

FX Quant Insight

Memorial for USD bulls

Key takeaways

- USD downtrends broadly held despite a short-lived rebound last week; USD remained offered in Asia hours.
- Option flow and trend continuation signals are bullish for GBPUSD. Uptrend unwind risk is low while above 1.32.
- Risk to bearish USD wagers is tariffs rate announcements. Dovish US tariff is the immediate solution ease market concerns.

FX Signal of the Week: Bullish GBP/USD at 1.3361

Exhibit 1: Option flow and spot trend continuation are bullish GBP/USD

Top signals from quant models

Section	Insight	Rationale
Option Flow	Bearish USD	Option flow was for USD puts vs European and Asia currencies.
Technical Matrix	Bullish GBPUSD	Bullish continuation signals for GBP and NOK vs USD.
CARS	Equity regime	Bullish NOK and CAD vs JPY and NZD on equity factor.
Time Zone	Asia hour USD supply	Asia-based investors continued to sell USD aggressively last week.
EM FX	Bearish MXN	USD/EM trends are broadly bearish except for USDMXN.

Source: BofA Global Research

BofA GLOBAL RESEARCH

Bearish USD trends remained intact

The USD downtrend staged a short-lived rebound following positive US/China trade deal announcement at the start of last week. However, global investors quickly faded the USD bounce and the 50d SMA support levels broadly held for G10 FX against the USD. For now, the USD continues to stay in a downtrend against every other G10 currency, and the bearish momentum has become less stretched after last week's washouts. Across time zones, the USD rallied in US trading hours, coinciding with the historically bullish seasonality in May. Asia-based investors continued to sell the USD most aggressively.

Bullish GBPUSD on option flow and trend continuation

Following the US sovereign credit rating downgrade headline, European currencies led by the EUR are rallying the most against the USD to start this week. Quant signals are more bullish for GBPUSD. 1m GBPUSD risk reversal has widened to a new 5-year high. The spot uptrend is supported by up/down vol and residual skew, and it is far from the unwind trigger level that is on a 1.31-handle. We expect bulls to chase the current uptrend until 1.3760, in-line with our Q2 '25 GBPUSD forecast (see our report: [Global FX Weekly, 16 May 2025](#)). Bearish USDCHF structures may also be considered. Year-to-date, USDCHF spot price has had -95% correlation with gold. To the extent that lingering US sovereign credit risk could support gold price, it should also weigh on USDCHF for a retest of the 0.82 support level. The risk to our bearish USD view would be benign US reciprocal tariffs rate announcements, as the US/China trade deal headlines showed easing tariffs tension could lead to short-term rebounds for the USD.

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

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 6 to 7.

12833891

Timestamp: 19 May 2025 10:43AM EDT

19 May 2025

G10 FX Strategy
Global

Howard Du, CFA
G10 FX Strategist
BofAS
+1 646 743 7017
yuhao.du@bofa.com

For more details on the construction of the quant signals, please refer to the [Global Rates and FX Primer: FX Quant Insight primer - 2024 15 July 2024](#).

CARS (model): Cross-Asset Regime Switching

SDR: Swap Data Repository

MAA: Moving Average Aggregator

UD: Up/Down volatility

RS: Residual Skew

ADX: Average Directional Movement Index

DMI: Directional Movement Index

SMA: Simple Moving Average

RV: relative value

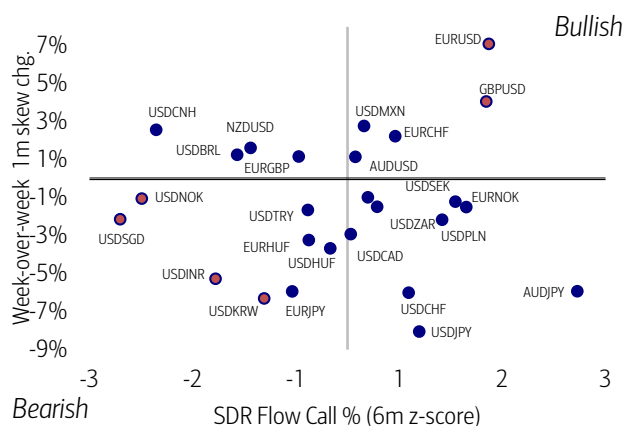
Option Flow Signals

Our options flow signals combine Event analysis framework ([FX Viewpoint: Vol-guided decisions 18 March 2021](#)) with SDR flows data ([FX Viewpoint: SDR: What do FX options flows tell us? 01 February 2021](#)) to gauge bullish and bearish sentiments.

