European Banks Strategy

Steady but sure: at 6.6x, four in a row ahead

Industry Overview

A year of calm should provide a fourth of outperformance

We see an 8% dividend yield complemented by 4% buybacks. A banking system set to grow net profits in line with nominal GDP at 4% offers 16% returns (Exhibit 5), even without re-rating from the sector's four-decade low (Exhibit 1). Banks were difficult for a long time (Exhibit 7), but now delivered 1,000bp+ total return outperformance in each of the last three years (Exhibit 2), while de-rating. We are positive on the sector.

Property markets are turning and a consumer windfall

Oil and gas prices were a tax on consumers and are now a windfall (Exhibit 13). Residential property markets are already stabilising, as discussed in our 28 November 2023 report, Year Ahead 2024: calm and re-rating, with tight underwriting standards (Exhibit 19, Exhibit 20) having substantially removed distress from the system. Most of monetary policy may already be in the rear view mirror (Exhibit 21).

Dispersion in momentum, but overall stability

There's a wide range of profit growth in the sector in 2024E (Exhibit 3, Exhibit 4), but most important is the diversity of profit sources: yes, customer spread income is falling (Exhibit 9), but volumes are set to recover (Exhibit 12) and hedges roll (Exhibit 14). We see trading revenue growth in a falling-rate environment (Exhibit 17), along with fees in a higher equity market (Exhibit 15). Meanwhile, impairments are set to decline as GDP recovers (Exhibit 18). Banks are not a one trick industry.

Regulatory stocktake on Cost of Equity – for them

Higher regulatory capital requirements contributed to banks' high Cost of Equity, now 16% (Exhibit 23) and the opposite of the Modigliani-Miller theory the regulators used (Box 1). Equity built but the distance to intervention by the authorities did not. Liquidity was built massively, but Liquidity Coverage Ratios are currently expected to be high. In effect, equity and the liquidity bought comfort for regulators and distance to loss for taxpayers, but not for equity investors. Any signs of balance from regulators could be a trigger for re-rating.

Growth choices, money vanished

Exhibit 27 shows central banks and non-banks picked up the slack as banks had to build capital. Central banks now wish to shrink, although they can't explain why (Exhibit 28). Bank shareholders can be relatively indifferent whether free cashflow is distributed or re-invested; society should prefer voluntary re-investment to support growth. After the years of "more is more" (Box 2, Exhibit 25), regulators should welcome modest bank re-leveraging and higher bank share prices.

>> 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.

Refer to important disclosures on page 16 to 17. 12641312

Timestamp: 05 January 2024 12:00AM EST

05 January 2024

Equity
Europe
Banks-Multinational/Universal

Alastair Ryan >>
Research Analyst
MLI (UK)
+44 20 7996 4806
alastair.ryan@bofa.com

Rohith Chandra-Rajan >>
Research Analyst
MLI (UK)
+44 20 7996 8495

Tarik El Mejjad >>
Research Analyst
MLI (UK)
+44 20 7996 0014

Antonio Reale >>
Research Analyst
MLI (UK)
+44 20 7996 1763

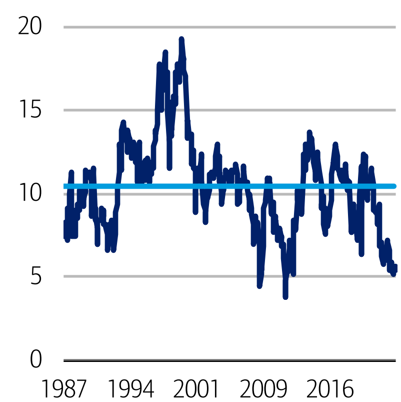
David Taranto >>
Research Analyst
MLI (UK)
+44 20 7996 7510

Filippo Munari >>
Research Analyst
MLI (UK)
filippo.munari@bofa.com

Olga Veselova >>
Research Analyst
Merrill Lynch (DIFC)

Ilija Novosselsky >>
Research Analyst
MLI (UK)

Exhibit 1: a 4 decade low PE
European banks 12 month forward PE 1987-2023 (x)



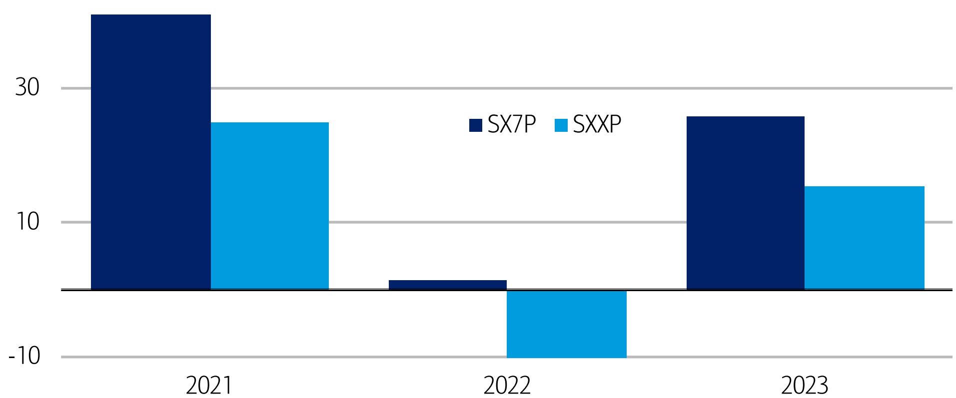
Source: BofA Global Research estimates, Eikon. Median multiple. Banks: BNP, Santander, Commerz, SHB, Deutsche – selected for length of time series available

BofA GLOBAL RESEARCH

A fourth year of outperformance ahead

This report complements our 28 November 2023 European Banks Strategy report, Year Ahead 2024: calm and re-rating. We retain our positive view on the European banks. Their depressed multiple after 3 years of annual 1,000bp outperformance (Exhibit 2) means it is increasingly risky not to own the banks if, as we expect, profits remain robust.

