

Situation Room

Higher rates = shorter supply

Higher rates = shorter supply

IG companies prefer to issue more in the front-end after interest rise. In contrast yield-sensitive investor demand is concentrated in the back-end. As a result, a big jump in interest rates typically leads to both less supply and more demand for 20 and 30yr bonds. We expect this positive technical to flatten 10s30s IG non-financial spread curve. In fact, the spread curve already trading steep to the current level of interest rates, which our rates strategists expect to persist into the year-end (see [Yield revisions following improved outlook](#)). We screen for the steepest IG spread curves.

Daily credit snapshot

US IG issuance totaled \$14.5bn across 9 deals today and \$29.6bn MTD. The average new issue concession was 9.5bps today, while the average break performance was 1.6bps tighter today. S&P 500 closed +0.90%, 10-year Treasury yields +6bps, CDX IG -1.5bps, CDX HY +\$0.26pts, and cash bond spreads quoted from +1bp to -2bps today, LQD closed 1.45bps tighter today.

Credit Market Strategist

We published the latest Credit Market Strategist on Friday. See inside for more details.

Daily dealer inventories update

-\$23mn (notional), -\$78,000 (DV01) today. Maturities and sectors inside.

Daily foreign demand tracker

We track dealer-to-affiliate volumes on Trace that are correlated with foreign buying.

07 August 2023

Credit Strategy
United States
Cross Product

Yuri Seliger
Credit Strategist
BofAS
+1 646 855 7209
yuri.seliger@bofa.com

Jean-Tiago Hamm
Credit Strategist
BofAS
jean-tiago.hamm@bofa.com

Srini Talagadadevi
Credit Strategist
BofAS
sreenivasa.rao@bofa.com

Research Overview — The Situation

Higher rates = shorter supply

IG companies prefer to issue more in the front-end after interest rise. In contrast yield-sensitive investor demand is concentrated in the back-end. As a result, a big jump in interest rates typically leads to both less supply and more demand for 20 and 30yr bonds. We expect this positive technical to flatten 10s30s IG non-financial spread curve. In fact, the spread curve already trading steep to the current level of interest rates, which our rates strategists expect to persist into the year-end (see [Yield revisions following improved outlook](#)). We screen for the steepest IG spread curves (Figure 5).

Less back-end supply

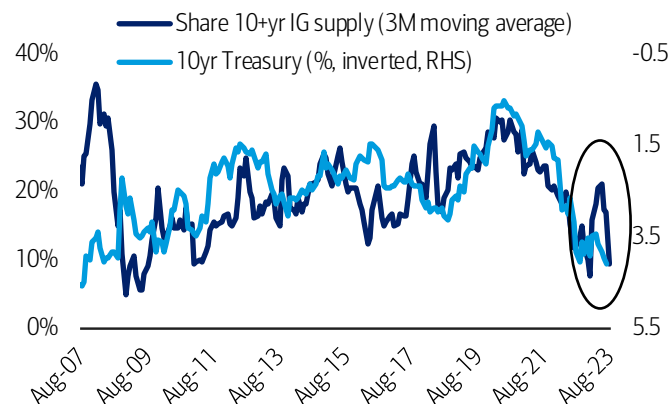
Not surprisingly, borrowers try to avoid locking-in the higher rates for longer. As a result, the share of 10+yr IG supply for non-financial issuers has been declining after peaking in 2020. The share has reached just 16% since June – in line with the current 4% 10yr Treasury yield (Figure 1, Figure 2).

Steep 10s30s IG spread curve

The IG non-financial IG spread curve is currently flat to the historical median levels. However, that makes sense given the rapid increase in interest rates since last year. In fact, zooming in to 2023 shows that the spread curve is steep relative to the current level of 10yr Treasury yield (Figure 3, Figure 4).

Figure 1: Higher rates -> shorter supply

The share of 10+yr supply is negatively correlated with the level of interest rates.