To learn more about FX volatility and options please refer to our [FX Volatility Dashboard](#) as well as the FX Vol Dashboard Primer ([Global Rates and FX Primer: 09 March 2022](#)).

Exhibit 2: Option flow for USD puts vs European and Asian currencies

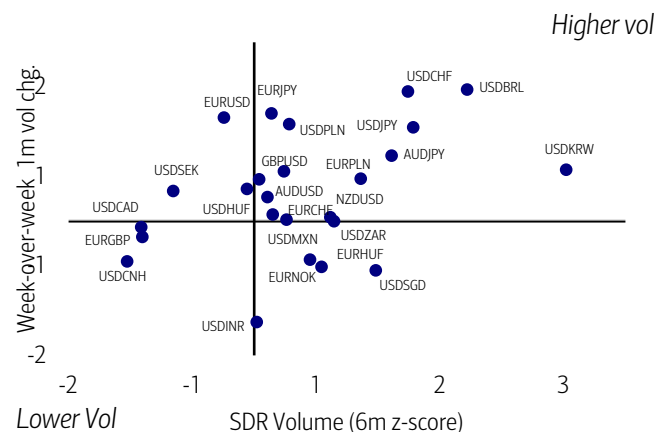
1m skew change vs call percentage z-score



Source: BofA Global Research, DTCC. Note: CNH flows are proxied by "CNY" flows in SDR.
BofA GLOBAL RESEARCH

Exhibit 3: Front-end implied vols broadly rose last week

1m implied vol change vs volume z-score



Source: BofA Global Research, DTCC. Note: CNH flows are proxied by "CNY" flows in SDR.
BofA GLOBAL RESEARCH

Exhibit 4: Bullish JPY vs USD on rising vol and call skew amid large spot move; moderately bullish rest of G10 FX vs USD as well

Event analysis signals after last week's spot and vol moves

Pair	Old spot	New spot	1m vol	1m vol chg	1y vol	1y vol chg	1y - 1m chg	Currency	Return vs USD	1m skew % chg vs USD	Signals
EURUSD	1.1087	1.1268	8.41	1.16	7.60	0.35	-0.81	EUR	1.62%	6.21	EUR No Signal
USDJPY	148.46	144.90	11.52	1.05	10.29	0.27	-0.78	JPY	2.43%	6.73	JPY Bullish Continuation
GBPUSD	1.3176	1.3381	7.81	0.56	7.77	0.21	-0.35	GBP	1.54%	3.91	GBP No Signal
USDCHF	0.8456	0.8338	9.79	1.45	8.26	0.58	-0.87	CHF	1.41%	3.78	CHF No Signal
AUDUSD	0.6372	0.6448	10.20	0.47	10.25	0.12	-0.35	AUD	1.19%	1.39	AUD No Signal
USDCAD	1.3975	1.3944	5.40	-0.07	5.73	0.02	0.09	CAD	0.22%	2.91	CAD No Signal
USDSEK	9.8233	9.6756	11.03	0.34	10.95	0.15	-0.18	SEK	1.51%	1.62	SEK No Signal
USDNOK	10.4550	10.2939	10.54	0.27	11.13	-0.11	-0.38	NOK	1.55%	1.23	NOK No Signal
NZDUSD	0.5855	0.5915	9.98	0.04	10.24	0.00	-0.04	NZD	1.02%	1.65	NZD No Signal
USDSGD	1.3062	1.2939	5.97	-0.55	5.83	-0.23	0.33	SGD	0.95%	2.91	SGD No Signal
USDKRW	1418.3	1391.5	12.14	0.58	10.43	0.16	-0.42	KRW	1.91%	6.14	KRW No Signal
USDMXN	19.6388	19.4499	9.88	0.02	11.76	-0.24	-0.26	MXN	0.97%	-2.74	MXN No Signal
USDTRY	38.7831	38.8445	11.68	-0.01	22.48	-0.05	-0.05	TRY	-0.16%	1.60	TRY No Signal
USDZAR	18.2639	18.0356	12.05	0.00	13.89	-0.15	-0.15	ZAR	1.26%	1.47	ZAR No Signal
USDHUF	365.2	357.1	11.17	0.35	11.50	0.00	-0.35	HUF	2.25%	4.01	HUF Bullish Continuation
USDPLN	3.8270	3.7882	11.70	1.09	10.84	0.26	-0.83	PLN	1.02%	3.07	PLN No Signal

Source: BofA Global Research, Bloomberg.

