Virginia Retirement System

2023 Board of Trustees Retreat

March 21-22, 2023

The Westin Richmond
6631 West Broad Street
Richmond, Virginia 23230

Tuesday, March 21, 2023

Virginia Retirement System

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Virginia Retirement System Board of Trustees Retreat

March 21-22, 2023

Westin Richmond Hotel ♦ Chesapeake Salon: A & B

Tuesday, March 21

12:00 pm. **Buffet Lunch (Chesapeake Foyer)**

12:45 p.m. **Welcome & Opening Remarks**

A. Scott Andrews – Virginia Retirement System
Chairman, Board of Trustees
Patricia Bishop – Virginia Retirement System
Director
Andrew Junkin – Virginia Retirement System
Chief Investment Officer

1:00 p.m. **Macro/Economic Overview**

Rupal Bhansali – Ariel Investments
Chief Investment Officer and
Portfolio Manager of Global Equity Strategies

1:45 p.m. **Private Markets Outlook**

Vik Sawhney – Blackstone
Chief Administrative Officer
Global Head of Institutional Client Solutions

2:30 p.m. **15-Minute Break**

2:45 p.m. **Public Markets Outlook**

Rick Rieder – BlackRock
Senior Managing Director and
Chief Investment Officer of Global Fixed Income

3:30 p.m. **Emerging Markets Debt**

Kristin Ceva – Payden and Rygel
Managing Principal

4:15 p.m. **Interpreting the Macro Environment**

Richard Murrall – BlackRock
Managing Director, Multi-Asset Strategies & Solutions

5:00 p.m. **Day 1 Closing Remarks**

Andrew Junkin – Virginia Retirement System
Chief Investment Officer

5:15 p.m. **Reception – Sponsored by BNY Mellon**
Chesapeake Salon C

6:30 p.m. **Buffet Dinner – Chesapeake Foyer**

Cliff Asness – AQR: "Fireside Chat with Cliff"
Founder, Managing Principal and Chief Investment Officer

Virginia Retirement System

Notes

Virginia Retirement System

Welcome

A. Scott Andrews

Chairman, VRS Board of Trustees

Virginia Retirement System

Welcome

Patricia S. Bishop

Director, VRS

Virginia Retirement System

Welcome

Andrew Junkin

Chief Investment Officer, VRS

Virginia Retirement System

Notes

Guest Speaker:
Macro/Economic Overview

Rupal Bhansali

Chief Investment Officer and
Portfolio Manager of Global Equity Strategies
Ariel Investments

Guest Speaker: Macro/Economic Overview

Rupal Bhansali ● Chief Investment Officer and Portfolio Manager of Global Equity Strategies

Ariel Investments

Rupal Bhansali is chief investment officer and portfolio manager of Ariel's global equity strategies. In this capacity, she oversees our global research effort and manages multi-billion dollar portfolios. She also co-manages our global concentrated strategy. Rupal joined Ariel in 2011 after 10 years with MacKay Shields where she was senior managing director, portfolio manager and head of international equities. Previously, she spent 5 years at Oppenheimer Capital, where she was responsible for international and global equity portfolios and was promoted to co-head of international equities. Additionally, Rupal has held various roles at other financial services firms since she began her career in 1989, including Soros Fund Management. In 2009, *Forbes International Investment Report* named her a "Global Guru," in 2015, *Barron's* recognized her as a "Global Contrarian," and in 2017 PBS's Consuelo Mack referred to her as an "unconventional thinker." In 2019, Rupal became the newest member of the prestigious *Barron's Investment Roundtable*, which showcases "10 of Wall Street's smartest investors." She was also awarded the North American Industry Leadership Award by 100 Women in Finance. In 2020, Rupal obtained the FSA credential, awarded by the Sustainable Accounting Standards Board (SASB) for professionals who understand the link between sustainability and financial performance. She is a frequent guest on Bloomberg, CNBC and Fox Business News, and authored the book, *Non-Consensus Investing: Being Right When Everyone Else Is Wrong*. Rupal was also featured on the *Barron's Top 100 Women in US Finance* in 2020, 2021 and 2022. Rupal serves on the Advisory Board of Directors of the Ira M. Millstein Center for Global Markets and Corporate Ownership at Columbia Law School, and the Board of Directors of the 100 Women in Finance Global Association. Fluent in several Indian languages including Hindi, Rupal earned a Bachelor of Commerce in accounting and finance, as well as a Master of Commerce in international finance and banking from the University of Mumbai. She later earned an MBA in finance from the University of Rochester, where she was a Rotary Foundation Scholar.

Macro/Economic Overview

Rupal J. Bhansali

Chief Investment Officer, Global Equities

Portfolio Manager, International and Global Equities

Compliance Disclosures

The information contained in this presentation is not guaranteed as to its accuracy or completeness. It is for educational purposes and should not be considered an offer for any of the securities referenced. The opinions expressed were current at the time of the presentation.

The information provided in this presentation does not provide information reasonably sufficient upon which to base an investment decision and should not be considered a recommendation to purchase or sell any particular security or asset class or to invest in any particular Ariel product.

Regime Change: Past is Not a Prologue

Last Cycle

Quantitative Easing

Risk-Taking Rewarded

Growth-Momentum-Loonshots

Leveraging

Illiquidity Premium

Goldilocks – Low/Falling Discount Rate

Support Wall Street

Cheap Beta: Set it & Forget it

Next Cycle

Quantitative Tightening

Risk-Taking Penalized

Value-Contrarian-Margin of Safety

Deleveraging

Illiquidity Discount

Stagflation - High/Rising Discount Rate

Support Main Street

Active alpha - Opportunistic & Agile

Our Track Record

Virginia Retirement System

As of 12/31/2022

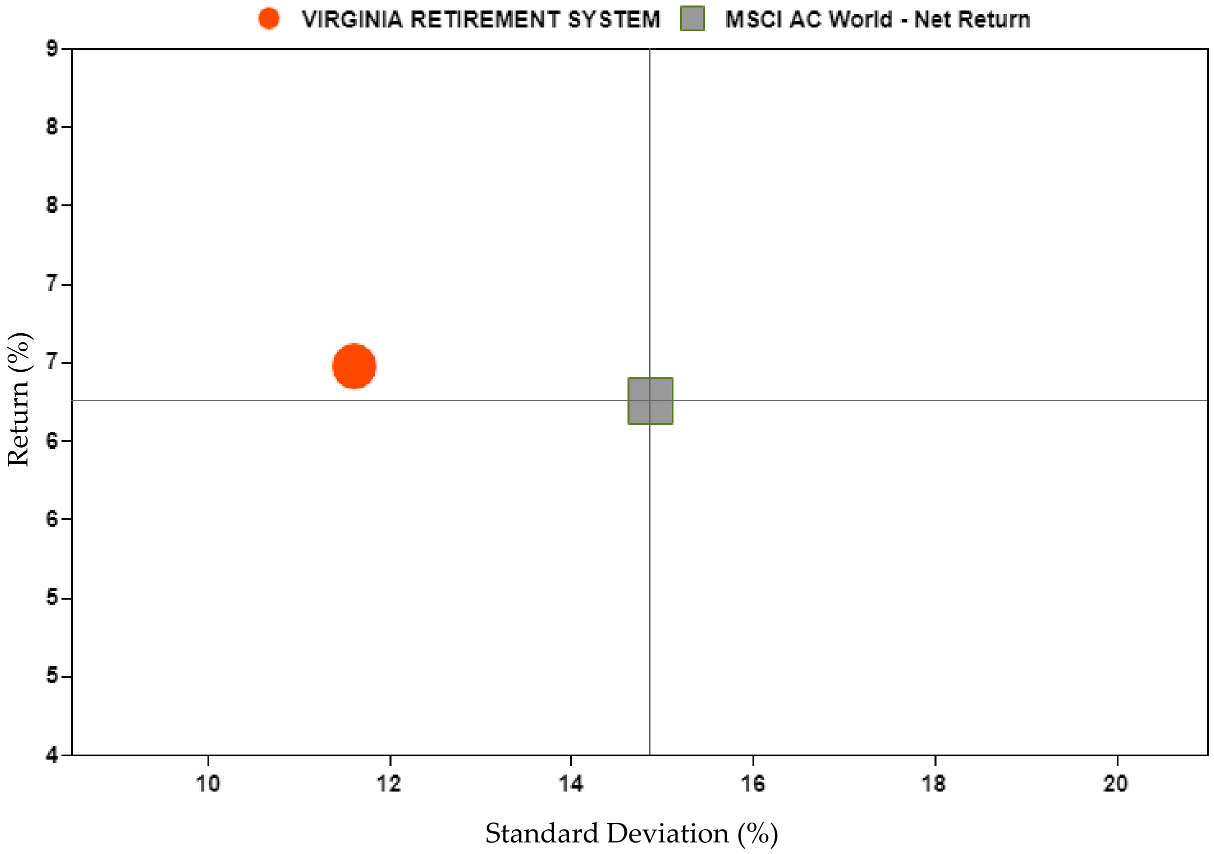
Performance (%)	Annualized			
	1-Year	3-Year	5-Year	Since Inception
Virginia Retirement System				06/01/2014
Gross of Fees	-4.17	5.85	5.88	6.47
Net of Fees	-4.56	5.41	5.44	6.03
MSCI ACWI Net Index	-18.36	4.00	5.23	6.26
MSCI ACWI Value Net Index	-7.55	3.30	3.47	4.43

Past performance does not guarantee future results. The Gross returns shown are gross of advisory fees, assume reinvestment of dividends and other earnings, and are net of transaction costs. Net returns reflect performance returns after the deduction of advisory fees (utilizing the highest management fee charged to any client in the composite) and transaction costs and assume the reinvestment of dividends and other earnings. Client returns will be reduced by advisory fees and any other expenses incurred in the management of its investment advisory account quarterly. Fee information is available upon request and may also be found in Ariel Investments, LLC's Form ADV, Part 2. Please see the disclosure page at the end for benchmark descriptions.

Risk-Adjusted Returns

Virginia Retirement System

As of 12/31/2022



	Standard Deviation	Beta	Tracking Error	Information Ratio	Upside Capture	Downside Capture
Virginia Retirement System	11.62	0.72	6.32	0.03	78.73	70.82
MSCI ACWI Net Index	14.86	-	-	-	-	-

Since Inception through December 31, 2022.

Past performance does not guarantee future results.

Portfolio Characteristics

As of 12/31/2022

Top Country Exposure[1] (% of net assets)

	Ending Weight	MSCI ACWI Net Index
United States	36.78	**60.37**
United Kingdom	9.13	**3.87**
Switzerland	6.45	**2.57**
France	6.29	**3.00**
China	5.84	**3.63**
Germany	4.09	**2.06**
Japan	3.99	**5.56**
Brazil	3.86	**0.59**
Spain	3.66	**0.61**
South Korea	2.99	**1.27**
Total EM exposure	**16.41**	**11.24**

Sector Weightings[1,2] (% of net assets)

	Ending Weight	MSCI ACWI Net Index
Health Care	21.23	13.37
Information Technology	14.64	20.00
Financials	13.08	15.19
Communication Services	12.09	6.78
Consumer Staples	11.45	7.75
Consumer Discretionary	7.44	10.43
Utilities	5.63	3.18
Real Estate	4.83	2.59
Industrials	0.90	10.16
Energy	0.00	5.58
Materials	0.00	4.98
Short-Term Investments	4.99	0.00

Characteristics[3]

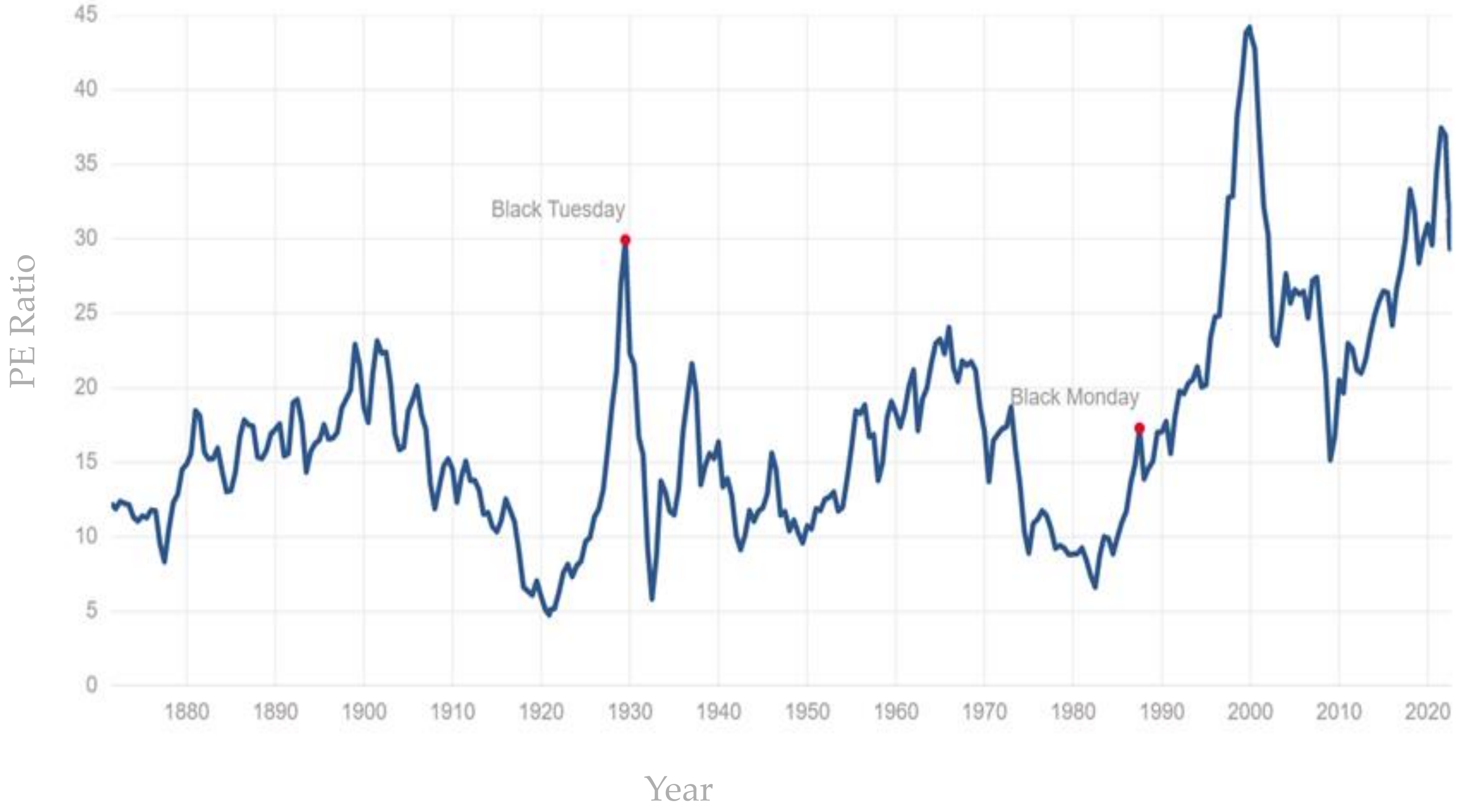
	Return on Equity (%)	Net Debt/Equity	Active Share (%)	Dividend Yield	Turnover (%)
Ariel Global	22.20	0.31	92.46	3.62	19.40
MSCI ACWI Net Index	22.91	0.69	-	2.33	-

Source: FactSet, as of 12/31/2022.
1. Holdings are categorized according to the MSCI Global Industry Classification Standard (GICS). Holdings not classified by GICS are categorized according to FactSet. Holdings are categorized according to MSCI Country. Holdings not classified by MSCI are categorized according to Bloomberg Country of Risk. Please see the disclosures page for further information on our sector classification and benchmark descriptions. 3. Please see disclosures page for definitions of quantitative measures listed.

Shiller PE Ratio

S&P 500

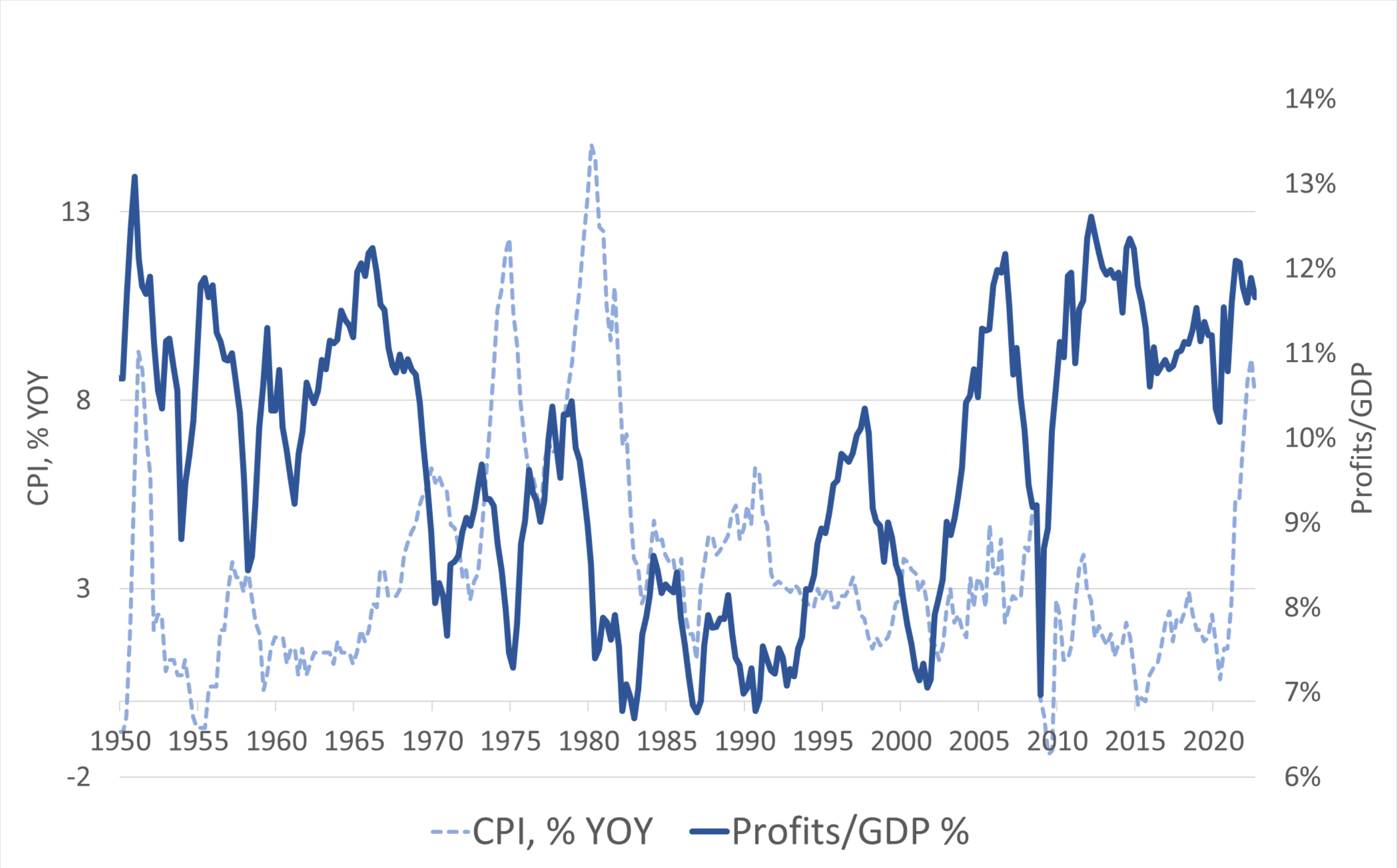
As of 12/31/2022



Source: Case Shiller - Shiller PE Ratio (multpl.com) as of 12/31/2022

CPI, % YOY vs. US Profit as % of GDP

As of 12/31/2022



Source: Bloomberg, as of 12/31/2022

Most Leading Indicators Signal a Recession

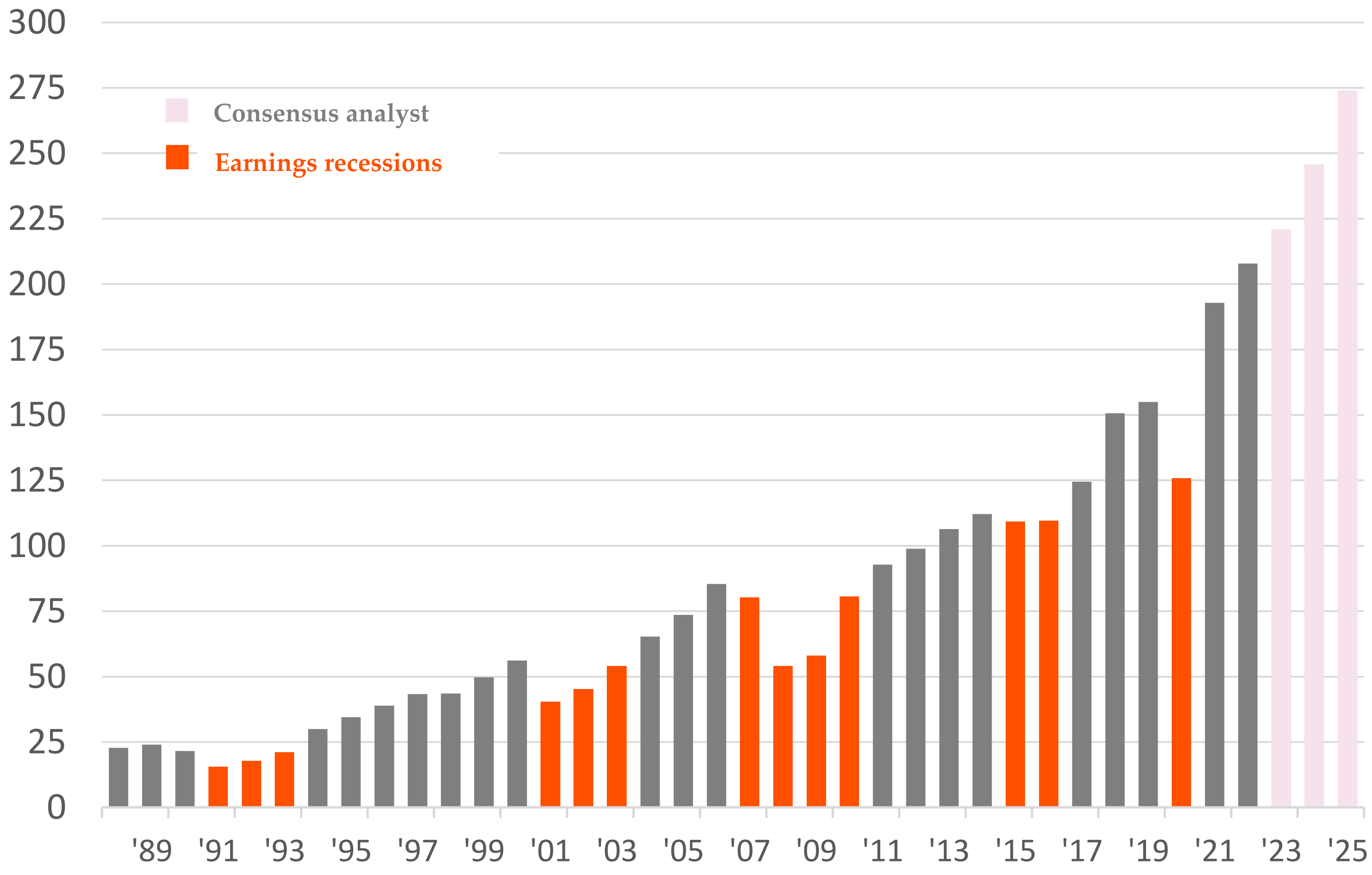
Recession warning scoreboard (Key categories of indicator)		1990	2000-01	2007-08	2012	2015	2023
		Category indicator signaling recession? (Y/N)					
1	Corporate Sector Health	Y	Y	Y	N	Y	N
2	Liquidity Indicator	Y	Y	Y	N	N	Y
3	Credit Conditions	Y	Y	Y	N	N	Y
4	Financial Conditions	Y	Y	Y	N	N	N
5	Housing	Y	N	Y	N	N	Y
6	Household Net Wealth	N	Y	Y	N	N	Y
7	Manufacturing	Y	Y	Y	N	N	Y
8	Conference Board LEI	Y	Y	Y	N	N	Y
9	Oil Price	Y	Y	Y	N	N	Y*
10	Michigan Sentiment	Y	N	Y	N	N	Y

Source: Longview Economics and The Daily Shot
* Move higher in oil cost as a share of GDP from 2020 to 2022

Earnings Per Share

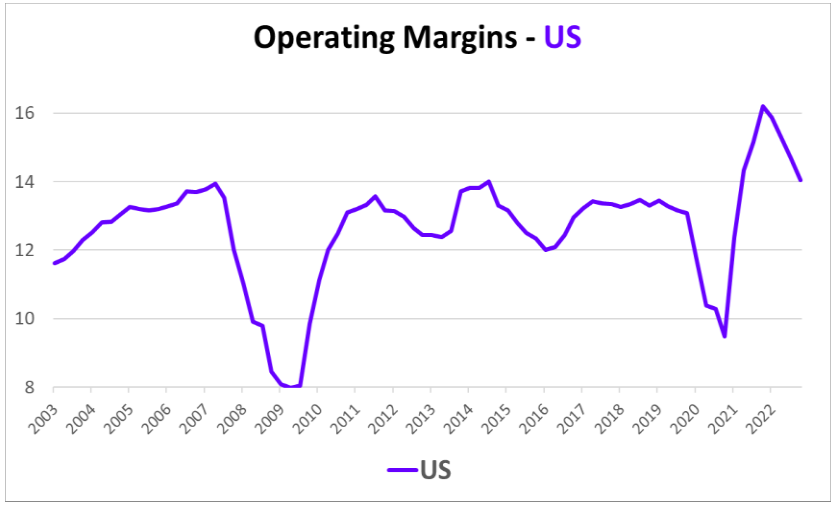
S&P 500

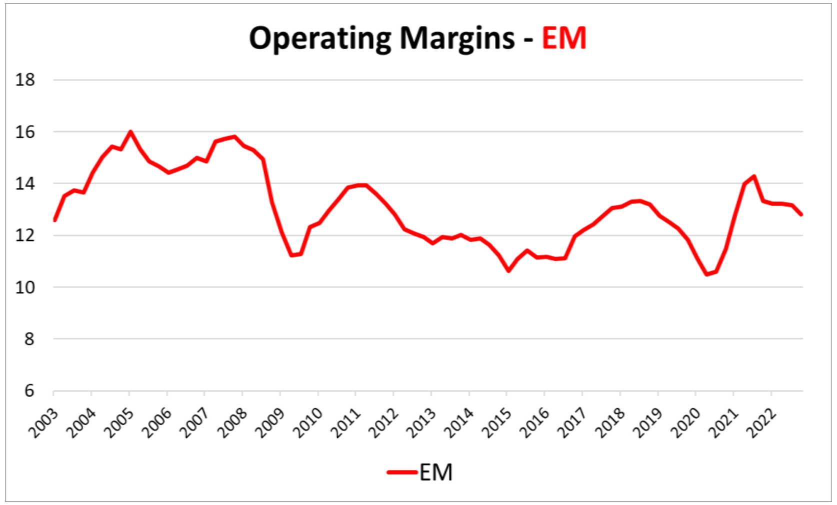
As of 12/31/2022

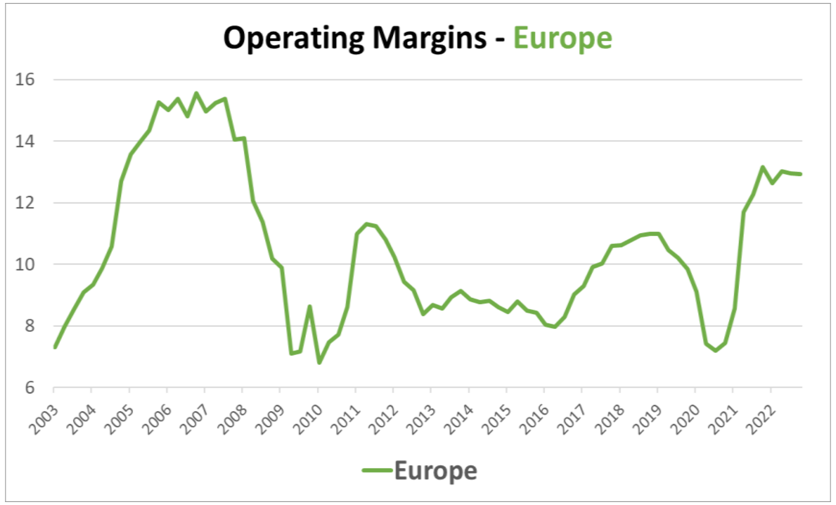


Source: Bloomberg, as of 12/31/2022

Operating Margins by Market





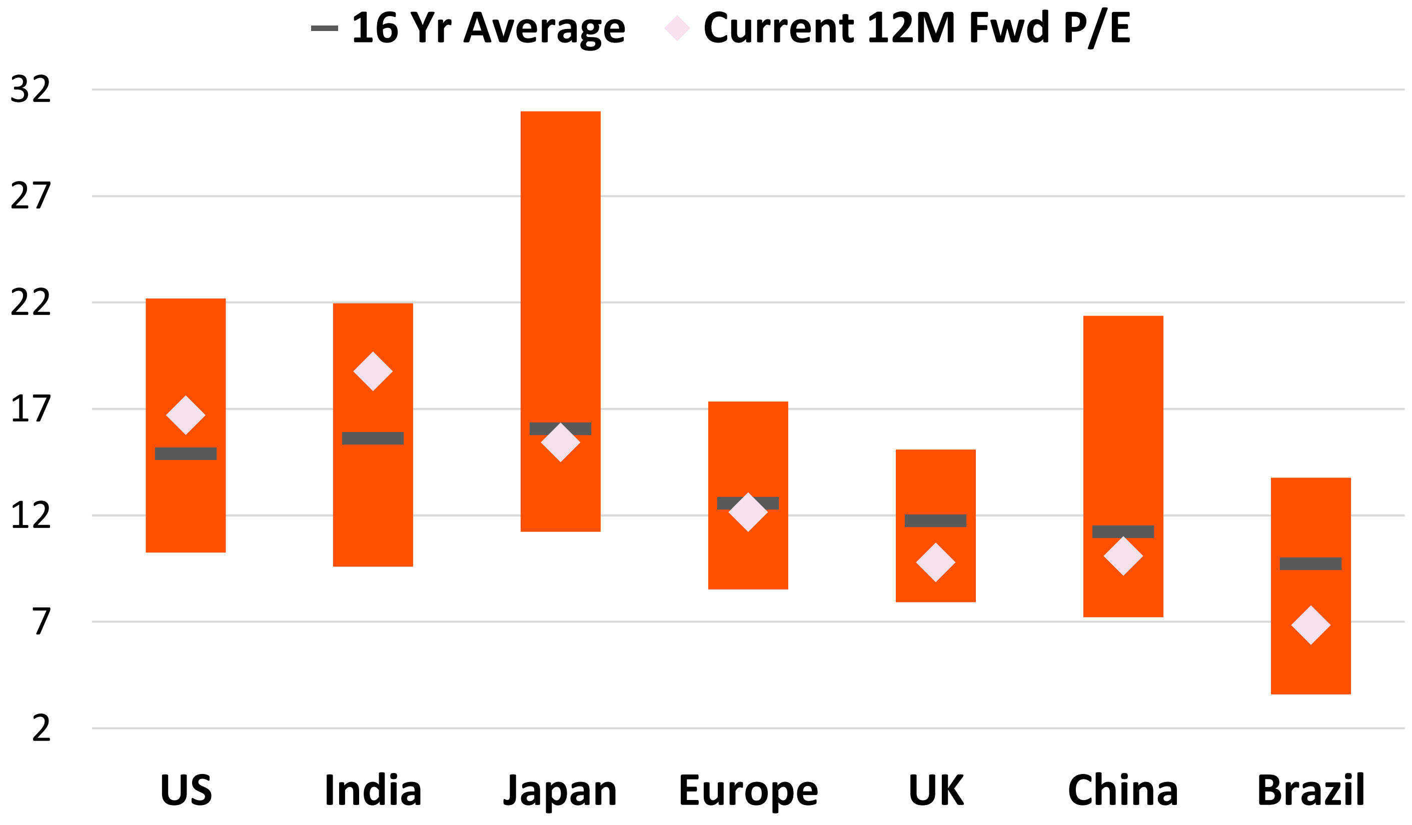


Source: Bloomberg, as of 12/31/2022
* EM: Emerging Market

Global Markets' Valuation Range

As of 12/31/2022

Brazil & UK: Out of Favor and Cheaper
US & India: Consensus Favorites and Expensive