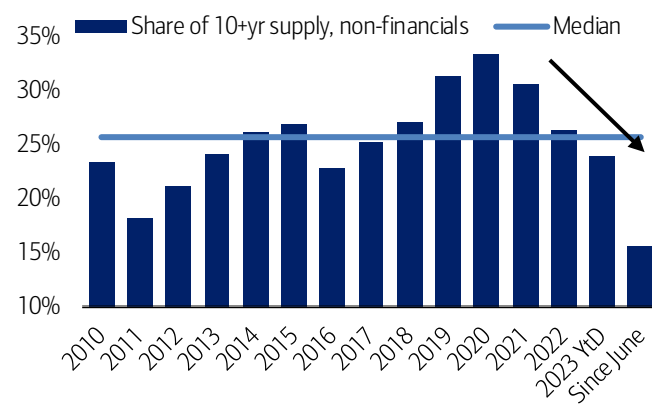


Source: BofA Global Research, Bloomberg.

BofA GLOBAL RESEARCH

Figure 2: The declining share of back-end supply

The YtD share of 10+yr IG non-financial supply (24.0%) is the lowest since 2016.

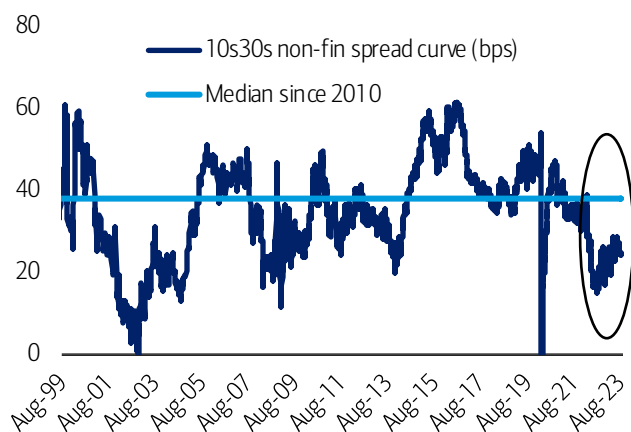


Source: BofA Global Research.

BofA GLOBAL RESEARCH

Figure 3: 10s30s IG spread curve vs. long-term median

The IG non-financial 10s30s IG spread curve (24bps) is currently flat to the historical median (38bps).

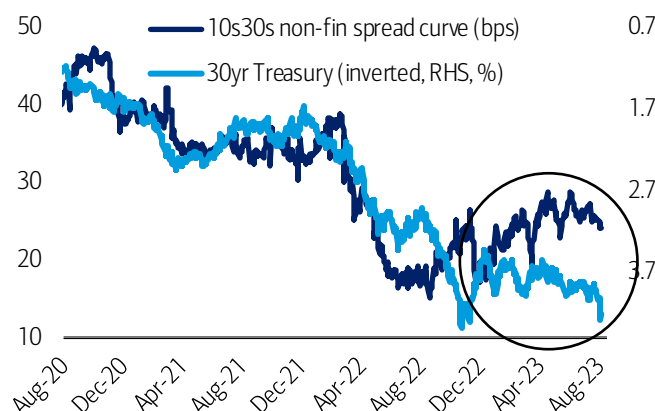


Source: BofA Global Research, ICE Data Indices, LLC

BofA GLOBAL RESEARCH

Figure 4: 10s30s IG spread curve is steep vs. rates

The current IG non-financial spread curve is a bit steeper this year despite higher 30yr Treasury yields.



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

BofA GLOBAL RESEARCH

Figure 5: Steepest IG 10s30s spread curves

We screen for the steepest IG 10s30s spread curves. The screen is based on issuer-matched on-the-run 10 and 30yr bonds with notional of at least \$500mn.

