue to climb

CFTC data show that asset managers extend longs to new record highs (Exhibit 7). Besides the US contract, longs were added across the curve but more concentrated at the back end. Similarly, leveraged funds cut shorts in US but extended shorts elsewhere. Speculative positioning excluding leveraged funds also increased on the week and sits above the 80th percentile over the last 5 years (Exhibit 5).

CTAs continue to cover shorts

Our top-down model (see: [CTA impact on the rates market](#)) showed a meaningful increase in the beta between 10y and returns, suggesting that CTAs may be covering UST shorts. (Exhibit 13). Consistent with this, our momentum signal continues to moderate. Our indicators also suggest that CTAs are in steepeners given the more negative beta to long rates vs short rates (Exhibit 14). A key risk to the steepener position that we also continue to favor is a flip in momentum which would likely drive material covering from CTAs and exacerbate flattening moves.

Foreign officials cut UST holdings, increase RRP

Foreign custodial holdings for the week ending Oct 25th dropped by \$7bn while foreign ON RRP grew by \$4bn (Exhibit 34). This likely reflects official institutions building up liquidity after modestly adding to UST holdings over the prior two weeks. Since the peak of holdings in early August, the official sector has reduced UST levels by about \$20bn alongside roughly flat RRP cash.

MoF data show limited Japanese flows into foreign bonds the week ending Oct 20th (Exhibit 27). We expect Japan to remain a more limited buyer of USTs given the extremely negative FX hedged pickup of USTs vs JGBs (Exhibit 22). However, foreign private demand for USTs overall has been strong over the past year (Exhibit 31). This is likely driven by buying from regions with large asset manager bases like Canada & UK, the largest foreign buyers since the start of the year (Exhibit 32). FX hedging cost improved over recent weeks alongside the curve steepening with forwards implying more attractive pickup for UK, EUR, and CAD investors in coming months (Exhibit 20).

Historic inflows into LT UST funds

Fixed income funds saw material inflows the week ending Oct 25th, primarily led by long term government funds (Exhibit 35). At almost \$6bn, flows into long term UST funds were the largest observed historically in EPFR data. About \$3bn reflect flows into TLT ETF, which subsequently saw \$1.2bn outflows at the end of last week. On the other hand, Corporate IG funds saw meaningful outflows, consistent with what we have observed recently and may indicate allocation shifts from credit to USTs.

Funds underperformed the benchmark on an AUM weighted basis the week ending October 26th alongside a rate rally and roughly flat curve (Exhibit 38). The few funds that outperformed had been materially underperforming in prior weeks. Since June, fund outperformance has generally tracked higher alongside rate selloffs. While relative performance can be driven by asset allocation decisions beyond rates, it suggests that overall fund positioning may remain short across many of these funds (Exhibit 42).

Exhibit 2: On deck next week

Calendar of upcoming events

	US Data			Fed Speaker / Event	Treasury Auction			Treasury Settlements	
	Series	BofA	BB Consensus		Security	Amount (\$bn)	Prior Δ	Security	Amount
M, Oct 30				<i>Fed blackout period</i>	13-week bills	75	0		
					26-week bills	68	0		
Tu, Oct 31	Employment Cost Index	0.80%	1%	<i>Fed blackout period</i>	52-week bills	44	0	Bills	35
	Case-Shiller HPI (yoy)	1.50%	-		42-day bills	75	0	Coupons	24
	Chicago Purchasing Managers	45.5	44.8						
	Consumer Confidence	98	100						
W, Nov 1	MBA Mortgage Applications	-	-	FOMC Rate Decision	US Treasury Quarterly Refunding				
	ADP Employment	-	135k	Fed Chair holds press conference following FOMC meeting	17-week bills	NA			
	S&P Global US manufacturing PMI	-	-						
	Construction Spending (mom)	0.50%	0.40%						
	ISM Manufacturing	49.5	49						
	JOLTS Job Openings	-	-						
	FOMC Rate Decision (mid-point)	5.38%	5.38%						
	Total Vehicle Sales	16.4M	15.1M						
Th, Nov 2	Initial Jobless Claims	214k	-	No major events	4-week bills	NA		Bills	55
	Nonfarm Productivity	4.40%	3.80%		8-week bills	NA			
	Unit Labor Costs	-0.30%	1.30%						
	Factory Orders	-	1.00%						
F, Nov 3	Change in Nonfarm Payrolls	230k	168k	No major events					
	Private Payrolls	200k	145k						
	Unemployment Rate	3.70%	3.80%						
	Average Hourly Earnings mom	0.30%	0.30%						
	Average Weekly Hours	34.4	34.4						
	S&P Global US services PMI	-	-						
	ISM Services	53	53						

Source: BofA Global Research, Bloomberg, US Treasury

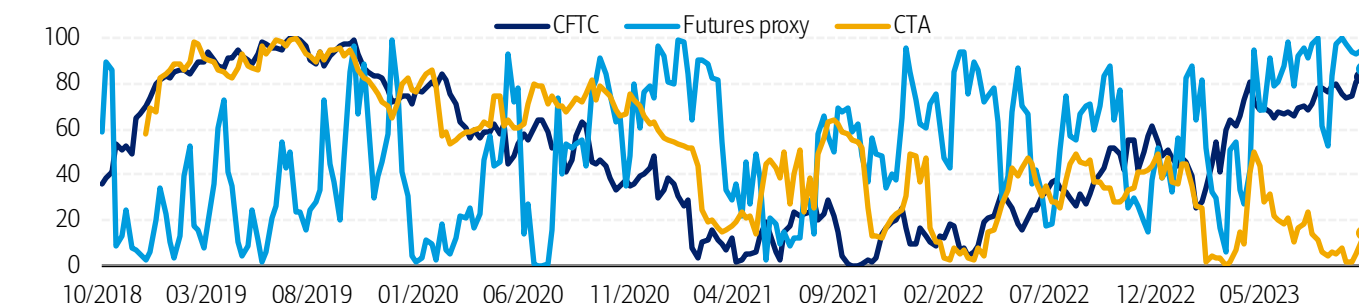
BofA GLOBAL RESEARCH



Positioning indicators

Exhibit 3: 5y percentile of 10 equivalent duration positioning (percentile: higher = longer)

Futures positioning proxy shows bias for rates to sell off, CFTC data adjusted for LFs is long, top down CTA model shows positioning is historically short

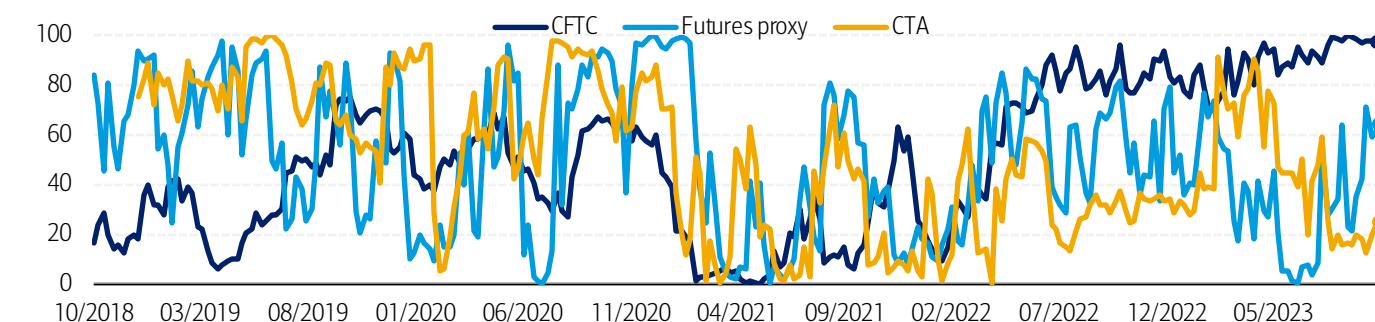


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 4: 5y percentile of curve positioning (percentile: higher = longer back-end relative to front end)

CTAs are in steeper but futures positioning proxy shows bias for back-end to sell off more, CFTC AMs have longs further out curve

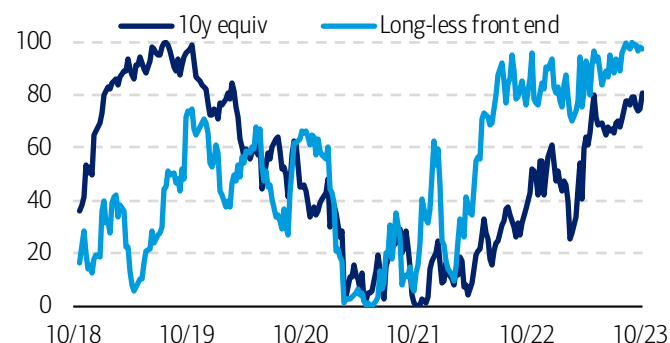


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 5: 5y percentile of non-commercial ex LF positioning