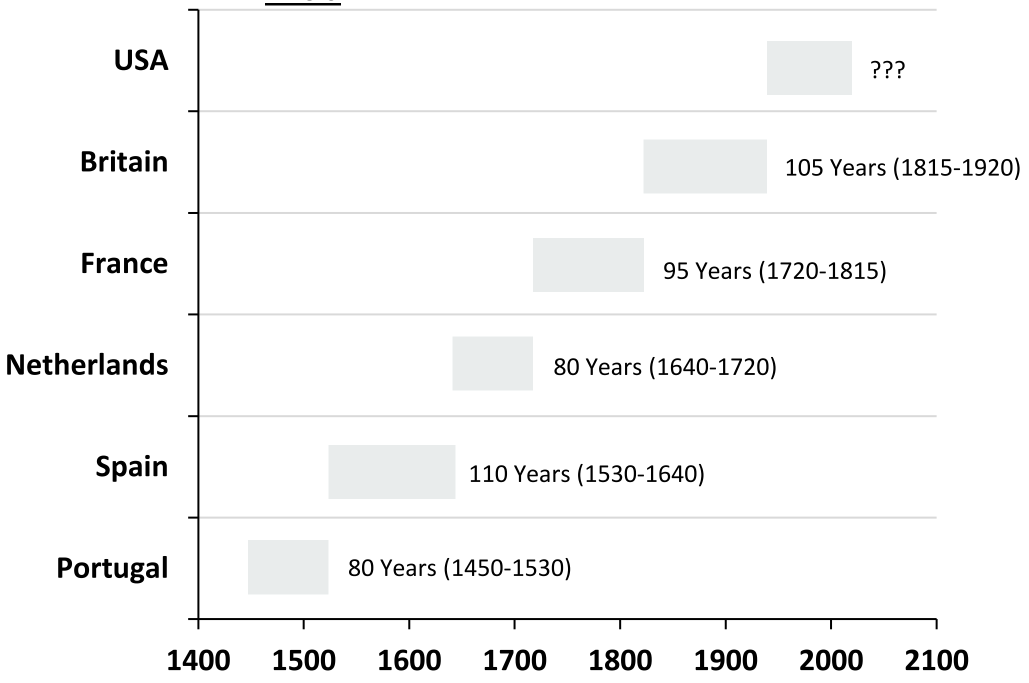


Source: Bloomberg, as of 12/31/2022

Regime Change:
Currency Hegemonies Last 80-110 yrs.

Pay Heed to History: US Dollar is on its 102nd year

Global Reserve Currencies since 1450



Events During Transition Process

???

Great Depression, WW2

French Revolution, Napoleonic Wars

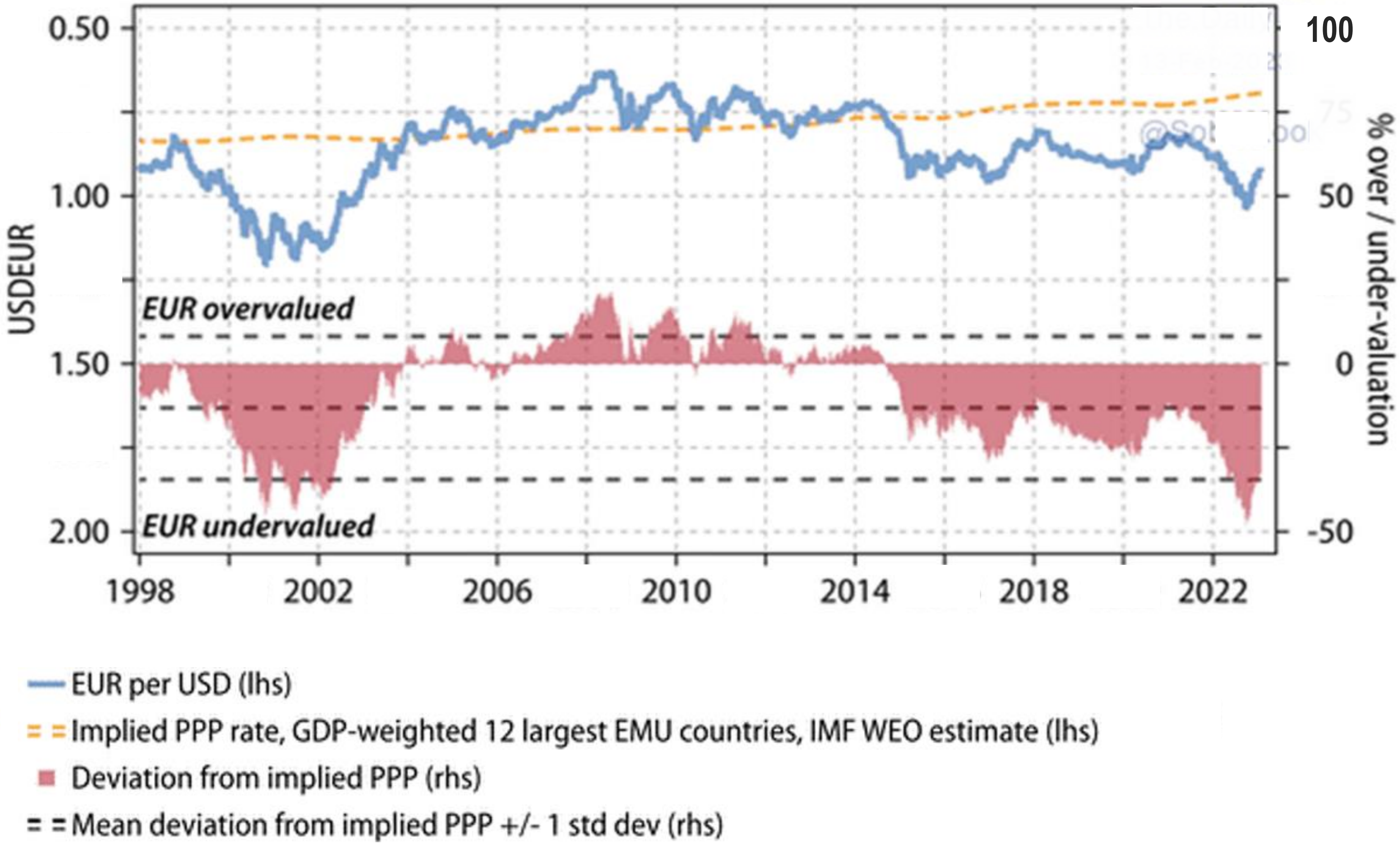
Dutch East India Company Decline, Anglo-Dutch Wars

Dutch Occupation, Catalan Revolt, Fall of the Iberian Union, Thirty Years' War

Portuguese succession crisis, Iberian Union

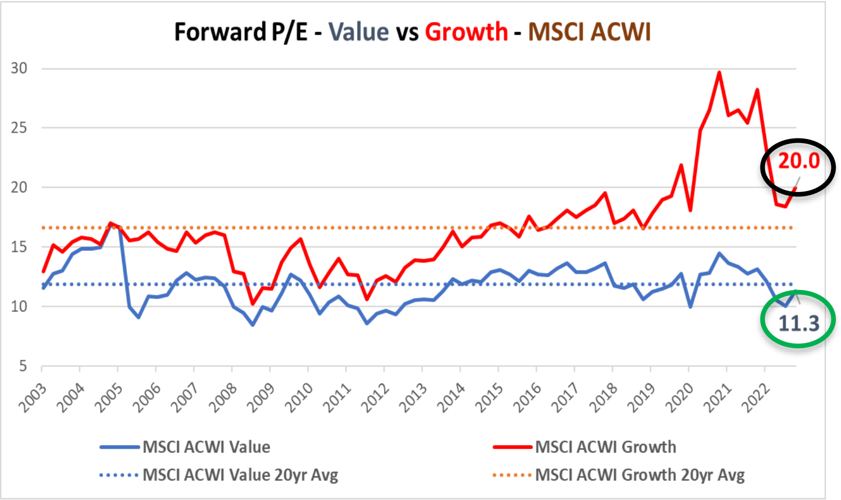
Source: http://www.economicreason.com/usdollarcollapse/world-reserve-currencies-what-happened-during-previous-periods-of-transition,.
Source date: August 11, 2014.

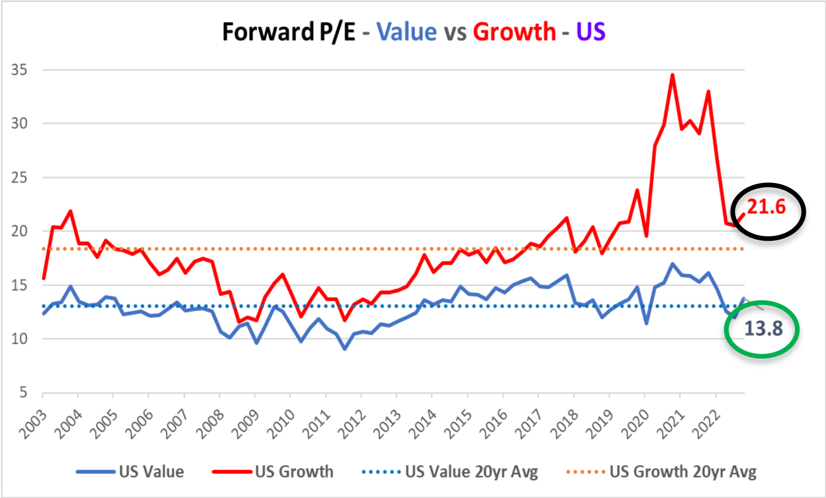
Euro is 33% Undervalued based on a PPP* basis

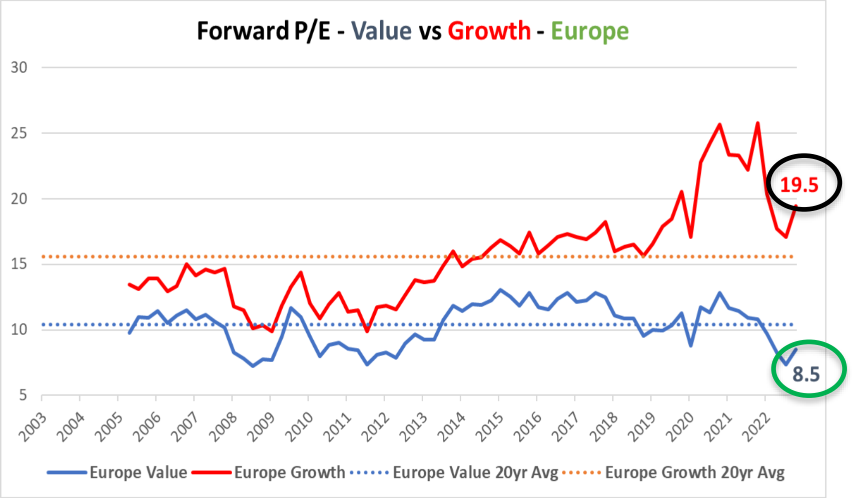


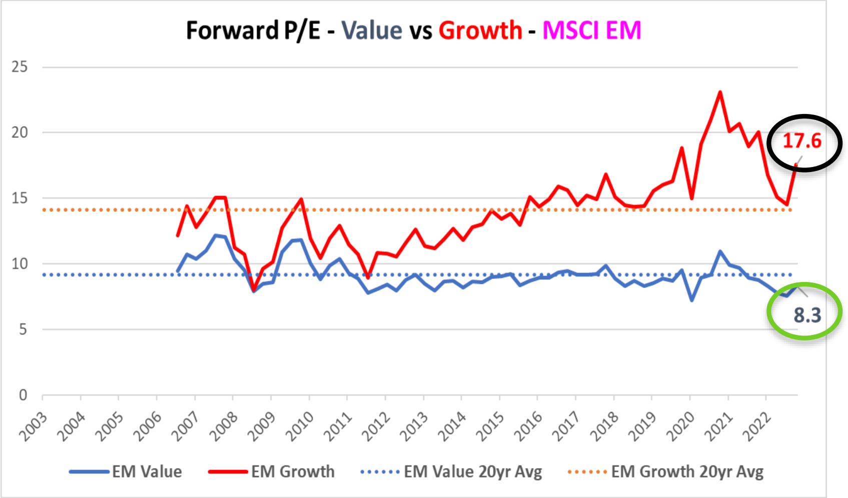
Source: Gavekal Research and The Daily Shot in Footnote
* Purchasing Power Parity

Value vs. Growth: ACWI*, US, Europe, EM**









Source: Bloomberg, as of 12/31/2022

* / ** ACWI: All Country World Index, EM: Emerging Markets. The indices are described on the Slide titled 'Disclosure' at the end.

Lost Decades: Dividends Cushion The Blow

	Lost Decades	Price Return	Dividends	Total Return
S&P 500	1969-1978	-7.46%	44.15%	36.69%
S&P 500	2001-2010	-4.74%	19.83%	15.08%
MSCI EAFE	2008-2017	-8.99%	35.17%	26.18%
MSCI EAFE	2008-2022	-13.73%	52.99%	39.26%

In this table: (i) Price Return equals the percentage change in the price of the index during the period; (ii) Dividends reflect the effect of dividend payments reinvested back into the index, measured by the difference between price return and total return; and (iii) Total Return represents the price return plus dividends reinvested. Past Performance does not guarantee future results. The indices are described on the Slide titled 'Disclosure' at the end.

Source: Bloomberg, as of 12/31/2022

Regime Change: Reposition Portfolios

What worked	What is likely to work
Junk Bonds	Treasuries
Junk Equities: 4L's*	Undervalued Quality
Private Equity	Hedge Funds
Equities (TINA)**	(TIAN)*** Fixed Income
Speculation	Fundamentals & Dividend Payers
Passive, Growth, Thematic	Active, Value, Idiosyncratic
US	Europe, UK, Latam, China

*4L's: Loss-making, Leveraged, Ludicrous Expectations & Lofty Valuations
**TINA: There is No Alternative; ***TIAN: There is an Alternative Now

Regime Change: Implications?

Past	Future
Work = Location	Work = Activity
OECD Work Visas = Protectionism	Digitalization = Work Without Borders
Blue Collar Work Outsourced(LCCS*)	White Collar Work Offshored
Pricing Power	Improve Productivity / Lower Costs
Sell Product or Service	Offer Solutions
Human Horsepower & Brainpower	Robots & Machine Learning

LCCS*: Low-cost country sourcing (LCCS) is procurement strategy in which a company sources materials from countries with lower labour and production costs in order to cut operating expenses. LCCS falls under a broad category of procurement efforts called global sourcing.
Source: Wikipedia

Speaker Biography

Rupal J. Bhansali

Chief Investment Officer, Global Equities
Portfolio Manager, International & Global Equities
Co-Portfolio Manager, Ariel Global Concentrated

Rupal Bhansali is Chief Investment Officer and Portfolio Manager of Ariel's global equity strategies. In this capacity, she oversees our global research effort and manages multi-billion-dollar portfolios. She also co-manages our global concentrated strategy. Rupal joined Ariel in 2011 after 10 years with MacKay Shields where she was senior managing director, portfolio manager and head of international equities. Previously, she spent 5 years at Oppenheimer Capital, where she was responsible for international and global equity portfolios and was promoted to co-head of international equities. Additionally, Rupal has held various roles at other financial services firms since she began her career in 1989, including Soros Fund Management.

In 2020, Rupal obtained the FSA credential, awarded by the Sustainable Accounting Standards Board (SASB) for professionals who understand the link between sustainability and financial performance. Rupal serves on the Advisory Board of Directors of the Ira M. Millstein Center for Global Markets and Corporate Ownership at Columbia Law School. She also serves on the Board of Directors of 100 Women in Finance, a non-profit organization that is committed to building a more diverse and gender-equitable finance industry.

Fluent in several Indian languages including Hindi, Rupal earned a Bachelor of Commerce in accounting and finance, a Master of Commerce in international finance and banking from the University of Mumbai, and an MBA in finance from the University of Rochester, where she was a Rotary Foundation Scholar.

Disclosures

Return on Equity is a profitability measure that represents return on average total equity for the period. Holdings are summarized at the portfolio level using weighted average.

Net Debt/Equity is a financial leverage measure that represents total net debt as a percentage of total equity for the period. Holdings are summarized at the portfolio level using weighted average.

Active Share measures the degree the portfolio deviates from the benchmark.

Dividend Yield is the aggregate weighted average of the strategy's equity holdings and their respective dividend yield. Dividend Yield shown does not represent any actual yield of the strategy, does not in any way represent the strategy's total return, and does not reflect the deduction of strategy expenses.

Turnover, a measure of portfolio change, is the lesser of purchases or sales divided by the average value of portfolio assets over the trailing one-year period; the metric is sourced from Ariel's portfolio accounting system Eagle.

Ending Weight is the value of the holding relative to the portfolio's total assets as of the report date.

Past performance does not guarantee future results. Investments in foreign securities may underperform and may be more volatile because of the risks involving foreign economies and markets, foreign political systems, foreign regulatory standards, foreign currencies and taxes. The use of currency derivatives, ETFs, and other hedges may increase investment losses and expenses and create more volatility. Investments in emerging markets present additional risks, such as difficulties in selling on a timely basis and at an acceptable price. The intrinsic value of the stocks in which the portfolio invests may never be recognized by the broader market. The portfolio is often concentrated in fewer sectors than its benchmarks, and its performance may suffer if these sectors underperform the overall stock market. Investing in equity stocks is risky and subject to the volatility of the markets.

The sectors shown for the Global strategies are the Global Industry Classification Standard ("GICS"). GICS was developed by and is the exclusive property and service mark of MSCI Inc. and Standard & Poor's (S&P), a division of The McGraw Hill Companies, Inc. GICS is licensed for use by Ariel Investments, LLC. Neither MSCI, S&P nor any third party involved in making or compiling GICS or any GICS classifications makes any express or implied warranties or representations with respect to such standard or classification (or the results to be obtained by the use thereof), and all such parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability and fitness for a particular purpose with respect to any such standard or classification. Without limiting any of the foregoing, in no event shall MSCI, S&P, any of their affiliates or any third party involved in making or compiling the GICS or any GICS classifications have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.

Disclosures

Indexes are unmanaged. An investor cannot invest directly in an index. The MSCI ACWI (All Country World Index) Index is an equity index of large and mid-cap representation across 23 Developed Markets (DM) and 24 Emerging Markets (EM) countries. Its inception date is January 1, 2001. The MSCI ACWI Value Index captures large and mid-cap securities exhibiting overall value style characteristics across 23 Developed Markets countries and 24 Emerging Markets (EM) countries. Its inception date is December 8, 1997. The MSCI ACWI Growth Index captures large and mid-cap securities exhibiting overall growth style characteristics across 23 Developed Markets and 25 Emerging Markets countries. Its inception date is December 8, 1997.

The MSCI EAFE® Index is an equity index of large and mid-cap representation across 21 Developed Markets (DM) countries around the world, excluding the U.S. and Canada. Its inception date is May 31, 1986.

The MSCI USA Value Index captures large and mid cap US securities exhibiting overall value style characteristics. The MSCI USA Value Index was launched on Dec 08, 1997. The MSCI USA Growth Index captures large and mid cap securities exhibiting overall growth style characteristics in the US. The MSCI USA Growth Index was launched on Dec 08, 1997.

The MSCI Europe Value Index captures large and mid cap securities exhibiting overall value style characteristics across the 15 Developed Markets (DM) countries in Europe (DM countries in Europe include: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK). The MSCI Europe Value Index was launched on Dec 08, 1997.

The MSCI Europe Growth Index captures large and mid cap securities exhibiting overall growth style characteristics across the 15 Developed Markets (DM) countries in Europe. The MSCI Europe Growth Index was launched on Dec 08, 1997.

All MSCI Index net returns reflect the reinvestment of income and other earnings, including the dividends net of the maximum withholding tax applicable to non-resident institutional investors that do not benefit from double taxation treaties. MSCI uses the maximum tax rate applicable to institutional investors, as determined by the companies country of incorporation. MSCI makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used to create indices or financial products. This report is not approved or produced by MSCI. The S&P 500® Index is widely regarded as the best gauge of large-cap U.S. equities. It includes 500 leading companies and covers approximately 80% of available U.S. market capitalization. Its inception date is March 4, 1957.

Fireside Chat:
Private Markets Outlook

Vik Sawhney

Chief Administrative Officer,
Global Head of Institutional Client Solutions
Blackstone

Hosted by K.C. Howell
Managing Director, Private Markets

Vik Sawhney ● Chief Administrative Officer, Global Head of Institutional Client Services

Blackstone

Vik Sawhney is Blackstone's Chief Administrative Officer, Global Head of Institutional Client Solutions, and a member of the firm's Management Committee.

Since joining Blackstone in 2007, Mr. Sawhney started Blackstone Capital Markets and also served as the Chief Operating Officer of the Private Equity group. Before joining Blackstone, Mr. Sawhney worked as a Managing Director at Deutsche Bank, and prior to that at the law firm of Simpson Thacher & Bartlett.

Mr. Sawhney represented Blackstone as a Rockefeller Fellow during 2010-2011, and currently sits on the board of the Blackstone Charitable Foundation. He is also the Board Chair of Dream, an east Harlem-based educational and social services organization. He graduated magna cum laude from Dartmouth College, where he was elected to Phi Beta Kappa. He received a J.D., cum laude, from Harvard Law School.

Fireside Chat: Vik Sawhney

Private Markets Outlook

Hosted by K.C. Howell

Managing Director, Private Markets

Virginia Retirement System

Notes

Virginia Retirement System

Break: 2:30 – 2:45 p.m.

Virginia Retirement System

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Guest Speaker:
Public Markets Outlook

Rick Rieder

Senior Managing Director and
Chief Investment Officer of Global Fixed Income
BlackRock

Guest Speaker: Public Markets Outlook

Rick Rieder ● Senior Managing Director and Chief Investment Officer of Global Fixed Income

BlackRock

Rick Rieder, Senior Managing Director, is BlackRock's Chief Investment Officer of Global Fixed Income, Head of the Fundamental Fixed Income business, and Head of the Global Allocation Investment Team. Responsible for roughly $2.4 trillion in assets, Mr. Rieder is a member of BlackRock's Global Executive Committee (GEC) and its GEC Investments Sub-Committee. He is also a member of BlackRock's Global Operating Committee, and Chairman of the firm-wide BlackRock Investment Council. Before joining BlackRock in 2009, Mr. Rieder was President and Chief Executive Officer of R3 Capital Partners. He served as Vice Chairman and member of the Borrowing Committee for the U.S. Treasury and member of the Federal Reserve's Investment Advisory Committee on Financial Markets.

Mr. Rieder currently serves on the Alphabet/Google Investment Advisory Committee and the UBS Research Advisory Board. He was nominated for Outstanding Portfolio Manager by Morningstar in 2021, was awarded the Global Unconstrained Fixed Income Manager of the Year for 2015 by Institutional Investor, was nominated for Fixed Income Manager of the Year by Institutional Investor for 2014 and was inducted into the Fixed Income Analysts Society Fixed Income Hall of Fame in 2013. Four of the funds Mr. Rieder manages (Strategic Income Opportunities, Fixed Income Global Opportunities, Total Return, and Strategic Global Bond) have been awarded Gold Medals by Morningstar.

From 1987 to 2008, Mr. Rieder was with Lehman Brothers, most recently as head of the firm's Global Principal Strategies team, a global proprietary investment platform. He was also global head of the firm's credit businesses, Chairman of the Corporate Bond and Loan Capital Commitment Committee, and a member of the Board of Trustees for the corporate pension fund. Before joining Lehman Brothers, Mr. Rieder was a credit analyst at SunTrust Banks in Atlanta.

Mr. Rieder earned a BBA degree in Finance from Emory University in 1983 and an MBA degree from The Wharton School of the University of Pennsylvania in 1987. He is a member of the board of Emory University, Emory's Goizueta Business School, and the University's Finance Committee, and is the Vice Chairman of the Investment Committee. Mr. Rieder is founder and chairman of the Goizueta Business School's BBA investment fund and community financial literacy program, Graduation Generation Public School Collaboration in Atlanta.

Mr. Rieder serves as Chairman and President of the Board of Education for North Star Academy's fourteen Charter Schools in Newark, New Jersey. He is on the Board of the BlackRock Foundation, the Board of Advisors for the Hospital for Special Surgery, and the Board of Big Brothers/Big Sisters of Newark and Essex County. Mr. Rieder formerly served on the Board and National Leadership Council of the Communities in Schools Educational Foundation, and Trustee for the US Olympic Foundation. Mr. Rieder was honored at the Choose Success Awards ceremony in Atlanta in 2015 for his dedication to public education in Atlanta through CIS and Graduation Generation.

Rick Rieder

CIO, Global Fixed Income
Head of Global Allocation Investments

@RickRieder

March 2023

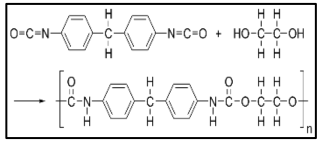
BlackRock®

Why They Call Time-Outs in Basketball

In January, we compared the US Economy to Polyurethane, which is a highly flexible and useful plastic material, as an analog for people underestimating how resilient the U.S. economy was (is) vs. the persistent calls for the economy moving into recession (or deep recession); we suggested that even if higher rates hit the interest-sensitive parts of the economy, the economy could flex to it…

January 2023 Re-Print: As we looked back at 2022, it became clear that the US Economy has become as efficient and as adaptive as ever, resembling a unique substance like Polyurethane…

Polyurethane


[1]

- A class of polymers composed of organic units joined by carbamate (urethane) links. In contrast to other common polymers, polyurethane is produced from a wide range of starting materials.
- This chemical variety produces polyurethanes with different structures leading to many applications. Since manufacturers can control the softness, rigidity, flammability, or resilience, polyurethane can be customized for a plethora of uses, making it a highly flexible and useful material

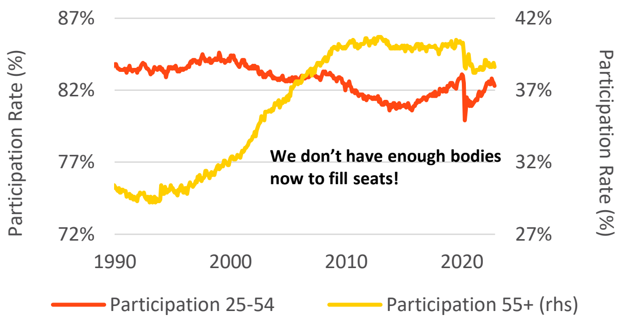
Over the years, as technology has progressed, so has the usage of polyurethane. Given the unique variety of the starting components of the substance, the applications have increased, along with the demand…


[2]

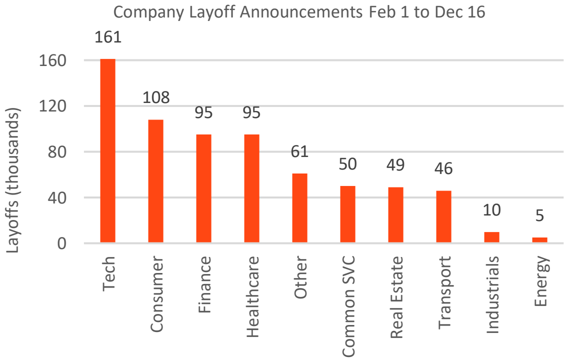
[3]

One area that we focused on as part of this dynamic was/is the Labor Market and its inherent resilience…

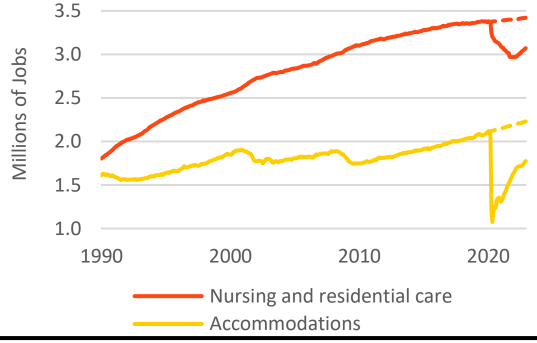
This tangible stickiness is emphasized by demographics… The wealth boost from 2020-2021 allowed for a large cohort to drop out of the labor force (55+ = 1/3 pop and growing)… [4]



While recent layoff announcements have taken the media, they have really been concentrated in the highest earning sectors… [5]



With lower paying jobs still needing a lot of help… In many key service sectors, we still have less people employed today than we did in 2020 despite significantly higher demand… [4]



A rapidly changing, evolving, and adaptive employment market continues to buoy efficient demand for labor and buoy the overall economy, especially as it is the lower wage jobs which continue to be in high demand and support a closing of the economic income gap…

Source: 1) Wikipedia, as of 1/18/2023; 2) Wink, as of 7/5/2021; 3) Tempur-pedic as of 2/24/2017; 4) Bureau of Labor Statistics, as of 12/31/2022; 5) Piper Sandler, as of 12/28/2022.