The table shows the 1-year percentile and 1-week change in 1m and 1y implied vol, the 1y-1m spread, and the 1m 25 delta risk reversal as a percentage of the ATM. For a currency with a put skew, the rules for generating the signal column are the following:

[1] Bearish Continuation: Spot change < -1%, 1m vol change > 0.5%, 1y vol change > 0%, 1m skew chg. < -2; [2] Bearish Contrarian: Spot change > 1%, 1m skew change < -2;

[3] Bullish Continuation: Spot change > 2%, 1y-1m change < -0.1%, 1m skew change > 2; [4] Bullish Contrarian Spot change < -1%, 1m vol change < -0.2%, 1m skew chg. > 1.

Parameters that triggered a bearish condition are colored in red; parameters that triggered a bullish condition are colored in green.

BofA GLOBAL RESEARCH



Technical Matrix

The Technical Matrix is a table of technical indicators (see our report: [Get to know even more technical strategy. 24 January 2022](#)) and BofA positioning analysis ([Global Rates and FX Primer: 01 October 2018](#)) that look at trend following and reversal signals. To learn more about a variety of technical strategies, please see [Technicals Explained primer](#), as well as our Quantifying Technicals publications for [the ADX](#) and [Bollinger indicators](#).

Exhibit 5: Bearish continuation signals for GBP and NOK vs USD in G10; Broadly bearish USD vs EM currencies except MXN

Technical matrix with positioning analysis and key levels to watch

		Positioning			Bollinger	Next		Trigger	Take-profit	
		Spot	Trend	Bullish / Bearish	ADX Trend	Bands	Support	Resistance	Level	Level
USD	EURUSD	1.1266	↑	No Signal	Uptrend	None	1.1117	1.1495	1.1162	1.1687
	USDJPY	144.94	↓	No Signal	Transition	None	139.58	146.09	145.64	136.42
	GBPUSD	1.3377	↑	Bullish	Transition	None	1.3127	1.3444	1.3134	1.3760
	AUDUSD	0.6445	↑	No Signal	Transition	None	0.6429	0.6453	0.6427	0.6619
	USDCHE	0.8337	↓	No Signal	Downtrend	None	0.8333	0.8482	0.8410	0.7927
	USDCAD	1.3947	↓	No Signal	Transition	None	1.3944	1.4022	1.3989	1.3626
	NZDUSD	0.5911	↑	No Signal	Range	None	0.5880	0.5933	0.5910	0.6142
	USDSEK	9.68	↓	No Signal	Transition	None	9.4704	9.8489	9.80	9.09
	USDNOK	10.30	↓	Bearish	Range	None	10.1920	10.5120	10.58	9.89
EUR	EURGBP	0.8422	↔	No Signal	Range	None	0.8420	0.8469		
	EURJPY	163.29	↑	No Signal	Range	None	162.45	164.93	162.31	170.20
	EURAUD	1.7480	↑	No Signal	Transition	None	1.7262	1.7552	1.7479	1.8340
	EURCHF	0.9392	↓	No Signal	Range	None	0.9206	0.9407	0.9393	0.9118
	EURCAD	1.5711	↑	No Signal	Transition	None	1.5628	1.5961	1.5598	1.6140
	EURNZD	1.9060	↑	No Signal	Range	None	1.9011	1.9066	1.9003	1.9840
	EURSEK	10.90	↓	No Signal	Range	None	10.6652	10.9438	10.96	10.51
	EURNOK	11.60	↓	Slightly Bullish	Range	None	11.2614	11.6285	11.71	11.31
G10 Cross	AUDJPY	93.41	↔	No Signal	Range	None	92.53	94.38		
	AUDNZD	1.0903	↔	No Signal	Transition	None	1.0864	1.0916		
	AUDCAD	0.8988	↔	No Signal	Range	None	0.8949	0.9020		
	NOKSEK	0.9398	↔	No Signal	Transition	None	0.9370	0.9475		
	CADJPY	103.93	↓	No Signal	Range	None	103.89	105.46	104.23	98.69
	GBPJPY	193.88	↑	No Signal	Transition	None	192.58	194.11	192.41	201.54
	NZDJPY	85.67	↔	No Signal	Range	None	85.16	86.03		
	GBPCHE	1.1152	↔	No Signal	Range	None	1.1145	1.1214		
EM	USDMXN	19.44	↓	Bullish	Downtrend	None	18.9107	19.4730	19.89	18.81
	USDBRL	5.6753	↓	Bearish	Range	None	5.5332	5.6828	5.7470	5.4682
	USDZAR	18.06	↓	Bearish	Transition	None	17.0356	18.1423	18.29	17.73
	EURPLN	4.2691	↑	No Signal	Range	None	4.2600	4.2850	4.2567	4.3690
	EURHUF	402.38	↓	Bearish	Range	None	399.69	403.69	404.63	394.82
	USDKRW	1392	↓	Slightly Bullish	Downtrend	None	1373.71	1395.43	1418	1376
	USDINR	85.40	↔	No Signal	Transition	None	85.08	85.45		
	USDCNH	7.2127	↓	Bearish	Transition	None	7.2002	7.2235	7.2372	7.1197

