

European Rates Watch

BoE reserves: Preferred minimum closer than you think

Bank of England reserves to decline in 2024-2025...

We forecast the Bank of England (BoE) balance sheet to drop by slightly over £100bn in 2024 and £200bn in 2025. On the asset side, we assume BoE's Quantitative Tightening (QT) will amount to £100bn per year. The roll-off of the Term Funding Scheme with additional incentives for SMEs (TFSME) will have an increasingly meaningful role into 2025. We do not assume early TFSME repayments. Risks therefore skew to earlier balance sheet drop. On the liability side, the decline will be reflected in the fall in Bank reserves (Exhibit 1 and Exhibit 2).

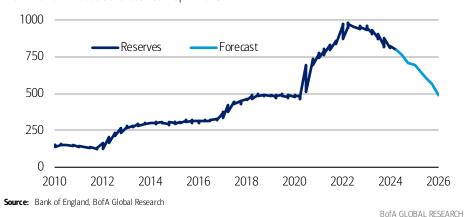
... amid the backdrop of declining global liquidity

The decline in BoE reserves in 2024-2025 will occur against the backdrop of declining global liquidity. In Global central bank balance sheets section of the Global Rates Year Ahead, 19 Nov, we forecast the collective central bank balance sheet in the US, Euro area, UK, Japan, Australia, and Canada to fall by USD1.5tm in 2024 (Exhibit 3). Excess liquidity changes are forecast to track balance sheet changes very closely but not necessarily one-for-one, with any differences reflecting additional expected shifts between central bank liabilities such as government deposits and banknotes.

Preferred Minimum Range of Reserves on the horizon

BoE's latest estimate of aggregate Preferred Minimum Range of Reserves (PMRR) is £335-495bn (Hauser, 3 Nov), not far from where we estimate reserves will be by late 2025.

Exhibit 1: BoE reserves incl. BofA forecast, £bn TFSME roll-off to accelerate reserves drop in 2025



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. >> Employed by a non-US affiliate of BofAS and is not registered/qualified as a research analyst

under the FINRA rules. Refer to "Other Important Disclosures" for information on certain BofA Securities entities that take responsibility for the information herein in particular jurisdictions.

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. 12635170

Timestamp: 07 December 2023 07:18AM EST

Refer to important disclosures on page 9 to 11.

Agne Stengeryte, CFA

MLI (UK)

Rates Strategist MLI (UK) agne.stengeryte@bofa.com

European Rates Research

Alastair Ryan >> Research Analyst MLI (UK) alastair.rvan@bofa.com

See Team Page for List of Analysts

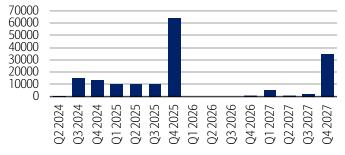
07 December 2023

Rates Research Europe

To test where the true PMRR might be, the Bank has introduced a weekly Short-Term Repo (STR) offering unlimited reserves against Gilt collateral at Bank Rate. BoE's goal for STR is to allow the Monetary Policy Committee (MPC) to focus solely on monetary policy considerations in setting its strategy for Asset Purchase Facility (APF) unwind, without concern for the Bank's ability to align short-term market interest rates close to Bank Rate. For now, the Bank intends the STR to be used freely. Close monitoring of STR in 2024 will help get a sense around PMRR.

Exhibit 2: Our assumed TFSME repayment schedule, £mn

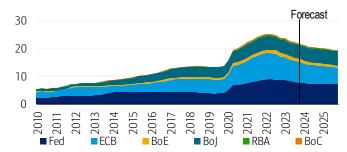
TFSME roll-off to reduce BoE balance sheet in 2024 and 2025



Source: Bank of England, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 3: Aggregate G-6 central bank balance sheet, USDtrn Aggregate balance sheet to continue falling



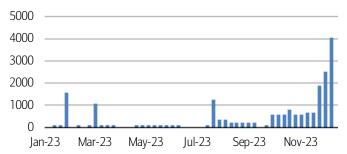
Source: BofA Global Research, Bloomberg. USD values based on spot exchange rate.

