

China Watch

Limited details on equipment renewals & consumer goods trade-in policies

Action plan to boost capex & consumption as telegraphed

On Mar 13, the State Council announced the action plan on large equipment renewals and trade-ins of consumer goods. This is an implementation of the decisions made at the CEWC last Dec and the 4th meeting of the Central Financial and Economic Affairs Commission recently.

In our view, the equipment renewal focused on lowering energy costs and improving efficiency, which is in line with the key goal of “prioritizing developing ‘new quality productive forces’”, highlighted in the GWR ([see also: NPC review](#)). In terms of the trade-ins of consumer goods, it should also help boosting consumption, especially for large-ticket items, including auto, home appliance, etc.

Laudable move in the right direction, but lacks details

This is a laudable move in the right direction for the current administration to boost domestic demand, in our view. If implemented effectively, it will help close the current output gap cyclically, and contribute to the industrial upgrading process structurally. In addition, the boost on large-ticket item sales (e.g. autos and home appliances) should also help buffer any downside amid the ongoing housing market downturn and make the annual growth target of “around 5%” more attainable.

That said, it is still lack of details on fiscal support from the government, especially from the central government. While some may see this as a disappointment, we believe it could be partly due to the data-dependent nature of current macro policies. Based on our analysis below, we forecast there will be around RMB50bn direct central government fiscal support to those targeted areas, along with the help on re-loans from the PBoC for an interest incentive to loans for equipment renewal. If we see continued sluggish domestic demand in coming months, the government will likely step up the fiscal help.

Sector impacts: Autos, large equipment may fare better

Our sector analysts see ICEV, NEV & industrial vehicle sectors benefiting the most in terms of the vehicle replacement policies, especially for auto dealers who are aggressive in used car transactions. Within industrials, we also expect automation & HDT to benefit, especially for higher equipment upgrades for intelligent and energy-efficient manufacturing in the medium term. That said, the impact on home appliances may be limited, as our analysts see the similar stimulus package from past cycles as unlikely to roll out this time. We will wait to see if there is any further detailed subsidy plan to be announced.

>> 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.

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 6 to 7.

12671607

Timestamp: 17 March 2024 07:30PM EDT

18 March 2024

GEM Economics
Asia | China

Helen Qiao
China & Asia Economist
Merrill Lynch (Hong Kong)
+852 3508 3961
helen.qiao@bofa.com

Benson Wu
China & Korea Economist
Merrill Lynch (Hong Kong)
+852 3508 5047
benson.wu@bofa.com

Chen Luo, CFA >>
Research Analyst
Merrill Lynch (Hong Kong)
chen.luo@bofa.com

Ming Hsun Lee, CFA >>
Research Analyst
Merrill Lynch (Hong Kong)
minghsun.lee@bofa.com

Fiona Liang >>
Research Analyst
Merrill Lynch (Hong Kong)
fiona.liang3@bofa.com

Lucy Yu >>
Research Analyst
Merrill Lynch (Singapore)
lucy.yu@bofa.com

Jessie Lo >>
Research Analyst
Merrill Lynch (Singapore)
jessie.lo@bofa.com

Joey Yang, CFA >>
Research Analyst
Merrill Lynch (Hong Kong)
joey.z.yang@bofa.com

Yikai Liu, CFA >>
Research Analyst
Merrill Lynch (Hong Kong)
yikai.liu@bofa.com

Abbreviations:

CEWC: Central Economic Work Conference
GWR: Government Work Report
PBoC: People's Bank of China
NDRC: National Development and Reform Commission
HDT: heavy duty truck
DCS: distributed control system
PLC: programmable logic controller
CNC: computer numeric control
FA: factory automation
UIO: unit in operation
NES: national emission standard

Hard to quantify the fiscal support in detail

In the joint press conference during the two sessions, NDRC director general highlighted that last year, the equipment investment in key areas reached RMB4.9tn in size. He also pointed out that the future market should reach to over RMB5tn in the coming years.

We searched the policy plan for concrete and quantitative details to help us figure out how much fiscal support we will see from both central and local levels. The policy document showed that fiscal support will likely take the form of direct subsidy, tax rebate, and re-loans, but didn't reveal the exact amount of fiscal stimulus.