Positioning is historically long and largely concentrated at the back-end

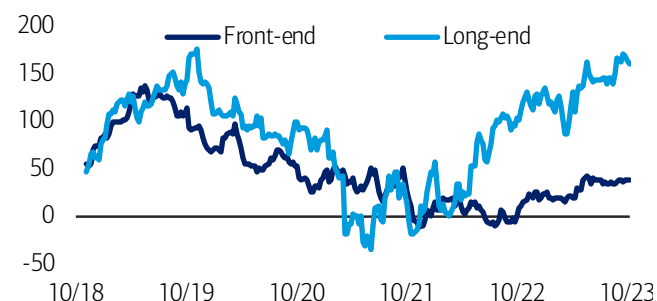


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 6: Non-commercial ex leveraged fund positioning (\$bn, 10y equivalent)

Longs are more concentrated in the back-end

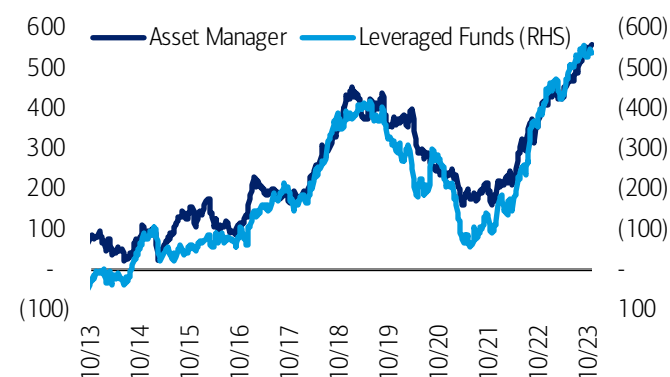


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 7: Asset manager and leveraged fund positioning (10y equivalent, \$bn)

Asset manager longs correspond with leveraged fund shorts

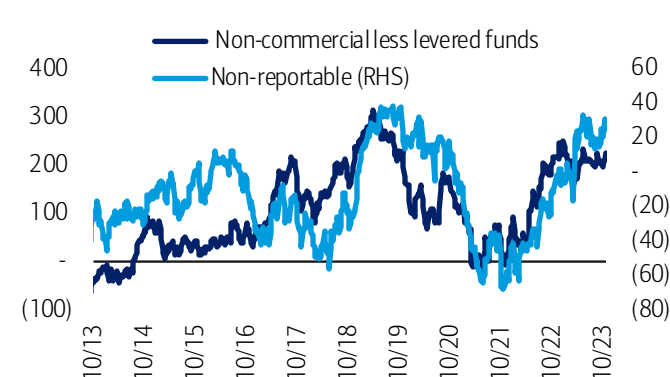


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 8: Non-commercial ex LFs and non-reportable positioning (10y equivalent, \$bn)

Directional positions trend together



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 9: 10y rate change for given percentile of non-commercial ex-Leveraged fund positioning (higher percentile = longer)

Positioning is a momentum signal: longer positioning is usually followed by stronger 10y performance

	0	1w	4w	8w	12w	16w
0 to 10	10	2	1	1	2	3
10 to 20	20	0	3	2	2	4
20 to 30	30	5	3	3	2	4
30 to 40	40	2	4	4	3	3
40 to 50	50	0	0	0	0	1
50 to 60	60	0	-1	0	0	0
60 to 70	70	1	1	1	0	0
70 to 80	80	-3	-2	-2	-2	-1
80 to 90	90	2	0	-1	-2	-4
90 to 100	100	-2	-2	-2	-2	-2

Source: BofA Global Research, Bloomberg, average performance calculated over last 5y

BofA GLOBAL RESEARCH

Exhibit 10: 10y rate change for given percentile of leveraged fund positioning (higher percentile = longer)

Positioning is a contrarian signal: shorter positioning is usually followed by stronger 10y performance

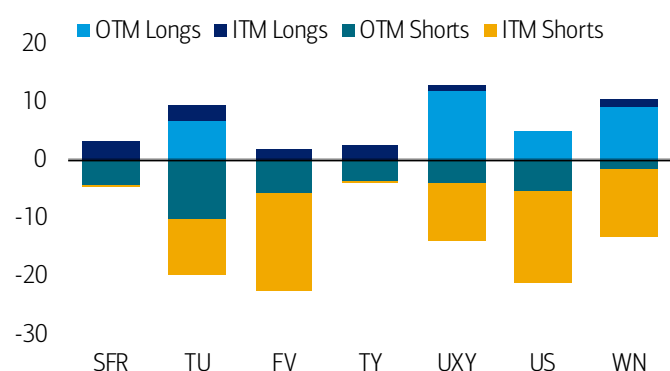
	0	1w	4w	8w	12w	16w
0 to 10	10	6	6	5	5	7
10 to 20	20	-4	-3	-1	-1	0
20 to 30	30	1	-3	-3	-3	-4
30 to 40	40	-6	-2	-3	-3	-5
40 to 50	50	-3	-2	-2	-2	-2
50 to 60	60	5	4	3	2	2
60 to 70	70	2	1	1	3	4
70 to 80	80	4	4	4	4	5
80 to 90	90	2	4	4	4	5
90 to 100	100	-1	-2	-1	0	0

Source: BofA Global Research, Bloomberg, average performance calculated over last 5y

BofA GLOBAL RESEARCH

Exhibit 11: Proxies for futures positioning

On the week, shorts are mixed in the front-end, longs are largely OTM

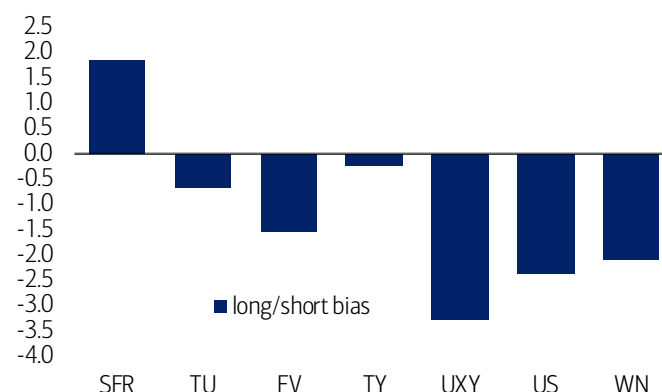


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 12: Analysis of proxies for futures positioning

Bias for rates to sell off in the back-end but signal a buy in SFR

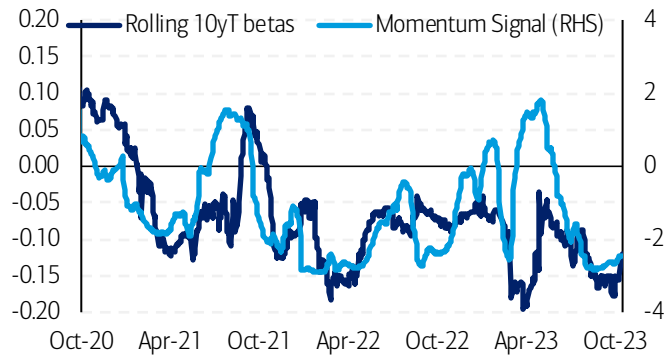


Source: BofA Global Research, Bloomberg, Note: reflects average positioning of futures stack over last 5 days

BofA GLOBAL RESEARCH

Exhibit 13: CTA positioning in 10yT

On the week, CTAs reduced shorts as momentum signal continued to moderate

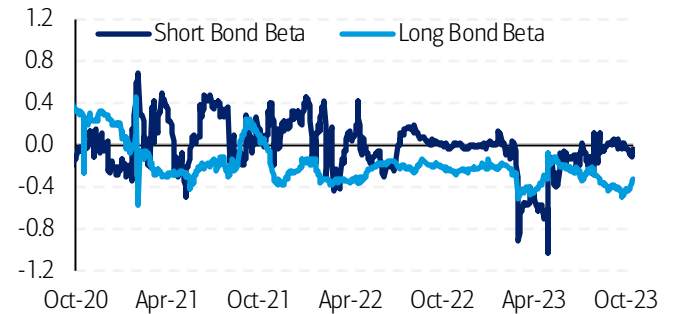


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 14: CTA positioning in longer duration and shorter duration bonds

Top-down model suggests CTAs are positioned for a steeper curve and are short the back-end

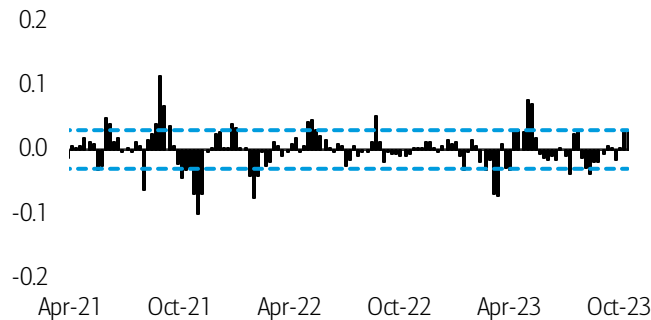


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 15: Changes in CTA 10yT beta

