

AGENDA
INVESTMENT COMMITTEE MEETING
MARIN COUNTY EMPLOYEES' RETIREMENT ASSOCIATION (MCERA)

One McInnis Parkway, 1st Floor
Retirement Board Chambers
San Rafael, CA

March 29, 2023 – 9:00 a.m.

This meeting will be held at the address listed above and will be accessible via videoconference and conducted in accordance with Government Code section 54953 and 54954.2 through December 31, 2025. Instructions for watching the meeting and/or providing public comment, as well as the links for access, are available on the [Watch & Attend Meetings](https://www.mcera.org/retirementboard/agendas-minutes/watchmeetings) page of MCERA's website. Please visit <https://www.mcera.org/retirementboard/agendas-minutes/watchmeetings> for more information.

The Board of Retirement encourages a respectful presentation of public views to the Board. The Board, staff and public are expected to be polite and courteous, and refrain from questioning the character or motives of others. Please help create an atmosphere of respect during Board meetings.

CALL TO ORDER

ROLL CALL

**CONSIDER ANY BOARD MEMBER REQUESTS TO TELECONFERENCE FOR
"JUST CAUSE" OR "EMERGENCY," AS SET FORTH ON THIS AGENDA BELOW**

A. OPEN TIME FOR PUBLIC EXPRESSION

Note: The public may also address the Committee regarding any agenda item when the Committee considers the item.

Open time for public expression, from three to five minutes per speaker, on items not on the Committee Agenda. While members of the public are welcome to address the Committee during this time on matters within the Committee's jurisdiction, except as otherwise permitted by the Ralph M. Brown Act (Government Code Sections 54950 et seq.), no deliberation or action may be taken by the Committee concerning a non-agenda item. Members of the Committee may (1) briefly respond to statements made or questions posed by persons addressing the Committee, (2) ask a question for clarification, or (3) provide a reference to staff for factual information.

B. MANAGER REPORTS

1. Manager Overview – Jim Callahan, Callan LLC
2. Artisan Partners – International Growth Equity – Sean Howley, Andrew Euretig
TIME CERTAIN: 9:05 a.m.
3. Invesco – Balanced-Risk Commodities – Dave Gluch, Delia Roges
TIME CERTAIN: 9:35 a.m.

C. NEW BUSINESS

1. Silicon Valley Bank Update – Jim Callahan, Callan LLC
2. Abbott Capital Management ACE VI Fund Extension (ACTION)
Consider, discuss and take possible action regarding Abbott Capital Management request for extension of ACE VI Fund
3. UBS Trumbull Property Fund (TPF) Extended Fee Program (ACTION)
Consider, discuss and take possible action regarding extension of UBS TPF fee program
4. Investment Manager Personnel Update – TimesSquare Capital Management
5. Capital Market Assumptions (ACTION) – Jim Callahan, Jay Kloepfer, Callan LLC
Discuss and review capital market assumptions and consider possible changes to current asset allocation
6. Future Meetings

D. INVESTMENT CONSULTANT QUARTERLY REPORT

1. Summary Report as of December 31, 2022
 - a. Flash Performance Update as of February 28, 2023

Note on Process: Items designated for information are appropriate for Committee action if the Committee wishes to take action.

Note on Voting: As provided by statute, the Alternate Safety Member votes in the absence of the Elected General or Safety Member, and in the absence of both the Retired and Alternate Retired Members. The Alternate Retired Member votes in the absence of the Elected Retired Member. If both Elected General Members, or the Safety Member and an Elected General Member, are absent, then the Elected Alternate Retired Member may vote in place of one absent Elected General Member.

Note on Board Member requests to participate by teleconference under Government Code section 54953, subdiv. (f): At least a quorum of the Committee must be present together physically at the meeting to invoke this provision. The provision is limited to “just cause” and “emergency” circumstances, as follows:

“Just cause” is only: (1) a childcare or caregiving need of a child, parent, grandparent, grandchild, sibling, spouse or domestic partner that requires them to participate remotely; (2) a contagious illness that prevents a member from attending in person; (3) a need related to a physical or mental disability, as defined; or (4) travel while on official business of MCERA or another state or local agency. A Board member invoking “just cause” must provide a general description of the circumstances relating to their need to appear remotely at a given meeting, and it may not be invoked by a Board member for more than two meetings in a calendar year.

“Emergency circumstances” is only: “a physical or family medical emergency that prevents a member from attending in person.” The Board member invoking this provision must provide a general description of the basis for the request, which shall not require the member to disclose personal medical information. Unlike with “just cause,” the Board must by majority vote affirm that an “emergency circumstance” situation exists.

As to both of the above circumstances, the Board member “shall publicly disclose at the meeting before any action is taken whether any other individuals 18 years of age or older are present in the room at the remote location with the member and the general nature of the member’s relationship with any such individuals.” Also, the Board member “shall participate through both audio and visual technology,” and thus be both audible and visible to those attending. Finally, no Board member may invoke these teleconference rules for more than three consecutive months or 20 percent of the regular meetings of the Board.



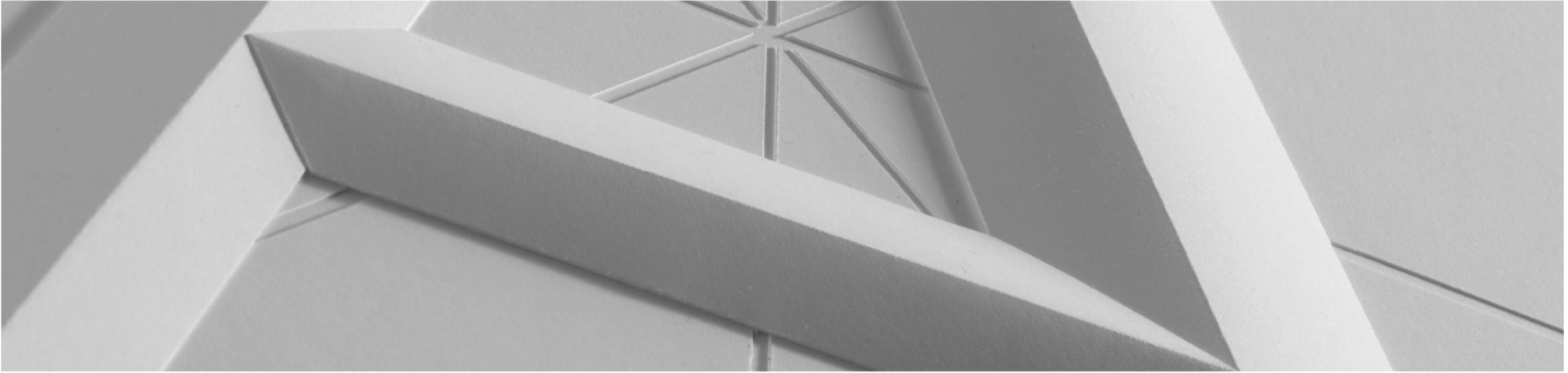
Agenda material is provided upon request. Requests may be submitted by email to MCERABoard@marincounty.org, or by phone at (415) 473-6147.

MCERA is committed to assuring that its public meetings are accessible to persons with disabilities. If you are a person with a disability and require an accommodation to participate in a County program, service, or activity, requests may be made by calling (415) 473-4381 (Voice), Dial 711 for CA Relay, or by email at least five business days in advance of the event. We will do our best to fulfill requests received with less than five business days’ notice. Copies of documents are available in alternative formats upon request.

The agenda is available on the Internet at <http://www.mcera.org>

B.1 Manager Overview

This is a discussion with no backup.



Q4 2022

Artisan International Growth Trust

Marin County Employees' Retirement Association

The Artisan International Growth Trust is a trust for the collective investment of assets of participating tax qualified pension and profit sharing plans and related trusts, and governmental plans, as more fully described in the Declaration of Trust for the Artisan International Growth Trust. The Artisan International Growth Trust is managed by SEI Trust Company based on the investment advice of Artisan Partners Limited Partnership. As a bank collective trust, Artisan International Growth Trust is exempt from registration as an investment company.



ARTISAN PARTNERS

Biographies — Artisan Partners Global Equity Team



Andrew J. Euretig is a managing director of Artisan Partners and a portfolio manager on the Global Equity team. In this role, he is a portfolio manager for the Artisan Global Equity Strategy and an associate portfolio manager for the Artisan Non-U.S. Growth Strategy. He also conducts research, primarily focusing on companies within the industrials and utilities sectors. Prior to joining Artisan Partners in June 2005, Mr. Euretig was a graduate student at the University of California at Berkeley. He previously served in the United States Navy as an amphibious operations officer. Mr. Euretig holds a bachelor's and a master's degree in business administration from the Haas School of Business at the University of California-Berkeley.



Sean J. Howley is a managing director of Artisan Partners and a business leader for the firm's Global Equity team. Prior to joining Artisan Partners in March 2007, Mr. Howley was the managing director and product manager for international and global equity products at Putnam Investments, where he was responsible for overseeing communications on policy, strategy and tactics with institutional clients. Before that, he was head of sales and distribution for Pioneer Investment Management, where he developed sales and marketing channels in the United Kingdom and Ireland. Mr. Howley holds a bachelor's degree in commerce from University College Dublin and a master's degree in business administration from the Haas School of Business at the University of California-Berkeley.

Contents

- I. Firm Overview
- II. Investment Team, Philosophy and Process
- III. Performance Analysis and Positioning

Appendix

Holdings

Statistics

Biographies

Notes and Disclosures

Client Service Team

Sean Howley

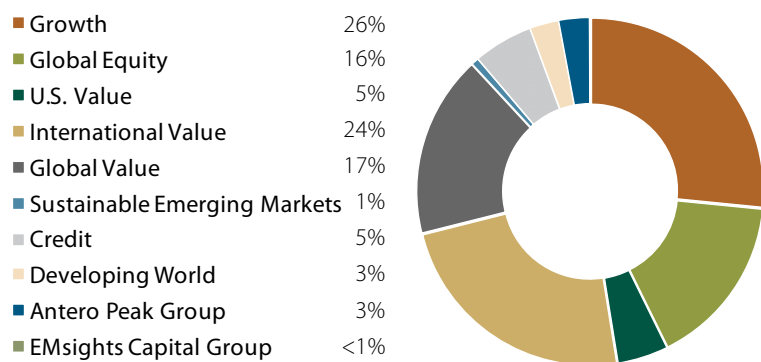
T 415 283 1075

sean.howley@artisanpartners.com

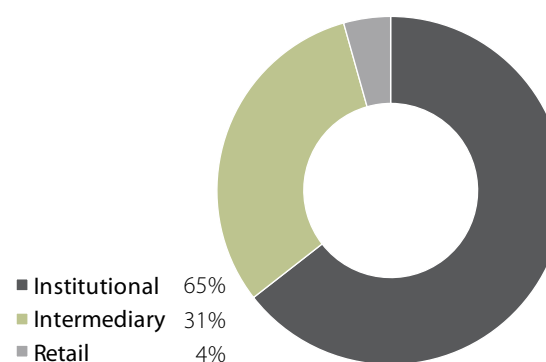
About Artisan Partners

- Founded in 1994; solely focused on providing high value-added investment strategies to sophisticated investors
- Autonomous investment teams oversee a range of investment strategies across multiple asset classes
- Primary offices in Atlanta, Boston, Chicago, Denver, Dublin, Hong Kong, London, Milwaukee, New York, San Francisco, Singapore, Sydney and Wilmington, with 549 associates
- Approximately \$127.9 billion under management as of 31 December 2022

AUM by Investment Team



AUM by Client Type



Growth Team

Global Opportunities
Global Discovery
U.S. Mid-Cap Growth
U.S. Small-Cap Growth

Global Equity Team

Global Equity
Non-U.S. Growth
Non-U.S. Small-Mid Growth
China Post-Venture

U.S. Value Team

Value Equity
U.S. Mid-Cap Value
Value Income

International Value Team

International Value
International Explorer

Global Value Team

Global Value
Select Equity

Sustainable Emerging Markets Team

Sustainable Emerging Markets

Credit Team

High Income
Credit Opportunities
Floating Rate

Developing World Team

Developing World

Antero Peak Group

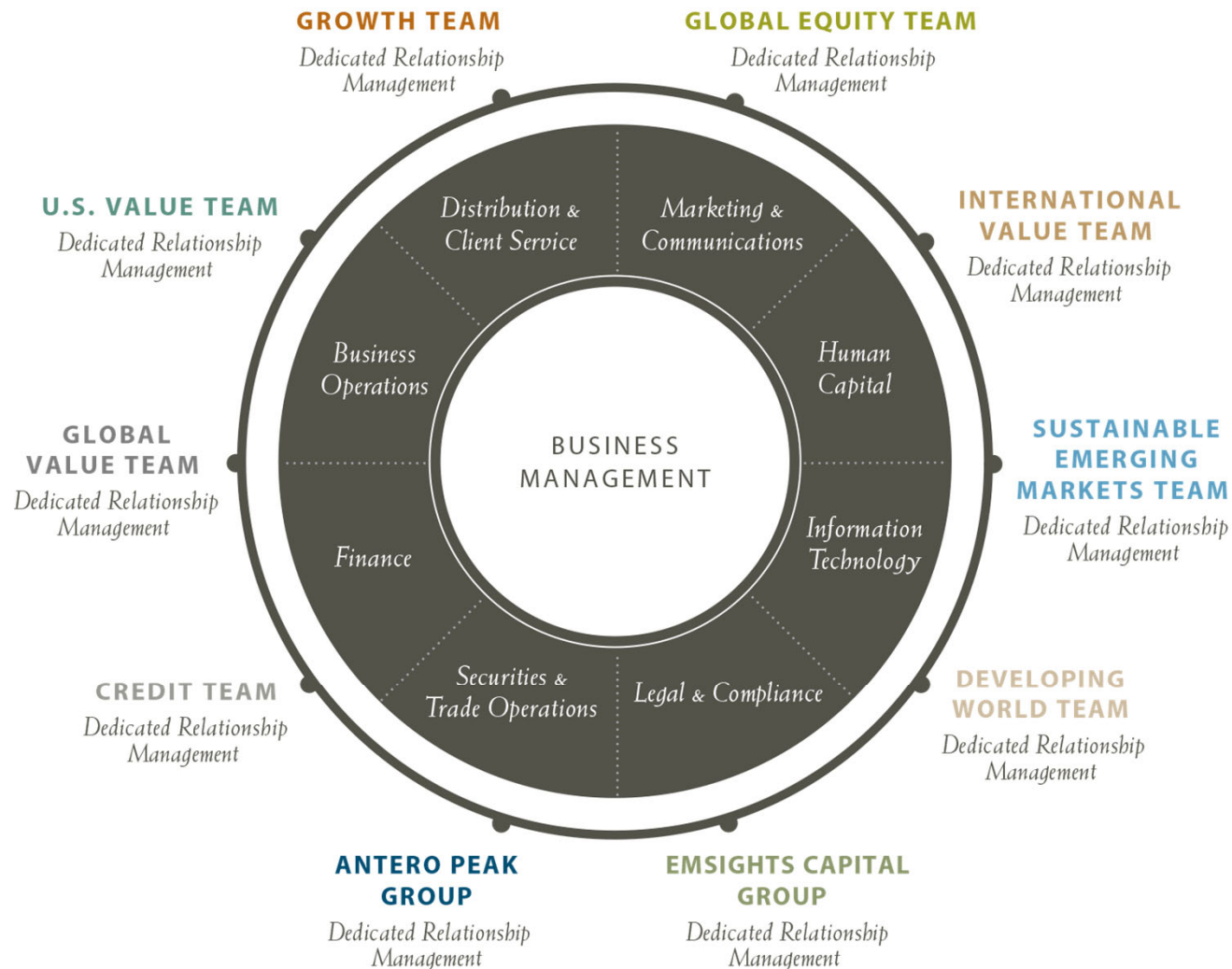
Antero Peak
Antero Peak Hedge

EMsights Capital Group

Global Unconstrained
Emerging Markets Debt Opportunities
Emerging Markets Local Opportunities

As of 31 Dec 2022.

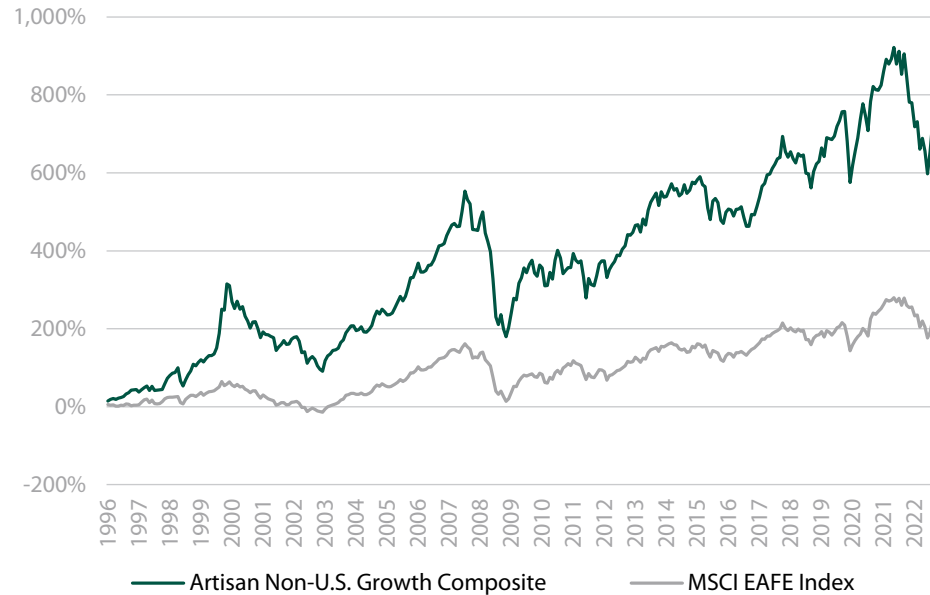
Talent-Driven Business Model



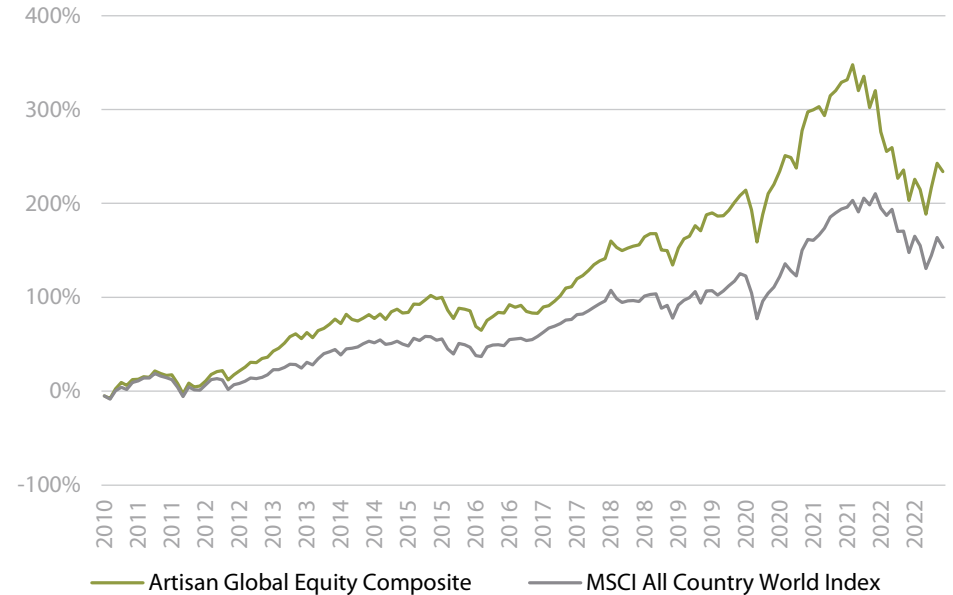
Our investment teams focus on generating results for our clients in a distraction-free environment

Long-Term Alpha Generation (USD)

Artisan Non-U.S. Growth Composite Cumulative Returns (% Net)



Artisan Global Equity Composite Cumulative Returns (% Net)



(%) as of 31 Dec 2022

	Status	Average Annual Total Returns				
		1 Yr	3 Yr	5 Yr	10 Yr	Inception
Artisan Non-U.S. Growth Composite: Gross (1 Jan 1996)	Open	-18.44	-0.84	2.83	5.66	9.07
Artisan Non-U.S. Growth Composite: Net		-19.21	-1.75	1.89	4.70	8.06
MSCI EAFE Index		-14.45	0.87	1.54	4.67	4.45
Artisan Global Equity Composite: Gross (1 Apr 2010)	Open	-19.79	3.60	7.69	10.41	10.97
Artisan Global Equity Composite: Net		-20.52	2.69	6.70	9.36	9.91
MSCI All Country World Index		-18.36	4.00	5.22	7.97	7.55
(Inception)						

Source: Artisan Partners/MSCI. Past performance does not guarantee and is not a reliable indicator of future results. Gross- and net-of-fees performance shown for the Composite. Current performance may be lower or higher than performance shown.

Artisan Partners Global Equity Team

Seasoned Leadership, Continuity of Decision Makers, Diverse Perspectives

Portfolio Leadership

- Process
- Research
- Decisions
- Construction / Risk



Mark Yockey, CFA

Global Equity
Non-U.S. Growth
New York
Investment Experience:
42 Years



Charles-Henri Hamker

Global Equity
Non-U.S. Growth
New York
Investment Experience:
33 Years



Andrew Euretig

Global Equity
Non-U.S. Growth
San Francisco
Investment Experience:
19 Years



Michael Luciano

Global Equity
Non-U.S. Growth
London
Investment Experience:
22 Years

Portfolio Specialists

Sean Howley | Ben Helsby | Ami Fox

Chief Operating Officer

Brett Meyer, CFA, FRM

- Talent, ESG, Risk

Research Analysts

- Diverse Perspectives
- Idea Generation
- Experienced
- Deep Stock Research
- Thematic Research

FINANCIALS

- Claudia Corra
- Brice Vandamme

HEALTH CARE

- Daniel Reagan, CFA
- Navdeep Singh

INDUSTRIALS / CYCLICALS / TECHNOLOGY

- Richard Logan, CFA
- Sam Zarnegar
- Mike West

MULTI-SECTOR

- Nikola Legetic, CFA

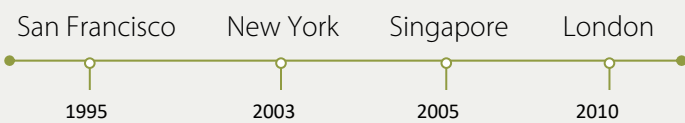
CONSUMER BUSINESSES

- Stephen Chan
- Jeff Zhu, CFA

RESEARCH ASSOCIATES (7)

- Fundamental Modeling
- Sector Research Support

Team Offices



Team Interaction

- Twice weekly research meetings
- Daily interaction between team members
- Daily meetings and conferences with management teams

Investment Portfolio Committee

- Monthly meetings
- Members include: Mark Yockey, Charles-Henri Hamker, Andrew Euretig, Brett Meyer, Claudia Corra, Michael Luciano and Nik Legetic

Investment Portfolio Committee (IPC)

Members

Chair: Brett Meyer

Mark Yockey | Charles-Henri Hamker | Andrew Euretig | Michael Luciano | Claudia Corra | Nik Legetic

Primary Functions

- Define thematic research priorities
- Evaluate risk
- Oversee ESG integration
- Consider macroeconomic, geopolitical impacts

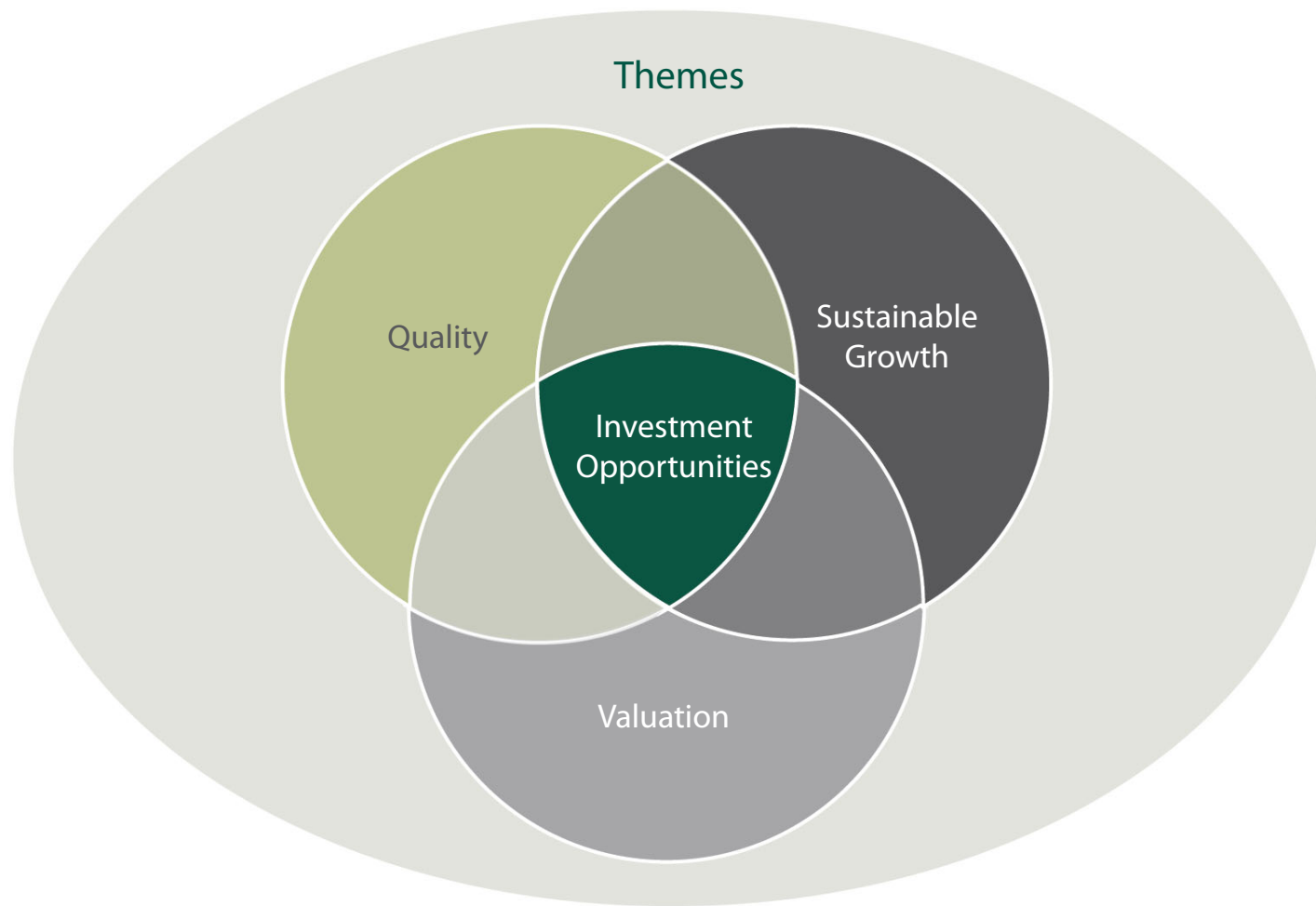
Process

- Meet monthly, distribute information weekly
- Document and maintain strategic decisions
- Review capital market environment and macroeconomic factors
- Review portfolio positioning and performance
- Evaluate pipeline of stock ideas and priorities
- Assess portfolio level risk factors

Investment Philosophy

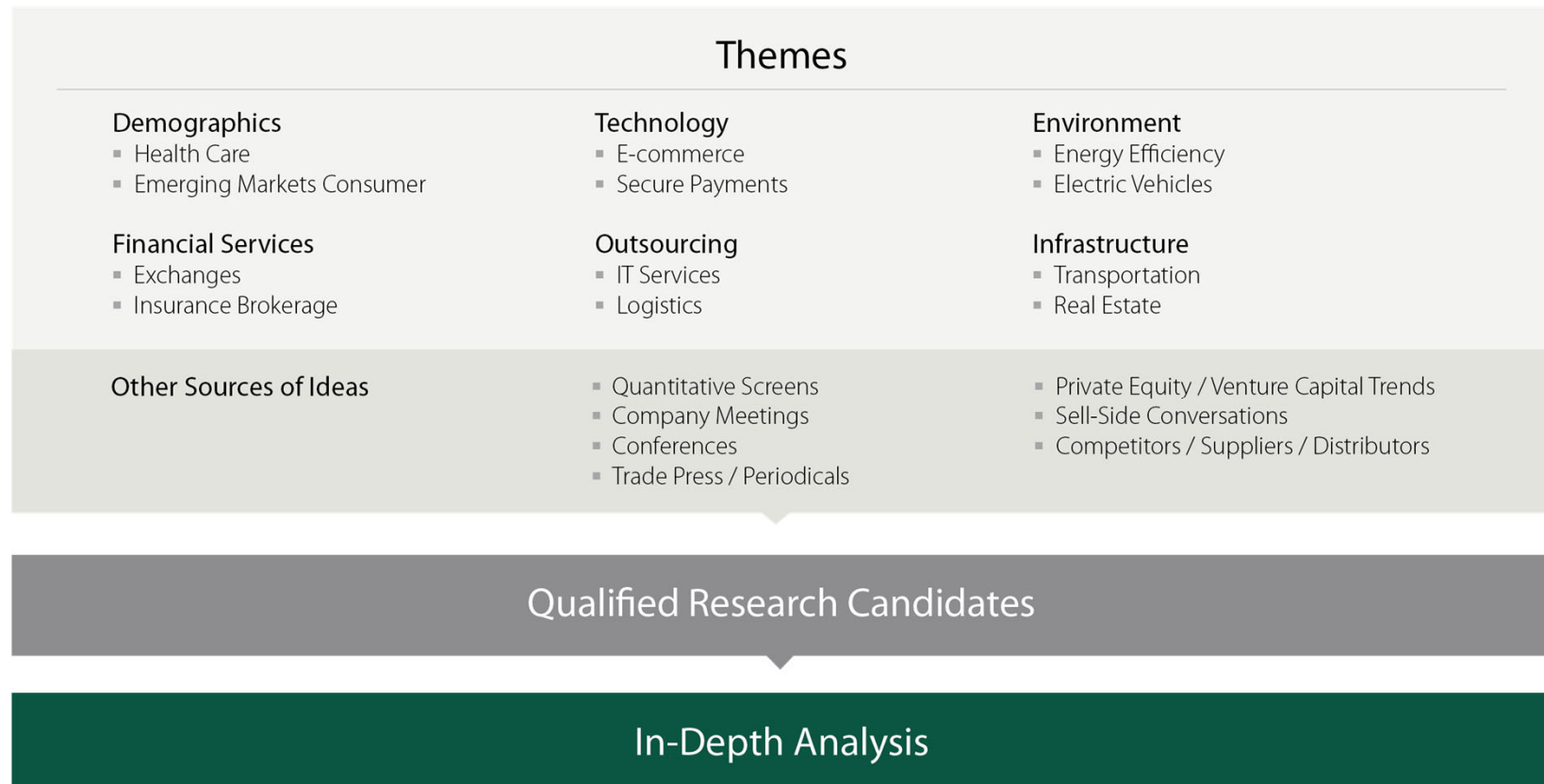
We believe investing in high-quality companies with sustainable growth characteristics at attractive valuations will lead to outperformance over a full market cycle.

Investment Process—Quality, Growth and Valuation



Investment Process—Idea Generation

Our ability to cut through the enormous amount of noise and remain focused on what matters is critical to directing our research appropriately.



Investment Process—In-Depth Analysis

Quality

- Focused management and strong governance
- Proven track record, clear business strategy
- Alignment of interest, treatment of stakeholders
- Financial strength, ROE, ROIC

Sustainable Growth

- Dominant market position, high barriers to entry
- Unique assets, brand strength → pricing power
- Investing for the future, responsible practices
- High and/or improving profit margins
- Significant free cash flow

Valuation

- EV/EBITDA
- FCF yield
- PEG ratio
- Sum-of-the-parts
- Relative to history and peers

Sustainable Growth factors outlined above apply to the investment selection criteria.

