

US Rates Watch

Funding spike: drivers & implications

Funding spike: the facts

US funding rates spiked on Sept quarter end. We address funding drivers, implications for year end, and Fed balance sheet policy considerations below.

On Sept 30, SOFR rose 12bps in the largest single day increase since COVID (Exhibit 1). The move coincided with a \$450b increase in SOFR volumes, largely driven by bilateral trades (Exhibit 2). Sponsored repo volumes also saw a sizeable increase of \$158b (Exhibit 3). MBS repo also jumped (Exhibit 4). The sharp increase in funding rates occurred with a divergence in Fed repo facility use. The Fed's liquidity adding SRF saw the largest use at \$2.6b since '20. The Fed's liquidity draining ON RRP facility increased \$29b to \$465b (Exhibit 5). The Fed was simultaneously adding & draining repo liquidity to the largest extent since Mar / Apr '20.

Funding drivers: large settlements & dealer constraints

The funding spike was driven by large UST settlements & dealer constraints, details below. Fed QT drain of \$20b on Sept 30 was a more marginal contributor to the move.

UST settlements: UST month end coupon settlements totaled \$118b (Exhibit 6, Exhibit 7). Additional coupon settlements on Sept 27 = \$28b. Total = \$146b in last two days of quarter.

Dealer constraints: dealer B/S constraints likely factored heavily into the moves. Recall, dealers have been running very high in their UST & MBS holdings (Exhibit 8). US GSIBs have also recently run high in their GSIB surcharge scores, which likely limits balance sheet capital flexibility (Exhibit 9). Contacts suggest RWA pressures at end Q3 may have pushed dealers to shed collateral contributing to the repo jump (especially in MBS).

Dealer constraints likely supported diverging use of Fed repo tools. **ON RRP use** typically rises at Q/E as dealers reduce repo activity for reporting. MMF are then pushed into ON RRP & unable to shift into FICC due to their own internal counterparty constraints (detail in: Sticky ON RRP). **Fed SRF use** rose because dealers could not easily access MMF cash or obtain attractive funding through FICC. In essence, dealer balance sheet constraints & MMF FICC limits are pushing the Fed to be the repo intermediary of last resort.

Year-end implications: risks of tighter funding

The repo dynamics at end Q3 raise risks of tighter funding conditions into year end. We expect dealers to better prepare for year-end vs Q3 quarter end but can't rule out a similar set of RWA or other capital constraints at end '24. It doesn't help that there will be a marginally larger \$147b of month end coupon settlements expected at end Dec '24. Consistent with this, Dec '24 SOFR/FF basis now implies the tightest levels seen YTD. Cross-currency basis does not imply a similar degree of expected funding pressure as SOFR/FF. We see risks that all funding markets may tighten into end '24. ... See page 2 for more detail on Fed & funding pressures including QT risks & dashboard omission...

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 5 to 7.

Timestamp: 02 October 2024 07:00AM EDT

02 October 2024

Rates Research United States

US Rates Research

BofAS +1 646 855 8846

Mark Cabana, CFA Rates Strategist

BotAS mark.cabana@bofa.com

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

See Team Page for List of Analysts

SOFR: secured overnight financing

rate

SRF: standing repo facility

ON RRP: overnight reverse repo

facility

UST: US Treasury

QT: quantitative tightening

B/S: balance sheet

GSIB: Global systemically important

bank

RWA: risk weighted assets

MMF: money market funds

Q/E: quarter-end

FICC: Fixed Income Clearing

Corporation

QT: quantitative tightening

SOMA: Secured Open Market

Account

Fed & funding pressure: QT risk & dashboard omission

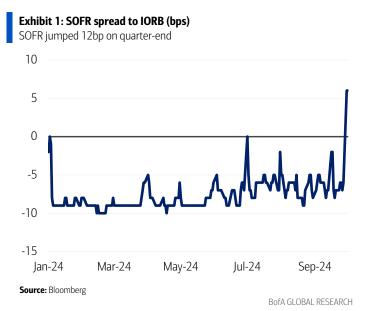
The Fed has undoubtedly taken notice of the funding spike and is internalizing the moves. The Fed is likely in no rush to adjust their balance sheet policy or liquidity tools, first wanting to see where funding rates settle after quarter end. We see three takeaways for the Fed: (1) repo intermediation risk, (2) SRF stigma, (3) QT risks.

