

# BofA GPS: Global Proprietary Signals

## Slow is good

### Global Proprietary Signals

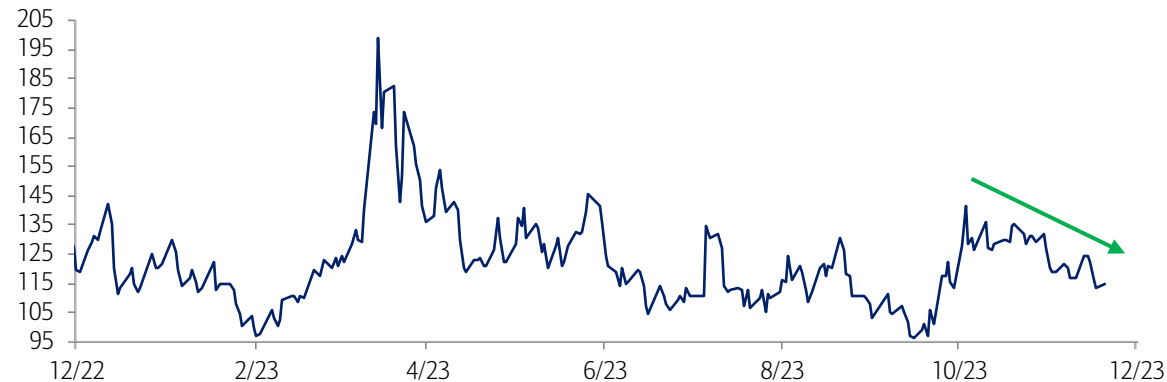
BofA Global Proprietary Signals is a compendium of 80+ proprietary indicators across different economies/strategies/markets/asset classes that reflects the insights of BofA Global Research analysts.

### Participate, but don't gorge

Global equity markets heaved a sigh of relief with the ease of pressure in the rates market, as benchmark yields retreated from the 5%-mark and bond volatility dissipated. However, the backdrop continues to have conflicting forces: an impending (*but well-flagged*) growth slowdown, evolving re-pricing of policy rates, ongoing quantitative tightening, and last but not least, recovering market technicals. A holistic analysis suggests that it may be prudent to participate, but not gorge at this stage.

#### Exhibit 1: Global equity markets heaved a sigh of relief as bond volatility dissipated

Bond volatility: ICE BofA MOVE Index



Source: BofA Predictive Analytics, ICE Data Indices, LLC, Bloomberg

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21 November 2023

BofA  
Data  
Analytics



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**Refer to important disclosures on page 28 to 30.**

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## Pervasive, but not pronounced slowdown

A year ago, a global recession was the consensus call. Today, it is a global slowdown – three-fourths of the participants in the Global Fund Manager Survey are braced for a weaker economy in the next 12 months. On a positive note, though, the same proportion expects the slowdown to be only a mild one. Our house-view too forecasts a mild deceleration in 2024, followed by a gradual recovery in 2025, with homogeneous inflation dynamics across regions, allowing central banks to adopt less restrictive monetary policy stances.

### Exhibit 2: Global soft landing: our house-view forecasts a mild deceleration in global growth in 2024

2023-2025 GDP Growth and CPI forecasts

	BofA GDP growth forecasts			
	2022	2023F	2024F	2025F
Global	3.5	3.0	2.8	3.0
US	1.9	2.4	1.4	1.3
Euro area	3.4	0.5	0.5	1.2
Japan	0.9	1.7	0.8	1.0
China	3.0	5.3	4.8	4.6
Developed Markets	2.6	1.5	0.9	1.2
Emerging Markets	4.2	4.2	4.2	4.3
Emerging Asia	4.2	5.0	4.8	4.8
Emerging EMEA	4.6	2.1	3.5	3.8
Latin America	4.0	2.2	1.8	2.1

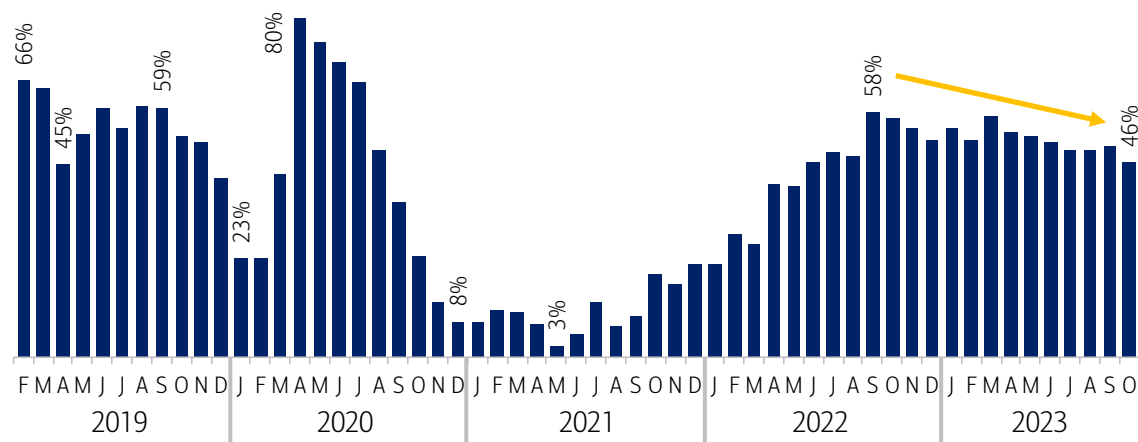
Source: BofA Global Research

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Our proprietary growth indicators convey a similar *below-trend* outlook, with the breadth of *Bearish* signals (46%) oscillating in a narrow range for a year now. The [Global Wave \(see note\)](#), which quantifies trends in global economic activity, treaded sideways, keeping the signal negative for a record twenty-fourth month.

### Exhibit 3: A below-trend outlook for global growth: 46% Bearish signals

Proportion of growth indicators providing 'Bearish' signal



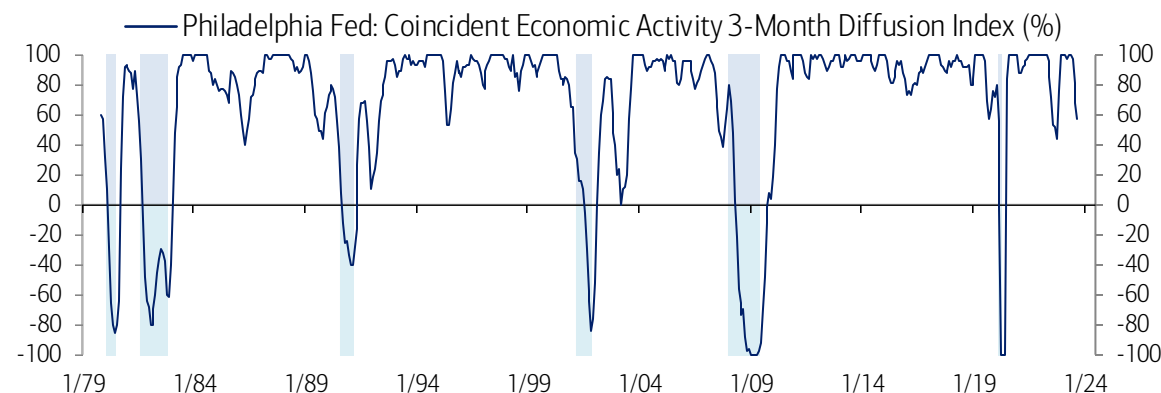
Source: BofA Predictive Analytics. Notes: Based on 50 growth indicators as of today.

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In the US, the September state coincident indexes from the Federal Reserve Bank of Philadelphia saw an improvement in only 58% (i.e. 29 out of 50) of the states over the past 3 months and 26% (i.e. 13 out of 50) over the past 1 month, versus 100% each in April.

**Exhibit 4: The September state coincident indexes from the Philadelphia Fed improved in only 58% of the states over the past 3 months versus 100% in April**

US State Coincident Indexes: pervasive slowdown



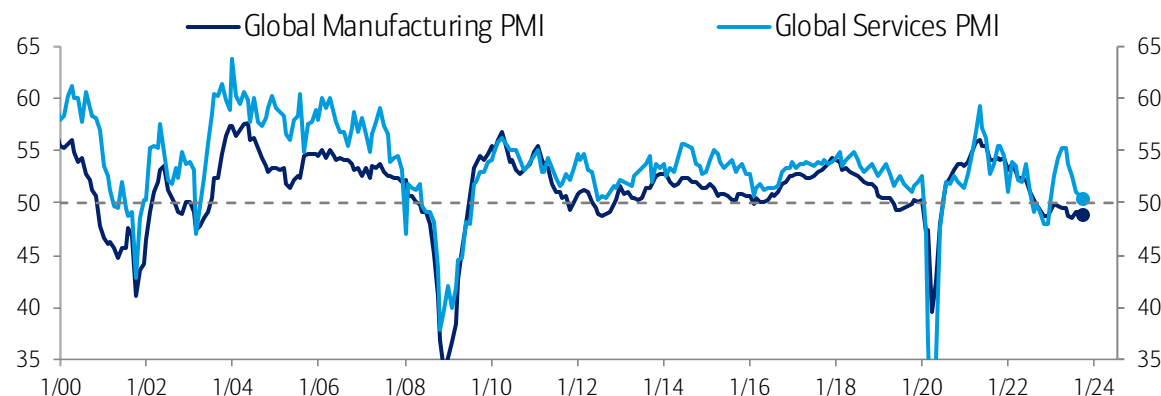
Source: BofA Predictive Analytics, FRB Philadelphia, Haver. **Notes:** Shaded areas denote NBER-defined US recessions.

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In Europe, the [Composite Macro Indicator \(see note\)](#) ticked down to stay put in the *Recession* phase. While the manufacturing slowdown is not exactly news, it is gradually percolating into the services domain, with the Global PMI (both manufacturing and non-manufacturing) tracking below long-run average levels now. Slice it and dice it the way you want, but a pervasive, although not pronounced, slowdown is *almost* inevitable.

**Exhibit 5: The manufacturing slowdown is gradually percolating into the services domain**

Global Manufacturing PMI (49) versus Global Services PMI (50): converging



Source: BofA Predictive Analytics, S&P Global, Haver

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Especially in the consumer space. Confidence is no longer in the doldrums, but is quite low across regions by historical standards. Our [UK Consumer Confidence Indicator \(see note\)](#) remains bearish, while the bi-monthly [China Consumer Survey \(see note\)](#) sensed further moderation in sentiment. The softness is widespread – affecting spending on discretionary items, staples, and even luxury goods. Luxury demand is wading through a quarter of normalization, as captured by the [Global Luxury Demand Indicator \(see note\)](#), prompting estimate cuts across the street. Our house-view expects more to come.

