Japan Macro Watch

BoJ flexibilizes yield curve control—quick take

28 July 2023

Macro
Japan

Izumi Devalier
Japan and Asia Economist
BofAS Japan
+81 3 6225 6257
izumi.devalier@bofa.com

Shusuke Yamada, CFA
FX/Rates Strategist
BofAS Japan
+81 3 6225 8515
shusuke.yamada@bofa.com

Masashi Akutsu >>
Strategist
BofAS Japan
+81 3 6225 7754
masashi.akutsu@bofa.com

Takayasu Kudo
Japan and Asia Economist
BofAS Japan
+81 3 6225 8592
takayasu.kudo@bofa.com

Tony Lin, CFA >>
Equity Strategist
BofAS Japan
+81 3 6225 8123
tony.y.lin@bofa.com

Tomonobu Yamashita
Rates Strategist
BofAS Japan
+81 3 6225 7950
tomonobu.yamashita@bofa.com

At its policy meeting on 28 July, the BoJ announced changes that would flexibilize yield curve control (YCC). Though the adjustment at this meeting was not the consensus among analysts, including BofA, markets were on high alert for a tweak following a Nikkei article early this morning foreshadowing the move (Japan Watch: Nikkei reports "BoJ to discuss YCC tweak to allow rates over 0.5%--quick take", 28 July 2023).

The key change: while the BoJ retained the "around zero percent" long-rate target, it watered down the +/-50bp permissible trading band around the target to a soft goal (original Japanese = 目途). Consistent with this, it added a new line stating that the central bank will "conduct YCC with greater flexibility, regarding the upper and lower bounds of the range as references, not rigid limits, in its market operations." More notably, it revised the level at which it promises to conduct daily, unlimited fixed rate bond-buying operations to 1.0% for 10yr JGBs, from 0.5% previously (Exhibit 7).

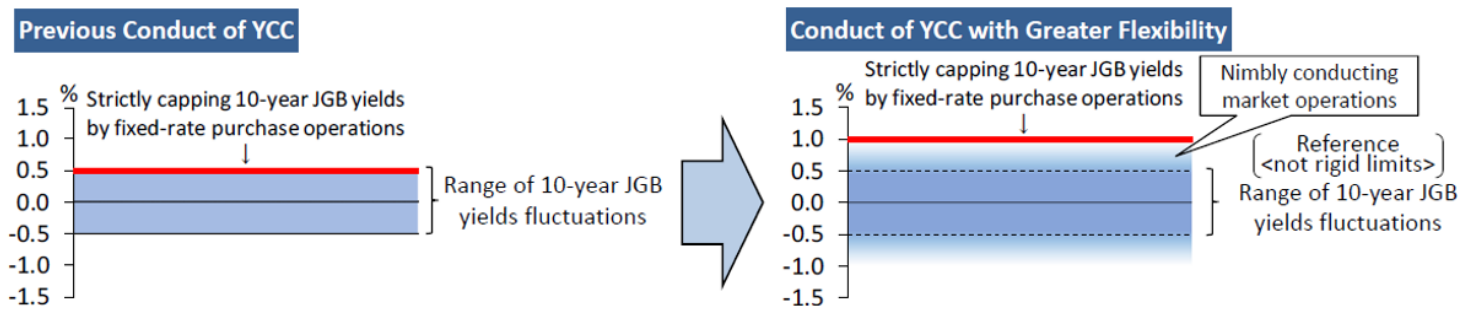
In explaining the context for today's tweaks, the BoJ reiterated the "extremely high uncertainties for Japan's economic activity and prices" and stated that "stable achievement of the 2% price stability target, accompanied by wage increases, has not yet come into sight." However, whereas it previously stressed mostly downside risks to the outlook, especially for growth, today's statement explicitly recognizes the upside risks to inflation that have emerged since the April MPM. The BoJ statement implies that further flexibilization of YCC long-end interest rate control is designed to pre-empt the negative impact on bond market functioning and "volatility in other financial markets."

