US Rates Watch

Monthly rates models update

02 June 2023

Rates Research
United States

Bruno Braizinha, CFA
Rates Strategist
BofAS
bruno.braizinha@bofa.com

Anna (Caiyi) Zhang
Rates Strategist
BofAS
caiyi.zhang@bofa.com

Katie Craig
Rates Strategist
BofAS
katie.craig@bofa.com

Monthly rates models update

We update some of the rates models we use to gauge risk bias, positioning, and relative value across duration, curve, real yields, breakevens, and front-end spreads.

Duration & curve

Rates had a roundtrip into cheap territory over the 2H of May (see Postcard from Europe), but are back to trading slightly rich (c.5-10bp) to fundamentals and global yields (reflecting expectations for a steady macro backdrop over the next 3-6 months). The frontend continues to drive the curve dynamic, but the bias shifted towards bear flattening as Fed cuts faded from the near-term policy trajectory.

Breakevens, TIPS & real yields

10y breakevens trade in line with fundamentals. A more orthodox BE dynamic suggests expectations for a recoupling of growth and inflation fundamentals. 10y real yields are fair in our macro framework. The BE dynamic suggests 52% odds assigned to lower growth and lower inflation scenarios, and only 34% odds to reacceleration.

Front end

SOFR/FF framework suggests that in the current environment of high ON RRP take-up SOFR will likely remain low relative to FF, which is likely to rise under the Fed's QT regime. We expect this trend to continue at least until Fed liquidity is <16% of GDP.

Allocations

A mean variance analysis of 1Q23 returns and covariances across asset classes shows a downgrade of optimal allocations from profiles consistent with a risk-on market dynamic in 4Q22 into profiles consistent with a transition market dynamic in the last quarter. Gauges of risk appetite and allocations obtained from ETF flows and futures positions show an upgrade of risk over May.

Duration: (1) Macro model for 10yT; (2) Global yield framework; (3) Decomposition of the 10yT dynamic.

Curve: Curve directionality 2s10s & 5s30.

Front End: SOFR/FF basis.

TIPS: (1) Macro model for Breakevens; (2) Real yield (10y BE vs 10y nominal model); (3) PCA Breakevens; (4) 10y BE directionality.

Asset Allocation: (1) Flows and allocation bias; (2) 3-state framework for portfolio allocation; (3) Positioning bias extracted from futures across assets classes.

Appendix: Model descriptions.

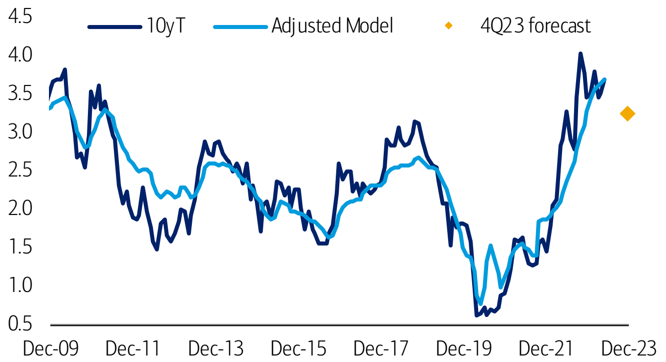
Glossary
10y – 10-year
10yT – 10-year Treasury
BE – Breakeven
c. – Circa
DM – Developed Markets
EM – Emerging Markets
EFFR – Effective Federal Funds Rate
ETF – Exchange Traded Funds
FF – Fed funds
GDP – Gross Domestic Product
IORB – Interest Rate On Reserve Balances
LC – Large Cap
ON RRP – Overnight Reverse Repo facility
PCA – Principal Component Analysis
QT – Quantitative Tightening
RV – Relative Value
SC – Small Cap
SOFR – Secured Overnight Financing Rate
VAR – Vector Auto-Regressive