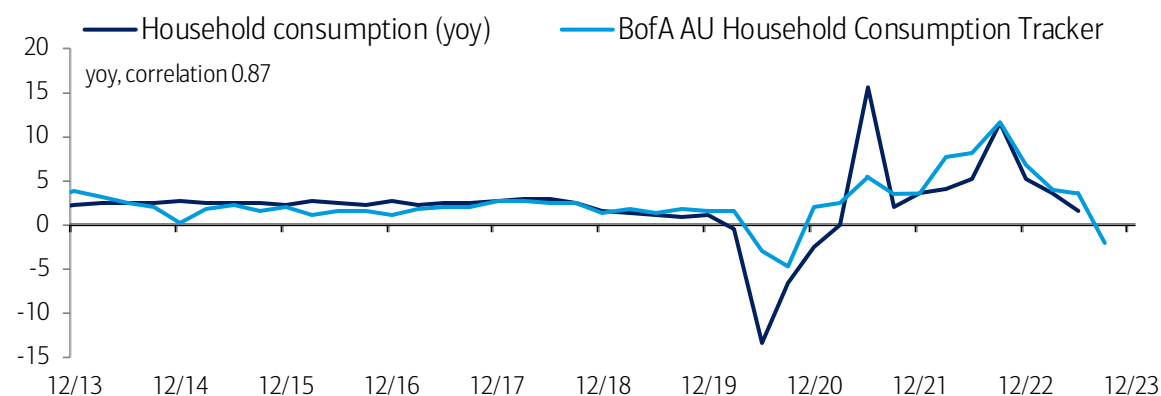
In the US, retail sales remains tepid despite an additional round of Prime Day and related promotions in October, with further headwinds down the line as more households resume student loan repayments. BAC aggregated US credit and debit card spending on travel (airlines) and lodging is trending negative, with bookings data showing softness in international and leisure travel demand quarter-to-date. The [Lodging Macro Activity Tracker \(see note\)](#) downshifted to a Neutral signal. So did the [US Discount Store Demand Indicator \(see note\)](#), as discount stores face pressure from mounting interest payments. The [RENO Barometer \(see note\)](#) portends a cloudy outlook for consumer spending at home improvement stores.

Eastwards in Asia Pacific, the [AU Household Consumption Tracker \(see note\)](#) moved into negative territory for the first time since the pandemic after peaking in 3Q 2022, as consumers navigate high rates, high cost of living and an unfavourable global backdrop. Furthermore, rising rents and dissipation of excess savings place additional pressure on household budgets.

In China, prior regulatory tightening has sapped the propensity to consume – panelists in the [Asia Fund Manager Survey \(see note\)](#) are almost unanimous in their belief that Chinese households will prioritize savings over consumption or investment. The [Macau Macro Activity Tracker \(see note\)](#) remains well below its long-term averages, painting a gloomy outlook for gaming revenues in Macau. Even liquor sales see a slow climb out of the bottom based on the flattish trends in the [BofA China White Liquor Hydrometer \(see note\)](#).

#### Exhibit 6: Australia household spending is set to weaken further

Australia Household Consumption Tracker



Source: BofA Global Research, Macrobond, CoreLogic, ABS

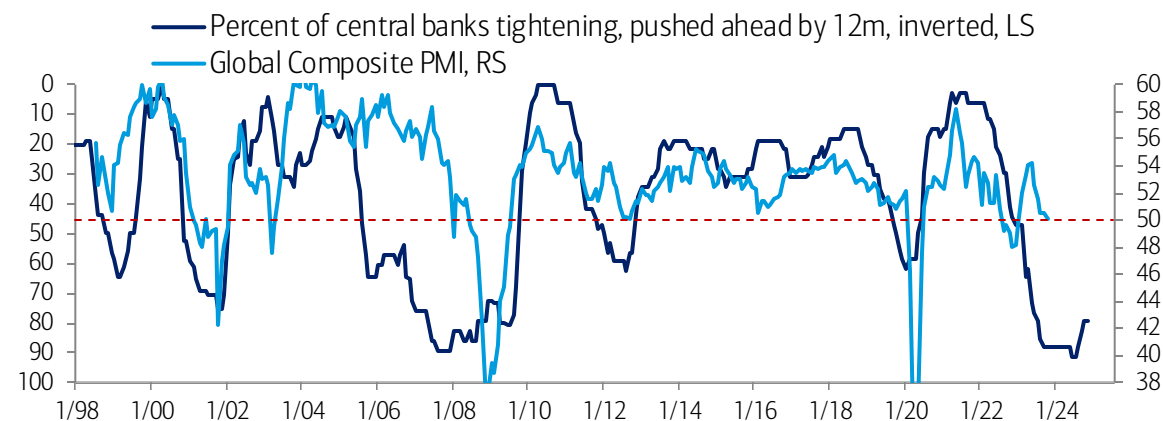
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While the weakness is well-anticipated (and priced in many sectors), rendering further sizeable downsides as unlikely, a sustainable upturn will be conditional to a turn in policy stance by more central banks.



**Exhibit 7: A sustainable upturn will be conditional to a turn in policy stance by more central banks**

Percent of central banks in tightening mode versus global composite PMI



Source: Ned Davis Research, S&amp;P Global, Haver

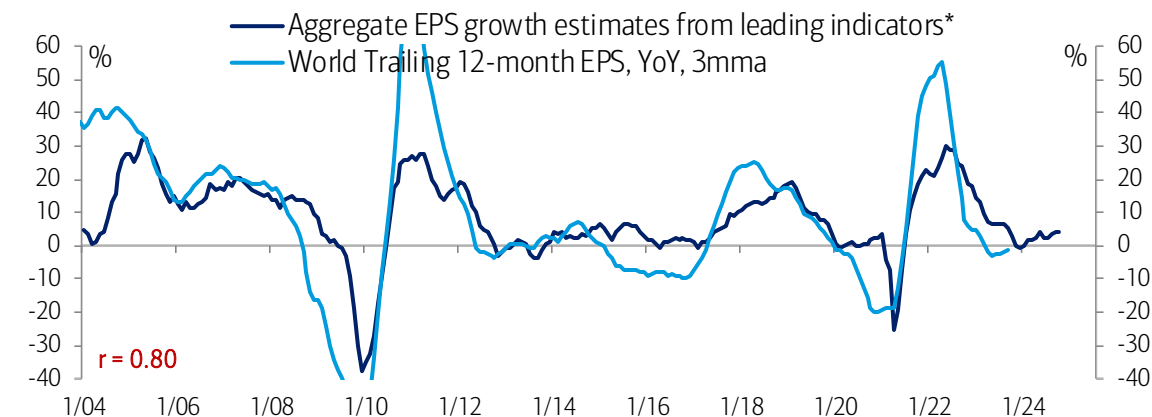
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**Earnings – a mini upturn ahead**

The earnings story is somewhat more encouraging as leading indicators continue to project a pedestrian mid-single digit growth over the course of the next 12 months.

**Exhibit 8: Leading indicators (aggregate) anticipate global earnings to grow 4% YoY in the next 12 months**

\*Global EPS growth projection: Based on Asian exports growth, global manufacturing PMI, global manufacturing new orders, global earnings revisions ratio, corporate guidance for the US, and BofA China Financial Conditions Indicator



Source: BofA Predictive Analytics, MSCI, IBES, FactSet

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1. Corporate guidance in the US is holding up, with the *proportion of above-consensus issuances* (a volatile series) implying an outsized world EPS growth of 21% in the next 12 months.



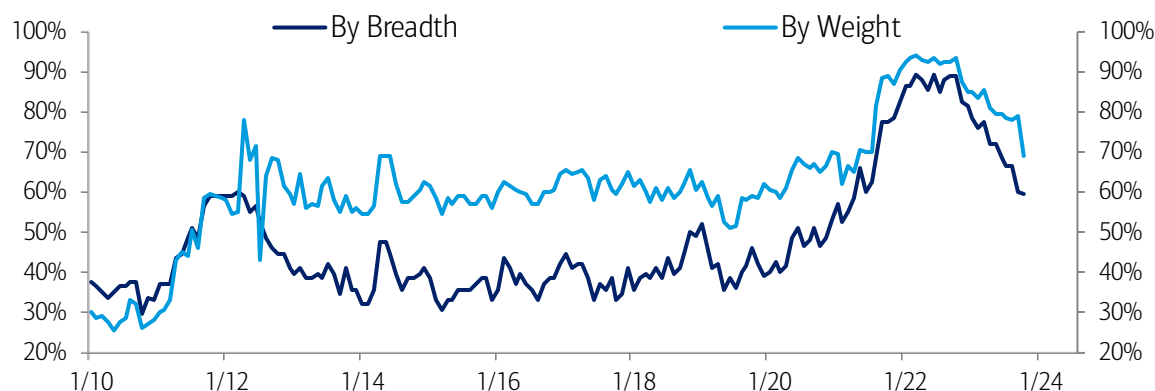
2. *Financial conditions in China*, as gauged by the [China Financial Conditions Indicator \(see note\)](#), similarly project optimistic profit growth of 14% in the year ahead with further upside in the event of a more coordinated and concentrated policy easing.
3. The 3-month *global earnings revisions ratio* is hovering near the long-term average levels, estimating world EPS to grow 5% in the next 12 months.
4. *Shrinking exports from the major Asian trading nations* (Japan, Korea, Singapore, and Taiwan) project the next 12-month EPS growth to stay flat.
5. *Global manufacturing PMI* slid further below par (48.8) implying -3% world EPS growth in the next 12 months.
6. So did *global manufacturing PMI new orders*, projecting the next 12-month world EPS growth at -4%.

## The great inflation unwind continues

The ‘so bad, it’s good’ argument is not new in finance, but caution is warranted when applying it to concepts like growth. The positive impulse of slower growth is limited to the extent that the economy does not slip into a recession. But that of slower inflation is less tricky – it is almost unconditionally positive during inflationary regimes. The October print lends credence to sustained broadbased disinflation after the September blip, with 40% of 74 CPI components already running below the threshold of 2.0% YoY, and more yet to come.

### Exhibit 9: On track: a sustained broadbased disinflation

Proportion of US CPI Components above 2% YoY: Based on 74 components



Source: BofA Global Research, BLS, Haver

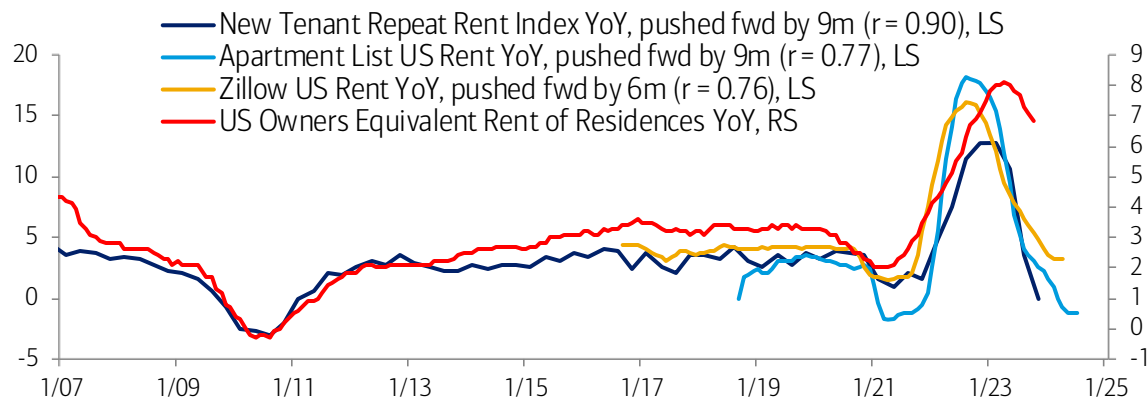
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The goods economy is already in deflation, with further downside in store, as COVID-induced supply chain pressures are not just unwound but reversed. Shelter accounted for close to 60% of the core CPI inflation last month, but a steady disinflation is underway, as informed by Apartment List, Zillow and the Cleveland Fed.