Investment Process—ESG Integration



Investment Process—Risk Management

A multi-faceted approach to mitigate risk of capital impairment

Security Level Know What You Own

- Continuous review of investment thesis
- Deep sector and industry knowledge
- Competitive landscape evaluation
- In-depth financial models and scenario analysis

Portfolio Construction

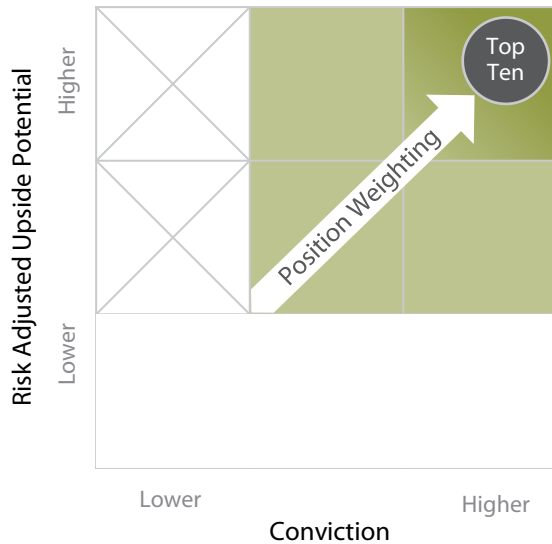
- Diversified by sectors, industries, themes
- Cognizant of common risk factors
- Mitigate unintended risks (Barra/Bloomberg)
- Monthly IPC meetings

Rigorous Sell Discipline

- Disruption of competitive advantages
- Deterioration in business quality and/or growth metrics
- Valuation levels
- Management or regulatory changes

Investment Process—Position Sizing

High conviction, benchmark agnostic and stock selection driven.



Portfolio Construction

Maximum position size generally 5%*

Number of holdings range from 50 to 90

Maximum of 25% in any one industry*

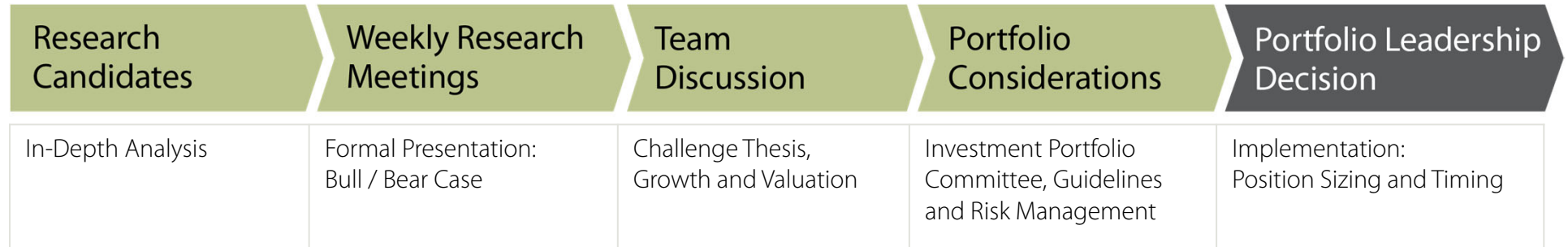
Maximum of 30% in any one country*

May invest up to 35% in emerging markets*

Typically less than 5% cash

Source: Artisan Partners. The investment process is provided for illustrative purposes only and individual securities may vary from the general approach shown. Determination of Risk Adjusted Upside Potential is based on analyst estimates. *Limitations apply at the time of purchase.

Investment Process—Decision-Making Process



Environment—Energy Efficiency and Clean Energy

Seek industry leaders that are providing the solutions to achieve the global energy transition

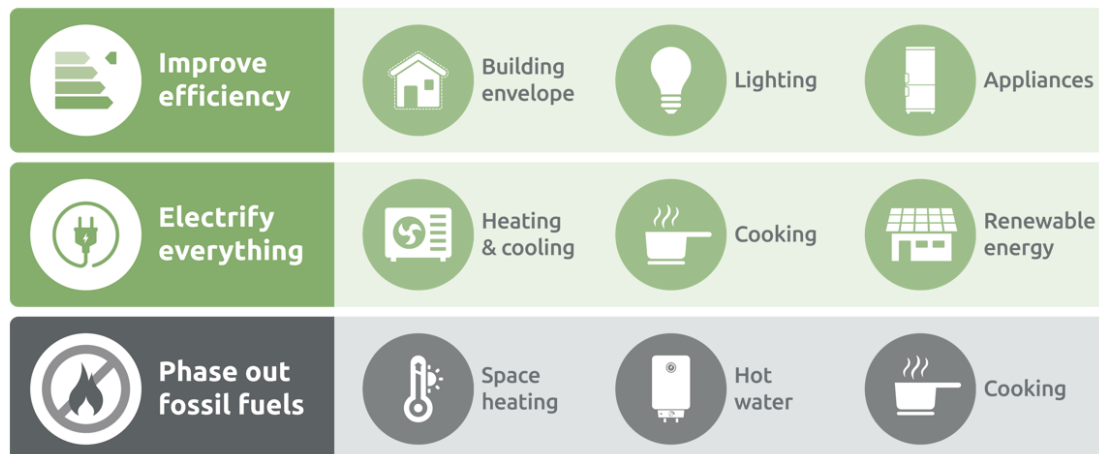
Energy Efficiency

- Industrial gases—reduced emissions and natural resources consumption
- Smarter, more efficient buildings
- Heating technology

Clean Energy

- Renewable capacity growth
- China—a leader in renewable power capacity additions
- Clean hydrogen

Electrification and efficiency key strategies for achieving zero carbon buildings



Source: climateactiontracker.org, *Decarbonising Buildings*, Feb 2022

Selected Holdings

Company	Trusts	
	International Growth	Global Equity
Linde	■	■
Schlumberger	■	■
Shell	■	■

Company	Trusts	
	International Growth	Global Equity
China Longyuan Power		■
NIBE Industrier		■

Source: Artisan Partners. As of 31 Dec 2022. Sustainability example is for illustrative purposes only and is subject to change without notice. Portfolio holdings are subject to change without notice. The holdings mentioned comprised the following weights as of 31 Dec 2022 in the Artisan International Growth Trust: Linde PLC 4.6%, Schlumberger NV 4.9%, Shell PLC 3.4% and Artisan Global Equity Trust: Linde PLC 0.6%, Schlumberger NV 4.4%, Shell PLC 1.4%, China Longyuan Power Group Corp Ltd 0.8%, Nibe Industrier AB 1.3%. Refer to Notes and Disclosures for additional information.

Financial Services—Rising Rates and Volatility

Seek competitively-advantaged beneficiaries of higher volatility and/or interest rates with attractive capital return profiles

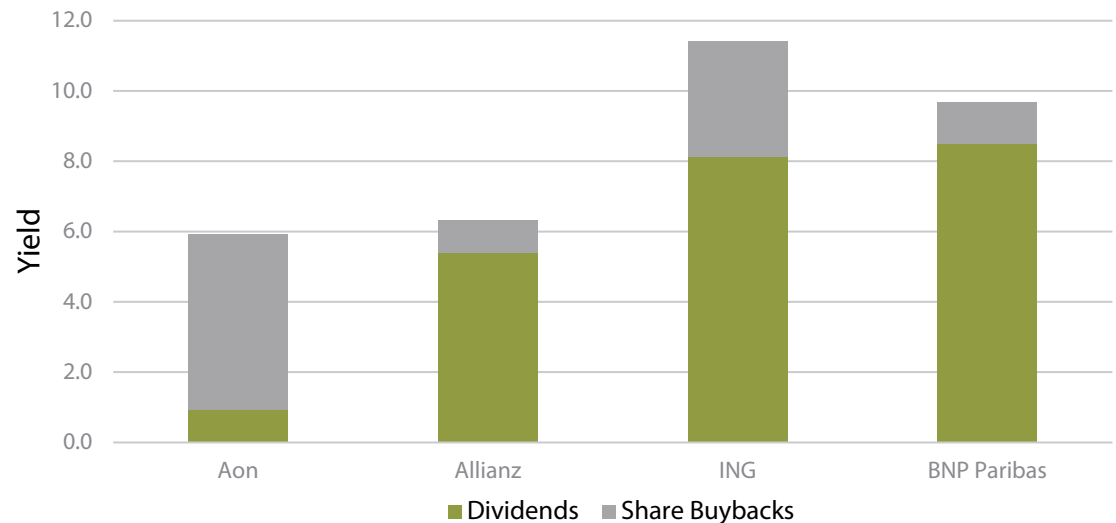
Exchanges

- “Mini-monopolies” approved by regulators
- Network effects
- Increased market volatility

Banks/Insurance

- Higher net interest margins
- Attractive dividend yields
- Disciplined management, strong free cash flow and strong return-of-capital

FY21 Return of Capital: Dividends + Share Buybacks¹



Selected Holdings

Company	Trusts	
	International Growth	Global Equity
Deutsche Boerse	■	
BNP Paribas	■	■
ING	■	■

Company	Trusts	
	International Growth	Global Equity
Allianz	■	
Aon	■	■
Intercontinental Exchange		■

Source: Artisan Partners. ¹Source: FactSet. As of 31 Dec 2022. Portfolio holdings are subject to change without notice. The holdings mentioned comprised the following weights as of 31 Dec 2022 in the Artisan International Growth Trust: Deutsche Boerse AG 4.1%, BNP Paribas SA 4.3%; ING Groep NV 2.7%, Allianz SE 1.6%, Aon PLC 3.0% and Artisan Global Equity Trust: BNP Paribas SA 1.5%, ING Groep NV 1.7%, Aon PLC 1.2%, Intercontinental Exchange Inc 2.0%. Refer to Notes and Disclosures for additional information.

Demographics—Luxury Goods/Top Brands

Seek leading brands that can provide pricing power and secular growth

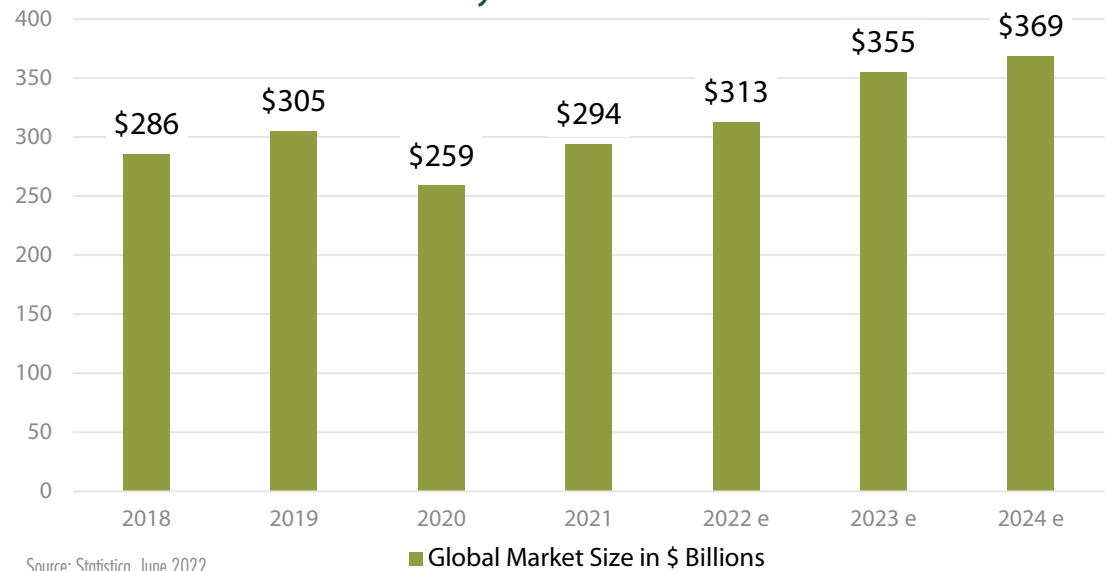
Personal Luxury

- Heritage, provenance and exclusivity create high barriers to entry
- Millennial and Gen Z consumers driving growth trends
- Affluent less affected by economic downturns than middle class

Premium Brands

- Brand equity and strong positioning provide pricing power
- “Premiumization” trend has led to market share growth for top brands
- Long-term growth opportunities in developing markets

Luxury Goods - Revenues



Selected Holdings

Company	Trusts	
	International Growth	Global Equity
Richemont	■	■
LVMH	■	■
Pernod Ricard	■	■

Company	Trusts	
	International Growth	Global Equity
Diageo	■	
Porsche	■	■
Wuliangye Yibin	■	■

Source: Artisan Partners. As of 31 Dec 2022. Portfolio holdings are subject to change without notice. The holdings mentioned comprised the following percentages of the portfolio's total net assets as of 31 Dec 2022 in the Artisan International Growth Trust: Cie Financiere Richemont SA 2.4%, LVMH Moet Hennessy Louis Vuitton SE 1.6%, Pernod Ricard SA 0.7%, Diageo PLC 1.6%, Dr Ing hc F Porsche AG 1.0%, Porsche Automobil Holding SE 0.2% and Wuliangye Yibin Co Ltd 1.4%. Artisan Global Equity Trust: Cie Financiere Richemont SA 1.0%, LVMH Moet Hennessy Louis Vuitton SE 1.3%, Pernod Ricard SA 0.6%, Dr Ing hc F Porsche AG 0.6% and Wuliangye Yibin Co Ltd 1.2%. Refer to Notes and Disclosures for additional information.

Demographics—Health Care

Seek high-conviction holdings with strong balance sheets, novel approaches for treatment and promising pipelines

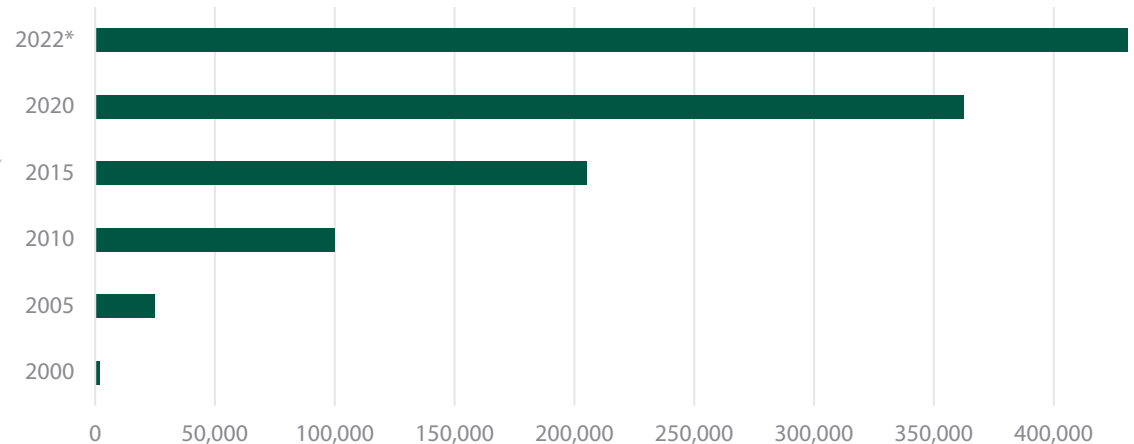
Consumer-Driven Care

- People living longer lives, requiring more care
- Patients becoming stakeholders in their own care
- Health systems moving toward patient-centric models

Technology Driving Continued Improvement in R&D

- Increased collaboration, aided by software innovation, bringing together multiple stakeholders to produce more targeted results
- Advanced computing allowing companies to increase the scope and scale of research to reduce time to market
- Technology advancements are helping to increase speed and effectiveness of clinical trials and approvals

Life Sciences Innovation Setting New Records Each Year



*Through 11/24/22
Source: Statista, 2022.

■ Total Number of Registered Clinical Studies Worldwide

Selected Holdings

Company	Trusts	
	International Growth	Global Equity
Argenx	■	■
Ascendis Pharma	■	■
Novo Nordisk	■	■

Company	Trusts	
	International Growth	Global Equity
UCB	■	■
AstraZeneca	■	■
Halozyne Therapeutics		■

Source: Artisan Partners. As of 31 Dec 2022. Portfolio holdings are subject to change without notice. The holdings mentioned comprised the following percentages of the portfolio's net assets as of 31 Dec 2022 in the Artisan International Growth Trust: Argenx SE 3.1%, Ascendis Pharma 1.7%, Novo Nordisk A/S 2.5%, UCB SA 1.8% and AstraZeneca PLC 1.9%. Artisan Global Equity Trust: Argenx SE 2.5%, Ascendis Pharma A/S 1.2%, Novo Nordisk A/S 2.2%, UCB SA 1.0%, AstraZeneca PLC 1.7% and Halozyne Therapeutics Inc 4.5%. Refer to Notes and Disclosures for additional information.

Market Review

- Inflation rates in the US and Europe ticked lower, even though they remained well above target, providing much-needed confidence to investors that central banks can turn the tide on rising prices.
- Stock prices rose substantially across developed and many emerging markets before resuming a downward path in the final weeks of the year.
- International equity stocks, as measured by the MSCI EAFE Index, produced strong returns in almost every sector and region.
- Value outperformed growth during the quarter, although both finished firmly higher.

		MSCI EAFE Index Total Returns (Local) %	
		Q4 2022	1 Yr
	Energy	10.7	40.7
	Consumer Staples	2.6	-5.9
	Health Care	5.9	-5.0
	Communication Services	1.4	-8.9
	Utilities	10.5	-5.5
	Financials	15.6	2.8
	Consumer Discretionary	8.4	-14.6
	Real Estate	4.6	-15.3
	Industrials	9.9	-12.8
	Materials	12.3	-2.6
	Information Technology	5.8	-25.7
	MSCI EAFE Index	8.7%	-7.2%
MSCI EAFE Growth Index		6.7%	-16.7%
MSCI EAFE Value Index		10.7%	2.8%

Source: Artisan Partners/FactSet/GICS/MSCI. As of 31 Dec 2022. Past performance does not guarantee and is not a reliable indicator of future results. An investment cannot be made directly in an index.

Investment Results—Average Annual Total Returns

(%) as of 31 Dec 2022	QTD	1 Yr	3 Yr	5 Yr	10 Yr	Inception
Linked Mutual Fund and Trust: Tier 3	16.11	-19.08	-1.70	2.32	4.81	7.18
MSCI EAFE Index	17.34	-14.45	0.87	1.54	4.67	6.46
MSCI All Country World ex USA Index	14.28	-16.00	0.07	0.88	3.80	6.76

Inception of Marin County investment into Artisan International Fund — Institutional Class: 30 Dec 2002, invested through 15 Feb 2018.

Transition to Marin County investment into Artisan International Growth Trust — Tier 3: 28 Feb 2018.

Period from 16 Feb 2018 through 27 Feb 2018 assumes a 0% return.

Differences between the Mutual Fund and Trust include, but are not limited to, the fee structure of each vehicle. Each vehicle's fee structure may have a different impact on performance. Performance is calculated using the date on which you first invested in the Fund as your "inception" date. The linked returns shown, which do not take cash flows into consideration, are computed by taking monthly NAV-based returns (as calculated by Artisan Partners for the Fund and SEI for the Trust) and then geometrically linking those daily returns. The linked performance is hypothetical and actual returns may vary due to different valuation policies and methodology.

As of 31 Dec 2022	Ending Market Value	Number of Shares	Share Price	Account Inception
Marin County (CA) Employees' Retirement Association	\$177,639,655.24	6,754,359.515	\$26.30	30 December 2002

Source: SEI/Artisan Partners/MSCI. Past performance does not guarantee and is not a reliable indicator of future results. Net-of-fees performance shown for the Trust. The principal value and investment return of the Trust will fluctuate, so you may have a gain or loss when you sell your units. Current performance may be lower or higher than performance shown. Trust returns were calculated net of total Trust fees and expenses (0.90% annually) which are incurred by each participating Tier 1 plan in the Trust. The Composite includes all accounts managed by Artisan Partners in the investment strategy, including the Collective Investment Trust. Composite performance is presented for informational purposes only and represents gross and net of investment management fees performance. Composite performance varies from Trust performance based on individual account restrictions and applicable fees and does not represent past or present Trust returns. Net-of-fees Composite returns were calculated using the highest fee applicable to portfolios within the Composite and does not reflect fees and expenses associated with the Trust. Returns less than one year are not annualized. Trust inception: 5 Jan 2009. Composite inception: 1 Jan 1996. MSCI ACWI ex USA Index performance represents the MSCI ACWI ex USA (Gross) Index from inception to 31 Dec 2000 and the MSCI ACWI ex USA (Net) Index from 1 Jan 2001 forward.

Contribution to Return—Q4 2022 and 1 Yr

Q4 2022

Top

Schlumberger	Energy
BNP Paribas	Financials
ING Groep	Financials
Linde	Materials
Shell	Energy

Bottom

Amazon.com	Consumer Discretionary
Alphabet (sold)	Communication Services
Adyen	Information Technology
TSMC	Information Technology
Porsche	Consumer Discretionary

1 Yr

Top

Schlumberger	Energy
Argenx	Health Care
Novo Nordisk	Health Care
Cie Financiere Richemont	Consumer Discretionary
Deutsche Telekom	Materials

Bottom

MMC Norilsk Nickel	Materials
Amazon.com	Consumer Discretionary
Sberbank of Russia PJSC	Financials
Alphabet (sold)	Communication Services
DSM (sold)	Materials

Source: Artisan Partners/FactSet/GICS. As of 31 Dec 2022. Past performance does not guarantee and is not a reliable indicator of future results. These securities made the greatest contribution to, or detracted most from, performance during the period. This is not a complete listing of portfolio activity. Upon request, Artisan will provide: (i) the calculation methodology and/or (ii) a list showing the contribution of each holding to overall performance during the measurement period. Securities of the same issuer are aggregated to determine the weight in the portfolio. Refer to Portfolio Holdings for security weights. The holdings mentioned above comprised the following average weights in the portfolio during the Q4 2022 time period: Schlumberger Ltd 4.8%, BNP Paribas SA 4.2%, ING Groep NV 2.7%, Linde PLC 4.6%, Shell PLC 4.6%, Amazon.com Inc 2.0%, Alphabet Inc 2.3%, Adyen NV 0.1%, Taiwan Semiconductor Manufacturing Co Ltd <0.1%, Porsche Automobil Holding SE 0.2%. The holdings mentioned above comprised the following average weights in the portfolio during the one-year time period: Schlumberger Ltd 3.3%, Argenx SE 3.0%, Novo Nordisk A/S 0.6%, Cie Financiere Richemont SA 1.1%, Deutsche Telekom AG 3.3%, MMC Norilsk Nickel PJSC 0.3%, Amazon.com Inc 2.8%, Sberbank of Russia PJSC 0.2%, Alphabet Inc 3.2%, Koninklijke DSM NV 1.9%. As of 3 Mar 2022, Russian holdings are valued at zero.

Representative Transactions — Q4 2022

New Positions	Sector	Description and Investment Thesis
Alibaba Group Holding Ltd	Consumer Discretionary	World's largest e-commerce company that provides online retail and wholesale services, digital media and entertainment, cloud computing and AI solutions through its subsidiaries in China and internationally. We are attracted to the company's secular growth prospects in online and mobile commerce.
Wuliangye Yibin Co Ltd	Consumer Staples	A state-owned enterprise in China that produces and distributes liquor, wine and tea, including baijiu, considered by many to be China's national drink. We think the company benefits from a global trend towards higher price/higher quality brands within the liquor category. A growing bar culture in China offers increased opportunities for liquor sales, including baijiu. We believe this stock is attractively priced and can benefit from China's reopening.
AstraZeneca	Health Care	Through its subsidiaries, AstraZeneca researches, produces and sells pharmaceuticals and medical products focusing on gastrointestinal, oncology, cardiovascular, respiratory and other major areas of medicine. We believe the company is well positioned to unlock the significant value of its pipeline of new products in the years to come.
Sold Positions	Sector	Reason(s) for Sale
Alphabet Inc	Communication Services	Slowing growth
Roche Holding AG	Health Care	Sold in favor of better opportunities
Koninklijke DSM NV	Materials	Slowing growth

Source: Artisan Partners/FactSet/GICS. As of 31 Dec 2022. This presentation is not a complete listing of portfolio activity. Refer to Portfolio Holdings for security weights.

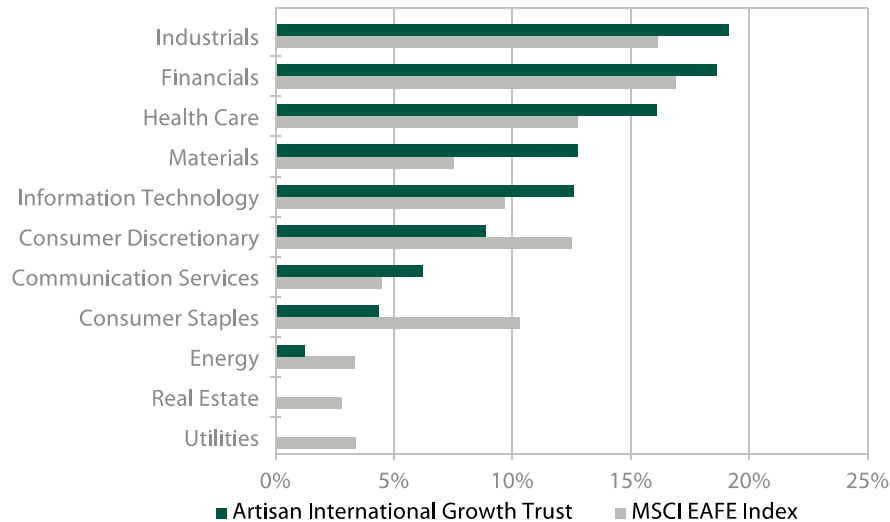
Top 10 Holdings

Company		% of total portfolio
Schlumberger NV	The world's largest oilfield services and equipment company.	4.9
Linde PLC	One of the world's largest industrial gas providers, supplying customers across a diverse range of industries.	4.6
BNP Paribas SA	One of the world's largest diversified banks.	4.3
Deutsche Boerse AG	Largest exchanges operator in Europe.	4.1
Deutsche Telekom AG	Europe's largest integrated telecom company.	3.9
Shell PLC	An oil and gas company.	3.4
Air Liquide SA	One of the leading industrial gas companies in the world.	3.4
Canadian Pacific Railway	A dominant trans-Canadian railroad.	3.3
Argenx SE	A commercial stage biotechnology company.	3.1
Aon PLC	A leading global risk management, insurance and reinsurance brokerage provider.	3.0
Total		38.1%

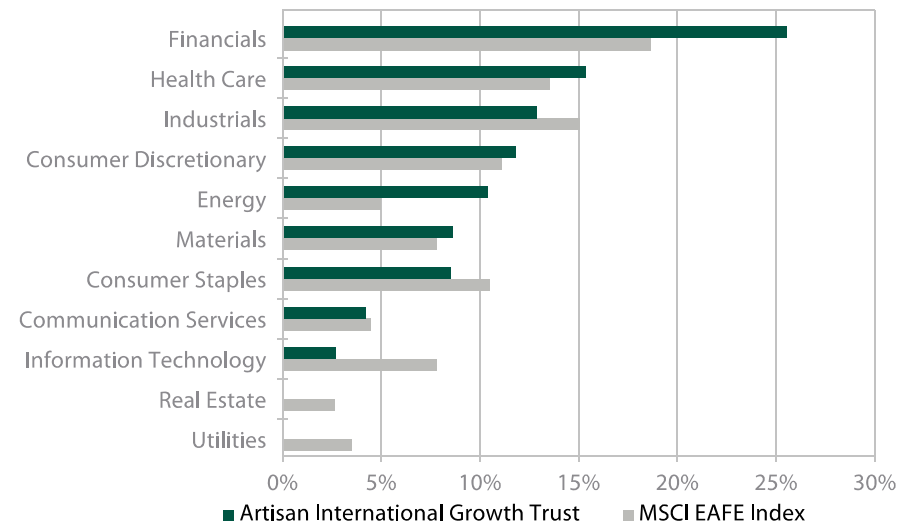
Source: Artisan Partners. As of 31 Dec 2022. Securities of the same issuer are aggregated to determine the weight in the portfolio.

Sector Weights

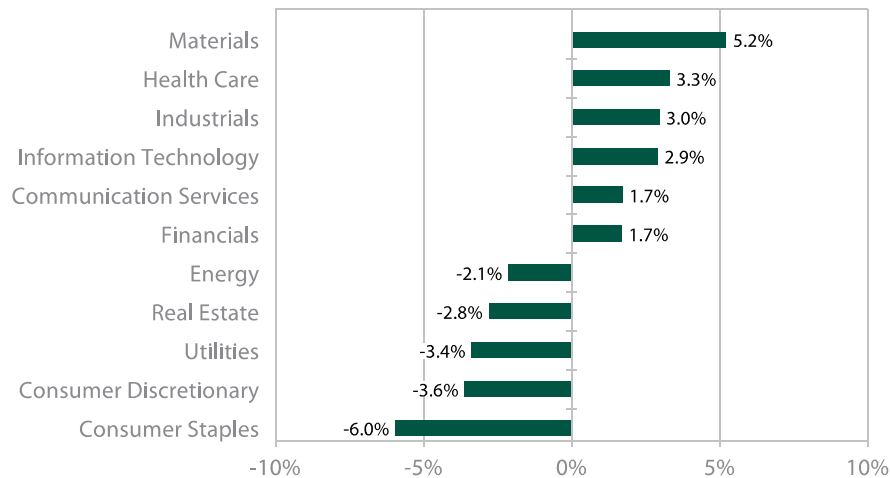
Sector Weights (31 Dec 2021)



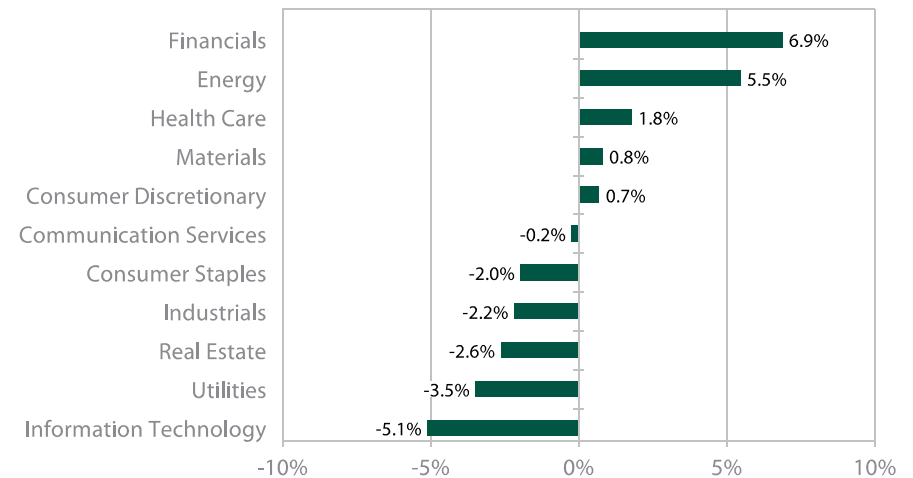
Sector Weights (31 Dec 2022)



Relative Sector Weights (31 Dec 2021)



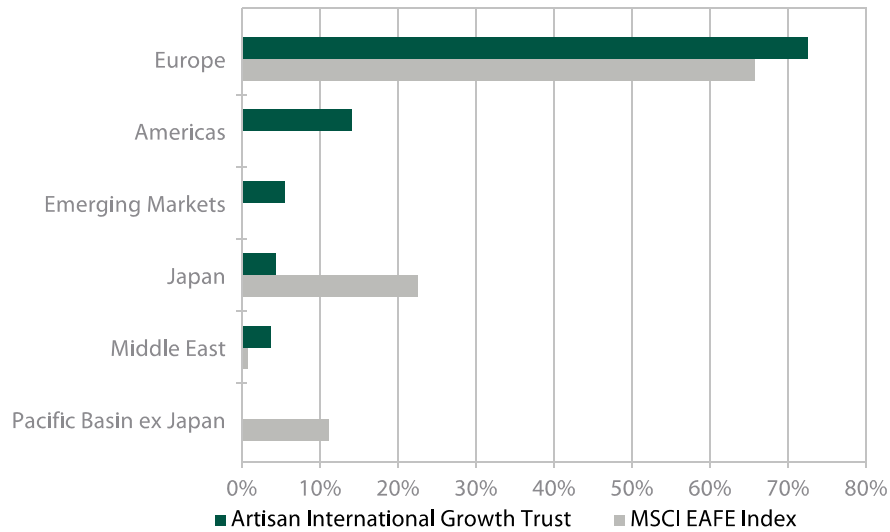
Relative Sector Weights (31 Dec 2022)



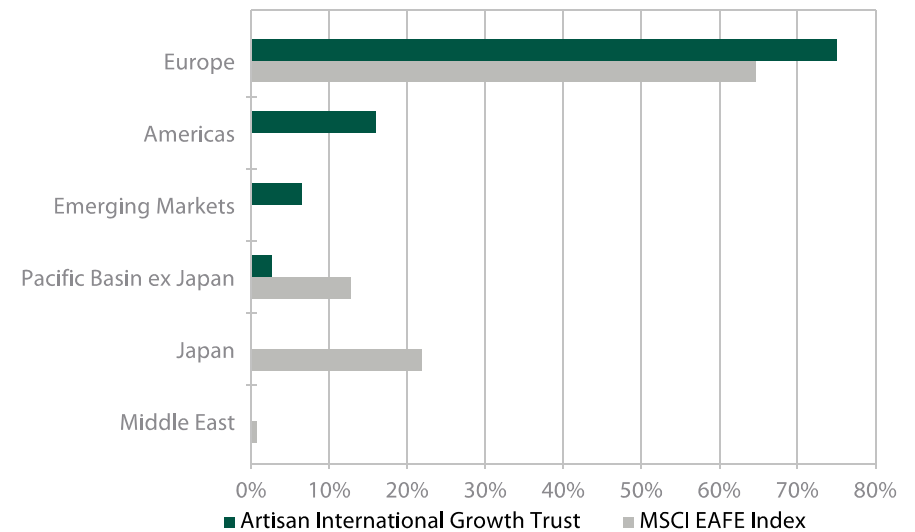
Source: GICS/MSCI. Percentages shown are of the portfolio securities compared to the MSCI EAFE Index. Cash represented 1.6% of the total portfolio at 31 Dec 2021 and 6.7% at 31 Dec 2022.