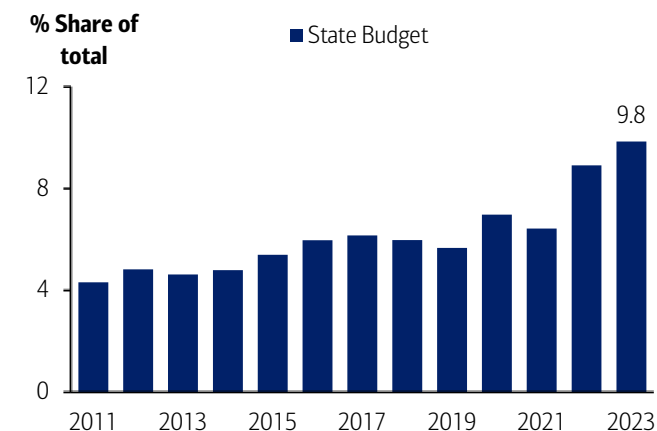
In particular, the action plan highlighted that it will **1) utilize the fiscal budget** from the central government to support the renewal of equipment and the trade-ins of autos, as well as the recycling and disposal of discarded electrical and electronic products; **2) improve tax support policies**, including the tax incentives for energy-saving, environmental protection related equipment renewals; **3) utilize financial supports, including using re-loans** to provide interest subsidy support to bank loans for equipment renewal and technological transformation.

To estimate the potential size of fiscal stimulus, we noted the action plan set a few numerical targets for 2027, including:

- To see the **aggregate investment scale of equipment** increasing by 25% compared with 2023 level in sectors including industrial, agriculture, construction, transportation, education, culture and tourism, and healthcare;
- To increase the **penetration rate of digital R&D design tools** exceeding 90%, and the numerical control rate of key processes to exceed 70% among above-scale industrial enterprises;
- To double the **recycling volume of scrapped vehicles** and increasing the used car sales volume by 45%, compared with 2023 level; To see the recycling of used household appliances up by 30% (vs. 2023 level).

Exhibit 1: Source of fund for FAI: state budget

The fund support on fixed asset investment from the state budget has risen over the years, reached 9.8% as of 2023

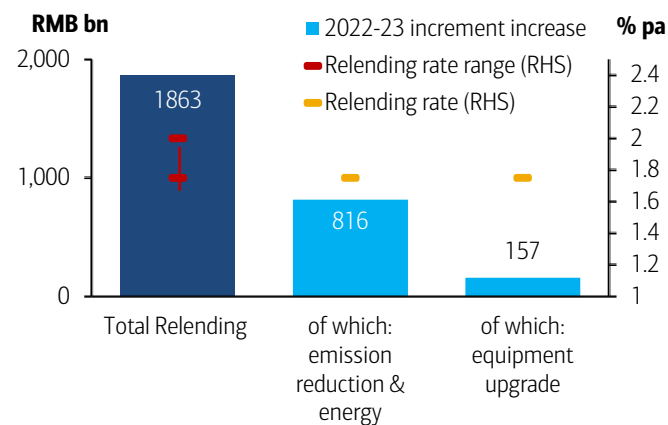


Source: Wind, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 2: PBoC relending tools and related usage in 2022-23

In 2022-23, RMB157bn of the relending tool targeted on equipment upgrade and RMB816bn related to emission reduction & energy



Source: PBoC, BofA Global Research estimates

BofA GLOBAL RESEARCH

If we use the historical share of the state budget fund to total FAI (around 10%, Exhibit 1), of the over RMB5tn size of the equipment renewal market, a 10% more annual fiscal support would imply an additional RMB50bn fiscal spending from the central government. In terms of the re-loans, on Mar 6, PBoC announced it will establish a new relending tool focusing on technology innovation and technological transformation. Previously, it had introduced the re-loan for equipment upgrade totaled RMB157bn in

2022-23, with a lower rate at 1.75% (Exhibit 2). We expect a similar relending tool to be introduced this time, and the size could be even larger if it will be targeting green sectors as well, in our view.

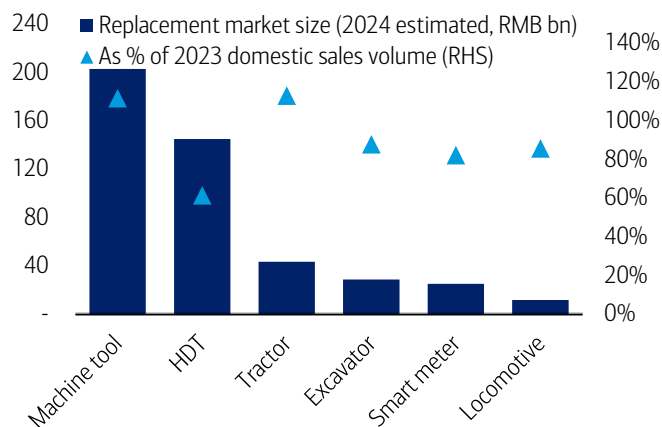
Industrials: positive for automation & HDT