BofA GLOBAL RESEARCH

First signs of STR in action

According to the latest BoE STR usage data, 4bn was borrowed in the week commencing 7 Dec against high quality Level A collateral at Bank rate (Exhibit 4). In the week prior, the borrowing was £2.5bn – also meaningfully above the £0.5bn/week on average since late September. The increase in STR borrowing coincided with cheapening of repo relative to Bank rate, with Repurchase Overnight Index Average (Ronia) spread to Bank rate briefly exceeding 8bp on 30 Nov (Exhibit 5). Pick up in STR operations as repo cheapened indicates dissipating cash/collateral imbalance. Under current framework, funding pressures may have more limited impact in the UK relative to Europe given more attractive pricing, we think. For more on EUR, see Running into a wall, 8 Nov.

Exhibit 4: BoE STR facility usage, £mnHigher usage lately...



Source: Bank of England, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 5: Ronia vs. Bank rate spread, bp ... corresponded to Ronia cheapening vs. Bank rate



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Bank analysts' deep dive into central bank balance sheets

Below is an excerpt from European Banks Strategy report Year Ahead 2024: calm and re-rating (28 Nov).

A few trillions of euros are sloshing around the financial system. This is one of the big uncertainties for 2024, we think. Good policy offers cheap solutions; bad policy can



generate financial market breakage. And while we conclude banks are resilient to most outcomes, bank stocks don't tend to do well during any financial stress.

The story for bank analysts in Europe and the UK is the following:

- Banks are more liquid than ever, but bank demand for reserves will conflict with central banks' desire for a smaller balance sheet and easier financial conditions, possibly already in 2024.
- Central banks could ease the strain through including bank collateral in their liquidity metrics, or through pushing for lower Liquidity Coverage Ratios (LCR).
 No sign yet of either. And without that, we worry a policy mistake is upcoming.
- The mandatory reserves discussion could compound the error in Europe, while diminishing central banks' most valuable currency, their credibility.

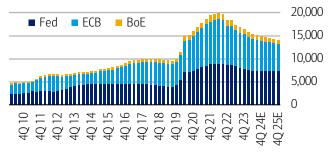
Central banks: the urge to shrink

A US\$15 trillion expansion in US and European central bank assets in the era of "no inflation" is being rapidly reversed (Exhibit 6). The way bank regulation – including the LCR – interacts with central bank shrinkage could be the source of trouble.

It is symmetrical for central banks to be seeking to reduce their scale while tightening monetary policy, but it is worth noting that the transmission mechanism has worked very well with big balance sheets: Exhibit 7 shows that loan rates have moved in line with higher ECB policy rates, for what the ECB characterises as "strong" transmission.

Exhibit 6: Western central banks rapidly shrinking

Federal Reserve, ECB and Bank of England total assets (US\$bn) 2010-25E



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 7: Composite cost of borrowing (%) 1999-2023

"Strong transmission of monetary policy to funding costs and bank lending"



Source: ECB, Schnabel

BofA GLOBAL RESEARCH

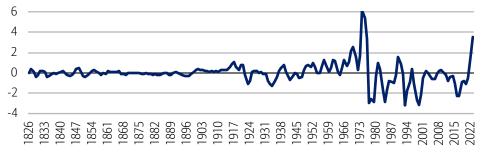
The size of the central bank balance sheet does not seem to have been an impediment to monetary tightening. Central banks have low confidence of how much of the rate hikes have been experienced by the economy. Perhaps less, as corporates are better funded and the rate shock lies ahead. Perhaps more, if the lack of residential mortgage stress means consumers just do not behave in a recessionary way this time.

Why then, introduce a further complexity by trying to shrink balance sheet at the same time? But current policy is strongly focused on reduction. We see the ECB and the BoE looking to reduce their balance sheet by more than US\$2 trillion over 2024E and 2025E

So far, the reduction has only been associated with two "shocks": the UK Gilt market collapse in September 2022 and much higher bond yields. After the BoE won its battle with HM Treasury and the UK government was changed, Gilt market functioning was restored and Quantitative Tightening (QT) has proceeded "smoothly" according to the BoE, if the largest back-up in yields since 1975 is considered smooth (Exhibit 8).

Exhibit 8: three-year cumulative change in Gilt yields largest since 1975

Gilt yields, three year rolling change, 1823-2023 (%)



Source: BofA Global Research estimates, Bank of England

BofA GLOBAL RESEARCH

Spinning wheels

Tightening was originally sequenced at both the ECB and the BoE: Quantitative Easing (QE) had to stop before rates could be hiked. Now, it seems quite possible that in 2024, the ECB will be cutting rates while shrinking the balance sheet quickly. We expect the Eurosystem's balance sheet to fall by €820bn in 2024 and €540bn in 2025 and the ECB to cut rates from June 2024.