Duration

Macro model

Exhibit 1: 10yT macro fair value

10yT fair value consistent with current fundamentals c.3.65%



Source: BofA Global Research

BofA GLOBAL RESEARCH

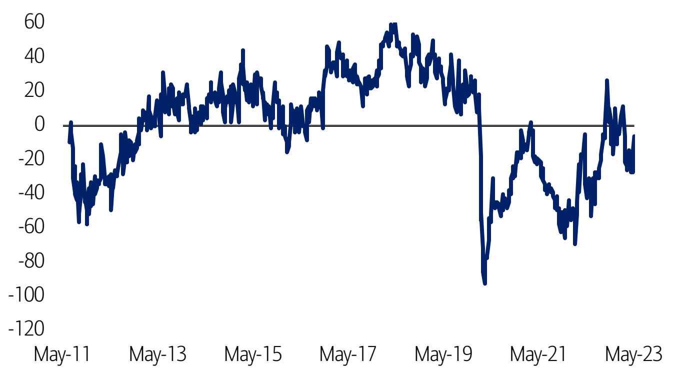
Our macro framework suggests that the 10yT fair value consistent with current fundamentals is c.3.65%.

Treasury yields trade fair to slightly rich to fundamental fair value, suggesting expectations for relatively anchored fundamentals over the next 3-6 months, with a slight slowdown bias.

Global yield framework

Exhibit 2: Residual of 10yT Global yield model

10yT fair value consistent with current global yields c.3.7%



Source: BofA Global Research

BofA GLOBAL RESEARCH

10yT yields are trading c.10bp rich relative to global yields.

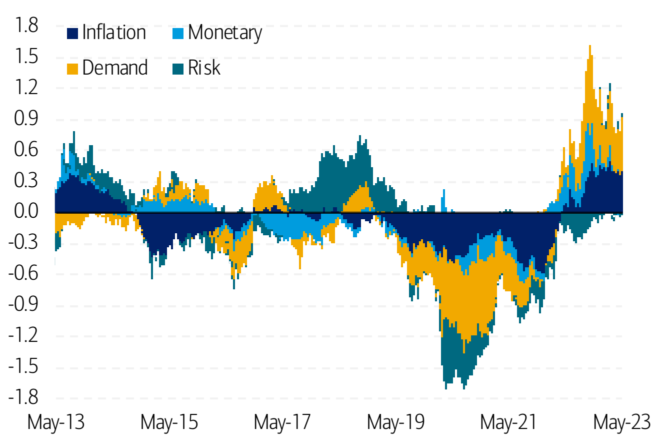
Richness relative to global yields reflects a context of reduced risk appetite.

Late cycle the bias should be for USTs to trade rich to global yields. A more significant selloff for 10yT beyond c.3.7% levels would therefore likely need to be supported by a broader bearish momentum in global yields.

Decomposition of the 10yT dynamic

Exhibit 3: Decomposition of the 10yT dynamic

Monetary policy c.5bp, Risk c.0bp; Inflation c.45bp & Demand c.55bp



Source: BofA Global Research

BofA GLOBAL RESEARCH

Steady state upgraded from c.2% in early 2022 to 2.5% currently, suggesting an upgrade for neutral rate expectations. We expect it to increase further towards c.2.75-3%.

10yT yield range likely shifted higher from 0.75-3.25% (125bp envelope around a 2% steady state) over the last cycle to a range c.1.25-4.24% over the next 1-3 years (125-150bp envelope around a 2.75-3% steady state).

Monetary policy and risk shocks are currently flat, and demand (c.55bp) and inflation (c.45bp) continue to drive some cheapening versus the steady state.

Curve

Curve directionality

Exhibit 4: 2s10s directionality Index
Dynamic shifted back to bear-flattening as cuts faded from the curve

Source: BofA Global Research

BofA GLOBAL RESEARCH

Front-end drives 80% of the 2s10s curve dynamic over the last two weeks, up from 71% of the dynamic over the last month.

Curve directionality shifted from bull steepening over the last 3m back to bear flattening more recently as cuts fade from the curve.

