

US Rates Viewpoint

Postcard from Brazil

Postcard from Brazil

Four days in Sao Paulo and Rio de Janeiro. An informal survey of views suggests a slight long duration bias, a constructive view on carry strategies near term (particularly into some corners of Latam like Chile, Brazil, and Mexico), and some level of skepticism around the softer versions of eventual landing scenarios. Conviction continues to be low.

Reacceleration odds and dip buying

Baseline expectations continue to be centered around lower growth and lower inflation states, with reacceleration odds put only at 39% (albeit higher than the 34% noted in our postcard from Europe). This continues to be a less-that-supportive backdrop for fundamentally driven selloffs.

10yT fair value levels and targets

10yT yields trade in line with fair value levels consistent with both current macro fundamentals (c.3.8%) and the level of global yields (c.3.85%). This, along with relatively split odds between slowdown and reacceleration scenarios justifies trading rates with a long bias in the range and buying 10yT dips beyond 3.8-3.85% fair values. We continue see potential for 10yT to mean revert to a c.3% steady state over the next year and see a neutral range for duration in this context c.3-3.25%.

Asset allocation - Risk-on or transition profiles?

2Q asset returns suggest a risk-on quarter, but risk adjusted returns continue to imply asset allocations that are more conservative around transition style portfolios. These can be characterized as carry portfolios and are consistent with soft landing scenarios or scenarios where the slowdown continues to be priced at a c.6m horizon on a rolling basis. Hedging of tail risks (hard landing & reacceleration) makes sense in this context.

Carry on... and potentially move into rates

The market has resolved the decoupling between the term structures of rates and equity volatility (inverted in the former, steep in the later) in the favor of a re-steepening of the term structure of rates volatility as data showed signs of resilience over the last month. To a large extend this supports the extension of carry strategies into rates space.

Curve dynamic

We continue to have less conviction on the curve view than on our duration stance. At current levels the bias starts to be skewed towards steepeners, but the absence of a near term catalysts that frontloads cuts back to <6m horizons and the negative rollup of forward steepeners makes these exposures un-attractive outright.

05 July 2023

Rates Research **United States**

Bruno Braizinha, CFA Rates Strategist **BofAS** bruno.braizinha@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.

Bof A 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 7 to 8.

12575498

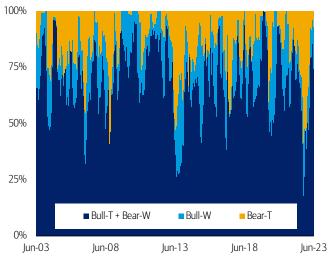
1. Reacceleration odds and dip buying

We use the dynamic of breakevens (BEs) to gauge the odds that the market is assigning to four fundamental scenarios for the US economy: (1) slowdown (lower growth and lower inflation = bull tightening of BEs); (2) acceleration (higher growth and higher inflation = bear widening of BEs); (3) goldilocks (higher growth and lower inflation = bear tightening of BEs); and (4) stagflation (lower growth and higher inflation = bull widening of BEs). The recent dynamic of breakevens (see Exhibit 1) continues to suggest:

- Expectations for a recoupling of growth and inflation fundamentals with 90% of the current dynamic driven by orthodox moves (bull tightening + bear widening frequencies see Exhibit 2) that reflect positive correlations and causality between growth and inflation
- Higher odds of slowdown vs reacceleration scenarios (51% of recent moves driven by bull tightening vs. 39% driven by bear widening) despite a positive bias in recent macro data (and some increase in re-acceleration odds – see Exhibit 3).

As we noted in <u>postcard from Europe from 1 June</u>, this breakdown of odds between slowdown and reacceleration scenarios is a less-than-supportive context for structural selloffs and continues to support a buy the dip bias.

Exhibit 1: Decomposition of the 10-year breakeven dynamicRecent dynamic suggests baseline expectations of lower growth & inflation



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 2: Frequencies of different types of moves in the 10-year breakeven dynamic

51% of the recent dynamic has been driven by bull tightening moves (expectations for lower growth & lower inflation) vs 39% frequency of bear-widening moves that reflect re-acceleration scenarios

	bull-Tight	bear-Wide	bull-Wide	bear-Tight
Current	51%	39%	0%	10%
1m	41%	38%	11%	10%
2m	28%	34%	12%	25%
3m	30%	33%	13%	24%

Source: BofA Global Research

BofA GLOBAL RESEARCH

2. 10yT fair value levels and targets

We use two frameworks to gauge fair value levels for 10yT (see <u>UST RV Primer</u>):

- Our US macroeconomic framework suggest fair value c. 3.8% (see Exhibit 4, with a standard deviation of residuals c.30bp). 10yT levels > c.4.1% reflect significant expectations for improving fundamentals ahead, whereas levels <3.5% reflect expectations for deteriorating fundamentals. 10yT yields c.3.85% trade marginally cheap to current fundamentals and suggests expectations for a relatively anchored macro backdrop ahead.
- Our global yield framework suggests fair value c.3.85% (see Exhibit 5). However, 10yT yield are biased cheap vs global yields earlier in the cycle and rich in the late cycle stages. In this framework, therefore, a late cycle bearish impulse in 10yT yields beyond the 3.8% level that is fair relative to global yields needs to be supported by a first principal component type move where all global yields reset higher.