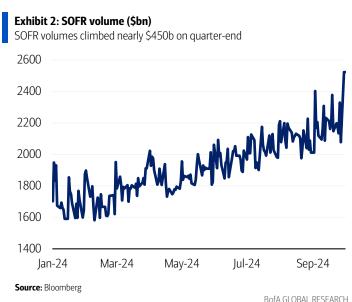
Repo intermediation risk: higher Fed ON RRP & SRF use essentially makes the Fed the repo intermediary of last resort. We doubt the Fed wants this role. To address this concern, the Fed & other official sector actors could: (a) encourage MMF to reduce their FICC internal counterparty constraint, which would push cash out of ON RRP & into sponsored repo, (b) work to reduce the capital impact UST & MBS repo has on dealer balance sheets. If the Fed envisions a more active cash lending repo market role, it may consider becoming a FICC member to allow for repo netting.

SRF stigma: the SRF may be stigmatized. At least \$630b in UST repo cleared above the SRF rate on Sept 30 (as implied by SOFR percentiles). Yet only \$2.6b was drawn from the Fed facility. Timing of UST repo trades may contribute to some of this dynamic but we think dealers may not be using the facility due to stigma concerns. Market contacts have suggested a reluctance to use SRF since it is a "facility" and not a more standard "open market operation". We initially dismissed these considerations as semantics, but it appears some are choosing to avoid any funding through a Fed facility.

QT risks: the Fed is unlikely to over-react to a repo jump on quarter-end. Persistent upward pressure in funding would increase risk of an earlier QT end. The Fed funding dashboard is not flashing signs of concern outside of recent repo dynamics (peak daylight overdraft activity did pick up towards in the most recent publicly available data as of end June '24 (Exhibit 10); see: Reserve "ampleness"). Last week, NY Fed SOMA manager Roberto Perli said "there is plenty of room to continue shrinking the SOMA portfolio". Persistently elevated repo rates might change that view. Note: we pushed our QT stop date to end March '25 after the Sept FOMC but before recent funding pressure.

Bottom line: recent repo pressure suggests there are broader shifts in cash, collateral, and dealer balance sheet dynamics. UST collateral continues to grow and dealer balance sheet flexibility is limited by capital considerations. Dealer balance sheet constraints are not a part of the Fed's funding dashboard but drive spikes in repo. The Fed may consider adding dealer balance sheet limits to their funding dashboard or risk becoming a more permanent repo intermediary. Recent funding dynamics also highlight SRF stigma and raise risks of an early QT end if repo pressure persists.

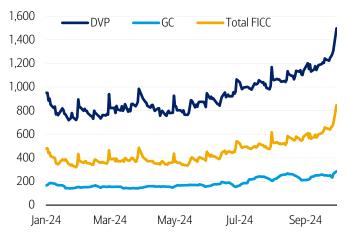




2

Exhibit 3: FICC sponsored repo volumes (\$bn)

FICC sponsored repo increased \$158b on quarter-end, largely in DVP



Source: DTCC FICC

BofA GLOBAL RESEARCH

Exhibit 5: ON RRP take-up (\$bn)

ON RRP take-up increased \$29b on quarter-end



Source: Bloomberg

BofA GLOBAL RESEARCH

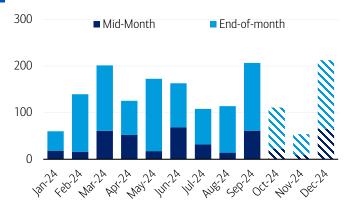
Exhibit 4: UST & MBS GCF repo spread to IORB (bps)