Exhibit 2: banks outperformed 1,000bp+ in each of the last three years
Total return including dividends, SX7P and SXXP indices (%) 2021-23

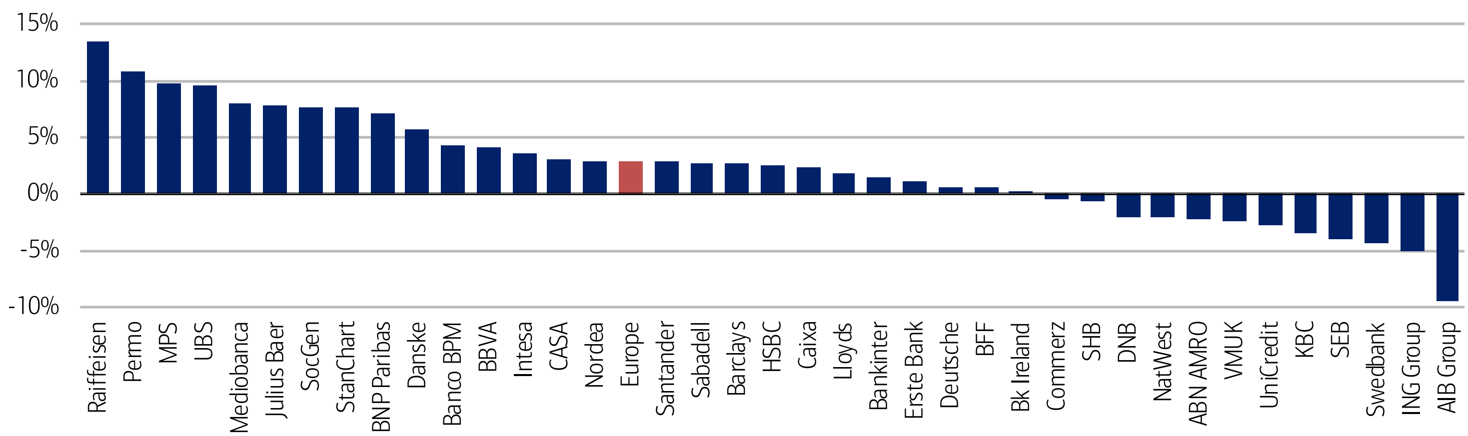


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

The lower rate forward curve and lower government bond yields are a drag on potential profits, but we see multiple offsets which we detail shortly. But to start at the beginning, we believe that European banks are set to deliver modest 3% income growth in 2024E (Exhibit 3).

Exhibit 3: 3% revenue growth 2024E
European banks revenue growth % y/y (€) 2024E

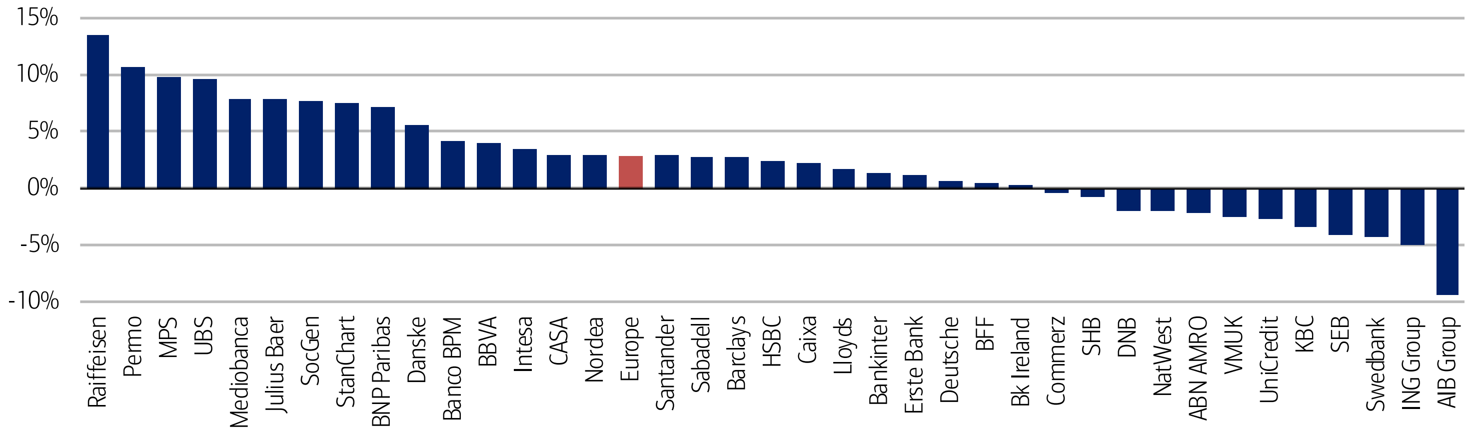


Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

This should translate into 3% Profit Before Tax growth. Costs are rising; impairments likely falling (Exhibit 4).

Exhibit 4: 3% Profit Before Tax growth 2024E
European banks PBT growth % y/y (€) 2024E

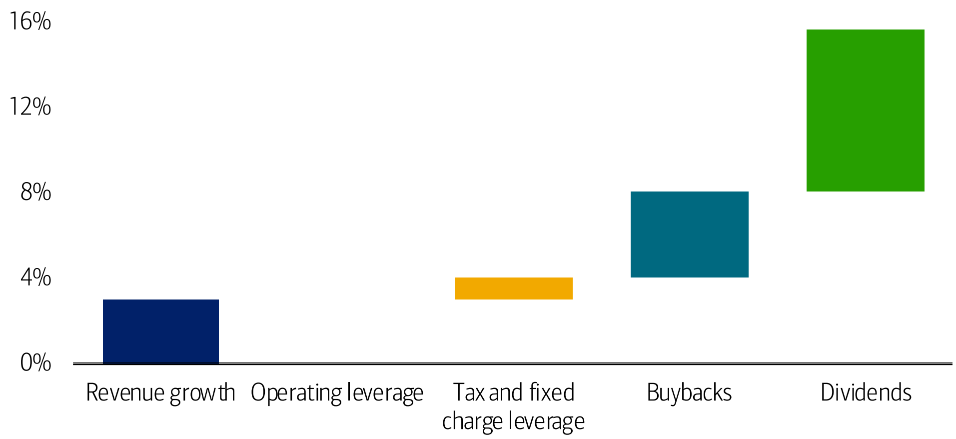


Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

A little growth in pre-tax profits should offer shareholders a 16% expected return in 2024E, without any re-rating (Exhibit 5). As we argue through this report and in the Year Ahead, a more-profitable and less-risky sector should also enjoy a re-rating towards the multiples of previous years.