…and we showed how employment flexibility and adaptability today is completely different than prior high interest rate regimes, despite the constant industry-wide comparisons to prior regimes*…

January 2023 Re-Print

… think about how different employment conditions and adjustments are vs. history...

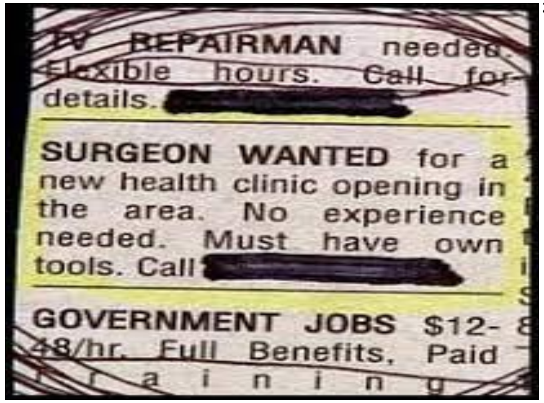
Employment was localized and took months to adjust, as people circled job opportunities in the classified pages to find jobs… [1]

… the process has changed quite a bit (thankfully)… Job searches were largely random exercises, incredibly local in nature, and, of course, with social and cultural norms which were quite different…


14 The Sydney Morning Herald, Mon., July 28, 1980 14

MONDAY JOB MARKET

POSITIONS VACANT Men and Boys | POSITIONS VACANT Men and Boys | POSITIONS VACANT Men and Boys | POSITIONS VACANT Men and Boys | POSITIONS VACANT Men and Boys



2

3

Finding people, and finding jobs, as the economy flexes and adjusts, regionally (or globally) as well, happens with amazing speed and efficiency by itself (like polyurethane)…

January 2023 Re-Print

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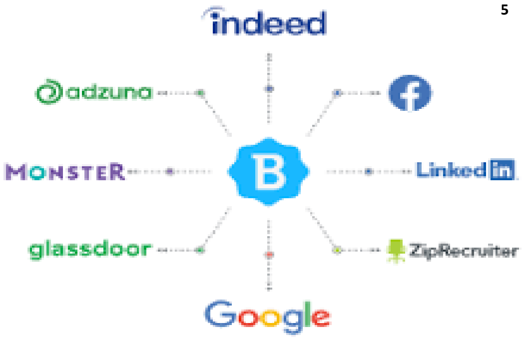

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… there are still amazing postings for people in fluid and efficient job-markets, as the hiring-process is lightyears more efficient in today's modern/dynamic economy…

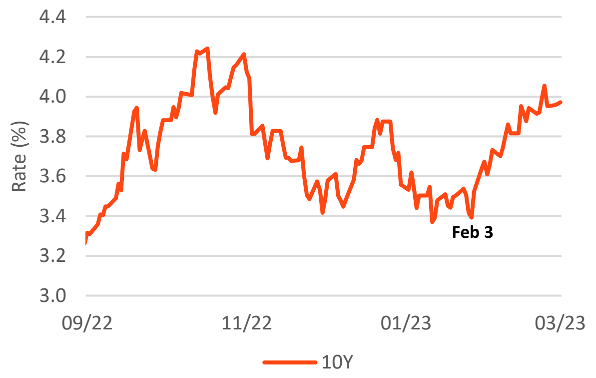
Source: 1) The Sunday Morning Herald, as of 7/28/1980; 2) Workright, as of 6/1/2020; 3) The Articulate CEO, as of 7/5/2012; 4) Recruiting Daily, as of 2/26/2016; 5) Betterteam, as of 1/20/2023; 6) Reader's Digest, as of 11/29/2021. *See January 2023 webcast "Polyurethane," 1/26/2023.

Yet, we still never would have predicted how strong the next employment report would be, which happened just days after our last webcast… this report radically changed the investing environment despite previously clear indications that employment would be more durable than many had suggested…

The report suggested immense strength in the labor market across multiple metrics [1]

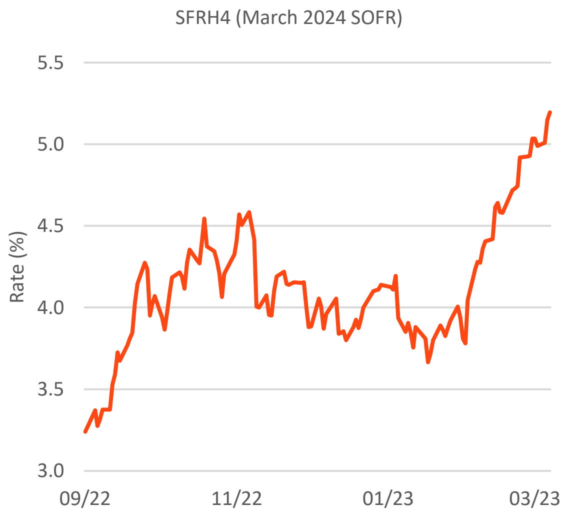
Event	Period	Surv(M)	Actual
Two-Month Payroll Net Revision	Jan	--	71k
Change in Nonfarm Payrolls	Jan	189k	517k
Change in Private Payrolls	Jan	190k	443k
Change in Manufact. Payrolls	Jan	7k	19k
Unemployment Rate	Jan	3.6%	3.4%
Average Hourly Earnings MoM	Jan	0.3%	0.3%
Average Hourly Earnings YoY	Jan	4.3%	4.4%
Average Weekly Hours All Employees	Jan	34.3%	34.7%
Labor Force Participation Rate	Jan	62.3%	62.4%

The 10Y Treasury unwound its January rally, backing up over 60bps since the payroll report [1]



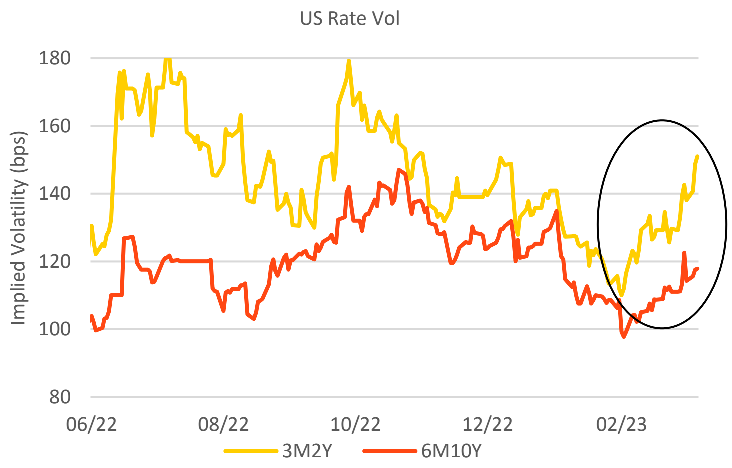
The 2Y note backed up over 70bps, eclipsing last year's highs to make a new cycle high [1]

But perhaps the biggest movers of all were the Fed Funds forwards – where the market once priced in a significant easing cycle vs. now pricing in an elongated hiking cycle. The March 2024 forward (1 year from now) has risen a whopping 140bps in a month! [2]



Asset	2 Feb Yield	8 March Yield	Change
2Y Note	4.10	5.06	0.94
10Y Note	3.39	3.98	0.59
2s10s	-0.71	-1.08	-0.37
SFRH4	3.78	5.20	**1.42**

We have said before that a series of 25bp moves is much less uncertain than the 75bp moves we saw last year, such that we still believe investors may want to reconsider their exposure at these historically high levels should vol bounce higher (more on that later) [1]



Source: 1) Bloomberg, as of 3/8/2023; 2) BB, as of 3/8/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Why they have time-outs in basketball: After a blistering start to the year, markets have since taken their cue from the data and the moves in rates, unwinding much of the January rally. Given the market's remarkable shift in the broad growth (and inflation) narrative, *it may be appropriate to take a time-out now to assess where things are and should go from here…*

In the U.S., we are approaching March Madness (the NCAA basketball tournament), although markets have really experienced January and February madness. Maybe March is for taking a time-out to assess where things are…

5 Reasons Why Coaches Call A time-out:

1. **Stop the momentum of the other team**
2. **Give your players a rest**
3. **Change your game strategy**
4. **Draw up a specific play**
5. **Fire up your team**

[1]

Bob McKillop talks to the Davidson Wildcats during a time-out at Belk Arena

If this were basketball with the momentum going the wrong way, the 'markets-coach' would probably call a time-out today… [2]

	Return (%)	2020	2021	2022	2023 Pre 2/3	2023 Post 2/3
Total Return	US Tsy	8.0	-2.3	-12.5	3.1	-3.2
	US Long Tsy	17.7	-4.6	-29.3	7.8	-6.4
	US Aggregate	7.5	-1.5	-13.0	3.9	-3.6
	Global Agg	9.2	-4.7	-16.2	4.7	-4.6
	APAC Agg	6.6	-5.0	-12.8	3.9	-5.3
	Global EM	5.9	-1.5	-16.5	5.0	-3.8
	US Agency	5.5	-1.3	-7.9	1.8	-1.8
	US Municipals	5.2	1.5	-8.5	3.2	-2.6
Excess Return	US MBS	-0.2	-0.4	-2.3	0.9	-0.7
	US IG Credit	0.8	1.2	-1.2	1.2	-0.3
	US HY	3.2	6.5	-3.5	2.2	1.2
Total Return	S&P 500	18.4	28.7	-18.1	9.0	-2.9
	NASDAQ	48.9	27.5	-32.4	17.1	-4.5
	Dow Transports	14.7	31.8	-18.7	16.8	-5.0
	Oil (CL1)	-20.5	55.0	6.7	-5.5	0.9
	Gold (GOLDS)	25.1	-3.6	-0.3	4.9	-5.2
	MSCI EM	15.8	-4.6	-22.4	9.3	-5.0
	MSCI DM	14.1	20.1	-19.5	9.4	-2.9
	3M US TSY Bill	0.7	0.0	1.5	0.3	0.4
Sample PF: 60% SPX + 40% US AGG		***14.0***	***16.6***	***-16.1***	***6.9***	***-3.2***

Cash is the only major asset to post a positive return both before and after the Jan payroll report… We will discuss the huge importance of uncorrelated and negatively correlated assets in portfolio construction

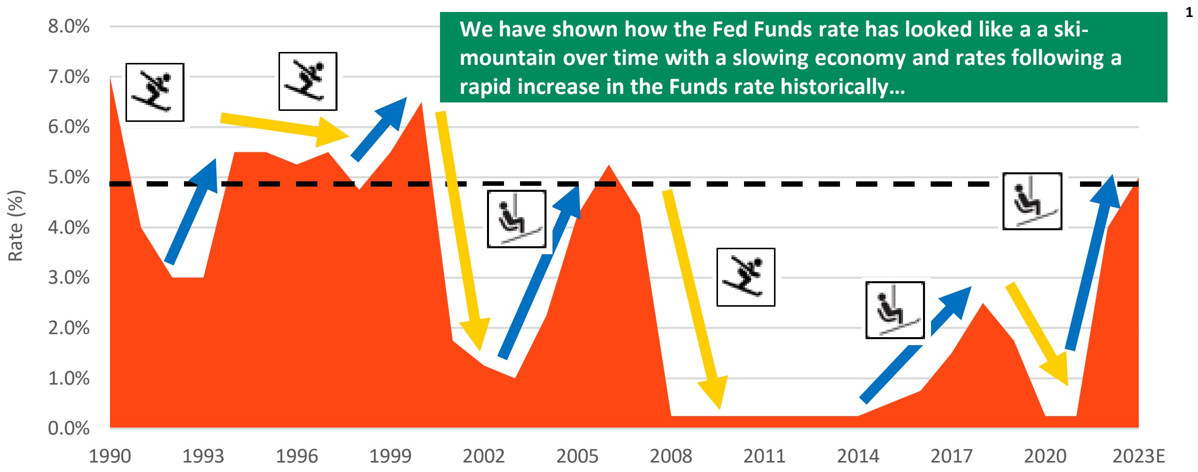
In this call, we will discuss why these "5 reasons to call a time-out" have real relevance for asset allocation across portfolios today…

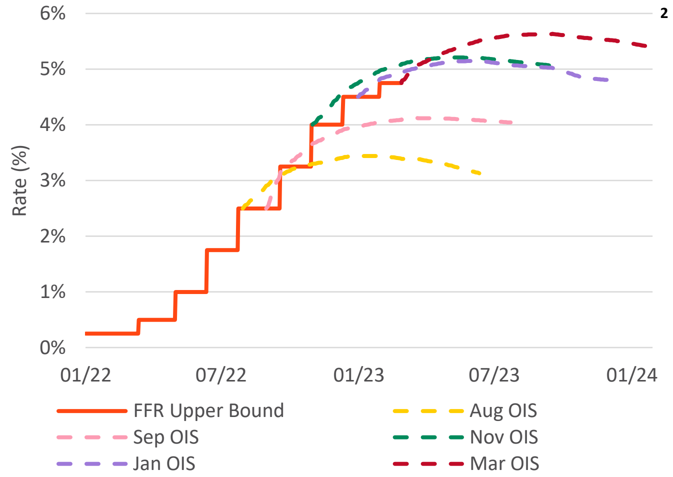
Source: 1) Source: 'Cats Stats, as of 1/1/2016; 2) BB, as of 3/8/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Why calling a time-out can make sense #1: Stop the momentum of the other team

The economic and inflation momentum has changed course… We need time to address where we are today as the momentum has shifted… The incredible persistence of elevated inflation (globally) has been a bit of a mystery and reversed a tremendous amount of the January performance momentum…

In December, we asked "Where is the peak of the mountain?" The peak has now changed course (higher) and has gained momentum in that direction…





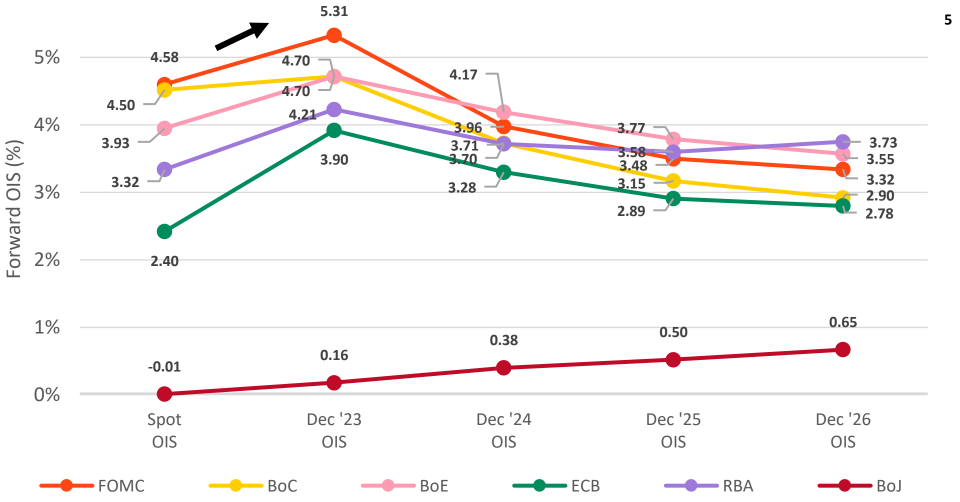
Inflation globally has stayed stubbornly elevated… A time-out is needed to assess where we are today and where we are going from here… Especially as global central banks recalibrate to this shift in momentum…

Core PCE and Core Services ex-Shelter [3]

	Core PCE (89%)				Core Services ex-Shelter PCE		
	YoY	MoM	3M Avg	12M Avg	YoY	MoM	3M Avg
Jun-22	5.04	0.54	0.49	0.41	4.95	0.51	0.45
Jul-22	4.70	0.08	0.36	0.38	3.94	-0.09	0.26
Aug-22	4.93	0.55	0.42	0.40	4.18	0.49	0.32
Sep-22	5.20	0.46	0.36	0.42	4.48	0.48	0.30
Oct-22	5.09	0.30	0.44	0.41	4.67	0.40	0.46
Nov-22	4.78	0.22	0.33	0.39	4.35	0.31	0.40
Dec-22	4.60	0.37	0.30	0.38	4.27	0.44	0.38
Jan-23	4.71	0.57	0.39	0.38	4.67	0.58	0.44

European HICP [4]

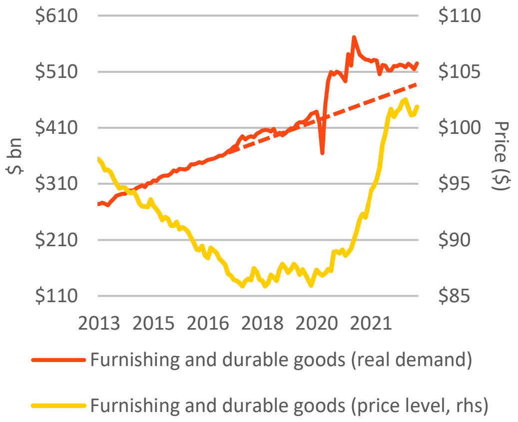
	Core HICP	
	MoM	YoY
Jun-22	0.29%	3.73%
Jul-22	0.32%	4.03%
Aug-22	0.57%	4.26%
Sep-22	0.59%	4.75%
Oct-22	0.47%	5.02%
Nov-22	0.40%	4.98%
Dec-22	0.42%	5.18%
Jan-23	0.67%	5.29%



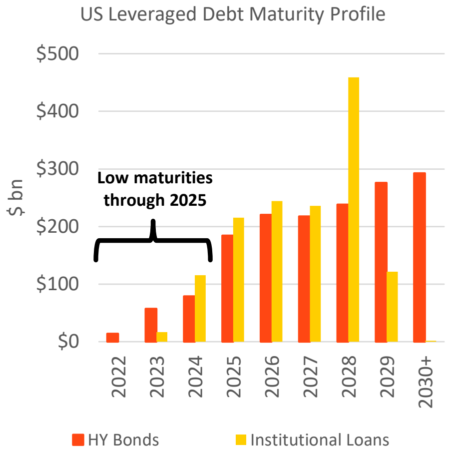
Source: 1) BB, as of 11/2/2022; 2) Federal Reserve, as of 1/31/2023; 3) Bureau of Economic Analysis, as of 3/7/2023; 4) Statistical Office of the European Communities and Haver Analytics, as of 3/2/2023; 5) BB and Anser, as of 3/3/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

... this is why the markets are so jumpy and uncertain... the US economy is so resilient in the face of historic policy tightening, with no signs of inflation abating alongside of it, and that *it may take more from the Fed (and other DM central banks) to "win the game" on inflation...*

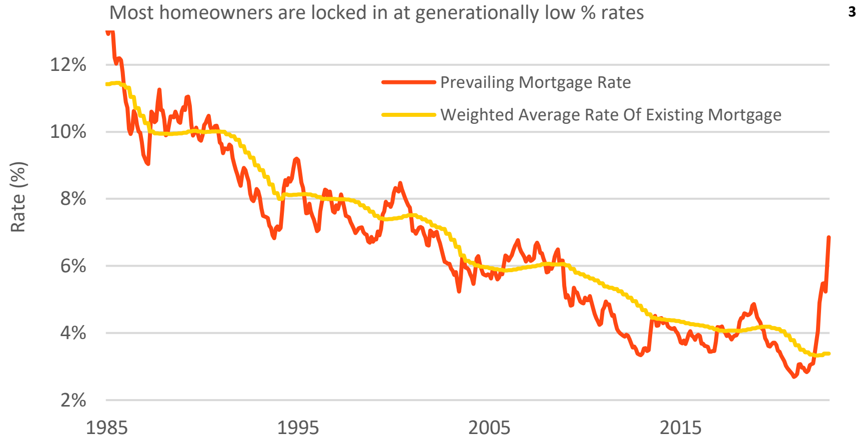
With durable goods consumption mean-reverting lower today, rate hikes are not having as much of an impact on this economic segment... [1]



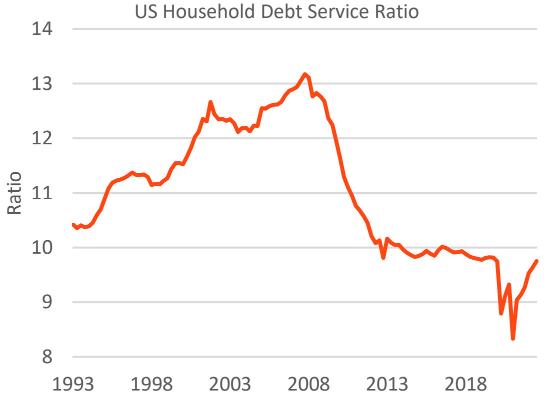
Opportunistic corporate refinancing during the pandemic termed out debt, which has alleviated some of the impact of rapid rate increases [2]



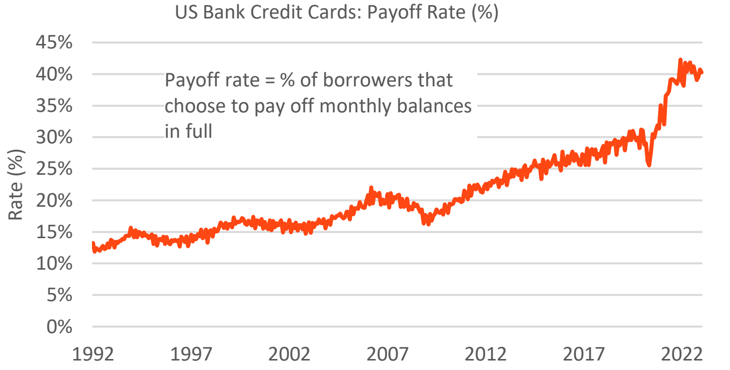
The degradation in housing turnover has as much to do with a lack of supply as a lack of affordability... and a majority of homeowners locked-in at generationally low mortgage rates; the housing market is not having its traditional price-elasticity to interest rate movements...



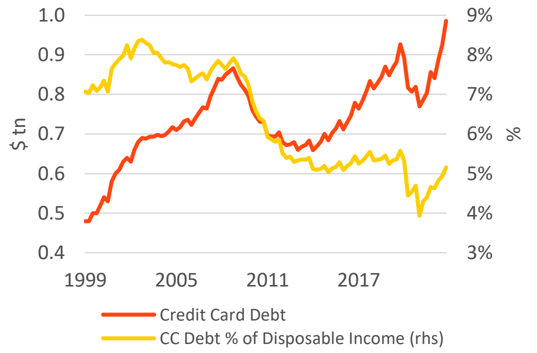
The interest burden on households, relative to income, is still historically low today [4]



Consumers are choosing to pay off balances in full at a record pace... signaling financial comfort in spite of rising rates (although the lowest income cohort is showing some stress here)... [5]



Credit card debt at $1tn is only 5.2% of disposable income — lower than any time over the past two decades other than during the pandemic [6]

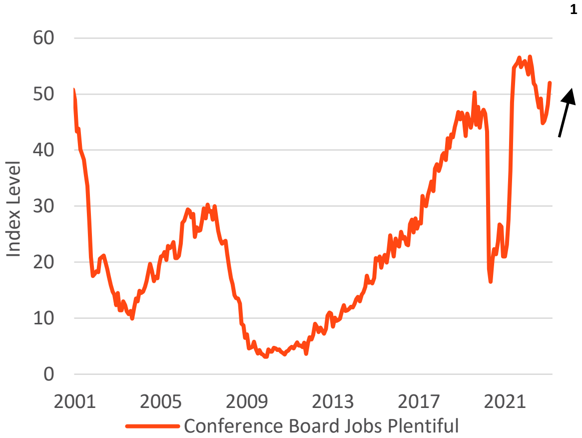


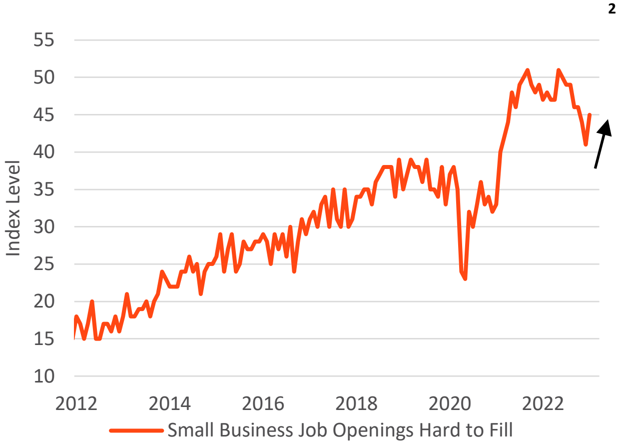
Markets constantly jump around in an attempt to anticipate new trends... The U.S. economy, however, is more reflexive and adaptive (like polyurethane) but particularly so when the starting point is so solid... Hence, being a bit more patient, and maybe *calling a time-out to assess and strategize from here makes some sense today, particularly when the central banks want to bring inflation closer to their targets...*

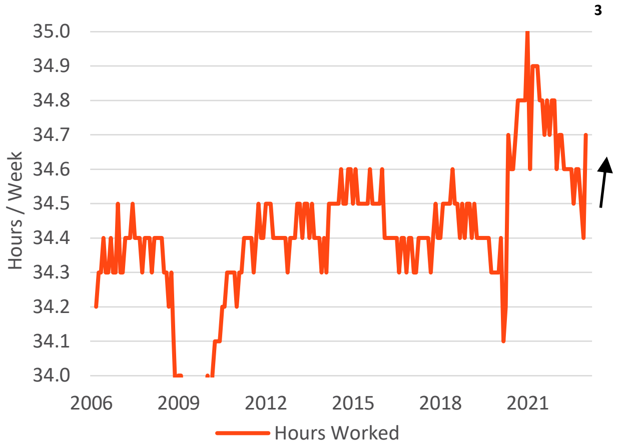
Source: 1) Morgan Stanley, as of 1/31/2023; 2) MS, as of 1/31/2023; 3) CPRCDR and Freddie Mac, as of 10/1/2022; 4) Federal Reserve, as of 9/30/2022; 5) Haver and S&P Credit Card Quality Index, as of 1/31/2023; 6) Federal Reserve Bank NY Consumer Credit Panel, Equifax, Haver and BEA, as of 2/23/2023. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

… particularly when this employment dynamic today is arguably still red-hot and potentially re-accelerating…

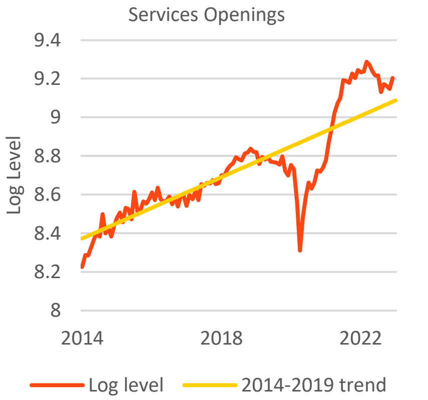
Is this not cooling yet, or is this an actual reacceleration???