Exhibit 3: Frequency of bear widening moves in the dynamic of 10y BEs

Recent Increase in bear-widening frequencies suggests slightly higher re-acceleration odds

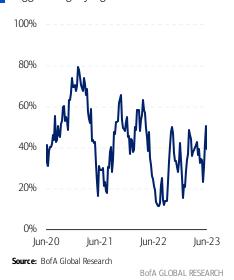


Exhibit 4: Macro model for 10yT suggests 3.8% fair value

Framework suggests market sees steady macro fundamentals ahead



RofA GLOBAL RESEARCH

the level of global

10yT levels fair to slightly cheap vs current macro fundamentals and the level of global yields, along with relatively split odds between slowdown and reacceleration scenarios justify trading rates with a long bias and buying of dips beyond 3.8-3.85% fair values.

Medium term, under slowdown scenarios that continue to be baseline for our economics team (see Resilient economy, higher policy rates) we continue to expect a convergence of 10yT yields back to a c.3% steady state (suggested by applying our framework for the decomposition of the 10yT dynamic as a function of inflation, monetary policy, risk and demand shocks – see Exhibit 6 – over more recent 3-5y windows).

Exhibit 5: Global yield framework for 10y sovereign yields

Framework suggests c.3.85% fair value for 10yT



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 6: 10yT decomposition of the 10yT dynamic

Demand (55bp) & inflation (40bp) shocks continue to drive the cheapness, while monetary policy (5bp) & risk (5bp) shocks continue to be relatively flat

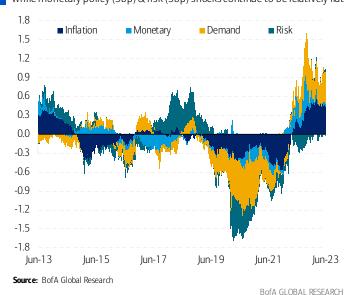
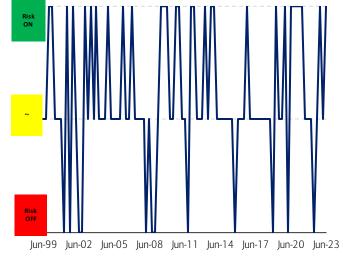


Exhibit 7: Three-state framework for asset class returns

A simple three-state framework for asset class returns suggests an upgrade of risk over 2Q23 $\,$



Source: BofA Global Research

BofA GLOBAL RESEARCH

This view is consistent with our ongoing recommendation (see Where is the 10yT fair value from Dec '22) to trade the 3.25-3.75% range for 10yT with a bullish bias, adding on dips into the 3.75-4% top end of the range, and shifting to a neutral stance on duration at c.3-3.25%.



3. Asset allocation - Risk-on or transition profiles?

Our economists upgrade for the '23 macroeconomic outlook creates scope for a material shift in market dynamic (see Mid-year update: surprisingly resilient):

- From the one seen over most of the 1Q and early 2Q where risky assets found a
 significant level of support from Fed on-hold expectations or potentially rate cuts in
 the context of softer landing scenarios for the economy (see <u>The stress and</u>
 uncertainty are all in rates)...
- Towards a dynamic whereby risky assets remain supported despite the potential
 for further Fed tightening (and a push out of the horizon of the first rate cut see
 Exhibit 8), i.e., a decoupling of the dynamic of risky assets from the discounting
 component of valuations and a refocus on their intrinsic fundamentals (growth and
 earnings expectations).

We are skeptical of such a shift, which in essence would imply a shift of asset allocation profiles towards a risk-on bias. From an asset return perspective, 2Q does look like a risk-on quarter (see Exhibit 7). Significantly also, relative to the optimal 1Q portfolios we see 2Q portfolios (see Exhibit 8) reflecting: (1) higher equity allocations in balanced profiles, and a more significant skew towards growth vs. value: (2) lower bond allocations in balanced profiles likely at the expense of mortgage allocations, and marginally higher in risk averse profiles; (3) higher EM debt allocations; (4) marginally higher credit allocations in risk averse profiles; (5) lower allocation to linkers.