**Exhibit 10: Shelter accounted for close to 60% of the core CPI inflation in October, but a steady disinflation is underway**

Disinflationary impulse: Measures of asking rents versus US owners' equivalent rent of residences YoY (26% weight in headline CPI)



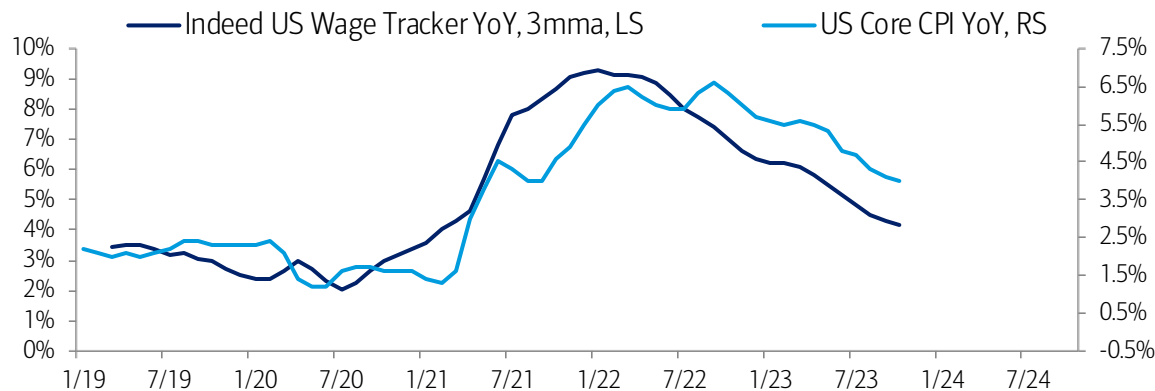
**Source:** BofA Predictive Analytics, BEA, Apartment List, Zillow Inc, Bloomberg, Adams, Brian, Lara Loewenstein, Hugh Montag, and Randal J. Verbrugge. 2022. "Disentangling Rent Index Differences: Data, Methods, and Scope." Federal Reserve Bank of Cleveland, Working Paper No. 22-38.

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Core services ex-shelter a.k.a. super-core inflation has fed off the labor market resilience, but a moderation is in the works. Advertised wages have decelerated considerably not just in the US, but also in Europe, per the Indeed Wage Tracker, presaging a cool-off in inflation. Hint of downside surprises, such as in October, could put policymakers on the spot and pull the easing cycle forward. Unsurprisingly, price pressures have already lost a considerable portion of the corporate mindshare as evident from the drop in discussions on inflation in earnings calls in the US.

**Exhibit 11: Deceleration in advertised wages, as informed by the Indeed Wage Tracker, presage a cool-off in inflation**

Wage growth: labor market rebalance in action



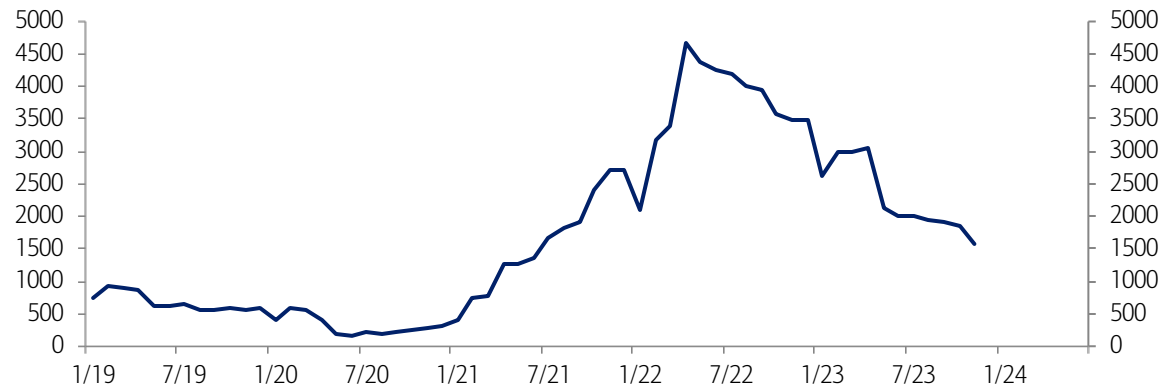
**Source:** BofA Predictive Analytics, Indeed, Bloomberg

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**Exhibit 12: Price pressures have lost a considerable portion of the corporate mindshare**

Number of discussions on Inflation in S&amp;P 500 Company Earnings Calls, 3mma



Source: BofA Predictive Analytics, Bloomberg

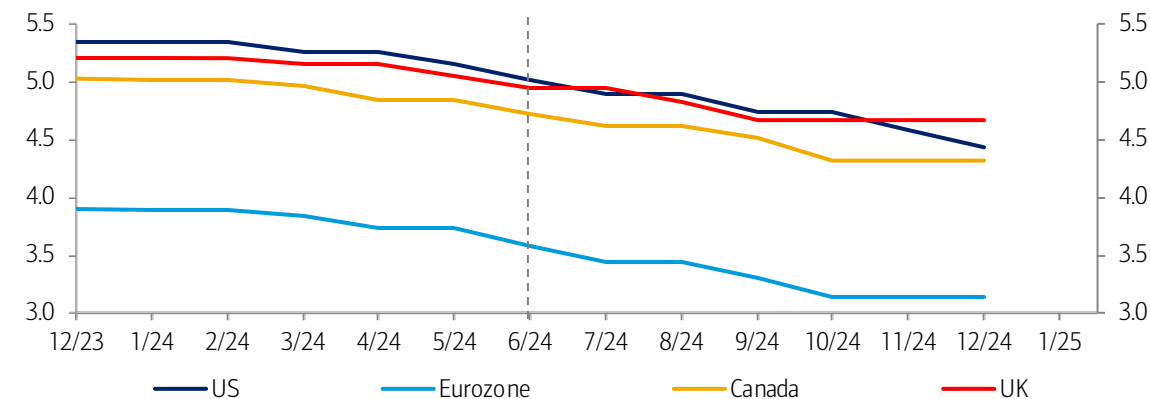
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**A path to synchronized policy easing**

The futures market is back to expecting four Fed rate cuts through the end of 2024 following lower-than-expected dataprints. Some Emerging Market central banks have already pivoted, and come 2H2024, we could have synchronized monetary policy easing. Indeed, investors have turned bullish on interest rates across tenors in an encouraging sign for risk assets – 80% of the Global Fund Manager Survey participants expect lower short-term rates in the next 12 months and 61% expect lower long-term rates. The key question will be to determine to what extent central bank actions will be able to fend off the negative impulse of quantitative tightening, with the Fed and the ECB withdrawing USD95bn and EUR15bn of liquidity respectively from the system every month.

**Exhibit 13: Come 2H2024, we could have synchronized monetary policy easing**

Futures Market Expectations of Policy Rates: Fed, ECB, BoE, BoC



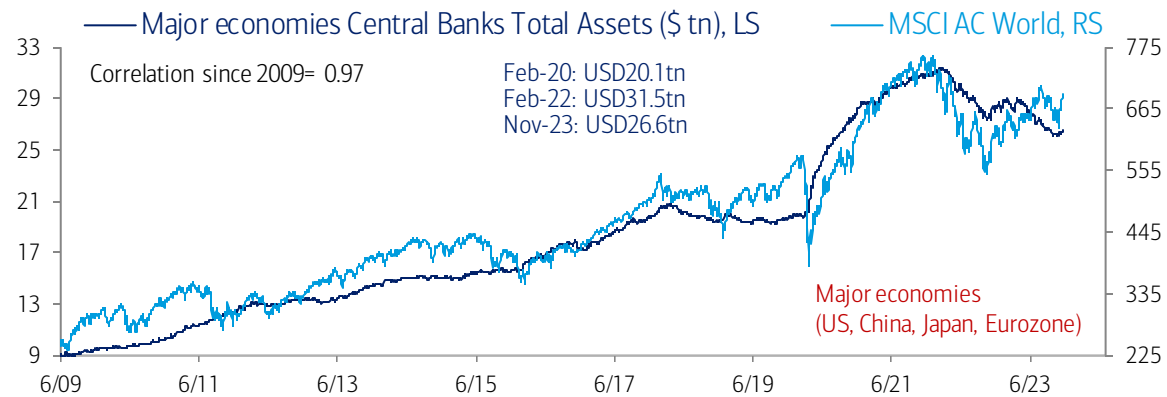
Source: BofA Predictive Analytics, Bloomberg

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**Exhibit 14: Quantitative tightening is still very much in vogue**

Liquidity drag: major economies central banks' balance sheet



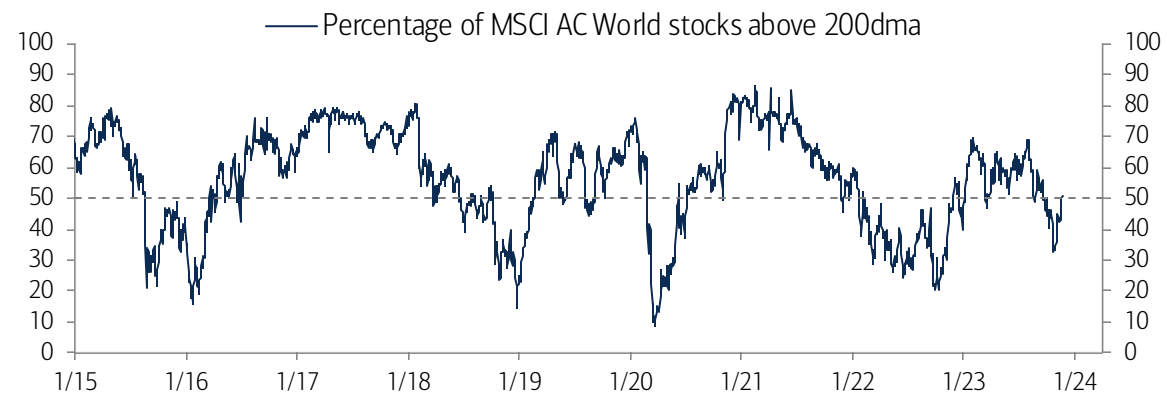
Source: BofA Predictive Analytics, MSCI, Bloomberg

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**Bottom line.** The weight of the evidence suggests a mildly positive narrative going into the next year. The encouraging concoction of a soft landing, a mild recovery in earnings, persistent disinflation, and recovering market technicals (including bullish breadth thrusts) should prevail over the headwinds from quantitative tightening. What could spoil the party? Resurgence in bond yields and bond volatility, given the negative correlation between equities and bond yields.