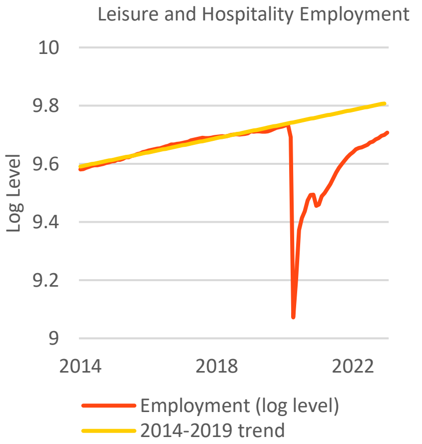


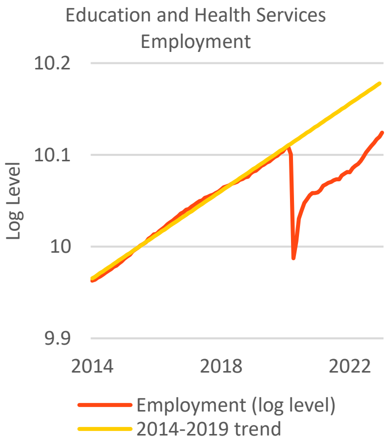


It's clear how much demand still remains for Services… Many of these areas of the economy that are severely structurally-short of labor are not as rate sensitive… [4]

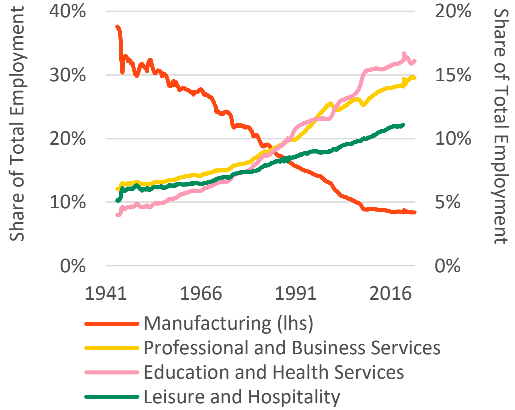


Despite the recent hires, Leisure & Hospitality and Education & Health Services remain the two sectors with the largest gaps in employment relative to trend and could be areas of support as the labor market should decelerate from here… [4]





… we will need to continue to see large drops in demand in these Services sectors before we begin to think the Labor Market is meaningfully weakening… [3]

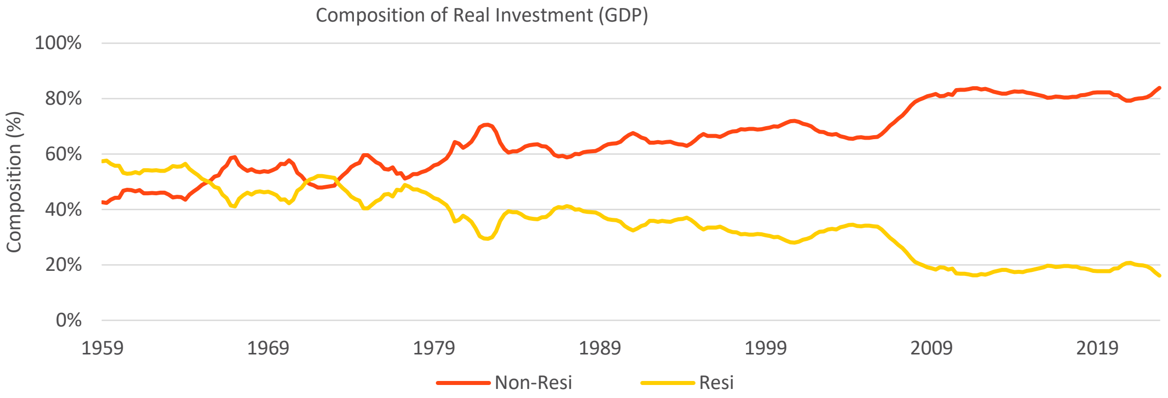


As a result, the real challenge for the Fed will be to slow inflation without damaging many of the good things that are happening in the labor market today… While we likely may not have another blockbuster payroll print like last month, the Fed will have to be careful to not indirectly harm a movement from capital to labor, which is keeping net disposable income for lower-income cohorts in a better place, while inflation moves progressively lower (hopefully)…

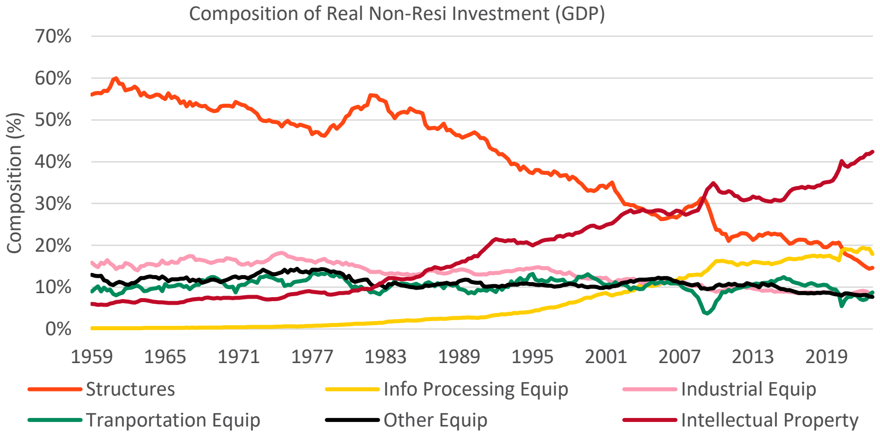
Source: 1) Conference Board, as of 2/28/2023; 2) National Fed of Industrial Business, as of 1/31/2023; 3) BLS, as of 1/31/2023; 4) BLS, as of 2/1/2023.

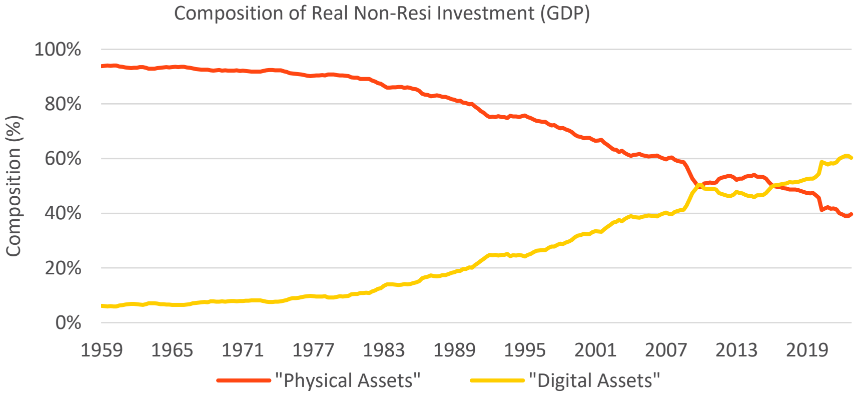
Putting this all together: traditionally, when the Fed raised rates to inflation, a subsequent contraction in non-residential investment preceded an employment contraction; however, this non-resi spend used to be made up of buildings, transportation equipment, and large industrial projects (i.e. capital-intensive, levered, interest rate sensitive projects)…

And while non-residential investment has gained share (and should hence have a bigger influence on the overall economy)…



… the composition of the non-resi investment is dramatically different today… it's computers, it's software, it's R&D; these are not debt-intensive, highly-levered physical assets, meaning the influence/impact of rate hikes is much more muted today; the transmission mechanism is grossly different, and importantly, *these are largely longer-term disinflationary investments*…





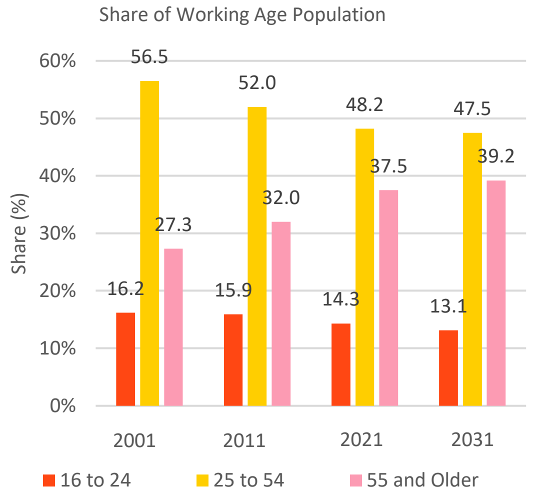
Physical = Structures, Industrial Equip, Transport Equip and Other
Digital = Info Processing Equip and Intellectual Property

Hence, we think that between the long and variable lags of policy implementation, the less sincere impact that interest rates should have on much of the economy, but the intense impact from policy that can overdo pressure on places like Real Estate, that this would all suggest that while the Fed could go to a 6% funds rate or higher, presumably some Fed patience (25 vs. 50 bp rate hikes) and a heightened focus on data-sensitivity could be their prevailing mindset from here…

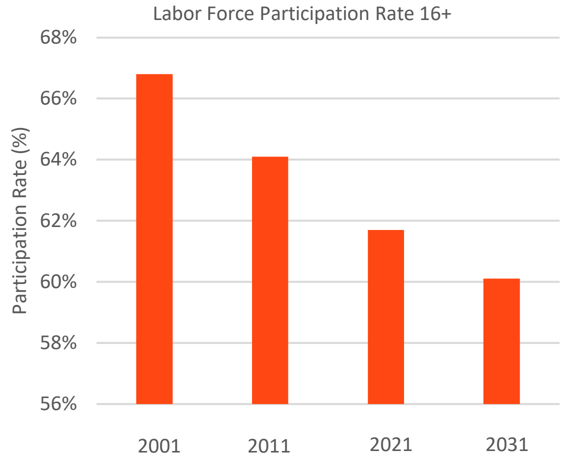
Source for all charts: BEA, as of 12/30/2022.

… while there are other environmental conditions (such as current demographic challenges) that could dampen how high the Fed would be willing to go… today's set of conditions may not be like anything we have seen before in terms of the influence on potential future fiscal spending, on sovereign debt credit quality, and maybe even reserve currency status…

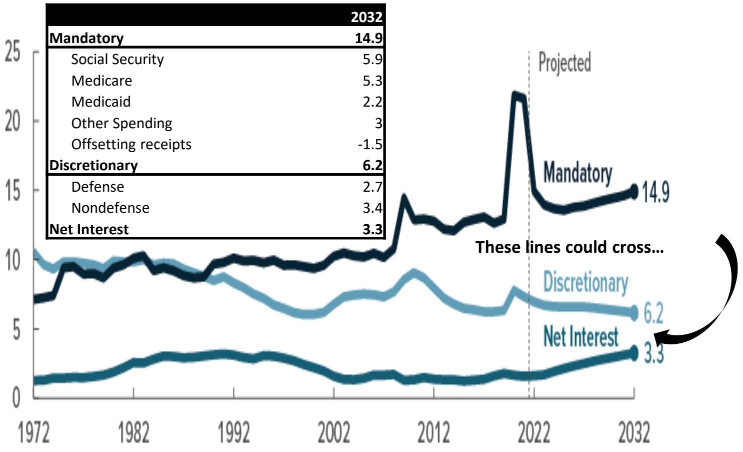
The working-age population is aging [1]



… and the labor participation-rate shrinks as the population ages [2]

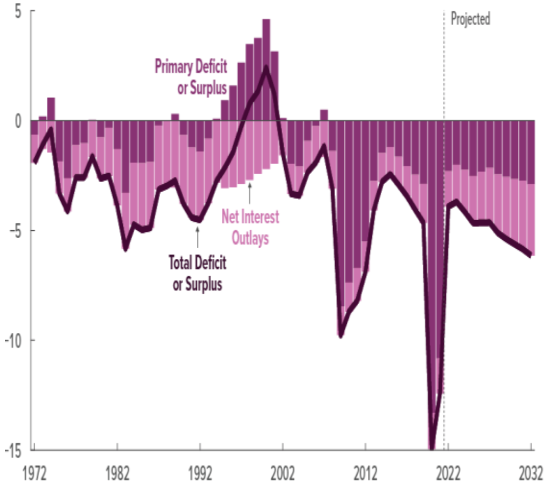


Almost definitionally it will mean that mandatory spending as a proportion of GDP will rise and that discretionary may decline! [3]

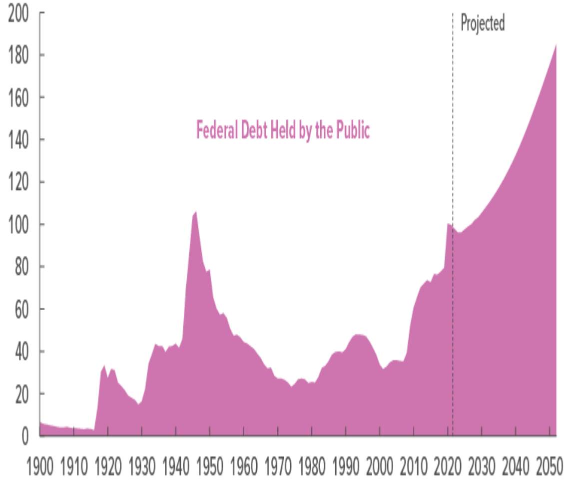


	2032
Mandatory	**14.9**
Social Security	5.9
Medicare	5.3
Medicaid	2.2
Other Spending	3
Offsetting receipts	-1.5
Discretionary	**6.2**
Defense	2.7
Nondefense	3.4
Net Interest	**3.3**

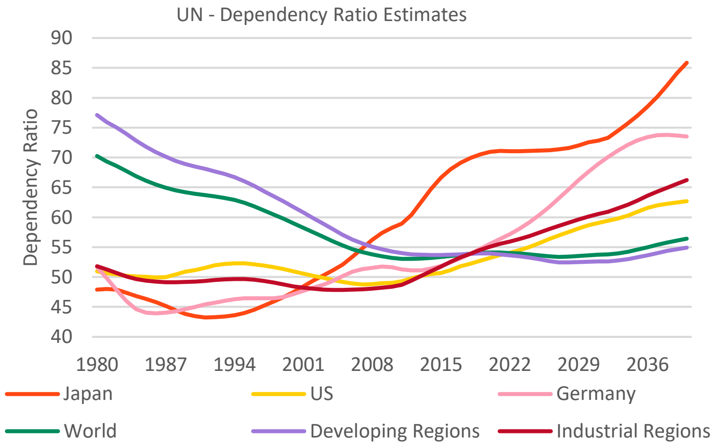
And as a result, deficits may structurally increase throughout the decade [3]



And debt to GDP may rise meaningfully throughout the decade [3]



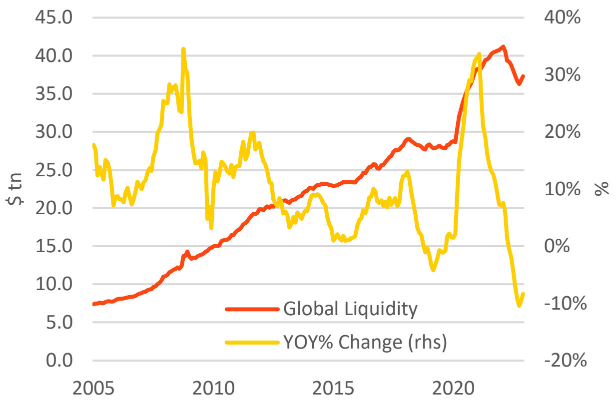
And while this is clearly concerning for the U.S., it may be arguably as bad (or worse) for many other advanced economies (such as Japan and Europe)… [4]

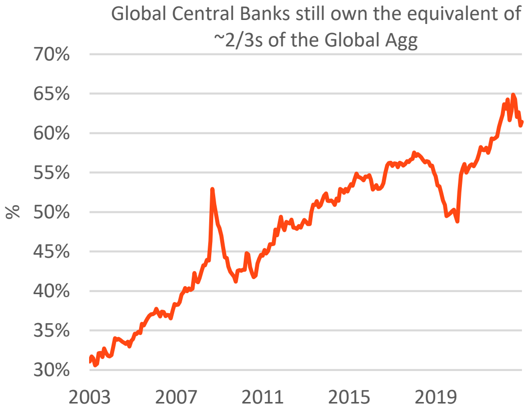


Source: 1) Organization for Economic Co-operation and Development, as of 1/31/2023; 2) BLS, as of 1/31/2023; 3) CBO, as of May 2022; 4) UN Population Statistics and SUERF The European Money and Finance Forum, as of 10/2020. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

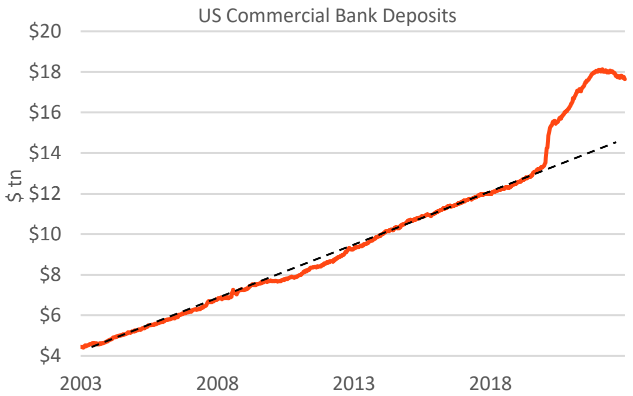
And finally, what other critical elements do we need to consider in markets today? Traditionally, the marginal dollar of global liquidity and M2 (the flow) was a major driver of financial economy trajectory. *We are now learning however that the pandemic liquidity and M2 injections were so large that, in spite of a modest ongoing contraction, the massive existing stock (vs. flow) has become a major influence on markets…*

Global liquidity is contracting now more than ever… However, the dominant influence today remains the massive stock of existing liquidity…. [1]



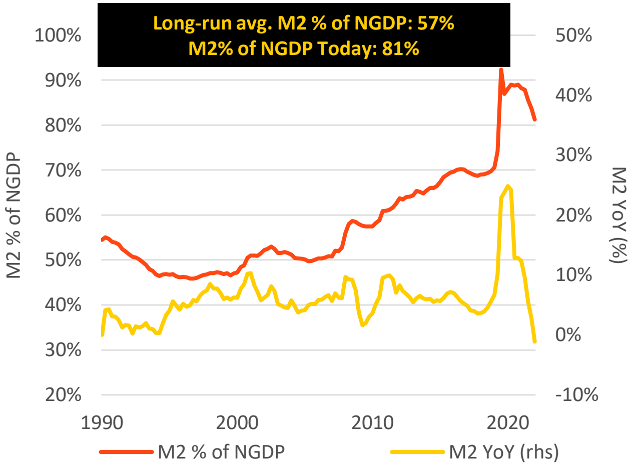


US commercial bank deposits are ~$3 trillion higher than the pre-pandemic trend… [2]

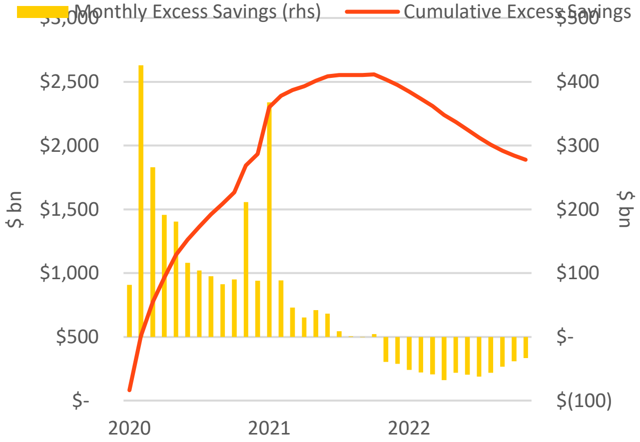


The pandemic M2 injections were so large that in spite of ongoing M2 contraction, the existing stock of broad money has become the transcendent influence today…

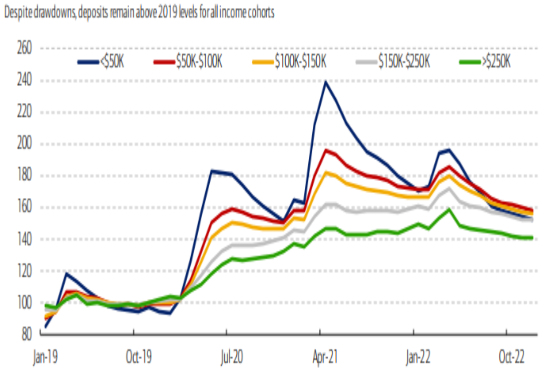
Nearly 28% of all existing US M2 was created since the onset of the pandemic… [1]



At the current drawdown pace of $50 bn/month, there is still 3 years for this pool of cash to flatter spending [3]



This excess savings is still being enjoyed by most income cohorts (albeit the bottom 10% is in tougher shape today)… [4]



The waning flow of liquidity and M2 is not having the deleterious impacts of previous cycles and keeps the underlying (but sometimes latent) need and demand for financial assets very high…

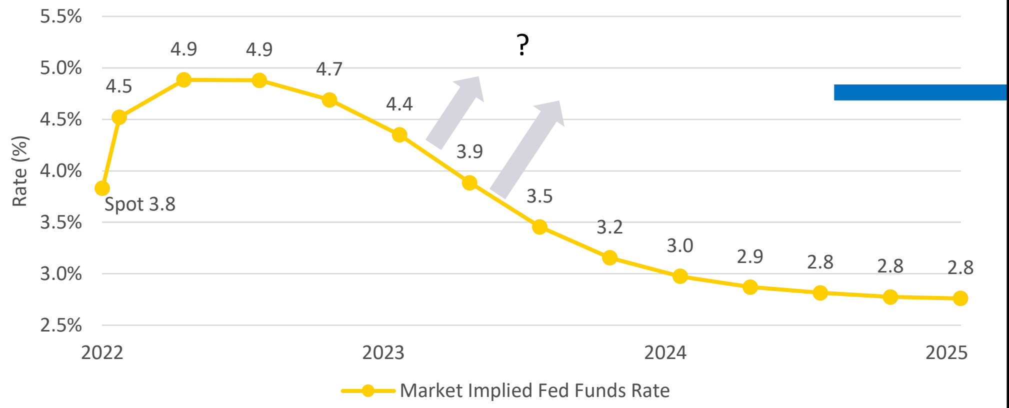
Source: 1) BB and Federal Reserve, as of 12/31/2022; 2) Federal Reserve, as of 2/8/2023; 3) BEA, as of 1/31/2023; 4) BOA Institute, as of 2/10/2023.

Why calling a time-out can make sense #2: Give your players a rest

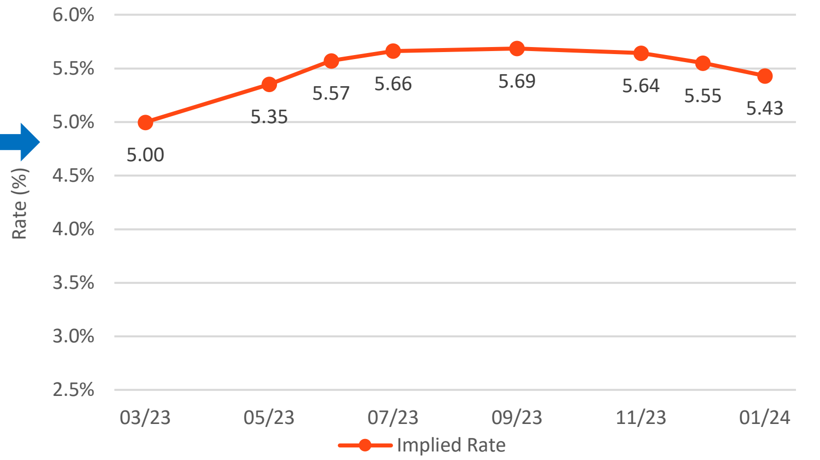
A massive amount of heavy lifting has been done by the rate forwards over the past few weeks to price out the (absurd) cuts that were priced in for later this year. At the same time, enormous supply of fixed income has come to market, with it heretofore being readily absorbed given this massive amount of cash in investors' hands…

Reprint from Dec 2022 Monthly Call

The markets and the Fed have made historic moves to reprice the terminal Funds rate higher all year. However, while a ~5% terminal rate is already priced into the forwards, prospective easing is also currently priced. To the extent that 2023/24 rate cuts get priced out of forwards, that would represent an incremental tightening of financial conditions… [1]

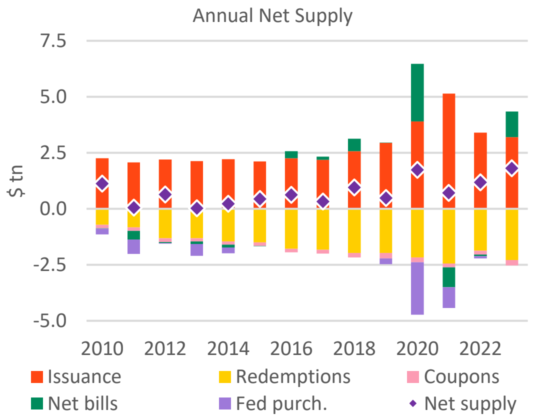


We think that market pricing a 5.50 to 5.75% terminal funds rate can rest here for now but will be data dependent, and perhaps may warrant an even higher terminal rate (6%)… [2]

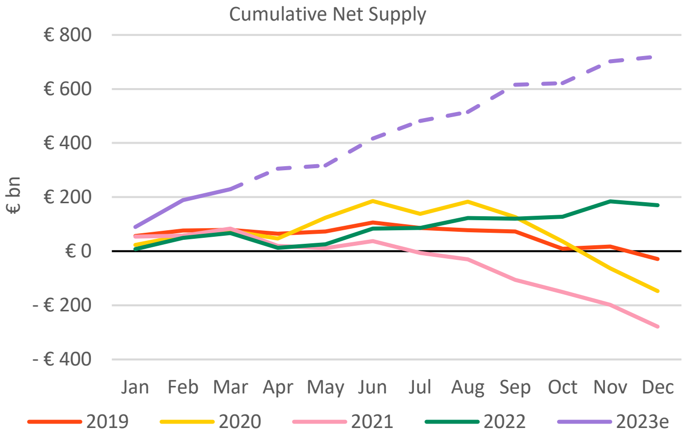


This is expected to be the highest issuance year in the US since 2020 and one of the highest of any year before 2020 [3]

Historical and forecasted US Treasury Supply

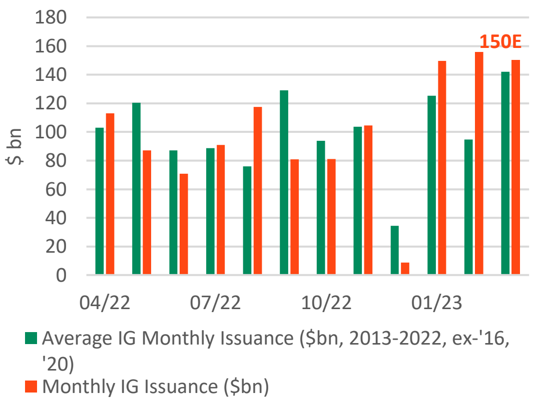


EUR government issuance has also been huge, with no respite anticipated. We can use a bit of a time-out to gauge the market's propensity for indigestion with all this supply… [4]



The credits markets (globally) have also seen record issuance to start the year… [4]

Historical and forecasted US IG Supply



Source: 1) BB and Federal Reserve, as of 11/23/2023; 2) BB, as of 3/8/2022; 3) GS, as of 3/7/2023 (A large portion of 2023 net issuance is T-Bills; coupon net supply net of Fed in 2023 will be 30-40% lower than in 2022); 4) CS, as of 3/1/2023. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Why calling a time-out can make sense #3: Changing your game strategy during this "time-out…"

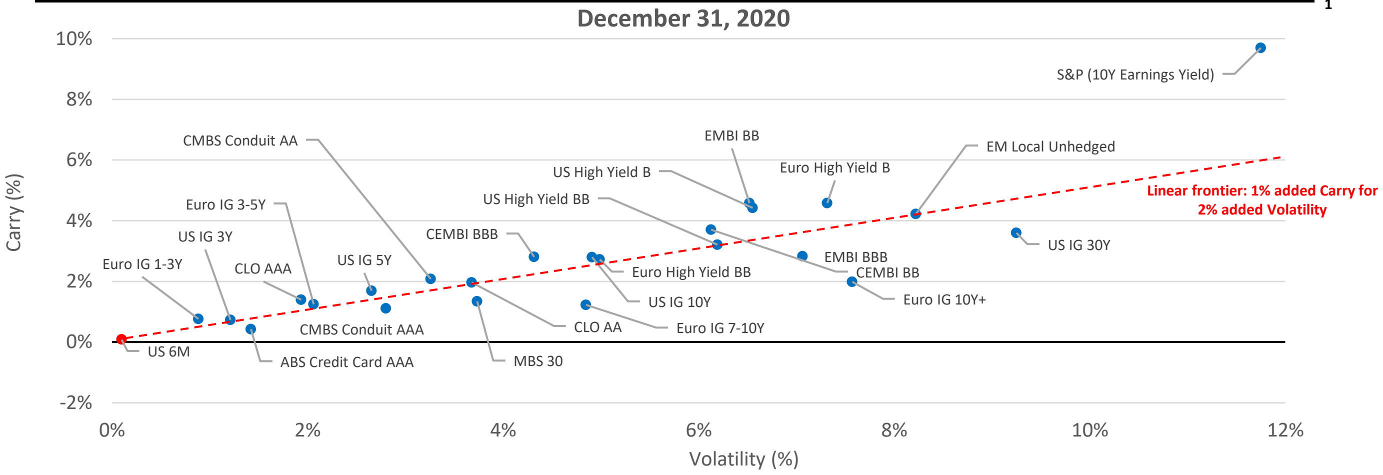
The role of cash in portfolios alongside a tightening Fed (and other central banks) and a more uncertain outcome could intensify: a higher cash rate (US 6M bill) means that assets need to reprice (lower price, higher expected forward return) in order to compensate investors for taking on added risk (volatility)…

Today, while there are some interesting opportunities to potentially lock in higher yields, investors are not necessarily being compensated well enough for taking on additional volatility; hence, cash can have a big role in portfolios for the time being!

While assets universally offer higher yields today, there are actually fewer that offer more expected potential return per unit of volatility relative to cash.