Change in 10y beta is positive on the week

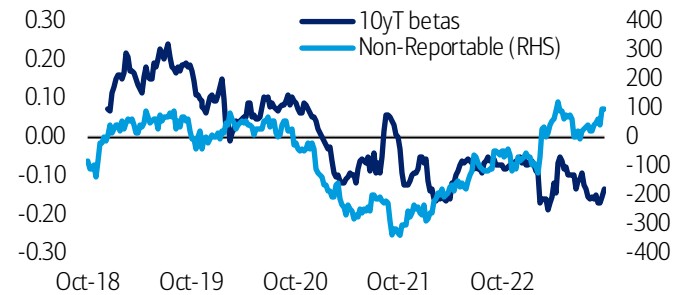


Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 16: CTA 10y TSY beta and non-reportable positions

Strong divergence between non-reportable position and top-down model, which tends to be lagged



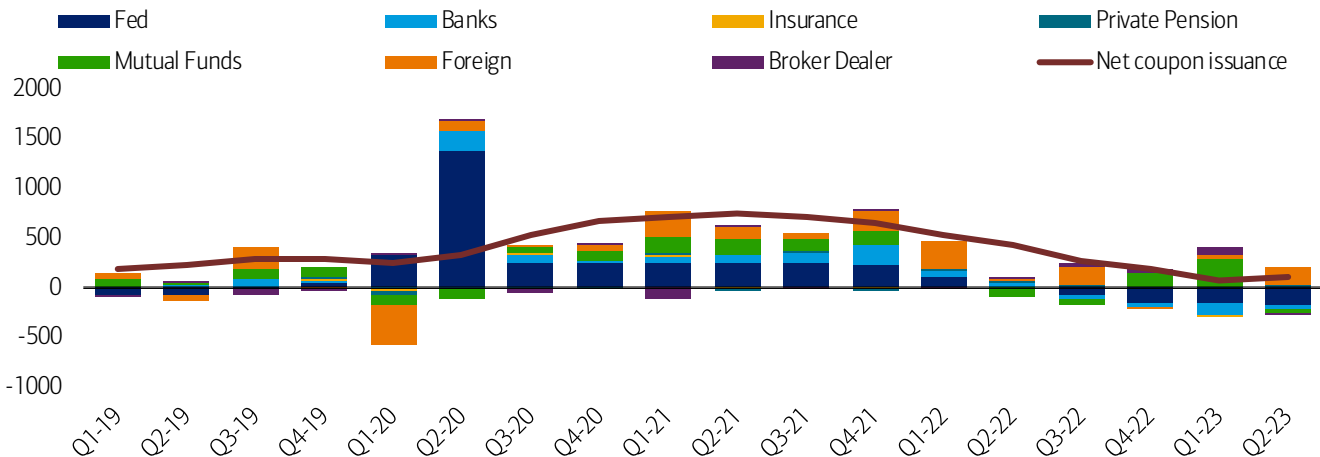
Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Flow of funds

Exhibit 17: Changes in large holders of UST securities (\$bn)

In Q2 foreign investors were largest buyers while Fed and banks reduced UST holdings the most

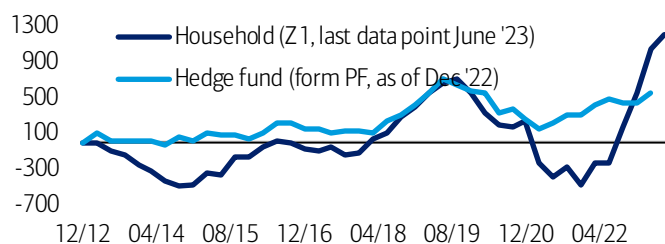


Source: BofA Global Research, Bloomberg, Note: change in levels adjusted for change in rates over the quarter

BofA GLOBAL RESEARCH

Exhibit 18: Change in UST holdings (\$bn)

Hedge funds UST holdings increased last year based on Flow of Funds data and form PF

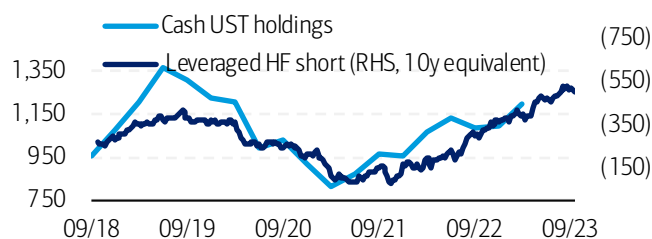


Source: BofA Global Research, Federal Reserve

BofA GLOBAL RESEARCH

Exhibit 19: Hedge fund cash UST holdings vs leveraged fund shorts (\$bn)

Form PF confirms that cash long has grown alongside futures short



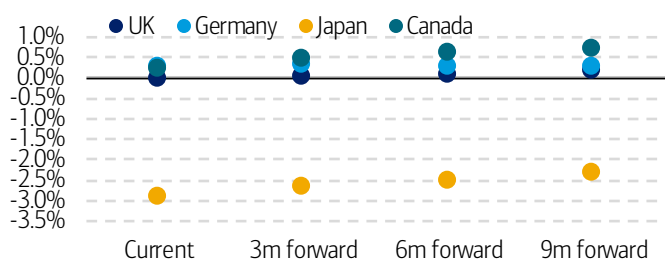
Source: BofA Global Research, Federal Reserve, Bloomberg

BofA GLOBAL RESEARCH

FX hedged pickup and foreign flows

Exhibit 20: FX hedged pickup of TSYs vs local alternatives implied by forwards

Market pricing does not reflect attractive environment for FX hedged carry trades in TSYs currently but forwards suggest improvement

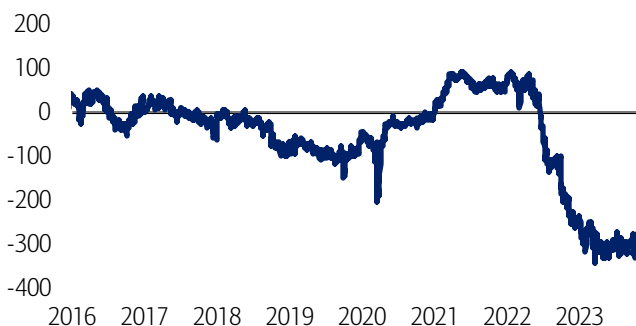


Source: BofA Global Research, Bloomberg. Note: pickup vs 10y local alternative except Japan which is relative to 20y JGB using 3m forward FX hedge

BofA GLOBAL RESEARCH

Exhibit 21: 10Y UST pickup to 20Y JGB, with 3m fx hedge (bps)

10y TSY now offer very negative hedged pickup vs 20yJGBs

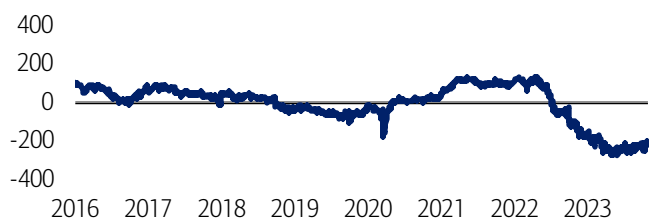


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 22: 10Y UST pickup to 10Y JGB, with 3m fx hedge (bps)

10y TSY now offer very negative hedged pickup vs 10yJGBs

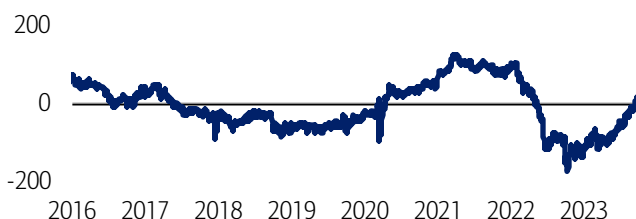


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 23: 10Y UST pickup to 10Y Bund, with 3m fx hedge (bps)

10y TSY offers near zero pickup vs 10y Bund

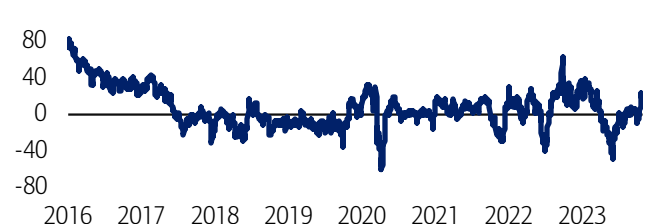


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 24: 10Y UST pickup to 10Y CAD govie, with 3m fx hedge (bps)

10y TSY erased previous modest hedged pickup to 10y CAD gov bond

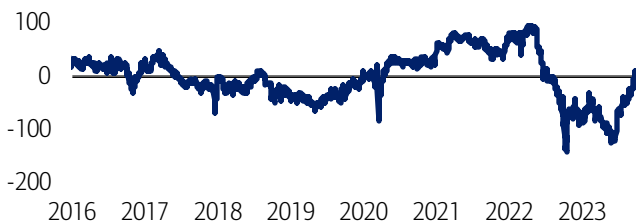


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 25: 10Y UST pickup to 10Y Gilt, with 3m fx hedge (bps)