Data as of 05/19/25. Source: BofA Global Research, Bloomberg.

Positioning uptrend has MAA > 60, downtrend MAA < 40. Positioning uptrend reversal likely if MAA/UD/RS > 80, continuation likely if UD, RS < 50. Positioning downtrend reversal likely if MAA/UD/RS < 20, and continuation likely if UD, RS > 50. UD and RS are 1y percentile and MAA is in %.

Positioning is bullish (green) if matrix shows downtrend reversal or uptrend continuation; Positioning is bearish (red) if matrix shows uptrend reversal or downtrend continuation.

Positioning is slightly bullish or slightly bearish (yellow) if only one of UD or RS supports the signal.

ADX downtrend if ADX > 25 and DMI+ is below DMI-. ADX uptrend if ADX > 25 and DMI+ is above DMI-. ADX shows Transition if ADX is between 20 and 25, and Range if ADX < 20. Cells in the ADX Trend column are colored with more intensity if the ADX trend signal matches the positioning signal. 14-day lookahead is used for the ADX indicators.

The Bollinger Bands column shows 'Upper' if spot is above the +2 std bollinger band, and 'Lower' if spot is below the -2 std band. 20-day SMA is used for Bollinger indicators.

Cells in Next Support and Next Resistance columns are colored if spot is within 0.5% of the support or resistance level.

For pairs in an existing uptrend or downtrend according to MAA, the Trigger Level shows the hypothetical spot level that would neutralize the existing trend in the next 2 weeks. The Take-profit Level shows the hypothetical spot level in the next 2 weeks that would suggest the trend has become too stretched according to the 2y z-score of the spot vs 50d SMA ratio.

For pairs current not in a prominent MAA trend, the Trigger Level shows the hypothetical spot level that would form a trend for the pair in the next two weeks. Pairs currently not in a prominent MAA trend would not have a Take-Profit Level.

BofA GLOBAL RESEARCH

CARS Signals

CARS ("cross-asset regime-switching") is a systematic model that makes weekly buy/sell decisions for G10 currencies based on cross-asset factors (equity, rates, and commodities). FX's relationship with other asset classes is not constant over time, and investors could flock to own haven currencies during shock periods. The CARS model chooses the most performing factor for the appropriate macro regime of the week ([FX Viewpoint: CARS model: weekly FX cross-asset drivers 22 June 2022](#)).