Region Weights

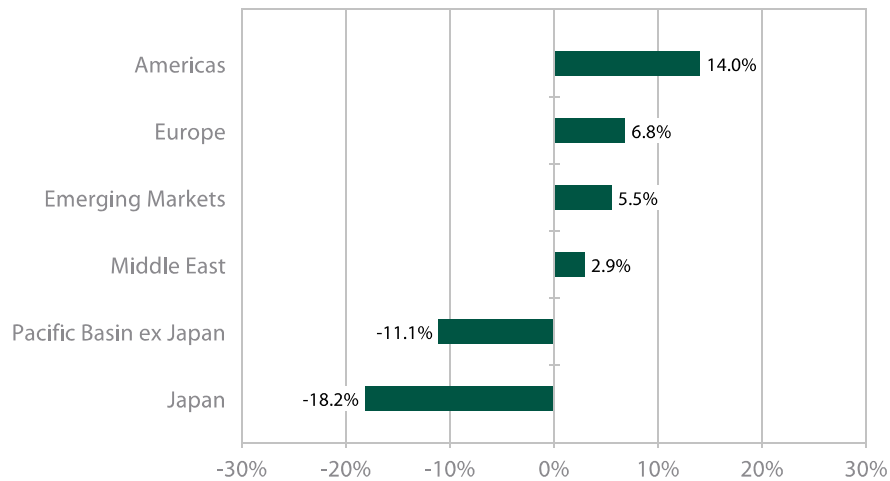
Region Weights (31 Dec 2021)



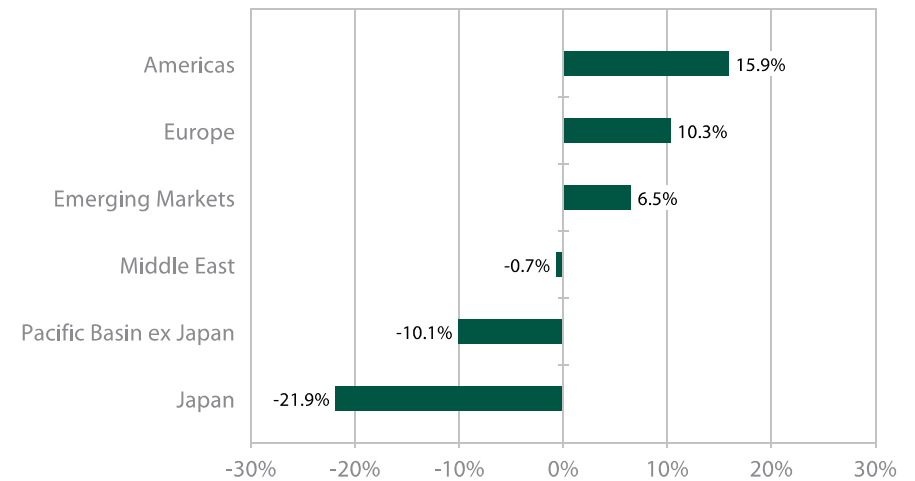
Region Weights (31 Dec 2022)



Relative Region Weights (31 Dec 2021)



Relative Region Weights (31 Dec 2022)



Source: MSCI. Percentages shown are of the portfolio securities compared to the MSCI EAFE Index. Cash represented 1.6% of the total portfolio at 31 Dec 2021 and 6.7% at 31 Dec 2022.

Portfolio Holdings (% of total portfolio)

Communication Services

3.9 Deutsche Telekom AG

Consumer Discretionary

2.6 Alibaba Group Holding Ltd

2.4 Cie Financiere Richemont SA

1.6 LVMH Moet Hennessy Louis Vuitton SE

1.5 Amazon.com Inc

1.0 Dr Ing hc F Porsche AG

1.0 Volkswagen AG

0.7 ANTA Sports Products Ltd

0.2 Porsche Automobil Holding SE

Consumer Staples

1.9 Nestle SA

1.6 Diageo PLC

1.4 Wuliangye Yibin Co Ltd

1.1 Unilever PLC

0.7 Barry Callebaut AG

0.7 Pernod Ricard SA

0.4 Tesco PLC

Energy

4.9 Schlumberger Ltd

3.4 Shell PLC

1.3 Reliance Industries Ltd

Financials

4.3 BNP Paribas SA

4.1 Deutsche Boerse AG

3.0 Aon PLC

2.7 ING Groep NV

2.7 Barclays PLC

1.7 UBS Group AG

1.6 Allianz SE

1.4 Intesa Sanpaolo SpA

1.1 United Overseas Bank Ltd

1.0 DBS Group Holdings Ltd

0.2 AIA Group Ltd

0.0 Sberbank of Russia PJSC

Health Care

3.1 Argenx SE

2.5 Novo Nordisk A/S

1.9 AstraZeneca PLC

1.8 Alcon Inc

1.8 UCB SA

1.7 Ascendis Pharma A/S

0.7 Medacta Group SA

0.4 ICON PLC

0.4 EssilorLuxottica SA

Industrials

3.3 Canadian Pacific Railway Ltd

2.3 Ryanair Holdings PLC

1.6 Canadian National Railway Co

1.5 Airbus SE

1.1 Ferrovial SA

1.0 BAE Systems PLC

0.5 Safran SA

0.4 International Consolidated Airlines Group SA

0.3 Deutsche Post AG

Information Technology

1.5 Capgemini SE

0.5 Kinaxis Inc

0.4 Adyen NV

0.1 Taiwan Semiconductor Manufacturing Co Ltd

Materials

4.6 Linde PLC

3.4 Air Liquide SA

0.0 MMC Norilsk Nickel PJSC

Source: GICS. As of 31 Dec 2022. Cash represented 6.7% of the total portfolio at 31 Dec 2022. Securities of the same issuer are aggregated to determine the weight in the portfolio. As of 3 Mar 2022, Russian holdings are valued at zero.

Portfolio Statistics

	Trust	MSCI EAFE Index	MSCI All Country World ex USA Index
Weighted Avg. Market Cap (Billions)	\$109.2	\$77.3	\$79.9
Median Market Cap (Billions)	\$63.3	\$11.8	\$8.3
Weighted Avg. P/E Ratio (FY1) ¹	13.6X	11.8X	11.4X
Weighted Avg. P/E Ratio (FY2) ¹	12.8X	11.9X	11.5X
Weighted Avg. LT EPS Growth Rate (3-5 Yr)	14.6%	9.8%	10.3%
Weighted Avg. PEG Ratio ²	1.0X	1.0X	1.0X
Weighted Avg. Operating Margin	17.0%	19.3%	19.9%
Number of Countries	18	21	46
Number of Securities	59	796	2,259
Percent in Top 10 Holdings	38.1%	14.8%	10.9%
Active Share	82.5%	—	—

Source: FactSet/MSCI. As of 31 Dec 2022. ¹Harmonic; excluding negative earners. ²Harmonic; excluding negative earners and companies with negative growth rates.

B.2

Artisan Partners Global Equity Team

Biographies — Artisan Partners Global Equity Team

Mark L. Yockey, CFA, is a managing director of Artisan Partners and a portfolio manager on the Global Equity team. In this role, he is a portfolio manager for the Artisan Non-U.S. Growth and Global Equity Strategies. Prior to joining Artisan Partners in December 1995, Mr. Yockey was the portfolio manager of the United International Growth Fund and vice president of Waddell & Reed from January 1990 through December 1995. Before assuming responsibility for the United International Growth Fund, Mr. Yockey was an analyst for Waddell & Reed from 1986 through 1989, specializing in the worldwide health care industry and international special situations. Earlier in his career, he was a health care analyst for the State of Michigan Retirement Fund for five years. Mr. Yockey holds a bachelor's degree and a master's degree in finance from Michigan State University. He completed one year of undergraduate work at the Université d'Aix-en-Provence in France. He also worked for the French bank, La Société Générale. He is fluent in French.

Charles-Henri Hamker is a managing director of Artisan Partners and a portfolio manager on the Global Equity team. In this role, he is a portfolio manager for the Artisan Global Equity Strategy and an associate portfolio manager for the Artisan Non-U.S. Growth Strategy. He also conducts research, primarily focusing on companies within the consumer discretionary and consumer staples sectors. Prior to joining Artisan Partners in August 2000, Mr. Hamker worked on the European Equities Desk in the New York office of Banque Nationale de Paris. Earlier in his career, he worked in the Paris and London offices of J.P. Morgan. Mr. Hamker holds a bachelor's degree with a specialization in finance and economics from the European Business School in Paris. He is fluent in French and German.

Andrew J. Euretig is a managing director of Artisan Partners and a portfolio manager on the Global Equity team. In this role, he is a portfolio manager for the Artisan Global Equity Strategy and an associate portfolio manager for the Artisan Non-U.S. Growth Strategy. He also conducts research, primarily focusing on companies within the industrials and utilities sectors. Prior to joining Artisan Partners in June 2005, Mr. Euretig was a graduate student at the University of California at Berkeley. He previously served in the United States Navy as an amphibious operations officer. Mr. Euretig holds a bachelor's and a master's degree in business administration from the Haas School of Business at the University of California-Berkeley.

Michael Luciano is a managing director of Artisan Partners and associate portfolio manager on the Global Equity team. In this role, he is an associate portfolio manager for the Artisan Global Equity and Non-U.S. Growth Strategies. He also conducts research as a generalist with a primary focus on companies within the consumer, financials, information technology and industrials sectors. Prior to joining Artisan Partners in November 2022, Mr. Luciano was a partner at AKO Capital, where he was part of the team managing the AKO Capital Global Fund. Before that, he spent over a decade at Fidelity Investments in portfolio management and investment research roles. Mr. Luciano started his career in sell side investment research notably at Credit Suisse First Boston and Deutsche Bank. Mr. Luciano holds a bachelor's degree in economics and finance from the University of Sydney.

Claudia P. Corra is an analyst on the Artisan Partners Global Equity Team. In this role, she conducts fundamental research, primarily focusing on global financial services companies. Prior to joining Artisan Partners in December 2003, Ms. Corra was an equity analyst for Independence Investors covering the financial services sector for the firm's domestic strategy and the global insurance sector for its international strategy. Earlier in her career, Ms. Corra worked at the Federal Reserve Bank of New York in various analyst positions. Ms. Corra holds a bachelor's degree in history and political science from New York University, a master's degree from Columbia University and a master's degree from Harvard University. She is fluent in German and Italian.

Stephen C. Chan is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on companies within the Asia Pacific region. Prior to joining Artisan Partners in April 2005, Mr. Chan was a managing director for American Century Investment Management Asia Pacific, where he led research efforts for Asia Pacific equities. Earlier in his career, Mr. Chan was a vice president at Merrill Lynch, where he conducted investment research for the technology sector. Mr. Chan holds a bachelor's degree in economics (magna cum laude) from the Wharton School, University of Pennsylvania and a master's degree in business administration from Stanford University. He is fluent in Mandarin and Cantonese.

B.2

Artisan Partners Global Equity Team

Biographies — Artisan Partners Global Equity Team

Brice Vandamme is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on global financial services companies. Prior to joining Artisan Partners in June 2011, Mr. Vandamme was an equity research analyst at Deutsche Bank in London where he covered European banks. Earlier in his career, he was a manager on the banking and finance advisory team at Ernst & Young that conducted management consulting projects for leading French banks. Mr. Vandamme holds a business degree from the Reims Management School in France. He is fluent in French.

Richard Logan, CFA, is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on the global chemicals and energy sectors. Prior to joining Artisan Partners in April 2013, Mr. Logan headed up the Goldman Sachs European Chemicals equity research team in London. Earlier in his career, he trained as a chartered accountant at Arthur Andersen before working in securities lending with Morgan Stanley. Mr. Logan holds a bachelor's degree in chemical engineering from Aston University in Birmingham, England, and a master's degree in finance from London Business School.

Nikola Legetic, CFA, is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research on multiple sectors. Prior to joining Artisan Partners in May 2017, Mr. Legetic was an analyst at GQG Partners LLC, where he covered emerging markets, global and international equities. Before that, Mr. Legetic was a senior research analyst at Riverloft Capital Management LP, where he worked on special situations, long/short equity, capital structure arbitrage and credit. Earlier in his career, he was an equity research analyst at Raymond James Financial/Eagle Asset Management, where he focused on financial services and energy. Mr. Legetic holds a bachelor's degree in international finance and international relations (with honors) from Eckerd College. He is fluent in Serbo-Croatian.

Sam Zarnegar is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on the technology sector. Prior to joining Artisan Partners in July 2017, Mr. Zarnegar was an analyst for Glenview Capital Management where he covered the technology sector for the firm's long/short equity hedge fund. Before that, he worked as an investment associate at Sageview Capital, a public/private equity hybrid fund, where he focused on TMT investments across the capital structure. Earlier in his career, Mr. Zarnegar was an investment banking analyst across a variety of industry verticals at Evercore Partners. Mr. Zarnegar holds a bachelor's degree in economics from Cornell University. He is fluent in Persian.

Daniel Reagan, CFA, is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on the health care sector. Prior to joining Artisan Partners in June 2015, Mr. Reagan interned at UBS Global Asset Management and Balyasny Asset Management while studying for his MBA. Earlier in his career, he was an equity analyst at Hamlin Capital Management. Mr. Reagan holds bachelor's degrees in biology and economics from Bowdoin College and a master's degree in business administration from New York University.

Jeffrey Zhu, CFA, is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on the media, internet and communication sectors. Prior to joining Artisan Partners in July 2014, Mr. Zhu was an analyst at J.P. Morgan Investment Management where he covered the financial services sector. Mr. Zhu holds bachelor's degrees in mathematics and economics from Yale University and a master's degree in business administration from the Wharton School, University of Pennsylvania.

Navdeep Singh is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research, primarily focusing on biopharmaceutical companies. Prior to joining Artisan Partners in June 2020, Mr. Singh was a global biotechnology research analyst for Fidelity Institutional Asset Management. Before that, he conducted equity research in biotechnology as a vice president for both Goldman Sachs and Deutsche Bank. Earlier in his career, Mr. Singh served as an associate in equity biotechnology research at three different companies which included Citi, Banc of America and C.E. Unterberg, Towbin. Mr. Singh has bachelor's degrees in biology and economics from the University of Rochester.

B.2

Artisan Partners Global Equity Team

Biographies — Artisan Partners Global Equity Team

Mike West is an analyst on the Artisan Partners Global Equity Team. In this role, he conducts fundamental research on technology companies. Prior to joining Artisan Partners in June 2018, Mr. West was a manager in human resource analytics at Morgan Stanley. Before that, he was a human resource management analyst at Mount Sinai Health System. Mr. West holds a bachelor's degree in management from Florida Gulf Coast University and a master's degree in business administration from the University of North Carolina, Kenan-Flagler Business School.

Derek G. de Petra is a managing director and head of global trading at Artisan Partners. Prior to joining Artisan Partners in January 2000, Mr. de Petra was a trader with Montgomery Asset Management where he was responsible for trading in developed and emerging Europe for the international and emerging strategies. Mr. de Petra began trading at Mellon Capital Management in San Francisco where he traded the firm's passive international strategies. Mr. de Petra holds a bachelor's degree in history from the University of California-Los Angeles and a master's degree in business administration from the Haas School of Business at the University of California-Berkeley.

Biographies — Operations and Client Service Team

Eric R. Colson, CFA, is a managing director and chief executive officer of Artisan Partners. Mr. Colson also serves as a director of Artisan Partners Funds, Inc. Prior to joining Artisan Partners in January 2005, Mr. Colson was an executive vice president of Callan Associates, Inc. where he managed the institutional consulting group, providing business and investment advice to asset management firms. Prior to managing the institutional consulting group, he managed Callan's global manager research. Mr. Colson holds a bachelor's degree in economics from the University of California-Irvine.

Brett J. Meyer, CFA, is the chief operating officer of the Artisan Partners Global Equity Team. In this role, he is responsible for a number of non-investment responsibilities to ensure the focus of the team's portfolio managers and analysts is on managing the team's investment strategies. His responsibilities include day-to-day coordination of the research processes, hiring investment talent, and the information flow among the members of the investment team and trading. In addition, he acts as the team's liaison with Artisan Partners' business management team on legal, compliance, accounting, finance, facilities and IT matters. Mr. Meyer joined Artisan Partners in February 2013 as a director in the Investment Operations group which supports the firm's existing investment teams as well as identifies new investment talent. Prior to joining Artisan, Mr. Meyer served as an equity analyst on the investment team at Quantum Capital Management. Previously, Mr. Meyer spent 12 years at Callan Associates in a variety of capacities, including director of research for the Independent Adviser Group. Mr. Meyer holds a bachelor's degree in business administration and sports management from Principia College.

Sean J. Howley is a managing director of Artisan Partners and a business leader for the firm's Global Equity team. Prior to joining Artisan Partners in March 2007, Mr. Howley was the managing director and product manager for international and global equity products at Putnam Investments, where he was responsible for overseeing communications on policy, strategy and tactics with institutional clients. Before that, he was head of sales and distribution for Pioneer Investment Management, where he developed sales and marketing channels in the United Kingdom and Ireland. Mr. Howley holds a bachelor's degree in commerce from University College Dublin and a master's degree in business administration from the Haas School of Business at the University of California-Berkeley.

Benjamin C. Helsby is a director on the institutional client services team at Artisan Partners with responsibility for institutional marketing and client service of the strategies managed by the firm's Global Equity team. Prior to joining Artisan Partners in June 2018, Mr. Helsby was an investment consultant at Willis Towers Watson. Mr. Helsby holds a bachelor's degree in finance from the University of Florida.

Ami Fox is a director on the institutional client services team at Artisan Partners with responsibility for institutional marketing and client service of the strategies managed by the firm's Global Equity team. Prior to joining Artisan Partners in September 2018, Ms. Fox was a marketing and client service associate at DePrince, Race & Zollo, Inc. Ms. Fox holds a bachelor's degree in international business from Rollins College and is fluent in French.

Notes and Disclosures

This section of this presentation contains information important to a complete understanding of the material presented. Please review it carefully.

Artisan Partners Limited Partnership (APLP) is an investment adviser registered with the U.S. Securities and Exchange Commission (SEC). Artisan Partners UK LLP (APUK) is authorized and regulated by the Financial Conduct Authority and is a registered investment adviser with the SEC. APEL Financial Distribution Services Limited (AP Europe) is authorized and regulated by the Central Bank of Ireland. APLP, APUK and AP Europe are collectively, with their parent company and affiliates, referred to as Artisan Partners herein.

Form ADV: Additional information about APLP or APUK, the firms, its partners, ownership, investment strategies, fees and expenses and policies is contained in each firm's respective Form ADV. Each firm will supply a copy of its Form ADV upon request.

SEI Trust Company: The collective investment trust is a trust for the collective investment of assets of participating tax qualified pension and profit sharing plans and related trusts, and governmental plans, as more fully described in the Declaration of Trust. The Trust is managed by SEI Trust Company based on the investment advice of Artisan Partners Limited Partnership. As a bank collective trust, the Trust is exempt from registration as an investment company.

Artisan International Growth Trust

International investments involve special risks, including currency fluctuation, lower liquidity, different accounting methods and economic and political systems, and higher transaction costs. These risks typically are greater in emerging and less developed markets, including frontier markets. Securities of small- and medium-sized companies tend to have a shorter history of operations, be more volatile and less liquid and may have underperformed securities of large companies during some periods. Growth securities may underperform other asset types during a given period.

This material may include the views of the portfolio manager and other information relating to the portfolio and portfolio securities. While we believe the data accurately reflects the investment process, this information is presented as of the date indicated and will change over time.

Composite Performance: Net-of-fees composite returns were calculated using the highest model investment advisory fees applicable to portfolios within the composite. All performance results are net of commissions and transaction costs, and have been presented gross and net of investment advisory fees. For performance presented net of fees, fees may be higher for certain pooled vehicles and the composite may include accounts with performance-based fees. Dividend income is recorded net of foreign withholding taxes on ex-dividend date or as soon after the ex-dividend date as the information becomes available to Artisan Partners. Interest income is recorded on the accrual basis. Performance results for the index include reinvested dividends and are presented net of foreign withholding taxes but, unlike the portfolio's returns, do not reflect the payment of sales commissions or other expenses incurred in the purchase or sale of the securities included in the indices.

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The index(es) are unmanaged; include net reinvested dividends; do not reflect fees or expenses; and are not available for direct investment.

Totals may not sum due to rounding. All data shown is in USD unless otherwise indicated.

Median is the data's midpoint value. **Weighted Average** is the average of values weighted to the data set's composition. **Price-to-Earnings Ratio (P/E Ratio)** measures how expensive a stock is. Earnings figures used for FY1 and FY2 are estimates for the current and next unreported fiscal years. **LT EPS Growth Rate** is the average of the 3-5 year forecasted EPS growth rate of a company. **Active Share** is the percentage of a portfolio that differs from its benchmark. Active Share can range from 0% for an index fund to 100% for a portfolio with no overlap with an index. **Median Market Cap** provides a measure of the market capitalization value of the companies in a portfolio. Equal numbers of companies in the portfolio have market capitalizations higher and lower than the median. **PEG Ratio** (an indicator of a stock's potential value) measures the ratio of the P/E of a company to the growth rate. **Weighted Average Market Cap** is the average of the market capitalizations of the companies in the portfolio weighted by the size of each company's position within the portfolio. Market capitalization is the aggregate value of all of a company's outstanding equity securities.

MSCI All Country World Index measures the performance of developed and emerging markets. MSCI EAFE Index measures the performance of developed markets, excluding the US and Canada. MSCI All Country World ex USA Index measures the performance of developed and emerging markets, excluding the US.

Assets Under Management (AUM) refers to the assets of pooled vehicles and accounts to which Artisan Partners provides investment services. Artisan Partners' AUM as reported here includes assets for which Artisan Partners does not have investment discretion, including certain assets for which we earn only investment-related service fees. Non-discretionary assets are reported on a one-month lag. Artisan's definition of AUM is not based on any definition of Assets Under Management contained in the ADV or in any of Artisan's fund management agreements.

Country Allocation: Historical country exposure percentages reflect country designations as classified by MSCI as of the date shown. Securities not classified by MSCI reflect country designations as of the date the report was generated.

Sector Allocation: Unless otherwise noted, sector exposure percentages reflect sector designations as currently classified by GICS. The Global Industry Classification Standard (GICS®) is the exclusive intellectual property of MSCI Inc. (MSCI) and Standard & Poor's Financial Services, LLC (S&P). Neither MSCI, S&P, their affiliates, nor any of their third party providers ("GICS Parties") makes any representations or warranties, express or implied, with respect to GICS or the results to be obtained by the use thereof, and expressly disclaim all warranties, including warranties of accuracy, completeness, merchantability and fitness for a particular purpose. The GICS Parties shall not have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of such damages.

Portfolio Statistics: Portfolio statistics are intended to provide a general view of the entire portfolio, or Index, at a certain point in time. Statistics are calculated using information obtained from various data sources. Artisan Partners excludes outliers when calculating portfolio statistics. If information is unavailable for a particular security Artisan may use data from a related security to calculate portfolio statistics.

Security Examples: The security examples provided do not constitute recommendations to buy or sell investments. The examples present information about the companies believed to be accurate and are the views of the portfolio managers as of the date indicated.

Portfolio Holdings: For the purpose of determining the portfolio's holdings, securities of the same issuer are aggregated to determine the weight in the portfolio. For an index, the largest holdings are calculated at the security level and do not aggregate securities held by an issuer. Holdings information is not intended to represent or predict portfolio investment performance or as a recommendation of any individual security. A complete list of the securities held by portfolio, other than cash and cash equivalents unless otherwise noted, as of the date indicated is included. Securities named in this material, but not listed within the portfolio holdings page were not held as of the date reported. Portfolio holdings are subject to change without notice.

Notes and Disclosures

This material is provided for informational purposes without regard to your particular investment needs. This material shall not be construed as investment or tax advice on which you may rely for your investment decisions. Investors should consult their financial and tax adviser before making investments in order to determine the appropriateness of any investment product discussed herein. We expressly confirm that neither Artisan Partners nor its affiliates have made or are making an investment recommendation, or have provided or are providing investment advice of any kind whatsoever (whether impartial or otherwise), in connection with any decision to hire Artisan Partners as an investment adviser, invest in or remain invested in any funds to which we serve as investment adviser or otherwise engage with Artisan Partners in a business relationship. In no event shall Artisan Partners have any liability for direct, indirect, special, incidental, punitive, consequential (including, without limitation, lost profits) losses or any other damages resulting from the use of this material.

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Invesco Balanced-Risk Commodity Strategy

Marin County Employees' Retirement Association

March 29, 2023

For one-on-one US institutional investor use only

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This does not constitute a recommendation of any investment strategy for a particular investor. Investors should consult a financial professional before making any investment decisions if they are uncertain whether an investment is suitable for them. Please read all financial material carefully before investing. For additional educational information about the strategy, contact Invesco. Past performance is not indicative of future results. This portfolio is actively managed. Portfolio holdings and characteristics are subject to change. The opinions expressed herein are based on current market conditions and are subject to change without notice. These opinions may differ from those of other Invesco investment professionals.

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Agenda

Invesco Global Asset Allocation Team

The case for commodities and Invesco Balanced-Risk Commodity Strategy

Marin County Employees' Retirement Association performance review

Commodity markets outlook and perspectives

Additional information

Invesco Global Asset Allocation team

Invesco Global Asset Allocation

Investment strategies

Research Focus

- **Risk Allocation and Management** – balance risk exposures and create well-defined risk budgets
- **Purpose-built Portfolios** – improve the expected Sharpe Ratio within asset classes
- **Tactical Allocation** – emphasize attractive assets and de-emphasize unattractive assets

Macro Factors

- **Growth**
- **Defensive**
- **Real Return**

Implemented primarily with futures and other derivatives providing ample liquidity across equities, fixed income, and commodities

Strategies

Multi-Asset

<i>Long-only total return</i>	<i>Long-short absolute return</i>
Balanced-Risk Allocation (9/08)* \$15.8 Billion	Macro Allocation (9/12)* \$1.0 Billion ¹

Focused Outcomes

<i>Real Return</i>	<i>Income</i>
Balanced-Risk Commodities (9/08)* \$2.7 Billion	Multi-Asset Income (12/11)* \$1.2 Billion

Equity Suite

<i>Equity Income</i>	<i>Portable Alpha</i>
Income Advantage (US, Int'l 7/21, Global 7/22)* \$327 Million	US Small Cap Index Plus (9/19)* \$291 Million

\$22.1 Billion AUM**

Source: Invesco as of 12/31/22. ¹ Macro Allocation assets include those of the Fundamental Alternatives strategy. *Inception dates. **Total GAA assets include \$1.0 billion managed in multi-asset and portable alpha portfolios and eliminates double counting. Assets subject to rounding and may not equal total.

Invesco Global Asset Allocation

Deep, experienced team with long tenure and low turnover



Depth & Experience

- 17 team members
- 25 years average experience in the industry
- Leverage firm in key support areas such as Trading, Product Management and Risk Management



Stability

- 18 years average tenure with the firm
- No Senior PM turnover



Co-Investment

- Broad ownership of strategies across the team

Source: Invesco as of 12/31/22.

Presenters



Dave Gluch, GFA

Client Portfolio Manager – Invesco Global Asset Allocation

David Gluch has served as a Client Portfolio Manager for the Invesco Global Asset Allocation team since 2012. He works with clients across global institutional and global retail channels, and he is a frequent speaker at industry conferences discussing the topics of asset allocation, commodities and risk management.

Mr. Gluch joined the firm in 1995. From 2005 to 2012, he served as head of US Product Management, where he oversaw product positioning, strategy and servicing for the retail and institutional channels. While in this role, he co-authored Invesco's educational and value-add program, Rethinking Risk.

Mr. Gluch received his BBA in finance from the University of Texas. He is a Chartered Financial Analyst® (CFA) charterholder.



Delia Roges

Managing Director – Regional Head, US Institutional

Delia Roges is Managing Director for the North America Institutional Sales team and Regional Head of US Institutional Sales. In these roles, she has responsibility for new business generation and relationship management for institutional investors in the Western United States. As Invesco's lead liaison, she works closely with institutional plan sponsors to help manage the appropriate investment strategies and solutions to implement on behalf of their plans' strategic objectives.

Ms. Roges joined Invesco in 2011. Prior to joining the firm, she was a senior member of a boutique investment banking and private placement firm focused on securing capital for private equity and real estate general partnerships. Previously, she served approximately 14 years as senior vice president for Trust Company of the West (TCW), where she was responsible for advising institutional clients and developing product solutions primarily for new business development. Ms. Roges began her career in the institutional investment management industry in 1994.

Ms. Roges earned a BBA degree from Loyola Marymount University (LMU) and an MBA from the University of Southern California. She holds the Series 3, 7, 30, 63, and 79 registrations.

The case for commodities and Invesco Balanced-Risk Commodity Strategy

The case for commodities

A confluence of factors may continue to drive commodity price higher

Underinvestment - Bear markets lead to lower production and capital investment needed to find new sources of supply.