10y TSY offers flat pickup vs gilts



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH



Exhibit 26: 3m rolling JPY currency hedge

From the perspective of Japanese investor, pickup is negative across all regions

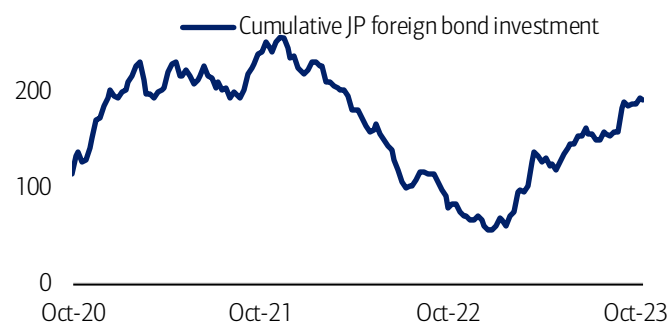
	10/26/2023		As of 1 wk ago		As of 1 mo ago		As of 1 yr ago	
	Pickup to 10y JGB	Pickup to 20Y JGB	Pickup to 10y JGB	Pickup to 20Y JGB	Pickup to 10y JGB	Pickup to 20Y JGB	Pickup to 10y JGB	Pickup to 20Y JGB
10y UST	-2.14%	-2.94%	-2.04%	-2.83%	-2.44%	-3.16%	-1.21%	-2.16%
10y GER	-2.39%	-3.18%	-2.31%	-3.10%	-2.31%	-3.03%	-0.04%	-0.98%
10y FRA	-1.77%	-2.56%	-1.69%	-2.48%	-1.75%	-2.47%	0.50%	-0.44%
10y BEL	-1.73%	-2.52%	-1.66%	-2.45%	-1.66%	-2.37%	0.57%	-0.37%
10y ITA	-0.40%	-1.20%	-0.30%	-1.09%	-0.39%	-1.10%	2.17%	1.23%
10y SPA	-1.29%	-2.09%	-1.21%	-2.00%	-1.23%	-1.94%	1.05%	0.11%
10y UK	-2.10%	-2.90%	-2.02%	-2.81%	-2.28%	-3.00%	-0.48%	-1.43%
10y CAN	-2.35%	-3.15%	-2.26%	-3.05%	-2.35%	-3.07%	-1.41%	-2.35%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 27: Japan investment in foreign bonds, cumulative weekly (\$bn)

Long & medium term bonds (\$bn) holdings little changed on the week

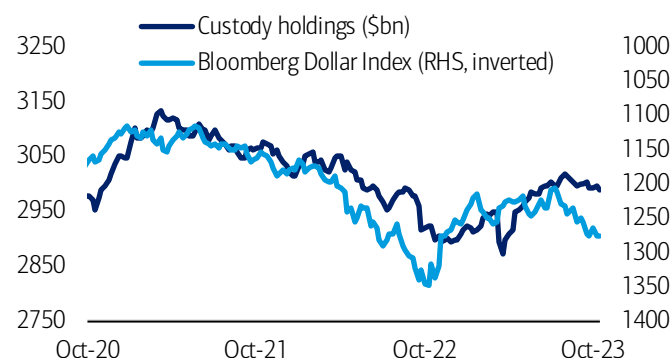


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 28: Weekly UST custody holdings, foreign official (\$bn)

Custody holdings dropped on the week

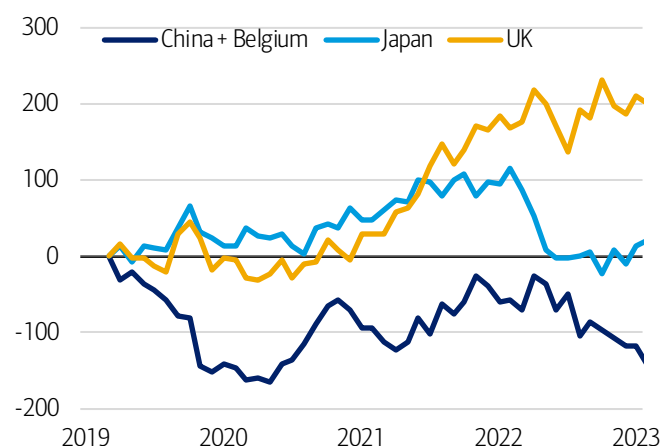


Source: BofA Global Research, NY Fed

BofA GLOBAL RESEARCH

Exhibit 29: Cumulative UST flows from foreign investors (\$bn)

China + Belgium have turned to net sellers since end of '22, Japan roughly flat after selling last year

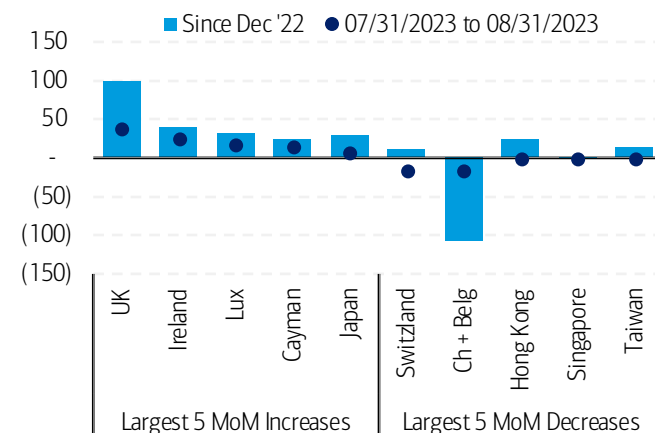


Source: BofA Global Research, Bloomberg, TIC, note: references the valuation-adjusted flow

BofA GLOBAL RESEARCH

Exhibit 30: Largest MoM changes in foreign TSY holdings (\$bn)

UK was largest buyer, Switzerland largest seller in August

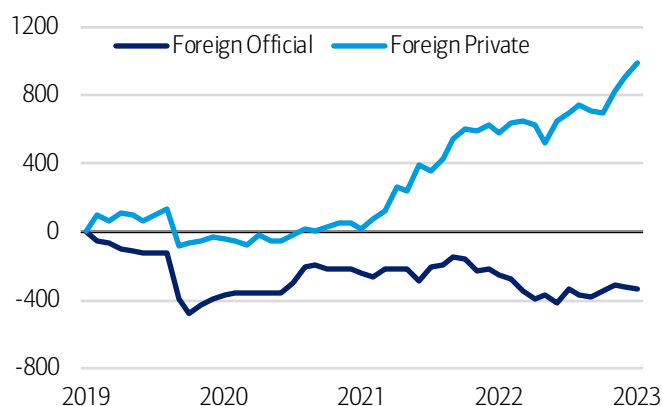


Source: BofA Global Research, TIC, Note: adjusted for level of rates

BofA GLOBAL RESEARCH

Exhibit 31: Cumulative UST flows from foreign investors (\$bn)

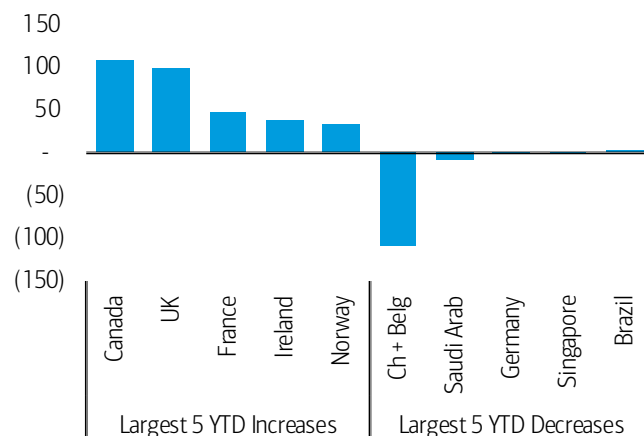
While official UST holdings have declined in recent years, foreign private investors have more than offset



Source: BofA Global Research, Bloomberg, TIC, note: references the valuation-adjusted flow
BofA GLOBAL RESEARCH

Exhibit 32: Largest YTD changes in foreign TSY holdings (\$bn)

Canada, UK were largest buyers, while China was largest seller

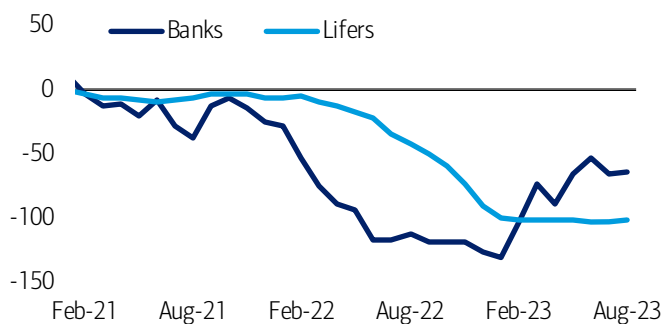


Source: BofA Global Research, TIC, Note: adjusted for level of rates

BofA GLOBAL RESEARCH

Exhibit 33: Cumulative change in Japanese investor foreign bond holdings (\$bn)

While banks and lifers have reduced foreign bond holdings in the last year, banks have recently turned modest buyers while lifer demand has been flat