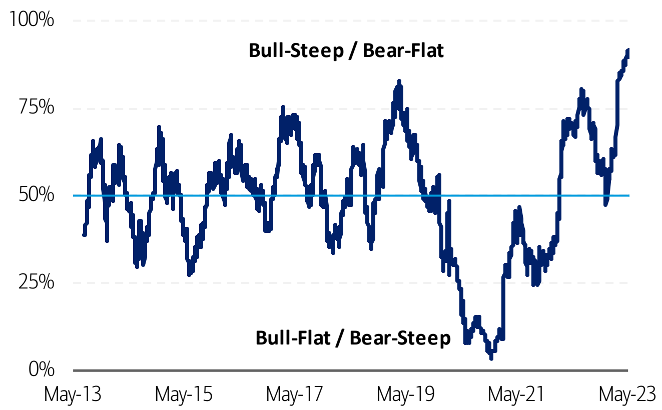
Exhibit 5: Decomposition of the 2s10s dynamic
Frontend continues to lead the dynamic

	bull-Steep	bear-Flat	bull-Flat	bear-Steep
2w	5%	75%	13%	7%
1m	8%	63%	13%	15%
2m	24%	50%	11%	15%
3m	47%	43%	4%	6%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 6: 5s30s directionality Index
Dynamic shifted back to bear flattening over the last month



Source: BofA Global Research

BofA GLOBAL RESEARCH

Belly drives 81% of the 5s30s curve dynamic over the last two weeks. Curve directionality as also shifted from a predominant bull steepening dynamic over the last 3m to a dominant bear flattening dynamic more recently.

Exhibit 7: Decomposition of the 5s30s dynamic
Belly continues to lead the dynamic

	bull-Steep	bear-Flat	bull-Flat	bear-Steep
2w	32%	49%	16%	3%
1m	23%	57%	11%	10%
2m	41%	45%	8%	6%
3m	54%	37%	5%	3%

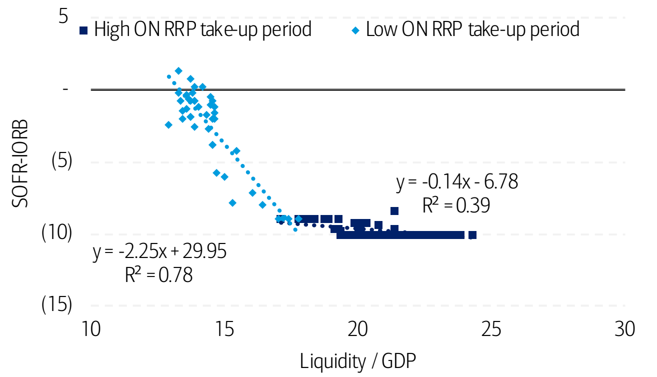
Source: BofA Global Research

BofA GLOBAL RESEARCH

Front end

SOFR/FF basis

Exhibit 8: SOFR-IORB spread versus Liquidity / GDP
When ON RRP take-up is high, SOFR is anchored to ON RRP



Source: BofA Global Research, Bloomberg, Federal Reserve

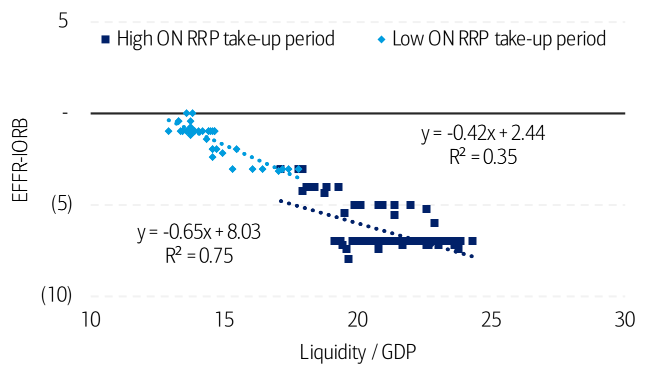
BofA GLOBAL RESEARCH

We forecast SOFR-IORB spread via a linear regression of ON RRP + Fed Reserves (Fed liquidity) over GDP & Marketable debt to GDP.