Green energy – Demand for cleaner energy sources will require significant amounts of metals such as copper, nickel and silver as well as fossil fuels to mine, transport and process them into end products.

Regulation and ESG have extended the time required before new production can come online.

Maturing geology results in lower quality output and higher production costs.

Deglobalization and protectionism – Reordering of supply chains may increase geopolitical risk.

Commodities are mostly produced in politically unstable parts of the world.

Source: Invesco analysis.

Invesco Balanced-Risk Commodity Strategy

Commodity sources of return comparison

Return Driver	Description	Invesco Balanced Risk Commodity Strategy	Bloomberg Commodity Index
		24 commodities; weights based on four distinct commodity return drivers	24 commodities; weights based on liquidity and production value to capture economic significance
Term Structure	Bias towards commodities exhibiting scarcity	✓	X
Equal Risk Contribution	Capture a rebalancing return by exploiting the high volatility and low correlation across commodity sub-complexes and individual exposures	✓	X
Optimal Roll Yield	Minimize risk or enhance return by using contracts other than the front month exposure	✓	X
Tactical Allocation	Alter exposure to each commodity based on absolute and relative attractiveness	✓	X

Sources: Invesco, Bloomberg.

Marin County Employees' Retirement Association performance review

Bloomberg Commodity Index

Periodic Table of sub-complex returns 1991 to 2022

1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
3%	14%	24%	67%	24%	88%	16%	-3%	82%	120%	1%
-8%	4%	18%	16%	24%	2%	-2%	-19%	37%	-3%	-17%
-11%	-6%	-16%	8%	3%	-5%	-7%	-20%	4%	-3%	-19%
-14%	-9%	-25%	-3%	-4%	-6%	-23%	-46%	-21%	-8%	-37%
-8%	4%	-1%	17%	15%	23%	-3%	-27%	24%	32%	-20%
2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
55%	43%	25%	42%	72%	30%	-4%	80%	43%	5%	6%
19%	31%	19%	33%	27%	26%	-27%	29%	38%	-14%	4%
17%	22%	7%	20%	14%	21%	-47%	14%	16%	-16%	1%
4%	14%	-13%	1%	-41%	-10%	-48%	-5%	-11%	-24%	-9%
26%	24%	9%	21%	2%	16%	-36%	19%	17%	-13%	-1%
2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
5%	-7%	-11%	20%	29%	-5%	17%	26%	52%	36%	
-14%	-7%	-16%	16%	11%	-11%	12%	16%	30%	16%	
-14%	-9%	-27%	10%	-4%	-13%	7%	16%	27%	0%	
-31%	-39%	-39%	2%	-11%	-19%	2%	-43%	-6%	-2%	
-10%	-17%	-25%	12%	2%	-11%	8%	-3%	27%	16%	

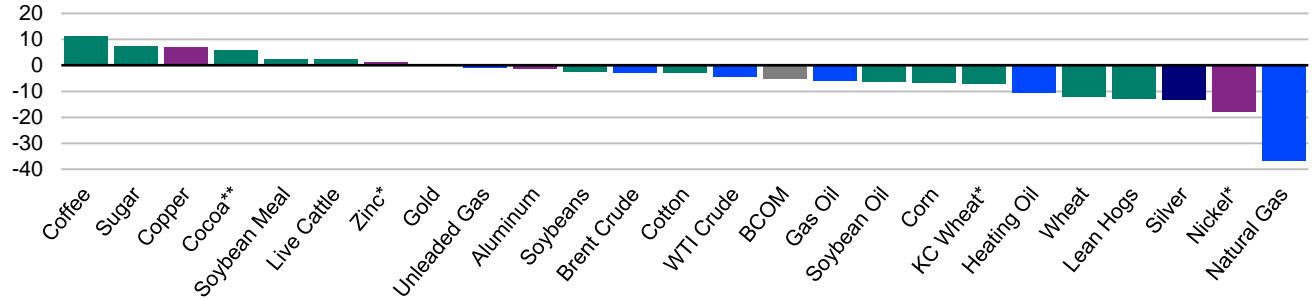
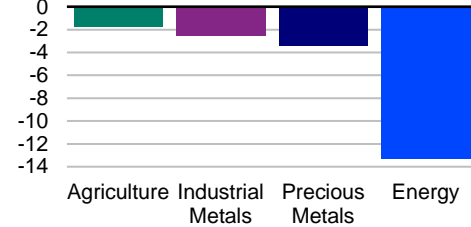
	Agriculture
	Energy
	Industrial Metals
	Precious Metals
	Bloomberg Commodity Index

Source: Bloomberg Commodity Indices Factsheets and Publications

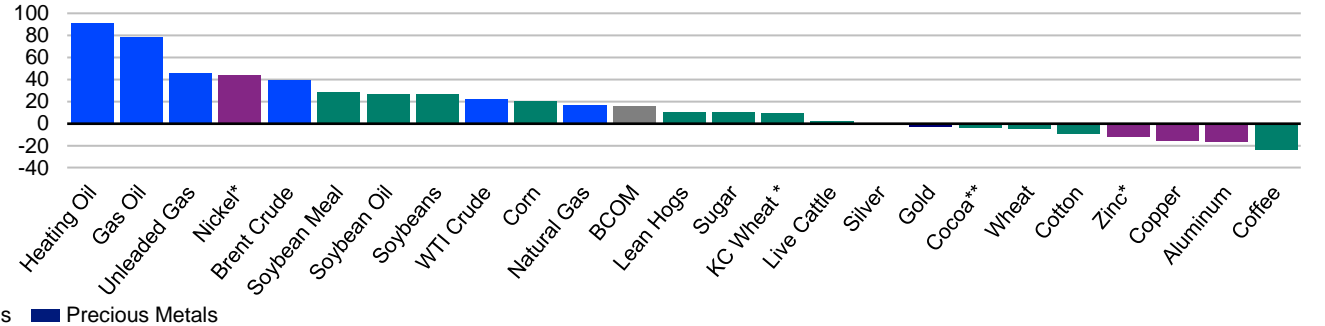
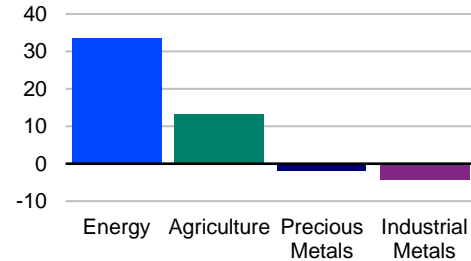
Invesco Balanced-Risk Commodity Strategy

Representative commodity performance returns

YTD 2023 (%)



2022 (%)



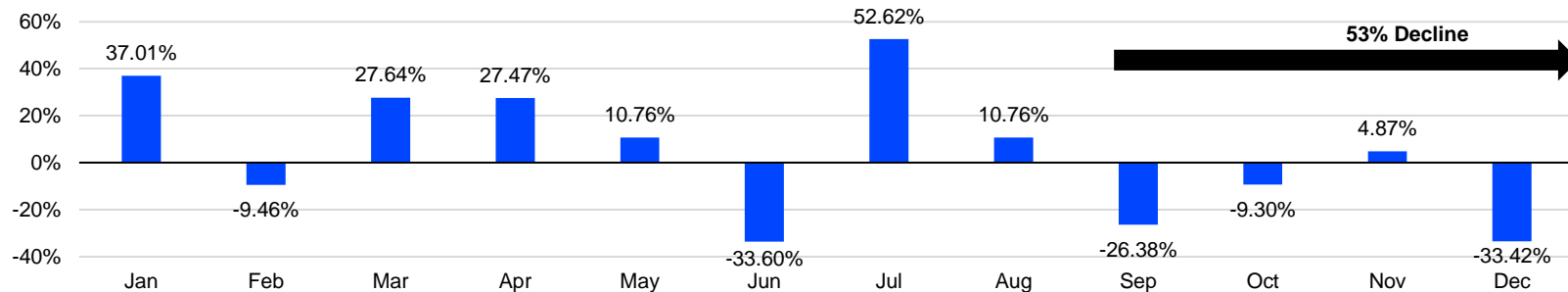
■ Agriculture
 ■ Energy
 ■ Industrial Metals
 ■ Precious Metals

Sources: Bloomberg L.P. and Invesco analysis. Data as of 02/28/23 based on continuous future return indices. Commodity and sub-complex returns represented by the Bloomberg sub-indices. *Index assets not included in the Invesco Balanced-Risk Commodity Strategy strategic allocation. **Non-index asset included in the Invesco Balanced-Risk Commodity Strategy. An investment cannot be made directly in an index. **Past performance is not a guarantee of future results.**

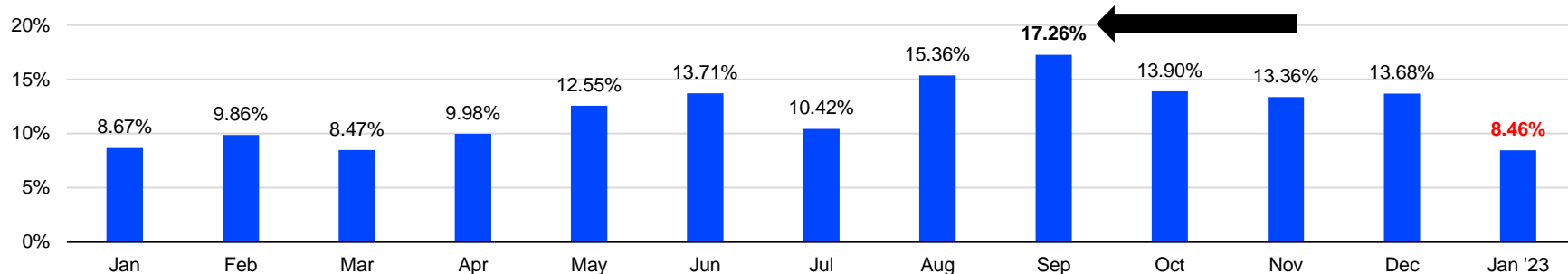
Natural Gas monthly returns versus Bloomberg Commodity Index allocation weight

Benchmark exposure to natural gas peaked at 2X its target weight and into a 53% decline

2022 monthly returns



2022 BCOM monthly Nat Gas weight*



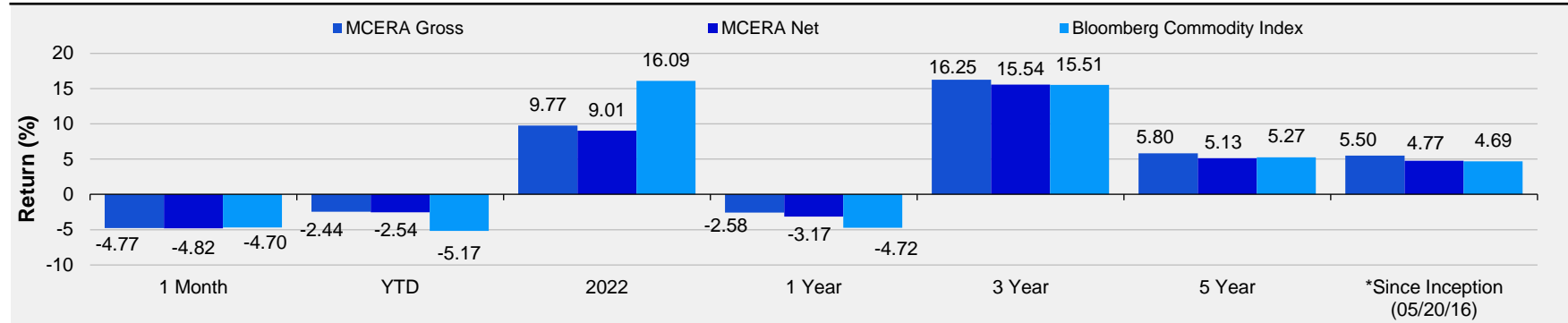
- Beginning of the month weight

Source: Invesco analysis. The allocation weight to natural gas is determined by its allocation weight and its return plus the returns and weights to other commodities in the Index.

Invesco Balanced-Risk Commodity Strategy

Marin County Employees' Retirement Association results

Performance chart (%)



Performance table (%)

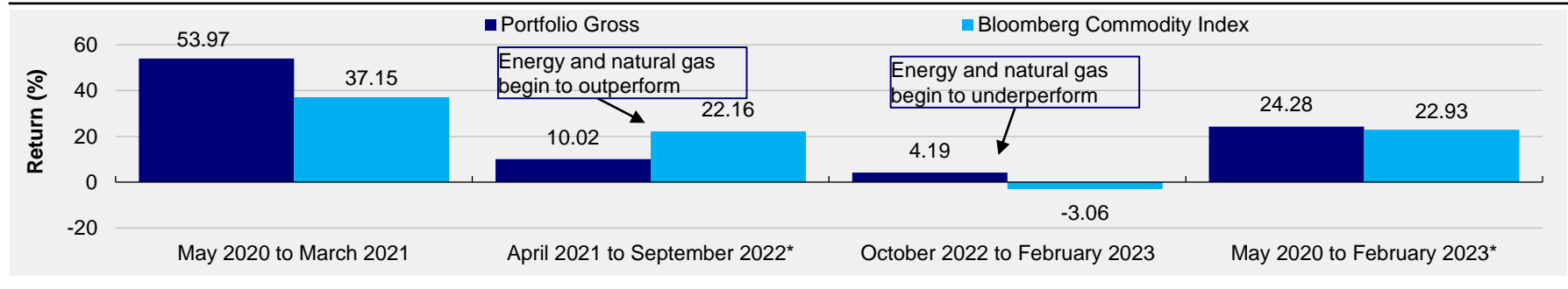
Period	Portfolio Gross (%)	Portfolio Net (%)	Benchmark (%)	Excess Gross Return (%)	Excess Net Return (%)
1 Month	-4.77	-4.82	-4.70	-0.07	-0.12
YTD	-2.44	-2.54	-5.17	2.73	2.62
2022	9.77	9.01	16.09	-6.32	-7.08
1 Year	-2.58	-3.17	-4.72	2.14	1.55
3 Year	16.25	15.54	15.51	0.75	0.04
5 Year	5.80	5.13	5.27	0.53	-0.14
*Since Inception (05/20/16)	5.50	4.77	4.69	0.81	0.08

Sources: DataStream and Invesco analysis. *Portfolio performance inception: 05/20/16. ¹Bloomberg Commodity Index. **Past performance is not a guarantee of future results.** Performance shown are gross; net of fee returns will be lower. Returns for less than one year are not annualized. Water & Power's combined account fee schedule is 70 bp on the first \$100mm and 55 bp thereafter. Data as of 02/28/23.

Invesco Balanced-Risk Commodity Strategy

Excess returns since May 2020 secular low in commodities

Performance chart (%)



Performance table (%)

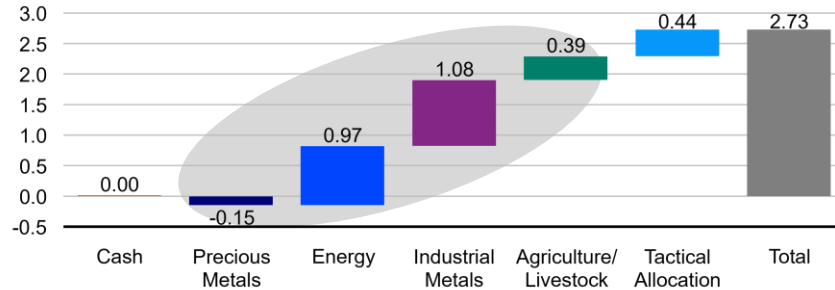
Period	Gross Portfolio (%)	Bloomberg Commodity Index(%)	Excess (%)
May 2020 to March 2021	53.97	37.15	16.83
April 2021 to September 2022	10.02*	22.16*	-12.14*
October 2022 to February 2023	4.19	-3.06	7.25
May 2020 to February 2023	24.28*	22.93*	1.34*

Source: Invesco analysis. All data as of 02/28/23. *Annualized. Returns for less than one year are not annualized. Portfolio returns are gross of fees. Past performance is not a guarantee of future results.

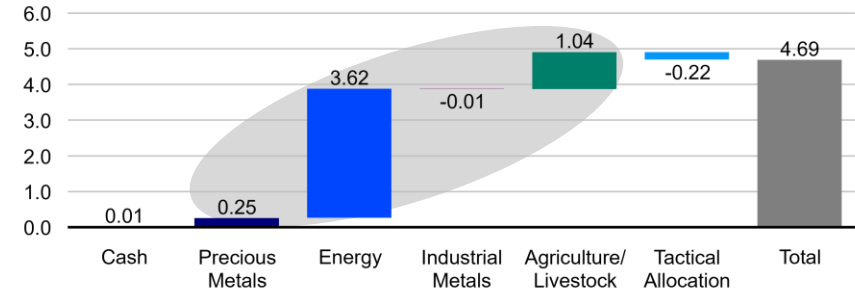
Invesco Balanced-Risk Commodity Strategy

Marin County Employees' Retirement Association– excess return

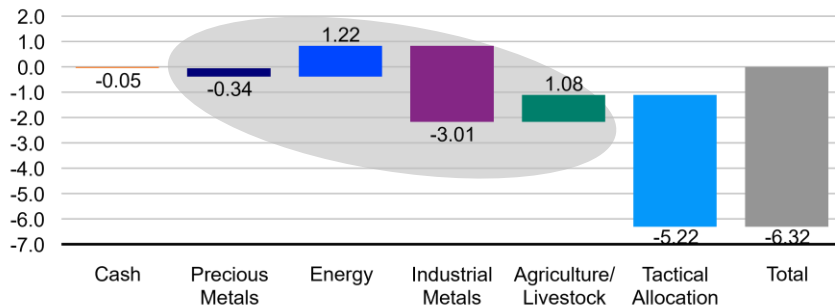
YTD relative to BCOM (gross %)



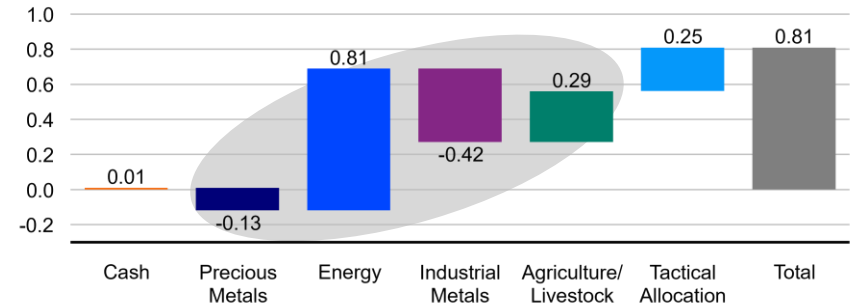
Q4 relative to BCOM (gross %)



2022 relative to BCOM (gross %)



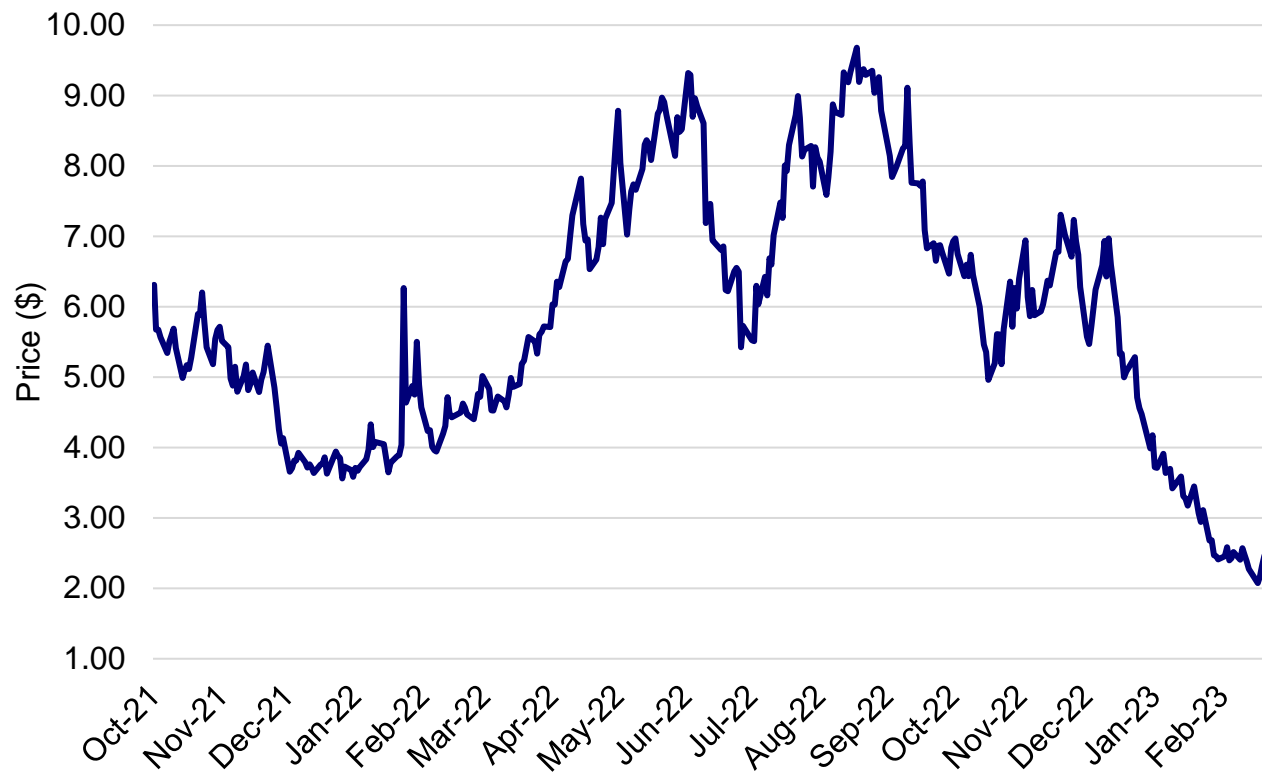
Since Inception relative to BCOM (gross %)



Source: Invesco analysis. Data as of 02/28/23. *Client Inception: 05/20/16. Note: Returns are gross of fees; net returns will be lower. **Past performance is not a guarantee of future results.**

Natural gas continuous futures

Extreme volatility with frequent high magnitude price reversals



Date	Price	%
10/05/21	\$6.20	
2/24/22	\$4.56	-26
6/6/22	\$9.32	104
6/30/22	\$5.42	-42
8/22/22	\$9.68	79
2/22/23	\$2.17	-78

Wheat continuous futures

The consensus said to stay long wheat due to war in Ukraine



Date	Price	%
12/31/21	\$837.94	
3/7/22	\$1397.37	67
4/1/22	\$1063.19	-24
5/17/22	\$1379.25	30
8/18/22	\$779.06	-44
10/10/22	\$975.62	25
2/28/23	\$705.50	-28

Nickel continuous futures

March 2022 short squeeze on the London Metals Exchange



Date	Price	%
12/31/21	\$19,600	
3/16/22	\$46,240	136
7/15/22	\$19,491	-58
12/7/22	\$31,445	61
2/28/23	\$24,620	-22

Invesco Balanced-Risk Commodity Strategy

Asset allocation versus the Bloomberg Commodity Index

	Invesco			Bloomberg	Active Weight
	Strategic	Tactical	Total		
Agriculture/Livestock	35.59%	-3.91%	31.68%	35.21%	-3.53%
Energy	25.00%	10.27%	35.27%	29.92%	5.35%
Industrial Metals	19.72%	-2.63%	17.10%	16.07%	1.03%
Precious Metals	19.69%	-4.29%	15.40%	18.79%	-3.39%
Grand Total	100.00%	-0.56%	99.44%	100.00%	-0.56%

Sources: Invesco analysis and Bloomberg. Past allocations are not a guarantee of future allocations. Data as of March 2023. Allocations subject to rounding and may not equal total.

Commodities market update and perspectives

Invesco Balanced-Risk Commodity Strategy

Outlook on commodities

2023 Major Themes

- 1 The magnitude of the anticipated recession being forecasted by the inverted yield curve

- 2 A recession that causes an early pivot by the US Federal Reserve before inflation has reached a sufficiently low level, that leads to a decline of the dollar and rise in Treasury yields

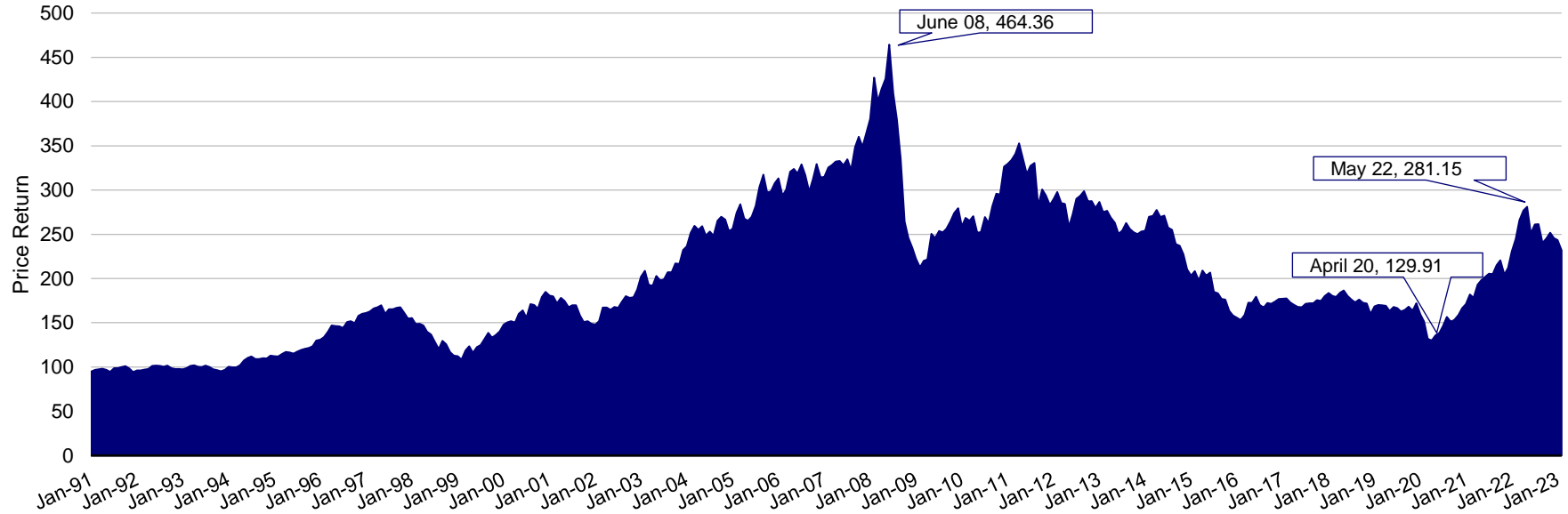
- 3 A reopening in China with a stimulus led recovery increasing demand for energy and industrial metals

- 4 The duration and escalation/de-escalation of the war in Ukraine and its potential impact on supply of key commodities from crude oil, refined products, natural gas to wheat and key industrial metals including nickel and aluminum.

- 5 Deglobalization and the ongoing energy transition that may keep inflation elevated over the next decade

Bloomberg Commodity Index

Still far below the all-time high



Data as of 2/28/23. Source: DataStream. Period covered: January 1991 –February 2023.

Invesco Balanced-Risk Commodity Strategy

Commodity perspectives

Bull market drivers

- 1 Tight physical supply with steady/rising demand
- 2 Increased investment to hedge inflation
- 3 A weaker US dollar
- 4 ESG lending and investment restrictions

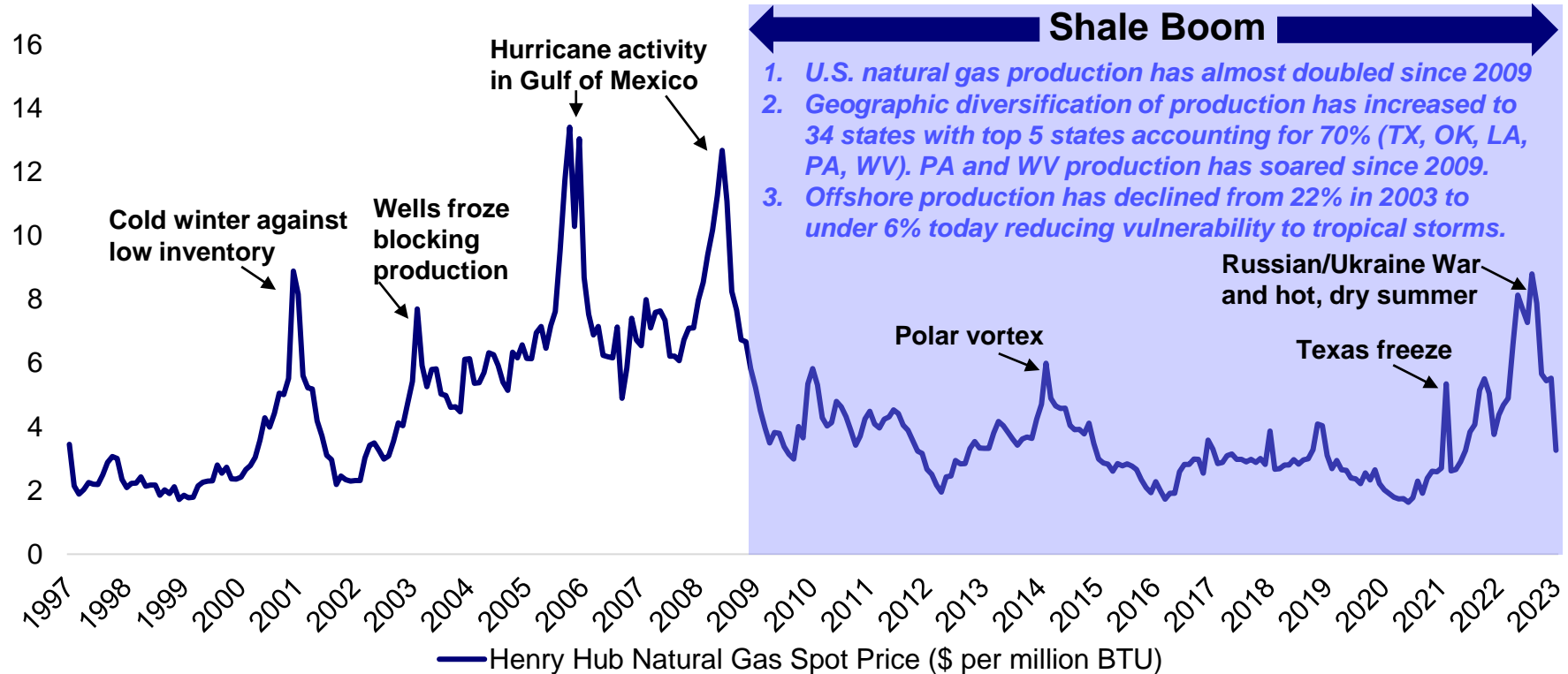
What determines magnitude and duration of bull market?