Issuer	10yr bond	30yr bond	Index rating	Sector	10yr spread (bps)	30yr spread (bps)	10s30s curve (bps)	10yr price (\$)	30yr price (\$)	10s30s curve, adjusted for \$ price	10s30s curve, share of 10yr spread
APPLE INC	AAPL 4.3 05/10/33	AAPL 4.85 05/10/53	AA1	Technology	47	76	29	98.4	98.6	30	62.6%
MCDONALD'S CORP	MCD 4.6 09/09/32	MCD 5.15 09/09/52	BBB1	Retail	83	123	40	98.1	96.1	43	52.6%
META PLATFORMS	META 4.95 05/15/33	META 5.6 05/15/53	A1	Media & Entertainment	98	142	44	99.5	99.5	45	46.0%
QUALCOMM INC	QCOM 5.4 05/20/33	QCOM 6.05/20/53	A2	Technology	90	131	42	103.5	106.8	38	43.6%
HOME DEPOT INC	HD 4 1/2 09/15/32	HD 4.95 09/15/52	A2	Retail	77	107	30	97.7	95.1	33	43.4%
INTEL CORP	INTC 5.2 02/10/33	INTC 5.7 02/10/53	A2	Technology	113	158	45	100.3	98.9	47	41.7%
PEPSICO INC	PEP 4.45 02/15/33	PEP 4.65 02/15/53	A1	Food, Bev, & Bottling	56	75	19	99.4	95.6	21	38.5%
TEXAS INSTRUMENT	TXN 4.9 03/14/33	TXN 5.03/14/53	A1	Technology	75	99	24	100.8	96.5	27	36.8%
CSX CORP	CSX 4.1 11/15/32	CSX 4 1/2 11/15/52	BBB1	Transportation	93	121	28	93.7	86.5	34	35.9%
LOWE'S COS INC	LOW 5.15 07/01/33	LOW 5.3/4 07/01/53	BBB1	Retail	126	168	42	98.9	98.0	45	35.4%
ORACLE CORP	ORCL 4.9 02/06/33	ORCL 5.55 02/06/53	BBB2	Technology	142	188	46	95.9	92.5	51	35.1%
DOW CHEMICAL CO	DOW 6.3 03/15/33	DOW 6.9 05/15/53	BBB1	Basic Materials	140	192	52	105.9	110.3	47	34.9%
BAT CAPITAL CORP	BATSLN 7 3/4 10/19/32	BATSLN 5.65 03/16/52	BBB2	Tobacco	236	279	43	108.7	83.3	77	34.3%
MOODY'S CORP	MCO 4 1/4 08/08/32	MCO 3 3/4 02/25/52	BBB1	Finance	107	131	24	94.1	75.1	36	33.0%
IBM CORP	IBM 4 3/4 02/06/33	IBM 5.1 02/06/53	A3	Technology	107	138	31	97.7	92.8	35	32.4%
UNITEDHEALTH GRP	UNH 4 1/2 04/15/33	UNH 5.05 04/15/53	A2	Health Care	93	121	28	96.5	94.9	30	32.1%
TARGET CORP	TGT 4.4 01/15/33	TGT 4.8 01/15/53	A2	Retail	91	116	25	95.9	91.8	29	31.8%
COMCAST CORP	CMCSA 4.8 05/15/33	CMCSA 5.35 05/15/53	A3	Media & Entertainment	104	135	31	98.0	97.0	32	30.7%
ELEC DE FRANCE	EDF 6 1/4 05/23/33	EDF 6.9 05/23/53	BBB1	Utilities	190	248	58	102.1	102.5	57	30.4%
DELL INT / EMC	DELL 5 3/4 02/01/33	DELL 3.45 12/15/51	BBB2	Technology	169	188	19	100.3	64.8	51	30.4%

Note: This screen is not a recommended list either individually or as a group of stocks. Investors should consider the fundamentals of the companies and their own individual circumstances/objectives before making any investment decisions.

Source: BofA Global Research, Bloomberg.

BofA GLOBAL RESEARCH

Credit Strategy



Daily credit snapshot

US IG issuance totaled \$14.5bn across 9 deals today and \$29.6bn MTD. The average new issue concession was 9.5bps today, while the average break performance was 1.6bps tighter today.

S&P 500 closed +0.90%, 10-year Treasury yields +6bps, CDX IG -1.5bps, CDX HY +\$0.26pts, and cash bond spreads quoted from +1bp to -2bps today, LQD closed 1.45bps tighter today.