Exhibit 5: we see 3% revenue and PBT growth, 1% leverage on fixed charges, a 4% buyback and an 8% dividend yield, for 16% returns without re-rating
2024E growth and returns, European banking (% y/y, yield % market cap)



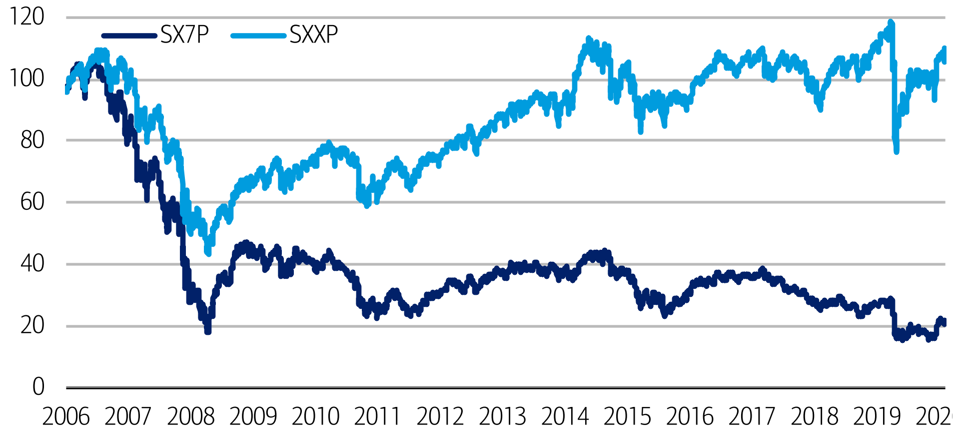
Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

That was then…

Taking a step back, we appreciate how many investors remain wary of banks. We show in Exhibit 6 how poor the banks were for the 15 years to 2020.

Exhibit 6: it was a very long 15 years, 2006-2020, for bank investors
European bank index and Eurostoxx, indexed to end 2006 (%), to end 2020

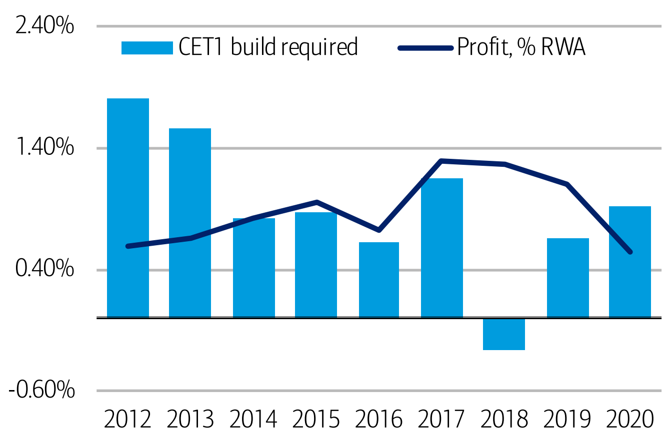


Source: Bloomberg

BofA GLOBAL RESEARCH

This reflected their depressed profits, compounded by strongly rising regulatory capital requirements. Exhibit 7 shows that the average 85bp Return on Risk Weighted Assets over 2012-20 was consumed by an average 80bp annual increase in regulatory capital demands. Free cashflow was trivial and those banks paying dividends were offset by those raising money. Exhibit 8 shows the sharp contrast today. Profits have more than doubled and we see very little regulatory overhang remaining. Free cashflow is abundant.

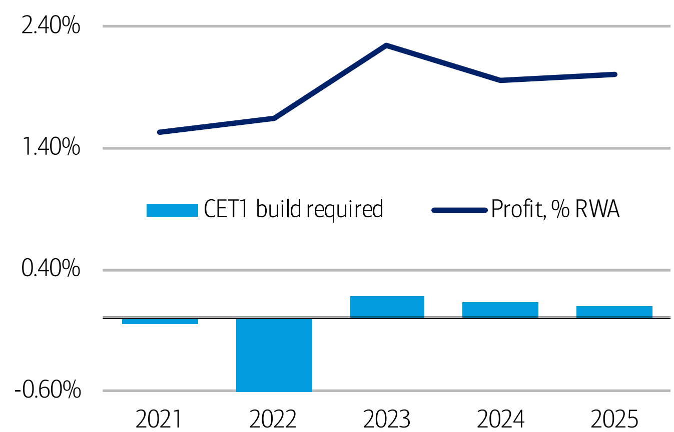
Exhibit 7: across 2012-20, increased regulatory demand consumed almost all bank profits – dividends offset by share issuance
European banks: Common Equity Tier 1 demand from regulators compared with profits (% RWA)



Source: BofA Global Research estimates, company report

BofA GLOBAL RESEARCH

Exhibit 8: since 2021, regulatory demand has fallen away, while profits have risen strongly. Free cashflow has multiplied
European banks: Common Equity Tier 1 demand from regulators compared with profits (% RWA)



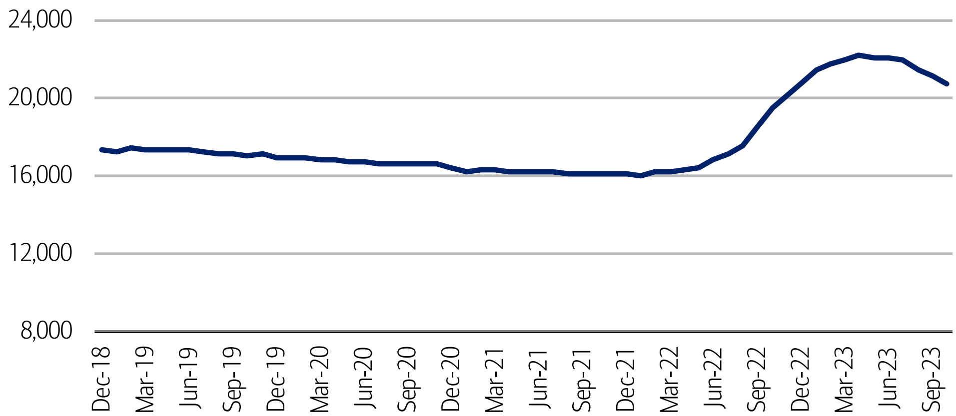
Source: BofA Global Research estimates, company report

BofA GLOBAL RESEARCH

Income sources: one fades, others recover

The last two years were a tale of rate normalisation. We see 2024 and onwards a more nuanced picture. We expect deposit migration and repricing to continue in 2024E, drags on the Net Interest Margin. Indeed, it was already evident in late 2023 (Exhibit 9). Lower policy rates could add complexity to bank margin management.

Exhibit 9: monthly spread income from loans and deposits has peaked
Euro area loan-deposit spread income, € mn, 2018-23

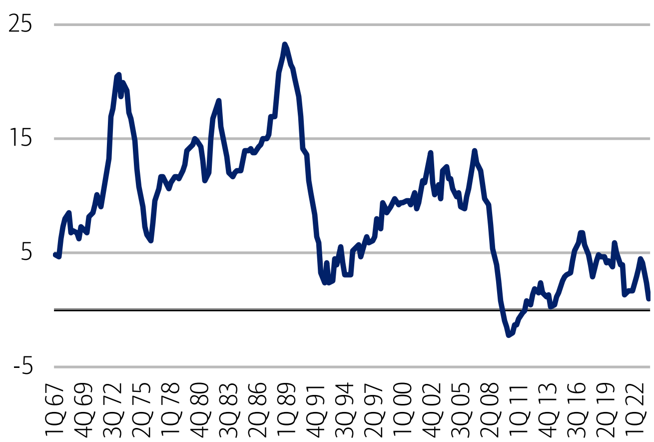


Source: BofA Global Research estimates, ECB

BofA GLOBAL RESEARCH

However, other bank income drivers were notably depressed in 2023. Exhibit 10 shows as an example UK credit growth at a six decade low.