- 1 High capital expenditures required
- 2 Delays in investment due to regulation or ESG restrictions
- 3 Length of time required for supply to balance demand
- 4 Falling ore grades, declining reserves, weather volatility

Additional information

Henry Hub Natural Gas monthly spot price 1997 to 2023

Natural gas price spikes less pronounced since 2009 shale boom

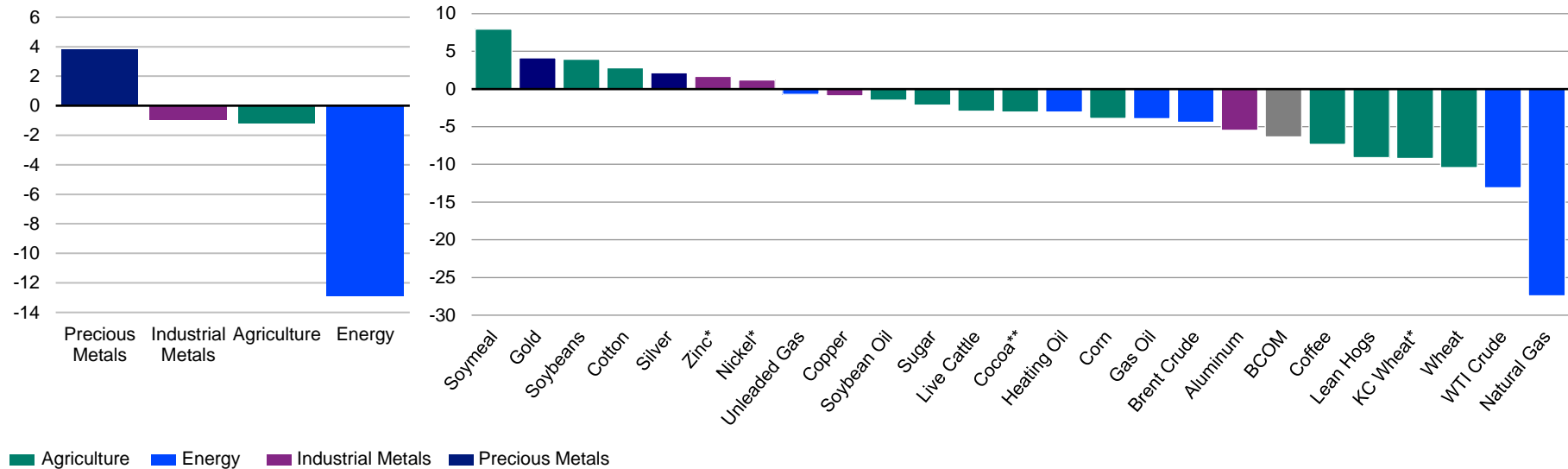


Source: Invesco analysis, EIA. All data as of 1/31/23.

Invesco Balanced-Risk Commodity Strategy

Representative complex performance returns

Since inception results for the sub-complexes and individual assets (%)



Sources: Bloomberg L.P. and Invesco analysis. Invesco Balanced-Risk Commodity Strategy inception: 09/30/08. Data as of 12/31/22 based on continuous future return indices. Commodities represented by the Bloomberg sub-indices. *Index assets not included in the Invesco Balanced-Risk Commodity Strategy strategic allocation. **Non-index asset included in the Invesco Balanced-Risk Commodity Strategy. An investment cannot be made directly in an index. **Past performance is not a guarantee of future results.**

Invesco Global Asset Allocation

Team summary

Team Member	In the Industry Since	With the Firm Since	Education
Research & Portfolio Management			
Scott Wolle, CFA Chief Investment Officer	1991	1999	Duke University, M.B.A. Virginia Tech, B.Sc.
Mark Ahnrud, CFA Sr. Portfolio Manager	1985	2000	Duke University, M.B.A. Babson College, B.Sc.
Chris Devine, CFA Sr. Portfolio Manager	1997	1998	University of Georgia, M.B.A. Wake Forest University, B.A.
Scott Hixon, CFA Sr. Portfolio Manager, Head of Investment Research	1992	1994	Georgia State University, M.B.A. Georgia Southern University, B.B.A.
Christian Ulrich, CFA Sr. Portfolio Manager	1987	2000	KV Zurich Business School, Switzerland
John Burrello, CFA, CAIA Sr. Portfolio Manager	1999	2012	Indiana University, B.A.
Hua Tao, PhD, CFA Research Analyst	2006	2014	Beijing Normal University, B.S. University of Illinois, PhD
Han Liang, CFA Research Analyst	2008	2017	University of Chicago, M.Sc. University of Illinois, M.Sc. Huazhong University of Science and Technology, B.Sc.

As of 12/31/22. Subject to change without notice.

Invesco Global Asset Allocation

Team summary (cont'd)

Team Member	In the Industry Since	With the Firm Since	Education
Client Portfolio Management			
David Gluch, CFA Client Portfolio Manager	1995	1995	University of Texas, B.B.A.
Mike McHugh, CFA Client Portfolio Manager	1996	1998	Bellevue University, B.S.
Max Andres Widmer, CFA Client Portfolio Manager	1988	2013	Graduate School of Business Administration (GSBA Zurich, Switzerland), B.B.A.
George Avery Client Portfolio Manager	2001	2001	University of Virginia, B.A.
Business & Trading Support			
Sergio Beresuita Investment Systems Analyst	2014	2014	Georgia Institute of Technology, B.S.
John Centner Investment Systems Analyst	1999	2012	University of Tennessee, B.A.
Shelly Flanagan Portfolio Analyst	1994	1994	Kennesaw State University, B.S.
Carey Millikin Business Support Analyst	1984	1990	Georgia State University, A.S.
Jennylyn Nogonaliza Portfolio Analyst	1994	1998	San Francisco State University, B.A.

As of 12/31/22. Subject to change without notice. Client portfolio managers (CPMs) are integrated with Invesco's investment teams and involved in the ongoing research matters of their respective team's portfolios. The primary responsibilities of the CPM are to represent the portfolios in the marketplace and to manage the business responsibilities of the investment team. The CPM does not manage strategy assets.

Invesco Balanced-Risk Commodity Composite – USD GIPS® Compliant – Schedule of Investment Performance

Period	Gross Rate of Return (%)	Net Rate of Return (%)	Benchmark Return (%)	Composite 3-Yr St Dev (%)	Benchmark 3-Yr St Dev (%)	Number of Portfolios	Composite Assets (USD millions)	Percentage of Firm Assets (%)	Total Firm Assets ¹ (USD billions)	Composite Dispersion (%)
2021	20.15	19.31	27.11	17.04	15.46	3	1,848.29	0.19	975.05	0.27
2020	8.43	7.68	(3.12)	16.22	14.13	3	1,100.55	0.13	875.96	0.41
2019	6.18	5.44	7.69	8.95	8.58	3	1,331.66	0.16	825.87	0.06
2018	(10.97)	(11.59)	(11.25)	10.94	9.73	3	1,590.5	0.27	578.9	n/a
2017	6.04	5.30	1.70	11.95	12.48	2	1,283.9	0.19	660.3	n/a
2016	14.35	13.55	11.77	12.36	14.26	2	811.8	0.14	599.0	n/a
2015	(15.61)	(16.19)	(24.66)	11.43	12.69	2	418.0	0.07	575.1	n/a
2014	(15.39)	(15.97)	(17.01)	13.71	12.67	2	570.8	0.10	584.9	n/a
2013	(13.06)	(13.66)	(9.52)	19.45	14.83	2	767.2	0.13	572.8	n/a
2012	8.77	8.01	(1.06)	20.64	17.91	2	450.9	0.09	497.1	n/a
2011	(7.14)	(7.78)	(13.32)	21.35	19.37	2	903.6	0.19	479.8	n/a
2010	31.10	30.19	16.83	n/a	n/a	2	350.8	n/a	n/a	n/a
2009	52.29	51.23	18.91	n/a	n/a	2	161.1	n/a	n/a	n/a
2008 (3 Months)	(22.93)	(23.06)	(30.05)	n/a	n/a	1	7.73	n/a	n/a	n/a

Annualized Compound Rates of Return Ending December 31, 2021:

1 Year	20.15	19.31	27.11
2 Years	14.14	13.35	10.97
3 Years	11.42	10.65	9.86
4 Years	5.34	4.61	4.16
5 Years	5.48	4.75	3.66
10 Years	0.08	(0.61)	(2.85)
Since Inception (9/30/2008)	2.80	2.08	(3.42)

Currency: US dollar. *Inception date: 09/30/08. Invesco Worldwide has prepared and presented this report in compliance with the US and Canadian version of the Global Investments Performance Standards (GIPS®). For complete GIPS® disclosure, see following page.

Invesco Balanced-Risk Commodity Composite – USD

GIPS® Compliant – Performance Notes

- 1 *Invesco Worldwide claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Invesco Worldwide has been independently verified for the periods 1st January 2003 through 31st December 2021. The verification reports are available upon request.
A firm that claims compliance with the GIPS standards must establish policies and procedures for complying with all the applicable requirements of the GIPS standards. Verification provides assurance on whether the firm's policies and procedures related to composite and pooled fund maintenance, as well as the calculation, presentation, and distribution of performance, have been designed in compliance with the GIPS standards and have been implemented on a firm-wide basis. Verification does not provide assurance on the accuracy of any specific performance report.
GIPS is a registered trademark of CFA Institute. CFA Institute does not endorse or promote this organization, nor does it warrant the accuracy or quality of the content contained herein.*
- 2 *For purposes of compliance with Global Investment Performance Standards (GIPS®), "Invesco Worldwide" refers collectively to all direct or indirect subsidiaries of Invesco Ltd. that provide discretionary investment advice with the exception of the following entities: Invesco Investment Management Ltd., Invesco Investment Advisers LLC, Invesco Asset Management Australia (Holdings) Ltd., Invesco Global Real Estate Asia Pacific, Inc., IRE (Cayman) Ltd., Invesco Senior Secured Management, Inc., Invesco Private Capital, Inc., and Invesco Capital Management LLC. Invesco Great Wall Fund Management Company Limited is compliant with GIPS but is not part of Invesco Worldwide. Invesco Canada Ltd. was added to the firm effective December 31, 2021.*
- 3 *The objective of the Balanced-Risk Commodity investment strategy is to outperform the index, Bloomberg Commodities Index, by 5% per annum over a rolling three to five year investment horizon. The strategy will strive to achieve this objective with a proprietary risk parity strategy that targets lower portfolio risk than the benchmark and seeks to minimize the risk of large draw downs with a risk-balanced investment process. Portfolio risk is defined as the annualized standard deviation of the strategy's returns. Effective March 30, 2012, the Composite name was changed from Invesco Balanced-Risk Commodity Strategy Composite to Invesco Balanced-Risk Commodity Composite - USD.*
- 4 *The Composite returns are benchmarked to Bloomberg Commodity Total Return Index, (formerly known as the Dow Jones-UBS Commodity Index). The benchmark is used for comparative purposes only. Investments made by the Firm for the portfolios it manages according to respective strategies may differ significantly in terms of security holdings, industry weightings, and asset allocation from those of the benchmark. Accordingly, investment results and volatility will differ from those of the benchmark.*
- 5 *The minimum portfolio size for the Composite is \$5,000,000.*

Invesco Balanced-Risk Commodity Composite – USD

GIPS® Compliant – Performance Notes Cont'd

- 6 *The Balanced Risk Commodities Strategy invests primarily in derivatives including commodity futures, exchange traded funds, and commodity linked notes. The composite notional value will generally not exceed 1.5 times capital.*
- 7 *Carve-outs from multi-asset class portfolios are included within this composite for the partial year 2008 and 2009. Carve-out returns were calculated by allocating cash to the commodities segment carve-out according to the strategic target cash position for the strategy. As of 31 December 2008 and 2009, carve-outs comprised 100% and 57% of the composite, respectively.*
- 8 *Gross-of-fee performance results are presented before management and custodial fees but after all trading commissions and withholding taxes on dividends, interest and capital gains, when applicable. Net-of-fee performance results are calculated by subtracting the highest tier of our published fee schedule for the product from the monthly returns. The management fee schedule is as follows: 70 basis points on the first \$100 million, 60 basis points thereafter.*
- 9 *Composite dispersion is measured by the standard deviation across asset-weighted portfolio gross-of-fee returns represented within the composite for the full year. It is considered not meaningful for composites with fewer than three portfolios during the entire year. The three-year annualized standard deviation measures the variability of the composite and the benchmark returns over the preceding 36 months. The standard deviation is not presented when there is less than 36 months.*
- 10 *Valuations and portfolio total returns are computed and stated in U.S. Dollars. The Firm consistently values all portfolios each day on a trade date basis. Portfolio level returns are calculated as time-weighted total returns on daily basis. Accrual accounting is used for all interest and dividend income. Past performance is not an indication of future results.*
- 11 *The composite creation date is April 2010.*
- 12 *The following are available on request:*
 - * Policies for valuing investments, calculating performance and preparing GIPS reports*
 - * List of composite descriptions*
 - * List of limited distribution pooled fund descriptions*
 - * List of broad distribution pooled funds*

Invesco Disclaimer

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Derivatives Risk

The Invesco Balanced-Risk Commodity Strategy invests (directly or indirectly) a substantial portion of its assets in “derivatives”—so-called because their value “derives” from the value of an underlying asset (including an underlying security), reference rate or index—the value of which may rise or fall more rapidly than other investments. The strategy invests principally in exchange-traded futures across a diverse mix of commodities. The Invesco Balanced-Risk Commodity Strategy is a long-only strategy, so the portfolio will hold no net short positions at any time. For some derivatives, it is possible to lose more than the amount invested in the derivative. If the portfolio uses derivatives to “hedge” a portfolio risk, it is possible that the hedge may not succeed. This may happen for various reasons, including unexpected changes in the value of the rest of the portfolio. Over the counter derivatives are also subject to counterparty risk, which is the risk that the other party to the contract will not fulfill its contractual obligation to complete the transaction with the portfolio.

Leverage Risk

The Invesco Balanced-Risk Commodity Strategy employs leverage as a fundamental element within the investment strategy. The implementation of a risk parity strategy requires the use of leverage in order to increase the risk of the government bond allocation in the strategy so that it can be balanced against the portfolio’s exposure to stocks and commodities. The use of derivatives facilitates the ability to create the desired level of leverage in the portfolio. Leverage may cause the portfolio to be more volatile than if the portfolio had not been leveraged because leverage can exaggerate the effect of any increase or decrease in the value of securities held by the portfolio.

Thank you

Memorandum

To: MCERA Board of Trustees
From: Jim Callahan, CFA
Anne Heaphy
Date: March 29, 2023
Subject: Recent Bank Failures and MCERA Exposure

It has been a very volatile and tenuous few weeks in the banking industry with the collapse of Silicon Valley Bank, Signature Bank of New York, Silvergate Capital, and Credit Suisse. The failure of these banks is due to some unique circumstances. Silicon Valley Bank, Signature Bank, and Silvergate Capital all had fairly concentrated customer and depositor bases while Credit Suisse was in the process of restructuring its business to address prior governance and risk management issues. The aggressive interest rate hikes by the Fed added increased pressures that caused some fissures in the system. Swift action by regulators has helped contain some of the fallout and has hopefully minimized broader contagion. However, the situation continues to evolve on a daily basis.

MCERA's collective debt and equity exposure to Silicon Valley Bank, Signature Bank, and Silvergate Capital is listed below. Also included is Credit Suisse AT1 bond exposure as that particular type of bond is being written down to zero with the sale to UBS. Credit Suisse senior debt is holding up well and is expected to be assumed by UBS. Overall, the exposures are minimal.

- SSGA Russell 1000 Index – 0.04% Silicon Valley Bank, 0.02% Signature Bank
- Wellington – 0.3% Credit Suisse senior debt, 0% AT1 bonds
- Western Asset – 0.8% Credit Suisse senior debt, 0.02% AT1 bonds
- CarVal Value Fund V – the total fund held about 1% in Credit Suisse AT1 bonds, MCERA represents 0.9% of the fund.

MCERA's private equity managers, Abbott and Pathway, were also impacted by the collapse of Silicon Valley Bank which was a key financial partner for venture capital funds.

Summary of Events

Silicon Valley Bank ("SVB") was a commercial bank founded in 1983 and headquartered in Santa Clara, CA. It was the largest bank in Silicon Valley and the 16th largest in the country. SVB primarily served commercial customers (businesses and startups) within the venture capital and technology industries.

Deposits at SVB grew rapidly as a result of the pandemic-induced tech boom—from \$60 billion in 1Q20 to \$200 billion in 1Q22. Deposits were invested in long-term U.S. Treasuries and mortgages, both of which declined sharply as interest rates rose.

C.1

Over the last year or so, SVB's deposits dropped in conjunction with the slowdown in the venture capital industry. Venture-backed companies were burning cash at a much faster rate than they were raising it. By 4Q22, deposits fell from \$200 billion to \$173 billion and were expected to continue declining in 2023. On March 8, SVB sold \$21 billion in securities to shore up its balance sheet and took a \$1.8 billion loss.

SVB then sought to raise \$2.25 billion in new capital through a stock sale, which led to a plunge in the stock price. This spooked the venture capital industry, and venture firms began advising their portfolio companies to pull cash out of their SVB accounts.

By Thursday, March 9, 2023, SVB customers were trying to withdraw \$42 billion in deposits and SVB ran out of cash.

On Friday March 10, a trading halt was initiated on SVB stock, its bank charter was revoked, and its business was transferred into a receivership under the Federal Deposit Insurance Corporation (FDIC). The business has been transferred to a new entity called the Deposit Insurance National Bank of Santa Clara, which will serve as a bridge bank to facilitate customer access to deposits.

On Sunday March 12, 2023, the FDIC initiated an auction for SVB's assets. Signature Bank was also shut down by regulators on this day. It was one of the biggest lenders to the crypto industry and marked the third-largest bank failure in U.S. history, ranking behind only SVB's shutdown and the collapse of Washington Mutual during the 2008 Global Financial Crisis.

The Treasury, the Federal Reserve and FDIC jointly announced that it would allow depositors, both insured and uninsured, at SVB and Signature Bank access to deposits on the following day. Additional funding will be made available through a new Bank Term Funding Program (BTFP), which provides loans of up to one year in length to banks and other eligible depository institutions. They must pledge U.S. Treasuries, agency debt and mortgage-backed securities, or other qualifying assets as collateral, but these assets will be valued at par. This measure should alleviate liquidity issues.

The demise of SVB appears to have been caused by a lack of diversification across its customer base, an asset/liability mismatch, and was further fueled by word-of-mouth (amplified by Twitter) throughout the closely knit tech sector. While actions from regulators certainly helped to restore confidence and mitigate contagion risk, the situation is still very fluid and tenuous.

Impact on Abbott and Pathway

Abbott

Three of Abbott's funds in which MCERA is invested (ACE VII, AP 2017, and AP 2021) held cash deposits at SVB. The total amount was approximately \$9.8 million, and Abbott now has full access to all cash deposits. Historically, Abbott maintained one primary bank account for each fund. Some funds were at SVB, while others were maintained at other financial institutions. Going forward, they will maintain more than one deposit banking relationship for each of the Abbott funds. The funds that held accounts at SVB are being transitioned to Wells Fargo with whom Abbott had an existing relationship. They continue to evaluate providers for additional accounts.

Pathway

All of Pathway's funds in which MCERA is invested (PPEF 2008, PPEF I-7, PPEF I-8, PPEF I-9, PPEF I-10, and PPEF I-11) held accounts at SVB although I-11 did not yet have a balance. The total amount was approximately \$13.7 million, and Pathway also has full access to all deposits now. Historically, Pathway held primary fund bank accounts with SVB. They are in the process of establishing new bank accounts for each fund with J.P. Morgan and Bank of America.

Both Abbott and Pathway reached out to their general partners to get manager and portfolio company exposure to SVB, and they continue to collect and analyze that data. Similar to Abbott and Pathway, these companies are also in the process of evaluating and adjusting their banking relationships.



Date: March 24, 2023

To: Investment Committee
Marin County Employees' Retirement Association (MCERA)

From: Jeff Wickman *fw*
Retirement Administrator

Subject: Abbott ACE VI Fund Extension Request

Background

In 2008 the Board of Retirement, through the Investment Committee, committed \$100 million to Abbott Capital Management's ACE VI fund. At that time MCERA entered into a Limited Partnership Agreement (LPA) to become a Limited Partner (LP) in the fund. The LPA defined the term of the fund as being 12 years with the option for the General Partner (GP) to extend the fund, at the GP's discretion, by three one-year extensions. The GP ultimately exercised all of the extensions and the fund is set to terminate on March 31, 2023. The impending termination of ACE VI was discussed with Abbott when they presented to the Investment Committee on September 28, 2022.

On March 8, 2023 Abbott sent a letter to each LP in ACE VI requesting consent to extend the term by an additional two years through March 31, 2025. As provided in Abbott's letter the extension is being requested to allow additional time to manage the funds remaining in the portfolio. As of 9/30/2022 the net asset value of MCERA's portion of ACE VI is approximately \$41 million.

Although Abbott's letter requests that the consent response be provided no later than March 27, 2023, MCERA requested and was granted an extension so this item could be agendaized for discussion with the Investment Committee. If a majority of the LPs consent to the extension, then it will be approved. If this occurs MCERA will continue to pay the management fee through the final liquidation of the fund. Abbott has proposed a modification to the management fee, as set forth in the enclosed confidential materials related to this alternative investment. So far in Fiscal Year 2022/23 MCERA has paid \$182,947 in management fees for ACE VI.

Recommendation

Staff recommends the Committee discuss the consent request for an extension to ACE VI. As noted above, if the Committee chooses not to consent to the request and the majority of LPs provide consent the extension will be put in place. MCERA's ACE VI LPA provides little recourse for MCERA. MCERA could request that Abbott sell off its investments in ACE VI using the secondary market. However, the Committee would need to weigh the potential impact on MCERA's anticipated risk-adjusted returns of taking that approach in the current market environment as well.

Memorandum

To: MCERA Board of Trustees
From: Jim Callahan, CFA
 Anne Heaphy
Date: March 29, 2023
Subject: UBS Trumbull Property Fund Loyalty Fee Program - Extended

UBS announced that they are extending their fee loyalty program for the Trumbull Property Fund. In September 2019, the fund announced investors would have a choice between two fee incentives:

- **Loyalty Incentive:** Investors would be entitled to a fee discount of 15% for investments committed for 3 years or a 25% fee discount for investments committed for 4 years
- **Top-Up Incentive:** Existing investors would be entitled to a zero base fee on any additional dollars they deposit into the Fund for up to 100% of their original starting balance

Investors decide the amount to commit. Investors were able to participate in both programs, but the programs cannot be applied to the same dollars.

MCERA approved of the Loyalty Incentive Program of 25% for four years, and it was applied to \$101,565,496.65 of MCERA's assets invested in the Fund. This discount commenced on January 1, 2020 and will end on December 31, 2023. As of September 30, 2022, MCERA has saved \$545,391 in fees through this program. The total amount of savings for the four years will be approximately \$800,000 (roughly \$50,000 per quarter/\$200,000 per year).

UBS is offering clients currently invested in their incentive programs to extend their benefit for a new term. The client can decide if the new term should begin upon expiration of their current commitment period or once the enrollment forms are received. The program options are the same. For the Loyalty Incentive Program, investors may choose to commit some assets for three years and some for four years. Should MCERA decide to sign up again for the Loyalty Incentive Program but needs to redeem assets before the end of the commitment period, then MCERA would pay back the discount applicable to the assets being redeemed. As of December 31, 2022, MCERA has \$109,932,429.17 invested in the Trumbull Property Fund.

MCERA has until March 2024 to decide; however, UBS has the ability to modify or terminate this offer at any time.

Memorandum

To: MCERA Board of Trustees
From: Jim Callahan, CFA
Anne Heaphy
Date: March 29, 2023
Subject: TimesSquare Capital Management Personnel Update

TimesSquare has announced that they have parted ways with Robert Purcell, a Research Analyst covering Japan. Purcell joined TimesSquare in 2019. There was an increasing divergence in process, and Japanese stock selection has been the largest detractor recently.

In the meantime, Magnus Larssen, who is co-Portfolio manager on the International Small Cap Fund (along with David Hirsch) is covering the Japanese names. David Oh, who is Head of Asia for the International Equity team but focuses more on emerging markets, supports Larssen. They are looking to add to the team.

The TimesSquare International Small Cap Fund invests in approximately 75 stocks, of which about 25%, or roughly 18 stocks, are Japanese. Larssen has been reworking most of these names.

The International Small Cap team consists of the following members:
Magnus Larsson – co-Portfolio Manager, Generalist/Japan
Davis Hirsch – co-Portfolio Manager, Europe

David Oh – Portfolio Manager/Analyst, Head of Asia
Reuben Scherzer – Analyst, Europe
Marisa Hernandez – Analyst, Latin America

While this is a notable personnel change that warrants increased monitoring, we do not believe any action is required at this time.

Callan

March 29, 2023

Mcera



2023 Capital Markets Projections and Asset Allocation Review

Jay Kloepper

Capital Markets Research

Jim Callahan, CFA

President

Anne Heaphy

Fund Sponsor Consulting

Important Disclosures regarding the use of this document are included at the end of this document. These disclosures are an integral part of this document and should be considered by the user.

Agenda

- ▶ **Process overview**
- ▶ **Current market conditions**
 - Special focus on inflation
- ▶ **2023 expectations**
 - Fixed Income
 - Equity
 - Alternatives
- ▶ **Detailed 2023 projections and resulting portfolio returns**

Callan

Process Overview

Why Make Capital Markets Projections?

Guiding objectives and process

Cornerstone of a prudent process is a long-term strategic investment plan

- ▶ Capital markets projections are key elements—set reasonable return and risk expectations for the appropriate time horizon
- ▶ Projections represent our best thinking regarding the long-term (10-year) outlook, recognizing our median projections represent the midpoint of a range, rather than a specific number
- ▶ Develop results that are readily defensible both for individual asset classes and for total portfolios
- ▶ Be conscious of the level of change suggested in strategic allocations for long-term investors: DB plan sponsors, foundations, endowments, trusts, DC participants, families, and individuals
- ▶ Reflect common sense and recent market developments, within reason

Callan's forecasts are informed by current market conditions, but are not built directly from them

- ▶ Balance recent, immediate performance and valuation against long-term equilibrium expectations

How Are Capital Markets Projections Constructed?

Guiding objectives and process

Underlying beliefs guide the development of the projections

- ▶ An initial bias toward long-run averages
- ▶ A conservative bias
- ▶ An awareness of risk premiums
- ▶ A presumption that markets are ultimately clear and rational

Reflect our beliefs that long-term equilibrium relationships between the capital markets and lasting trends in global economic growth are key drivers to setting capital markets expectations

Long-term compensated risk premiums represent “beta”—exposure to each broad market, whether traditional or “exotic,” with limited dependence on successful realization of alpha

The projection process is built around several key building blocks

- ▶ Advanced modeling at the individual asset class level (e.g., a detailed bond model, an equity model)
- ▶ A path for interest rates and inflation
- ▶ A cohesive economic outlook
- ▶ A framework that encompasses Callan beliefs about the long-term operation and efficiencies of the capital markets

How Are Capital Market Projections Constructed?

Projections are 10-year forward-looking, representing a medium- to long-term planning horizon:

- Differ from the actuarial assumptions, which tend to reflect longer-term horizons of 30-40 years

Projections consist of return and two measures that contribute to portfolio volatility: standard deviation and correlation

Cover most broad asset classes and inflation

- Broad U.S. equity
 - *Large cap*
 - *Smid cap*
- Global ex-U.S. equity
 - *Developed market*
 - *Emerging market*
- U.S. fixed income
 - *Short duration*
 - *Core U.S. fixed*
 - *TIPS*
 - *High yield*
 - *Long duration (government, credit, and government / credit)*
- Global ex-U.S. fixed income
- Real estate
- Alternative investments (private equity, hedge funds, and private credit)
- Cash
- Inflation

2023 vs. 2022 Risk and Returns Assumptions

Summary of Callan's Long-Term Capital Markets Assumptions (2023–2032)

		Projected Return		Real	Projected Risk	2022–2031			vs. 2022	
		1-Year Arithmetic	10-Year Geometric*		Standard Deviation	1-Year Arithmetic	10-Year Geometric*	Standard Deviation	Geometric* Delta	Std Dev Delta
Asset Class	Index									
Equities										
Broad U.S. Equity	Russell 3000	8.75%	7.35%	4.85%	18.05%	8.00%	6.60%	17.95%	0.75%	0.10%
Large Cap U.S. Equity	S&P 500	8.60%	7.25%	4.75%	17.75%	7.85%	6.50%	17.70%	0.75%	0.05%
Smid Cap U.S. Equity	Russell 2500	9.60%	7.45%	4.95%	22.15%	8.75%	6.70%	21.30%	0.75%	0.85%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.45%	7.45%	4.95%	21.25%	8.70%	6.80%	20.70%	0.65%	0.55%
Developed ex-U.S. Equity	MSCI World ex USA	9.00%	7.25%	4.75%	20.15%	8.25%	6.50%	19.90%	0.75%	0.25%
Emerging Market Equity	MSCI Emerging Markets	10.45%	7.45%	4.95%	25.70%	9.80%	6.90%	25.15%	0.55%	0.55%
Fixed Income										
Short Duration Gov/Credit	Bloomberg 1-3 Year Gov/Credit	3.75%	3.80%	1.30%	2.30%	1.50%	1.50%	2.00%	2.30%	0.30%
Core U.S. Fixed	Bloomberg Aggregate	4.25%	4.25%	1.75%	4.10%	1.80%	1.75%	3.75%	2.50%	0.35%
Long Government	Bloomberg Long Gov	4.55%	3.70%	1.20%	13.50%	1.85%	1.10%	12.50%	2.60%	1.00%
Long Credit	Bloomberg Long Credit	5.75%	5.20%	2.70%	11.75%	2.60%	2.10%	10.50%	3.10%	1.25%
Long Government/Credit	Bloomberg Long Gov/Credit	5.25%	4.75%	2.25%	11.35%	2.30%	1.80%	10.40%	2.95%	0.95%
TIPS	Bloomberg TIPS	4.10%	4.00%	1.50%	5.30%	1.35%	1.25%	5.05%	2.75%	0.25%
High Yield	Bloomberg High Yield	6.75%	6.25%	3.75%	11.75%	4.40%	3.90%	10.75%	2.35%	1.00%
Global ex-U.S. Fixed	Bloomberg Global Agg ex US	2.70%	2.25%	-0.25%	9.80%	1.20%	0.80%	9.20%	1.45%	0.60%
Emerging Market Sov Debt	EMBI Global Diversified	6.25%	5.85%	3.35%	10.65%	4.00%	3.60%	9.50%	2.25%	1.15%
Alternatives										
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.25%	14.20%	6.60%	5.75%	14.20%	0.00%	0.00%
Private Infrastructure	MSCI GI Infra/FTSE Dev Core 50/50	7.15%	6.15%	3.65%	15.45%	7.10%	6.10%	15.45%	0.05%	0.00%
Private Equity	Cambridge Private Equity	11.95%	8.50%	6.00%	27.60%	11.45%	8.00%	27.60%	0.50%	0.00%
Private Credit	N/A	8.00%	7.00%	4.50%	15.50%	6.40%	5.50%	14.60%	1.50%	0.90%
Hedge Funds	Callan Hedge FOF Database	5.80%	5.55%	3.05%	8.45%	4.35%	4.10%	8.20%	1.45%	0.25%
Commodities	Bloomberg Commodity	5.05%	3.50%	1.00%	18.00%	4.05%	2.50%	18.00%	1.00%	0.00%
Cash Equivalents	90-Day T-Bill	2.75%	2.75%	0.25%	0.90%	1.20%	1.20%	0.90%	1.55%	0.00%
Inflation	CPI-U		2.50%		1.60%		2.25%	1.60%	0.25%	0.00%

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Source: Callan

Callan

Current Market Conditions

Mayhem in the Capital Markets

Russian invasion of Ukraine threw expectations for an orderly transition from pandemic era out the window.

Inflation is burning out of control, with CPI-U up more than 8% year-over-year in each month from March through September.

► Inflation readings decelerated after September, coming in at 6.5% in December..

The S&P 500 and Bloomberg Aggregate were down together for three consecutive quarters through 3Q22; both were up in 4Q22.

The Fed remains on a mission to raise interest rates to fight inflation; new target range set in December 2022 is 4.25%–4.5%.

► The Fed has raised rates 425 bps since March, from a range of 0.0%-0.25%.

No place to hide in 2022; almost every asset class is down. It was the worst year for a 60/40 portfolio in decades.