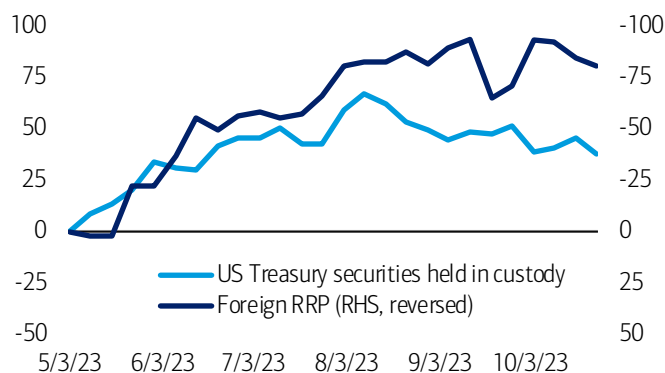


Source: BofA Global Research, Bloomberg, Note: JPY flow converted to USD using end of month FX level, last data point is June '23

BofA GLOBAL RESEARCH

Exhibit 34: Cumulative change in custody holdings and foreign RRP since May 2023 (\$bn)

Dropped in custody holdings accompanied by decline in foreign RRP



Source: BofA Global Research, Federal Reserve, Bloomberg

BofA GLOBAL RESEARCH

Fund flows and returns

Exhibit 35: US fixed income fund flows (\$million)

US FI funds saw significant inflows on the week primarily in govt long funds, outflows seen primarily in corp IG

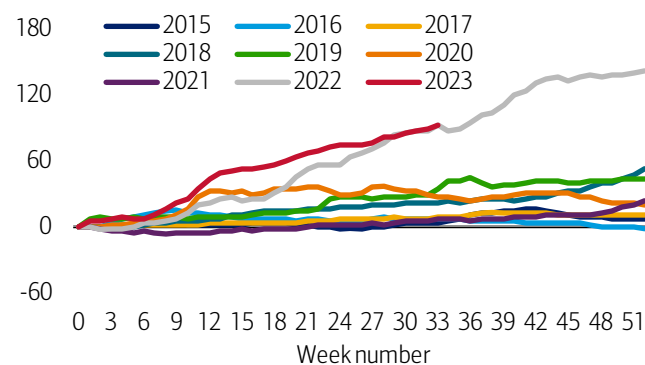
	10/25/2023	Rolling 4w average	Rolling 8w average	Rolling 12w average	Rolling 52w average
Gov: short	1,790	2,333	1,863	1,854	1,066
Gov: intermediate	1,132	692	470	458	345
Gov: long	5,671	2,564	1,636	1,315	1,267
Corp: IG	(2,442)	(1,183)	(1,133)	(852)	205
Corp:HY	(899)	(1,634)	(1,068)	(786)	(242)
Corp: all quality	(13)	32	42	36	29
MBS	1,390	571	371	289	246
Inflation	(880)	(337)	(264)	(368)	(442)
Muni	(233)	(303)	(463)	(224)	(183)
Mixed allocation	1,525	1,645	1,738	1,627	1,559
All US FI	5,659	3,692	2,940	3,190	3,371

Source: BofA Global Research, EPFR

BofA GLOBAL RESEARCH

Exhibit 36: Sovereign fund inflows by year (\$bn)

Flows YTD are on track with highs of last year

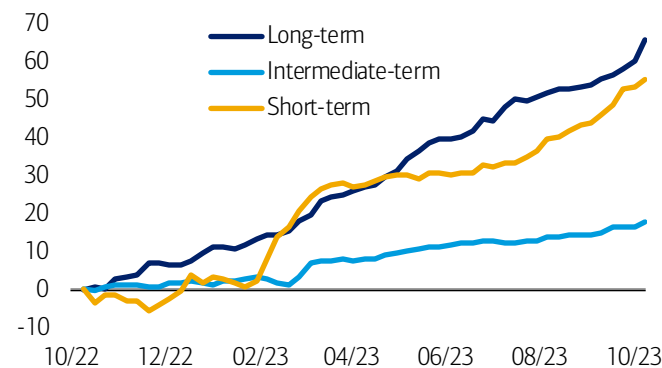


Source: BofA Global Research, EPFR

BofA GLOBAL RESEARCH

Exhibit 37: Sovereign inflows by tenor (\$bn)

Inflows have been concentrated in long-term and short-term funds

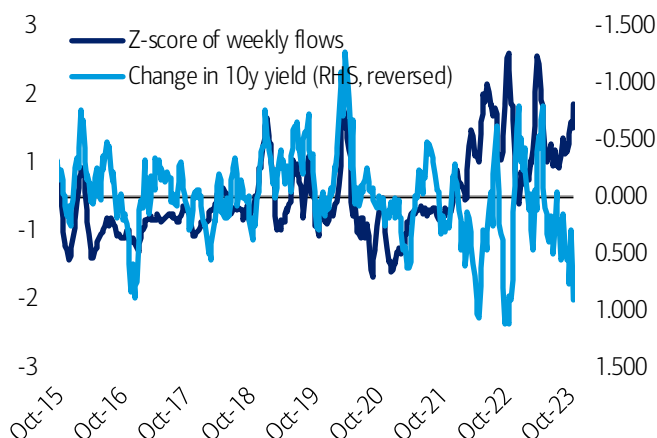


Source: BofA Global Research, EPFR

BofA GLOBAL RESEARCH

Exhibit 38: Fund flows and rate change (Z-score)

Fund flows recently have been historically strong alongside rates rally

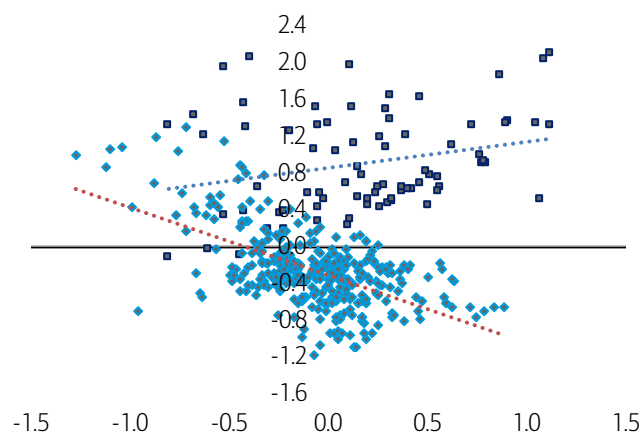


Source: BofA Global Research, EPFR

BofA GLOBAL RESEARCH

Exhibit 39: Fund flows and rate change

Since start of '22, fund flows are less negatively correlated to change in rates



Source: BofA Global Research, EPFR, Bloomberg, Note: dark = post '22, light = '15-'22

BofA GLOBAL RESEARCH

Exhibit 40: Total return FI fund performance vs benchmark

Over the last week, AUM weighted fund performance was below benchmark

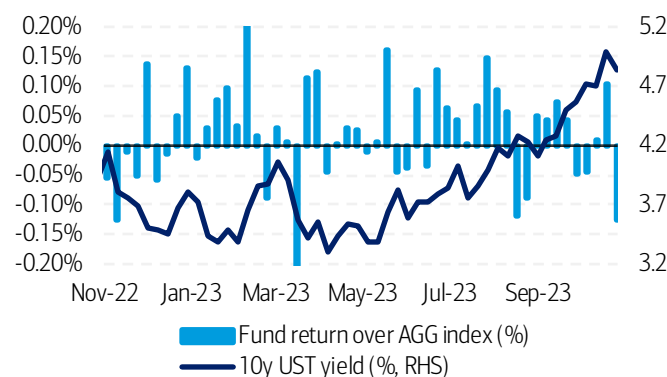
	AUM (\$Bn)	10/26/2023	Vs. Agg	Last 4w	Vs. Agg
Vanguard Total Bond Market II Index Fund	250	0.97%	-0.07%	-1.28%	0.05%
Vanguard Total Bond Market Index Fund	197	0.96%	-0.08%	-1.27%	0.06%
PIMCO Income fund	127	0.63%	-0.41%	-1.17%	0.17%
The Bond Fund of America	74	0.93%	-0.11%	-1.34%	-0.01%
MetWest Total Return Bond Fund	54	1.05%	0.01%	-1.87%	-0.53%
PIMCO Total Return Fund	52	0.96%	-0.08%	-1.75%	-0.42%
Dodge & Cox Income Fund	57	0.86%	-0.17%	-1.60%	-0.27%
PGIM Total Return Bond Fund	40	0.90%	-0.13%	-1.40%	-0.06%
BlackRock Strategic Income Opportunities Fund	35	0.43%	-0.61%	-0.31%	1.02%
Baird Aggregate Bond Fund	40	0.99%	-0.05%	-1.40%	-0.07%
JPMorgan Core Bond Fund	40	0.84%	-0.20%	-1.43%	-0.10%
DoubleLine Total Return Bond Fund	31	0.98%	-0.06%	-1.62%	-0.29%
Fidelity Series Investment Grade Bond Fund	33	1.05%	0.02%	-1.35%	-0.01%
Fidelity Total Bond Fund	31	0.88%	-0.16%	-1.53%	-0.20%
Western Asset Core Plus Bond Portfolio	21	1.27%	0.23%	-2.14%	-0.81%
Baird Core Plus Bond Fund	24	0.87%	-0.16%	-1.44%	-0.10%
John Hancock Bond Fund	22	0.89%	-0.15%	-1.84%	-0.51%
TIAA-CREF Bond Index Fund	21	1.07%	0.04%	-1.29%	0.04%
BlackRock Total Return Fund	17	0.95%	-0.09%	-1.68%	-0.35%
JPMorgan Core Plus Bond Fund	16	0.89%	-0.14%	-1.31%	0.02%
Bridge Builder Core Bond Fund	16	1.04%	0.00%	-1.32%	0.01%
T Rowe Price New Income Fund	16	0.75%	-0.29%	-1.75%	-0.42%
Western Asset Core Bond Fund	14	1.21%	0.18%	-1.97%	-0.64%
CREF Bond Market Account	10	0.87%	-0.17%	-1.48%	-0.14%
Fidelity Investment Grade Bond Fund	8	0.97%	-0.06%	-1.31%	0.03%
DoubleLine Core Fixed Income Fund	7	0.92%	-0.11%	-1.50%	-0.16%
TCW Total Return Bond Fund	3	0.95%	-0.09%	-2.33%	-0.99%
Janus Henderson Flexible Bond Fund	3	1.01%	-0.02%	-1.55%	-0.22%
Weighted avg	1259	0.91%	-0.13%	-1.39%	-0.05%
Agg		1.04%		-1.33%	
10y return		1.45%		-2.70%	