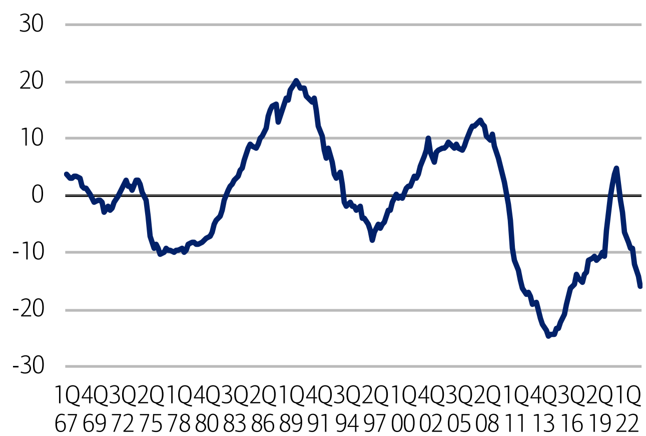
Exhibit 10: UK credit growth almost at a 60 year low
UK nominal growth in credit, % y/y 1967-2023 (£)



Source: Bank of England

BofA GLOBAL RESEARCH

Exhibit 11: UK credit-to-GDP gap only even reached zero briefly during Covid
UK credit to GDP gap, points, 1967-2023. Above zero = above trend

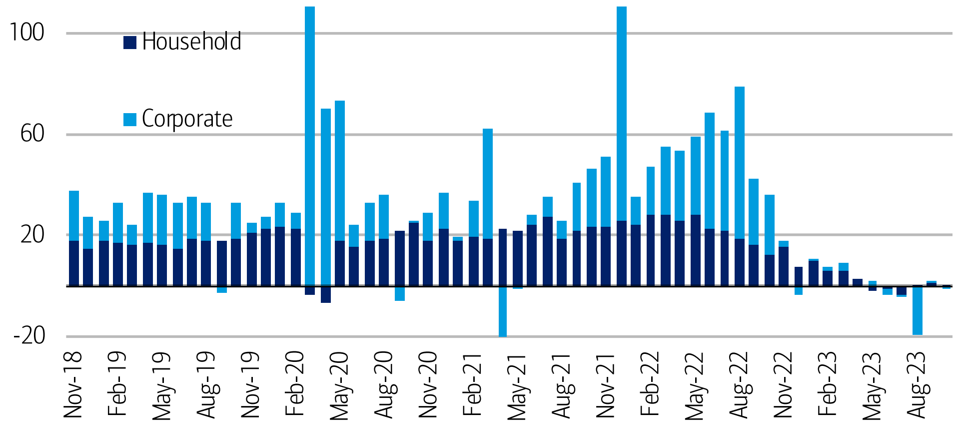


Source: Bank of England

BofA GLOBAL RESEARCH

A shorter time series in Exhibit 12 shows the abrupt impact of higher rates on euro area loan growth from 2022 through 2023. As designed, sharply higher rates threw the anchor on credit growth. With longer term yields already in decline and short rates likely to, we see the potential for banks to find opportunities to grow their books through 2024E.

Exhibit 12: monthly loan growth collapsed to zero as rates rose sharply
Euro area adjusted monthly loan growth (€ bn) 2018-23

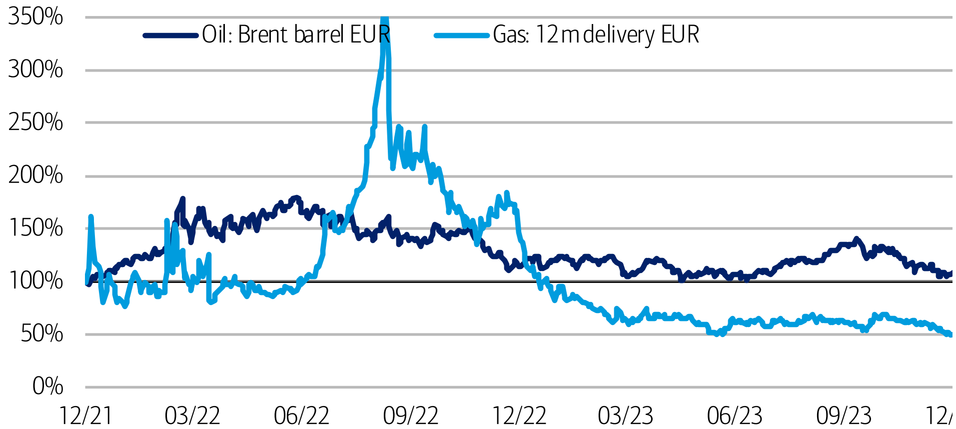


Source: BofA Global Research estimates, ECB

BofA GLOBAL RESEARCH

For consumers, the "tax" of high energy prices was felt keenly in 2021, but has now fully or more-than fully reversed (Exhibit 13). This provides a following wind to their real incomes and confidence.

Exhibit 13: European gas prices halved and oil fell in euro over 2023
Oil prices (Brent, barrel, €) and 12 month forward gas (€/MWh) 2021-23

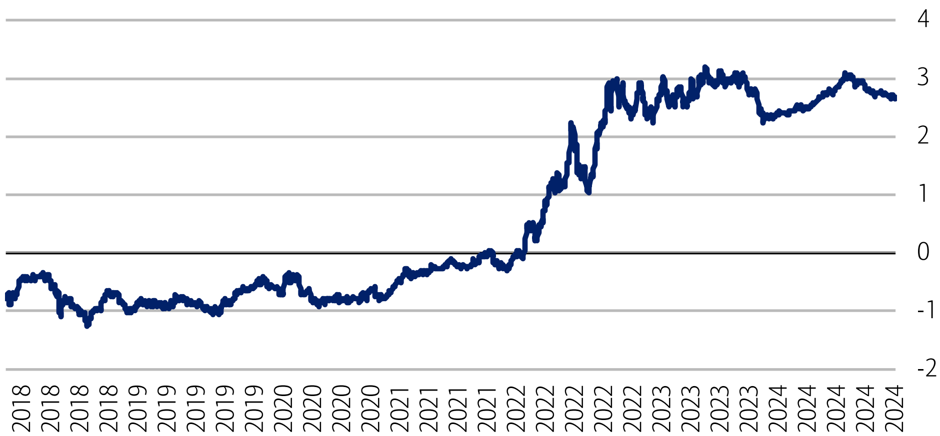


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

For banks, their hedges will further contribute to revenue growth. Exhibit 14 shows that while 5 year swap rates have declined, maturing swaps at this typical bank duration are still 280bp higher-yielding than those rolling off.