We break out the regression into two periods, a high and low ON RRP take-up period with the high take-up referring to anything above $500bn in ON RRP take-up.

We find that when ON RRP take-up is high, SOFR is anchored to ON RRP, 10bps below SOFR. We expect this trend to continue at least through year-end.

Exhibit 9: EFFR-IORB spread vs Liquidity / GDP
EFFR is less sticky versus SOFR but curve is less steep in low ON RRP period



Source: BofA Global Research, Bloomberg, Federal Reserve

BofA GLOBAL RESEARCH

We forecast EFFR-IORB spread via a linear regression of ON RRP + Fed Reserves (Fed liquidity) over GDP & Marketable debt to GDP.

We break out the regression into two periods, a high and low ON RRP take-up period with the high take-up referring to anything above $500bn in ON RRP take-up.

We find that EFFR is less sticky than SOFR, but the curve is less steep relative to SOFR-IORB in the low ON RRP take-up period.

Exhibit 10: Regression outputs for FF-SOFR spread (bps)
In high ON RRP take-up period, FF-SOFR spread widens as FF lifts faster

	Low ON RRP take-up			High ON RRP take-up		
Date	SOFR-IORB	EFFR-IORB	FF-SOFR	SOFR-IORB	EFFR-IORB	FF-SOFR
Dec-2022	-16	-5	11	-10	-6	4
Mar-2023	-18	-6	12	-9	-7	2
Jun-2023	-14	-5	9	-9	-6	3
Sep-2023	-8	-3	5	-9	-5	4
Dec-2023	-4	-2	2	-8	-4	4
Mar-2024	-1	-1	0	-8	-4	4
Jun-2024	0	-1	-1	-8	-4	4
Sep-2024	1	-1	-2	-8	-3	5
Dec-2024	2	0	-2	-7	-3	4

Source: BofA Global Research, Bloomberg, Federal Reserve

BofA GLOBAL RESEARCH

Using the regression inputs for both periods, we forecast FF-SOFR spread based on our forecast for ON RRP, Reserves, Marketable debt ex Fed and GDP.

In the high ON RRP take-up regression output, FF-SOFR spread widens as EFFR lifts off faster than SOFR.

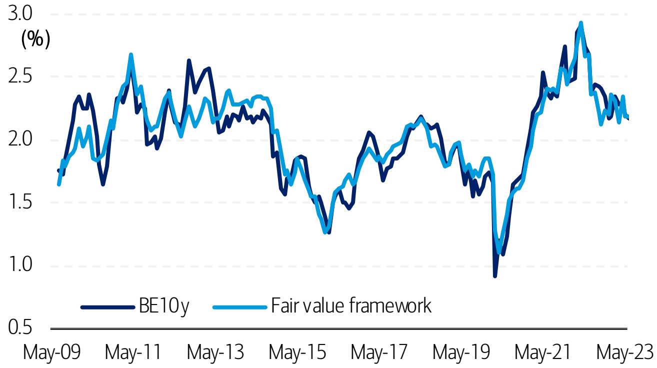
In the low ON RRP take-up regression output, FF-SOFR spread narrows as SOFR lifts off faster than EFFR.

Recent upward pressure on SOFR, which we incorporate into our model, has pulled forward the projected tightening in SOFR-IORB.