MBS repo saw significant upward pressure on quarter-end



Exhibit 6: UST coupon settlements by mid-month and end-of-month

Oct & Nov will be smaller settlement months but Dec end will be \$148b



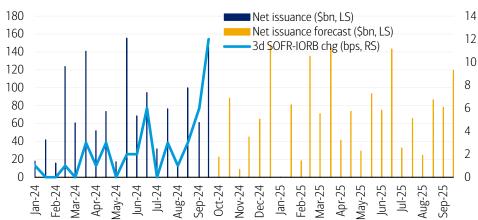
Source: BofA Global Research, US Treasury

dates (\$bn)

BofA GLOBAL RESEARCH

Exhibit 7: UST coupon settlement vs 3-day change in SOFR-IORB spread

Larger UST settlements have had a larger impact on SOFR in recent months



Source: BofA Global Research, US Treasury, Bloomberg

BofA GLOBAL RESEARCH



Exhibit 8: Primary dealer securities holdings (\$bn)

Dealer UST and MBS holdings are elevated

	Total	US Treasuries					Agency ex MBS	MBS	Corporates		State & Munis	ABS Variable Rate Notes	
			Bills	Coupons	FRNs	TIPS				Commercial Paper			
9/18/2024	483,536	320,076	77,527	217,089	2,778	23,673	11,874	116,769	11,452	6,696	12,732	8,199	2,434
Chg YTD	84,061	63,687	12,200	56,519	-10,169	6,128	-143	19,539	88	2,705	348	700	-158

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 9: GSIB surcharge changes over recent reporting dates

Large banks have generally shifted higher across GSIB surcharge ranges

Low End	GSIB Score									High End	Surcharge
930									JPM 1024	1029	5.0%
830		JPM 857								929	4.5%
730	C 734									829	4.0%
630			BAC 663			C 697		GS 711		729	3.5%
530				MS 580	BAC 598	GS 599		MS 614		629	3.0%
330										429	2.0%
230	·		BK 267	BK 277		WFC 288		WFC 313		329	1.5%
130							STT 214			229	1.0%

GSIB score based on 2Q24 data

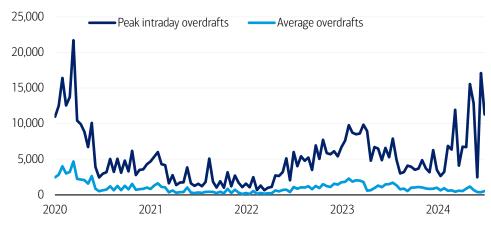
□ Score determining current G-SIB surcharge

Source: FR Y-15, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 10: Peak and average overdraft activity (\$mn)

Peak daylight overdraft activity has been rising as of late



Source: 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

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 Prudential 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.bofaml.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 (Hong Kong): Merr (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch (Canada): Merrill Lynch (Canada): Merrill Lynch (Mexico): Merrill Mexico): Merrill Mexico (Mexico): Merrill Mexico): Merrill Mexico (Mexico): Merrill Mexico (Mexico de Bolsa, regulated by the Comisión Nacional Bancaria y 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 (DIFC): Merrill Lynch (DIFC): Merrill Lynch (Brazil): M 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 HKSFC; 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 2024 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 inform

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 sustainability in this material is limited as discussed herein and is not intended to provide a comprehensive view on any sustainability claim with respect to any issuer or security.

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.



BofA GLOBAL RESEARCH 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

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

Bruno Braizinha, CFA

Rates Strategist BofAS

bruno.braizinha@bofa.com

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

Katie Craig

Rates Strategist BofAS katie.craig@bofa.com

Meghan Swiber, CFA Rates Strategist

meghan.swiber@bofa.com

Anna (Caiyi) Zhang

Rates Strategist BofAS caiyi.zhang@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.