**Exhibit 15: Market technicals are in a recovery mode**

Breadth of global stocks trading above 200-day moving average: at 51



Source: BofA Predictive Analytics, MSCI, Bloomberg

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**Exhibit 18: Bullish breadth: [Nov 11 was a 90% up day](#) for US equities (% of advancing stocks and up volume both > 90%)**

NYSE stocks 90% up day (86 prior observations) and S&amp;P returns

Statistic	1-day return	2-day return	5-day return	10-day return	20-day return	30-day return	65-day return
Average return	-0.14%	0.08%	0.10%	1.06%	2.12%	3.03%	5.35%
Median return	-0.05%	0.27%	0.59%	1.44%	2.24%	3.28%	6.21%
% of time positive return	44.20%	58.10%	57.00%	69.80%	75.60%	74.40%	81.40%
Maximum gain	3.06%	7.47%	8.13%	12.02%	16.10%	18.13%	30.51%
Maximum loss	-4.42%	-9.52%	-17.43%	-15.39%	-9.56%	-20.26%	-16.02%
Standard deviation	1.18%	2.30%	3.45%	3.83%	4.58%	5.38%	8.30%

Source: BofA Global Research, Bloomberg

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*Check inside for indicator signals.***See links to recent editions of the BofA Global Proprietary Signals below**[BofA GPS: Global Proprietary Signals: The unbearable heaviness of higher rates 20 October 2023](#)[BofA GPS: Global Proprietary Signals: The weight of the evidence 14 September 2023](#)[BofA GPS: Global Proprietary Signals: After the rally 04 August 2023](#)

## Exhibit 17: Macroeconomic Indicators

Please refer to the Glossary at the back of the report for a brief description of each of these indicators (and see links to macro indicator reports below, numbered in the global column)

#	Indicator	Predictor of	Latest Signal											
Global			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
1	<a href="#">Global Wave</a> (M) - N. Tupper	Global Equities	X	X	X	X	X	X	X	X	X	X	X	X
2	<a href="#">Global EPS Growth Model</a> (W) - M. Hartnett	Global EPS Growth	⇔	⇔	X	X	X	X	X	X	X	X	X	X
3	<a href="#">WTI Crude Oil Directional Forecast</a> (M) - F. Blanch	WTI Crude Oil	✓	✓	X	X	✓	✓	X	✓	X	✓	X	X
4	<a href="#">GFSI Risk Allocator</a> (W) - B. Bowler	Cross-Market Gauge of Risk	X	X	X	⇔	X	X	X	⇔	⇔	⇔	X	⇔
5	<a href="#">Global Risk-Love Indicator</a> (M) - R. Samadhiya	Global Equities	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
6	<a href="#">Global News Pulse</a> (M) - N. Tupper	Global Equities	X	X	X	X	✓	✓	✓	✓	✓	✓	✓	⇔
7	<a href="#">Global FMS Cash Indicator</a> (M) - M. Hartnett	Global Equities	✓	✓	✓	✓	✓	✓	✓	✓	✓	⇔	✓	⇔
8	<a href="#">Global Breadth Rule</a> (W) - M. Hartnett	Global Equities	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
9	<a href="#">Global Flow Trading Rule</a> (W) - M. Hartnett	Global Equities	X	✓	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	✓	⇔
10	<a href="#">EM Flow Trading Rule</a> (W) - M. Hartnett	Emerging Markets Equities	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
11	<a href="#">CompassAlarm</a> (Q) - D. Hauner	Emerging Markets Currencies	✓	✓	✓	✓	✓	✓	⇔	⇔	⇔	X	⇔	⇔
12	<a href="#">BofA Bull &amp; Bear Indicator</a> (W) - M. Hartnett	Global Cross-Asset Risk	✓	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	✓	✓
13	<a href="#">EMFX Carry Sentiment Indicator</a> (Q) - D. Hauner	Emerging Markets Currencies	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	✓
14	<a href="#">Emerging Monetary Mood Indicator</a> (Q) - D. Hauner	EM Central Banks Policy Stance	X	X	X	X	X	X	X	X	X	⇔	✓	✓

Americas			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
15	<a href="#">BofA Indicator of US Labor Market Momentum</a> (M) - M. Gapen	US Labor Market	X	X	X	X	X	X	X	X	X	X	X	X
16	<a href="#">BofA Indicator of US Financial Conditions</a> (M) - M. Gapen	US Financial Conditions	X	X	X	X	X	X	X	X	X	X	X	X
17	<a href="#">US Composite Recession Indicator</a> (M) - S. Juneau	US Recession	X	X	X	X	X	X	X	⇔	⇔	⇔	⇔	⇔
18	<a href="#">US GDP Tracker</a> (W) - M. Gapen	US GDP	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	✓	✓	✓	⇔
19	<a href="#">BAC Aggregated Card Data</a> (M) - A. Bhav	US Retail Sales	⇔	⇔	⇔	✓	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
20	<a href="#">Sell Side Indicator</a> (M) - S. Subramanian	US Equities	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
21	<a href="#">BofA Indicator of US Financial Stress</a> (M) - M. Gapen	US Financial Stress	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
22	<a href="#">US HY Default Rate Indicator</a> (M) - O. Melentyev	US High Yield Default Probability	⇔	✓	✓	✓	⇔	⇔	X	⇔	✓	⇔	⇔	⇔
23	<a href="#">Liquidity Premium Indicator</a> (M) - O. Melentyev	US High Yield Market Liquidity	⇔	⇔	⇔	⇔	⇔	⇔	X	⇔	X	X	⇔	⇔
24	<a href="#">BofA Brazil Activity Coincident Tracker</a> (M) - D. Beker	Brazil Economic Cycle	⇔	⇔	X	X	X	⇔	⇔	⇔	X	⇔	X	⇔
25	<a href="#">US Regime Indicator</a> (M) - S. Subramanian	US Business Cycle	⇔	⇔	⇔	⇔	X	X	X	X	X	✓	✓	✓



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26	<a href="#">Machine-learning Based Cycle Indicator</a> (Q) - A. Bhave	US Economic Cycle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
27	<a href="#">BofA Indicator of US Labor Market Conditions</a> (M) - M. Gopen	US Labor Market	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
28	<a href="#">Corporate Misery Indicator</a> (Q) - S. Subramanian	S&P 500 EPS Growth	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Europe			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
29	<a href="#">European Composite Macro Indicator</a> (M) - P. Strzelinska	European Business Cycle	X	X	X	X	X	X	X	X	X	X	X	X
30	<a href="#">Euro Area GDP Tracker</a> (M) - R. Segura-Cayuela	Euro Area GDP	X	X	X	X	X	X	X	X	X	X	X	X
31	<a href="#">UK GDP Tracker</a> (M) - R. Wood	UK GDP	X	X	X	X	X	X	X	X	X	X	X	X
32	<a href="#">UK Consumer Confidence Indicator</a> (M) - R. Wood	UK Consumer Spending	X	X	X	X	X	X	X	X	X	X	X	X
33	<a href="#">NORBI Mood Indicator</a> (M) - M. Rousakis	Norges Bank Policy Rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X
34	<a href="#">Bank of England Mood Indicator</a> (M) - R. Wood	Bank of England Policy Rate	✓	✓	✓	X	⇔	⇔	✓	✓	✓	✓	⇔	⇔
35	<a href="#">European Credit Macro Indicator</a> (M) - I. Angelakis	European Credit Spreads	X	⇔	⇔	⇔	✓	✓	✓	✓	✓	⇔	⇔	⇔
36	<a href="#">Euro Area Procyclical Core Inflation</a> (M) - R. Segura-Cayuela	Euro Area Inflation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
37	<a href="#">European Momentum Conviction Indicator</a> (M) - P. Strzelinska	Momentum Style	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	✓
38	<a href="#">Riksbank Mood Indicator</a> (M) - M. Rousakis	Riksbank Policy Rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Asia Pac			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
39	<a href="#">AU Household Consumption Tracker</a> (Q) - M. Fuchila	Australia Household Consumption											X	X
40	<a href="#">BofA China Investment Compass</a> (Q) - W. Wu	China Business Cycle	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
41	<a href="#">BofA China FCI</a> (M) - H. Qiao	Liquidity in China	✓	✓	⇔	⇔	⇔	✓	✓	✓	⇔	⇔	⇔	⇔
42	<a href="#">Asia ex-Japan Risk-Love Indicator</a> (M) - R. Samadhiya	Asian Equities	✓	✓	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	✓
43	<a href="#">BofA China A-share Wax &amp; Wane Indicator</a> (W) - W. Wu	China A-share Equities	✓	✓	✓	✓	✓	⇔	✓	✓	✓	✓	✓	✓
44	<a href="#">BofA China ACT</a> (M) - H. Qiao	China Economic Cycle	X	X	✓	✓	⇔	✓	✓	✓	⇔	⇔	⇔	✓
45	<a href="#">BofA RBA Sentiment Indicator</a> (M) - O. Levingston	RBA Policy Rate	✓	✓	✓	✓	⇔	✓	✓	✓	✓	✓	✓	✓

Source: BofA Predictive Analytics

BofA GLOBAL RESEARCH

✓ denotes Bullish ⇔ denotes Balanced X denotes Bearish

Note: D, W, B, M, Bm and Q in the parentheses denote frequency of update/publication of the indicator. D denotes daily, W denotes weekly, B denotes biweekly, M denotes monthly, Bm denotes bimonthly and Q denotes quarterly.