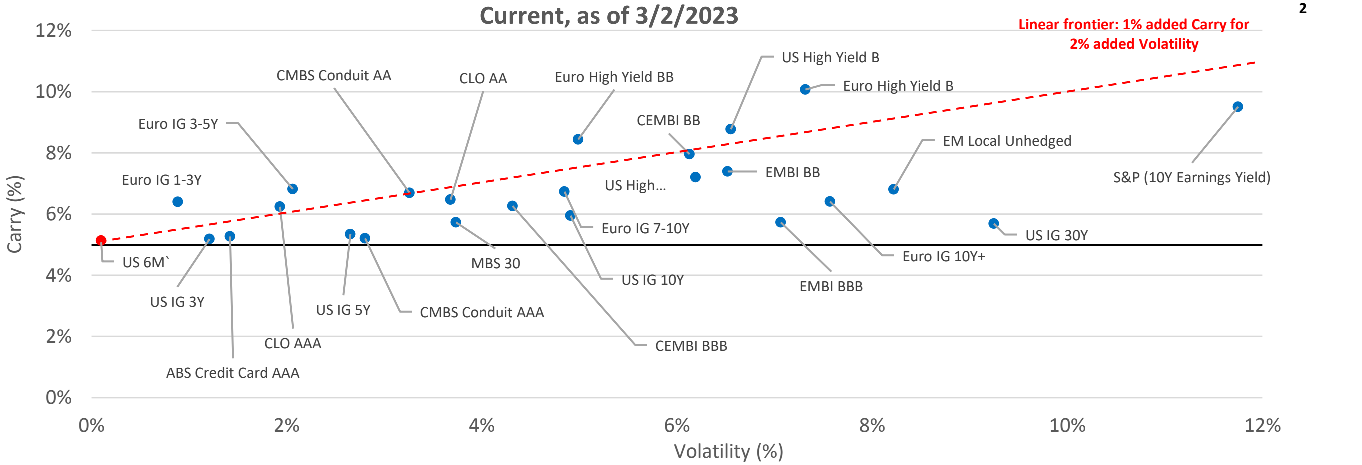
Hence, it makes sense to take a breather, reduce some spread risk, and tactically hold a bit more cash…

When rates were low, most fixed income assets were "above the line" of appropriate carry for the level of volatility…



Think about leveraged loans today which are floating rate and have to refinance at higher levels in an economy that may be slowing vs. the 6% you can get in cash-like assets today…

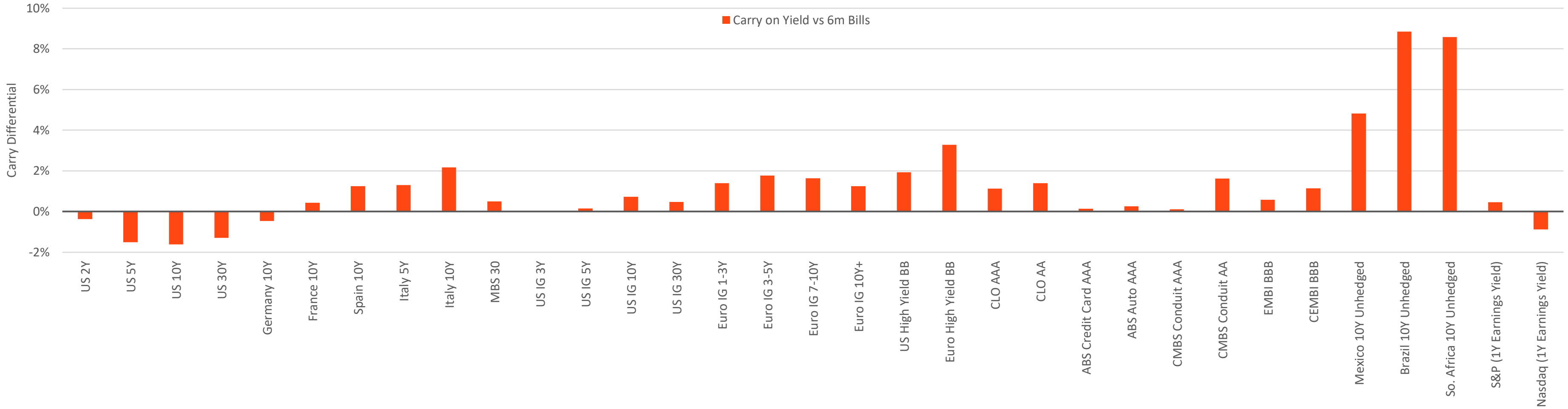
The opposite is the case today with most assets below or well below the incremental carry required per unit of volatility (has the risk of recession dropped to zero???)…



Source: 1) BB, as of 12/31/2020; 2) BB, as of 3/2/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Cash and short-term paper can provide a very functional utility for portfolios today… For example, Investment Grade Commercial Paper can potentially offer almost as much as 6% yield over 9-12 months today… To meaningfully obtain a higher yield than that, you basically need to go into High Yield or EM within an economy which may be pressed into recession…

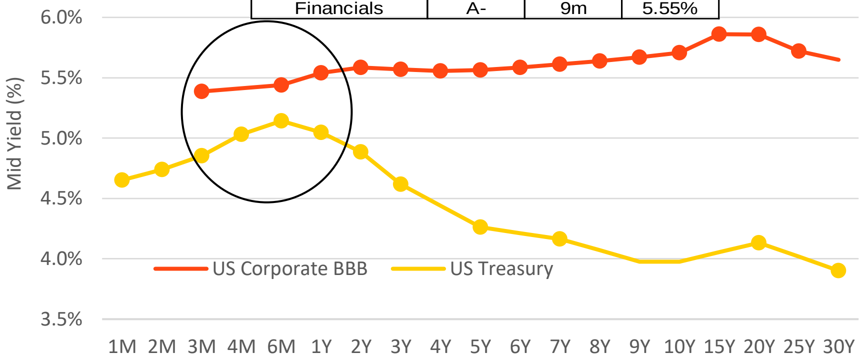
You have to go to Europe, High Yield, or EM to meaningfully obtain higher yields than 6m US bills – let alone CP! [1]



The problem is that HY doesn't look very exciting today! [2]

A-BBB rated Paper offers nearly 6% today! This may be a great option while we take our time-out and draw up a gameplan… [3]

Sector	Rating	Maturity	Yield
Communications	BBB+	1Y	5.93%
Financials	A	1Y	5.70%
Auto	BBB+	9m	5.65%
Financials	BBB+	9m	5.60%
Financials	A-	9m	5.55%



Source: 1) BB and JP Morgan, as of 3/3/2023; 2) BB, as of 2/24/2023; 3) BB, as of 3/3/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

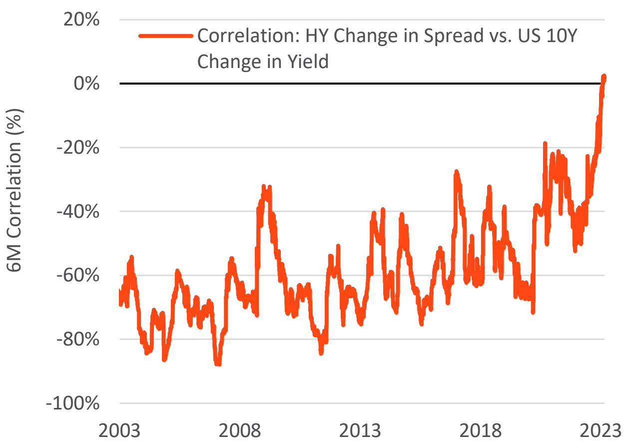
We brought up this idea of cash being the most uncorrelated asset to everything else at the beginning of the presentation. Cash and cash-like instruments may provide a comfortable (and high-yielding) place to be during this time-out, especially while correlations elsewhere may stay as stubbornly high as inflation…

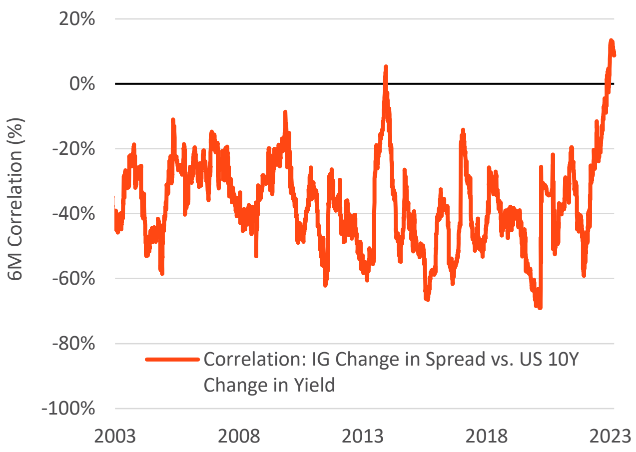
A 30bps per month of yield (and rising) is not an easy number to overlook, especially when there isn't much differentiation across everything else today… [1]

		2023	
	Total Return (%)	**Pre 2/3**	**Post 2/3**
Total Return	US Tsy	3.1	-3.2
Total Return	US Long Tsy	7.8	-6.4
Total Return	US Aggregate	3.9	-3.6
Total Return	Global Agg	4.7	-4.6
Total Return	APAC Agg	3.9	-5.3
Total Return	Global EM	5.0	-3.8
Total Return	US Agency	1.8	-1.8
Total Return	US Municipals	3.2	-2.6
Excess Return	US MBS	0.9	-0.7
Excess Return	US IG Credit	1.2	-0.3
Excess Return	US HY	2.2	1.2
Total Return	S&P 500	9.0	-2.9
Total Return	NASDAQ	17.1	-4.5
Total Return	Dow Transports	16.8	-5.0
Total Return	Oil (CL1)	-5.5	0.9
Total Return	Gold (GOLDS)	4.9	-5.2
Total Return	MSCI EM	9.3	-5.0
Total Return	MSCI DM	9.4	-2.9
Total Return	3M US TSY Bill	0.3	0.4
Sample PF: 60% SPX + 40% US AGG		***6.9***	***-3.2***

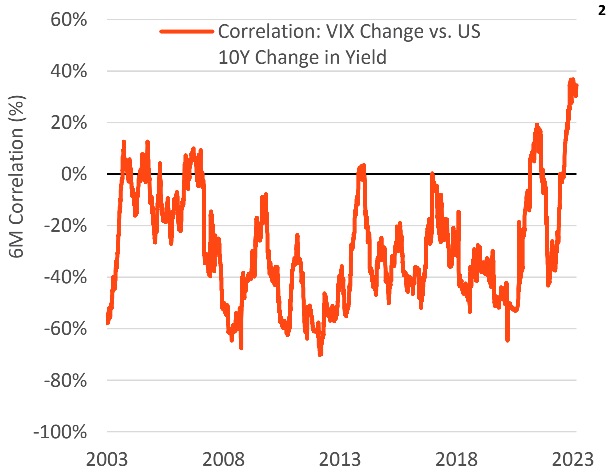
The world wants answers, but what is the right question? The right question today is not "rates or risk?," but rather "financial assets or cash?" During this time-out, we would argue that the answer may be to consider a higher allocation to cash for now, while assessing the situation…

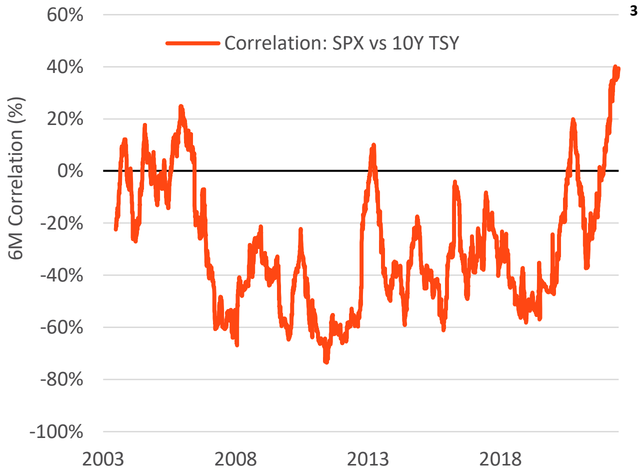
… especially when duration is the least effective hedge for credit as it's been in decades… [2]





Equity returns and equity vol have likewise become even more positively correlated to rates…There is simply a heightened sensitivity to the rate complex all the way down the cap stack…



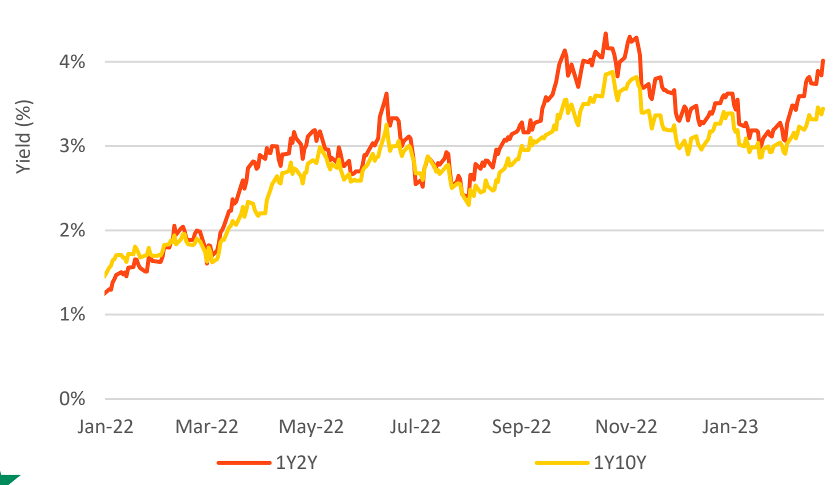


Source: 1) BB, as of 3/8/2023; 2) BB and Shiller, as of 2/28/2023; 3) BB, as of 3/3/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

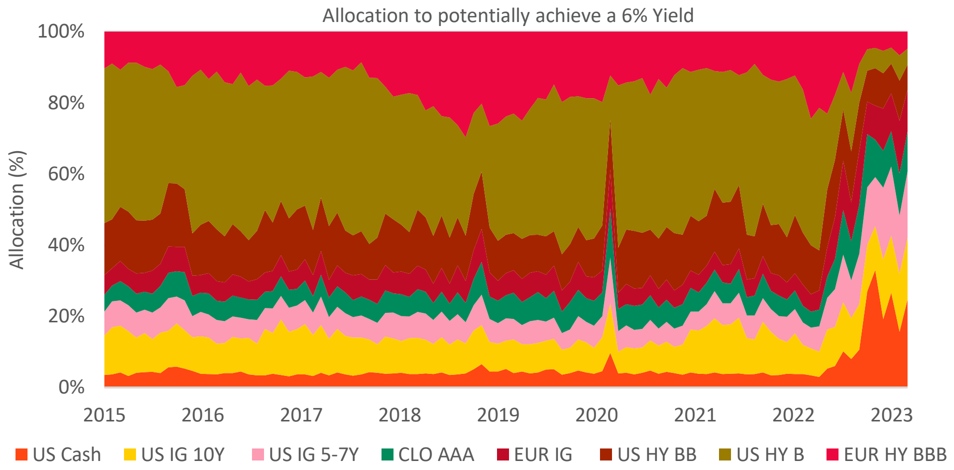
Why calling a time-out can make sense #4: Draw up a specific play for today's portfolio positioning

The rate forwards have re-priced such that our optimizer indicates that for now, cash/short-term debt instruments, and some shorter-dated rate forwards, may be a large part of a portfolio today, with a much higher quality rating…

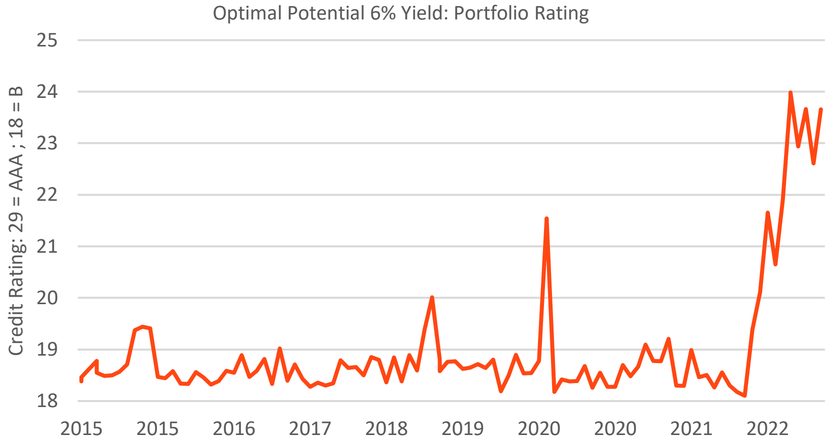
Short-dated rate forwards offer a decent, low-duration risk profile [1]



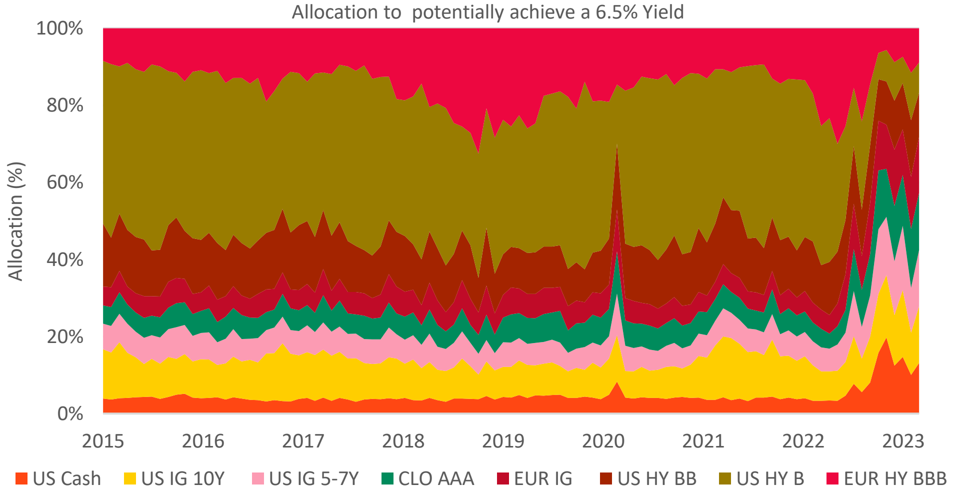
A 6% portfolio can enjoy a healthy allocation to cash [2]



Historically, to potentially construct a portfolio with a 6% yield, it may have had to run a low-BB rated portfolio (or lower right after the pandemic), now it may be a 'single A' implied portfolio – which is amazing given the fact that a recession is still a distinct possibility in the intermediate-term… [2]



… and if constructing a potential 6.5% yielding portfolio, the cash component may still be much higher, as a bit more US and Euro HY may be added, or even potentially adding EM into the equation… [2]



Source: 1) BB, as of 2/24/2023; 2) Bloomberg/Barclays Indices and BLK Estimates, as of 2/24/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Why calling a time-out can make sense #5: Fire up your team

Basketball coaches call time-outs when they can see a path to victory but first need to fire up their team to pursue it. We still believe that this hiking cycle is setting the stage for a generational return profile in Fixed Income… We just need some clarity around the timing – and we think we will get that clarity over the next 1-3 months…

As an asset allocation thought exercise, we often ask: "What would it take for fixed income to deliver equity-like returns of, say, 10%?"

It is incredible how small the price contributions would need to be in high quality fixed income to achieve this equity-like return profile, given the embedded carry today.

	Current Yields	Current Yield Percentile*	Pro Forma Yield Given 10% Total Return**	Yield Percentile* to get a 10% Total Return*
US IG	5.51%	98%	4.88%	95%
US HY	8.55%	93%	8.17%	90%
US Treasury	4.42%	99%	3.52%	95%
US 1-3Y Treasury	4.89%	100%	2.27%	79%
US Long Treasury	4.03%	98%	3.66%	94%
Euro High Yield (Hedged)	9.67%	94%	9.56%	94%
MBS	4.83%	99%	3.97%	95%

*Percentiles reference 2013-2023 yield lookback
**10% Total Return is based on interest rate shifts in duration

We were just at 4.88% in US IG earlier this year

The carry alone almost gets you to 10% in HY

With the FX hedge, European HY is yielding close to 10%

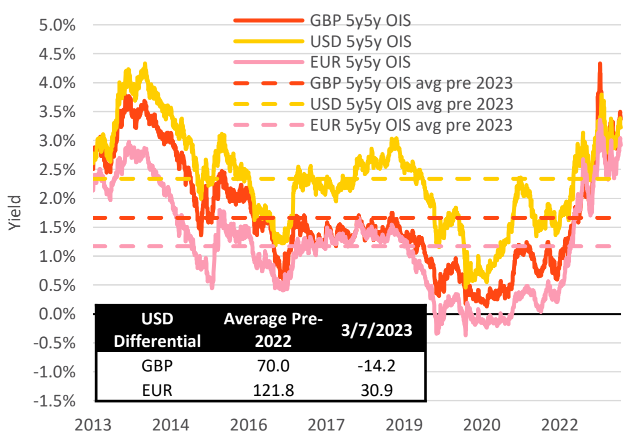
Mortgages are a nice way to sell rate vol, and have not delivered a 10% total return since 2000

Source: BB, as of 3/2/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Getting more comfortable with more duration coming out of our time-out suggests taking advantage of some (more) attractive yields in Europe, the UK, and EM, as well as the US…

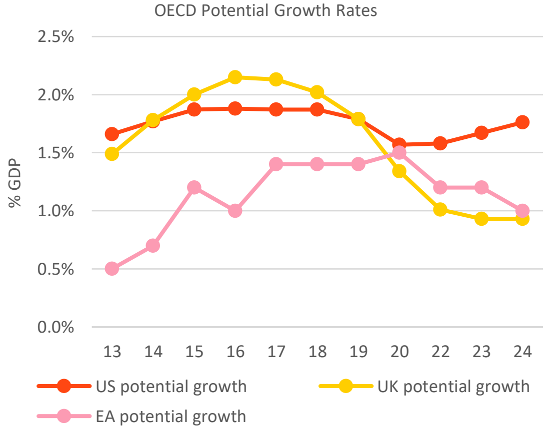
EUR & GBP Rates look high relative to US… especially when considering potential growth in each region going forward

The Average Rate Differentials here are the US rates being 70 bps over the UK and 122 bps over the EU… [1]

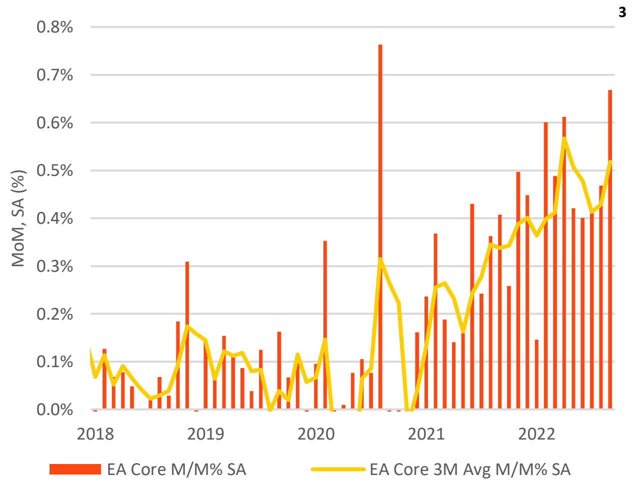


USD Differential	Average Pre-2022	3/7/2023
GBP	70.0	-14.2
EUR	121.8	30.9

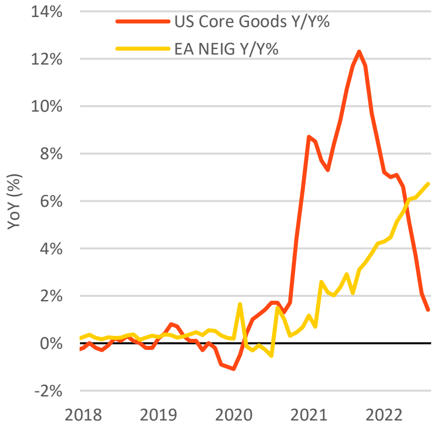
… which normally makes sense with US potential growth above the UK and Europe… [2]



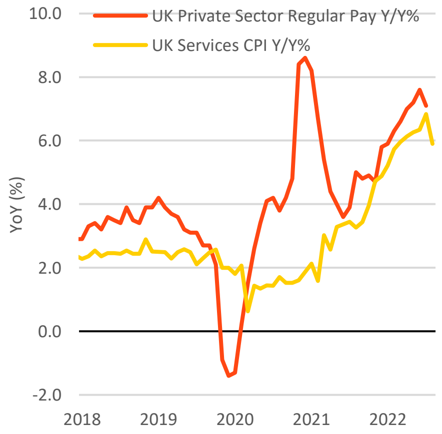
… but Euro Area core inflation has been very sticky…



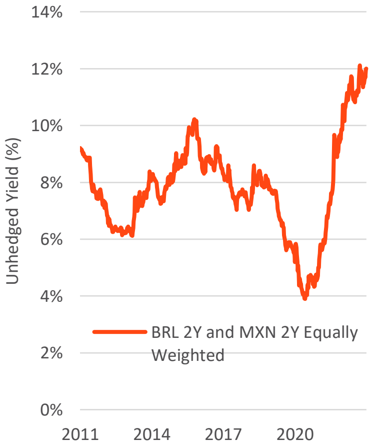
… but herein lines the opportunity as core goods inflation in Europe ought to start following global goods disinflation down… [4]



… and in the UK, without an acceleration in private sector regular wages and services inflation, the BOE may pause in H1 2023 [5]



Meanwhile, EM Local Yields (especially front-end) may offer even higher yields, which could make for a good entry point if US rates and the USD can find more of a range… [2]



EM Local Currency - Unhedged

	Yield			
	2Y	3Y	5Y	10Y
Colombia	10.53%	12.00%	12.59%	12.39%
South Africa		7.96%	8.37%	11.23%
Brazil	12.78%	13.14%	11.77%	13.62%
Mexico	11.14%	10.33%	8.77%	9.33%

	Yield vs USD Cash Rate			
	2Y	3Y	5Y	10Y
Colombia	5.96%	7.43%	8.02%	7.82%
South Africa		3.39%	3.80%	6.66%
Brazil	8.21%	8.57%	7.20%	9.05%
Mexico	6.57%	5.76%	4.20%	4.76%

Source: 1) BB, as of 3/7/2023; 2) BB, as of 3/2/2023; 3) European Central Bank, as of 2/28/2023; 4) BLS and Eurostat, as of 1/31/2023; 5) Office of National Statistics, as of 12/31/2022. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

If rates can find a range, investors may selectively start to lock in some very nice yields… That is exactly what we will be looking to do (at hopefully slightly better prices) as we come out of our time-out (and even selectively during it)…

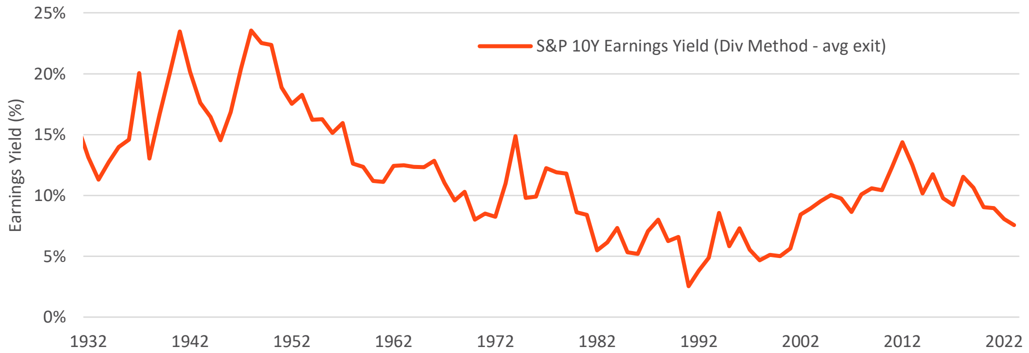
The days of paltry Fixed Income returns may be coming to an end, with the valuations vs. equities extremely compelling…

While we like being a bit patient today, once rates can find a range, we think Fixed Income may be a valuable tool for a long time to come…

While we like being tactically cautious, there is no debating that the Fixed Income opportunity set has been structurally refreshed in a way we haven't seen in over 15 years and may provide some very nice potential return going forward…

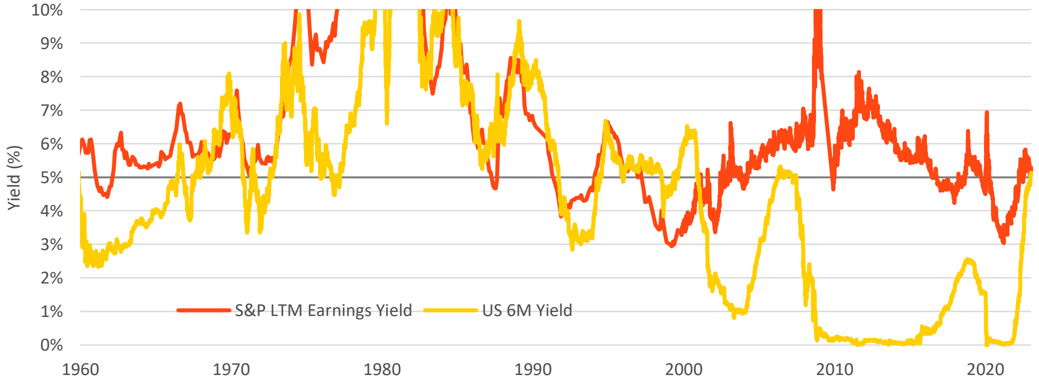
	Yield	FX Hedge	FX-Hedged Yield	Yield Roll	Carry on Yield Today	Carry on Yield Dec 31, 2020
			A+B		A+B+E	
US 6m	5.19%				5.19%	0.08%
MBS 30	5.61%				5.61%	1.34%
US IG 3Y	5.62%			-0.56%	5.06%	0.73%
US IG 5Y	5.48%			-0.22%	5.26%	1.69%
US IG 7Y	5.48%			0.00%	5.48%	2.52%
US IG 10Y	5.59%			0.24%	5.83%	2.79%
US IG 30Y	5.58%			-0.01%	5.57%	3.60%
Euro IG 1-3Y	4.37%	2.21%	6.58%		6.58%	0.76%
Euro IG 3-5Y	4.53%	2.21%	6.73%	0.23%	6.96%	1.25%
Euro IG 5-7Y	4.47%	2.21%	6.68%	-0.14%	6.54%	0.83%
Euro IG 7-10Y	4.39%	2.21%	6.60%	0.22%	6.83%	1.22%
Euro IG 10Y+	4.36%	2.21%	6.56%	-0.14%	6.43%	1.99%
US High Yield BB	7.04%				7.04%	3.21%
US High Yield B	8.57%				8.57%	4.43%
US High Yield ex Energy BB	7.03%				7.03%	2.97%
US High Yield ex Energy B	8.58%				8.58%	4.12%
Euro High Yield BB	6.25%	2.21%	8.46%		8.46%	2.73%
Euro High Yield B	7.79%	2.21%	10.00%		10.00%	4.58%
EMBI BBB	5.68%				5.68%	2.83%
EMBI BB	7.30%				7.30%	4.58%
CEMBI BBB	6.25%				6.25%	2.81%
CEMBI BB	7.91%				7.91%	3.71%
EM Local Unhedged	6.79%				6.79%	4.22%
China 10Y Unhedged	2.89%			0.11%	3.00%	3.05%
Mexico 10Y Unhedged	9.33%			0.64%	9.97%	6.65%
Brazil 10Y Unhedged	13.62%			0.33%	13.95%	8.32%
So. Africa 10Y Unhedged	11.23%			2.48%	13.71%	9.63%
China 10Y Hedged	2.89%	2.69%	5.58%	0.11%	5.70%	0.58%
Mexico 10Y Hedged	9.33%	-6.92%	2.41%	0.64%	3.05%	2.46%
Brazil 10Y Hedged	13.62%	-6.77%	6.86%	0.33%	7.19%	7.40%
So. Africa 10Y Hedged	11.23%	-2.99%	8.25%	2.48%	10.73%	4.97%