Exhibit 14: Swaps rolling 280bp higher through 2024
5 year euro swap, reinvestment vs maturities, 2018-24E (%), using latest swap rate of 2.53%



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

We also expect non-funded income to recover. Exhibit 15 shows that the world stock market index was up by 15% over 2023, with most performance late in the year.

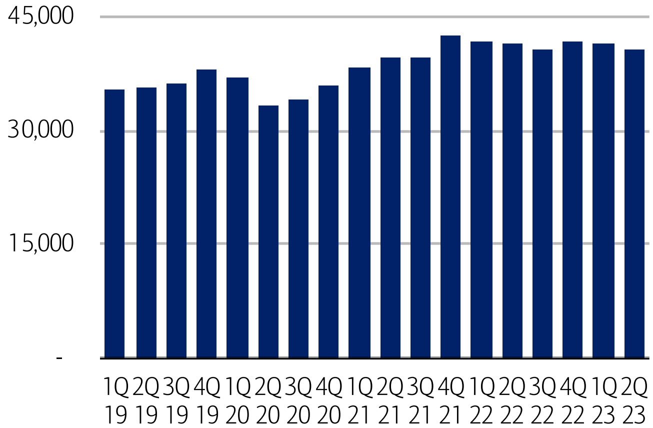
Exhibit 15: FTSE All World index recovered strongly in late 2023
FTSE All World Index (points) 2022-23

Source: Bloomberg

BofA GLOBAL RESEARCH

Overall non-interest income in euro area banks grew by 7% between 2019 and mid-2023, shown in Exhibit 16 and Exhibit 17. If these income lines had kept pace with nominal GDP, they would have grown by 17%. The 10% points shortfall is equivalent to €20bn of “missing” revenues, which in a recovering-GDP and falling-rate environment can be expected to return.

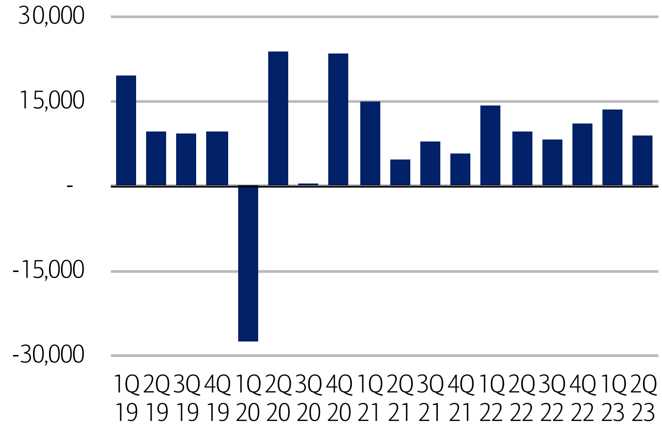
Exhibit 16: fees down in nominal terms y/y 2023
Euro area bank fee revenues, 2019-23 (€ mn)



Source: ECB

BofA GLOBAL RESEARCH

Exhibit 17: trading revenues have been depressed in 2023
Euro area bank trading and fair value revenues, 2019-23 (€ mn)



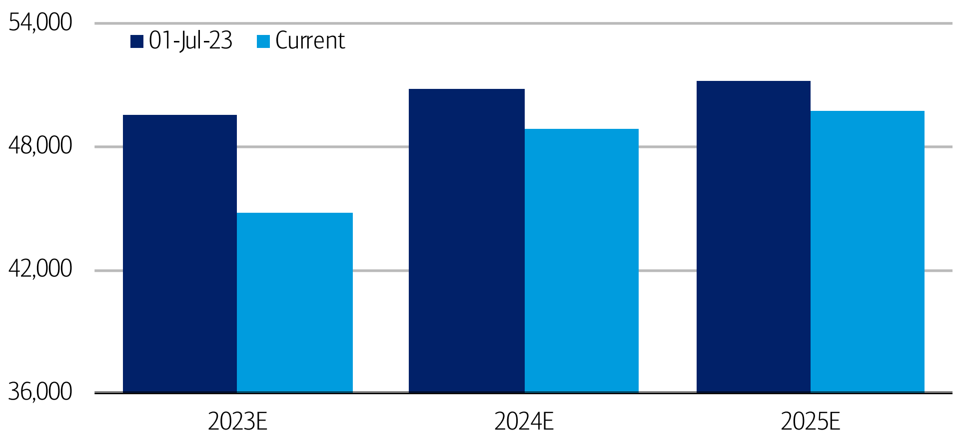
Source: ECB

BofA GLOBAL RESEARCH

Further down the P&L: favourable impairments

Through the second half of 2023, banks delivered a favourable impairment experience, while building additional reserves as GDP expectations declined. We show in Exhibit 18 that like the banks themselves, we have normalised impairments back higher in 2024E. Should property markets have stabilised – as we believe – and as GDP re-accelerates into 2025E, we believe these expectations should prove conservative.

Exhibit 18: European bank impairments (€ mn): a strong 2023E outcome, but we conservatively normalise into 2024E
P&L impairments (€ mn) 2023E-25E over time

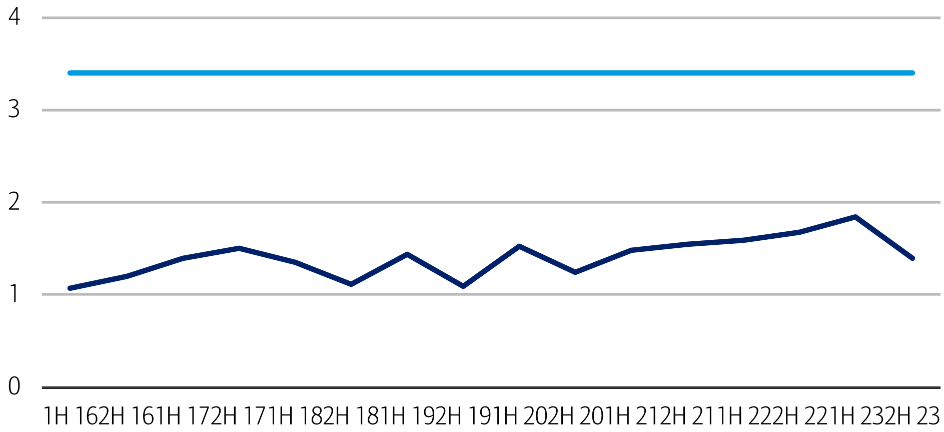


Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

As detailed in the *Year Ahead*, key to lower impairments is the structural reduction in risks taken by banks in the last decade. Bitter experience was one driver of lower risk appetite, compounded by stress testing and in particular by macroprudential limits on who could qualify for a mortgage. One illustration: Exhibit 19 shows that tight underwriting kept the proportion of UK households with high debt servicing low through the low-rate years.