Broadly, however, while these results reflect a slight upgrade in risk sentiment from 1Q, they continue to suggest a more conservative bias with allocations centered around transition style portfolios that show a large dispersion of allocations weights across risk averse (min variance), balanced and risk seeking (max return) profiles.

Exhibit 8: Horizon for pricing of the first rate cute getting pushed out First rate cut now priced at a 10m horizon



RofA GLOBAL R

Exhibit 9: Optimal global long only portfolio for 2Q23

Optimal allocation weights obtained in a mean variance framework

	Min	Max	Risk Averse	Balanced	Risk Seeking
Equities	30%	70%	30%	54%	70%
Large Cap	10%	50%	10%	24%	40%
Small Cap	5%	35%	5%	5%	5%
Value	0%	25%	0%	0%	0%
Growth	0%	25%	15%	25%	25%
EM	0%	15%	0%	0%	0%
Bonds	5%	50%	37%	20%	20%
Sov	0%	45%	27%	0%	0%
Linkers	0%	5%	0%	0%	0%
EM Hard	0%	10%	0%	10%	10%
EM Local	0%	10%	10%	10%	10%
Credit	0%	15%	3%	0%	10%
IG	0%	20%	3%	0%	0%
HY	0%	10%	0%	0%	10%
Cash	0%	15%	15%	15%	0%
US	0%	15%	15%	15%	0%
Alt	0%	20%	15%	11%	0%
Commodities	0%	15%	0%	0%	0%
Mortgages	0%	15%	15%	11%	0%

Source: BofA Global Research

BofA GLOBAL RESEARCH

4. Carry on... and potentially move into rates

The market dynamic over 3Q is likely to continue suggest optimal asset allocations profiles closer to transition states. Our baseline view is for the market to continue to price higher odds of soft-landing scenarios or a context where a slowdown continues to be priced 3-6m ahead on a rolling basis. Demand for duration is likely to stay supported in 3Q under these expectations, driving a range bound context for rates.



Transition portfolios are in essence carry-type portfolios, with still relatively high EM, credit, and equity allocations (see Exhibit 8) but falling short of the aggressive risk profiles that are typical of risk on-states. As such, they should be seen as meta-stable, reflecting scope for carry near-term (likely over the next 3m, potentially longer) but exposed to shocks that can push the market towards large tails that should be hedged:

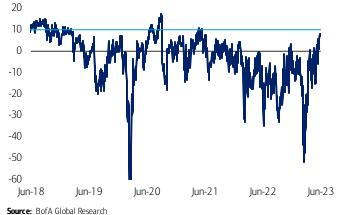
- On the risk-off side of the distribution of outcomes, harder landing scenarios are likely to drive a significant repricing of risk, even in a context where the Fed cuts sooner and more aggressively (in harder landing scenarios risky assets intrinsic fundamentals are likely to dominate over the discounting component of the dynamic). Out of the money puts on risky assets or long duration exposures in the belly and backend of the curve are likely to provide decent hedges for these scenarios. The latter is likely contingent on expectations for the recoupling of inflation to growth fundamentals in slowdown scenarios. Our view is closer to a more orthodox dynamic where higher harder landing probabilities drive inflation expectations lower and increase the utility duration as a hedge and diversifier.
- The risk-on side of the distribution likely implies re-acceleration scenarios (higher growth and higher inflation) where the Fed needs to reach a higher terminal. With the Fed already significantly above neutral, higher rates exacerbate some of the known-unknow risks around regional banks and commercial real estate and add scope for unknown-unknowns. Payer skew at the frontend of the curve is likely to provide a decent hedge to these scenarios.

Volatility and carry

We have been cautious on aggressive carry strategies in rates space. Our cautious stance was driven to a large extent by an inverted term structure of rates vol (see Exhibit 10). In <u>The stress and uncertainty are all in rates</u> we noted that:

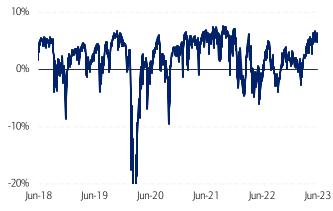
- The term structure of equity vol stayed upward sloping (see Exhibit 11) even in the
 context of all the uncertainty priced in rates vol space, reflecting the impact of a
 potential Fed put (and implicitly a shift of bond / equity correlations back into
 positive territory).
- How the equity and bond vol dynamics recouple likely depends on the baseline scenario for the outlook: (1) soft landing scenarios or scenarios where slowdown expectations continue to be priced at a c.6m horizon on a rolling basis like resteepen both; (2) hard landing scenarios likely push the equity vol term structure into inverted territory alongside rates.