In terms of areas of the equipment investment, we see this as largely in line with the “The Fourteen-Five plan” (published in 2022). In the action plan, equipment upgrades in key industries including steel, non-ferrous metals, petrochemicals, chemicals, building materials, electricity, machinery, aerospace, shipbuilding, textile, and electronics have been highlighted. In terms of usage, it is said to focus on the civil infrastructure related investment, as well as transportation replacement (including electrification replacement of public buses) and the renewal of old agricultural machinery.

According to the policy document, equipment investment in industrials, agriculture, construction, transportation, education, culture & tourism and medical industry should grow >25% by 2027 from the 2023 level. The penetration rate of digital R&D and design tools/CNC in key manufacturing processes should reach 90%/75% respectively by 2027. The policy also calls for accelerating the retirement of diesel trucks with or below NES-III emission standard, and continued implementation of agricultural machinery replacement subsidies. Regarding financial resources, the policy requires the incorporation of eligible equipment renewal and recycling projects into the central government’s budget.

Exhibit 3: Assessment for replacement market size by sector

We believe the automation and HDT sectors should be the key beneficiaries

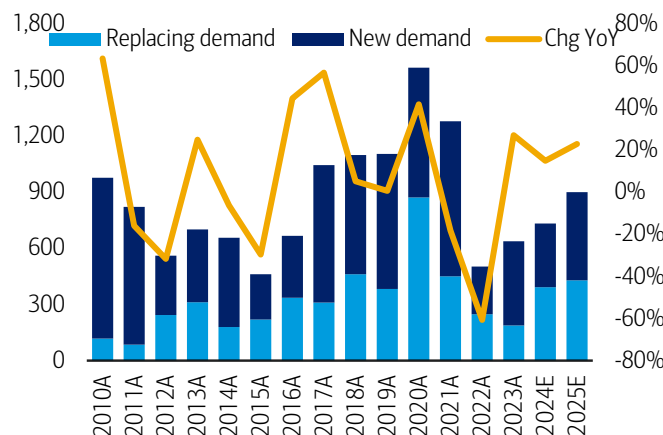


Source: BofA Global Research, NBS, CAAN, CNRG, SGCC

BofA GLOBAL RESEARCH

Exhibit 4: China domestic HDT sales (replacement vs new demand)

We expect replacement demand to continue to tick up



Source: BofA Global Research estimates, CAAM

BofA GLOBAL RESEARCH

While we are still awaiting more clarity on the form and amount of financial supports, our initial assessment suggests that the automation and HDT sectors should be the two key beneficiaries of the equipment renewal policy. In the **automation** sector, we expect higher equipment upgrade for intelligent and energy-efficient manufacturing in the coming 3-5 years, led by SOEs in the petrochemical/chemical/mining/power industries with better financial resources. This should benefit suppliers of DCS, mid-to-large PLC, instrument and industrial software in the process automation industry. Machine tool is another subsector that may benefit from the equipment renewal policy, driven by (1) the replacement of aged machine tools; (2) the rising penetration of CNC systems; and (3) technological upgrades to the high-end five-axis machine tool. We estimate the total UIO of machine tools to be more than 8mn units, among which c.30% are aged machine tools with >10 years old. The penetration of CNC systems in newly sold metal cutting/forming machine tools in China was only 46%/11% in 2022, much lower than the 70%-80% in US, Europe and Japan. On the other hand, we think the impacts on FA products (inverter, servo, small PLC, industrial robots) may be lower due to the sluggish

end-demand, high channel stock, and unclear financial incentives for private-owned enterprises.

In the **HDT** sector, more subsidies are expected to be provided to truck users to eliminate aged trucks (NES III and NES IV trucks). According to our estimates, the UIO if HDT in China by end-2023 reached 8.8 million unit, among which 2.0 million units are NES III & NES IV HDT. We estimate the domestic HDT sales volume in 2024E will reach 789k units, up 25% YoY. That said, the promotion of automobiles trade-in might accelerate the replacing demand of HDT and hence the domestic HDT sales in 2024.