Implications

In light of the continued rise in Japan's inflation-related data, we had viewed YCC adjustment as a matter of time. But given Governor Ueda's communications, we had expected the move to come slightly later, in October (see Japan Macro Watch: BoJ preview: Are we there yet?, 25 July 2023). As explained in the policy statement and stressed repeatedly in Governor Ueda's press conference remarks, the latest YCC changes are designed to pre-empt a renewed deterioration in YCC's side effects (i.e. on market functioning, FX volatility) in the event that upside risks to the BoJ's inflation outlook continue to materialize.

It is important to note that though the BoJ's new, hard "line in the sand," for the 10yr JGB yield is 1%, this is the last line of defense, and not an immediate "target" for 10yr JGB yields (Exhibit 1). Indeed, in his press conference, Governor Ueda stated that, "we [the BoJ] do not expect long-term interest rates to rise to 1%." This underscores the fact that, given the BoJ's assessment of the economy/inflation and the balance of risks around the outlook, it judges the fair value of 10yr JGB yield to be much lower than 1% at the moment. We believe this view is also backed by the central bank's discussions with domestic market fixed income participants ahead of today's policy meeting.

Exhibit 1: BoJ schematic of the new, more flexible conduct of Yield Curve Control
From the materials accompanying the 28 July MPM decision



Source: Bank of Japan

BofA GLOBAL RESEARCH

Thus, the BoJ is likely to continue intervening in the markets so that any rise in JGB yields, is gradual and consistent with further evidence of firming inflation pressures based on future data releases.

Risk of earlier NIRP removal

Having flexibilized YCC, we think the BoJ's next step will be to end negative interest rate policy (NIRP). On this point, Governor Ueda re-iterated his long-standing stance that, "there is still a long way to go before we [the BoJ] can raise the short-term policy rate from the current negative level," citing the fact that the BoJ was not yet confident in the sustainability of 2% inflation. Indeed, the latest Outlook Report showed that, while the median of the BoJ policy board's FY24 Japan-style core CPI projections is close to (1.9%), several members still see the risks as titled to the downside, while the central bank's confidence in the FY25 inflation outlook is even lower (Exhibit 3).

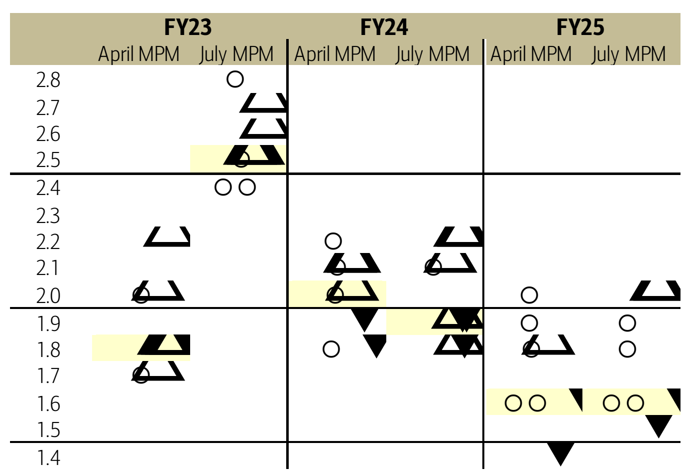
Exhibit 2: BoJ Policy Board median CPI projections vs. consensus
The BoJ revised up its FY23 CPI forecasts

	CPI ex fresh food				CPI ex FF & energy			
CY	BoJ (4/28)	BoJ (7/28)	BBG (7/12)	BofA (7/28)	BoJ (4/28)	BoJ (7/28)	BBG (7/12)	BofA (7/28)
2023	--	--	3.0	3.0	--	--	3.6	3.8
2024	--	--	1.7	2.6	--	--	1.7	2.2
2025	--	--	1.5	1.5	--	--	1.6	1.7
FY								
2023	1.8	2.5	2.6	2.8	2.5	3.2	3.3	3.6
2024	2.0	1.9	1.6	2.3	1.7	1.7	1.5	1.9
2025	1.6	1.6	1.5	1.5	1.8	1.8	1.6	1.6

Source: Bank of Japan

BofA GLOBAL RESEARCH

Exhibit 3: BoJ July '23 CPI ex Fresh Food forecasts
Policy Board Members' Forecasts and Risk Assessments



Source: Bank of Japan, BofA Global Research; Note: The locations of ○, △, and ▼ in the charts indicate the figures for each Policy Board member's forecasts to which they attach the highest probability. The risk balance assessed by each Policy Board member is shown by the following shapes: ○ indicates that a member assesses "upside and downside risks as being generally balanced," △ indicates that a member assesses "risks are skewed to the upside," and ▼ indicates that a member assesses "risks are skewed to the downside." The yellow-shaded figure refers to the median of the Policy Board members' forecasts.