Figure 6: Recent new issue pricing and new issue concessions

List of new issues in the IG corporate bond market today along with performance metrics.

Date	Ticker	Name	Tenor	Size (\$mm)	Moody's/S&P Rating	Coupon (%)	Px Spread (bps)	New Issue Conc. (bps)	* Break performance	Current spread (bps)
2023-08-07	ANZNZ	ANZ New Zealand Intl Ltd/London	5	1,000	A1/AA-	5.335	120	n.a.	n.a.	n.a.
2023-08-07	BNP	BNP Paribas SA	PERP	1,500	Ba1/BBB-	8.5	n.a.	n.a.	n.a.	n.a.
2023-08-07	CAT	Caterpillar Financial Services Corp	2	350	A2/A	FRN	SOFR+45.5	n.a.	n.a.	n.a.
2023-08-07	CAT	Caterpillar Financial Services Corp	2	800	A2/A	5.15	40	14	n.a.	n.a.
2023-08-07	GS	Goldman Sachs Group Inc/The	3NC2	500	A2/BBB+	FRN	SOFR+106.5	n.a.	n.a.	n.a.
2023-08-07	GS	Goldman Sachs Group Inc/The	3NC2	2,250	A2/BBB+	5.798	103	8	-1	102
2023-08-07	HSBC	HSBC Holdings PLC	4NC3	700	A3/A-	FRN	SOFR+157	n.a.	n.a.	n.a.
2023-08-07	HSBC	HSBC Holdings PLC	4NC3	2,300	A3/A-	5.887	145	n.a.	1	146
2023-08-07	SRE	San Diego Gas & Electric Co	5	600	A1/A	4.95	90	n.a.	n.a.	n.a.
2023-08-07	TMO	Thermo Fisher Scientific Inc	3	600	A3/A-	4.953	50	n.a.	n.a.	n.a.
2023-08-07	TMO	Thermo Fisher Scientific Inc	7	750	A3/A-	4.977	85	n.a.	-2	83
2023-08-07	TMO	Thermo Fisher Scientific Inc	10	1,000	A3/A-	5.086	100	14	-3	97
2023-08-07	TMO	Thermo Fisher Scientific Inc	20	600	A3/A-	5.404	98	2	-3	95
2023-08-07	TS LX	Sixth Street Specialty Lending Inc	5	300	Baa3/BBB-	6.95	295	n.a.	n.a.	n.a.
2023-08-07	WMB	Williams Cos Inc/The	3	350	Baa2/BBB	5.4	88	n.a.	n.a.	n.a.
2023-08-07	WMB	Williams Cos Inc/The	5	900	Baa2/BBB	5.3	118	n.a.	n.a.	n.a.

Note: We calculate new issue concessions by estimating the difference between new issue bond spread and interpolated G spread from comparable liquid secondary bonds of the same issuer prior to the new issue deal announcement, adjusted for the spread impact of dollar prices deviating from par. Break performance is computed as the difference between new issue pricing and secondary closing spread on the first day of trading.

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Previously published here

[Credit Market Strategist: Rate resilience 04 August 2023](#)

Credit Market Strategist

Rate resilience

The rapid rise in interest rates over the past week has been negative for both stocks and credit spreads. Moreover, BofA Global Research rates strategists are now calling for the higher rates to stick with newly revised Treasury yield forecasts (see Global Rates Weekly: Steep demand curve). Despite the initial weakness, we look for IG credit spreads to remain resilient for four reasons. First, the further increase in yields should support investor demand. Second, the rapid jump in borrowing costs could discourage supply in August. Third, bond mutual fund flows have decoupled to the upside from the lackluster bond returns YtD. Fourth, spreads benefit from the lower bond dollar prices. On the other hand, higher rates mean more expensive funding costs. We screen which IG issuers could be most impacted.

weaker

2Q leverage was higher on lackluster earnings growth, accelerating debt growth, and higher borrowing costs.

2Q earnings half-time update: another positive surprise

We are tracking the strongest YoY growth rate in 2Q since 1Q-2022.