Rising likelihood of recession: GDP declined in both 1Q and 2Q, rebounded in 3Q, and in Q4, but...

Yield curve is inverted!

Equity and Fixed Income Markets Down Together in 2022

Declines for both stocks and bonds for three straight quarters are extremely unusual

Global equity markets down sharply in 2022 despite rebound in 4Q

- Similar impact across all equity market segments: developed, emerging, small cap

Fixed income down with sharply higher inflation and interest rates

- Bloomberg Aggregate: -13% for the year, worst year ever for the index by a wide margin
- CPI-U: +6.5% for the year ended Dec. 2022
- ▶ Number of times stocks and bonds have been down together
 - 38 quarters in almost 100 years, about 10% of the quarters
 - But just twice on annual basis
- ▶ Inflation at highest rate in decades
- ▶ Economic data show growth hit 'pause'
 - GDP rose 2.9% in 4Q22, after a 3.2% rise in 3Q, a 0.6% drop in 2Q, and a 1.6% decline in 1Q.

Returns for Periods ended 12/31/22

	Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
U.S. Equity						
Russell 3000	7.18	-19.21	-19.21	8.79	12.13	7.68
S&P 500	7.56	-18.11	-18.11	9.42	12.56	7.64
Russell 2000	6.23	-20.44	-20.44	4.13	9.01	7.13
Global ex-U.S. Equity						
MSCI World ex USA	16.18	-14.29	-14.29	1.79	4.59	4.65
MSCI Emerging Markets	9.70	-20.09	-20.09	-1.39	1.44	--
MSCI ACWI ex USA Small Cap	13.31	-19.97	-19.97	0.67	5.24	6.87
Fixed Income						
Bloomberg Aggregate	1.87	-13.01	-13.01	0.02	1.06	3.97
90-day T-Bill	0.84	1.46	1.46	1.26	0.76	1.91
Bloomberg Long Gov/Credit	2.61	-27.09	-27.09	-1.21	1.57	5.38
Bloomberg Global Agg ex-US	6.81	-18.70	-18.70	-3.07	-1.64	2.71
Real Estate						
NCREIF Property	-3.50	5.53	5.53	7.46	8.82	9.04
FTSE Nareit Equity	5.24	-24.37	-24.37	3.68	6.53	7.87
Alternatives						
CS Hedge Fund Index	0.92	1.06	1.06	4.25	4.24	5.81
Cambridge Private Equity*	-1.84	-3.77	-3.77	16.84	15.31	14.31
Bloomberg Commodity	2.22	16.09	16.09	6.44	-1.28	1.87
Gold Spot Price	9.22	-0.13	-0.13	6.88	0.86	7.64
Inflation - CPI-U	0.00	6.45	6.45	3.78	2.60	2.47

*Cambridge PE data through 09/30/22.

Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

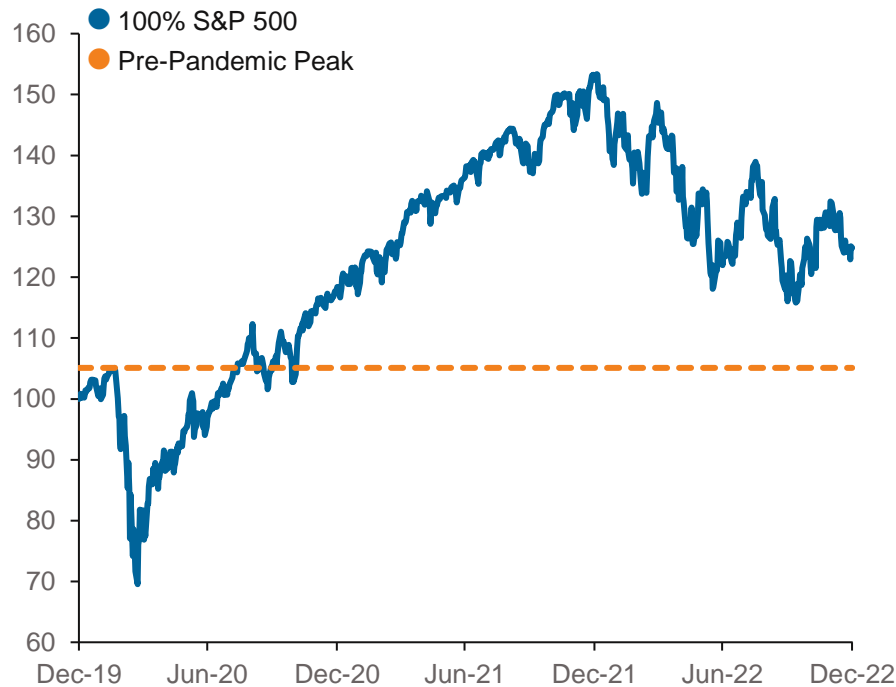
Callan Periodic Table of Investment Returns

Monthly Returns												Annual Returns
Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	2022
Emerging Market Equity	Small Cap Equity	Real Estate	High Yield	Dev ex-U.S. Equity	U.S. Fixed Income	Small Cap Equity	Emerging Market Equity	High Yield	Small Cap Equity	Emerging Market Equity	Global ex-U.S. Fixed Income	High Yield
-1.89%	1.07%	4.47%	-3.56%	0.83%	-1.57%	10.44%	0.42%	-3.97%	11.01%	14.83%	1.31%	-11.19%
Global ex-U.S. Fixed Income	High Yield	Large Cap Equity	U.S. Fixed Income	U.S. Fixed Income	Global ex-U.S. Fixed Income	Large Cap Equity	Small Cap Equity	U.S. Fixed Income	Large Cap Equity	Dev ex-U.S. Equity	U.S. Fixed Income	U.S. Fixed Income
-1.96%	-1.03%	3.71%	-3.79%	0.64%	-4.50%	9.22%	-2.05%	-4.32%	8.10%	10.65%	-0.45%	-13.01%
U.S. Fixed Income	Global ex-U.S. Fixed Income	Small Cap Equity	Real Estate	Emerging Market Equity	Emerging Market Equity	Real Estate	High Yield	Global ex-U.S. Fixed Income	Dev ex-U.S. Equity	Real Estate	Dev ex-U.S. Equity	Dev ex-U.S. Equity
-2.15%	-1.11%	1.24%	-5.48%	0.44%	-6.64%	7.96%	-2.30%	-5.87%	5.51%	6.73%	-0.48%	-14.29%
High Yield	U.S. Fixed Income	Dev ex-U.S. Equity	Emerging Market Equity	High Yield	High Yield	High Yield	U.S. Fixed Income	Large Cap Equity	Real Estate	Large Cap Equity	High Yield	Large Cap Equity
-2.73%	-1.12%	1.16%	-5.56%	0.25%	-6.73%	5.90%	-2.83%	-9.21%	2.99%	5.59%	-0.62%	-18.11%
Dev ex-U.S. Equity	Dev ex-U.S. Equity	High Yield	Dev ex-U.S. Equity	Large Cap Equity	Small Cap Equity	Dev ex-U.S. Equity	Large Cap Equity	Dev ex-U.S. Equity	High Yield	Global ex-U.S. Fixed Income	Emerging Market Equity	Global ex-U.S. Fixed Income
-4.41%	-1.56%	-1.15%	-6.57%	0.18%	-8.22%	4.97%	-4.08%	-9.26%	2.60%	5.58%	-1.41%	-18.70%
Large Cap Equity	Real Estate	Emerging Market Equity	Global ex-U.S. Fixed Income	Small Cap Equity	Large Cap Equity	U.S. Fixed Income	Dev ex-U.S. Equity	Small Cap Equity	Global ex-U.S. Fixed Income	U.S. Fixed Income	Real Estate	Emerging Market Equity
-5.17%	-2.47%	-2.26%	-6.83%	0.15%	-8.25%	2.44%	-4.67%	-9.58%	-0.14%	3.68%	-2.79%	-20.09%
Real Estate	Emerging Market Equity	U.S. Fixed Income	Large Cap Equity	Global ex-U.S. Fixed Income	Real Estate	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	Emerging Market Equity	U.S. Fixed Income	Small Cap Equity	Large Cap Equity	Small Cap Equity
-5.75%	-2.99%	-2.78%	-8.72%	0.01%	-8.69%	1.92%	-4.99%	-11.72%	-1.30%	2.34%	-5.76%	-20.44%
Small Cap Equity	Large Cap Equity	Global ex-U.S. Fixed Income	Small Cap Equity	Real Estate	Dev ex-U.S. Equity	Emerging Market Equity	Real Estate	Real Estate	Emerging Market Equity	High Yield	Small Cap Equity	Real Estate
-9.63%	-2.99%	-3.20%	-9.91%	-4.35%	-9.41%	-0.25%	-6.49%	-12.42%	-3.10%	2.17%	-6.49%	-25.10%

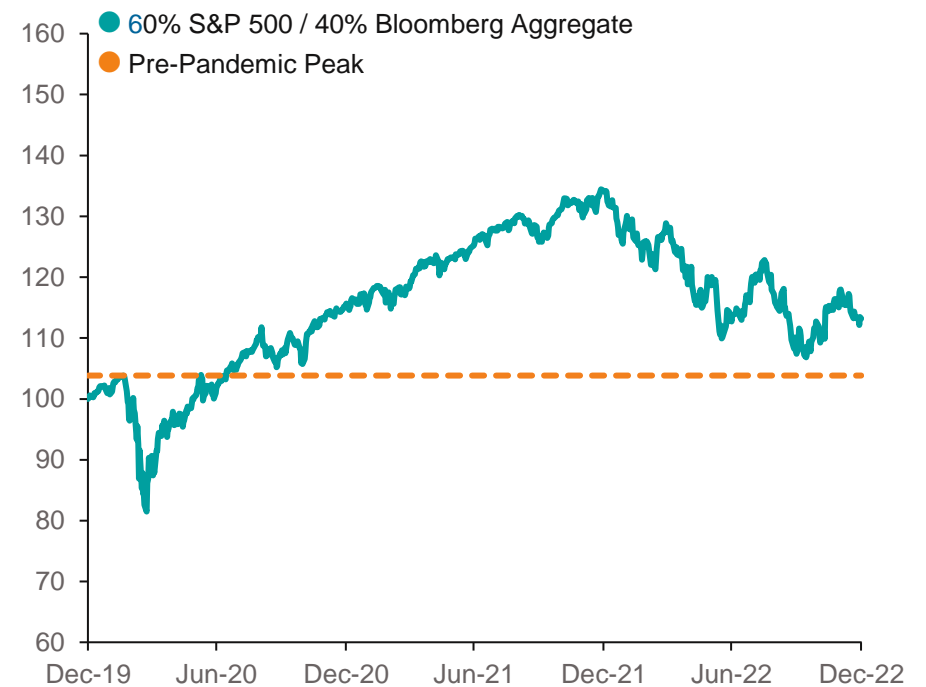
Sources: ● Bloomberg Aggregate ● Bloomberg Corp High Yield ● Bloomberg Global Aggregate ex US ● FTSE EPRA Nareit Developed
 ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Post-Pandemic Market Performance

Growth of \$100 Invested on 12/31/19



Growth of \$100 Invested on 12/31/19

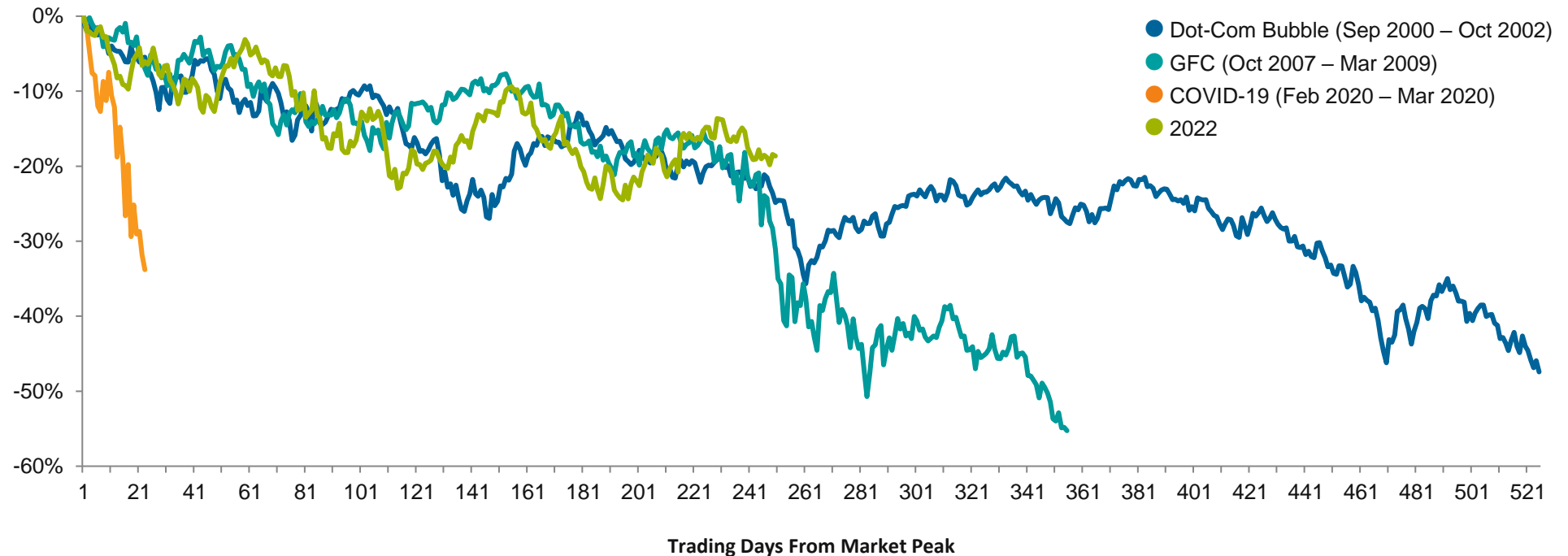


	Investment in S&P 500	Investment in 60% S&P 500 / 40% Bloomberg Agg
Gain from pre-pandemic peak to post-pandemic peak	45.9%	29.4%
Gain over pre-pandemic peak	18.8%	9.0%
Loss from post-pandemic peak	-18.6%	-15.8%
Further loss needed to return to pre-pandemic peak	-15.8%	-8.2%
Total loss if markets decline from post-pandemic peak to pre-pandemic peak	-31.5%	-22.7%

2022 Equity Drawdown: A More 'Typical' Correction?

S&P 500 Cumulative Returns

Market Peak-to-Trough for Recent Corrections vs. 2022 Through 12/31/22

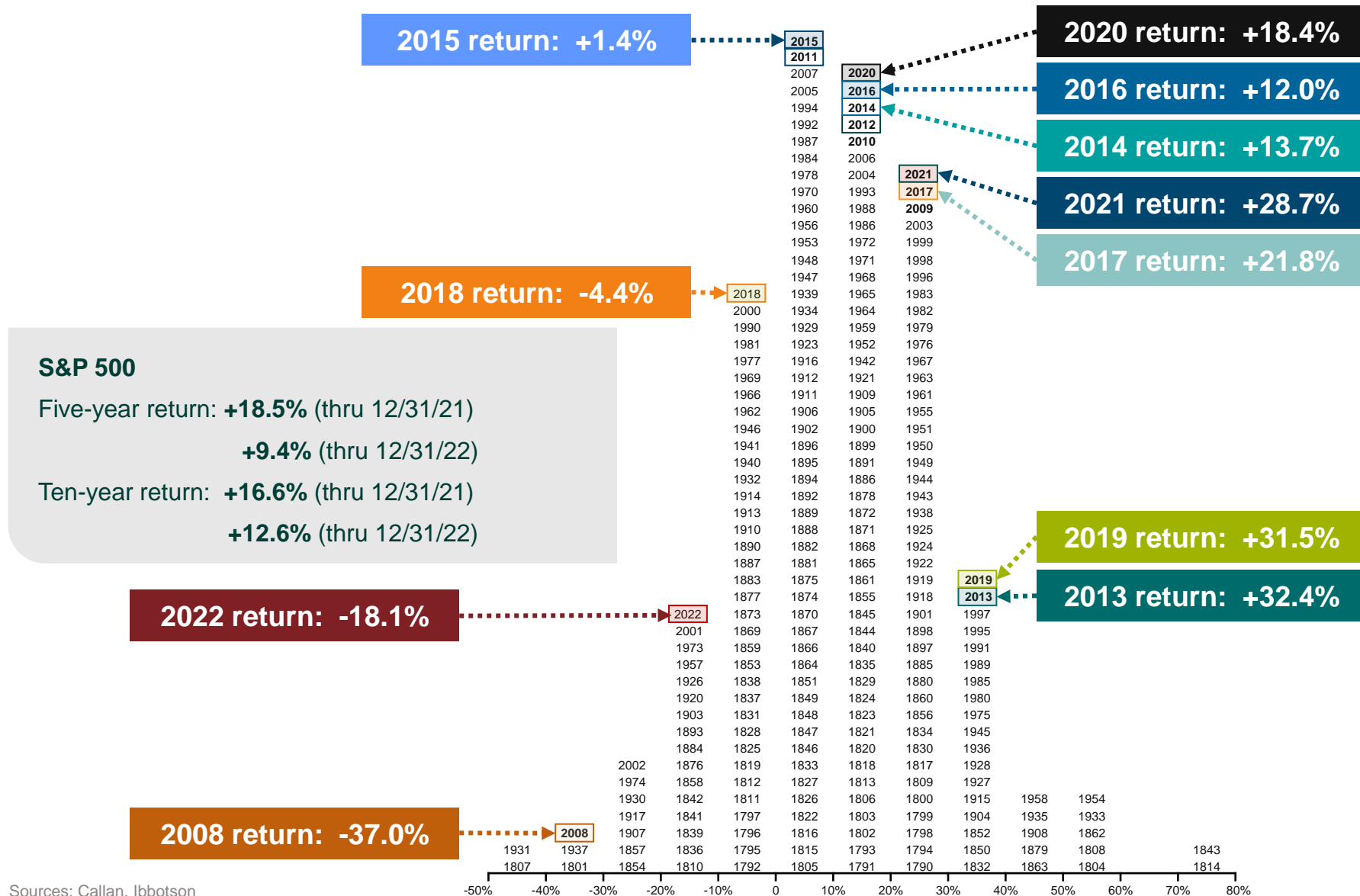


- ▶ While the COVID correction was swift and intense, the 2022 correction resembles the GFC and Dot-Com Bubble.
- ▶ The 2022 drawdown has been 250 trading days through December.
- ▶ It would take another 105 trading days to get to the bottom of the GFC and 275 trading days to get to the bottom of the Tech Bubble.

Sources: Callan, S&P Dow Jones Indices

Stock Market Returns by Calendar Year

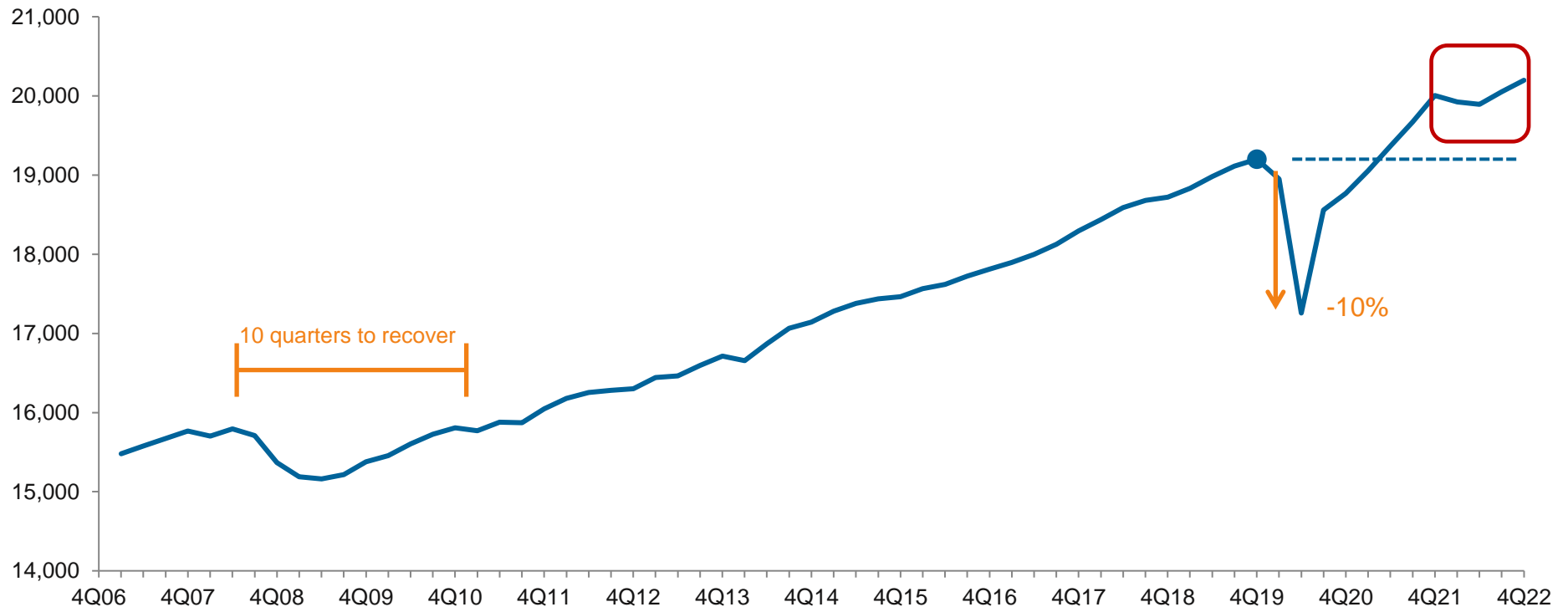
2022 YTD performance in perspective: History of the U.S. stock market (233 years of returns)



GDP Dropped for Two Straight Quarters in 1Q and 2Q, but Rebounded in 3Q and 4Q

Recovered pre-pandemic level in 2Q21 after deepest drop in 75 years

Seasonally Adjusted Real GDP in Billions of Dollars Through 12/31/22



GDP growth in 2022 slowed compared to 2021 but rebounded after declines in the first two quarters of last year.

- ▶ 4Q22 GDP rose 2.9%, after a 3.2% rise in 3Q, a 0.6% drop in 2Q, and a 1.6% decline in 1Q.
- ▶ Loss of business and consumer confidence followed the start of the conflict in Ukraine.
- ▶ Consumer wealth hit by stock and bond market drop, and now a sharp slowdown in residential housing, as mortgage rates doubled from the start of the year.

Source: Federal Reserve Bank of St. Louis

The Stock Market Is Not the Economy



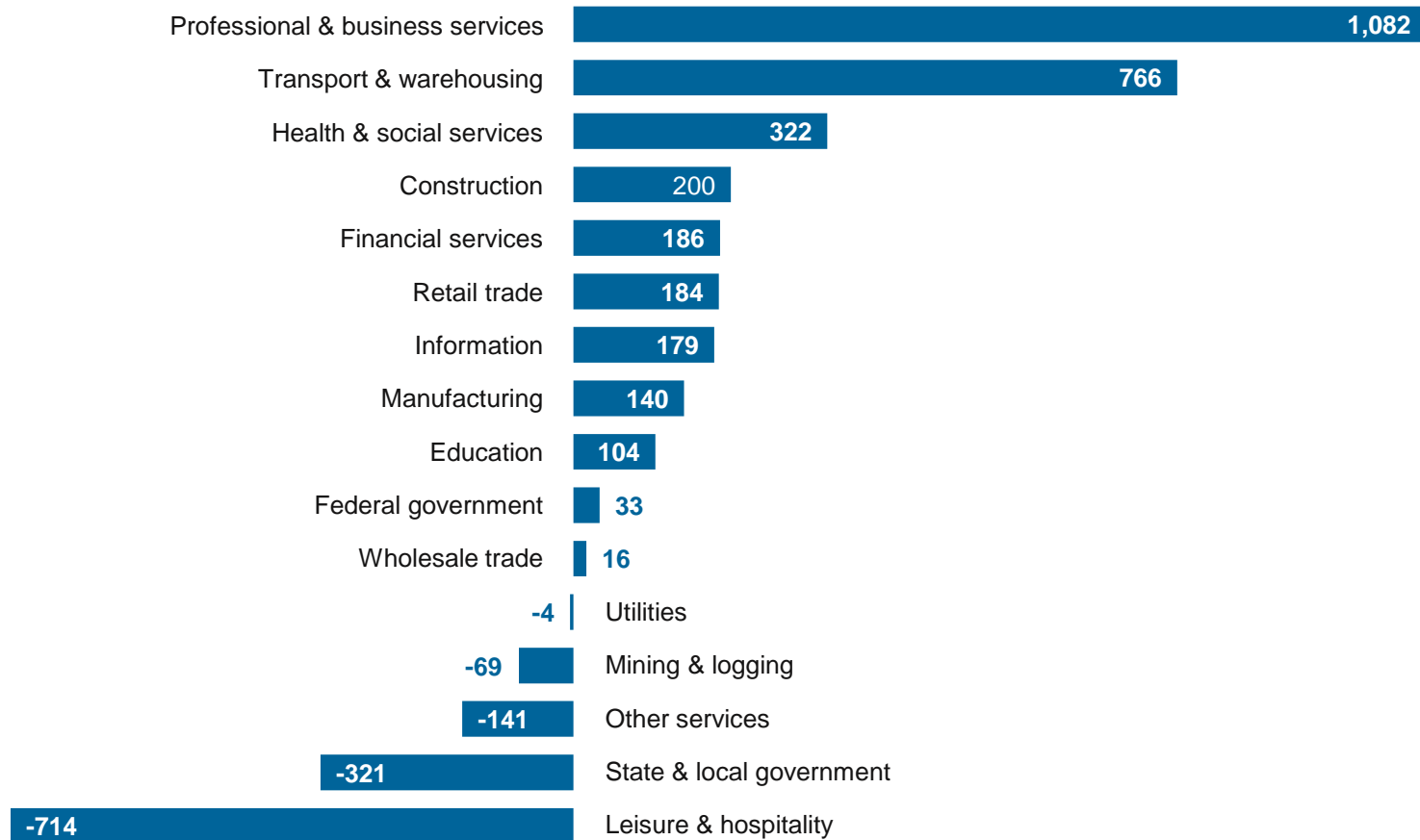
- ▶ The job market lost over 22 million jobs in the pandemic, and just regained the pre-pandemic high water mark in the summer of 2022.
- ▶ Steep structural challenges face many job-laden sectors of the economy that are underrepresented in the current stock market valuation.

Sources: St. Louis FRED, S&P Dow Jones Indices

While the Recovery Continues, Employment Landscape Remains Uneven

Leisure / hospitality remains by far the hardest-hit sector for job losses

Change in Payroll Employment Since 12/31/19 through 12/31/22 (thousands)

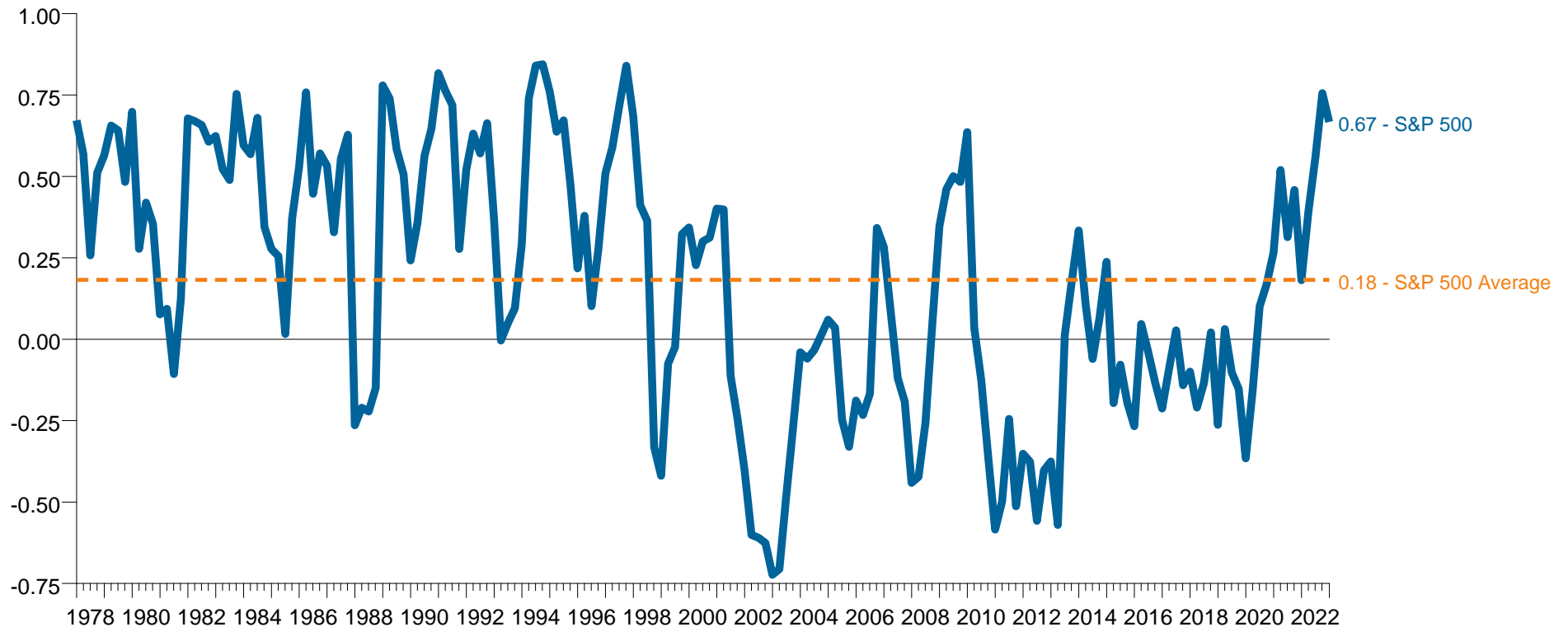


Sources: IHS Markit, Department of Labor

Did Diversification Fail in 2022?

Stocks and bonds down together in each of the first three quarters of 2022; up together in 4Q22

Rolling 1 Year Correlation of S&P 500 to Bloomberg Aggregate for 45 Years Ended 12/31/22



Are we seeing a return to a regime of higher correlation between stocks and bonds, potentially lessening the diversification benefit of bonds to stocks?

Sources: Bloomberg, Callan, S&P Dow Jones Indices

Did Diversification Fail in 2022?

How capital markets interact under stress

S&P 500 was down 4.6% in 1Q22, 16.1% in 2Q, and another 4.9% in 3Q

- Worst year since 2008 (-18.1%) despite strong rebound in 4Q (+7.6%)

Bloomberg Aggregate was down 5.9% in 1Q22, 4.7% in 2Q, and another 4.8% in 3Q; -13.1% for the year

Less decline in local currency around the global markets, but the strong U.S. dollar made things worse for U.S. investors

- MSCI ACWI ex USA down 16.0% in USD, 9.6% in local currency
- Global Aggregate down 16.3% in USD, 11.2% hedged to the U.S. dollar

How often does this happen?

- Stocks and bonds declined together in 10% of all quarters back to 1926.
- In quarters when the stock market declined, bonds declined 33% of the time.