BofA GLOBAL RESEARCH

We continue to think that the outlook for next year's spring wage negotiations are critical. Should the BoJ gain confidence that this year's strong wage hikes will be repeated in FY24, it is also likely to conclude that underlying inflation is likely to be sustained at 2%.

Given the BoJ's cautious stance, our base case was that NIRP would be removed in mid-CY24, when the central bank could confirm the initial results of the spring wage negotiations. However, we see growing risks that the move happens earlier, i.e. in 1Q CY24.

- Izumi Devalier & Takayasu Kudo, Japan Economists

Rates: 10yr JGB yield to challenge 0.70% level

As noted above, the BoJ essentially expanded the YCC band at its MPM on 27-28 July and will now allow the yield on the cheapest-to-deliver (CTD) and on-the-run 10yr JGBs to rise as high as 1.00%. JGB futures and cash bonds were both sold off after a morning report by the Nikkei mentioned that the BoJ was likely to make some revision to its monetary policy at its July MPM, and JPY rates resumed rising after the BoJ's announcement.

The BoJ's decision to conduct YCC with greater flexibility is likely to lead to a gradual rise in JGB yields from the week beginning 31 July, with scheduled JGB auctions on 1 Aug (10yr JGB), 3 Aug (10yr JGBi) and 8 Aug (30yr JGB). We think the 10yr JGB yield could challenge 0.70% level. The BoJ's YCC announcement was accompanied by the release of a revised schedule of its outright purchases of JGBs, which included expanding the purchase size at each auction of bonds with residual maturities of more than 3 and up to 5 years and more than 5 and up to 10 years, by ¥50mn (¥25mn on each side of the band). The revised schedule indicates the BoJ's plans to flexibly conduct its bond purchasing operation in response to any excessive spikes in the JGB yields.

While the BoJ's effective raising of the upper limit of its YCC band could result in a reduction of bond purchases by the Bank, the BoJ MPM again included forward guidance on its intention to continue expanding the monetary base. We, therefore, think any reduction in bond purchasing operation will be carried out at a gradual pace. In the post-meeting press conference, BoJ Governor Ueda said that trend of the monetary base expansion would not be a contradiction to the Bank's forward guidance. However, the BoJ's forward guidance already has become a rather formal statement that does not reflect the Bank's actual conduct, as indicated by its June purchases of JGBs totaling ¥5.8tn, down from ¥7.4tn in May and below the amount of scheduled redemptions. JGBs held by the BoJ will be redeemed from August till next March, at a monthly average of ¥7tn. In addition, we expect any reduction to be at a gradual pace because a rapid reduction of the BoJ's purchasing operations would likely trigger renewed YCC attacks.

Exhibit 4: BoJ's JGB purchase schedule

Purchase size range expanded for bonds with residual maturities of more than 3 and up to 5 years and more than 5 and up to 10 year

3Q2023

Residual maturity	Purchase size (JPY bn)	Frequency of auction (per month)
Up to 1yr	150	1
More than 1yr and up to 3yr	350-650	4
More than 3yr and up to 5yr	400-750	4
More than 5yr and up to 10yr	450-900	4
More than 10yr and up to 25yr	100-500	4
More than 25yr	50-350	3
JGBi	60	1
Total JGBs	5,500-12,400	Per month