July ratings: upgrades, but at a slower pace

Net ratings upgrades accelerated to +\$46bn in July, up from \$30bn in June excluding Credit Suisse (CS).

The July Senior Loan Officer Survey: better demand trends

Banks continue to report weaker loan demand on net but by a smaller margin.

August supply: moderate

We look for August IG supply in the \$80bn-\$90bn range.

Slower M&A volumes in July

M&A announcements moderated to \$121bn in July from \$153bn in June.

IG market technicals

Supply: \$34.6bn of issuance this week, expect \$25-35bn next week. **Flows:** +\$1.86bn inflow this past week ending on August 2. **Weekly technicals:** expect \$4.1bn of coupon payments to become effective next week. **Bond maturities:** \$12.0bn this week, \$7.4bn next week. **Dealer inventories:** +\$1,170mn past week ended Thursday. Details inside.

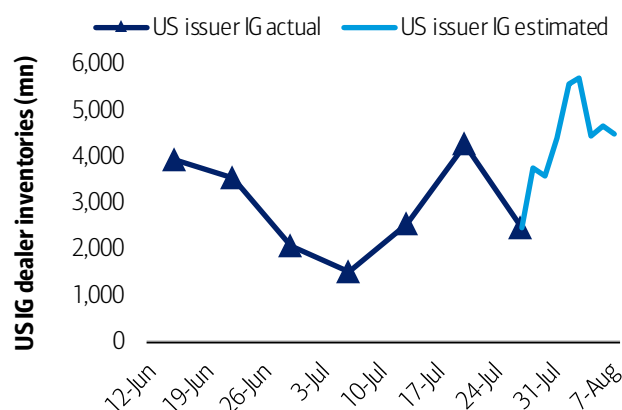
We published the weekly CMS data and charts in the latest [Situation Room](#) report.

Daily dealer inventories update

Below we estimate dealer inventories for the IG corporate bonds based on TRACE data. The actual inventories of US issuer bonds based on NY Fed survey, as well as the estimated change since the latest Fed report are plotted in Figure 7 and Figure 8. We estimate the corresponding DV01 equivalent in Figure 8. More details by sector and maturity are available in Figure 9 and Figure 10. Finally, note that the data for the current date is through about 4:40 p.m. Eastern Standard Time.

Figure 7: Estimated dealer inventories of IG corporate bonds.

We estimate IG dealer inventories of US issuer bonds increased to \$4.5bn currently from \$2.5bn on Jul-26.



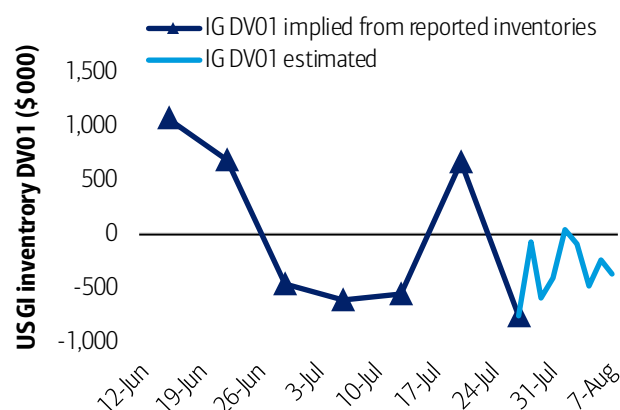
Note: data for US issuer bonds only, maturities 13M or longer. Actual dealer inventory data is from Primary Dealer Statistics survey by the NY Fed. The subsequent change in inventory is estimated based on TRACE.

Source: BofA Global Research, FINRA, TRACE, Federal Reserve

BofA GLOBAL RESEARCH

Figure 8: Estimated dealer inventory DV01 for IG corporate bonds.

We estimate IG dealer inventory DV01 of US issuer bonds increased to -\$0.4mn currently from -\$0.8mn on Jul-26.



Note: data for US issuer bonds only, maturities 13M or longer. Actual dealer inventory data is from Primary Dealer Statistics survey by the NY Fed. The subsequent change in inventory is estimated based on TRACE.