Exhibit 6: Bullish NOK and CAD vs bearish JPY and NZD on equity factor

CARS signals for a trending week (no macro shock)

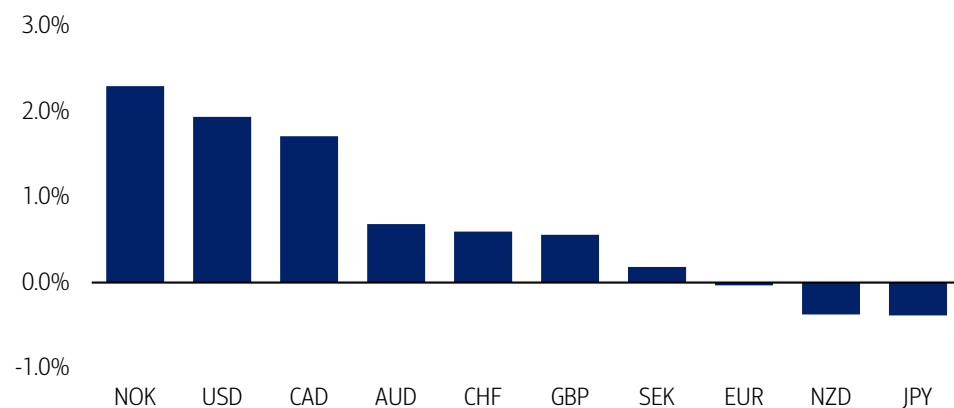
Currency	Bullish/Bearish	Equity	Rates	Commodity	Global regime	Values
EUR		8	7	7	Commodity z-score	-0.6
JPY	Bearish	9	1	8	Performing factor	Equity
GBP		6	4	5		
AUD		4	3	2		
CAD	Bullish	2	9	4	USD Equity	3
CHF		5	10	9	USD Rates	5
NZD	Bearish	10	6	3		
SEK		7	8	6		
NOK	Bullish	1	2	1		

Source: BofA Global Research, Bloomberg. The Equity ranking is ordered by 5y z-score of 1-week equity return. The Rates ranking is ordered by 5y z-score of 1-week rate change and level of 2y swap rate. The Commodity ranking is ordered by 52-week FX correlation with BCOM. The Commodity z-score is the 1y z-score of 1-week BCOM Index return.