Exhibit 10: Term structure of volatility for 10y tails (1y vs 1m ATM vol) Term structure of rates volatility re-steepened (c.8bp vol spread currently) ...



BofA GLOBAL RESEARCH

Exhibit 11: Term structure of volatility for the S&P (1y vs 1m ATM vol) ... alongside term structure of equity volatility (c.4.7% vol spread currently)



Source: BofA Global Research

BofA GLOBAL RESEARCH



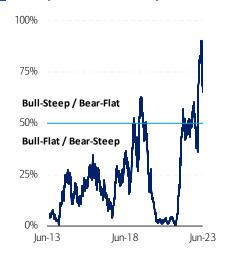
The market has resolved this decoupling in favor of a re-steepening of the term structure of rates volatility as data showed signs of resilience over the last month. To a large extend this supports the extension of carry strategies into rates space, and indeed the desinversion of the term structure of rates volatility reflects a pickup of flow into short gamma exposures.

5. Curve dynamic

The recent data resilience and the repricing of the near-term Fed policy bias back towards tightening has pushed the curve dynamic back into bear-flattening mode (61% of the 2s10s dynamic and over the last couple of weeks – see Exhibit 12), with the 2s10s curve reaching the flattest levels in the cycle.

We continue to have less conviction on the curve view than on our duration stance. At current levels the bias starts to be skewed towards steepeners, but the absence of a near term catalysts that frontloads cuts back to <6m horizons (see Exhibit 8) and the negative rollup of 2s10s and 5s30s curve forwards makes these exposures un-attractive outright. 2s10s curve caps and cap spreads with 1-2y expiries continue to be an alternative (see 2s10s curve steepeners).

Exhibit 12: 2s10s curve directionality 2s10s dynamic still dominated by the frontend



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 13: 2s10s directionality breakdownBear flattening dynamic back to dominating over

	bull-S	bear-F	bull-F	bear-S
2w	0%	61%	22%	18%
1m	3%	39%	40%	18%
2m	9%	53%	27%	12%
3m	18%	47%	19%	16%

Source: BofA Global Research

the last couple of weeks

BofA GLOBAL RESEARCH

Exhibit 15: 5s30s directionality breakdownBear flattening dynamic back to dominating over

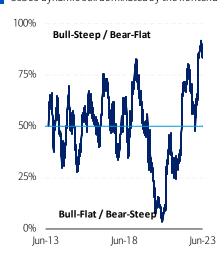
Bear flattening dynamic back to dominating over the last couple of months

	bull-S	bear-F	bull-F	bear-S
2w	19%	56%	26%	0%
1m	20%	57%	24%	0%
2m	22%	57%	17%	4%
3m	34%	51%	11%	4%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 14: 5s30s curve directionality 5s30s dynamic still dominated by the frontend



Source: BofA Global Research

BofA GLOBAL RESEARCH

Disclosures

Important Disclosures

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

BofA Securities fixed income analysts regularly interact with sales and trading desk personnel in connection with their research, including to ascertain pricing and liquidity in the fixed income markets

Other Important Disclosures

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

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

This report may refer to fixed income securities or other financial instruments that may not be offered or sold in one or more states or jurisdictions, or to certain categories of investors, including retail investors. Readers of this report are advised that any discussion, recommendation or other mention of such instruments is not a solicitation or offer to transact in such instruments. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor for information relating to such instruments. Rule 144A securities may be offered or sold only to persons in the U.S. who are Qualified Institutional Buyers within the meaning of Rule 144A under the Securities Act of 1933, as amended. SECURITIES OR OTHER FINANCIAL INSTRUMENTS DISCUSSED HEREIN MAY BE RATED BELOW INVESTMENT GRADE AND SHOULD THEREFORE ONLY BE CONSIDERED FOR INCLUSION IN ACCOUNTS QUALIFIED FOR SPECULATIVE INVESTMENT.

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

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

Officers of 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); BofAŚE (France): BofA Śecurities 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 (Australia): Merrill Lynch (Hong Kong): Merrill (H (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 Lynch (Mexico) Merrill Lynch (Mexico) Merrill Lynch (Mexico): Merrill Lynch (Mexico) Merrill Lynch (Mexico): Merrill Lynch (Mexico) Merrill Lynch (Mexico): Mexico (Mexico): Mexico (Mexico): Mexico (Mexico): Mexico (Mex 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): Merrill Lynch (Israel): Merrill Lynch (Israel) (Imited, 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 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 in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securit

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, induding 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 aguide 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 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 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 any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.