## Exhibit 18: Sectoral Indicators

Please refer to the Glossary at the back of the report for a brief description of each of these indicators (and see links to macro indicator reports below, numbered in the global column)

#	Indicator	Predictor of	Latest Signal											
Global / Americas			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
46	<a href="#">BofA Petrochemical Sentiment Indicator</a> (M) - S. Byrne	Global Petrochemical Sentiment	X	X	X	X	X	X	X	X	X	X	X	X
47	<a href="#">BofA Global EV Battery Value Chain Indicator</a> (M) - J. Lee	Global EV Battery Revenue	X	X	X	X	X	X	X	X	X	X	X	X
48	<a href="#">Fluid Power Distributor Indicator</a> (B) - A. Obin	Global Fluid Power Outlook	↔	↔	↔	✓	✓	✓	↔	↔	X	X	X	X
49	<a href="#">Health Care Labor Tracker</a> (M) - K. Fischbeck	US Health Care Earnings Outlook					X	X	X	X	X	X	X	X
50	<a href="#">S&amp;P500 Energy Sector Directional Forecast</a> (M) - F. Blanch	US Energy Sector Relative Price	✓	✓	✓	X	✓	✓	X	✓	✓	✓	X	X
51	<a href="#">BofA Apple Indicator</a> (Q) - W. Mohan	Apple's Revenue Growth	X	X	X	X	X	X	X	X	X	X	X	X
52	<a href="#">BofA Global Luxury Demand Indicator</a> (M) - A. Wallace	Global Luxury Companies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	↔	↔
53	<a href="#">Industrial Momentum Indicator</a> (M) - M. Feniger	Global Industrial Activity	↔	✓	✓	✓	✓	↔	X	↔	↔	↔	↔	↔
54	<a href="#">Truckload Diffusion Indicator</a> (B) - K. Hoexter	US Trucking Freight Outlook	X	X	↔	X	X	X	X	X	↔	↔	↔	↔
55	<a href="#">Industrial Real Estate Indicator</a> (M) - C. Bonnel	US Industrial Real Estate Demand				↔	↔	↔	↔	↔	↔	↔	↔	↔
56	<a href="#">Flight Signals</a> (Q) - A. Didora	US Domestic Airline Unit Revenue	✓	✓	✓	↔	↔	↔	X	X	X	X	X	↔
57	<a href="#">Lodging Macro Activity Tracker</a> (M) - S. Kelley	US Lodging Industry Revenue	X	X	X	X	X	X	X	X	↔	↔	✓	↔
58	<a href="#">RENO Barometer</a> (M) - E. Suzuki	US Home Improvement Spend	↔	↔	X	X	X	X	↔	↔	↔	↔	↔	↔
59	<a href="#">BofA US Discount Store Demand Indicator</a> (M) - R. Ohmes	Spending at U.S. Discount Stores	X	X	X	X	X	X	↔	↔	✓	✓	✓	↔
60	<a href="#">Internet Advertising Indicator</a> (M) - J. Post	US Digital Advertising Revenue							↔	↔	✓	✓	✓	✓
61	<a href="#">Managed Care Utilization</a> (M) - K. Fischbeck	US Managed Care Earnings	✓	✓	✓	✓	✓	↔	↔	↔	↔	↔	✓	✓
Europe			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
62	<a href="#">Testing Growth Indicator</a> (Q) - S. Sarli	Testing, Inspection & Certification	↔	↔	↔	↔	↔	X	X	X	X	X	X	X
63	<a href="#">EMEA Staffing Indicator</a> (Q) - S. Sarli	EMEA Staffing											X	X
64	<a href="#">Veolia Waste Volume Indicator</a> (M) - A. Roncier	Veolia Waste Volume Growth											X	X
65	<a href="#">Chemical Conditions Tool</a> (M) - M. Yates	European Chemical Sentiment										↔	↔	↔
Asia Pac			Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
66	<a href="#">BofA Apple Supply Chain Indicator</a> (Q) - R. Cheng	Apple Supply Chain	X	X	X	X	X	X	X	X	X	X	X	X
67	<a href="#">BofA Athletic Footwear Indicator</a> (Q) - R. Leung	Global Athletic Footwear Revenue	X	X	X	X	X	X	X	X	X	X	X	X
68	<a href="#">BofA Asian Synthetic Rubber Indicator</a> (Q) - J. Lee	Asian Synthetic Rubber Revenue	X	X	X	X	X	X	X	X	X	X	X	X



## Exhibit 18: Sectoral Indicators

Please refer to the Glossary at the back of the report for a brief description of each of these indicators (and see links to macro indicator reports below, numbered in the global column)

#	Indicator	Predictor of	Latest Signal											
69	<a href="#">BofA China Cement Indicator</a> (M) - M. Zhao	China Cement Sector Outlook	X	X	X	X	X	X	X	X	X	X	X	X
70	<a href="#">BofA Korean Banks NII Indicator</a> (Q) - J. Park	Korean Banks Net Interest Income						X	X	X	X	X	X	X
71	<a href="#">BofA Singapore Credit Growth Indicator</a> (M) - A. Swaminathan	Singapore Credit Growth	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	X	X	X
72	<a href="#">BofA Malaysia Credit Growth Indicator</a> (M) - A. Swaminathan	Malaysia Credit Growth	⇔	⇔	⇔	⇔	⇔	⇔	⇔	X	X	X	X	X
73	<a href="#">BofA Thailand Credit Growth Indicator</a> (M) - A. Swaminathan	Thailand Credit Growth	✓	✓	✓	X	X	X	X	X	X	X	X	X
74	<a href="#">BofA Philippines Credit Growth Indicator</a> (M) - A. Swaminathan	Philippines Credit Growth	⇔	⇔	⇔	⇔	⇔	⇔	⇔	X	X	X	X	X
75	<a href="#">BofA Vietnam Credit Growth Indicator</a> (M) - A. Swaminathan	Vietnam Credit Growth	⇔	⇔	⇔	X	X	X	X	X	X	X	X	X
76	<a href="#">BofA Athletic Apparel Indicator</a> (Q) - R. Leung	Global Athletic Apparel Revenue	X	X	X	X	X	X	X	X	⇔	⇔	⇔	⇔
77	<a href="#">BofA Australian Bank Credit Loss</a> (Q) - M. Dunger	Australian Banks Bad Debts	X	X	X	X	X	X	X	X	⇔	⇔	⇔	⇔
78	<a href="#">BofA India Loan Growth Indicator</a> (M) - A. Swaminathan	India Commercial Banks Loan Growth	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔	⇔
79	<a href="#">BofA China White Liquor Hydrometer</a> (Q) - C. Luo	China White Liquor Revenue	X	X	X	X	X	⇔	⇔	⇔	⇔	⇔	⇔	⇔
80	<a href="#">Macau Macro Activity Tracker</a> (M) - S. Kelley	Macau Gross Gaming Revenue								⇔	⇔	X	⇔	⇔
81	<a href="#">BofA Memory Indicator</a> (M) - S. Woo	Semiconductor Memory Cycle	X	X	X	X	X	X	X	X	X	X	✓	✓
82	<a href="#">Japan Factory Automation Indicator</a> (M) - K. Hotta	Japan Factory Automation Cycle	X	X	X	X	X	✓	✓	✓	✓	✓	✓	✓
83	<a href="#">BofA China Flight Signals</a> (M) - N. Gee	China Airlines Unit Revenue	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
84	<a href="#">BofA Indonesia Credit Growth Indicator</a> (M) - A. Swaminathan	Indonesia Credit Growth	⇔	✓	✓	⇔	⇔	⇔	⇔	✓	✓	✓	✓	✓

Source: BofA Predictive Analytics

BofA GLOBAL RESEARCH

✓ denotes Bullish    ⇔ denotes Balanced    X denotes Bearish

D, W, B, M, Bm and Q in the parentheses denote frequency of update/publication of the indicator. D denotes daily, W denotes weekly, B denotes biweekly, M denotes monthly, Bm denotes bimonthly and Q denotes quarterly.

The indicators above have different methodologies, risk considerations and assumptions, and reflect different time horizons. **The labels of 'bullish', 'balanced' or 'bearish' reflect the analysts' interpretation of their respective indicators. 'Bullish' in a broad sense means that the indicator currently suggests a positive outlook for the relevant economy/strategy/discipline/market/ asset class. Similarly, 'bearish' means that the indicator currently suggests a negative outlook for the relevant economy/strategy/discipline/market/asset class. When the analyst is of the view that the indicator does not currently suggest a clear directional signal (either bullish or bearish), it is labeled as 'balanced'.** Investors should always refer to the most recent reports (hyperlinks) for full details and consider their own circumstances/objectives before making any investment decisions.



**Disclaimer:** Each of the indicators above is intended to be indicative metric only and may not be used for reference purposes or as a measure of performance for any financial instrument or contract, or otherwise relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. These indicators were not created to act as benchmarks.

The analysis of all the indicators in this report is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the hypothetical back-tested performance of a particular strategy over the time period indicated. In future periods, market and economic conditions will differ and the same strategy will not necessarily produce the same results. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein. In fact, there are frequently sharp differences between back-tested returns and the actual results realized in the actual management of a portfolio. Back-tested performance results are created by applying an investment strategy or methodology to historical data and attempts to give an indication as to how a strategy might have performed during a certain period in the past if the product had been in existence during such time. Back-tested results have inherent limitations including the fact that they are calculated with the full benefit of hindsight, which allows the security selection methodology to be adjusted to maximize the returns. Further, the results shown do not reflect actual trading or the impact that material economic and market factors might have had on a portfolio manager's decision-making under actual circumstances. Back-tested returns do not reflect advisory fees, trading costs, or other fees or expenses.



# Glossary

## Asia ex-Japan Risk-Love Indicator

Risk-Love is a contrary investor sentiment indicator. It tries to quantify investor emotions and help us understand swings in investor psychology. When at extremes, the indicator is valuable in anticipating reversals in investor mindset, and thus markets, going forward. We have constructed Risk-Love indicator for major Asian/emerging markets as well as for the world as a whole. We include data on positioning, investor surveys, volatility, spreads, correlations, hedging and market technicals measures. Since 1993, median 12m forward returns for Asia ex-Japan markets equities were 17% (in US dollar terms) when the Asia ex-Japan Risk-Love Indicator was in panic.

## BAC US Aggregated Credit and Debit Card Data

The BAC US aggregated credit and debit card data is based on aggregated and anonymized transaction data. The data is utilized to predict US Retail Sales. Readers should be aware that although the BAC datasets utilized in our analysis represent a significant number of data points, they nevertheless present a degree of selection bias, including but not limited to income levels and geographies. In addition, the data are limited to debit and credit cards and does not include other payment methods such as cash or checks. For more information on the methodology, disclaimers and limitations regarding BAC US aggregated credit and debit card data please see the most recent BofA on USA report ([see linked report here](#)).

## Bank of England Mood Indicator (BoEMI)

We apply Natural Language Processing techniques to quantify the degree of hawkish 'sentiment' in around 400 BoE publications since 1997. Backtesting the BoEMI, pre-2008 the correlation between the BoEMI and the shadow rate peaks at 0.73 where the BoEMI has an eight month lead. Between 2008 and 2018 the same correlation peaks at 0.57 where the BoEMI has an eleven month lead.

## BofA Apple Indicator

The Apple Indicator is a tool for identifying directional trends in Apple's YoY revenue growth based on aggregated BAC U.S. credit and debit card spend on electronics and revenue growth for a representative set of 14 Apple supply chain companies based in Taiwan.

## BofA Apple Supply Chain Indicator

The Apple Supply Chain Indicator is a tool for identifying directional trends in aggregate Apple supply chain YoY revenue growth, based on BAC aggregated credit and debit card spend on electronics, Korean exports of electronics & electronics products and Taiwan exports related to parts of electronics products.