We forecast the BoE balance sheet to drop by £100bn in 2024 and £200bn in 2025, with QT £100bn per year and the roll-off of the TFSME additional in 2025. It's less likely the BOE will be cutting rates, as UK inflation is more entrenched, but the potential for this accelerating with the handbrake on is present in the UK too.

LCR and QE together and inseparable

One of the main pillars of Basel III post the financial crisis was the LCR. Announced as a goal in 2011 and first binding in 2015, it has absorbed trillions in liquidity need.

European banks had an 70% LCR as of mid-2011, which meant a shortfall of liquid assets of €1.15tn, according to the European Banking Authority (EBA). Quantity and quality were both lacking against the new rules. Banks rapidly built their HQLA: from 60% LCR required in 2015 to 100% in 2019, the banks accelerated through to 161%.

Looking at HQLA reserves component (deposits by banks with the ECB), Exhibit 9 shows what we think is a very clear picture. The LCR drove a massive increase in bank demand for cash. It's important that the industry has shown very little appetite to run down its cash position even as the ECB has started shrinking its balance sheet (Exhibit 10).

Exhibit 9: Euro area bank reserves to total assets, %, 2006-23 Bank reserves to assets rose sixfold 2015-19

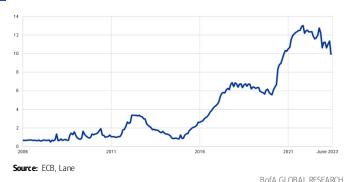
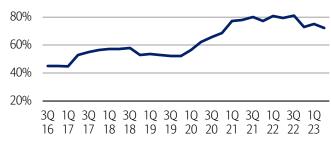


Exhibit 10: Euro area bank cash position, % HQLA, 2016-23 (%) Banks have a strong cash preference within HQLA



Source: BofA Global Research, ECB

BofA GLOBAL RESEARCH

Government bonds are a part substitute for cash

Banks could substitute government bonds for cash in their HQLA. But bonds have price risk and market haircuts. The ECB may charge up to a 13% haircut; the market may

charge more. Bonds also consume stress capital, banks having to include the possibility of falling prices in their stress test. Overall, a strong preference for maintaining record levels of cash-dominated HQLA is clear, we think (Exhibit 11).

Exhibit 11: HQLA decline in the euro area only a quarter of the reduction in the ECB's balance sheet Change from peak, € mn, ECB total assets and euro area bank HQLA



Source: BofA Global Research estimates, ECB

BofA GLOBAL RESEARCH

Double demands

A key of the LCR is it is calculated on assets that can be sold into the private market:

The LCR promotes the short-term resilience of a bank's liquidity risk profile. It does this by ensuring that a bank has an adequate stock of unencumbered high-quality liquid assets (HQLA) that can be converted into cash easily and immediately in private markets to meet its liquidity needs

Basel Committee 2013

Central banks chose to exclude eligible assets

However, this is also in some ways peculiar. A key function of Central Banks is to provide liquidity insurance to the banking system. The LCR ignores this. The implications are highly significant for the central banks' own balance sheets – they have to be much bigger. Some examples serve to illustrate:

- Nationwide: A recent announcement in November 2023, the UK's
 Nationwide Building Society reported a 141% LCR, net of Term Funding
 Scheme financing liquidity. This was driven by its £53bn of HQLA. But it
 disclosed a further £75bn in central bank drawdown capacity, which does not
 feature.
- **HSBC:** Among listed banks, HSBC is always an extreme, given its low loan/deposit ratio and historical focus on remaining exceptionally liquid, but the US\$1 trillion in potential liquidity it could generate from its assets, pre-haircuts would illustrate how poor a benchmark the LCR is.
- Bank of Ireland: At the end of 2022, Bank of Ireland had a 221% LCR, based on HQLA of €38bn almost entirely cash at central banks. But it had multiple sources of potential liquidity:
 - 1. Retained covered bonds we estimate a 20% typical ECB haircut on this readily available collateral,
 - 2. Other mortgages likely eligible for ECB or BoE refinancing with less certainty over timing and quality, we assume a 40% haircut.
 - 3. Other loans such as corporate exposure the ECB has facilities to accept these loans, but we assume a high discount for them. In the



round, Bank of Ireland's "real" liquidity access might reasonably be considered double that of its reported level.