Exhibit 19: Bank of England shows that in the good times, underwriting standards stayed strong
Share of UK households with high cost-of-living-adjusted debt-servicing ratios (COLA-DSR), 2016-23, compared with Global Financial Crisis (%)

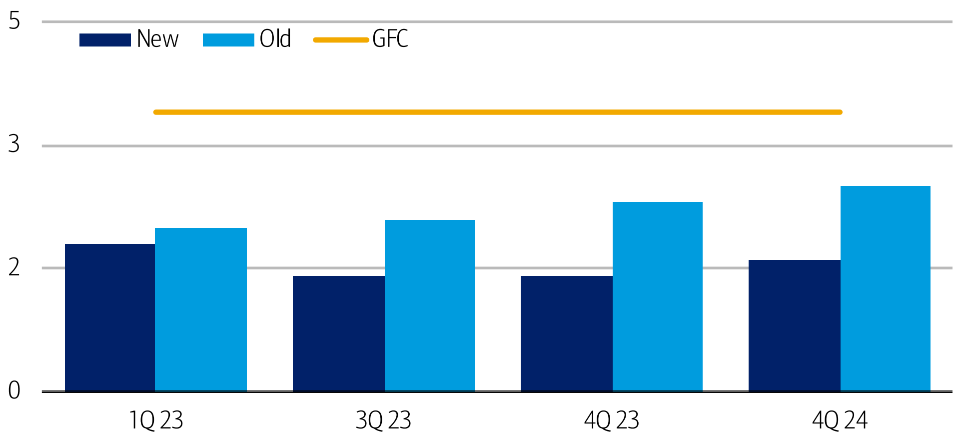


Source: Bank of England

BofA GLOBAL RESEARCH

This means that the Bank of England has recent found itself significantly reducing its estimates of potential stress in the mortgage market (Exhibit 20).

Exhibit 20: the Bank of England has significantly reduced its stress expectations for households
Share of UK households with high cost-of-living-adjusted debt-servicing ratios (COLA-DSR), latest Bank of England Financial Stability Report and prior, compared with Global Financial Crisis (%)

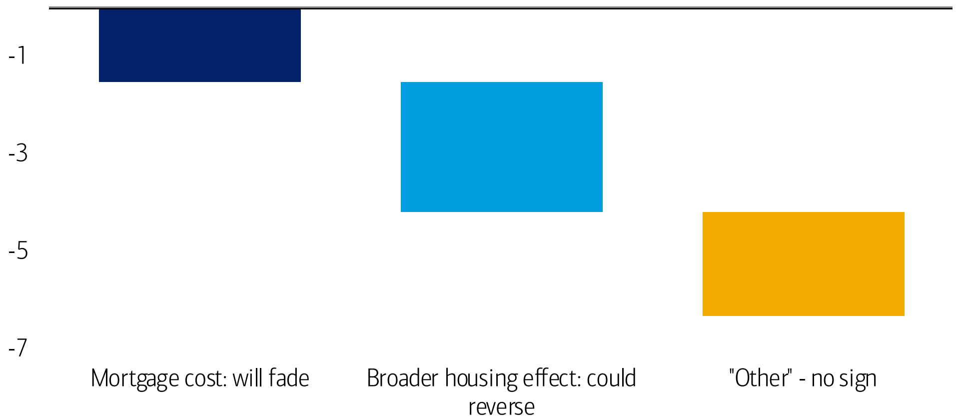


Source: Bank of England. Compares December 2023 FSR with June FSR

BofA GLOBAL RESEARCH

The feedback loop could prove to be quite powerful. The Bank of England thinks that most of the impact of monetary tightening on the housing market lies ahead. Exhibit 21 shows that it sees 1.5% reduction in consumer spending out to 2026 because of higher mortgage rates, multiplied up to another 4.8% by changes to consumer behaviours in the face of falling home prices. If the housing market is already recovering, only the 1.5% mortgage hit lies ahead, and that fading at current Bank Rate forwards. In the round, four fifths of the monetary tightening through this channel simply does not happen, we think.

Exhibit 21: Bank of England sees multiple drivers of housing declines to lower consumer spending. But home prices are recovering
Impact on the level of consumption (% points) to 2026 from higher rates propagating via the housing market



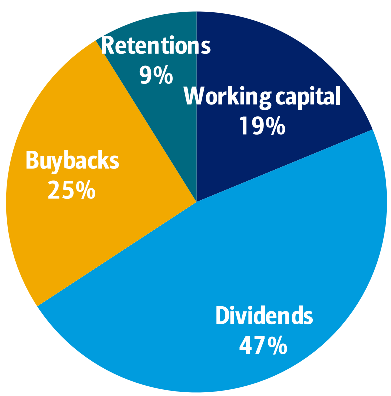
Source: Bank of England

BofA GLOBAL RESEARCH

Structurally less stress in housing

We see this playing out across Europe – lower housing distress in turn leads to higher home prices; in turn boosting consumer confidence. Regulators should have confidence in the success of their prudential and macroprudential constructs, which have moved risk out of the banking system. We believe that a banking system supporting loan growth and building capital while paying its shareholders €115bn in 2024E is one that is proving its strength (Exhibit 22).

Exhibit 22: European banks - use of profits 2024E
Distributions set to be 72% of profits, while banks grow Risk Weighted Assets and build capital



Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

We now turn to a more complex area: the interaction between objective bank strength and the twin challenges of a high Cost of Equity and the central bank desire to shrink.

A regulatory peak, a stocktake due

Banks building capital ratios was supposed to be free. In Box 1, we quote the Bank of England, capturing an underlying theme across European central banks. Higher capital requirements were going to be met with a lower required Return on Capital, as the risk of the sector declined.