Source: BofA Global Research, FINRA, TRACE, Federal Reserve

BofA GLOBAL RESEARCH

Figure 9: Estimated changes in IG dealer inventories by maturity and broad sector.

We estimate IG dealer inventories declined -\$23mn today and increased \$302mn over the prior week.

Sector	Net dealer buy (\$mn)					Net dealer DV01 change (\$thousand)					Trading volumes on 7-Aug-23 (\$mn)			
	7-Aug	4-Aug	1 W	2 W	4 W	7-Aug	4-Aug	1 W	2 W	4 W	Buy	Sell	Dealer	Total
High grade (13M+)	-23	341	302	3,731	10,323	-78	335	-26	128	5,329	8,477	8,499	5,436	22,411
<3yr	493	101	1,456	3,530	3,777	84	22	255	606	690	1,668	1,176	1,056	3,900
3-5yr	-490	49	-647	376	2,004	-185	26	-224	117	662	1,742	2,232	1,302	5,276
5-11yr	-101	-13	-892	607	2,191	-52	31	-529	294	1,246	3,019	3,120	1,764	7,903
11+yr	76	205	385	-783	2,350	75	255	473	-890	2,731	2,047	1,971	1,314	5,332
Fin	401	-14	-282	1,297	1,353	136	34	-318	156	478	3,527	3,126	2,082	8,735
Non-Fin	-423	356	584	2,434	8,970	-214	301	292	-28	4,851	4,950	5,373	3,354	13,676
Fixed	-121	348	41	3,565	10,350	-106	361	-92	105	5,318	8,282	8,403	5,371	22,056
Floating	99	-7	260	166	-28	28	-26	66	22	11	195	96	65	355
US issuers	-161	189	97	2,193	7,467	-130	244	41	-147	4,201	6,799	6,960	4,330	18,090
DM Yankees	132	93	126	1,073	1,983	44	52	-106	-6	612	1,441	1,309	1,028	3,777
EM Yankees	6	59	79	465	873	8	39	39	281	516	237	230	78	545

Note: data for maturities 13M or longer. Changes in inventories are estimated based on TRACE.

Source: BofA Global Research, FINRA, TRACE.

BofA GLOBAL RESEARCH

Figure 10: Estimated changes in IG dealer inventories by sector.

We estimate today IG dealer inventories increased \$393mn for Banks/Brokers and declined -\$148mn for Energy.

Sector	Net dealer buy (\$mn)					Net dealer DV01 change (\$thousand)					Trading volumes on 7-Aug-23 (\$mn)			
	7-Aug	4-Aug	1 W	2 W	4 W	7-Aug	4-Aug	1 W	2 W	4 W	Buy	Sell	Dealer	Total
Aerospace/Defense	-43	-51	-157	-21	-39	-37	-46	-78	-2	41	88	131	73	292
Automobiles	61	88	257	319	620	43	32	98	72	112	276	215	136	628
Banks/Brokers	393	11	311	793	62	97	11	-137	-35	-299	2,187	1,794	1,330	5,311
Basic Materials	72	82	-77	62	119	45	50	-40	-80	-125	365	293	254	911
Commercial Services	-83	-6	-109	99	119	-63	1	-92	18	20	60	143	65	269
Energy	-148	28	232	549	1,207	-75	39	231	247	706	474	622	336	1,433
Finance	12	8	-205	129	478	25	82	68	140	487	679	667	405	1,750
Food, Bev, & Bottling	11	-5	-218	-121	496	12	-31	-194	-289	20	196	185	185	565
Health Care	-136	72	-80	465	1,257	-149	152	-161	-237	609	822	958	550	2,329
Industrial Products	3	85	116	-92	49	38	75	86	-49	30	200	197	121	519
Insurance	-22	-45	-192	63	124	8	-72	-148	0	11	276	298	177	751
Media & Entertainment	-96	2	34	27	861	-60	-6	22	13	641	249	346	215	810
REITs	18	12	-195	311	688	7	14	-101	50	279	385	367	170	922
Retail	-52	2	73	419	952	-32	18	67	301	803	271	323	220	813

Figure 10: Estimated changes in IG dealer inventories by sector.