TIPS

Macro framework for breakevens (BEs)

Exhibit 11: Macro framework for 10y BE
10y BE fair value c.220bp, market trading in line with fundamentals



Source: BofA Global Research

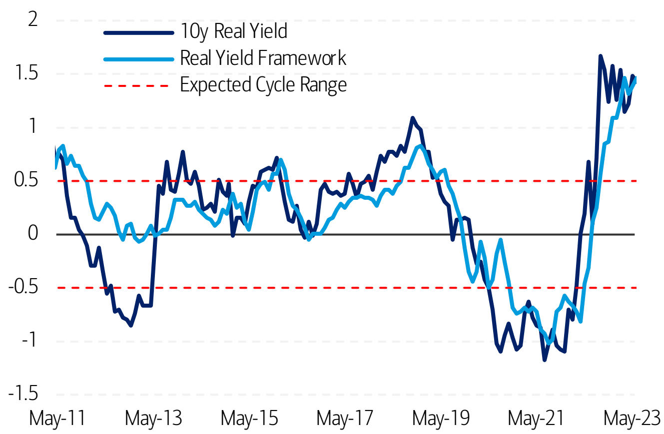
BofA GLOBAL RESEARCH

We model 10y BE as a function of inflation expectation, inflation risk premium, and inflation liquidity premium components.

US 10y breakevens fair value c.220bp, down from c.235bp in early May. The market is trading in line with fundamentals.

Real yield (10y BE vs 10y nominal model)

Exhibit 12: 10y real yield framework
Fair value for 10y real yields in macro framework c.145bp



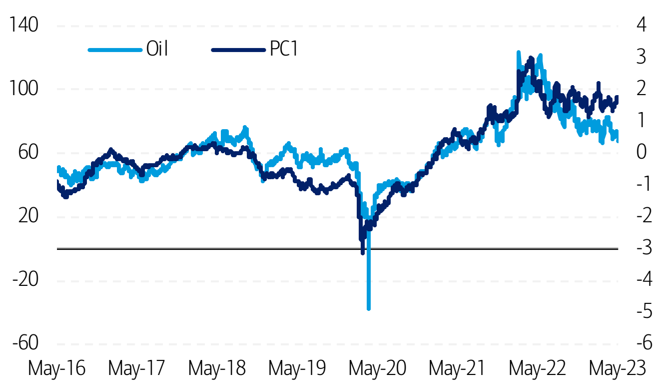
Source: BofA Global Research

BofA GLOBAL RESEARCH

US 10y real rate fair value is c.145bp. The market is trading 10y real yields in line with fair value suggested by our macro framework.

PCA on global 10y BEs

Exhibit 13: First breakeven closely matches 1st crude oil futures
Oil is a primary driver of global inflation expectations



Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

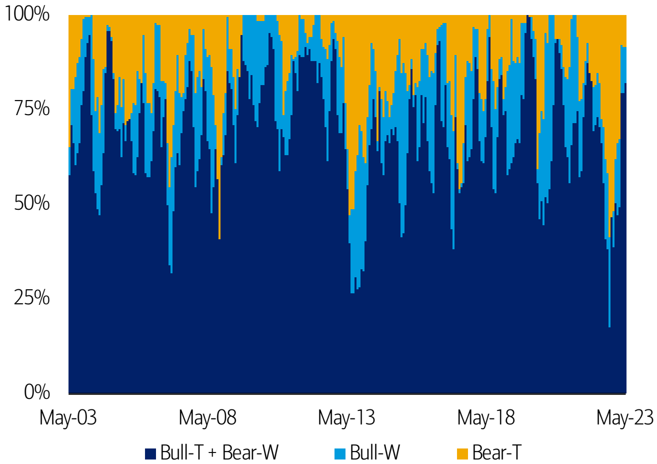
1st principal component of global 10y BEs suggests that oil has become the main driver of global inflation expectations for several years now.

This also implies that any single central bank may have very limited impact on its domestic inflation expectation markets.

Directionality of 10y BEs

Exhibit 14: Breakeven directionality breakdown

10y breakevens showing a more standard directionality now



Source: BofA Global Research

BofA GLOBAL RESEARCH

10y BEs are showing a more standard directionality. Orthodox moves (bull tightening & bear widening) are back to dominating the dynamic (c.86%) and in line with historical frequencies, suggesting market expectations for a higher correlation and causality between growth and inflation in '23.

Bull tightening dominated the dynamic over the last two weeks, suggesting expectations for lower growth and lower inflation. We see only 34% frequency associated to a bear-widening dynamic, which generally reflects reacceleration expectations.