Putting these examples together, we are struck by two compounding factors:

- Banks are choosing a 30-60 point LCR surplus: Banks are choosing an LCR vastly in excess of their 'required' LCR of 100%. In the EA alone, this represents €2 trillion of 'lost' liquidity. Regulatory, supervisory, rating agency, counterparty and market expectations have built this surplus into banks' planning.
- 2. **Trillions of potential liquidity not considered:** Banks then likely have several trillion euro of potential liquidity embedded in their loan books. This receives no external credit, even though it is included in the banks' internal planning with the ECB, Bank of England and so on.

Choices, choices

The ECB and BoE *could* change this strong preference for cash holdings, in multiple ways:

Central banks could emphasise that they do not value banks hoarding LCR.
 Currently, the opposite is true: a high LCR is held up as evidence of the system's strength:

Banks' liquidity situation remained strong, with an average liquidity coverage ratio of 158%.

Andrea Enria. November 2023

- They could emphasise the amount of potential liquidity they know is available to the banks through their repo-eligible assets;
- They could create a repo facility that is clearly available to banks without stigma. The ECB Chief Economist recently discussed this, but it looks like very early stages.

The BoE does have a repo facility now, the STR, which it intends to be a non-stigmatised funding option and is available at Bank Rate. Quote below from a recent speech by Andrew Hauser, seeks to emphasise that at least from his point of view, banks can be expected to use the facility structurally in the future. Where does this bite? The BoE is far from sure: its latest estimate of UK banks' PMRR is high:

One obvious way to get a handle on banks' PMRRs is simply to ask them – and we run a twice-yearly survey to do just that. The latest aggregate PMRR estimate from this exercise is £335-495bn.

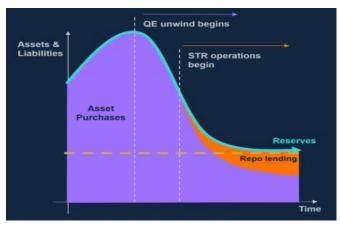
Bank of England, November 2023

The high end of this range has doubled since 2021, as shown in Exhibit 13 and the BoE is clear that the LCR creates an even larger figure, of £570bn, some of which is currently filled with other HQLA.



Exhibit 12: stylised path for UK bank reserves and repo

As the BoE reduces its assets, it expects banks to use repo funding

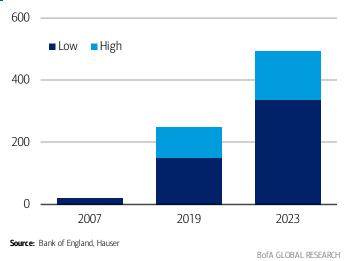


Source: Bank of England

BofA GLOBAL RESEARCH

Exhibit 13: BoE estimate of banks' reserve demand since 2019, £bn

Banks' reserve demand has doubled since 2019



A €3.5 trillion euro-area equivalent choice

The Swiss have also been active in balance sheet reduction and the necessary conclusions. The Swiss National Bank (SNB) implemented a repo and bond programme in 2022. This was quickly a CHF200bn balance sheet liability for the SNB, or 25% of GDP.

And as the Swiss National bank says:

One possible measure to mitigate this stigma issue is to try to make liquidity assistance commonplace. The hope then is that receiving liquidity support loses its stigma if liquidity is obtained by banks on a regular basis rather than only being available in an emergency. Yet it is clear that obtaining large amounts of liquidity will always sound alarm bells — even if it is not called 'emergency' assistance. Stigma will therefore not be resolved simply by renaming liquidity assistance.

Swiss National Bank, November 2023





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

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 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 (HKSFC); 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 Canadian Investment Regulatory Organization; 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 HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in Instruments and Exchange Act in Japan, or its permitted affiliates; is latituded in Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Instruments and Exchange Act in Japan, or its permitted affiliates; 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 distribut

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

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:

effectively assume currency risk.

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.



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

Ralf Preusser, CFA Rates Strategist MLI (UK) ralf.preusser@bofa.com

Sphia Salim Rates Strategist MLI (UK) sphia.salim@bofa.com

Mark Capleton Rates Strategist MLI (UK) mark.capleton@bofa.com

Ronald Man

Rates Strategist MLI (UK) ronald.man@bofa.com

Erjon Satko

Rates Strategist BofASE (France) erjon.satko@bofa.com

Agne Stengeryte, CFA

Rates Strategist MLI (UK) agne.stengeryte@bofa.com

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