2Q2023

Residual maturity	Purchase size (JPY bn)	Frequency of auction (per month)
Up to 1yr	150	1
More than 1yr and up to 3yr	350-650	4
More than 3yr and up to 5yr	425-725	4
More than 5yr and up to 10yr	475-875	4
More than 10yr and up to 25yr	100-500	4
More than 25yr	50-350	3
JGBi	60	1
Floating-rate bonds	30	1 per quarter
Total JGBs	5,700-12,200	Per month

Source: Bank of Japan, BofA Global Research

BofA GLOBAL RESEARCH

- Tomonobu Yamashita, Rates Strategist

FX: carry > policy uncertainty

Today's result was close to our risk scenario 1 in our preview report (see: Liquid Insight: BoJ preview: Are we there yet? 27 July 2023). We argued USD/JPY's dip would be short-lived as domestic JGB demand would prevent destabilization of the JGB market and the front-end would likely be anchored even if YCC is tweaked (see: JPY – key themes before BoJ MPM and for summer 24 July 2023).

As noted above, the BoJ's YCC tweak appears to be meant to prevent a YCC attack in case upside risk to inflation materializes, considering the nature of YCC, and not a signal for a proper tightening cycle.

JPY may be impacted by potential volatility in the JGB market as the MoF's bond auction for August will start next week and there is some uncertainty regarding how the BoJ would control the yield curve under the new parameters, but we expect carry to be the primary driver of JPY into the fall and USD/JPY will rise toward 145 without significant upside surprises on Japanese inflation that prompts the BoJ to enter a hiking cycle.

If the BoJ's YCC tweak is influenced by the government's will to contain JPY weakness, policymakers may resume verbal intervention as USD/JPY rises toward 145. But we think the hurdle for FX intervention may be higher this year as Japan enjoys a strong equity market and economic performance (see: Japan Viewpoint: Yen weakness in '22 = headache for MoF; Yen weakness in '23 = tailwind for BoJ 07 June 2023).

- Shusuke Yamada, FX/Rates Strategist

Equities: Volatility transitory; favor domestic demand stocks

The main implications for Japanese stocks are as follows. First, market volatility is likely to weigh on share prices for the time being. Because the BOJ Governor Ueda had previously made comments to quell speculation that YCC would be adjusted, this policy change from the blindside was somewhat a surprise (although not a complete surprise, since there has been constant threat of a YCC change).

Additionally, although high now, we think this volatility will prove transitory. (1) Domestic financial institutions have a very strong desire to buy weakness in the JGB market (see Japan Rates and FX Watch 24 July 2023). Even if the 10yr yield suddenly rose to 1%, it is unlikely to stay that high. (2) At the very least, it will be a while before the BOJ raises the IOER to positive territory. (3) Assuming the above, this latest policy adjustment may give the impression that bad news for Japanese stocks is running out. We are sticking with our view that Japanese stocks should trade in a box pattern in Jul-Sep, and will subsequently gain upward momentum in Oct-Dec.

Second, stock selection is likely to favor domestic demand-led stocks for the time being. Especially given that policy change was focused more on the ceiling for long-term rates than on the floor, this should be a clear positive for financial stocks. Banking stocks had already given back some of their outperformance following the YCC change in December last year and are not yet poised to regain all of it. Additionally, domestic demand-led stocks are generating stronger earnings than external demand-led stocks; the domestic economy should do well during the summer holidays in Jul-Sep. We expect 1H results to be generally strong. Accelerated wage increases could also provide tailwinds to equities (for the list of domestic demand-oriented stocks with resilient earnings, see Japan Equity Strategy 28 July 2023).

- Masashi Akutsu & Tony Lin, Equity Strategists

Appendix

Exhibit 5: Schedule of BoJ monetary policy meetings and key releases in 2023
2023