Source: BofA Global Research, Bloomberg, Note: Excess returns are fund total returns over Bloomberg Barclays Agg Index

BofA GLOBAL RESEARCH

Exhibit 41: Total return funds, excess return vs. 10y rate

Weekly asset-weighted total returns for total return funds. Funds return below benchmark on the week

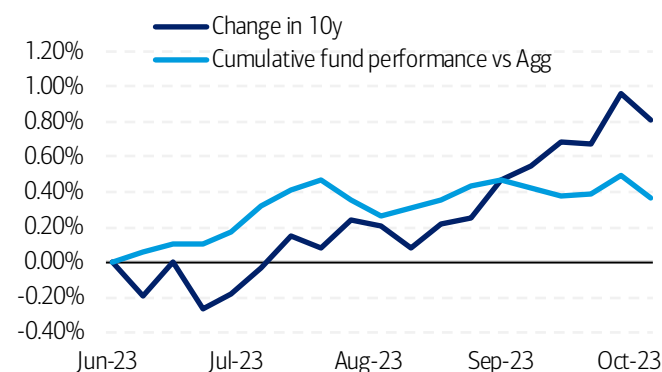


Source: BofA Global Research, Bloomberg. Note: Excess returns are fund total returns over Bloomberg Barclays Agg index

BofA GLOBAL RESEARCH

Exhibit 42: Cumulative return of TR FI funds over benchmark vs 10yT

Funds have modestly outperformed since start of the year



Source: BofA Global Research, Bloomberg. Note: Excess returns are fund total returns over Bloomberg Barclays Agg index

BofA GLOBAL RESEARCH

Exhibit 43: Total return funds' published UST allocations vs benchmark from Q1 and Q2 '23

Funds moderated underweight UST position from Q1 to Q2

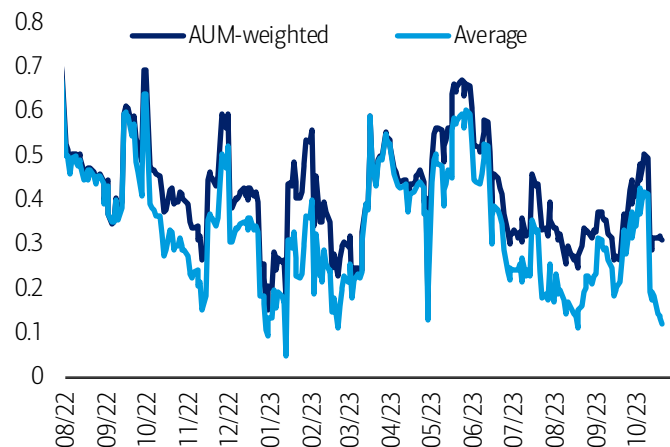
		AUM (\$bn)	Q1 '23 (%)	Q2 '23 (%)	Change (PPTS)
VTBIX	Vanguard Total Bond Market II Index Fund	250.0	2.4	2.1	-0.3
VBMFX	Vanguard Total Bond Market Index Fund	197.0	1.7	1.4	-0.3
PIMIX	PIMCO Income fund	127.4	-43.4	-34.1	9.3
ABNDX	The Bond Fund of America	73.6	-11.3	-14.0	-2.7
DODIX	Dodge & Cox Income Fund	56.5	-28.1	-32.7	-4.6
MWTIX	MetWest Total Return Bond Fund	54.2	-16.5	-18.7	-2.2
PTTRX	PIMCO Total Return Fund	52.5	-15.4	-18.6	-3.2
PGBOX	JPMorgan Core Bond Fund	40.3	-5.0	-2.2	2.8
PDBAX	PGIM Total Return Bond Fund	40.1	-33.7	-34.2	-0.5
BAGIX	Baird Aggregate Bond Fund	39.6	-16.9	-17.7	-0.8
BSIIX	BlackRock Strategic Income Opportunities Fund	35.0	-17.3	-23.4	-6.1
FSIGX	Fidelity Series Investment Grade Bond Fund	33.3	-7.5	-10.1	-2.6
DBLTX	DoubleLine Total Return Bond Fund	31.2	-32.7	-32.8	-0.1
FTBFX	Fidelity Total Bond Fund	31.2	-12.0	-12.5	-0.4
BCOIX	Baird Core Plus Bond Fund	24.2	-18.5	-18.4	0.1
JHBI	John Hancock Bond Fund	21.6	-22.8	-22.5	0.3
WACPX	Western Asset Core Plus Bond Portfolio	21.4	-33.7	-38.0	-4.3
TBIIX	TIAA-CREF Bond Index Fund	20.9	0.8	0.3	-0.5
MAHQX	BlackRock Total Return Fund	17.3	-13.7	88.0	101.7
ONIA	JPMorgan Core Plus Bond Fund	16.3	-5.1	-2.9	2.2
BBTBX	Bridge Builder Core Bond Fund	15.8	-22.1	-23.0	-0.9
PRCIX	T Rowe Price New Income Fund	15.5	-16.2	-11.8	4.4
WATFX	Western Asset Core Bond Fund	13.8	-30.7	-31.1	-0.4
QCBMIX	CREF Bond Market Account	10.2	-21.1	-22.6	-1.5
FBNDX	Fidelity Investment Grade Bond Fund	8.2	-5.7	-0.3	5.4
DBLFX	DoubleLine Core Fixed Income Fund	6.6	-16.9	-17.9	-1.0
JFLEX	Janus Henderson Flexible Bond Fund	2.7	-11.3	-17.9	-6.7
TGLMX	TCW Total Return Bond Fund	2.6	-38.5	-39.6	-1.1
AUM weighted		1258.7	-13.3	-11.8	1.4

Source: BofA Global Research, funds' publicly available reports

BofA GLOBAL RESEARCH

Exhibit 44: Rolling 30-day correlation between excess return and change in 10y UST yield

A higher correlation between the two would suggest that when UST yields increase, excess return is higher (more short), recent decline may suggest moderation in short positioning

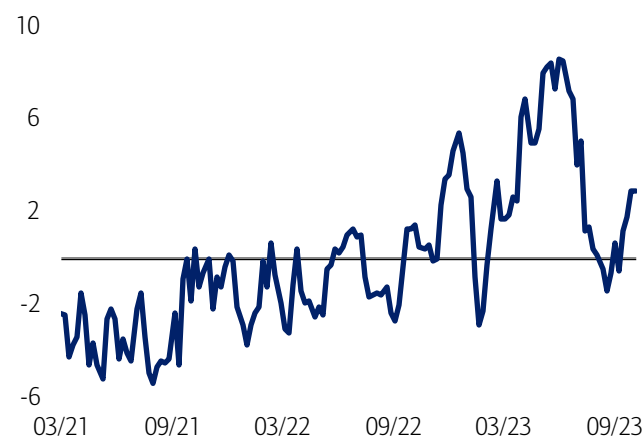


Source: BofA Global research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 45: Primary dealer 2-6y holdings of TIPS (\$bn)

Primary dealer holdings have modestly recovered from the decline since end of June



Source: BofA Global research, Note: cumulative change since 2021 reflects adjustment for change in market value

BofA GLOBAL RESEARCH

Bank balance sheets

Exhibit 46: Changes to bank balance sheet assets (\$bn)