## BofA ASEAN Credit Growth Indicators (BofA Singapore Credit Growth Indicator, BofA Malaysia Credit Growth Indicator, BofA Indonesia Credit Growth Indicator, BofA Thailand Credit Growth Indicator, BofA Philippines Credit Growth Indicator, & BofA Vietnam Credit Growth Indicator)

The BofA ASEAN Credit Growth Indicators seek to identify directional trends and key turning points in credit growth across each of the ASEAN-6 countries – Singapore, Malaysia, Indonesia, Thailand, the Philippines, and Vietnam. With lead times ranging from 3-12 months, these indicators are intended to help gauge how banks' loan growth are likely to shape up over the next one to two quarters. The set of six indicators – one for each of the six countries – is calculated using 5-10 input variables for each country that have leading cyclical properties contributing to system credit growth. The inputs, consisting of a mix of macro/market variables, banking system data, and other BofA proprietary indicators,



can broadly be classified under four key categories – namely, system liquidity, business/retail expectations, rates and prices, and external factors. Our back-tested analysis indicates a 0.7-0.8 correlation between our set of BofA ASEAN Credit Growth Indicators and system credit growth across the entire backtested period.

### **BofA Asian Synthetic Rubber Indicator**

The BofA Asian Synthetic Indicator is an aggregate of nine components (seven industry-specific and two macro) that drive the synthetic rubber business cycle. It tracks the directionality trends of the average YoY rubber revenue growth of the major listed synthetic rubber manufacturers in the Asia-Pacific region. The indicator leads the synthetic rubber revenues by six months with a correlation of 0.81 as well as the YoY change in aggregated average share prices by one quarter with a correlation of 0.80 since March 2004.

### **BofA Athletic Supply Chain Indicators (BofA Global Athletic Footwear Indicator & BofA Global Athletic Apparel Indicator)**

The BofA Athletic Supply Chain Indicators seek to identify revenue growth trends in the global athletic footwear and apparel industry that has been a key driver of earnings and valuation. They track the revenue of key suppliers to gauge order trends for the overall industry and brands, given the relatively concentrated supply chain that continues to consolidate further. The BofA Global Athletic Footwear Indicator leads the sales-weighted average YoY revenue growth of major athletic footwear brands by two quarters with a correlation of 0.82 since 2014. The BofA Global Athletic Apparel Indicator leads the sales-weighted average YoY revenue growth of the major athletic apparel brands by three quarters, with a correlation of 0.83 since 2011.

### **BofA Australian Bank Credit Loss Indicator**

The Australian Bank Credit Loss Indicator is a proprietary tool that seeks to identify turning points and directionality in the Australian banking system credit cycle.

### **BofA Brazil Activity Coincident Tracker**

The BofA Brazil Activity Coincident Tracker is a monthly composite gauge of the underlying growth rate of the economy that helps to flag inflection points in the economic cycle based on the growth rates of consumer confidence, business confidence, auto sales, and narrow money supply. It provides a “sneak peek” into the trend of monthly GDP (proxied by the IBC-Br index) four weeks in advance with a correlation of 0.90 between September-2006 and February-2018 and of 0.95 between March-2018 and June-2020. The directionality hit ratio (i.e. % of correct prediction in GDP growth yoy change direction) is also high at 80%.

### **BofA Bull & Bear Indicator**

The BofA Bull & Bear Indicator is a proprietary cross-asset barometer that uses fund flows, positioning data & market technicals to quantify investor sentiment. The indicator is max bullish when it reaches 10 and max bearish when it reaches 0. Sell risk assets when the Bull & Bear Indicator exceeds the “greed” threshold of 8.0. Buy risk assets when the Bull & Bear Indicator falls below the “fear” threshold of 2.0.

### **BofA China A-share Wax & Wane Indicator**

The BofA China A-share Wax & Wane (W&W) Indicator gauges the China A-share market sentiment in the short term using fund flows, liquidity, positioning, leverage, and valuation data. Scaled between 0 and 100, a reading above 80 for this contrarian indicator denotes a ‘*Very Bearish*’ signal, while those between 60 and 80 count as a ‘*Bearish*’ signal. Similarly, a reading below 20 is a ‘*Very Bullish*’ signal and the range between 20 and 40 denotes a ‘*Bullish*’ signal. ‘*Very Bullish*’ and ‘*Very Bearish*’ signals had hit rates of 88-100% over a 3-6 month horizon, while ‘*Bullish*’/‘*Bearish*’ signals were found to be 60-70% accurate in the back-testing since Jan-2010.



## BofA China ACT

The BofA China Aggregate Coincident Tracker (China ACT) is designed to gauge coincident growth momentum in aggregate demand of the Chinese economy. It is a composite indicator constructed by aggregating the YoY growth rate of seven monthly components with their respective weights. The components cover investment, government expenditure, exports, imports and household consumption (in goods and services). The correlations of BofA China-ACT with contemporaneous IP and GDP growth are 87% and 80% respectively during January 2002 to September 2016. In addition, BofA China-ACT displays a higher standard deviation than IP and GDP, and thus likely to better captures the short-term economic growth fluctuations.

## BofA China Cement Outlook Indicator

The BofA China Cement Outlook Indicator tracks the market sentiment on cement based on a proprietary survey of 150 cement producers (accounting for c.18% of the national capacity) and 50 concrete stations about their 3-month price outlook and the relative cement inventory level. The indicator is scaled to a range of  $\pm 1$ , with +1 denoting the most positive case for a price hike in next 3 month (i.e. a higher likelihood of price hike in our view) and vice versa. We assign scores of +1/0/-1 to the survey responses of positive/neutral/negative about the participants' expectation of both demand and price over the next 3-months to arrive at the 3-month price outlook and calculate the inventory level from Digital Cement, relative to the past 24 months, scaled in the range of +1 to -1, with +1 being the lowest absolute level during the period. A weighting scheme of 50/25/25% is applied to the 3-month cement outlook/the 3-month concrete outlook/the relative cement inventory level to arrive at the indicator.

## BofA China FCI

The BofA China FCI is designed to offer a simple measure of liquidity tightness in China to help calibrate future growth of the Chinese economy. It is the weighted-sum of nominal interest rate, CNY nominal effective exchange rate, and total social financing growth. The weights are estimated to optimize the explaining power of input variables on industrial production (IP) growth. In addition, it reliably leads our coincident indicator, BofA China Activity Coincident Tracker, by 6-7 months.

## BofA China Flight Signals

The BofA China Flight Signals is a proprietary directionality indicator for the unit revenue (quarterly revenue per available tonne kilometer) of Chinese airlines, which is a key driver of Chinese airline ROEs and valuations. It tracks the unit revenue for the three largest Chinese airlines for the next 6 months using Chinese domestic unit revenue data, airline supply/demand data and other macro variables. The indicator leads quarterly average Chinese airline unit revenue by 6 months with a correlation of 0.83 since 2005.

## BofA China Investment Compass

The BofA China Investment Compass is a four-phase framework that identifies the current state in the China investment cycle, based on GDP growth and liquidity (*defined as the quarterly average of the 3-month SHIBOR minus the 3-month benchmark time deposit rate*). The four phases are – **C1**: *recovering phase*, with accelerating GDP growth and loose liquidity; **C2**: *peaking phase*, with accelerating growth and tight liquidity; **C3**: *over-tightening phase*, with decelerating growth and tight liquidity; and **C4**: *stimulating phase*, with decelerating growth and loose liquidity. Chinese equities typically have low beta with flattish returns in C1, while C4 witnesses higher volatility. On the other hand, C2 typically coincides with a bull market, and C3 a bear market.

**BofA China White Liquor Hydrometer**

The BofA China White Liquor Hydrometer is a directionality indicator to track the revenue growth of the white liquor sector in China, defined as YoY growth of the rolling 12-month revenue for a total of 16 listed white liquor A-share companies, using a total of nine factors (two macro and seven industry-specific), which, in our view, drive the white liquor cycle. The indicator leads the China white liquor sector revenue growth by two quarters with a correlation of 0.85 since 2007.

**BofA US Discount Store Demand Indicator**

The BofA US Discount Store Demand Indicator provides an indication of BofA US discount stores company coverage same-store sales growth direction based on 13 factors spanning five different US consumer categories viz. US Spending & DPI, Earnings & Employment, Consumer Confidence & Borrowing, Housing & Mortgages and Cost of Living. The indicator is used to identify directional trends and major inflection points for US Discount Stores and has a correlation of 0.78 since 2008 with a one quarter lead.

**BofA GFSI Risk Allocator**

The Risk Allocator (RA) can help investors add or reduce exposure to risk assets based on how financial market stress is distributed across asset classes, as measured by the BofA Global Financial Stress Indicator (BofA GFSI™). Note that the GFSI is a broad gauge of risk, hedging demand and investment flows across geographies and asset markets. The RA uses the proportion of GFSI components that are in Bullish, Bearish or Neutral territory to infer a level of conviction when investing in risk assets. From 2005 to 2018, managing global equity beta by varying exposure (from 0 to 200%) using the GFSI's RA would have hypothetically generated 1.6x the Sharpe of global equities and reduced max drawdowns by more than half.

**BofA Global EV Battery Value Chain Indicator**

The BofA Global EV Battery Value Chain Indicator tracks the trends in the rapidly growing EV value chain sector. The indicator provides visibility into the EV-battery-related revenue growth of 26 major value chain names for the next quarter (correlation of 0.87 since 1Q 2017), with a focus on identifying the turning points. Constructed using 20 industry-specific factors that broadly fall under the categories of car sales, battery demand and supply, raw material prices, and analyst opinions, this directional indicator also has a correlation of 0.74 with the average YoY change in EV battery companies' share prices.

**BofA Global Luxury Demand Indicator**

The BofA Global Luxury Demand Indicator is a proprietary tool to gauge global luxury demand and constant currency revenue growth of the luxury companies under BofA coverage. It is constructed using the weighted average growth of 51 key data points.

**BofA India Activity Indicator**

The BofA India Activity Indicator, a comprehensive high-frequency indicator to gauge the growth momentum of the Indian economy and guide our views on RBI policy, includes seven components - real cash demand, real credit flow, traffic, industrial production, capex, auto sales and construction services - weighted by US Conference Board methodology. Our back tested BofA India Activity Indicator maps non-agricultural real GDP growth (old series) over time.



### **BofA India Loan Growth Indicator**

The BofA India Loan Growth Indicator is a proprietary tool that seeks to identify inflection points and directionality in the Indian banking system credit cycle by tracking the aggregate growth in loans for all Scheduled Commercial Banks (SCBs) in India. The indicator has been fitted using a multiple linear regression model using six macroeconomic data inputs spanning interest rates, wage inflation, price inflation, industrial activity and money supply growth. It leads the actual SCB loan growth by eight months with a correlation of 79% since May-1999.