Our measure of 10Y expected return on Equities comes in below average relative to the last 90 years… 7-8% returns potential may be still solid over the medium term but this is just much less interesting when cash and high-quality fixed income may potentially provide 6-7%… It is the polar opposite of the 2010s when Equities registered as cheap and rates were pinned near zero…



Here we calculate 10Y Equity Yield (a 10Y annual expected return #) by growing Earnings and Dividends for 10 years at the historical average, assuming an exit in 10Y at the historical average multiple, and then taking the IRR of all dividends & exit cash flows

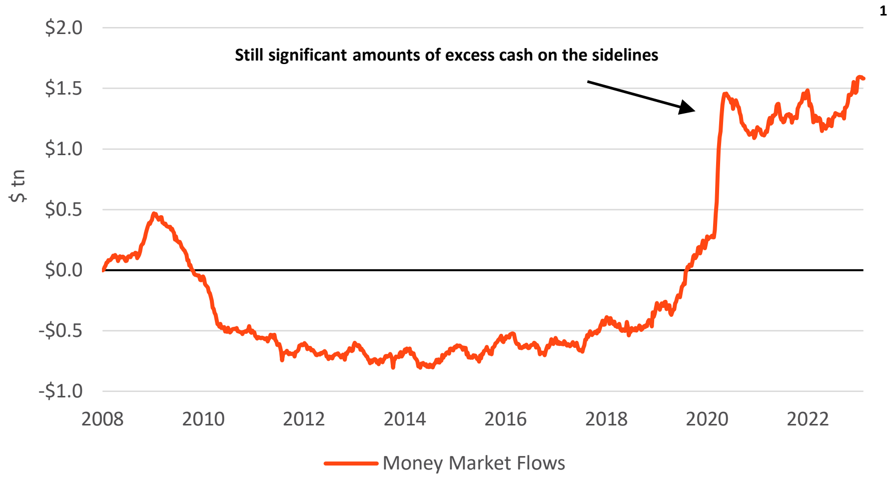
… and equity earnings yields have rarely been below 5%, especially with 6m cash-yields so high, which suggests Equity valuations are mediocre at best today – yet they still remain buoyed by the immense amount of cash still out there today…

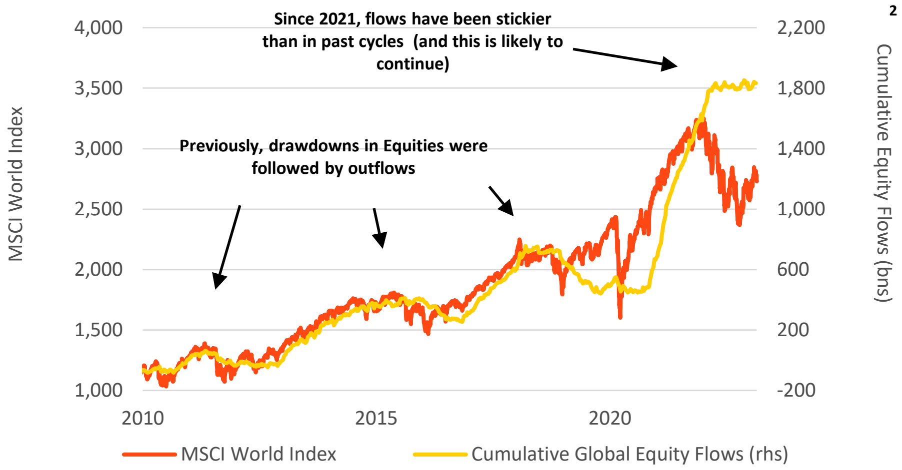


Source: BB, as of 3/2/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

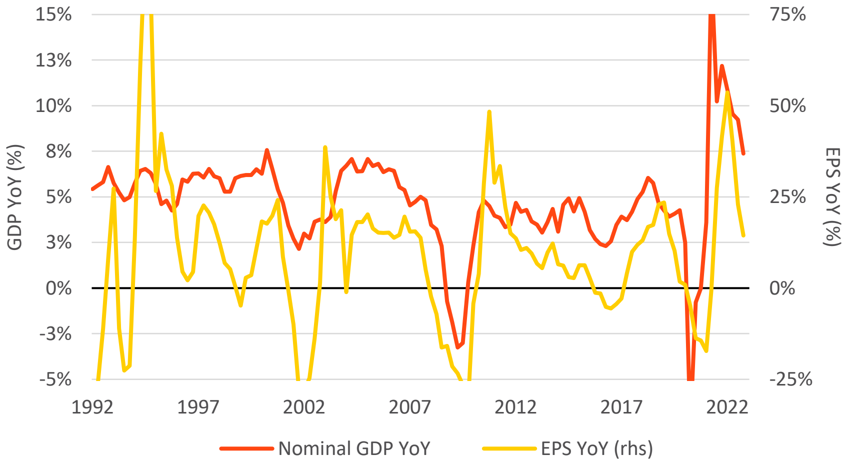
So, given this clear valuation differential, why haven't equities fallen further? While valuations can create a ceiling, technicals and a growing economy/ EPS can create a floor for stocks… Hence, we are not dismissing owning some equities, but just suggest their upside seems muted relative to the return potential from safer assets today…

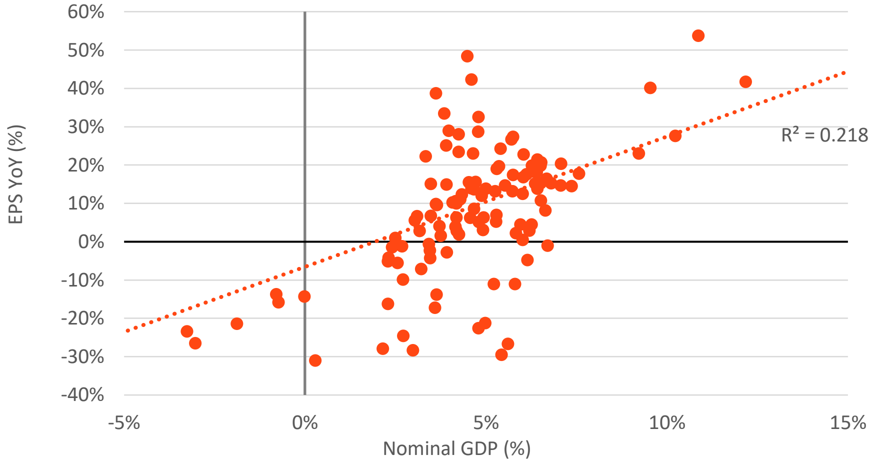
The elephant in the room - the incredible 2020 injection of $ into the financial system seems to be making Equity flows much stickier! And there is still a lot of cash on the sidelines…





… and if NGDP stays a bit higher for a bit longer, that could benefit EPS… So, while valuation is a headwind, technicals and a higher growth environment could be tailwinds – meaning Equities may be range bound for some time, just not relatively attractive… [3]

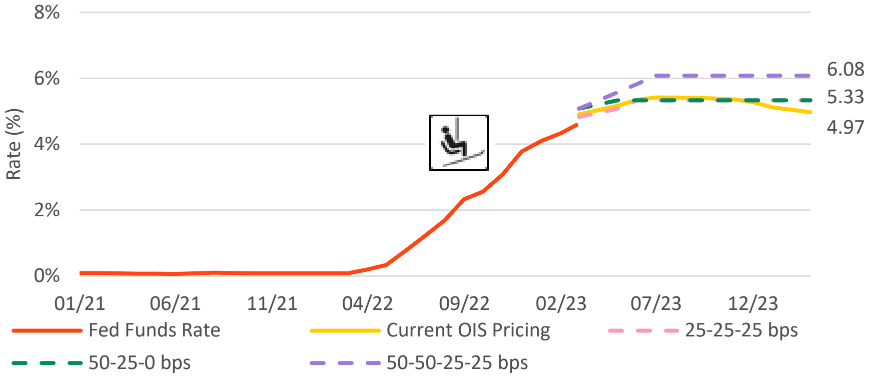


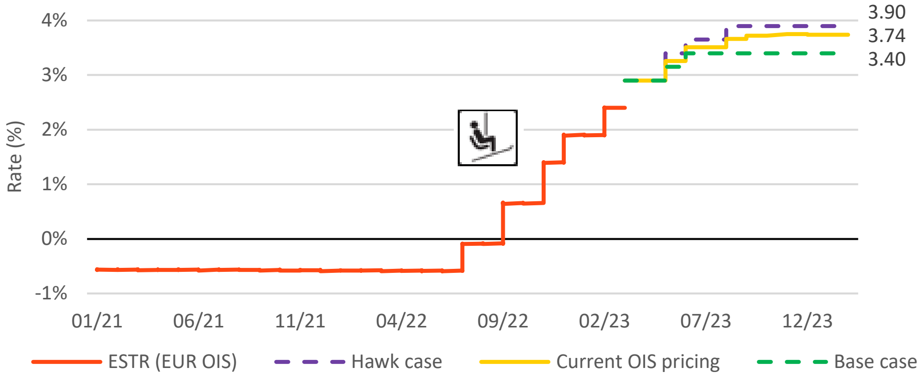


Source: 1) EPFR, as of 2/25/2023; 2) EPFR and BB, as of 2/15/2023; 3) BB and BEA, as of 9/30/2022.

So, while more data may tell us from here how high the central banks may have to move the peak of the rate mountain before pausing for a while, *we are very confident that the next 3 years or so of return-construct may be very different than the last 10…*

How many more rate hikes will have to be implemented? For how long? And where is the "top of the mountain" on rates and how long do we stay there? [1]





January was an embodiment of how powerful returns could be when we reach the end of the hiking cycle… But longer-term, isn't the return mix going to be a lot different across debt and equity??? [2]

	Return (%)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10Y Avg.	Jan '23	Feb '23	Mar '23	YTD
Total Return	US Tsy	2.0	-2.7	5.1	0.8	1.0	2.3	0.9	6.9	8.0	-2.3	-12.5	0.9	2.5	-2.3	0.1	-0.3
Total Return	US Long Tsy	3.6	-12.7	25.1	-1.2	1.3	8.5	-1.8	14.8	17.7	-4.6	-29.3	1.9	6.4	-4.7	1.2	1.4
Total Return	US Aggregate	4.2	-2.0	6.0	0.5	2.6	3.5	0.0	8.7	7.5	-1.5	-13.0	1.5	3.1	-2.6	0.2	0.0
Total Return	Global Agg	4.3	-2.6	0.6	-3.2	2.1	7.4	-1.2	6.8	9.2	-4.7	-16.2	0.2	3.3	-3.3	-0.3	-0.6
Total Return	APAC Agg	-7.0	-14.6	-6.8	-0.5	5.3	5.2	2.7	3.7	6.6	-5.0	-12.8	-2.1	2.6	-3.6	-0.6	-1.2
Total Return	Global EM	18.5	-6.6	5.5	1.2	10.2	9.3	-4.6	14.4	5.9	-1.5	-16.5	3.3	3.1	-2.2	0.4	0.9
Total Return	US Agency	2.2	-1.4	3.6	1.0	1.4	2.1	1.3	5.9	5.5	-1.3	-7.9	1.1	1.5	-1.3	-0.1	-0.2
Total Return	US Municipals	6.8	-2.6	9.1	3.3	0.2	5.4	1.3	7.5	5.2	1.5	-8.5	2.7	2.9	-2.3	0.1	0.6
Excess Return	US MBS	0.9	1.0	0.4	-0.2	-0.1	0.2	-0.6	1.2	-0.2	-0.4	-2.3	0.0	0.9	-0.3	-0.4	0.2
Excess Return	US IG Credit	6.9	3.0	-0.5	-1.0	4.8	2.4	-3.2	7.1	0.8	1.2	-1.2	1.9	1.2	-0.5	0.3	0.9
Excess Return	US HY	13.0	9.1	-1.0	-5.7	14.6	5.9	-3.6	8.7	3.2	6.5	-3.5	4.3	2.2	0.4	0.8	3.4
Total Return	S&P 500	16.0	32.4	13.7	1.4	12.0	21.8	-4.4	31.5	18.4	28.7	-18.1	13.9	6.3	-2.4	0.9	4.2
Total Return	NASDAQ	18.4	36.9	19.4	9.8	7.3	33.0	0.0	39.5	48.9	27.5	-32.4	18.9	10.7	-0.4	1.8	11.3
Total Return	Dow Transports	5.7	39.5	23.5	-17.8	20.4	17.3	-13.6	18.9	14.7	31.8	-18.7	11.1	9.4	0.5	0.1	10.4
Total Return	Oil (CL1)	-7.1	7.2	-45.9	-30.5	45.0	12.5	-24.8	34.5	-20.5	55.0	6.7	2.9	-1.7	-2.3	-0.1	-3.3
Total Return	Gold (GOLDS)	7.1	-28.0	-1.7	-10.4	8.6	13.5	-1.6	18.3	25.1	-3.6	-0.3	2.5	5.7	-5.3	-1.3	-0.6
Total Return	MSCI EM	15.1	-5.0	-4.6	-17.0	8.6	34.3	-16.6	15.4	15.8	-4.6	-22.4	1.7	7.9	-6.5	0.4	3.3
Total Return	MSCI DM	13.2	24.1	2.9	-2.7	5.3	20.1	-10.4	25.2	14.1	20.1	-19.5	8.4	7.0	-2.5	0.7	4.7
Total Return	3M US TSY Bill	0.1	0.1	0.0	0.1	0.3	0.9	1.9	2.3	0.7	0.0	1.5	0.7	0.3	0.3	0.1	0.7
	Sample PF: 60% SPX + 40% US AGG	*11.3*	*18.6*	*10.6*	*1.1*	*8.2*	*14.5*	*-2.6*	*22.4*	*14.0*	*16.6*	*-16.1*	*9.0*	*5.0*	*-2.5*	*0.6*	*2.5*

A generation of incredibly strong bottom-of-the-stack returns in public and private equities…

A pension, endowment, or regulated capital portfolio had to stretch to achieve return targets over the past few years…

If the return target is 7%, 9% has been good. What will it be the next 5 years?

… while all the returns for the past 10 years have been lower on the cap stack, couldn't the next 3 to 5 years be very different???

Source: 1) BB, as of 3/1/2023; 2) BB, as of 3/8/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

In a rapidly changing world today, which requires taking a bit of a time-out to take advantage of the benefit of reassessment and re-evaluation, our potential forward portfolio produces great carry with a high proportion of cash, yielding assets, and some moderate beta through this "March Madness…"

We feel that there is the possibility to build potentially very nice yielding portfolios today that could potentially create attractive returns for the coming quarters while also giving investors some room to "rest" (via cash / CP) such that they can take advantage of any opportunities going forward…

High-Quality Fixed Income Hypothetical Portfolio

	FX-Hedged Yield	Carry	Portfolio
US 6m	5.11%	5.11%	25%
CP 9-12m	5.75%	5.75%	10%
MBS 30	5.58%	5.58%	10%
US IG 10Y	5.61%	5.87%	10%
Euro IG 3-5Y	6.60%	6.85%	15%
US High Yield BB	7.09%	7.09%	5%
Euro High Yield BB	8.41%	8.41%	10%
CLO AAA	6.24%	6.24%	5%
EMBI BB	7.37%	7.37%	5%
Mexico 2Y Unhedged	11.10%	11.10%	3%
Brazil 2Y Unhedged	12.93%	12.67%	2%

Portfolio Carry	**6.5%**
Portfolio Vol (Last 3m)	**4.0%**
Portfolio Vol (LT)	**2.4%**

Lower-Quality Fixed Income Hypothetical Portfolio

	FX-Hedged Yield	Carry	Portfolio
US 6m	5.11%	5.11%	10%
CP 9-12m	5.75%	5.75%	10%
MBS 30	5.58%	5.58%	10%
US IG 10Y	5.61%	5.87%	15%
Euro IG 3-5Y	6.60%	6.85%	15%
US High Yield BB	7.09%	7.09%	10%
Euro High Yield BB	8.41%	8.41%	10%
CLO AAA	6.24%	6.24%	5%
EMBI BB	7.37%	7.37%	5%
Mexico 2Y Unhedged	11.10%	11.10%	5%
Brazil 2Y Unhedged	12.93%	12.67%	5%

Portfolio Carry	**7.0%**
Portfolio Vol (Last 3m)	**5.0%**
Portfolio Vol (LT)	**3.3%**

60/40 Benchmark

	FX-Hedged Yield	Carry	Portfolio
US 6m	5.11%	5.11%	15%
CP 9-12m	5.75%	5.75%	10%
MBS 30	5.58%	5.58%	5%
US IG 10Y	5.61%	5.87%	5%
Euro IG 3-5Y	6.60%	6.85%	10%
US High Yield BB	7.09%	7.09%	5%
Euro High Yield BB	8.41%	8.41%	5%
CLO AAA	6.24%	6.24%	3%
EMBI BB	7.37%	7.37%	2%
Mexico 2Y Unhedged	11.10%	11.10%	3%
Brazil 2Y Unhedged	12.93%	12.67%	2%
S&P	5.56%	5.56%	20%
Eurostoxx	10.07%	10.07%	15%

?

Portfolio Carry	**6.9%**
Portfolio Vol (Last 3m)	**6.6%**
Portfolio Vol (LT)	**5.6%**

Source: 4) BB, as of 3/2/2023. Index definitions are found on slides 23-28. Index returns are shown for illustrative purposes only. It is not possible to invest directly in an index. **Past performance is not indicative of future results**. Forecasts are based on estimates and assumptions. There is no guarantee that they will be achieved.

Indices

EM Hard Currency = Bloomberg Barclays EM Hard Currency Index

10Y BE = US Breakeven 10 Year

10Y Real = US Generic Govt TII 10 Year Yield

10Y Reals = US Generic Govt 10Y Real Yield

1st Month VIX Future = Generic 1st CBOE Volatility Index

20+yr Treasury = ICE US Treasury 20+ Year Total Return Index

25+yr IG YTW = Bloomberg Barclays Long Corporate Yield to Worst

3-5yr IG TR = Bloomberg Barclays US Corporate 1-3 Year TR Index

3-5yr IG YTW = Bloomberg Barclays US Corporate 1-3 Year Yield to Worst

5Y BE = US Breakeven 5Y Index

5Y Real = US Generic Govt 5Y Real Yield

7-10yr IG TR = Bloomberg Barclays Intermediate Corporate TR Index

7-10yr IG YTW = Bloomberg Barclays Intermediate Corporate Yield to Worst

Alternatives = Thomas Reuters Private Equity Buyout Index

Apartment Sales Volume = United States National Apartment Sales Volume Index

Asian Pacific (APAC) Agg = Bloomberg Barclays Asian Pacific Aggregate TR Index

Autos = S&P 500 Automobiles and Components GICS Level 2 Index

Avg. 6M Ahead Empire and Philly = Average of Empire State Manufacturing Survey 6M Ahead General Activity Index and Philly Fed 6M Ahead General Activity Index

Avg. Current Empire and Philly = Average of Empire State Manufacturing Survey General Activity Index and Philly Fed General Activity Index

Banks = S&P 500 Banks GICS Level 2 Index

Cap Goods = S&P 500 Capital Goods GICS Level 2 Index

Cash = Bloomberg Barclays 1-3 Month T-Bill Total Return Index

CEMBI Asia B = J.P. Morgan CEMBI BROAD Div Asia B

CEMBI Asia BB = J.P. Morgan CEMBI BROAD Div Asia BB

CEMBI Corp Hard Currency (CEMBI Corp HC Yield) = Hard Currency Credit 50-50 Corporates

China Aggregate = Bloomberg Barclays China Aggregate Index

CLO A = Palmer Square CLO A Price

CLO AA = Palmer Square CLO AA Price

CLO AAA = Palmer Square CLO AAA

CLO AAA = Palmer Square CLO AAA Price

CLO BB = Palmer Square CLO BB Price

CLO BBB = Palmer Square CLO BBB

CMBS Conduit A (Non-Agencies) = Morgan Stanley US Fixed Rate CMBS Conduit A

CMBS Conduit A = Morgan Stanley US Fixed Rate CMBS Conduit A

CMBS Conduit AA = Morgan Stanley US Fixed Rate CMBS Conduit AA

CMBS Conduit AA = Morgan Stanley US Fixed Rate CMBS Conduit AA

CMBS Conduit AAA = Morgan Stanley US Fixed Rate CMBS Conduit AAA

CMBS Conduit BBB = Morgan Stanley US Fixed Rate CMBS Conduit BBB

Communications/Telecom Services = S&P 500 Communication Services Sector GICS Level 1 Index

Cons. Dur. = S&P 500 Consumer Durables GICS Level 2 Index

Consumer Services = S&P 500 Consumer Services GICS Level 2 Index

Corporate Bonds = Bloomberg Barclays US Corporate TR Index

Credit Yield = Bloomberg Barclays US Corporate Yield to Worst Index

CSI 300 Index = Shanghai Shenzhen CSI 300 Index

DAX = DAX Index (German Stock Index)

Discretionary = S&P 500 Consumer Discretionary Sector GICS Level 1 Index

Diversified Financials = S&P 500 Diversified Financials GICS Level 2 Index

DM: Euro Area, Japan, UK, Australia, Canada, New Zealand, Switzerland, Norway, Sweden

Dow Transports = Dow Jones Transportation Average Index

Duke/CFO Own Company Optimism = US Duke CFO Survey Own Comp Optimism Level

DXY = US Dollar Index

EM Corp IG = J.P. Morgan CEMBI Diversified Broad High Grade Blended Spread

EM Currency Index = JP Morgan Emerging Market Currency Index

EM FX = GBI-EM FX Index

EM FX HY = .EMFXHY Index

EM GDP Growth = Goldman Sachs EM Activity Index

Indices

EM Hard Currency = Bloomberg Barclays EM Hard Currency Agg TR Index

EM HY = ICE/BofA EM HY Corporate Plus Index

EM Local = Bloomberg Barclays EM Local Currency Government TR Index

EM Sov = J.P. Morgan EMBI Global Diversified Sovereign Spread

EM: Brazil, Chile, China, Czech, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Argentina, Thailand, Turkey

EMBI EM Hard Currency (EMBI Sov HC Yield, EM Hard) = J.P,. Morgan EMBA Global TR Index

Energy = S&P 500 Energy GICS Level 1 Index

Energy = S&P 500 Energy Sector GICS Level 1 Index

ESM0 Index = S&P E-mini June 2020

EUR IG 1-3Y = Bloomeberg Euro-Aggregate: Corporate 1-3 Year Total Return

EUR IG 30Y = Bloomeberg Euro-Aggregate: Corporate 30 Year Total Return

EUR IG 3-5Y = Bloomeberg Euro-Aggregate: Corporate 1-3 Year Total Return

EUR IG 5-7Y = Bloomeberg Euro-Aggregate: Corporate 5-7 Year Total Return

EUR IG 7-10Y = Bloomeberg Euro-Aggregate: Corporate 7-10 Year Total Return

Euro 10+ Year Credit = Bloomberg Barclays Euro-Aggregate Corporate 10+ Year

Euro 10+ Year Treasury = Bloomberg Barclays Euro-Aggregate Long Treasury

Euro 1-3 Year Credit = Bloomberg Barclays Euro-Aggregate Corporate 1-3 Year

Euro 1-3 Year Treasury = Bloomberg Barclays Euro-Aggregate Treasury 1-3 Year

Euro 3-5 Year Credit = Bloomberg Barclays Euro-Aggregate Corporate 3-5 Year

Euro 3-5 Year Treasury = Bloomberg Barclays Euro-Aggregate Treasury 3-5 Year

Euro 5-7 Year Credit = Bloomberg Barclays Euro-Aggregate Corporate 5-7 Year

Euro 5-7 Year Treasury = Bloomberg Barclays Euro-Aggregate Treasury 5-7 Year

Euro 7-10 Credit= Bloomberg Barclays Euro-Aggregate Corporate 7-10 Year

Euro Agg = Bloomberg EuroAgg Total Return Index

Euro Credit = Bloomberg Barclays Pan-Euro HY Index

Euro HY (High Yield) B = Bloomberg Barclays Euro HY B Rating Only TR Index

Euro HY (High Yield) BB = Bloomberg Barclays Euro HY BB Rating Only TR Index

EuroAgg HY = Bloomberg Barclays Euro HY 3% TR Index

EuroAgg IG = Bloomberg Barclays Euro Aggregate Corporate TR Index

Eurostoxx = Eurostoxx 50 Index

Financials = S&P 500 Financials Sector GICS Level 1 Index

Food and Beverage = S&P 500 Food, Beverage & Tobacco GICS Level 2 Index

Food Retail = S&P 500 Food and Staples Retailing GICS Level 2 Index

France 10Y = France 10 Y Yield

FTSE MIB = FTSE MIB Index

GBI EM Local Currency = J.P. Morgan GBI-EM USD Index

Germany 10Y = Generic Germany 10 Yr

Germany 2Y = Generic Germany 2 Yr

Germany 30Y = Generic Germany 30 Yr

Germany 5Y = Generic Germany 5 Yr

Global Aggregate (Global Agg) = Bloomberg Barclays Global Aggregate TR Index

Global Manufacturing PMI = JPM/IHS Markit Global Manufacturing PMI

Global Treasury = Bloomberg Barclays Global Aggregate Treasuries Index

Government Bonds= Bloomberg Barclays US Long Treasury TR Index

Growth = S&P 500 Growth Index

GS Secular Growth = Goldman Sachs Secular Growth Index

GS US FCI = Goldman Sachs US Financial Conditions Index

GS Value Long = GS Long Value Index

Healthcare = S&P 500 Healthcare Sector GICS Level 1 Index

Healthcare Equipment = S&P 500 Healthcare Equipment GICS Level 4 Index

Hedge Fund Crowding = GS Hedge Fund Crowding Index

HH Products = S&P 500 Household and Personal Products GICS Level 2 Index

High Yield Muni = Bloomberg Barclays Muni High Yield TR Index

Household Products = S&P 500 Household Products GICS Level 4 Index

Housing Market Index = NAHB Market Index

HY = Bloomberg Barclays US High Yield Index

Indices

HY OAS = Bloomberg Barclays US Corporate HY Index

HY Spread (US HY OAS) = Bloomberg Barclays High Yield OAS Index

HY Yield = Bloomberg Barclays US Corporate YW Index

IG OAS = Bloomberg Barclays US Corporate OAS Index

IG Yield = Bloomberg Barclays US Corporate YW Index

Industrials = S&P 500 Industrials GICS Level 1 Index

Inflation = US CPI YoY

Insurance = S&P 500 Insurance GICS Level 2 Index

Intermediate Agg = Bloomberg U.S. Agg Intermediate Total Return Index

Intermediate US IG (US Intermediate Credit)= Bloomberg Barclays Intermediate Corporate Agg

IPO Basket = UBXXIPO Index

ISM Manufacturing Index = ISM Manufacturing Index

ISM Manufacturing New Orders = ISM Manufacturing Report on Business New Orders

Italy 10Y = Italy Generic Govt 10 Y Yield

Japan 10Y = Japan Generic Govt 10Yr Yield

Japan 2Y = Japan Generic Govt 2Yr Yield

Japan 30Y = Japan Generic Govt 30Yr Yield

Japan 5Y = Japan Generic Govt 5Yr Yield

JPM EM FX Index = JP Morgan Emerging Markets Currency Index

JPM EMBIA Global Spread (EMBI Spread) = = JP Morgan EMBI Global Spread Index

KOSPI = Korea Stock Exchange KOSPI Index

Large Cap = S&P 500 Index

Loans = S&P/LSTA US Leveraged Loan 100 Index

Long Muni = Bloomberg Barclays Long Muni TR Index

Long US IG (US Long Credit) = Bloomberg Barclays Long-Term Corporate Agg

Long-Short Value Factors Diffusion Index = JPM Long-Short Value Factors Diffusion Index

Materials = S&P 500 Materials Sector GICS Level 1 Index

MBA US Purchase Index = MBA US Purchases Index

Media = S&P 500 Media GICS Level 2 Index

Mortgage Refi Index = MBA US Refinancing Index

MSCI DM = MSCI Developed Markets Index

MSCI EM = MSCI Emerging Markets Index

MSCI World = MSCI World Index

MSCI World Index = MSCI World Index

Muni 10Y = Bloomberg Barclays 10Y Muni TR Index

Muni 3Y = Bloomberg Barclays 3Y Muni TR Index

Muni 5Y = Bloomberg Barclays 5Y Muni TR Index

NAR Housing Affordability Index =

Nasdaq Composite Index = Nasdaq Composite Index

Nasdaq Composite Index = Nasdaq Composite Index

NDX Index = NASDAQ 100 Stock Index

NDXE = NASDAQ 100 Equal Weighted Index

NFIB Percent of Firms with Positions Hard to Find = NFIB Small Business Job Openings Hard to Fill