Domestic bank balance saw decrease in assets driven by cash

		Current	1w change	Rolling 4w avg wkly chg	Rolling 8w avg wkly chg	Rolling 12w avg wkly chg	Rolling 52w avg wkly chg
All (\$bn, NSA)	Total Assets	22868	-115	30	11	11	4
	Cash	3343	-85	27	11	11	5
	UST & Agency	1516	-7	-1	2	1	-3
	MBS	2509	-8	-13	-9	-6	-5
	Loans and Leases	12196	-12	4	7	6	8
	Other	3304	-3	14	1	-2	-1
Large Domestic (\$bn, NSA)	Total Assets	13284	-108	18	9	8	-1
	Cash	1601	-98	18	11	10	4
	UST & Agency	1114	-3	-1	1	1	-3
	MBS	1907	-6	-7	-6	-3	-2
	Loans and Leases	6737	-9	0	2	0	1
	Other	1925	8	9	1	0	-2
Small Domestic (\$bn, NSA)	Total Assets	6526	-10	3	1	3	2
	Cash	438	-11	5	1	0	1
	UST & Agency	295	0	2	1	0	-1
	MBS	577	-2	-6	-3	-2	-4
	Loans and leases	4422	1	2	3	5	6
	Other	794	2	0	0	0	0
All Domestic (\$bn, NSA)	Total Assets	19810	-118	22	10	11	2
	Cash	2039	-109	23	12	10	5
	UST & Agency	1409	-3	1	2	1	-3
	MBS	2483	-7	-13	-9	-6	-5
	Loans and leases	11160	-8	2	5	6	7
	Other	2719	10	9	1	0	-2
Foreign (\$bn, NSA)	Total Assets	3058	3	9	1	0	2
	Cash	1305	24	4	-1	1	0
	UST & Agency	106	-3	-2	0	0	0
	MBS	26	-1	0	0	0	0
	Loans and leases	1036	-5	2	2	1	1
	Other	585	-13	5	0	-2	1

Source: BofA Global Research, Federal Reserve, Bloomberg

BofA GLOBAL RESEARCH



Exhibit 47: Select bank balance sheet liabilities (\$bn, NSA)

Domestic liability decline driven by deposits

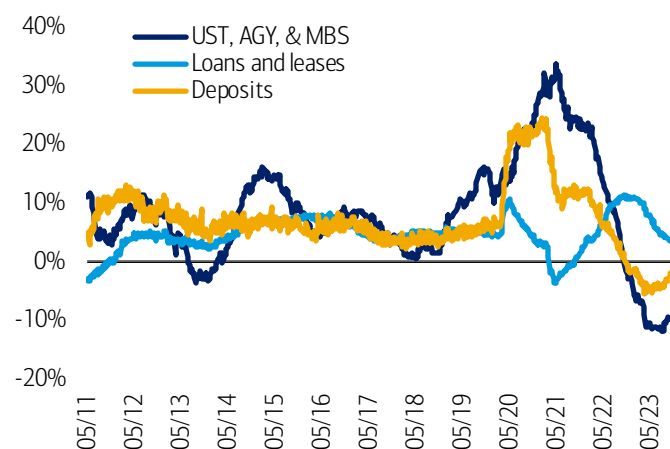
		Current	1w change	Rolling 4w avg wkly chg	Rolling 8w avg wkly chg	Rolling 12w avg wkly chg	Rolling 52w avg wkly chg
Deposits (\$bn, NSA)	All	17224	-129	-3	-3	2	-9
	Domestic	15963	-117	3	0	4	-9
	Large Domestic	10692	-101	0	-3	-1	-8
	Small Domestic	5271	-16	4	3	5	-1
	Foreign	1261	-12	-7	-2	-2	0
Other borrowing (\$bn, NSA)	All	2359	-14	19	12	8	12
	Domestic	1352	1	11	9	7	9
	Large Domestic	920	-3	11	12	10	7
	Small Domestic	432	3	-1	-2	-2	2
	Foreign	1007	-15	9	3	1	3

Source: BofA Global Research, Federal Reserve, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 48: YoY change in securities, loans, and deposits

Securities growth usually only positive when deposit growth is positive

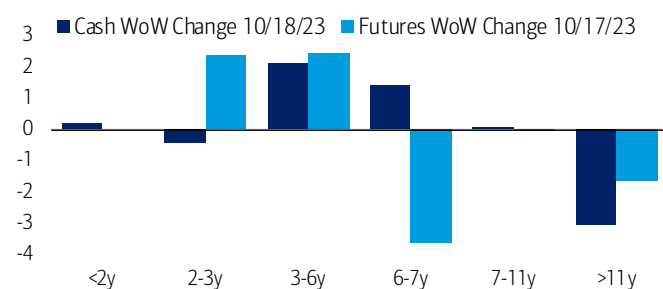


Source: BofA Global Research, Bloomberg, Federal Reserve

BofA GLOBAL RESEARCH

Primary dealer balance sheet**Exhibit 49: Dealers WoW change in positions**

10y equivalent, \$bn, cash positions higher in the belly but lower in the back-end

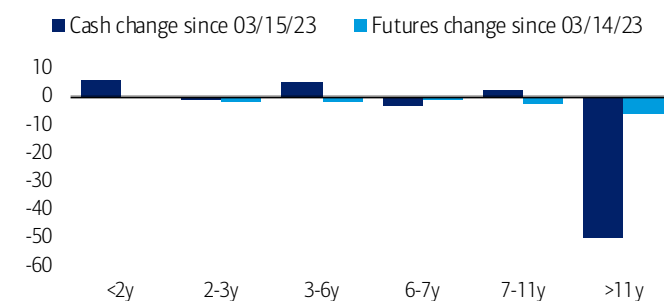


Source: BofA Global Research, NY Fed, CFTC

BofA GLOBAL RESEARCH

Exhibit 50: Dealers change in positions since bank risk events

10y equivalent, \$bn, cash positions lower at back-end

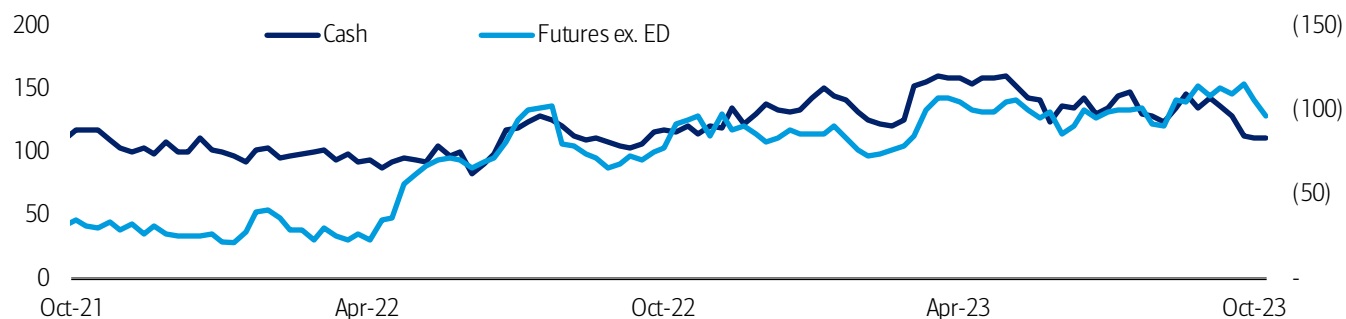


Source: BofA Global Research, NY Fed, CFTC

BofA GLOBAL RESEARCH

Exhibit 51: Dealers total sector positions

10y equivalent, \$bn, short futures & long cash dropped on the week



BofA GLOBAL RESEARCH

Auction statistics**Exhibit 52: Auction summary statistics**

Z-score calculated on levels, Investment fund participation in auctions remains robust

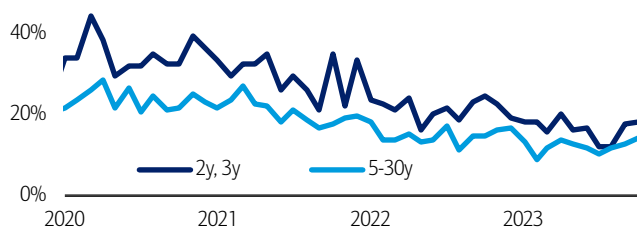
		Primary Dealer	Indirect Bidder	Direct Bidder	Investment Fund	Foreign	Depository Institution
2y	10/2/2023	14.0%	65.0%	21.0%	68.8%	13.9%	0.0%
	MoM Change	-1.0%	0.0%	1.0%	-1.1%	1.5%	0.0%
	1Y Z-score	-1.0	0.6	0.0	1.0	-0.5	-0.4
3y	10/16/2023	22.1%	56.0%	21.9%	62.8%	13.1%	0.0%
	MoM Change	1.8%	-1.7%	-0.2%	-0.7%	-0.4%	0.0%
	1Y Z-score	0.9	-1.1	0.9	-0.2	-0.8	0.1
5y	10/2/2023	11.2%	17.6%	71.1%	73.7%	13.4%	0.1%
	MoM Change	-2.6%	-0.7%	3.2%	-1.1%	3.4%	0.1%
	1Y Z-score	-0.7	-0.4	0.7	0.8	-0.1	1.2
7y	10/2/2023	14.6%	65.5%	19.9%	70.7%	13.0%	0.0%
	MoM Change	4.8%	-9.8%	4.9%	-10.0%	4.7%	0.0%
	1Y Z-score	0.4	-0.5	0.3	-0.1	0.0	-0.5
10y	10/16/2023	18.7%	60.3%	20.9%	66.1%	11.6%	0.0%
	MoM Change	4.9%	-6.0%	1.0%	-1.5%	-4.6%	0.0%
	1Y Z-score	0.5	-0.7	0.8	-0.1	-0.4	-0.6
20y	10/2/2023	9.3%	65.4%	25.4%	72.9%	15.4%	0.0%
	MoM Change	-2.1%	-3.1%	5.2%	-2.6%	5.0%	0.0%
	1Y Z-score	-0.3	-1.3	2.3	-0.1	0.3	#DIV/0!
30y	10/16/2023	18.2%	65.1%	16.7%	69.0%	10.6%	0.0%
	MoM Change	2.4%	0.6%	-3.0%	2.1%	-4.2%	0.0%
	1Y Z-score	1.9	-0.9	-1.4	-0.4	-0.9	1.1