The “curse” of zero correlation

- In a market drawdown, investors want correlation between stocks and bonds to be -1: when stocks go down, bonds are likely to be up.
- In real life, correlation of stocks to bonds is closer to zero.
 - *Zero correlation = when one asset class is down, the probability that the other asset class is up or down is similar; zero means no discernable pattern between the returns of the two asset classes.*

In normal times, correlation close to zero suggests a strong diversification benefit

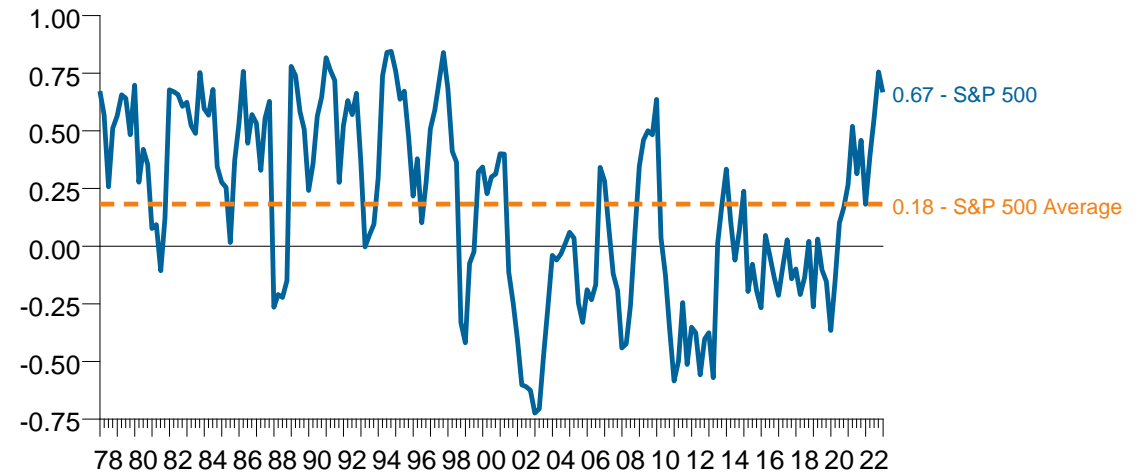
- A diversified portfolio of stocks and bonds will not see negative returns for stocks and bonds together 90% of the time.
- Note that when stocks are down, bonds can also be down about 1/3 of the time.

Correlation Changes With Interest Rate Regimes and Economic Conditions

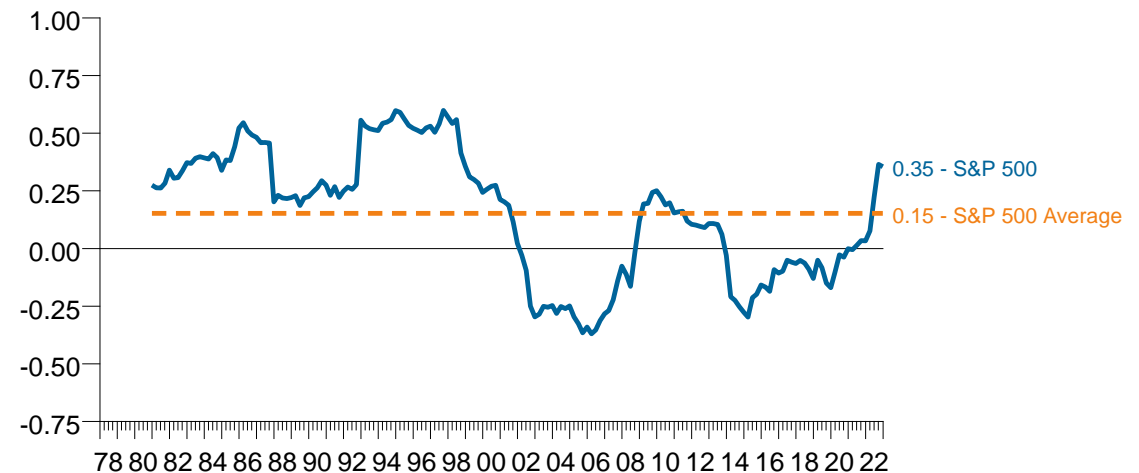
- Rolling one-year correlation spiked in 2021 and 2022.
- Rolling five-year shows how correlation runs in cycles over time.
- Table below examines correlation and the occurrence of negative returns for stocks and bonds together in three interest rate and inflation regimes. Regime 2 shows higher stock/bond correlation and suggests less diversification benefit under rising rates and inflation.

Period	Regime Description	Negative Return Frequency	Stock/Bond Correlation
Regime 1 1926–1965	Low, stable interest rates	7%	0.13
Regime 2 1966–1981	Secular rate rise	26%	0.48
Regime 3 1982–present	Secular rate decline	6%	0.05

Rolling 1 Year Correlation of S&P 500 to Bloomberg Aggregate



Rolling 5 Year Correlation of S&P 500 to Bloomberg Aggregate



Sources: Bloomberg, Callan, S&P Dow Jones Indices

Recession Watch

Common definition of recession: two consecutive quarters of decline in GDP

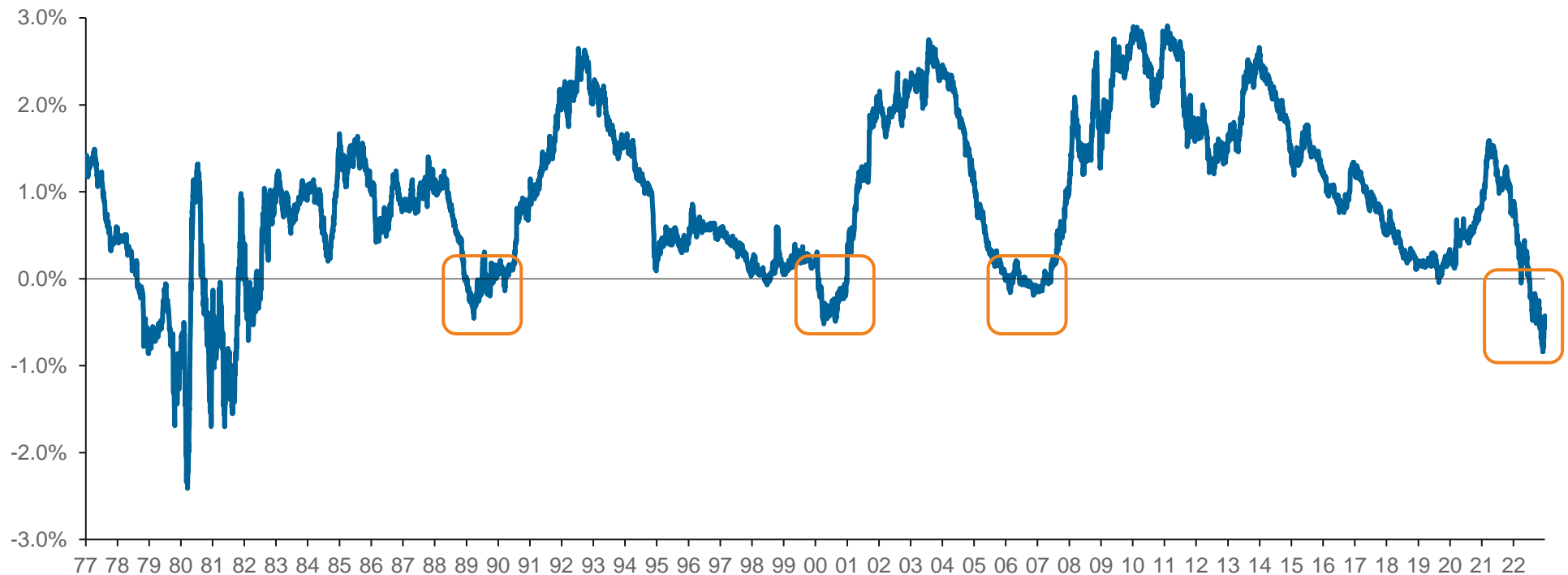
- ▶ Actual definition: The National Bureau of Economic Research (NBER) Business Cycle Dating Committee defines a recession as “a significant decline in economic activity that is spread across the economy and that lasts more than a few months.”

Indicators to watch

- ▶ GDP declined in 1Q and 2Q22, the proverbial two-quarters-in-a-row rule of thumb that often indicates recession.
 - However, GDP rose 3.2% in 3Q, reversing the trend.
- ▶ Housing market is weakening with more than a doubling of mortgage rates since the start of 2022.
- ▶ Job market remains strong, with substantial job creation year to date; job listings remain larger than the number of seekers.
 - Initial unemployment claims are creeping up: a leading indicator.
- ▶ PMI is showing initial signs of recession in the business activity and output indices; PMI is also a leading indicator.
- ▶ Exports have weakened with slowing growth overseas, geopolitical uncertainty, and a strong dollar.
- ▶ Inflation remains historically high, sapping purchasing power and eroding confidence.
- ▶ Federal Reserve is committed to raising interest rates to combat inflation; target Fed Funds rate is 4.25%–4.50%.
- ▶ Fed’s resolve may be tested if economy slows sharply in the fourth quarter or the first half of 2023.

Is the Bond Market Expecting a Recession?

10-Year Treasury vs. 2-Year Treasury Spread



- ▶ The 10-year to 2-year Treasury spread went negative two days in April and has been negative for most of 3Q and 4Q.
- ▶ Inversion in this spread does not always forecast a recession, but most recessions are preceded by a yield curve inversion.
 - Yield curve inversion means investors expect a recession will occur and that interest rates will be cut, and therefore increase their demand for securities with longer duration, and therefore a higher potential for capital gain when rates fall.
- ▶ The 10-year Treasury to cash spread turned negative, which may be a better indicator of whether recession has already struck.

Source: Federal Reserve Bank of St. Louis

Callan

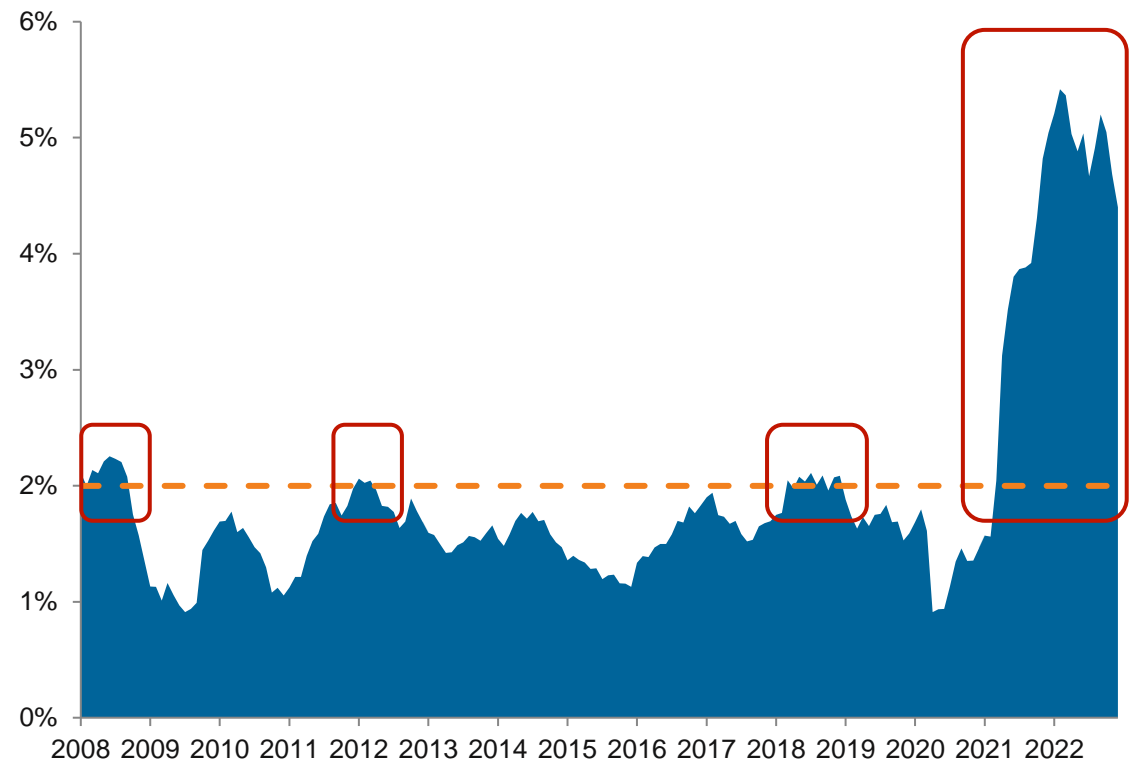
**Current Market Conditions:
Special Focus on Inflation**

The Fed's New Inflation Framework

Targeting core Personal Consumption Expenditures Index

- ▶ Inflation worries are in the headlines, and the data are challenging the Fed's dual mandate to manage inflation and unemployment.
- ▶ Inflation had consistently undershot the Fed's 2% target, prompting the Fed to change its inflation framework.
- ▶ Fed's aim is to achieve an average of 2% inflation over the medium term, which is not specifically defined.
- ▶ Personal Consumption Expenditures (PCE) Index is the Fed's target, different from and typically lower than CPI-U, which had a year-over-year gain of 6.5% as of Dec. 31. Core PCE dropped from 5.4% in February to 4.7% in July, inched back up to 5.2% in September, and fell to 4.4% again in December.

PCE Excluding Food and Energy (Chain-Type Price Index) Year-Over-Year Change (Through 12/31/22)



Sources: Federal Reserve Bank of St. Louis, U.S. Bureau of Economic Analysis

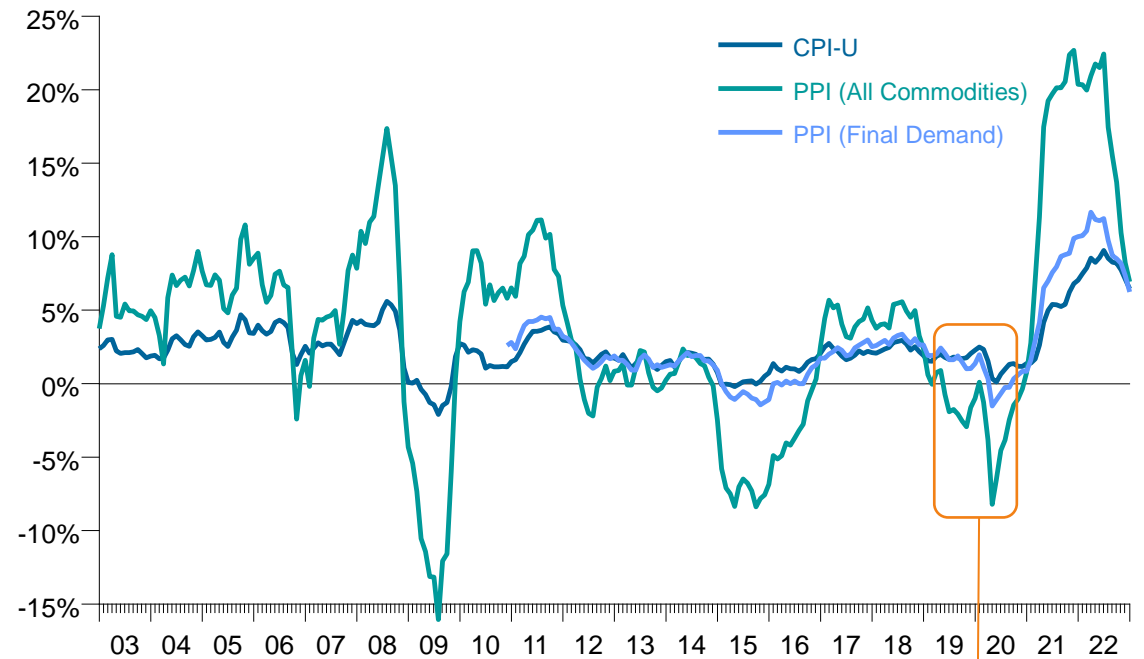
Inflation Rebounds and Spurs Headline Concerns

CPI and PPI remain at sharply elevated rates

Big drop for inflation at start of pandemic

- ▶ Sustained rise in 2022 CPI-U represents added pressure from the war in Ukraine on top of kinks in supply chains and labor markets after more than a year of global economic disruption and shutdown.
- ▶ Most recent CPI is up 6.5% year-over-year; the 2Q 9.1% rise was the highest recorded inflation since 4Q81.
- ▶ Producer prices had been tumbling for more than a year prior to the pandemic; recovery to 2018 price **levels** happened by 2Q21 and generated eye-popping year-over-year percentage changes. PPI rose sharply through 2Q but has dropped over two thirds through December.
- ▶ Prices for transportation goods, energy, and food are driving the elevated rates in both the Consumer and Producer Price Indices.

Consumer and Producer Price Indices – Inflation Year-Over-Year



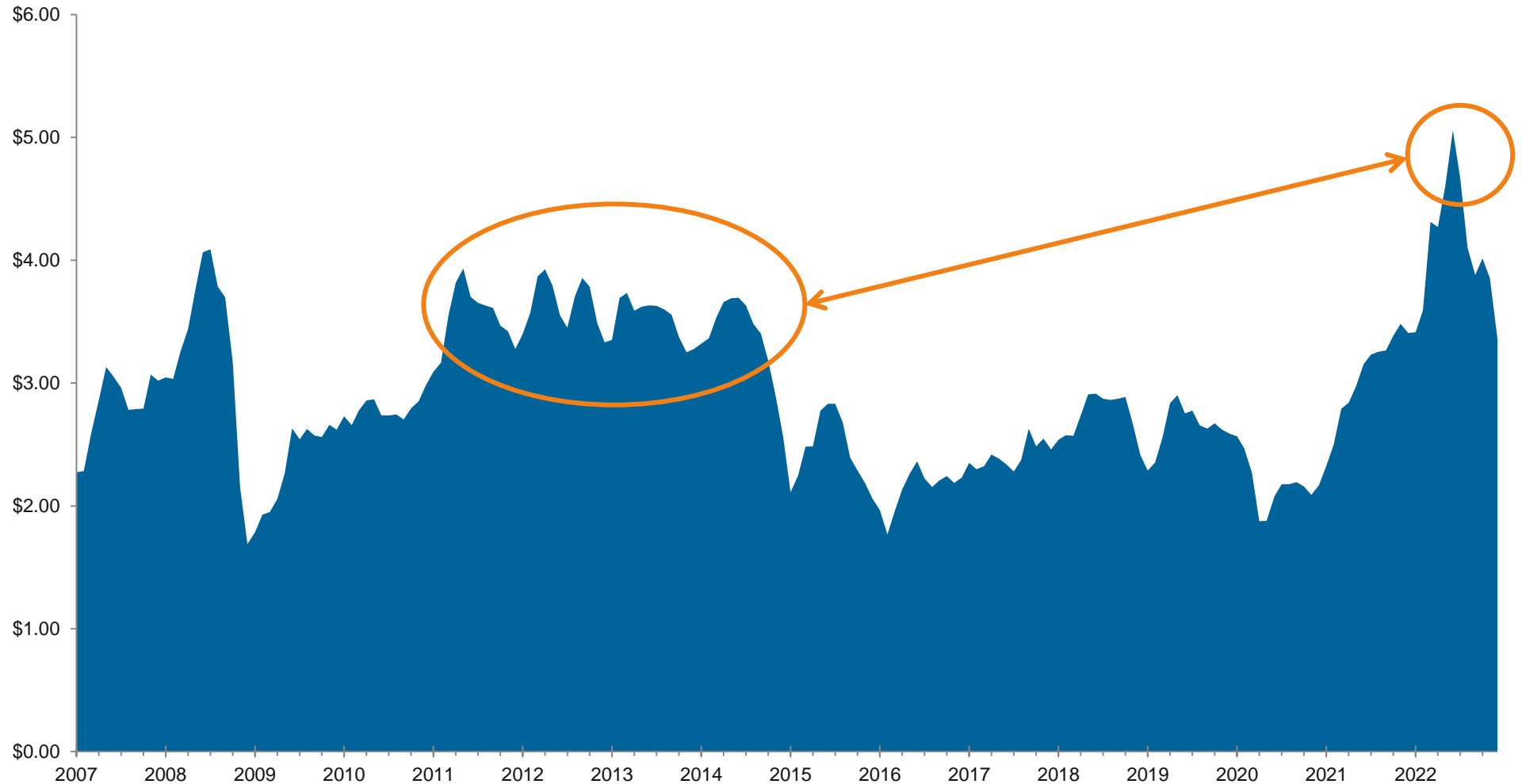
Sharp drop in PPI (All Commodities) in 2019 and first half of 2020

Source: Federal Reserve Bank of St. Louis (through November 2022)

Gasoline Prices Are Top of Mind for Consumers, Now Far Above Early 2010s Peaks

A highly visible inflation measure; feeds expectations

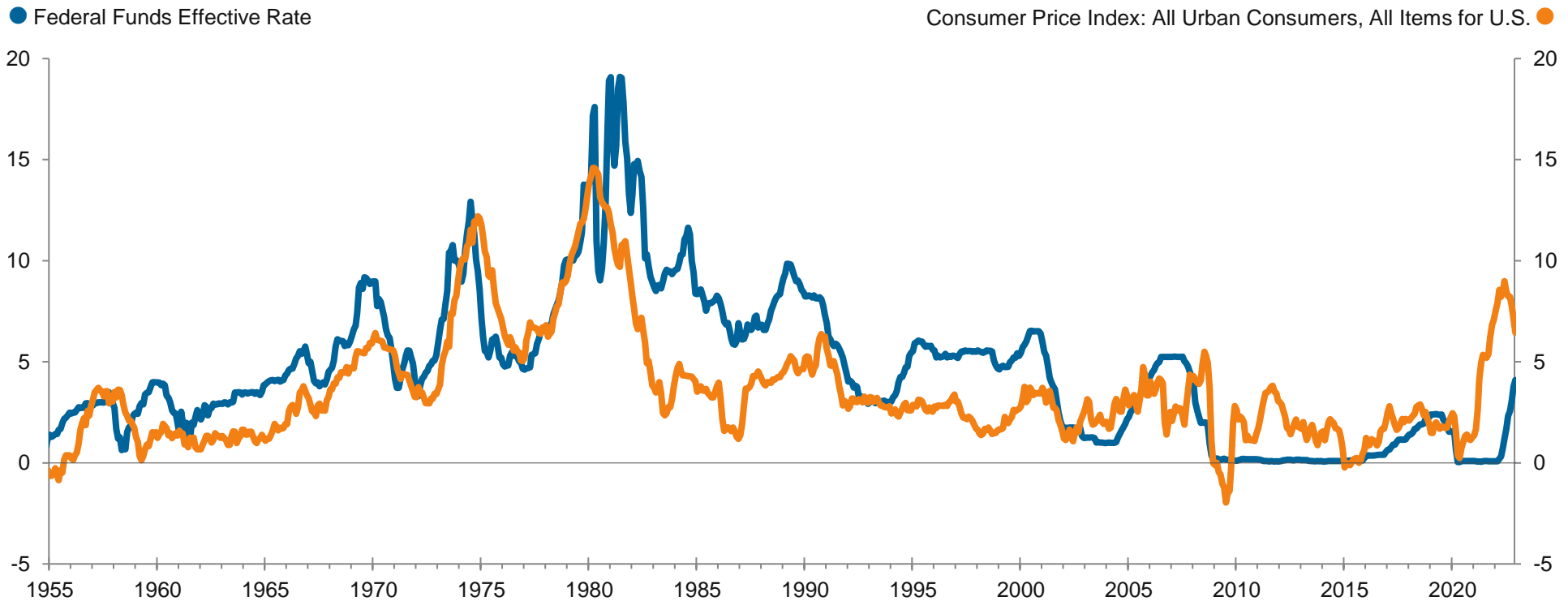
Average Price: Gasoline, Unleaded Regular (Cost per Gallon / 3.785 Liters) in U.S. City Average Through 12/31/22



Source: Federal Reserve Bank of St. Louis

Inflation vs. Interest Rates Over the Long Term

Federal Funds vs. Consumer Price Index



- ▶ We are now looking at an inflation spike that is above the last rise in inflation from 2005–08.
- ▶ The gap between inflation and the Fed Funds rate is larger than that seen just before the GFC.
 - Yield history suggests that the Fed Funds rate is typically above inflation, not below it.
- ▶ Recent gaps between CPI and the Fed Funds rate are unprecedented in the history of the CPI-U, going back to 1955
 - Resolution to the historical relationship requires the Fed Funds rate to rise and inflation to fall.

Source: Federal Reserve Bank of St. Louis

Inflation Is Currently a Problem: What Key Variables Should We Track?

The majority of the working-age and younger population has no experience with sustained inflation

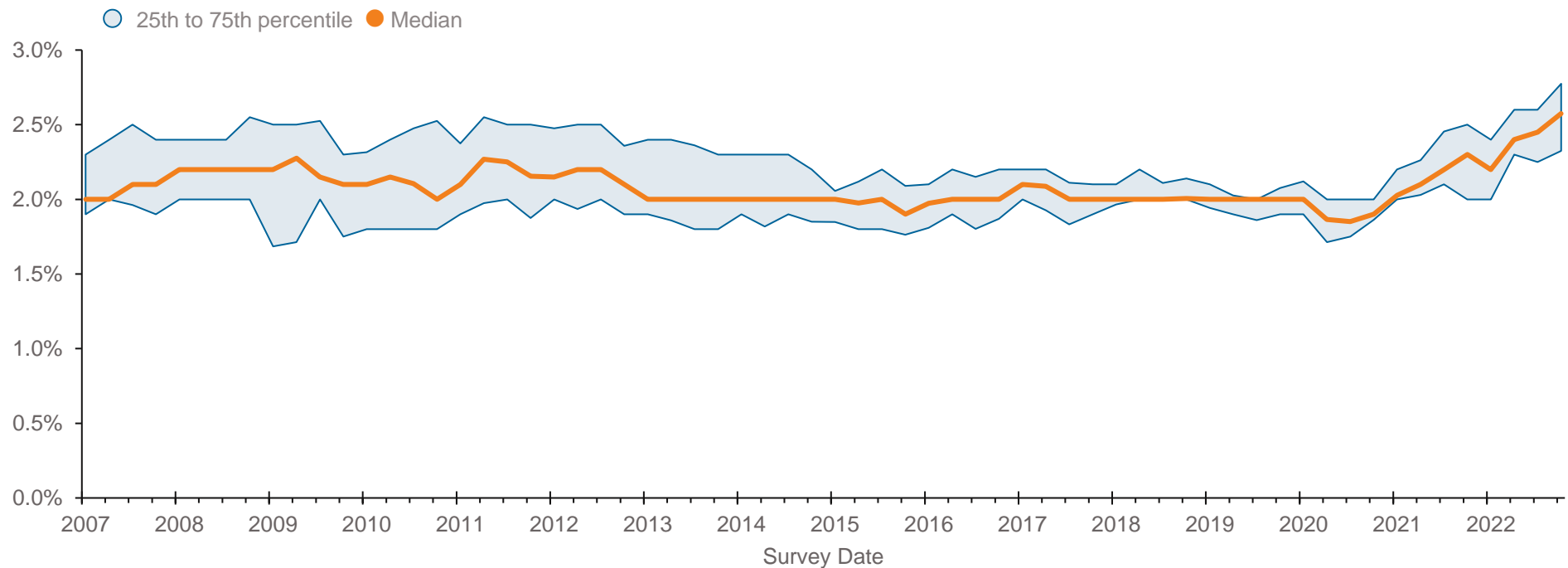
Key variables to track:

- ▶ Personal Consumption Expenditures Index—the Fed's preferred measure of inflation
 - Typically lower and less volatile than CPI-U
- ▶ Spread between inflation and the Fed Funds rate—at an extreme, suggesting some adjustment is coming in both variables
- ▶ Five-year, five-year forward rate, and 10-year breakeven rate
 - Bond market expectations
 - Long enough horizon to minimize short-term emotion and reaction to immediate events
- ▶ Philadelphia Fed survey of professional forecasters

Inflation Forecasts: Survey of Professional Forecasters, 10-Year Horizon

PCE inflation

Projections for the 10-Year Annual-Average Rate of PCE Inflation

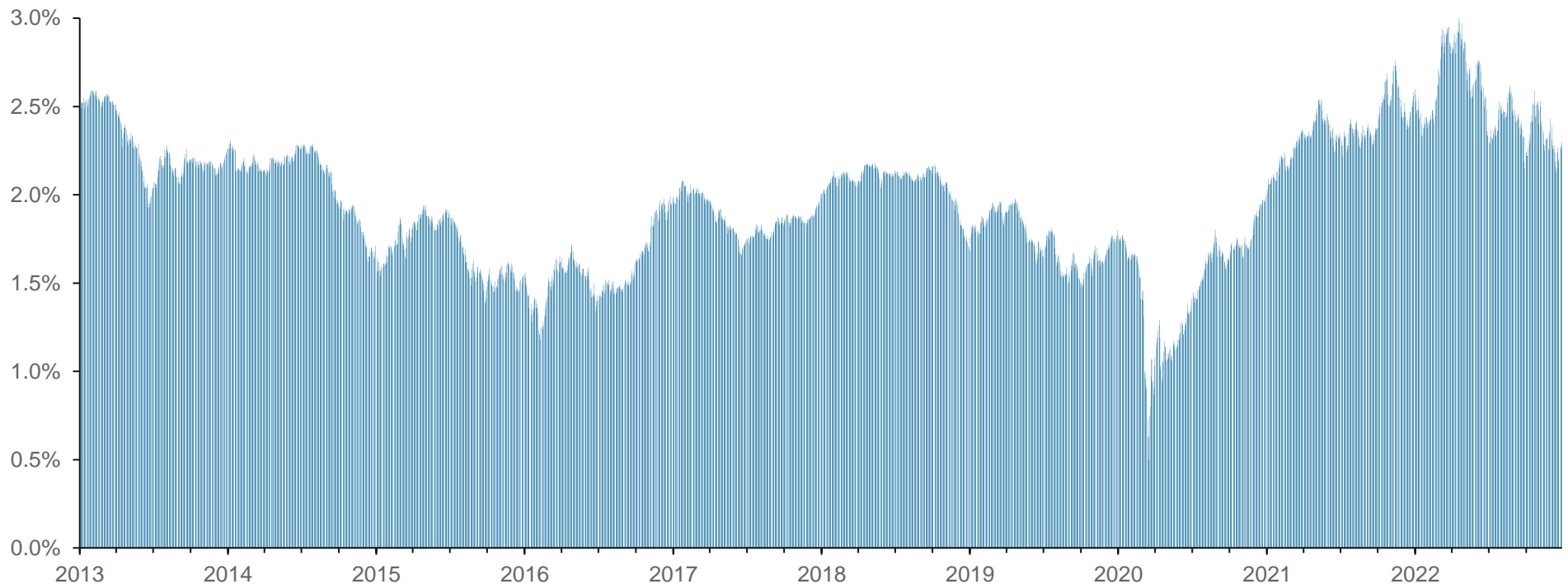


- Ten-year forecasts for inflation have risen since the start of 2021.
- In the most recent survey published in November, the 10-year forecast was 2.6%.