Nikkei = Nikkei 225 Index

Pan-Euro Aggregate = Bloomberg Barclays Pan-European Aggregate Index

Pan-Euro HY = Bloomberg Barclays Pan-European High Yield Index

Pharma= S&P 500 Pharmaceuticals GICS Level 3 Index

Portugal 10Y = Portugal 10 Year Government Bond Yield

Private Assets = PrEQIn Private Capital Quarterly Index

Private Assets = Russell 2000

Professional (Prof) Services = S&P 500 Professional Services GICS Level 2 Index

Real Estate = S&P 500 Real Estate GICS Level 1 Index

Real Output per Hour = Nonfarm Business Sector Real Output per Hour Index

Retailing = S&P 500 Retailing GICS Level 2 Index

Russell 2000 = Russell 2000 Index

S&P 500 High Dividend = S&P 500 High Dividend Index

Indices

S&P Insurance Index= S5INSU Index

Semis = S&P 500 Semiconductors GICS Level 2 Index

SHCOMP = Shanghai Stock Exchange Composite Index

Short US IG (US Short Credit) = Bloomberg Barclays Short-Term Corporate Agg

Small Biz Confidence = NFIB Small Business Optimism Index

Small Cap = Russell 2000 Index

Software Services = S&P 500 Software Services GICS Level 2 Index

Spain 10Y = Spain Generic Govt 10Y Yield

SPX = S&P 500 Index

Stable Growth Stocks = GSTHSTGR Index

Staples = S&P 500 Consumer Staples Sector GICS Level 1 Index

Stoxx Europe 600 = Stoxx Europe 600 Index

SX5E = Euro Stoxx 50 Price EUR

Tech Hardware = S&P 500 Technology Hardware GICS Level 2 Index

Transportation = S&P 500 Transportation GICS Level 2 Index

Treasuries = Bloomberg Barclays US Treasuries Index

Treasury Bills= Bloomberg Barclays US Short Treasury TR Index

UK 10-15 Year Credit = Bloomberg Barclays Sterling Corporate 10-15 Year

UK 15+ Year Credit = Bloomberg Barclays Sterling Corporate 15+ Year

UK 5-7 Year Credit = Bloomberg Barclays Sterling Corporate 5-7 Year

UK 7-10 Year Credit = Bloomberg Barclays Sterling Corporate 7-10 Year

UK IG 1-3Y = Bloomberg Sterling Corporate 1-3 year Index

UK IG 1-5Y = Bloomberg Sterling Corportate 1-5 year Index

UK IG 5-7y = Bloomberg Sterling Corporate 5-7 year Index

UK IG 7-10Y = Bloomberg Sterling Corporate 7-10 year Index

UKX = FTSE 100 Index

UMich Consumer Sentiment = University of Michigan Consumer Sentiment Index

UMich Expected Change in Prices = UMich Expected Change in Prices During the Next 5-10 Years: Median

US 10+ Treasury = Bloomberg Barclays US Long Treasury

US 10Y = US Generic Govt 10 Year Yield

US 10Y30Y = USD Forward Swap 10Y30Y

US 1-3 Year Corporate = Bloomberg Barclays US 1-3 Year Corporate TR Index

US 1-3 Year Treasury = Bloomberg Barclays US Treasury 1-3 Year

US 2Y (2Y) = US Generic Govt 2 Year Yield

US 2Y2Y = USD Forward Swap 2Y2Y

US 2Y5Y = USD Forward Swap 2Y5Y

US 30Y = US Generic Govt 30 Year Yield

US 3-5 Year Treasury = Bloomberg Barclays US Treasury 3-5 Year

US 3-5Y Treasury TR = Bloomberg Barclays US 3-5 Treasury TR Index

US 3-5Y Treasury YTW = Bloomberg Barclays US 3-5 Treasury YTW Index

US 5-7 Year Treasury = Bloomberg Barclays US Treasury 7-10 Year

US 5Y = US Generic Govt 5 Year Yield

US 5Y10Y = USD Forward Swap 5Y10Y

US ABS = Bloomberg Barclays US ABS TR Index

US Agency = Bloomberg Barclays US Agg Agency Total Return Index

US Aggregate (US Agg) = Bloomberg Barclays US Aggregate Total Return Index

US Aggregate 1-3 Year = Bloomberg Barclays US Aggregate 1-3 Year Total Return Index

US Aggregate 3-5 Year = Bloomberg Barclays US Aggregate 3-5 Year Total Return Index

US Aggregate 5-7 Year = Bloomberg Barclays US Aggregate 5-7 Year Total Return Index

US Aggregate 7-10 Year = Bloomberg Barclays US Aggregate 7-10 Year Total Return Index

US B = J.P. Morgan Domestic High Yield B STW

US BB = J.P. Morgan Domestic High Yield BB STW

US BB Credit (BB) = Bloomberg Barclays BB Corporate Index

US BE 10Y (10Y BEs) = US Breakeven 10Y Index

US BE 3Y = US Breakeven 3Y Index

US CMBS = Bloomberg Barclays US CMBS TR Index

Indices

US Corporate (US IG, Corporate Bond, IG) = Bloomberg Barclays US Corporate TR Index

US Corporate 1-5Y = LDC5TRUU Index

US Credit (IG) = Bloomberg Barclays US Corporate Agg

US Floating Rate Notes = BFRNTRUU Index

US Government Related = Bloomberg Barclays US Aggregate: Government-Related Total Return Index Value

US Government/Credit = Bloomberg Barclays US Government/Credit Bond Index

US High Yield (US HY, HY) = Bloomberg Barclays US Corporate High Yield TR Index

US HY (High Yield) B = Bloomberg Barclays B Corporate OAS Index

US HY (High Yield) BB = Bloomberg Barclays BB Corporate OAS Index

US HY CCC = Bloomberg Barclays CCC Corporate OAS Index

US HY Energy = Bloomberg Barclays High Yield Energy Total Return Index Value

US HY Energy B = Bloomberg Barclays B US High Yield Index

US HY Energy BB = Bloomberg Barclays Ba U.S. High Yield Index

US HY Energy CCC = Bloomberg Barclays Caa US High Yield Index

US HY Ex Energy = Bloomberg Barclays US High Yield ex Energy Total Return Index Value

US IG 10+ Y = Bloomberg Barclays US Aggregate Corporate 10+ Year Index

US IG 1-3 Y = Bloomberg Barclays US Aggregate Corporate 1-3 Year Index

US IG 3-5 Y = Bloomberg Barclays US Corporate 3-5 years Average OAS

US IG 3-5 Y = Bloomberg Barclays US Aggregate Corporate 3-5 Year Index

US IG 5-7 Y = Bloomberg Barclays US Aggregate Corporate 5-7 Year Index

US IG 7-10 Y = Bloomberg Barclays US Aggregate Corporate 7-10 Year Index

US IG A (Single A) = Bloomberg Barclays A Corporate OAS Index

US IG AA = Bloomberg Barclays Aa Corporate OAS Index

US IG AAA = Bloomberg Barclays Aaa Corporate OAS Index

US IG BBB (BBB) = Bloomberg Barclays BBB Corporate OAS Index

US IG Duration = Bloomberg Barclays US Agg Corporate Statistics Modified Adjusted Duration

US IG Maturity = Bloomberg Barclays US Agg Corporate Maturity

US IG OAS = Bloomberg Barclays Corporate OAS Index

US IG Spread = Bloomberg Barclays US Agg Corporate Average OAS

US IG TR = Bloomberg Barclays US Corporate TR Index

US IG YTW = Bloomberg Barclays US Corporate YTW Index

US IG/HY Basic Industry = Bloomberg Barclays Basic Industry IG/HY TR Index

US IG/HY Capital Goods = Bloomberg Barclays Capital Goods IG/HY TR Index

US IG/HY Communications = Bloomberg Barclays Communications IG/HY TR Index

US IG/HY Consumer Cyclicals = Bloomberg Barclays Consumer Cyclicals IG/HY TR Index

US IG/HY Consumer Non-Cyclical = Bloomberg Barclays Consumer Non-Cyclical IG/HY TR Index

US IG/HY Energy = Bloomberg Barclays Energy IG/HY TR Index

US IG/HY Financial Institutions = Bloomberg Barclays Financial Institutions IG/HY TR Index

US IG/HY Technology = Bloomberg Barclays Technology IG/HY TR Index

US IG/HY Transportation = Bloomberg Barclays Transportation IG/HY TR Index

US IG/HY Utility = Bloomberg Barclays Utility IG/HY TR Index

US Intermediate Corporate/Credit = Bloomberg Barclays US Intermediate Corporate TR Index

US Intermediate Treasury = Bloomberg Barclays US Intermediate Treasury TR Index

US Long Aggregate = Bloomberg Barclays US Aggregate Long Total Return Index

US Long Corporate/Credit (US Long IG) = Bloomberg Barclays US Long Corporate TR Index

US Long IG (US Long Credit) = Bloomberg Barclays US Long Corporate Aggregate Index

US Long Treasury = Bloomberg Barclays US Long Treasury TR Index

US MBS (MBS) = Bloomberg Barclays US MBS TR Index

US Municipals = Bloomberg Barclays Municipal Bond Total Return Index

US Pending Home Sales = US Pending Home Sales Index

US PMI Services Employment Index = IHS Markit US Services Employment PMI Index

US Securitized = Bloomberg Barclays US Securitized TR Index

US Short Treasury = Bloomberg Barclays US Short Treasury TR Index

US Tech = S&P 500 Technology Sector GICS Level 1 Index

US Trade Weighted Broad Dollar = US Trade Weighted Broad Dollar 1997=100

US Treasury (Treasury Bond) = Bloomberg Barclays US Aggregate Government TR Index

Indices

US Treasury 25+Y: = Bloomberg Barclays US Treasury 25+Y Index

US Treasury Duration = Bloomberg Barclays US Agg Treasury Statistics Modified Adjusted Duration

US Yield to Worst = Bloomberg Barclays US Agg YTW Index

USD Index = DXY Index (US Dollar Index Spot Rate)

Utilities = S&P 500 Utilities GICS Level 1 Index

UXM0 Index = CBOE Volatility Index June 2020

UXX0 = CBOE Volatility Index November 2020

Value = S&P 500 Value Index

World Trade Volume Index = CPB Merchandise: World Trade Volume Index

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Virginia Retirement System

Notes

Fireside Chat:
Emerging Markets Debt

Kristin Ceva
Managing Principal
Payden & Rygel

Hosted by Greg Oliff
Co-Director, Fixed Income Management

Kristin Ceva ● Managing Principal

Payden & Rygel

Kristin Ceva is a Managing Director at Payden & Rygel. Kristin is a member of the firm's Investment Policy Committee and is a Senior Portfolio Manager directing the firm's emerging market debt strategies. She also is a frequent speaker at industry forums, focusing on topics related to international investing and emerging markets.

Prior to joining Payden & Rygel, Kristin worked as a consultant for Deloitte & Touche, and with a number of international policy institutes including: the Pacific Council on International Policy, the Center for U.S.-Mexican Studies and the North America Forum at Stanford University.

Kristin serves as board member for EMpower, a non-profit organization founded by emerging markets financial professionals to support at-risk youth and is on the California Committee of Human Rights Watch.

Kristin earned a PhD from Stanford University in Political Science with an emphasis on international political economy. She was a Fulbright Scholar based in Mexico City. Kristin has completed extensive economic and political research on emerging markets and is fluent in Spanish. She received a BBA in Finance from Texas A&M University.

Virginia Retirement System

Fireside Chat: Kristin Ceva
Emerging Markets Debt

Hosted by Greg Oliff
Co-Director, Fixed Income Management

Virginia Retirement System

Notes

Guest Speaker:
Interpreting the Macro Environment

Richard Murrall
Managing Director,
Multi-Asset Strategies & Solutions
BlackRock

Guest Speaker: Interpreting the Macro Environment

Richard Murrall ● Managing Director, Multi-Asset Strategies & Solutions

BlackRock

Richard Murrall, CFA, Managing Director, is Head of EMEA and Co-Head of US Institutional Clients for the Global Tactical Asset Allocation (GTAA) team – a part of the Multi-Asset Strategies & Solutions group. He is also responsible for the team's Thematic Research efforts.

The Multi-Asset Strategies & Solutions (MASS) team is the investment group at the heart of BlackRock's portfolio construction, asset allocation, and active management ecosystem. MASS draws on the full toolkit of BlackRock's index, factor, and alpha-seeking investment capabilities to deliver precise investment outcomes and cutting-edge alpha insights. Mr. Murrall is responsible for ensuring that the discretionary alpha insights of the GTAA team are scaled across the MASS platform and implemented in whole portfolio solutions along with pure alpha-seeking client accounts.

Mr. Murrall's service with the firm dates back to 2010. He earned a BS, with first class honors, in economics from the University of Warwick.

Richard Murrall
Managing Director

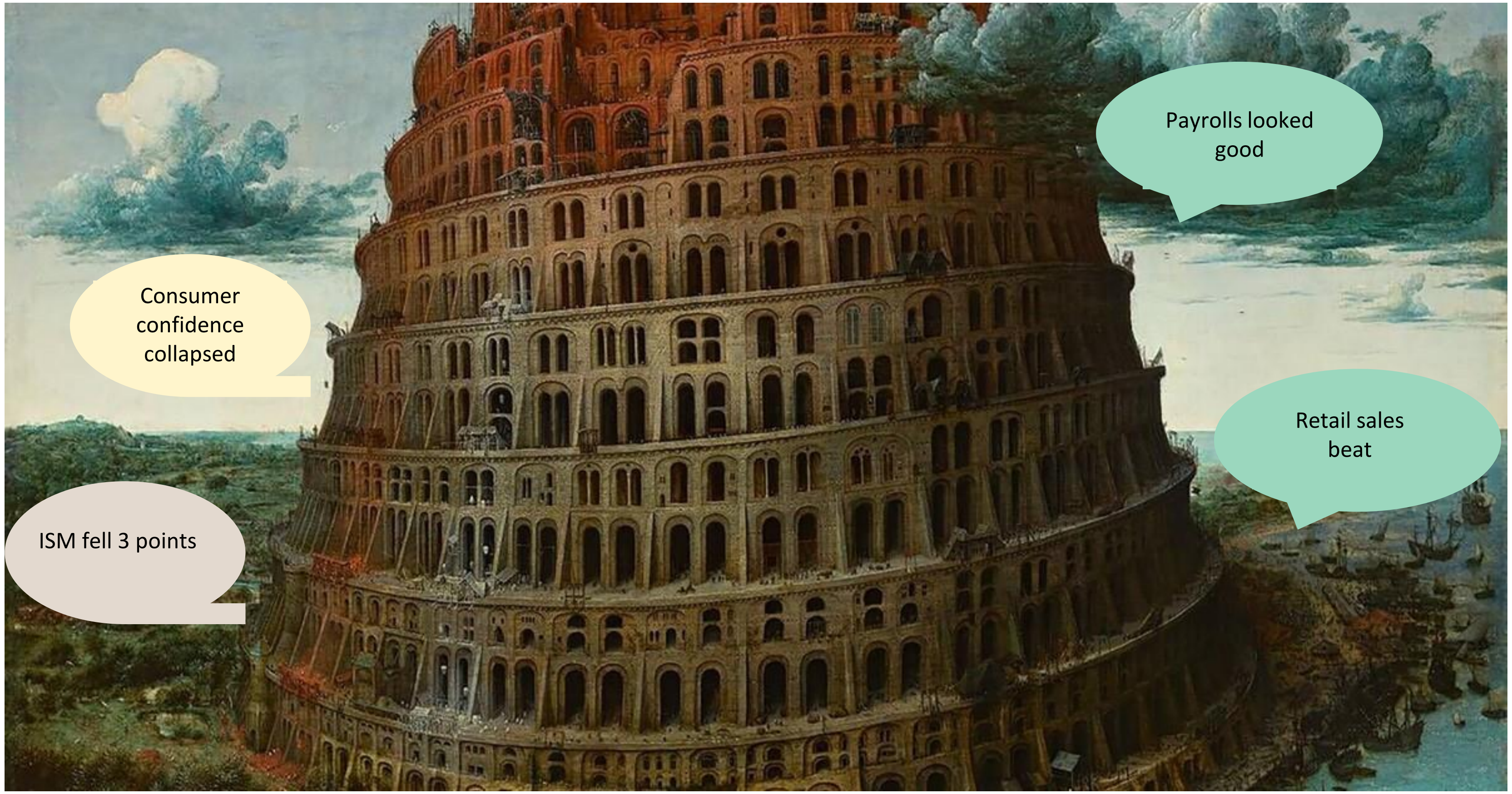
March 21, 2023

BlackRock®

Interpreting the Macro Environment

Virginia Retirement System Board of Trustees Retreat

Avoiding Macro Babylon Can Be Difficult



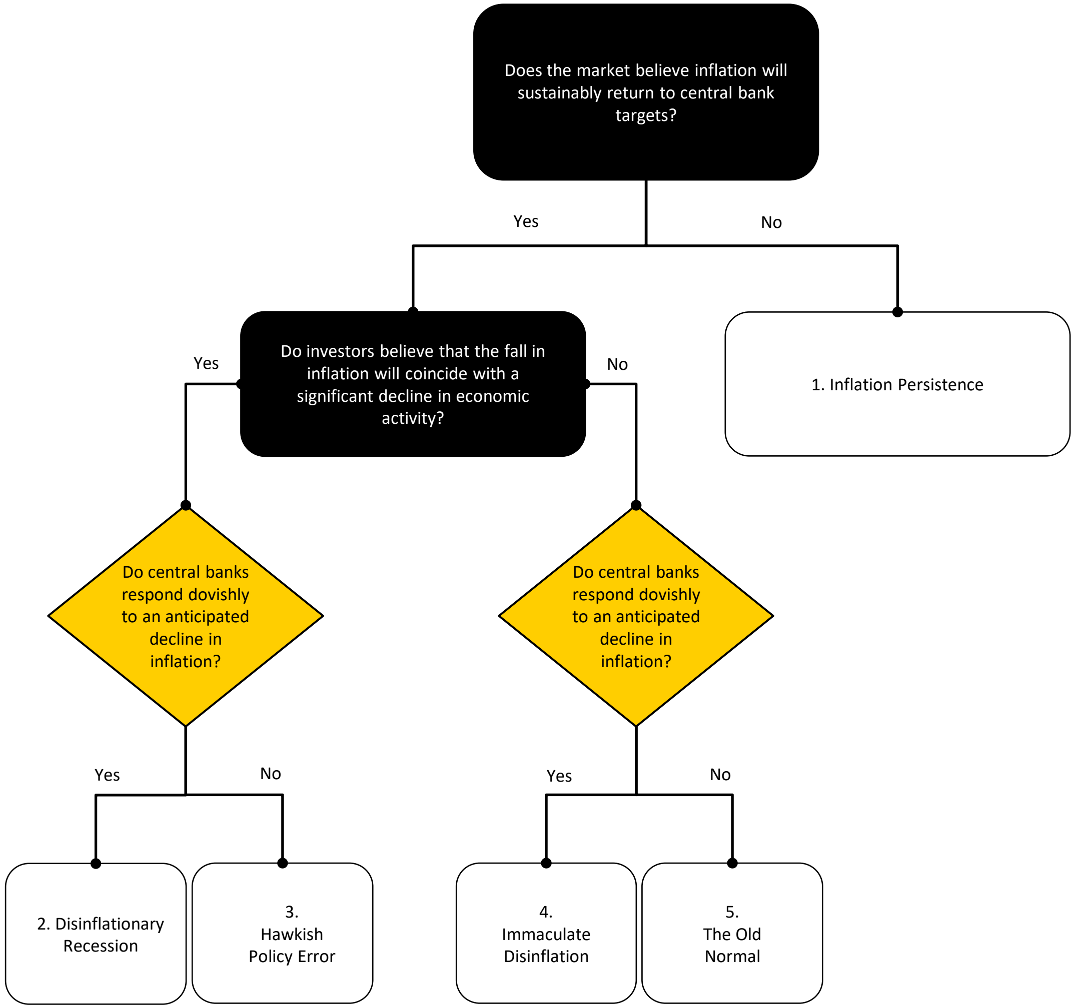
For illustrative purposes only

2023: Key topics and scenarios

- In order to arrive at the right macro answers for 2023, **it is first necessary to ask the right questions.**
- We believe the remainder of 2023 will likely be more nuanced than 2022 as investors assess the **following three sequential questions:**

1) Does the market believe inflation will sustainably return to central bank targets?
2) Do investors believe that the fall in inflation will coincide with a significant deterioration in economic activity?
3) Do central banks respond dovishly to an anticipated decline in inflation?

We have developed a range of scenarios to cover the permutations of answers to these questions.



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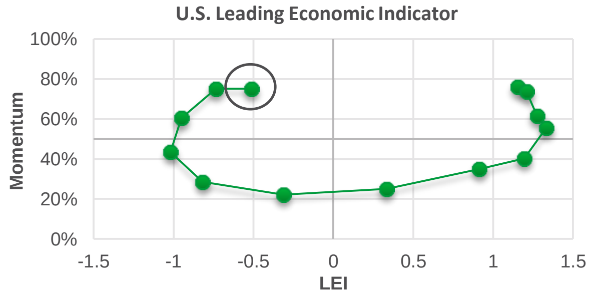
Different Asset Classes Have Common Underlying Drivers

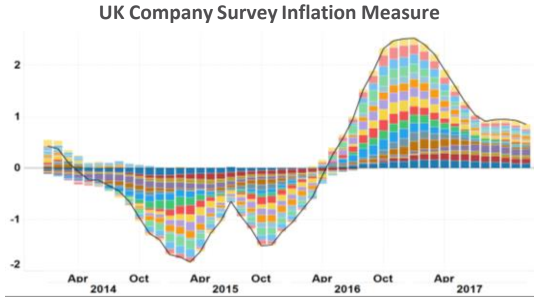
Growth

- Cyclical turning points – a consistent forecaster of potential equity returns
- Composition of growth – consumer vs. manufacturing, inventory cycles, fiscal



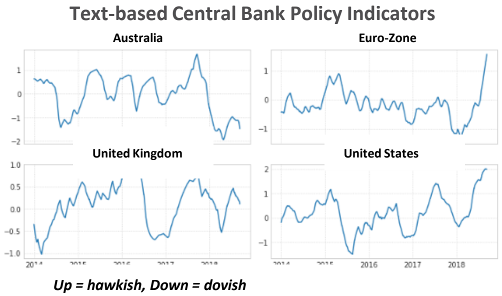
Inflation

- Nominal bonds highly sensitive to shifts in inflation expectations
- Exchange rate changes - important for small, open economies and emerging market bonds



Policy

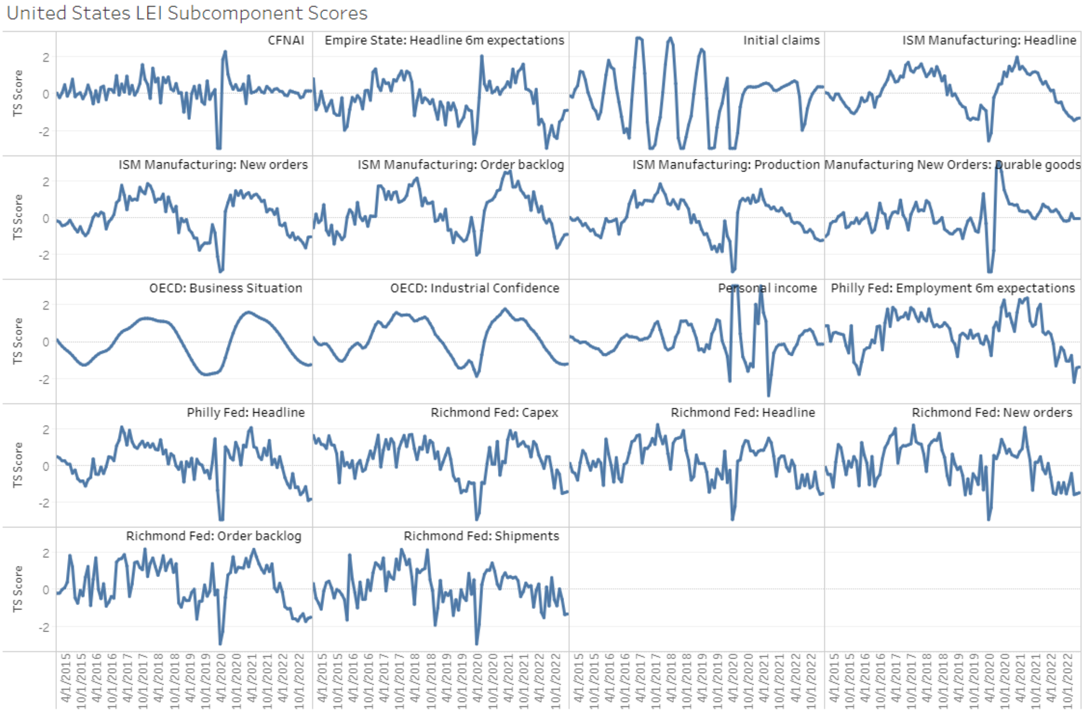
- Shifts in monetary policy expectations create relative value across yield curves
- Fiscal policy and structural reform in EMs create regime changes in exchange rates



For illustrative purposes only. Source: BlackRock. Data as of March 2023

Growth: Separating Signal from Noise

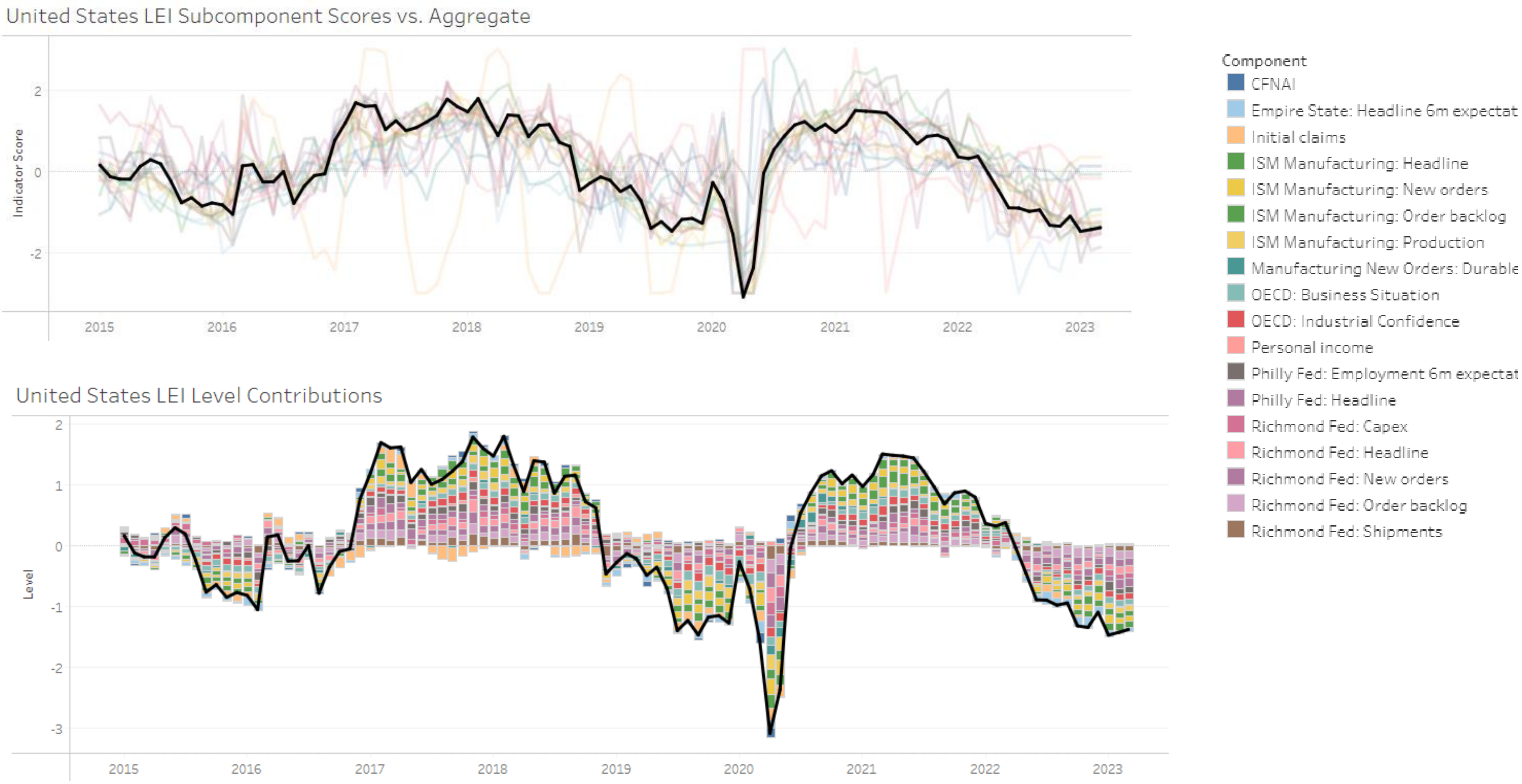
- We identify the most relevant macro time-series and then transform, score, and smooth them to ensure comparability – each individual series is synthesized into an aggregated indicator using Principal Component Analysis (PCA).



Source: BlackRock. Data as of March 2023

Growth: Separating Signal From Noise

- Principal Component Analysis upweights indicators that are least sensitive to idiosyncratic noise and allows us to focus on extracting the common business cycle component.