Exhibit 15: 10y Breakeven directionality

Bull tightening and bear widening driving the 10yBE dynamic again

	bull-Tight	bear-Wide	bull-Wide	bear-Tight
Current	52%	34%	10%	4%
1m	37%	35%	13%	15%
2m	26%	32%	14%	28%
3m	28%	34%	13%	25%

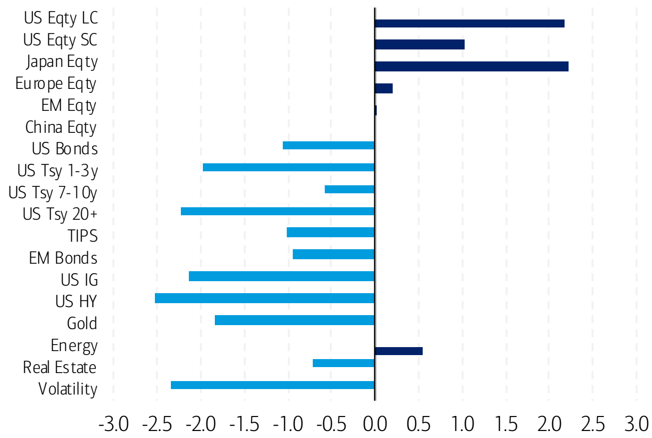
Source: BofA Global Research

BofA GLOBAL RESEARCH

Asset allocation

Flows and allocation bias

Exhibit 16: Gauge of risk profile obtained from ETF flows
Profile suggests upgrade of risk appetite over May



Source: BofA Global Research

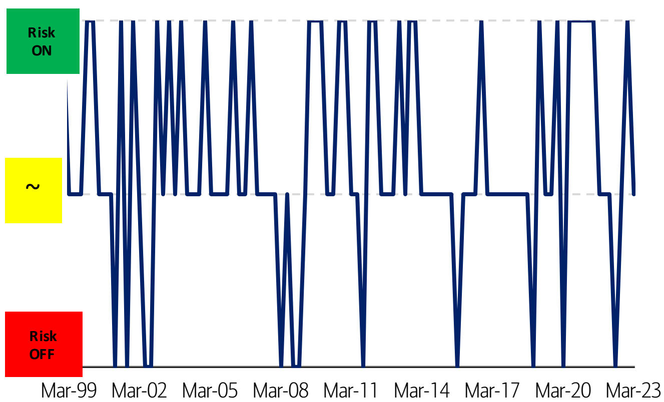
BofA GLOBAL RESEARCH

Gauge of risk profile and allocations obtained from ETF flows shows upgrade of risk over the last couple of weeks:

- Bonds – Short USTs, particularly frontend and backend, TIPS and EM bonds.
- Equities – Long US LC & SC, Japan, and Europe. Neutral EM and Chinese equities.
- Credit – Short IG & HY
- Alternatives – Short gold & long Energy
- Volatility – Short equity volatility

Broadly, these suggest a moderate bias towards risk on.

Exhibit 17: Regimes for quarterly performance across asset classes
Market dynamic in 4Q22 was closer to risk on.... shift towards a transition dynamic in 1Q23



Source: BofA Global Research

BofA GLOBAL RESEARCH

Downgrade of optimal allocations from profiles consistent with a risk-on market dynamic in 4Q22 shifted to profiles consistent with a transition market dynamic in 1Q23.

Market dynamic over 2Q is likely to push optimal asset allocations profiles between those implied by risk-off/recession and transition states. Demand for duration is likely to stay robust over 2Q in our baseline view.