### **BofA Indicators of US Financial Stress and Conditions**

The BofA Indicator of US Financial Stress is a tool for gauging the state of market functioning in the US, while the BofA Indicator of US Financial Conditions tracks the degree of tightness or looseness in US monetary policy. A principle components analysis was performed with 11 financial market variables that capture the monetary policy transmission mechanism effectively – viz. the foreign exchange value of the US dollar, the 30-day change in the US dollar, the US corporate AAA yields less the 10-year US Treasury yield, the US corporate BBB yields less US corporate AAA yields, the US corporate high yield less US corporate BBB yields, the 10-year US Treasury yield less 2-year US Treasury yield, the 10-year US Treasury yield less global government bond yields, a modified TED spread, the 2-year swap spread, the 30-day change in the S&P500 index, and the ratio of volatility of financial stocks to industrial stocks – each with daily observations spanning from 1990 to present. The resulting first principal component reflects financial stress events in the US and is referred to as the BofA Indicator of US Financial Stress, while the second principal component reflects the degree of US monetary policy tightness and is referred to as the BofA Indicator of US Financial Conditions. Values were normalized with a mean of zero and standard deviation of one, with readings above zero indicating periods in which financial stress is higher than normal or financial conditions are tighter than normal compared to the three-decade span of data and vice-versa.

### **BofA Indicators of US Labor Market Conditions and Momentum**

The BofA Indicator of US Labor Market Conditions is a tool for gauging US labor market activity, while the BofA Indicator of US Labor Market Momentum tracks the rate of change of US labor market activity. A principal components analysis was performed with 14 labor market variables on monthly US labor market data starting from January 1994. The resulting primary principal component, which corresponds with level-based indicators of labor market activity such as the U3 unemployment rate and long-term unemployment, is referred to as the BofA Indicator of US Labor Market Conditions, while the secondary principal component, which corresponds with indicators of the rate of change in labor market conditions such as six-month percent changes in private payroll employment and temporary help services employment, is referred to as the BofA Indicator of US Labor Market Momentum. Readings above zero for the Conditions Indicator suggest above-average conditions, while those below zero mark below-average conditions. Similarly, for the Momentum Indicator, readings above zero indicate above-average positive momentum, while those below zero indicate deteriorating labor market conditions. Additionally, the Conditions Indicator typically rises with positive readings of the Momentum Indicator and vice-versa.

### **BofA Internet Advertising Indicator**

The Internet Advertising Indicator is a proprietary macro tool designed to identify inflection points and momentum in US digital advertising revenues. It is an aggregate of six, equally weighted inputs that capture US consumer health and activity, US corporate sentiment, and US/global economic outlook. The indicator has a high correlation to US Internet ad revenue growth published by the Interactive Advertising Bureau (0.81 since 2003), as well as that from Google Properties (0.89 since 2017), Meta (0.81 since 2017), and a basket of stocks under our coverage (0.87 since 2017).

### **BofA Korean Banks Net Interest Income (NII) Indicator**

The BofA Korean Banks Net Interest Income Indicator is a directional tool to identify inflection points in the aggregated YoY NII growth of the Korean banks under our coverage. It is an equal-weighted average of five factors in standardized form, namely, Korea leading composite index growth (YoY), Korea industrial production growth (YoY), Korea retail (household) delinquency rate, Korea credit card delinquency rate, and Korea loan rate changes. On a back-tested basis since 2Q07, it has a correlation of 0.84 with the coverage banks' NII growth (YoY) with a lead of one quarter and a correlation of 0.67 with the KRX Bank Index growth (YoY).

### **BofA Leading Industrial Real Estate Indicator**

The BofA Leading Industrial Real Estate Indicator gauges the demand cycles of industrial real estate over the next 12 months with a focus on identifying the near-term inflection points of demand. It is based on ten variables across four key categories, viz. consumption, trade/supply chains, construction, and jobs, that have a leading relationship with industrial real estate demand. Each variable is equally weighted within each category so that the four categories make up a quarter of the total weighting of our indicator. This directional indicator has strong historical correlations with net absorption (90%), annual net effective rent growth (78%) and REIT SS (same store) NOI (net operating income) growth (85%) since 2007.

### **Lodging Macro Activity Tracker**

Lodging Macro Activity Tracker (LMAT) is a macro tool that can be used to predict the current and near-term RevPAR environment. The LMAT consists of two components, 1) a demand component that is an average of the year-over-year growth of 11 macro factors across the U.S. with high correlations to traditional U.S. Lodging metrics, and 2) a supply component, which tracks expected U.S. hotel room supply growth. The LMAT has a 94% correlation with RevPAR on a 3-month leading basis since 2009.

### **Macau Macro Activity Tracker**

Macau Macro Activity Tracker (MMAT) is intended to provide a gauge of Chinese economic and financial activity and how it may impact Macau gross gaming revenues (GGR). It is an average of the year-over-year growth of 12 data series across China with high correlations to Macau GGR. The MMAT has a ~90% coincident correlation with monthly Macau GGR growth since 2009. A subset of the MMAT leads overall Macau GGR and these leading components are ~90% correlated with Macau GGR growth since 2009 on a 3-month forward basis.

### **BofA Memory Indicator**

The BofA Memory Indicator identifies the current phase of the semiconductor memory cycle by gauging the earnings momentum (YoY growth in revenue and operating profit) of the four key memory companies. This monthly indicator, constructed using seven components (DRAM spot price, DRAM ASP, DRAM billings, NAND spot price, NAND ASP, NAND billings, and Korea semis exports) that fall under three broad categories of data – memory prices, billings, and exports, provides a read ahead of the companies' quarterly earnings results. It has a correlation of 0.93 / 0.78 / 0.75 with these companies' revenues (1Q09-4Q20) / operating profits (1Q10-4Q20) / share-price performance (since 1991).

### **BofA Petrochemical Sentiment Indicator**

The BofA Petrochemical Sentiment Indicator tracks the sentiment on petrochemicals based on Natural Language Processing of all S&P Global Platts' Polymerscan reports (*a leading publication on global plastic and resins including polyethylene, polypropylene, and polyvinyl chloride*) published since October 27, 2004. A smoothened version (12-month

moving average) of the indicator has a correlation above 0.70 with 18 out of 30 stocks under our coverage over the last five years, including 7 with a correlation of 0.80+. A higher reading denotes a more positive sentiment and vice-versa.

### **CompassAlarm**

The indicator seeks to estimate probability of pressures on EM currencies over the upcoming six months based on various macro/market indicators. Pressure is defined as a 2.5 standard deviation move vs historical average. The indicator would have predicted correctly 60% of the pressure episodes over the past 15 years. Moreover, most of the model errors are episodes of no pressures given alarm, with a very tiny fraction of pressure given no alarm.

### **Corporate Misery Indicator**

The Corporate Misery Indicator is our macro-based predictor of the profits cycle and is based on the CPI, Average Hourly Earnings, and the Coincident Indicators. Our theory is that corporate profits are a function of how many units a company sells and their margin per unit. Implicitly, these factors incorporate productivity because enhanced productivity will result in either better margins or more units sold for the same inputs. When the indicator declines, it implies that profits are being squeezed. This has historically coincided with a decelerating profits cycle. Based on its history since 1978, subsequent to the indicator's peaks, EPS growth in the next 12-mth declined in 78% of cases.

### **EM Flow Trading Rule**

The BofA EM Flow Trading Rule is a contrarian indicator. When investor flows into EM funds become overly bullish, EM equities become vulnerable to short-term tactical pull-backs and vice versa. Sell EM equities when inflows into EM equity funds represent more than 1.5% of AUM over four weeks. Buy EM equities when redemptions from EM equity funds are greater than 3.0% of AUM over four weeks.

### **Emerging Monetary Mood Indicator (EMMI)**

The indicator data-mines EM central banks statement to gauge the attitude of monetary authorities, by country and for EM as a whole. EMMI is positively correlated and leads policy rates in most EM.

### **EMFX Carry Sentiment Indicator**

The indicator uses information contained in various positioning and survey data to gauge sentiment on EM carry. Chances of a selloff over subsequent month are an increasing function of "exuberance" as measured by the indicator. When the indicator is at the 80th percentile, chances of a selloff are 60% in the subsequent month.

### **Euro Area GDP Tracker**

This is a nowcasting model that seeks to provide a timely measure of GDP growth in the course of a quarter for the euro area and its main economies. In other words, it attempts to replicate national accounts, but a faster and timelier way. We use this indicator to monitor the risks to our, ECB and consensus forecasts.

### **Euro Area Procyclical core Inflation**

It measures core inflation including only those components that react to the cycle. Procyclical core is a very good leading indicator for core inflation 12 months ahead.

### **European Composite Macro Indicator**

European Composite Macro Indicator quantifies the trend in European economic activity in order to identify the phase of the cycle and act as a timing indicator for style investing in European equities. It consists of six inputs: OECD EU Leading Indicator, German IFO, 12m change in Pan European BY, Producer Price Inflation, Pan European Consensus GDP

Forecasts and Global EPS Revision Ratio. The Style Cycle strategy which marries the phase indicated by European CMI and the styles preferences, gained since its inception in 2004, on the top stocks 99.2% and on the bottom stocks 55.9%.

### **European Credit Macro Indicator**

The European Credit Macro Indicator is an aggregation of selected macroeconomic data. We find that country specific OECD Leading Indicators, PMIs from Germany and the EZ, along with data from the ECB on loan demand and 3m EPS Revision Ratio from Germany best capture trends in credit markets. From these, we construct an indicator that can be used as a tool to determine whether patterns seen in credit land are consistent with the prevailing macroeconomic backdrop and to identify turning points in macroeconomic trends. Our work highlights that a negative reading of our Indicator tended to be associated with positive excess returns and tighter spreads over the next 12 months; both in IG and HY credit.

### **European Momentum Conviction Indicator**

The BofA European Momentum Conviction Indicator is a tactical indicator that helps in dynamic Momentum allocation by significantly reducing skewness risk and identifying potential momentum crashes of 10% or more. It aims to identify episodes where volatility of a cross-sectional approach to Momentum investing is too high to support consistent returns or when trends might break. The indicator is constructed using three sets of inputs: Momentum Volatility Risk, Implied Volatility for Equities, and Trend Reversal Risk, which are combined using an equal-weighted scheme and scaled from 0-100 to arrive at the final indicator, with values close to 100 denoting a bull signal or those close to 0 denoting a bear signal for Momentum style investing.

### **Flight Signals**

BofA Flight Signals is intended to be an indicator of how domestic PRASM could trend over a 6 month horizon. Key inputs into the indicator include airline bookings data, domestic US capacity, fuel prices, BAC credit and debit card spend on Airlines and macro data. The primary analytics method used is called principal component analysis, and our indicator has a historical correlation of 0.73 with domestic PRASM and directionality hit rate of 70% since 4Q06.

### **Fluid Power Distributor Indicator**

The Global Fluid Power Distributor Indicator is based on a survey of 50 industrial distributors from North America, EMEA, and Asia Pacific focusing on fluid power (hydraulics and pneumatics). The indicator tries to gauge sentiment through demand trends, pricing, and inventory levels. An indicator value greater than 50 marks improving sentiment, while below 50 marks deteriorating sentiment. To calculate the indicator value, we assign a value of +1 to responses of “better” demand, “too low” inventory levels, and “improving” pricing. “Same”, “normal”, and “flat” are assigned a value of 0, and “worse”, “too high”, and “declining” are assigned -1. We divide the sum of these values by the number of survey respondents, multiply by 50, and add 50 to get a value relative to our 50.0 baseline.