We estimate today IG dealer inventories increased \$393mn for Banks/Brokers and declined -\$148mn for Energy.

Sector	Net dealer buy (\$mn)					Net dealer DV01 change (\$thousand)					Trading volumes on 7-Aug-23 (\$mn)			
	7-Aug	4-Aug	1 W	2 W	4 W	7-Aug	4-Aug	1 W	2 W	4 W	Buy	Sell	Dealer	Total
Technology	152	-164	124	-135	1,050	162	-126	158	-312	442	717	564	327	1,608
Telecom	-108	-11	-305	-30	744	-96	-12	-244	-42	603	257	365	233	854
Tobacco	-24	12	107	114	169	-18	7	53	50	125	34	58	35	126
Transportation	-15	61	67	361	611	16	55	105	253	576	168	184	128	480
Utilities	-73	95	452	203	260	-34	64	232	-82	-30	617	690	401	1,708
Other	55	64	67	216	494	32	29	49	110	278	156	101	74	331

Note: data for maturities 13M or longer. Changes in inventories are estimated based on TRACE.

Source: BofA Global Research, FINRA, TRACE.

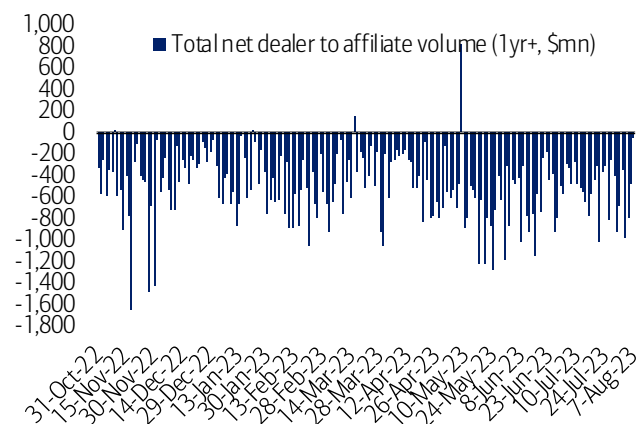
BofA GLOBAL RESEARCH

Daily foreign demand tracker

We believe net dealer-to-affiliate volumes from Trace are correlated with foreign buying of US HG corporate bonds - i.e., negative numbers mean foreign investor buying (US dealers taking down inventory in favor of foreign affiliates). For supporting material see our “primer” on tracking foreign inflows (See: [Credit Market Strategist: One year round-trip in spreads 15 July 2016](#)). Figure 11 shows the overall daily dealer-to-affiliate volumes while Figure 12, Figure 13 and Figure 14 show subsets of this data. In particular Figure 12 shows net dealer-to-affiliate volumes for longer maturity (12+ years) bonds, Figure 13 displays volumes reported to Trace before 8am NY time (biased toward Asian buying) and Figure 14 shows the subset of net trades reported between 8am and noon (biased toward European buying).

Figure 11: Net dealer buying from affiliate (1yr+)

Figure shows inconsistent overall foreign buying of US IG corporate bonds for some time.



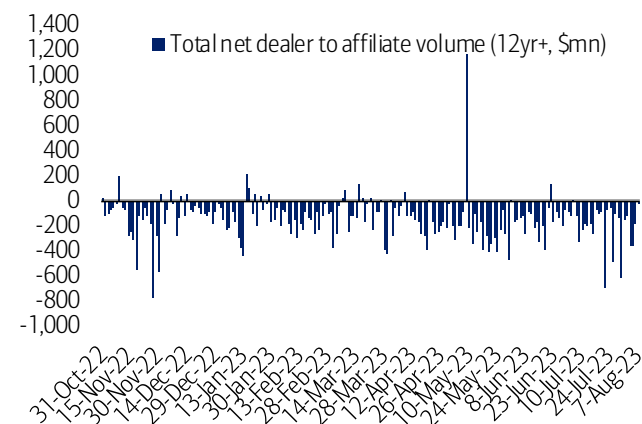
Note: Net dealer-to-affiliate volumes are correlated with foreign buying/selling. Negative numbers indicate foreign buying.