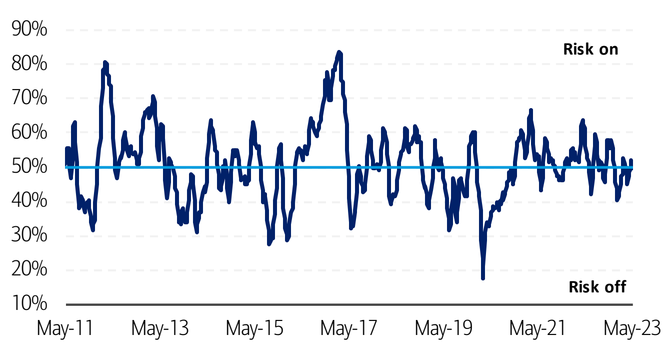
Exhibit 18: Transition probabilities between different states for the market dynamic
Transition probability from risk-off/recession to risk-on (57%) is much larger than the transition probability from risk-on to risk-off

	Risk off	~	Risk on
Risk off	14%	29%	57%
~	16%	61%	23%
Risk on	6%	61%	32%

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 19: Positioning bias extracted from futures across assets
Recent bias neutral



Source: BofA Global Research

BofA GLOBAL RESEARCH

Positioning bias extracted from futures across asset classes suggests a neutral risk bias recently (c.50% currently versus vs 45% - slightly risk off – at the end of April).

Appendix: Model descriptions

Macro model

In our macro framework for the dynamic of Treasuries, we calculate the first two PCs of the rates curve (2s, 5s, 10s and 30s), and regress each of these on Fed funds (to define cycle dynamic) and the principal components of growth variables, inflation variables, and employment variables (see our report, A hitchhikers guide to RV on the UST curve).

Macro models are calibrated over long historical windows, generally longer than the average cycle length (somewhere between 7 years and 15 years) to capture the broader dynamic of Treasuries throughout the cycle. Significantly, these models tend to break down in periods of significant non-economic buying of Treasuries. We have seen several of these periods over the last couple of cycles, for example the following:

- The Greenspan conundrum, when we saw the back end of the Treasury curve rallying even as the Fed hiked rates in the early stages of the 2004-06 tightening cycle, driven foreign central bank buying.

- Quantitative easing (QE) periods, when the Fed acts as a non-economic buyer. Indeed, in general, these periods drive a negative correlation between growth and yields, and it is a challenge to avoid solutions that converge to these sorts of non-economic betas in macro frameworks for the dynamic of yields

- Global yield demand in a context of very low global yields. Indeed, global demand for USTs may be driven less by US fundamentals but more by yield differentials to other DM yields and the cost of hedging the FX exposure

To account for the pressures on the Treasury curve from these non-economic distortions, we include in our independent data set the dynamic of the Fed balance sheet and the first principal component of global DM rates. In our framework, therefore, we converge to two solutions: one whereby we express fair value consistent with US macro fundamentals alone and an adjusted framework whereby we incorporate the impact of overseas demand on the Treasury curve.

Global yield framework

This framework is an alternative approach to PCA, which addresses the shortcoming of PCA not being able to capture trends in the data to a large extent. The framework can achieve this by capturing the shared covariances in the dataset through hidden state processes and also allows for the modeling of the time-varying dynamic of these factors explicitly. In a relatively simple specification, a number of factors (determined a-priori) are defined through a given state equation:

$$x(t) = B * x(t-1) + w(t)$$

while the independent variables are modeled as a function of these factors:

$$y(t) = Z * x(t) + v(t)$$

where:

$$w(t) \sim MVN(0,Q)\ ,\ \ v(t) \sim MVN(0,R)\ ,\ x(0) \sim MVN(X0,V0)$$

The factors (*x's*) are calibrated to explain the dynamic of the independent variables (*y's*) through the linear combinations defined by the calibrated projection matrix (Z). The projection matrix Z can be constrained to add more intuition to the interpretability of the factors.

Decomposition of the 10yT dynamic

In statistics, the traditional frequentist approach assumes that each parameter has a "true" value, and the goal is to find a close estimate to that (fixed) value. In contrast, the Bayesian approach views each parameter as a random variable, characterized by some underlying probabilistic distribution, along with constraints on the relative dynamic of the different parameters. The latter allows the analyst to avoid non-economic solutions, for example models where Treasury yields are negatively correlated with growth.