(see also: [Further policy supports for equipment renewal: positive for the industrials sector](#))

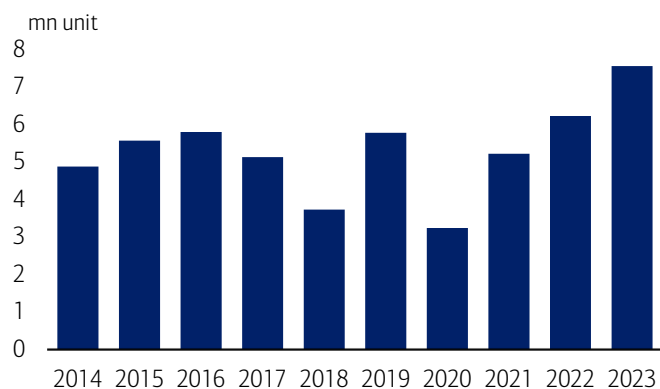
Vehicle replacement: benefit ICEV, NEV & industry vehicle

The policy will support vehicle replacement demand, encourage rational competition and market system, implement vehicle scrapping according to safety and emission requirement, optimize vehicle license plate restriction measures, carry forward a complete vehicle life cycle managing and monitoring system. Also, the policy aims to boost used-car transaction and circulation, optimize used-car registration system, support used-car export business, strengthen electronic system, credit record management, and guard users' information safety, etc. In 2023, the number of vehicle scrappage came in at 7.6mn. Government aims to double vehicle scrappage and recycle volume to 15.2mn in 2027. In 2023, the number of used-car transaction came in at 18.4mn units. Used-car transaction volume is expected to increase by 45% to 26.7mn in 2027.

That said, there is no further specific measure revealed on how to achieve aforementioned goals, and the government has not discussed about the potential total budget, subsidy per car, scale (nationwide or by province/city). However, we expect to see some subsidy support for vehicle replacement, covering both ICEV (internal combustion engine vehicle) and NEV (new energy vehicle). We believe more monetary support will boost industrial vehicle sales and the demand of whole supply chain, especially auto dealers who are aggressive in used-car transaction. (see also: [First take on vehicle replacement stimulus policies](#)).

Exhibit 5: China vehicle scrappage volume

In 2023, the number of vehicle scrappage came in at 7.6mn. Government aims to double vehicle scrappage and recycle volume to 15.2mn in 2027

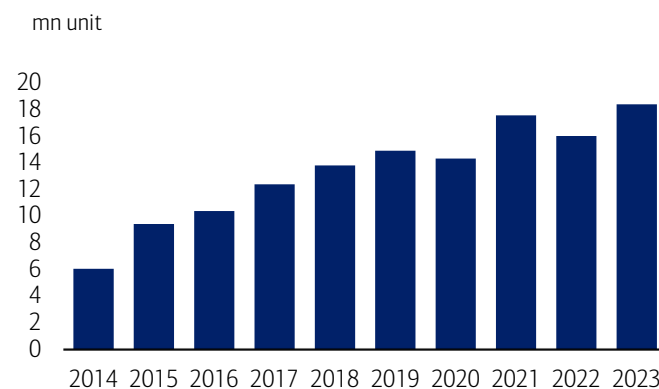


Source: Ministry of public security of China, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 6: China used car sales volume

In 2023, the number of used-car transaction came in at 18.4mn units. Used-car transaction volume is expected to increase by 45% to 26.7mn in 2027



Source: CADA, BofA Global Research

BofA GLOBAL RESEARCH

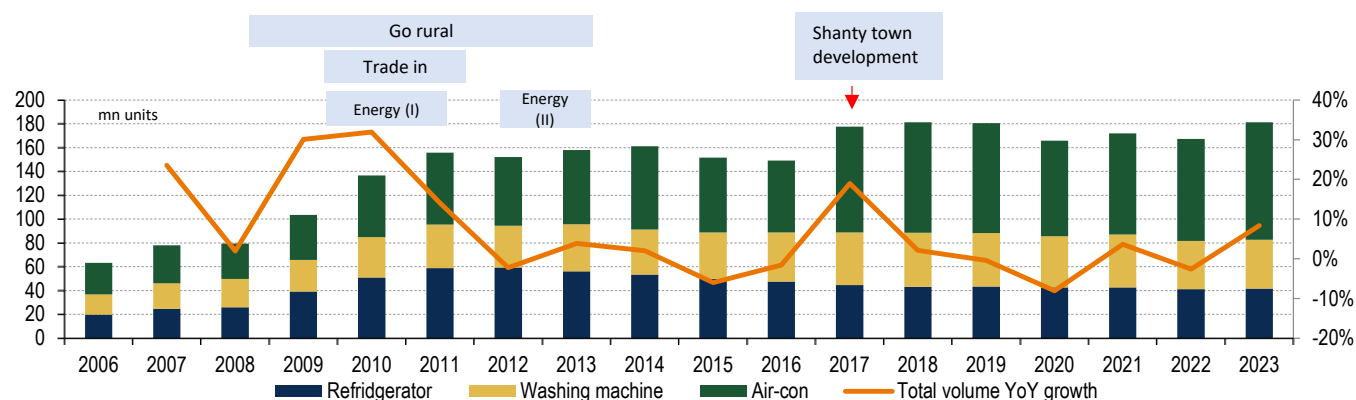
Home appliance: limited impact for now, in our view