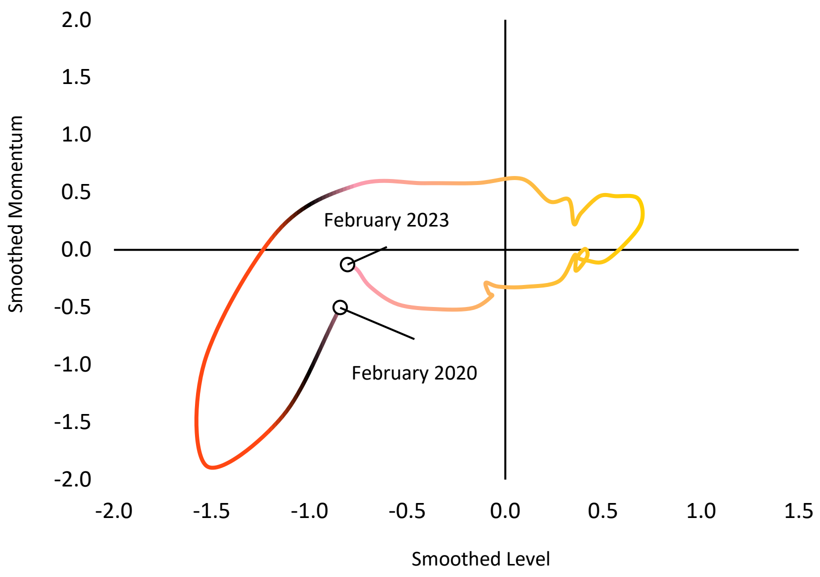
Source: BlackRock. Data as of March 2023

Growth: Recent Acceleration Driven By EU & China

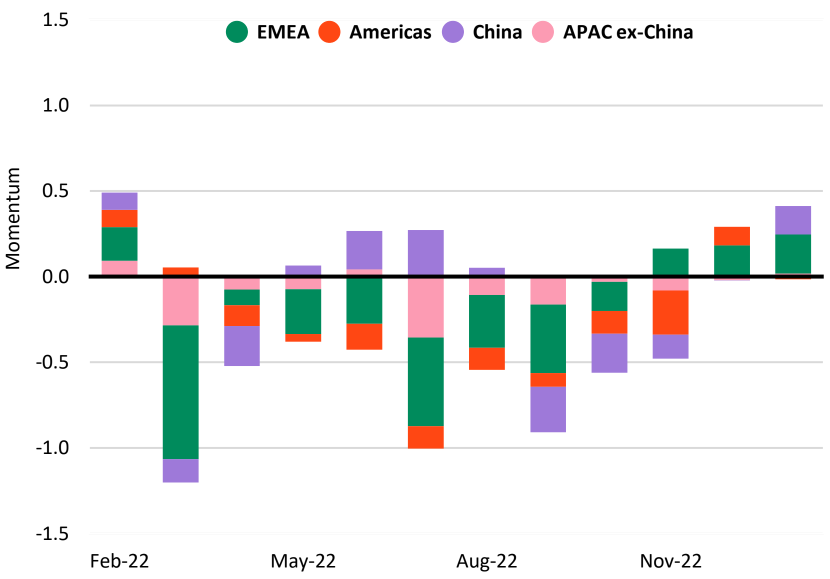
- Activity moved from the weak and declining phase at the onset of the pandemic to above trend and accelerating in 2021 before consistently declining in 2022. This year **global growth has accelerated**.

- The Chinese reopening impulse was an important driver of improvement in leading indicator momentum, but it's worth noting that **gains were broad-based** with European activity benefiting from the abatement of the energy crisis.

Global Leading Economic Indicator (LEI)

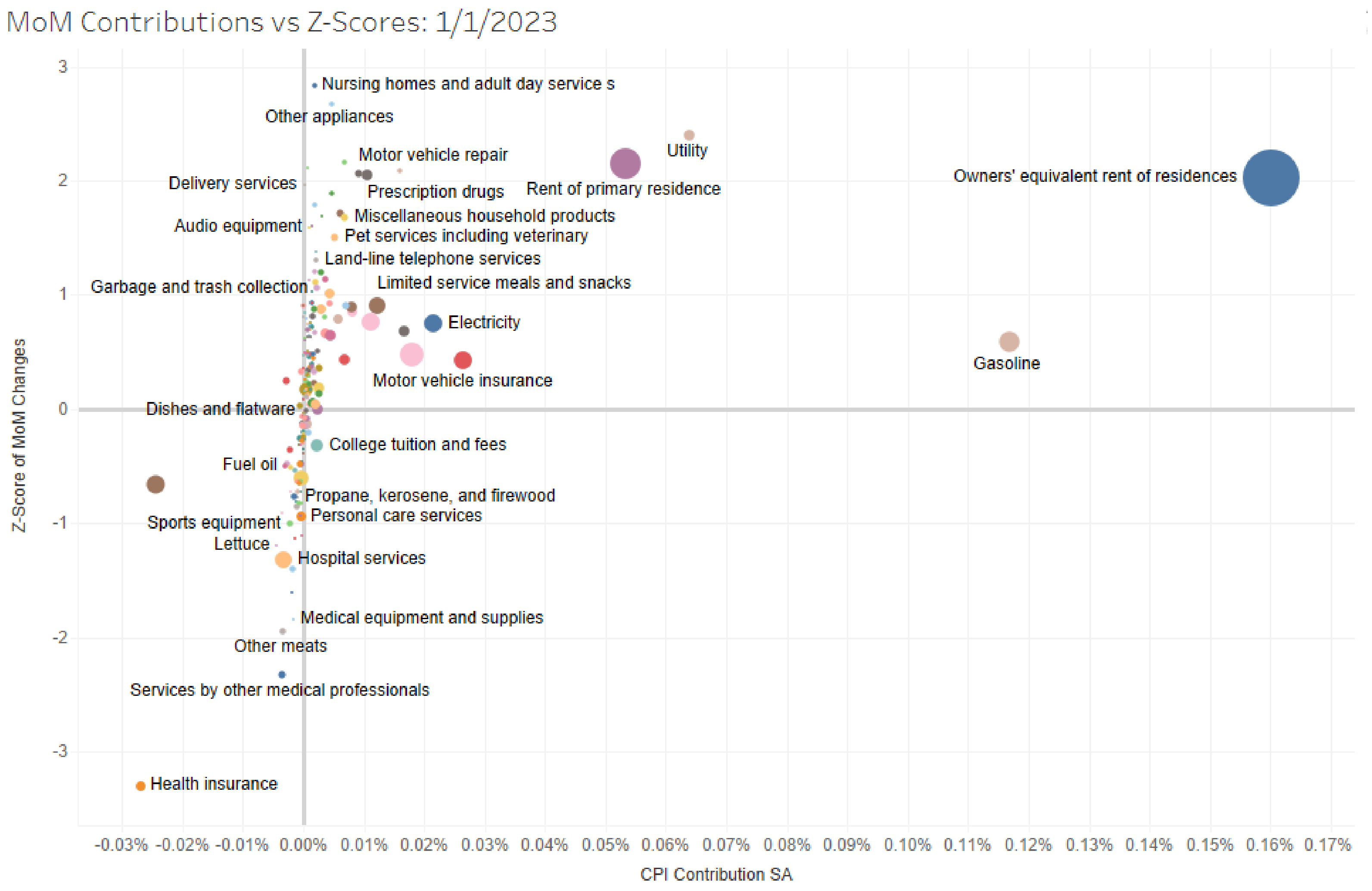


LEI Momentum Contributions



Source: BlackRock. Data as of March 2023

Inflation: Unpacking the US CPI Basket



Source: BlackRock. Data as of March 2023

Inflation: Alternative Indicators

- Our alternative inflation indicators average across 4 different noise-reducing constructions:

  CPI-XX: Excludes extreme moves in basket items (more than 2 standard deviations in the month)

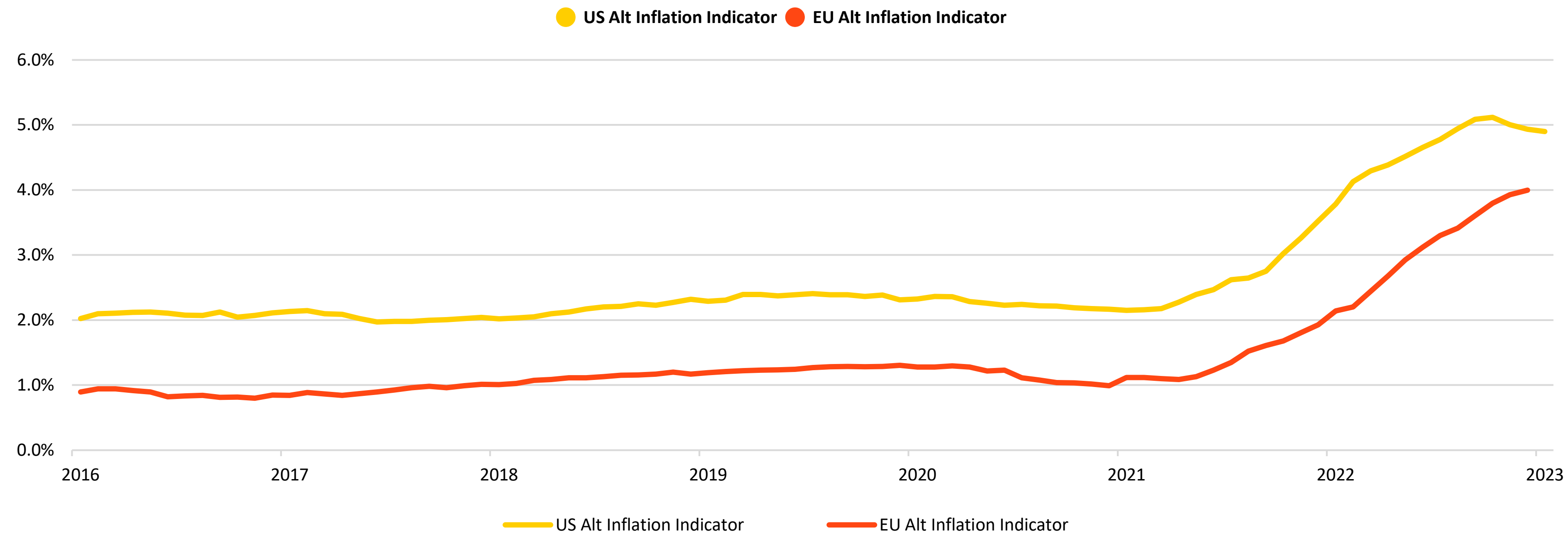
  Inverse-Variance (IV) CPI: Each basket item’s weight is inversely proportional to its variance

  IVXX CPI: Applies the inverse-variance weighting scheme and also excludes monthly outliers

  Trimmed-mean CPI: Excludes the items that fall into the tails of the monthly price changes distribution

- Recent data is broadly consistent with **gentle disinflation rather than the rapid convergence to target** that markets are pricing.

Alternative Inflation Indicators



Source: BlackRock. Data as of March 2023

Policy: Using Unstructured Data To Track Central Banks

- We leverage unstructured data to measure the policy stance of global central banks.
- We combine **the quantitative analysis of text data via Natural Language Processing** with **fundamental judgement to interpret policy.**
- This tool is powerful for interpreting the **direction of change** and the **level of policy stance at the country-level** as well as **comparing policy stance across global central banks**.

Manuscript

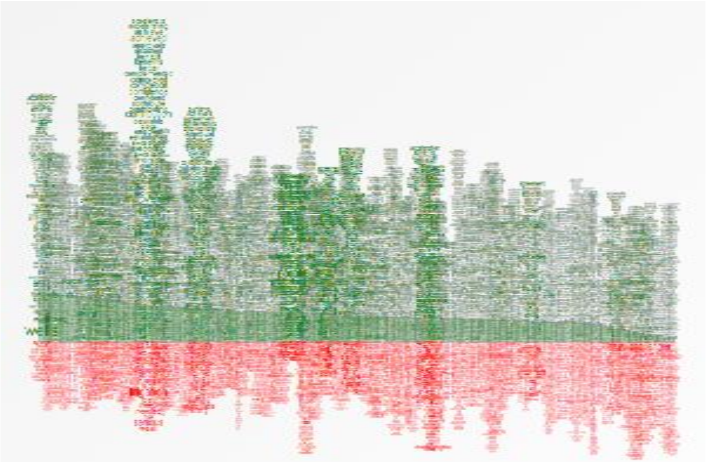
FEDERAL RESERVE press release

For release at 2 p.m. EST

January 30, 2019

Information received since the Federal Open Market Committee met in December indicates that the labor market has continued to strengthen and that economic activity has been rising at a solid rate. Job gains have been strong, on average, in recent months, and the unemployment rate has remained low. Household spending has continued to grow strongly, while growth of business fixed investment has moderated from its rapid pace

Aggregate



Source: BlackRock. For illustrative purposes only.

Why Might Markets Misprice Macro Regimes?

- **Failure to distinguish between leading/lagging/coincident data:** There are thousands of macro time series released each month; it's not an easy task to identify which of them are forward-looking.

- **Failure to properly incorporate all data:** The human brain does not have comparative advantage over technology in processing the universe of millions of structured and unstructured data points we receive each month.

- **Confirmation bias:** Interpreting all incoming information through the lens of a chosen narrative. This tends to make the burden of proof for evidence of regime shift away from your prior excessively high. Contradictory data is underweighted.

- **Anchoring to the forecast:** Adjustment away from the "anchor" of recent data/historic trend tends to be too conservative as incoming data is underweighted. Campbell and Sharpe (2007)* demonstrate this empirically.

- **Defend the forecast mentality / endowment effect:** Having dedicated great time and energy to coming up with forecasts, the endowment effect kicks in as forecasters become emotionally attached to their forecasts. The sense of personal attachment makes the threshold for change relatively high.

- **Hindsight bias:** A tendency to believe that you correctly forecast previous outturns. This leads to excessive confidence in forecasting ability and a corresponding reluctance to accept evidence that the actual outturn differs from your predicted outturn.

Empirical evidence supports the idea that forecasters are too conservative…

- Most of the above biases suggest a conservatism in responding to incoming information. This is consistent with empirical work:

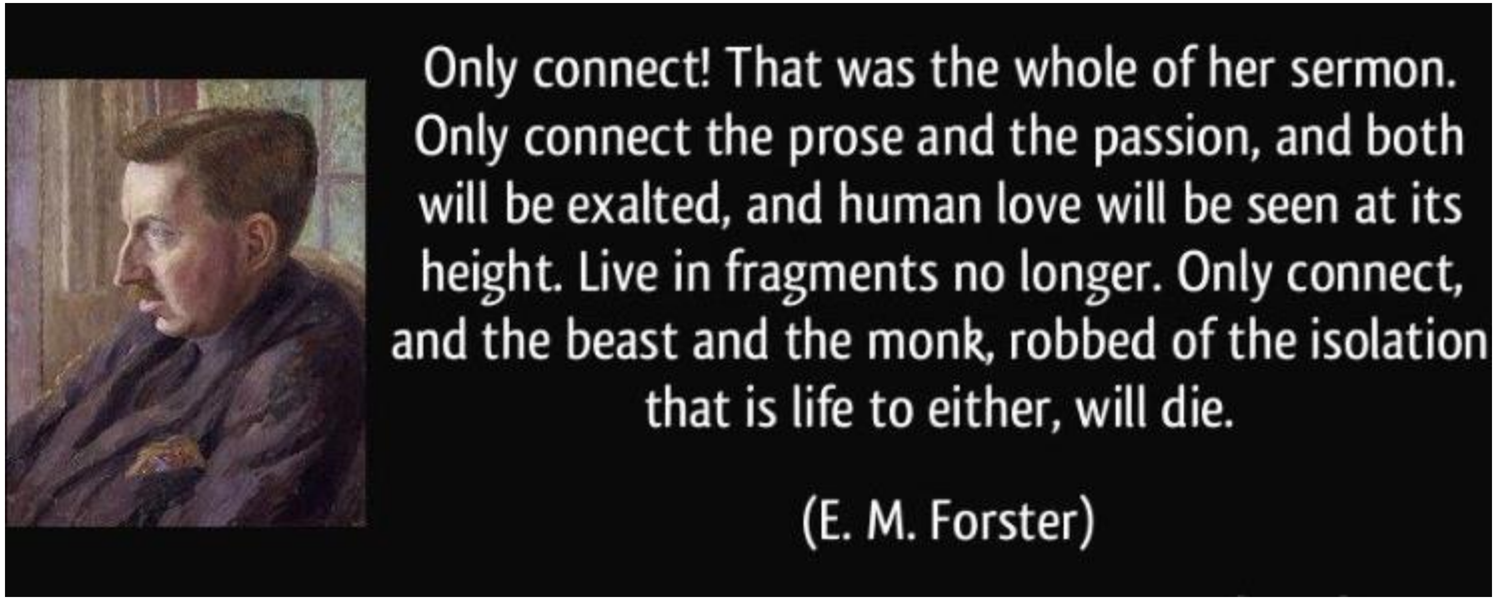
- Several papers* gauge forecast accuracy by running the following regression:

$$\text{Actual data}_t = \beta_1 \text{Forecast data}_t + \varepsilon_t$$

- They find that the beta estimate is typically greater than 1; **consensus forecasts are too conservative and have to be amplified by a coefficient of greater than 1 to fit the actual data**. Moreover, forecast changes tend to be positively serially correlated suggesting only a gradual adjustment to new information.

* E.g. *Anchoring Bias in Consensus Forecasts and its Effect on Market Prices*, Campbell and Sharpe (2007), Federal Reserve Board

Connecting Data And Context



For illustrative purposes only.

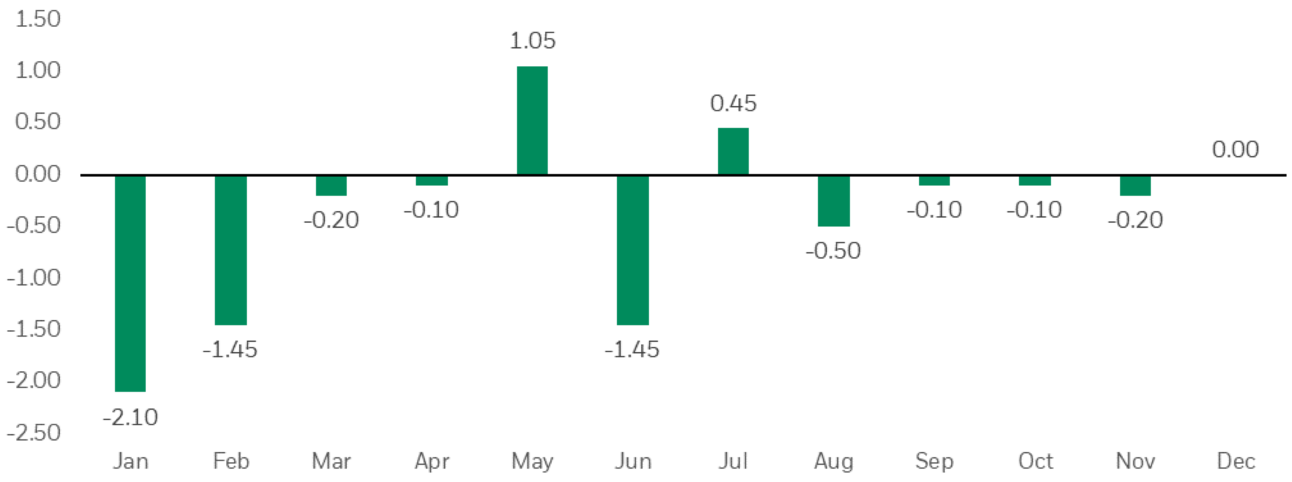
Don’t Take It Out Of Context

- Objective and austere analysis of macro data is an important starting point in our investment process – but incorporating context in a structured manner is critical to generating alpha.

- US growth data for December (received in January) provided a timely illustration of the importance of context – while data uniformly surprised to the downside, the backdrop of historically cold weather in peak spending season suggested the reported slowing was not driven by underlying weakness.

- We used the associated decline in bond yields as an opportunity to add underweight fixed income positions that we subsequently removed as economic data bounced back the following month.

Median Monthly Change in ISM in Periods of Extreme Cold

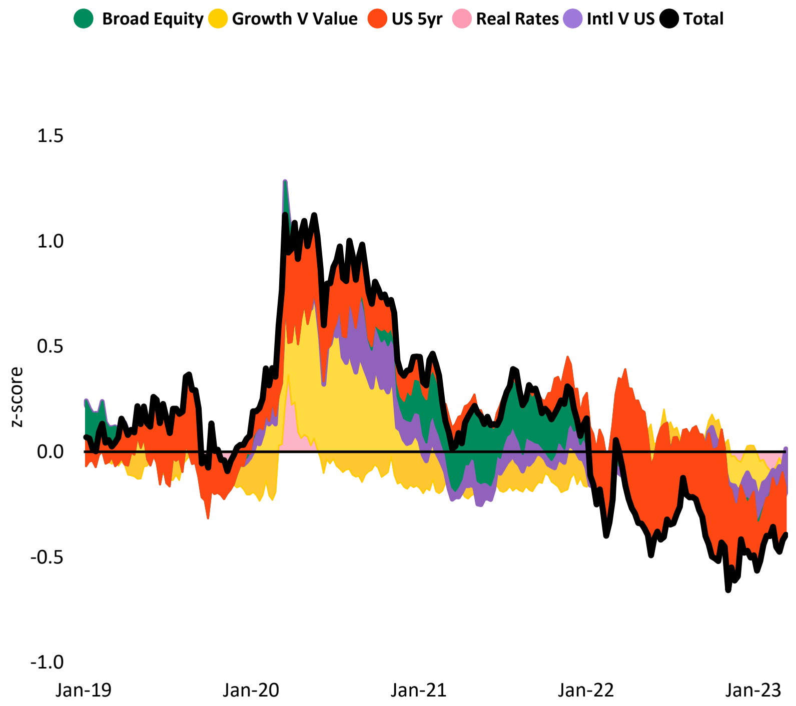


Source: BlackRock. For illustrative purposes only.

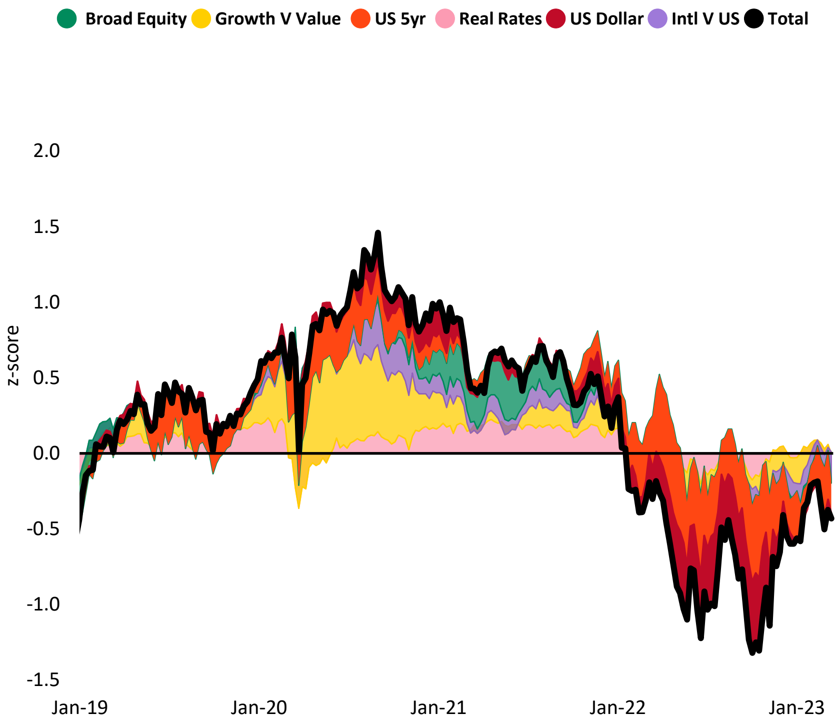
Connecting Macro and Pricing

- Our key focus is on identifying instances in which market pricing is diverging from our interpretation of the macro environment. We have developed pricing factors for each of the previously laid out scenarios to support this endeavour.
- The Immaculate Disinflation and Disinflationary Recession pricing factors show that the **market priced in a higher likelihood of these scenarios at the turn of the year** before reversing in February.

Scenario Pricing: Disinflationary Recession



Scenario Pricing: Immaculate Disinflation

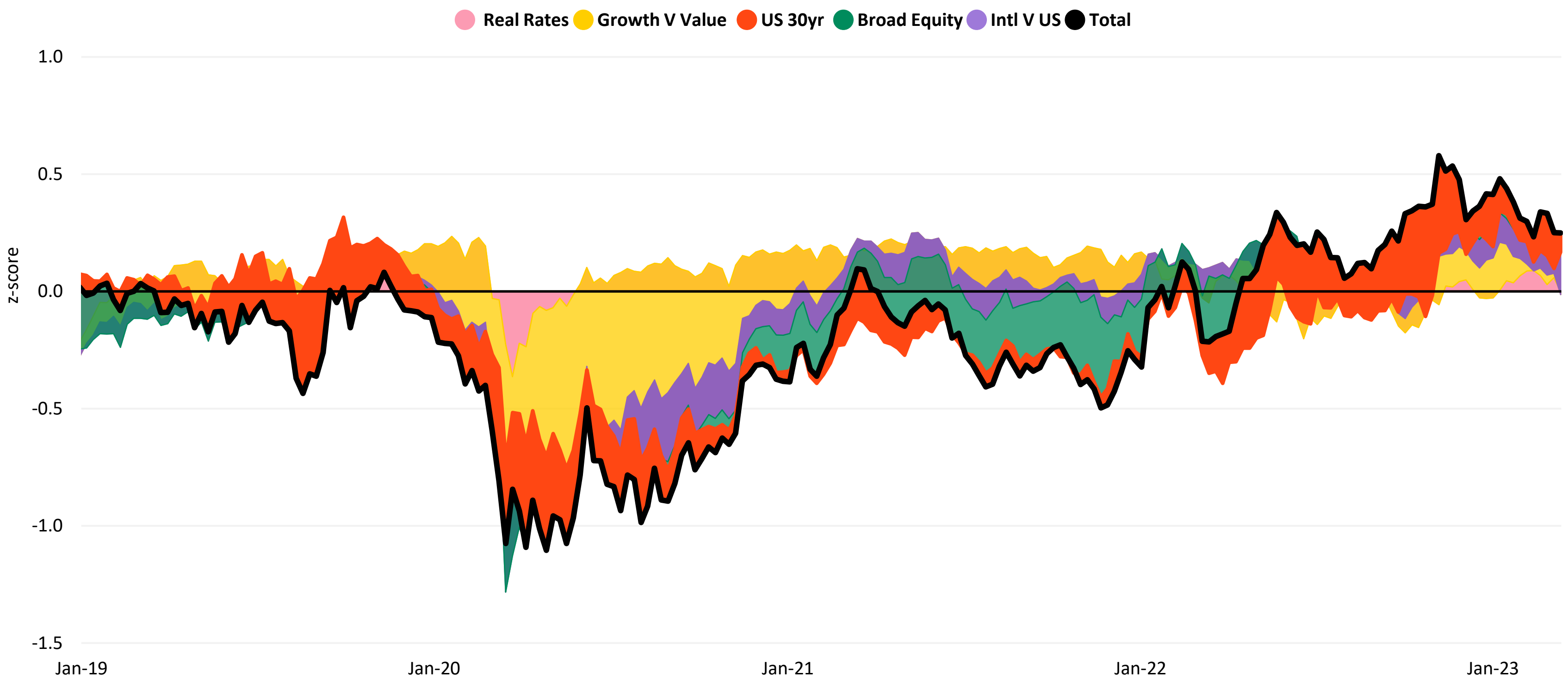


Source: BlackRock. Data as of March2023

Connecting Macro and Pricing

- The market has also attached a moderately **diminished likelihood to our Old Normal scenario materializing** – we do not view this change in pricing as supported by changes in the macro environment.

Scenario Pricing: The Old Normal



Source: BlackRock. Data as of March2023

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Virginia Retirement System

Day 1 Closing Remarks

Andrew Junkin

Chief Investment Officer

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Dinner Speaker: “Fireside Chat with Cliff”

Cliff Asness

Founder, Managing Principal and Chief Investment Officer
AQR

Hosted by Chung Ma
Managing Director, Portfolio Solutions

Dinner Speaker: Fireside Chat with Cliff

Cliff Asness ● Founder, Managing Principal and Chief Investment Officer

AQR

Cliff is a Founder, Managing Principal and Chief Investment Officer at AQR Capital Management. He is an active researcher and has authored articles on a variety of financial topics for many publications, including The Journal of Portfolio Management, Financial Analysts Journal, The Journal of Finance and The Journal of Financial Economics. He has received five Bernstein Fabozzi/Jacobs Levy Awards from The Journal of Portfolio Management, in 2002, 2004, 2005, 2014 and 2015. Financial Analysts Journal has twice awarded him the Graham and Dodd Award for the year's best paper, as well as a Graham and Dodd Excellence Award, the award for the best perspectives piece, and the Graham and Dodd Readers' Choice Award. He has won the second prize of the Fama/DFA Prize for Capital Markets and Asset Pricing in the 2020 Journal of Financial Economics. In 2006, CFA Institute presented Cliff with the James R. Vertin Award, which is periodically given to individuals who have produced a body of research notable for its relevance and enduring value to investment professionals. Prior to co-founding AQR Capital Management, he was a Managing Director and Director of Quantitative Research for the Asset Management Division of Goldman, Sachs & Co. He is on the editorial board of The Journal of Portfolio Management, the governing board of the Courant Institute of Mathematical Finance at NYU, the board of directors of the Q-Group, the board of the International Rescue Committee and the board of trustees of The National WWII Museum. Cliff received a B.S. in economics from the Wharton School and a B.S. in engineering from the Moore School of Electrical Engineering at the University of Pennsylvania, graduating summa cum laude in both. He received an M.B.A. with high honors and a Ph.D. in finance from the University of Chicago, where he was Eugene Fama's student and teaching assistant for two years (so he still feels guilty when trying to beat the market).

Virginia Retirement System

Notes

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