BofA GLOBAL RESEARCH

Exhibit 7: Global equity markets broadly gained last week

1-week global equity return



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

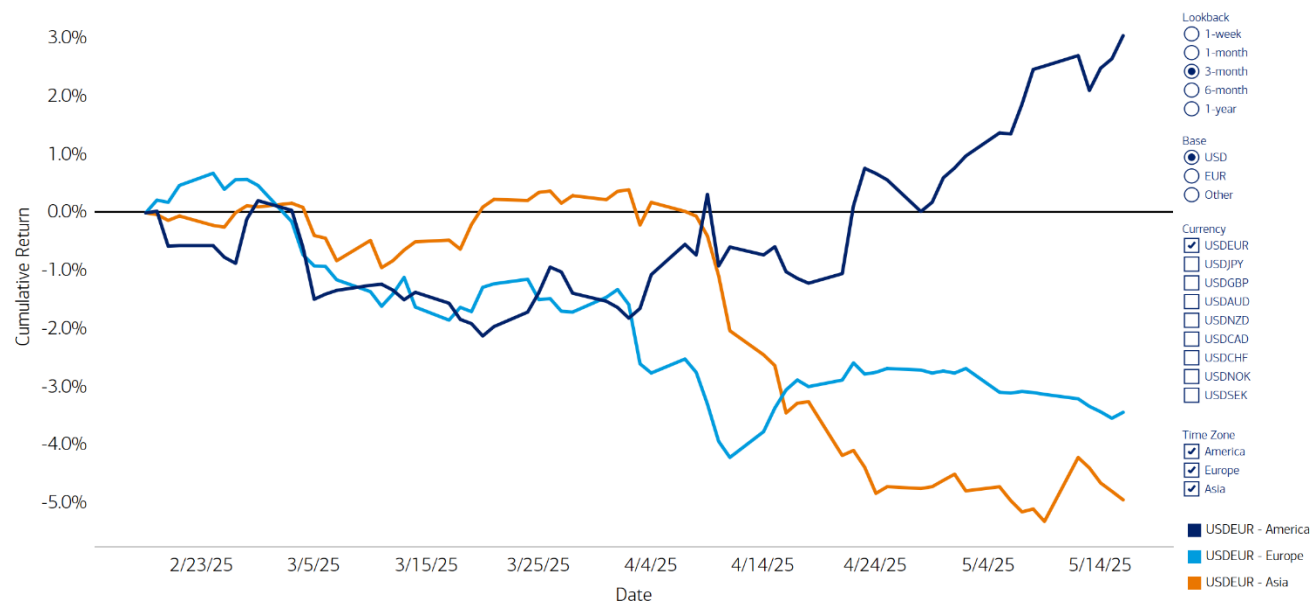


Interactive Time Zone

Expanding exhibits in the HTML view shows cumulative FX returns at different lookback periods, currency groupings, and time zones ([FX Watch: Interacting with time zones 06 July 2022](#)). Hours are shown in Coordinated Universal Time (UTC). We define America time zone as 1pm-12am UTC (8am-7pm EST), Europe time zone as between 8am-1pm UTC (3am-8am EST), and Asia time zone as between 12am to 8am UTC (7pm-3am EST).

Exhibit 8: USD was bid in US hours in May but continued to be sold in Europe and Asia hours

Interactive time zone plot. For readers of the web-formatted version of this report, access interactive features of the visualization by clicking on the image. Use Google Chrome or Microsoft Edge browsers for the best experience



We denote America time zone as between 1pm to 12am UTC, Europe time zone as between 8am to 1pm UTC, and Asia time zone as between 12am to 8am UTC.

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 9: USD weakened the most in Asia hours last week (0am-3am UTC)

Interactive time zone plot. For readers of the web-formatted version of this report, access interactive features of the visualization by clicking on the image. Use Google Chrome or Microsoft Edge browsers for the best experience

	0am-3am	3am-6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-0am
USDEUR	-0.3%	-0.1%	0.3%	0.8%	-0.1%	0.6%	-0.2%	-0.3%
USDJPY	-0.8%	-0.4%	0.6%	0.6%	0.2%	0.1%	0.0%	-0.4%
USDCAD	-0.2%	-0.2%	0.3%	0.5%	-0.3%	0.0%	-0.1%	-0.1%
USDAUD	-0.3%	0.5%	0.5%	0.8%	-0.2%	0.1%	-0.1%	-0.7%
USDNZD	-0.9%	-0.4%	0.4%	0.8%	0.4%	0.5%	-0.1%	0.0%
USDCAD	-0.2%	-0.1%	0.4%	0.5%	0.4%	-0.1%	-0.4%	-0.1%
USDCHE	-0.5%	0.0%	-0.1%	1.0%	0.3%	0.4%	-0.3%	-0.3%
USDNOK	-0.1%	-0.4%	-0.7%	0.7%	0.4%	0.5%	-0.1%	0.0%
USDSEK	0.2%	0.2%	-0.5%	1.5%	0.1%	-0.2%	-0.6%	-0.1%

Lookback
☒ 1-week
☐ 1-month
☐ 3-month
☐ 6-month
☐ 1-year

Base
☒ USD
☐ EUR
☐ Other

Hours are as of UTC. Currency pairs with greater loss over the lookback period are colored in darker red. Currency pairs with greater gain over the lookback period are colored in darker green. We denote America time zone as between 1pm to 12am UTC, Europe time zone as between 8am to 1pm UTC, and Asia time zone as between 12am to 8am UTC.

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Options Risk Statement

Options and other related derivatives instruments are considered unsuitable for many investors. Options strategy is by definition governed by a finite duration. The most severe risks associated with general options trading are total loss of capital invested and delivery/assignment risk, all which can occur in a short period.



Disclosures

Important Disclosures

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible. BofA Securities fixed income analysts regularly interact with sales and trading desk personnel in connection with their research, including to ascertain pricing and liquidity in the fixed income markets.

Other Important Disclosures

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

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

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

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

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute,



investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

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

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.

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

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

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

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

Copyright and General Information:

Copyright 2025 Bank of America Corporation. All rights reserved. IQdatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. This document and its content is provided solely for informational purposes and cannot be used for training or developing artificial intelligence (AI) models or as an input in any AI application (collectively, an AI tool). Any attempt to utilize this document or any of its content in connection with an AI tool without explicit written permission from BofA Global Research is strictly prohibited. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

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

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS 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 sustainability in this material is limited as discussed herein and is not intended to provide a comprehensive view on any sustainability claim with respect to any issuer or security.

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.