Date of MPM		Outlook Report	Summary of opinions	MPM Minutes
17 Jan (Tue)	18 Jan (Wed)	18 Jan (Wed)	26 Jan (Thu)	15 Mar (Wed)
9 Mar (Thu)	10 Mar (Fri)	-	20 Mar (Mon)	8 May (Mon)
27 Apr (Thu)	28 Apr (Fri)	28 Apr (Fri)	11 May (Thu)	21 Jun (Wed)
15 Jun (Thu)	16 Jun (Fri)	-	26 Jun (Mon)	2 Aug (Wed)
27 Jul (Thu)	28 Jul (Fri)	28 Jul (Fri)	7 Aug (Mon)	27 Sep (Wed)
21 Sep (Thu)	22 Sep (Fri)	-	2 Oct (Mon)	6 Nov (Mon)
30 Oct (Mon)	31 Oct (Tue)	31 Oct (Tue)	9 Nov (Thu)	22 Dec (Fri)
18 Dec (Mon)	19 Dec (Tue)	-	27 Dec (Wed)	26 Jan '24 (Fri)

Source: BofA Global Research, Bank of Japan

BofA GLOBAL RESEARCH

Exhibit 6: G3 central bank decision calendar
2023

	2023											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BoJ	**18** (Wed)		**10** (Fri)	**28** (Fri)		**16** (Fri)	**28** (Fri)		**22** (Fri)	**31** (Tue)		**19** (Tue)
Fed		**01** (Wed) [T+1]	**22** (Wed) [T+1]		**03** (Wed) [T+1]	**14** (Wed) [T+1]	**26** (Wed) [T+1]		**20** (Wed) [T+1]		**01** (Wed) [T+1]	**13** (Wed) [T+1]
ECB		**02** (Thu)	**16** (Thu)	**05** (Wed)		**15** (Thu)	**27** (Thu)		**14** (Thu)	**26** (Thu)		**14** (Thu)

Source: BofA Global Research, Bloomberg Note: Blue shaded dates represent decisions associated with Summary of Economic Projections (SEP) for the FOMC, Staff projections for the ECB, and Outlook Report for the BoJ.

BofA GLOBAL RESEARCH

Exhibit 7: The language around the YCC in the statement
Changes from June to July highlighted in red

	June '23 MPM	July '23 MPM
The short-term policy interest rate	The Bank will apply a negative interest rate of minus 0.1 percent to the Policy-Rate Balances in current accounts held by financial institutions at the Bank.	The Bank will apply a negative interest rate of minus 0.1 percent to the Policy-Rate Balances in current accounts held by financial institutions at the Bank.
The long-term interest rate	The Bank will purchase a necessary amount of Japanese government bonds (JGBs) without setting an upper limit so that 10-year JGB yields will remain at around zero percent.	The Bank will purchase a necessary amount of Japanese government bonds (JGBs) without setting an upper limit so that 10-year JGB yields will remain at around zero percent.
Trading band around the long-term interest rate target	The Bank will continue to allow 10-year JGB yields to fluctuate in the range of around plus and minus 0.5 percentage points from the target level.	The Bank will continue to allow 10-year JGB yields to fluctuate in the range of around plus and minus 0.5 percentage points from the target level, while it will conduct yield curve control with greater flexibility, regarding the upper and lower bounds of the range as references, not as rigid limits, in its market operations.
Fixed-rate purchase operations	The Bank will offer to purchase 10-year JGBs at 0.5 percent every business day through fixed-rate purchase operations, unless it is highly likely that no bids will be submitted.	The Bank will offer to purchase 10-year JGBs at 1.0 percent every business day through fixed-rate purchase operations, unless it is highly likely that no bids will be submitted.
Other operations	In order to encourage the formation of a yield curve that is consistent with the above guideline for market operations, the Bank will continue with large-scale JGB purchases and make nimble responses for each maturity by increasing the amount of JGB purchases and conducting fixed-rate purchase operations.	In order to encourage the formation of a yield curve that is consistent with the above guideline for market operations, the Bank will continue with large-scale JGB purchases and make nimble responses for each maturity by, for example, increasing the amount of JGB purchases and conducting fixed-rate purchase operations and the Funds-Supplying Operations against Pooled Collateral.