Box 1: Modigliani-Miller failed

Modigliani and Miller (1958) showed that, under certain assumptions, moving to higher levels of funding in the form of common stock, and therefore lower levels of debt and financial leverage, would leave the total cost of funding unchanged. In particular, the Modigliani-Miller (MM) theorem implies that as more equity capital is used, return on equity becomes less volatile and debt becomes safer, lowering the required rate of return on both sources of funds. It does so in such a way that the overall weighted average cost of funds remains unchanged. This idealised situation represents the case where there is a complete (100%) offset in relative funding costs as the debt and equity compositions change…

Estimates suggest that while the MM theorem holds in the UK, it does so only partially, with the central estimate at 45%… other studies document MM offsets for banks in other countries… Junge and Kugler (2012) estimate an offset of 36% using Swiss banking data, Toader (2014) uses a broader set of European banking data from 1997 to 2011 and estimates a 42% offset, while the ECB (2011) documents offsets ranging from 41% to 73%… Focusing on US banking data spanning 1996 to 2012, Clark et al (2015) estimate offsets of 43% to 100%.

Bank of England, 2015

Exhibit 23 shows that that hasn't worked out. We estimate the banking industry is currently being accorded a 16% Cost of Equity, close to an all-time peak.

Exhibit 23: a 16% Cost of Equity

Cost of Equity implied by Gordon growth approach, 2024E (%)

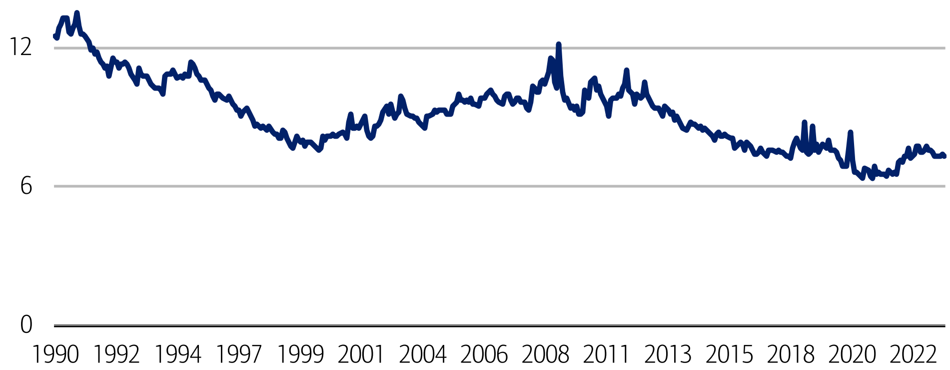
	2024E
ROTE	13.2%
COE	15.9%
g	3%
P/NAV	0.79

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

This contrasts with our calculation of a global Cost of Equity now around 8% - Exhibit 24.

Exhibit 24: global implied Cost of Equity now around 8%
Implied Cost of Equity, global (%), 1990-2023



Source: BofA Global Research estimates, company report

BofA GLOBAL RESEARCH

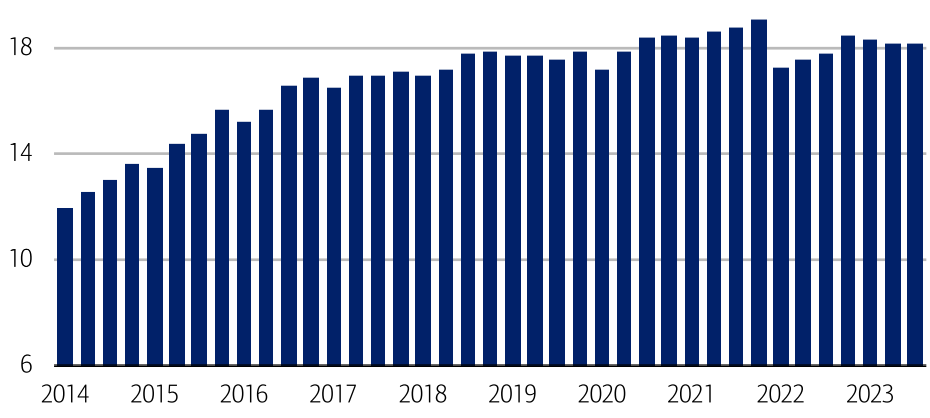
We think the answer is straightforward – that while capital and liquidity build distanced taxpayers from tail risk, continued inflation in regulatory expectations has left bank owners concerned that the distance to intervention by regulators remains small. A reminder, just a few short years ago the Bank of England thought that a 14% Tier 1 ratio was likely to be perfectly reasonable (Box 2).

Box 2: capital inflation continued

> But our analysis suggests that once resolution requirements and standards for additional loss-absorbing capacity that can be used in resolution are in place, the appropriate level of [Tier 1] capital in the banking system is significantly lower than earlier estimates, at 10-14% of risk-weighted assets
> *Bank of England 2015*

Since then, the dividend ban came along at a 17.9% Tier 1 ratio and persisted until mid-2021, by which time the banks were sat on an 18.6% Tier 1 ratio. At today's 18.2% Tier 1 (Exhibit 25), the banks are sat on £124bn more capital than the regulator felt would be appropriate.

Exhibit 25: banks have built capital way past the original plan
UK bank Tier 1 ratio



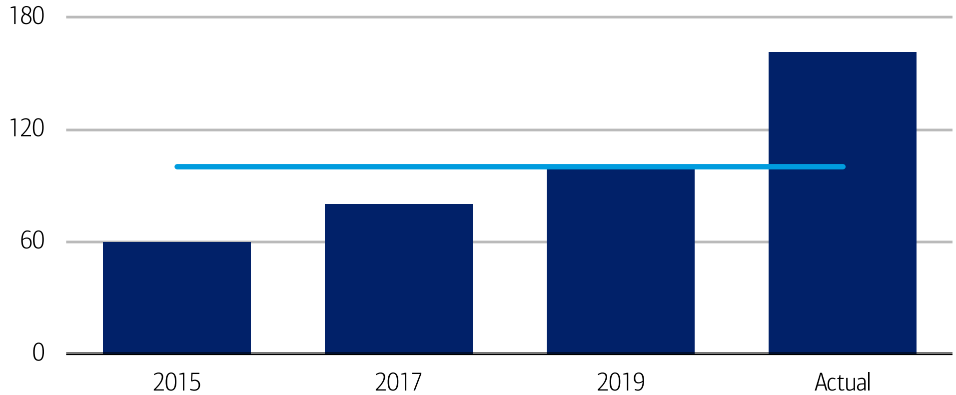
Source: Bank of England

Exhibit 25: banks have built capital way past the original plan
UK bank Tier 1 ratio

BofA GLOBAL RESEARCH

Similarly, banks were supposed to have to build to a 100% Liquidity Coverage Ratio. From a starting point at 70% of the new ratio, this was onerous. But with the sector now at close to 160% (Exhibit 26), there's been some trillions of euros "disappeared". They are on the banks' balance sheets, but if the banks believe that they are expected to maintain such a high level, there's nothing the banks can do with them.