The vector auto-regressive framework is used to capture the relationship between multiple time series as they evolve over time, versus lagged levels. A *p*th-order VAR refers to a VAR model with a time lag for the last *p* time periods and is denoted VAR(*p*). This can be expressed as follows:

$$y(t) = a0 + A1 * y(t-1) + \ldots + Ap * y(t-p) + \varepsilon(t) \text{ with } \varepsilon(t) \sim N(0,\Sigma)$$

Where $y(t)$ is the $M \times 1$ vector of endogenous variables, $a0$ is the $M \times 1$ vector of constants, Ai is the $M \times M$ time-variant coefficient matrix, and $\varepsilon(t)$ is the $M \times 1$ exogenous factor or the error terms with a Gaussian distribution with mean zero and variance-covariance matrix Σ.

In our formulation, we adapt an existing European Central Bank (ECB) framework[1] to decompose the dynamic of 10yT yields in terms of monetary policy, demand, risk, and inflation shocks. The key in this model is to define the sign restriction priors that transform the dynamic of the underlying variables in the model (10yT yields, 5y5y inflation, real effective exchange rate for the dollar, and cyclical adjusted P/E ratios) into the shocks below (see our report, A hitchhikers guide to RV on the UST curve).

Curve directionality

One framework that adds to the understanding of the dynamic of the curve is a measure of how frequent the different modes for the curve (bull flattening, bear steepening, bear flattening, and bull steepening) have been in recent history. One can do this by constructing 4 indices, one for each mode, that measure the number of bp moves that can be attributed to that mode in a given historical window versus the sum of absolute moves on the curve over the same period. Those 4 indices can be grouped into short leg (2yT leg in the 2s10s dynamic) driven moves (adding the bear-flattening and bull steepening indices) and belly (10yT in the 2s10s dynamic) driven moves (adding bull flattening and bear steepening moves). This framework is useful to gauge the prevailing modes on the curve and understand the periods when the curve is undergoing a shift in its dynamic.

PCA on global 10y BEs

We run a 2-factor PCA on 10y breakevens across US, UK, AU, JP, EU, and CAD with at least 6 years of history. While central bank policy is certainly a factor for the global inflation market, especially around pivots or other surprises, we find that the first principal component (PC1) explains 85% of the variance in global breaks and is highly correlated with the price of oil. The second principal component of breakevens accounts for 9% of the variance, which results in a total of 94% covered by 2 factors. We find that PC2 correlates well to global financial stress and the Fed's published real rate term premium (see our report, Rates relative value update with PCA).

[1] *European Central Bank, Financial Stability Review, Nov. 2018,* www.ecb.europa.eu/pub/pdf/fsr/ecb.fsr201811.en.pdf

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.

This report may refer to fixed income securities or other financial instruments that may not be offered or sold in one or more states or jurisdictions, or to certain categories of investors, including retail investors. Readers of this report are advised that any discussion, recommendation or other mention of such instruments is not a solicitation or offer to transact in such instruments. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor for information relating to such instruments.
Rule 144A securities may be offered or sold only to persons in the U.S. who are Qualified Institutional Buyers within the meaning of Rule 144A under the Securities Act of 1933, as amended.
SECURITIES OR OTHER FINANCIAL INSTRUMENTS DISCUSSED HEREIN MAY BE RATED BELOW INVESTMENT GRADE AND SHOULD THEREFORE ONLY BE CONSIDERED FOR INCLUSION IN ACCOUNTS QUALIFIED FOR SPECULATIVE INVESTMENT.
Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.
The securities or other financial instruments discussed in this report may be traded over-the-counter. Retail sales and/or distribution of this report may be made only in states where these instruments are exempt from registration or have been qualified for sale.
Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.
This report, and the securities or other financial instruments discussed herein, may not be eligible for distribution or sale in all countries or to certain categories of investors, including retail investors.
Refer to BofA Global Research policies relating to conflicts of interest.
"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.
Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:
BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle 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