Source: BofA Global Research, BoJ

BofA GLOBAL RESEARCH

Exhibit 8: Summary of BoJ monetary policy statement (July 2023)

Key changes from June '23 MPM in red

	28 July MPM
Overall assessment of Japan's economy	Has recovered moderately ~~picked up, despite being affected by factors such as high commodity prices~~
Exports	Have been affected by the developments in overseas and more or less flat, supported by a waning of the effects of supply-side constraints
Business investment	Has increased moderately
Private consumption	Has increased steadily at a moderate pace ~~moderately~~, despite being affected by price rises
Housing investment	Has been relatively weak
Public investment	Has increased moderately
Industrial production	Have been affected by the developments in overseas and more or less flat, supported by a waning of the effects of supply-side constraints
Labor market	Has improved moderately
Financial conditions	Have been accommodative ~~on the whole, although weakness in firms' financial positions has remained in some segments~~
Consumer prices	Year-on-year rate of increase in the CPI (all items less fresh food) is slower than a while ago, mainly due to the effects of pushing down energy prices from the government's economic measures, but it has been in the range of 3.0-3.5 ~~at around 3.5~~ percent recently owing to the effects of a pass-through to consumer prices of cost increases led by a rise in import prices.
Inflation expectations	have shown some upward movements again ~~been more or less unchanged recently after rising~~
Outlook for the Japanese economy	Japan's economy is likely to continue recovering moderately ~~toward around the middle of fiscal 2023~~, supported by factors such as the materialization of pent-up demand, although it is expected to be under downward pressure stemming from ~~past high commodity prices and~~ a slowdown in the pace of recovery in overseas economies. Thereafter, as a virtuous cycle from income to spending gradually intensifies, Japan's economy is projected to continue growing at a pace above its potential growth rate. ~~That said, the pace of growth is highly likely to decorate gradually.~~
Consumer prices	The year-on-year rate of increase in the CPI (all items less fresh food) is likely to decelerate ~~toward the middle of fiscal 2023,~~ with a waning of the effects of a pass-through to consumer prices of cost increases led by a rise in import prices. Thereafter, the rate of increase is projected to accelerate again moderately, albeit with fluctuations, as the output gap improves and as medium- to long-term inflation expectations and in wage growth rise, accompanied by changes in factors such as firms' price- and wage-setting behaviour.
Risks to the outlook	Concerning risks to the outlook, there remain extremely high uncertainties for Japan's economy, including developments in overseas economic activity and prices; developments ~~in the situation surrounding Ukraine and~~ in commodity prices, and domestic firms' wage- and price-setting behaviour. In this situation, it is necessary to pay due attention to developments in financial and foreign exchange markets and their impact on Japan's economic activity and prices.
Conduct of monetary policy	With extremely high uncertainties surrounding economies and financial markets at home and abroad, the Bank will patiently continue with monetary easing while nimbly responding to developments in economic activity and prices as well as financial conditions. By doing so, it will aim to achieve the price stability target of 2 percent in a sustainable and stable manner, accompanied by wage increases. The Bank will continue with QQE with Yield Curve Control, aiming to achieve the price stability target of 2 percent, as long as it is necessary for maintaining that target in a stable manner.
Overshoot commitment	It will continue expanding the monetary base until the year-on-year rate of increase in the observed CPI (all items less fresh food) exceeds 2 percent and stays above the target in a stable manner
Future conduct of monetary policy and forward guidance for rates	For the time being, the Bank will not hesitate to take additional easing measures if necessary,

Source: Bank of Japan, BofA Global Research

BofA GLOBAL RESEARCH

Disclosures

Important Disclosures

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. VOLATILITY RISK RATINGS, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. INVESTMENT RATINGS reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R1]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R1] Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

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.
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.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 Investment Industry Regulatory Organization of Canada; 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.

Futures and options are not appropriate for all investors. Such financial instruments may expire worthless. Before investing in futures or options, clients must receive the appropriate risk disclosure documents. Investment strategies explained in this report may not be appropriate at all times. Costs of such strategies do not include commission or margin expenses.

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

This report may contain a trading idea or recommendation which highlights a specific identified near-term catalyst or event impacting a security, issuer, industry sector or the market generally that presents a transaction opportunity, but does not have any impact on the analyst's particular "Overweight" or "Underweight" rating (which is based on a three month trade horizon). Trading ideas and recommendations may differ directionally from the analyst's rating on a security or issuer because they reflect the impact of a near-term catalyst or event.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright and General Information:

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.