Exhibit 26: Liquidity Coverage Ratio from 60% to 158% since 2015
Basel requirements for LCR coverage in %, 2015-2019 and current actual euro area average

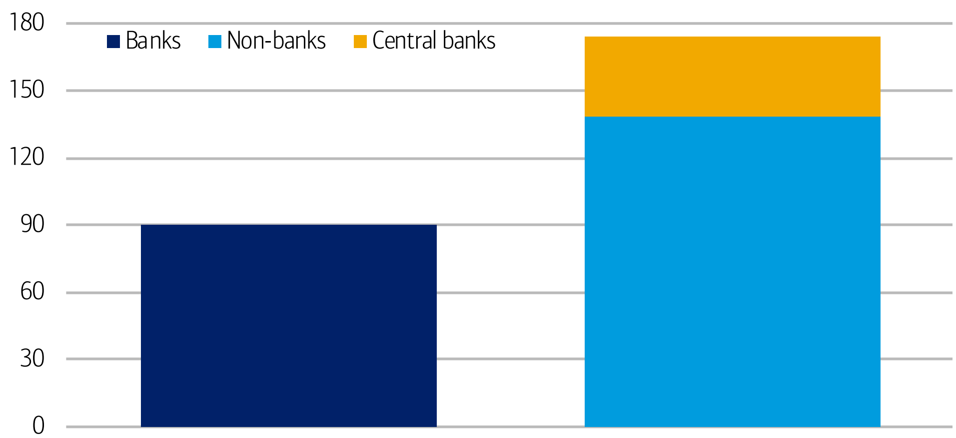


Source: Basel Committee, ECB

BofA GLOBAL RESEARCH

Perhaps this was fine when central banks were happy to do two things: supply liquidity and take risk. Exhibit 27 shows that between 2007 and 2021, non-banks and central banks grew by twice as much as banks, having started out as the same size.

Exhibit 27: globally since 2007, non-banks and central banks grew twice as much as banks
Asset growth, US$ trillion, 2007-21

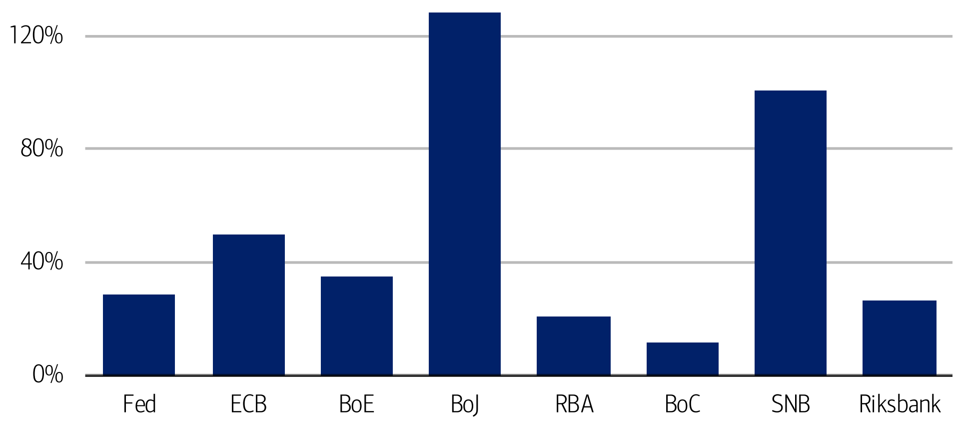


Source: BofA Global Research estimates, FSB, Bloomberg

BofA GLOBAL RESEARCH

But central banks now want to shrink – well, central banks except the very largest (Exhibit 28).

Exhibit 28: central bank assets % GDP: a very wide range
Is 15% the right number, or 120%?

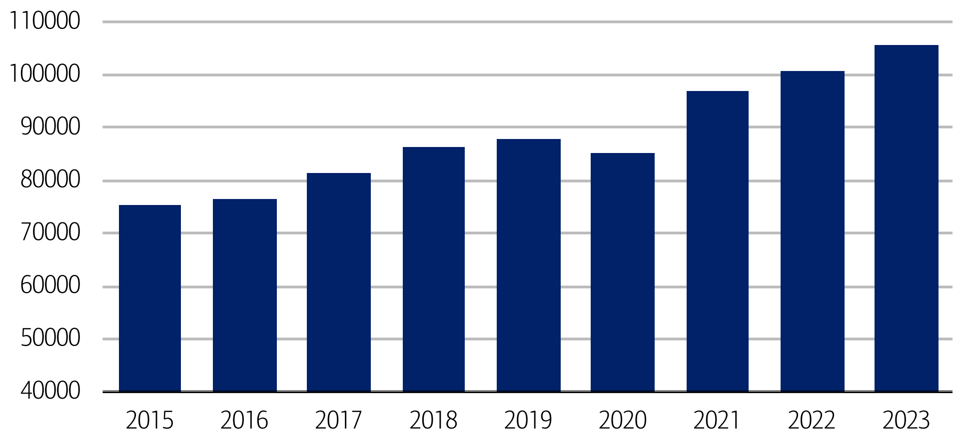


Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

And global GDP continues to grow, unlike regulators' charge for bank size, the Globally Significant Important Bank buffer, whose calculation has remained unchanged since 2015 (Exhibit 29).

Exhibit 29: global nominal GDP (US$ billion) up by 40% since 2015
Bank Globally Significant Important Bank buffers have been fixed in nominal terms for 8 years



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

This opens the space for reflection by regulators, we think. The status quo is fine for bank shareholders – a 16% annual return is quite acceptable, we think. But it is likely that the system will under-produce credit to support economic growth with such a high return benchmark set. And as the ECB recently recognised, liquidity hoarded in the expectation of supervisory expectations is liquidity not available for use (Box 3), nor indeed available for central banks to shrink.

Box 3: becoming aware of liquidity rule limitations

Banks might, in practice, be reluctant to use their liquidity buffers in times of liquidity stress (i.e. to allow their LCR to fall below 100%). Reasons for such behaviour include potential market stigma, uncertainty about supervisory response or a desire to maintain a certain level of reserves to withstand potential further stress. However, if

> banks are unwilling to use liquidity buffers this might lead them to engage in exaggerated defensive measures, which could negatively affect the vital services banks provide to the economy.
> *ECB Macroprudential Bulletin, December 2023*

We believe the market would welcome any recognition by central banks and their regulatory and supervisory arms that too much has been asked for. In the absence of such recognition, we see a 2024 in which banks continue to respond appropriately to strong free cashflow and low valuations by distributing free cashflow to their owners. And at €115bn a year, we think that works for equity investors, if less well for rulemakers.

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

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.
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.
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.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 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.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

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.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, 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.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

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

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

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

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

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

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

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