In terms of home appliance trade-in, the plan encouraged local governments with "suitable conditions" to offer subsidies for green energy smart home appliances. The plan also sets a target of 30% growth of appliance replacement volume from 2023 to 2027.

However, the plan has not specified the exact amount of subsidies. It also emphasizes a market-led approach and calls for local government to maneuver existing funding without commitment of any extra central government funding support. Given fiscal pressure faced by local governments, we only expect limited subsidies to be granted (most of which will be concentrated in some wealthy regions, such as Shanghai which has recently announced a new round of trade-in subsidies), which might not lead to meaningful impact nationwide. This is very different from the last round of trade-in programs post the global financial crisis. Back then, total trade-in subsidies amounted to RMB30bn covering 3 years with 80% funded by the central government and the rest 20% by local governments. Subsidies were up to 10% of selling prices, which led to RMB342bn home appliance sales over the 3-year period. Meanwhile, we also believe the central government will take a wait-and-see attitude. Should there be further downside risks of the economy, we still do not rule out the possibility for the central government to commit further funding support in the future, in order to further boost home appliance replacement demand.

Exhibit 7: White goods: domestic volume surged during the past policy stimulus cycles

Domestic ex-factory volume



Source: China IOL, BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 8: The three rounds of subsidies amounted to RMB150bn+ total subsidies and led to RMB1.5tn sales in around 5.5 years

Summary of past nationwide home appliance subsidy programs

Subsidy program name (Ch)	家电下乡	以旧换新	节能惠民	节能补贴
Subsidy program name (En)	Go rural	Trade in	Energy subsidy (Phase I)	Energy subsidy (Phase II)
Time period (trial)	Dec 2007 - Dec 2008	Jun 2009 - May 2010	June 2009 - Jun 2011	June 2012 - May 2013
Time period (full rollout)	Feb 2009 - Jan 2013	Jun 2010 - Dec 2011	June 2009 - Jun 2011	June 2012 - May 2013
Department of finance	State (80%) and provincial (20%) finance	State (80%) and provincial (20%) finance	State finance	State finance
Categories coverage	10 categories (flat panel TV, air-condition, refrigerator, washing machine, water heater, microwave, magnetic stove, PC, mobile)	5 categories (flat panel TV, air-condition, refrigerator, washing machine, PC)	10 categories (flat panel TV, air-condition, refrigerator, washing machine, high-efficiency lightening, gas water heater, PC, high-efficiency motor) that carry Energy Efficiency Grades of 1 and 2	5 categories (flat panel TV, air-condition, refrigerator, washing machine, gas water heater) that carry Energy Efficiency Grades of 1 and 2
Subsidy (as % of ASP subject to caps)	13%	10%	RMB500-850/unit for Grade 1 RMB300-650/unit for Grade 2	RMB70-400/unit
Sales unit (mn units)	298	92	NA	NA
Sales value (RMBbn)	720	342	>200	250
Subsidy granted (RMBbn) (Estimated)	90	30	22	12
Leverage (x)	8	11	c.10	20

Source: Ministry of Finance, Ministry of Commerce, 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.

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.

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.

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.

Individuals identified as economists do not function as research analysts under U.S. law and reports prepared by them are not research reports under applicable U.S. rules and regulations.

Macroeconomic analysis is considered investment research for purposes of distribution in the U.K. under the rules of the Financial Conduct Authority.

Refer to [BofA Global Research policies relating to conflicts of interest](#).

"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.

Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofamli.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the 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; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority. This information has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclaimers](#) for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of

this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.

This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Certain investment strategies and financial instruments discussed herein may only be appropriate for consideration in accounts qualified for high risk investment.

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 information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS or any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.