### **Global Breadth Rule**

The BofA Global Breadth Rule is a contrarian indicator of equity market breadth. When an overwhelming majority of equity markets around the world become oversold, we turn bullish as equities tend to trough and rebound on the back of overdone pessimism. Buy global equities when a net 88% of markets in the MSCI All Country World Index are trading below both their 200-day moving average and 50-day moving average. Sell global equities when a net 88% of markets in the MSCI All Country World Index are trading above both their 200-day moving average and 50-day moving average.



### Global EPS Growth Model

The BofA Global EPS Growth Model is composed of Asian export growth, global PMI, US Treasury yield curve & Chinese financial conditions and predicts the year-on-year change in 12-month forward IBES consensus EPS for MSCI ACWI.

### Global Flow Trading Rule

The BofA Global Flow Trading Rule combines cross-asset flows with a validating filter for macro conditions to generate buy & sell signals for global equities. When flows into global equity & HY bond funds become overly bullish especially against a backdrop of weaker PMI, risk assets become vulnerable to short-term tactical pullbacks and vice versa. Sell global equities when average inflows to global equity funds and global HY bond funds exceed 1.0% of AUM over four weeks and ISM is trending lower. Buy global equities when average redemptions from global equity funds and global HY bond funds exceed 1.0% of AUM over four weeks and ISM is trending higher.

### Global FMS Cash Indicator

The BofA Global FMS Cash Rule is a contrarian trading signal designed to take advantage of the predictive value of FMS cash balance data for future equity returns. Buy equities when the FMS average cash balance rises to 4.5% or higher. Sell equities when the FMS average cash balance falls to 3.5% or lower.

### Global News Pulse

The Global News Pulse tries to quantify whether significant news globally is trending positively or negatively. The Global News Pulse has had a 79% correlation with the MSCI All Country World Index (ACWI) over the last 15 years, according to our backtesting.

### Global Risk-Love Indicator

Risk-Love is a contrary investor sentiment indicator. It tries to quantify investor emotions and help us understand swings in investor psychology. When at extremes, the indicator is valuable in anticipating reversals in investor mindset, and thus markets, going forward. We have constructed Risk-Love indicator for major Asian/emerging markets as well as for the world as a whole. We include data on positioning, investor surveys, volatility, spreads, correlations, hedging and market technicals measures. The Global Risk-Love indicator has 35 factors. Buy when it is low and sell when it is extremely high. Since 1988, median 12m forward returns for emerging markets equities were 15% (in US dollar terms) when the EM Risk-Love Indicator was in panic.

### Global Wave

Global Wave quantifies global trends in economic activity in order to predict equity market performance and rotation within equities. The Global Wave consists of seven indices including Global Industrial Confidence, Global Consumer Confidence, Global Capacity Utilisation, Global Unemployment, Global Producer Prices, Global Credit Spreads, and Global Earnings Revision Ratio. Since 1988, the MSCI ACWI has returned 14.4% post troughs in the Global Wave, and -1.2% post peaks in the Global Wave, on average.

### Industrial Momentum Indicator

It is a tool for identifying major inflection points for Industrials spanning the US, European, and Japanese Machinery, Transportation, Multi-Industry, and Aerospace & Defense sectors. It is based on BofA's Truckload Diffusion Indicator, Global Fund Manager Survey, and the copper price.



### Japan Factory Automation Indicator

The indicator is an aggregation of nine components (five macro and four industry-specific) that drive the factory automation cycle. It has a 0.92 correlation since 2008 with the Japan machine tool orders data series on a 3 month forward basis. The indicator leads YoY (%) growth in sector revenue and operating profit by two quarters with a 0.9 correlation since June 2007.

### Liquidity Premium Tracker

Liquidity Premium Tracker combines the 10year treasury yields (US, EU, and Japan), the 10year-2year US treasury yield curve, high yield fund flows, and single A-rated investment grade (IG) spreads to track the US high yield liquidity premium.

### Machine-learning Based Cycle Indicator

The business cycle indicator takes a big-data approach, classifying the US cycle into three phases that correspond to economic booms, soft patches and recessions. It is derived by running a machine-learning algorithm on over 55 years of monthly data covering 124 economic and financial variables. Since November 1962, the correlation between the machine-learning recession indicator and the official NBER indicator has been 82%.

### Managed Care Utilization

The monthly Managed Care Utilization Tracker measures utilization through a proprietary hospital volume surveys and industry data.

### NORBI Mood Indicator

NORBI, an acronym which stands for NORges Bank mood Indicator, gauges the hawkishness of the monetary policy assessments of Norges Bank by applying Natural Language Processing techniques. It quantifies the hawkish 'sentiment' in the statements accompanying a monetary policy decision (akin to press releases) with score between 0 and 1 that represents the fraction of sentences that our algorithm determines are 'hawkish'. Post the Global Financial Crisis, the YoY change in NORBI exhibits peak correlation of 0.68 with the YoY change in the policy rate and 0.74 with the YoY change in the 1-year swap with a 7-period lead.

### RENO Barometer

The BofA RENO barometer is a proprietary indicator meant to gauge the outlook for consumer spending at home improvement stores. Inputs for the barometer include: Real-time spending metrics, such as aggregated BAC credit and debit card data; Economic drivers, such as residential investment; National household financial health, such as home prices; and Opinions on housing, such as consumer confidence. The BofA RENO barometer is comprised of 14 factors, which in aggregate had an 85% historical correlation with the average same-store sales growth of major US home improvement companies from February 2009 to September 2018, according to our backtested analysis.

### Riksheard Mood Indicator

Riksheard applies Natural Language Processing techniques to Riksbank policy meeting minutes to assess the hawkishness of the Riksbank Monetary Policy Committee that tends to have a bearing into the potential future path of the Swedish policy interest rate. It quantifies the hawkish 'sentiment' in the statements with score between 0 and 1 that represents the fraction of sentences that our algorithm determines are 'hawkish'. Riksheard leads the policy interest rate by 2-months with a peak correlation of 0.47 pre-2008 and 0.54 post-2010.



## S&P500 Energy Sector Directional Forecast

S&P500 Energy Sector Directional Forecast tracks the monthly performance of the S&P500TR Energy sector index relative to the S&P500 TR broad market index using the same set of 10 fundamental and 9 macro/financial variables as used in the WTI Crude Oil Directional Forecast Indicator. We employ a number of linear and non-linear forecasting techniques: predictive regression approaches using fixed, dynamic as well as no correlation filters, Principal Component Regression (PCR), Partial Least Squares (PLS), regularized regressions (Lasso and Ridge), decision tree frameworks (random forest and gradient boost). On their own, the best performing models based on the last 12 monthly forecasts were Random Forest, Lasso and PCR with hit rates of 75% and higher - decision tree frameworks were found to be better at capturing turning points in energy sector outperformance, but regularized regressions performed better over the full sample period. Given their unique set of benefits and varying relative accuracies over time, we average out the forecasts across all models to arrive at our aggregate signal.

## Sell Side Indicator

The Sell Side Indicator is based on the average recommended equity allocation of Wall Street strategists as of the last business day of each month. We have found that Wall Street's consensus equity allocation has been a reliable contrary indicator. In other words, it has historically been a bullish signal when Wall Street was extremely bearish, and vice versa. The Sell Side Indicator has had stronger predictive power (R-square: 26%) over 12-month S&P 500 returns than many other popular market timing models like the Fed Model, valuation frameworks, money growth, etc.

## Testing Growth Indicator

The Testing Growth Indicator for each testing, inspection & certification (TIC) company is a tool to gauge organic revenue growth rates and trends in the next six months, based on global macro indicators.

## Truckload Diffusion Indicator

The Truckload Diffusion Indicator is a result of a survey of nearly 1,000 truck shippers. It is a sentiment indicator, with the Indicator focused on shippers outlook for demand for the next 0-3 months (with the other questions focused on truck pricing, supply, and shipper's inventory levels). We look to discern the trends in the Transportation sector, given trucking represents two-thirds of all tonnage moved in the US and more than 80% of all revenue spent on transportation.

## UK Consumer Confidence Indicator

An online survey of around 4000-5000 consumers a month. Six questions are repeated each month, allowing us to produce a consumer confidence indicator and wage growth indicators. We rotate other questions depending on the issues in focus.

## UK GDP Tracker

Uses soft and hard data to 'nowcast' UK GDP growth.

## US Composite Recession Indicator

The composite recession indicator is a weighted average of multiple univariate recession probit models based on an array of both financial and economic data. It consolidates these signals to gauge the risk of a downturn in the US economy. We find that it increases ahead of recessions and think it has value when that increase is sustained. Since 1975, we find that the indicator rises and remains above a reading of 30% an average of 12 months prior to a recession.

## US GDP Tracker

The US GDP tracker is a nowcasting model that monitors quarterly US real GDP growth in real time using the higher frequency monthly US economic data. The US GDP tracker utilizes a bottoms-up framework that mimics the Bureau of

Economic Analysis's (BEA) methodology, with GDP components estimated using source data generally from government agencies like the Census Bureau and Bureau of Labor Statistics. Since 2012, the average absolute forecast error for the advance estimate of GDP is 0.5% qoq saar.

### **US High Yield Default Rate Indicator**

The US High Yield Default Rate Indicator attempts to estimate the next-12-month value of Moody's US high yield issuer weighted default rate, which is defined as the number of companies defaulting over a given 12mo time horizon divided by the total number of issuers rated HY by this agency. The indicator consists of four factors - Fed lending survey, issuers with plunging bonds, the degree of dispersion, and low quality issuance. The indicator explains 87% of the variation in the next-12mo issuer-weighted HY default rates.

### **US Regime Indicator**

We aggregate top-down variables that capture earnings and economic growth expectations, inflation, credit conditions and other variables, to yield the following four signals on the business cycle: Early Cycle – below-average but improving trends in macro indicators, Mid Cycle – above-average and improving trends in macro indicators, Late Cycle – above-average but deteriorating trends in macro indicators, and Recession – below-average and deteriorating trends in macro indicators. Based on its history since 1990, the indicator tends to identify outperforming investment styles with 75% to 100% success rate.

### **WTI Crude Oil Directional Forecast**

WTI Crude Oil Directional Forecast uses a dynamic signal-based approach to forecast WTI crude oil returns. We combine 10 fundamental and 9 macro/financial variables to project weekly crude returns using a number of linear and non-linear forecasting techniques: a fixed-threshold correlation filter with a predictive regression approach, a dynamic-threshold correlation filter with a predictive regression approach, Principal Component Analysis (PCA), Partial Least Squares (PLS), regularized regressions (Lasso and Ridge), and decision tree frameworks (random forest and gradient boost). Although the most accurate predictions are derived from the OLS model with a static correlation filter (hit rate of 0.55 over the last 10 years coupled with rolling 1-y hit rates in excess of 0.5 throughout most of the out of sample period), we aggregate the outputs of all the models to arrive at our final forecast.



# Disclosures

## Important Disclosures

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

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