Source: Bloomberg, TRACE

BofA GLOBAL RESEARCH

Figure 12: Net dealer buying from affiliate (12yr+)

Foreign buying of longer maturity US IG corporate bonds has been consistent this year



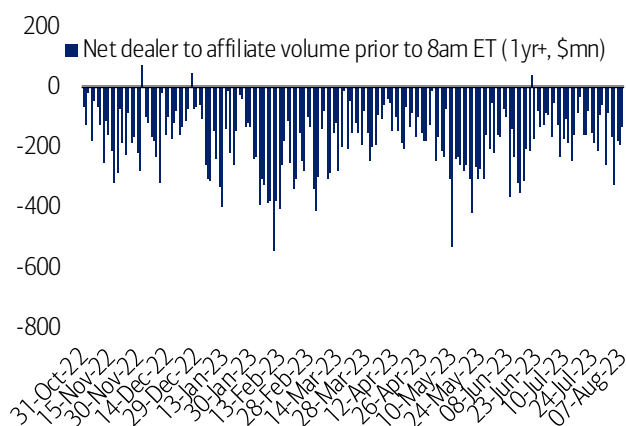
Note: Net dealer-to-affiliate volumes are correlated with foreign buying/selling. Negative numbers indicate foreign buying.

Source: Bloomberg, TRACE

BofA GLOBAL RESEARCH

Figure 13: Net dealer-to-affiliate trading volumes before 8am ET

Foreign buying before 8am NY time is dominated by Asia and has been consistent this year



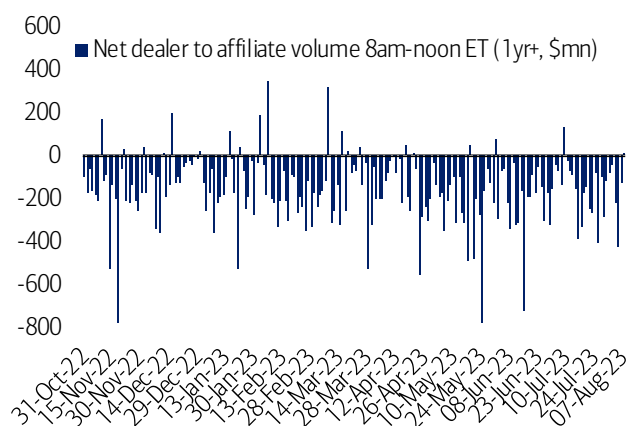
Note: Morning share of daily trading volume is correlated with secondary market activity of foreign investors due to different time zones.

Source: BofA Global Research, TRACE

BofA GLOBAL RESEARCH

Figure 14: Net dealer-to-affiliate trading volumes 8am - noon ET

Foreign buying 8am-noon NY time is dominated by Europe and has been inconsistent this year



Note: Morning share of daily trading volume is correlated with secondary market activity of foreign investors due to different time zones.

Source: BofA Global Research, TRACE

BofA GLOBAL RESEARCH

Common abbreviations:

IG: Investment Grade

HG: High Grade

LQD: iShares iBoxx \$ Investment Grade Corporate Bond ETF

DV01: Dollar value of a basis point

CDX IG: The Markit CDX North America Investment Grade Index

CDX HY: Markit CDX North America High Yield Index

ECB: European Central Bank

QE: Quantitative Easing

CSPP: corporate sector purchase programme

Unched: Unchanged

CPI: Consumer Price Index

FOMC: The Federal Open Market Committee

Disclosures

Important Disclosures

Due to the nature of strategic analysis, the issuers or securities recommended or discussed in this report are not continuously followed. Accordingly, investors must regard this report as providing stand-alone analysis and should not expect continuing analysis or additional reports relating to such issuers and/or securities.

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.

Information relating to Affiliates of BofAS, MLPF&S and Distribution of Affiliate Research Reports:

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.

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 HKSCF; 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 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.