Source: BofA Global Research, Treasury

BofA GLOBAL RESEARCH

Exhibit 53: Primary dealer – average auction allotment

Dealer participation has leveled

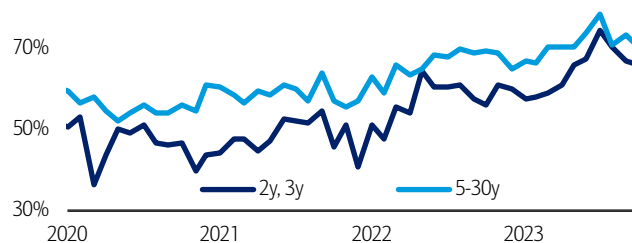


Source: BofA Global Research, Treasury

BofA GLOBAL RESEARCH

Exhibit 54: Investment fund – average auction allotment

Fund participation still elevated but shows sign of decline

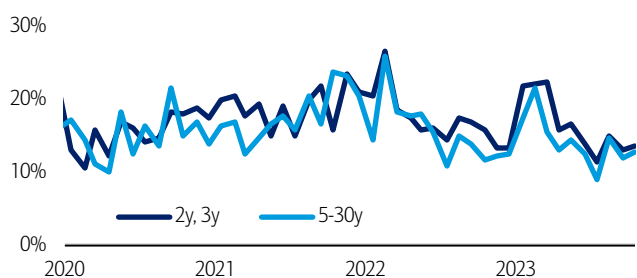


Source: BofA Global Research, Treasury

BofA GLOBAL RESEARCH

Exhibit 55: Foreign investment – average auction allotment

Foreign participation still below average despite modest uptick in recent weeks

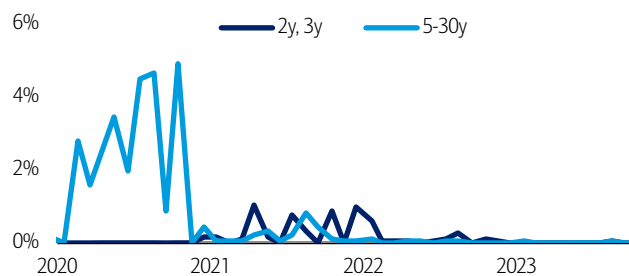


Source: BofA Global Research, Treasury

BofA GLOBAL RESEARCH

Exhibit 56: Depository institutions – average auction allotment

Participation is minimal



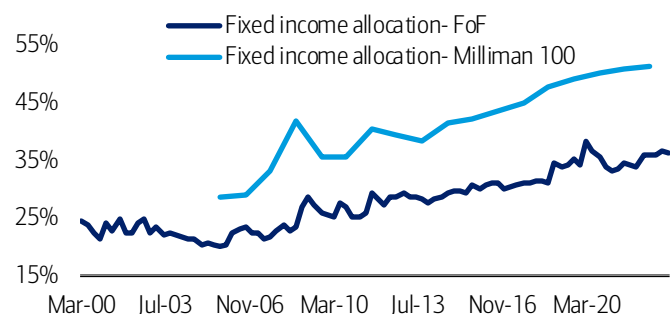
Source: BofA Global Research, Treasury

BofA GLOBAL RESEARCH

Pensions

Exhibit 57: DB private pension fixed income allocation from Flow of Funds and smaller Milliman subset

Milliman funds have shown more de-risking than broader private DB pension funds according to FoF

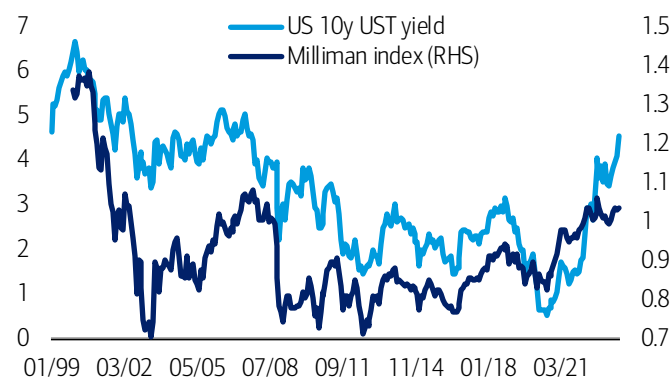


Source: BofA Global Research, Milliman, Federal Reserve

BofA GLOBAL RESEARCH

Exhibit 58: 10y UST yield and Milliman pension funded index

Funded status historically improves with an increase in interest rates

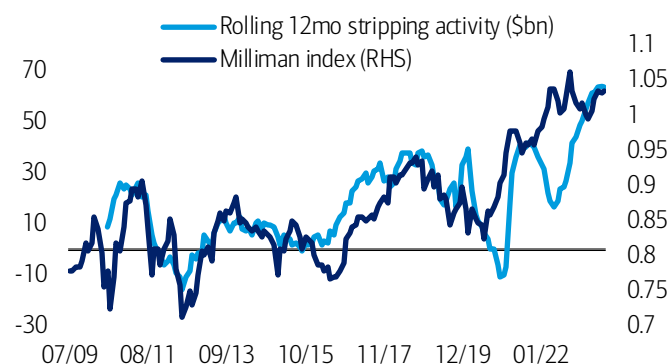


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 59: Milliman index and 12mo increase in USTs held in stripped form

Higher pension funded status aligns with higher stripping activity

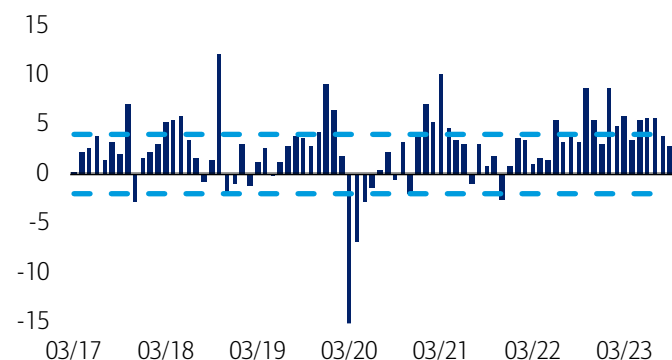


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 60: Change in USTs held in stripped form (\$bn)

Stripping activity cooled modestly in August

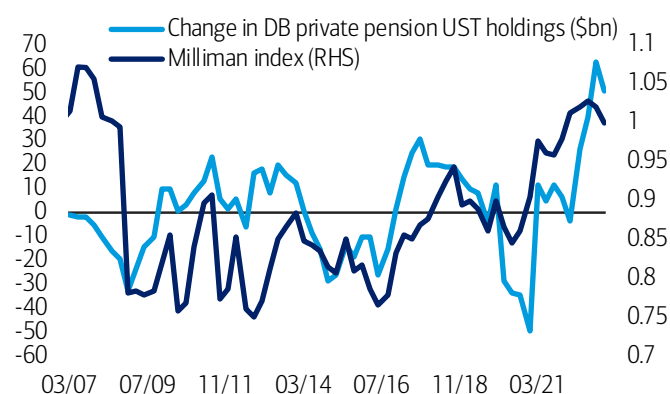


Source: BofA Global Research, Note: dashed line is 1stdev

BofA GLOBAL RESEARCH

Exhibit 61: UST holdings of private DB pensions and funded status

When funded status is higher, pension funds buy more USTs



Source: BofA Global Research, Bloomberg, Federal Reserve

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 BofAS 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. ("BofAS") 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:

BofAS 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; 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; BofAS 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; BofAS 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 BofAS 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 BofAS 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 BofAS 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. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS 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.

This report may contain a trading idea or recommendation which highlights a specific identified near-term catalyst or event impacting a security, issuer, industry sector or the market generally that presents a transaction opportunity, but does not have any impact on the analyst's particular "Overweight" or "Underweight" rating (which is based on a three month trade horizon). Trading ideas and recommendations may differ directionally from the analyst's rating on a security or issuer because they reflect the impact of a near-term catalyst or event.

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

US Rates Research

Ralph Axel
Rates Strategist
BofA
ralph.axel@bofa.com

Bruno Braizinha, CFA
Rates Strategist
BofA
bruno.braizinha@bofa.com

Mark Cabana, CFA
Rates Strategist
BofA
mark.cabana@bofa.com

Katie Craig
Rates Strategist
BofA
katie.craig@bofa.com

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.