Source: Philadelphia Federal Reserve, *Fourth Quarter 2022 Survey of Professional Forecasters*

10-Year Breakeven Rate: Bond Market Forecast of Inflation

10-Year Breakeven Inflation Rate

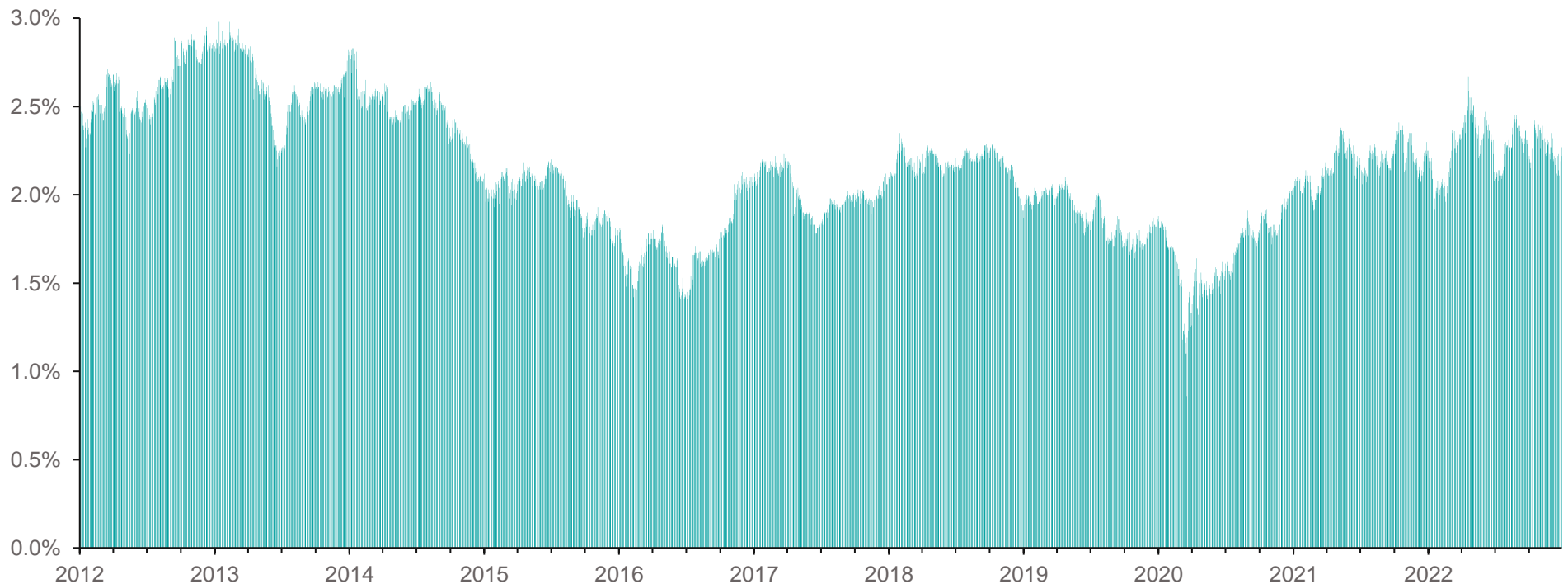


- ▶ 10-year breakeven inflation rate is the difference in yield between the nominal 10-year Treasury and the 10-year Treasury Inflation-Protected Security (TIPS).
 - Extra yield nominal Treasury would have to earn to maintain the same purchasing power as a TIPS investment.
- ▶ Values of implied inflation reached 3% in April but have since declined below 2.5%.
 - Includes current high levels of inflation

Source: Federal Reserve Bank of St. Louis

5-Year, 5-Year Forward Rate: Bond Market Forecast of Inflation

5-Year, 5-Year Forward Inflation Expectation Rate



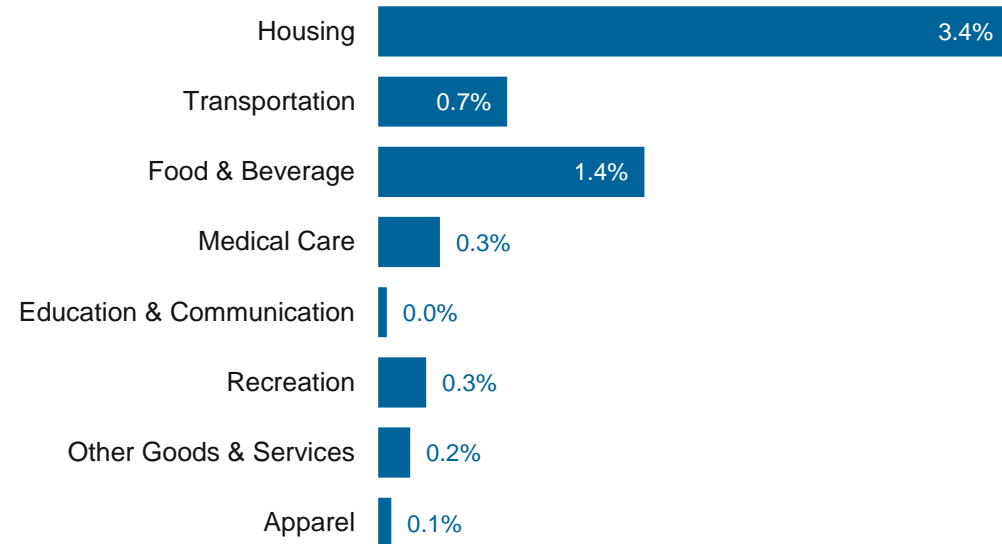
- ▶ The 5-year, 5-year forward rate is the bond market's estimate of the 5-year inflation rate 5 years from now.
 - Excludes current high levels of inflation
- ▶ The market inflation expectation for the years 2027 through 2031 is approaching 2% after peaking at 2.7% in April.

Source: Federal Reserve Bank of St. Louis

Contributors to Recent Inflation: Primary Categories

- ▶ Transportation inflation has finally begun to trend downward.
- ▶ Housing took over as the biggest weighted contributor to headline inflation due to the category's high weight in the index (42.4%).
- ▶ Transportation's downward trend in inflation has been somewhat offset by an upward trend for Food & Beverage and Housing.

Contribution to December 2022 Year-Over-Year Inflation

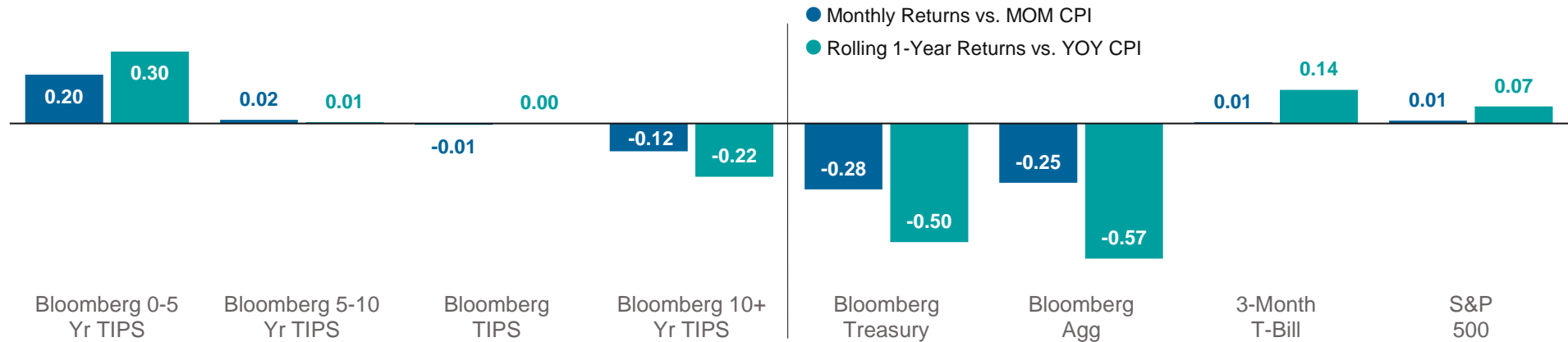


Primary Category	Primary Category Weight	Year-over-Year Change											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All Items	100.0%	7.5%	7.9%	8.5%	8.3%	8.6%	9.1%	8.5%	8.3%	8.2%	7.7%	7.1%	6.5%
Housing	42.4%	5.7%	5.9%	6.4%	6.5%	6.9%	7.3%	7.4%	7.8%	8.0%	7.9%	7.8%	8.1%
Transportation	18.2%	20.8%	21.1%	22.6%	19.9%	19.4%	19.7%	16.4%	13.4%	12.6%	11.2%	7.8%	3.9%
Food & Bev	14.3%	6.7%	7.6%	8.5%	9.0%	9.7%	10.0%	10.5%	10.9%	10.8%	10.6%	10.3%	10.1%
Medical Care	8.5%	2.5%	2.4%	2.9%	3.2%	3.7%	4.5%	4.8%	5.4%	6.0%	5.0%	4.2%	4.0%
Education & Communication	6.4%	1.6%	1.6%	1.5%	1.0%	0.8%	0.8%	0.5%	0.5%	0.2%	0.0%	0.7%	0.7%
Recreation	5.1%	4.7%	5.0%	4.8%	4.3%	4.5%	4.6%	4.4%	4.1%	4.1%	4.1%	4.7%	5.1%
Other Goods & Svcs	2.7%	4.9%	5.6%	5.5%	5.7%	6.3%	6.7%	6.3%	6.6%	6.9%	6.5%	7.0%	6.4%
Apparel	2.5%	5.3%	6.6%	6.8%	5.4%	5.0%	5.2%	5.1%	5.1%	5.5%	4.1%	3.6%	2.9%

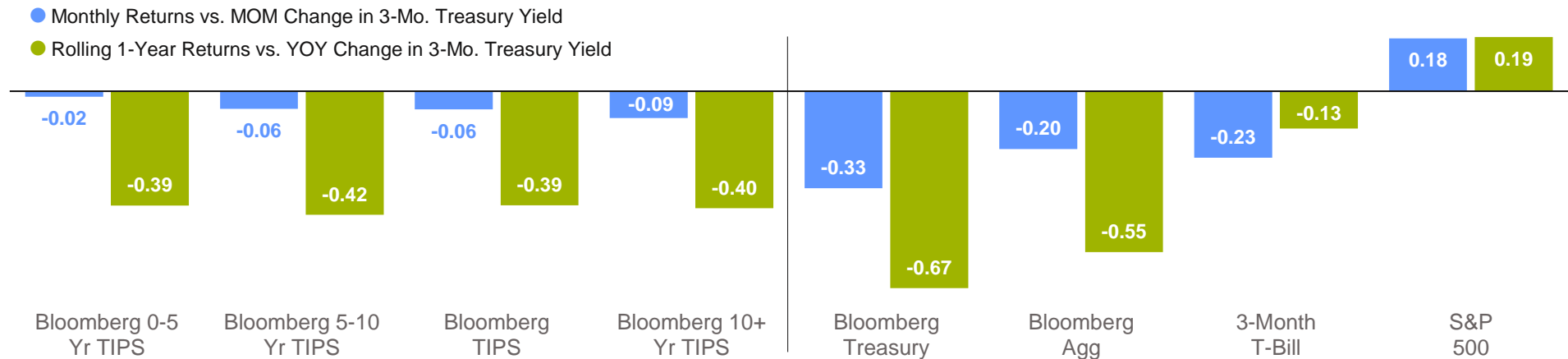
Source: U.S. Bureau of Labor Statistics

Do TIPS Hedge Inflation?

Correlation of Benchmark Returns vs. CPI Inflation



Correlation of Benchmark Returns vs. Changes in 90-day T-Bill Yield

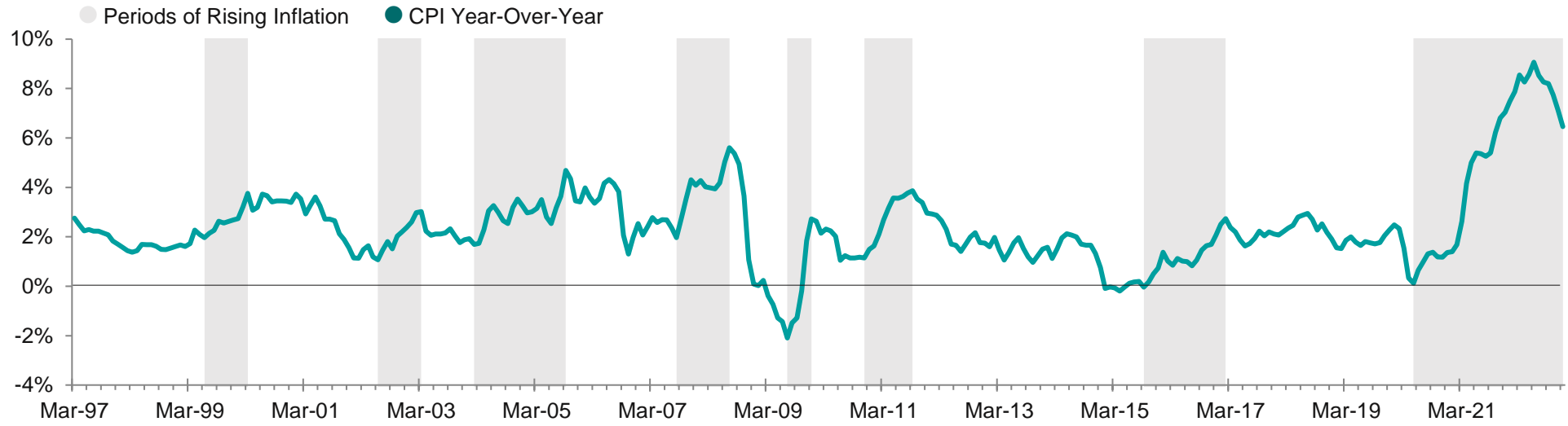


The correlation between the broad TIPS index and inflation is similar to that of cash and equities.

Short duration TIPS appear to be a better hedge to inflation than intermediate and longer-dated TIPS.

– Intermediate and longer-dated TIPS react just as strongly to movement in interest rates as they do to inflation, if not more.

TIPS May Not be a Pure Inflation Hedge, but Recent Performance Is NOT Typical



	Cumulative Bloomberg TIPS Nominal Return	Total Inflation Over Period	Cumulative Bloomberg TIPS Real Return	Change in 90-day Treasury Yield
7/1/99 – 3/31/00	4.85%	3.01%	1.85%	1.10%
7/1/02 – 3/31/03	11.60%	2.39%	9.21%	-0.56%
3/1/04 – 9/30/05	7.67%	6.77%	0.90%	2.59%
9/1/07 – 7/31/08	10.99%	5.79%	5.20%	-2.33%
8/1/09 – 12/31/09	4.82%	0.28%	4.54%	-0.12%
12/1/10 – 9/30/11	8.88%	3.70%	5.18%	-0.15%
10/1/15 – 2/28/17	5.38%	2.38%	3.01%	0.53%
6/1/20 – 12/31/22	-1.11%	15.76%	-16.87%	4.28%

So What Should We Expect After All This Mayhem?

Painful losses across the board for most investors in 2022

Lower asset values but higher returns expected going forward

- ▶ Stocks are more reasonably priced
- ▶ Higher bond yields mean investors now get paid to hold fixed income
- ▶ Private markets have yet to fully price in the market changes, but they will
 - Private equity, real estate, private debt

U.S. economy remained strong through most of this mayhem in 2022

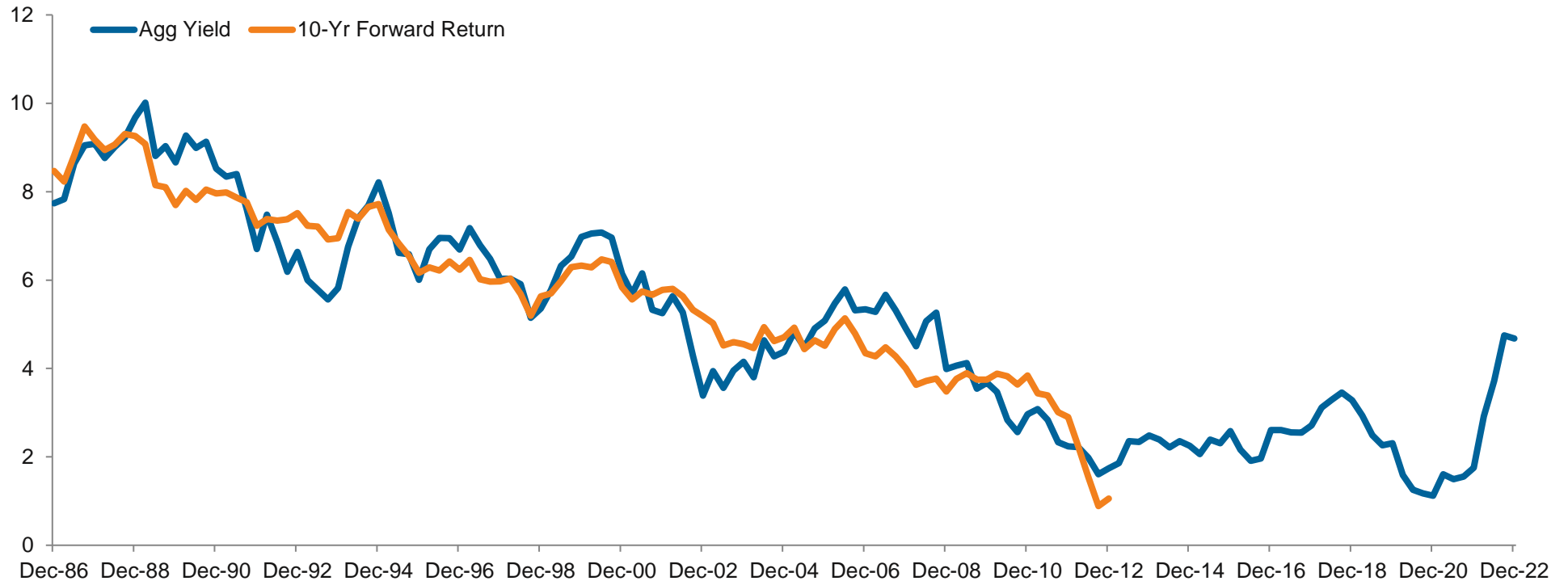
- ▶ Job market finally reached pre-pandemic level of employment this past summer
- ▶ Headline layoffs have been concentrated in tech and finance
- ▶ Strong income growth, but not enough to offset inflation
- ▶ Housing market taking a big hit from much higher mortgage rates
 - Risks
- ▶ Recession
 - Jobs and income
 - Sales and earnings growth
 - Fed reverses course
- ▶ Inflation remains elevated
- ▶ Housing market
- ▶ Geopolitical strife

Callan

Fixed Income

Starting Yield Strongly Predicts Forward Returns

Bloomberg Aggregate Index Starting Yield vs. 10-Year Forward Return



- There is a strong relationship between starting yields and subsequent 10-Year returns.
- Yield on the Bloomberg Aggregate Index was 4.68% as of December 31, 2022.

Source: Bloomberg

10-Year Expected Returns

	Income Return	+	Capital Gain/Loss	+	Credit Default	+	Roll Return	=	2023 Expected Return	Prelim 2023 Expected Return	Change vs 2023 Prelim	2022 Expected Return	Change vs 2022
Cash	2.75%		0.00%		0.00%		0.00%		2.75%	2.40%	0.35%	1.20%	1.55%
1-3 Year G/C	3.45%		0.20%		-0.10%		0.25%		3.80%	3.20%	0.60%	1.50%	2.30%
1-3 Year Government	3.15%		0.20%		0.00%		0.25%		3.60%	3.10%			
1-3 Year Credit	3.85%		0.10%		-0.20%		0.25%		4.00%	3.40%			
Intermediate Gov/Credit	3.95%		0.00%		-0.10%		0.25%		4.10%	3.60%	0.50%	1.70%	2.40%
Intermediate Gov	3.65%		0.10%		0.00%		0.25%		4.00%	3.40%			
Intermediate Credit	4.50%		-0.10%		-0.40%		0.25%		4.25%	3.90%			
Aggregate	4.30%		-0.20%		-0.10%		0.25%		4.25%	3.90%	0.35%	1.75%	2.50%
Government	3.80%		-0.10%		0.00%		0.25%		3.95%	3.60%			
Securitized	4.00%		0.00%		0.00%		0.25%		4.25%	3.90%			
Credit	5.25%		-0.40%		-0.40%		0.25%		4.70%	4.10%			
Long Duration Gov/Credit	6.15%		-1.70%		-0.30%		0.60%		4.75%	4.00%	0.75%	1.80%	2.95%
Long Government	4.90%		-1.80%		0.00%		0.60%		3.70%	3.30%			
Long Credit	6.50%		-1.50%		-0.40%		0.60%		5.20%	4.50%			
TIPS	3.95%		-0.20%		0.00%		0.25%		4.00%	3.25%	0.75%	1.25%	2.75%
Non-US Fixed (unhedged)	2.40%		-0.20%		-0.20%		0.25%		2.25%	2.00%	0.25%	0.80%	1.45%
High Yield	8.00%		0.20%		-2.20%		0.25%		6.25%	6.00%	0.25%	3.90%	2.35%
Emerging Market Debt	7.40%		0.20%		-2.00%		0.25%		5.85%	5.80%	0.05%	3.60%	2.25%
Bank Loans	7.40%		0.30%		-1.60%		0.00%		6.10%	6.10%	0.00%	4.60%	1.50%

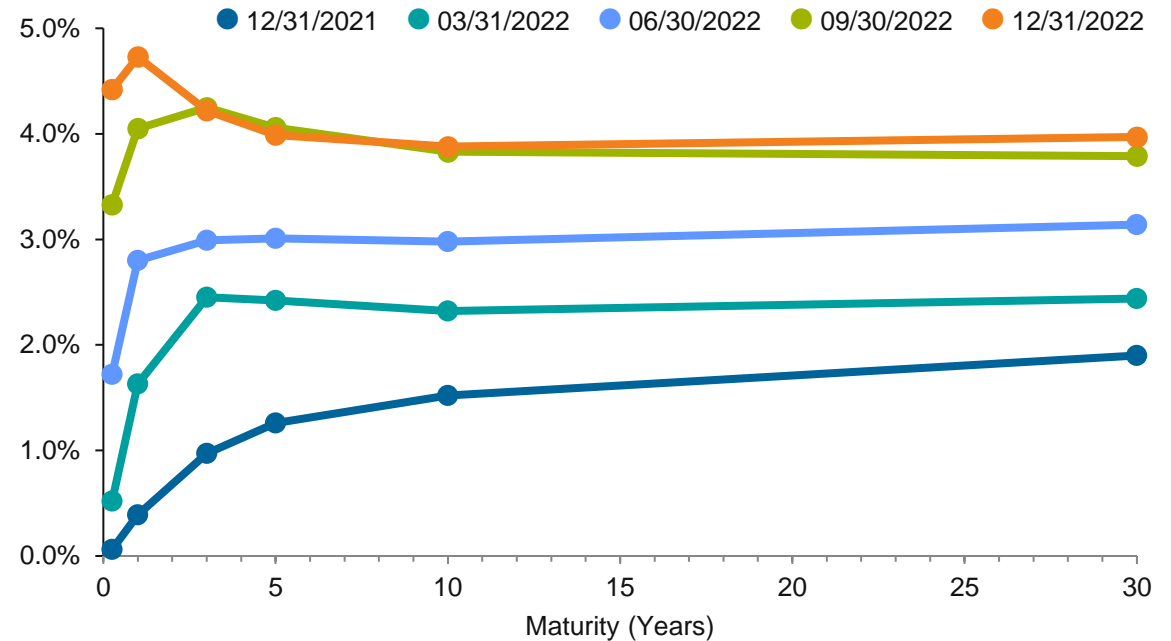
Source: Callan

Yield Curve Continued to Rise and Became Inverted in Second Half of 2022

Rising yields throughout 2022 brought capital losses across bond indices.

Higher yields would lead to higher future returns, especially if yields stay at elevated levels.

Treasury Yield Curve Change



	3 Month	1 Year	3 Year	5 Year	10 Year	30 Year
12/31/2021	0.06	0.39	0.97	1.26	1.52	1.90
03/31/2022	0.52	1.63	2.45	2.42	2.32	2.44
06/30/2022	1.72	2.80	2.99	3.01	2.98	3.14
09/30/2022	3.33	4.05	4.25	4.06	3.83	3.79
12/31/2022	4.42	4.73	4.22	3.99	3.88	3.97

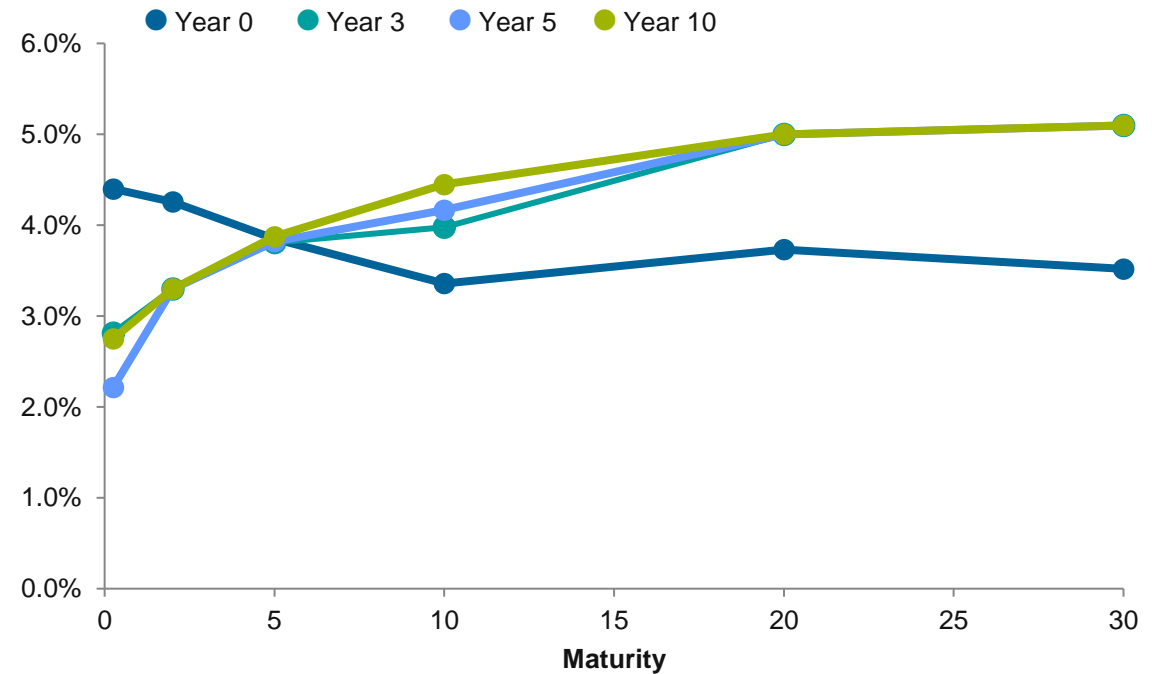
Source: Bloomberg

Shape of Yield Curve at Different Points in Forecast Horizon

Our forecast has the yield curve steepening within the first few years.

With yields already high, we expect yields to reach equilibrium by year 10 of our forecast (vs. year 30 in prior forecasts).

Yield Curve Forecast



	3 Month	2 Year	5 Year	10 Year	20 Year	30 Year
Forecast Year 0	4.40	4.26	3.85	3.36	3.73	3.52
Forecast Year 3	2.82	3.30	3.81	3.98	5.00	5.10
Forecast Year 5	2.22	3.30	3.82	4.17	5.00	5.10
Forecast Year 10 (Equilibrium Reached)	2.75	3.30	3.88	4.45	5.00	5.10

Source: Callan

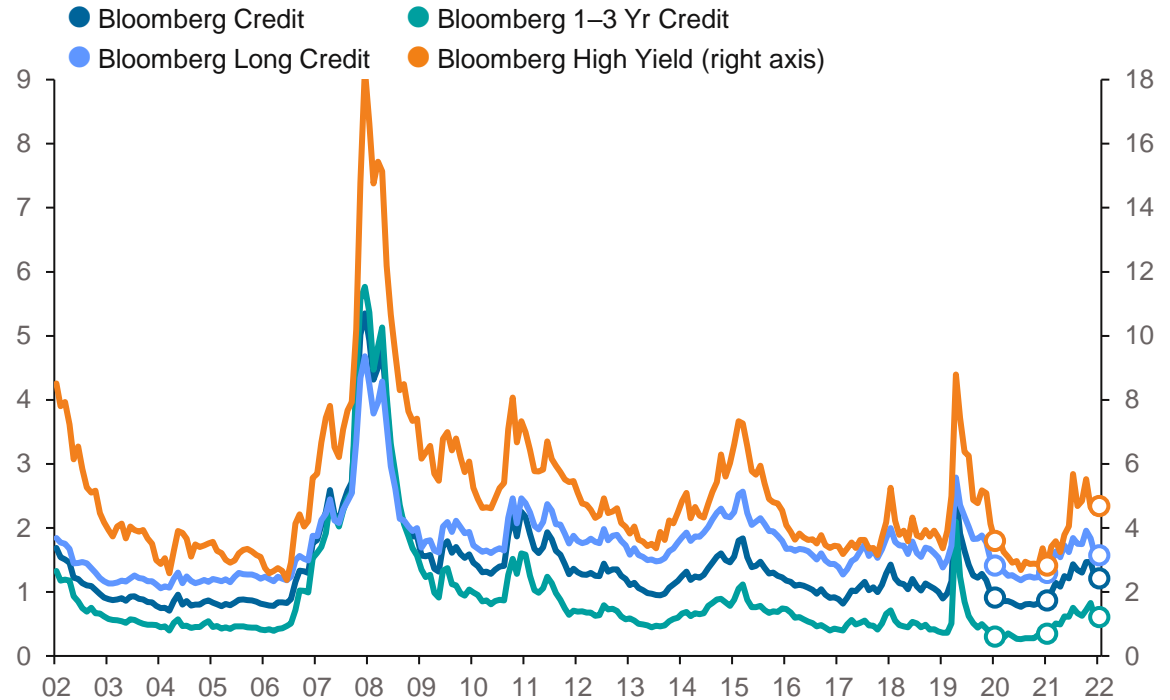
Spreads Dipped Through 2021 but Returned Toward Medians Throughout 2022

20 years ending 12/31/22

2022 projections had risk-free rates rising and credit spreads widening, creating twin headwinds for expected returns, especially for high yield.

After falling throughout 2021, credit spreads rose in 2022 and are closer to median in many cases.

Historical Option-Adjusted Spreads (OAS)

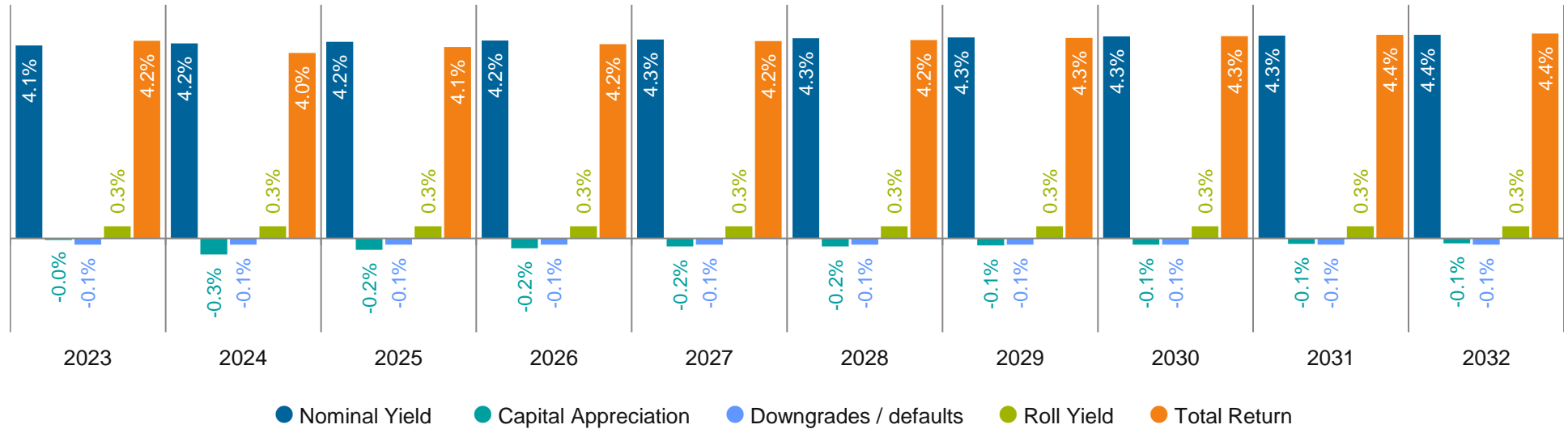


	December 2020		December 2021		December 2022	
	OAS	Percentile*	OAS	Percentile*	OAS	Percentile*
Bloomberg 1-3 Yr Credit	0.3	3%	0.4	5%	0.6	47%
Bloomberg Credit	0.9	23%	0.9	17%	1.2	50%
Bloomberg Long Credit	1.4	26%	1.3	22%	1.6	38%
Bloomberg HY	3.6	26%	2.8	3%	4.7	56%

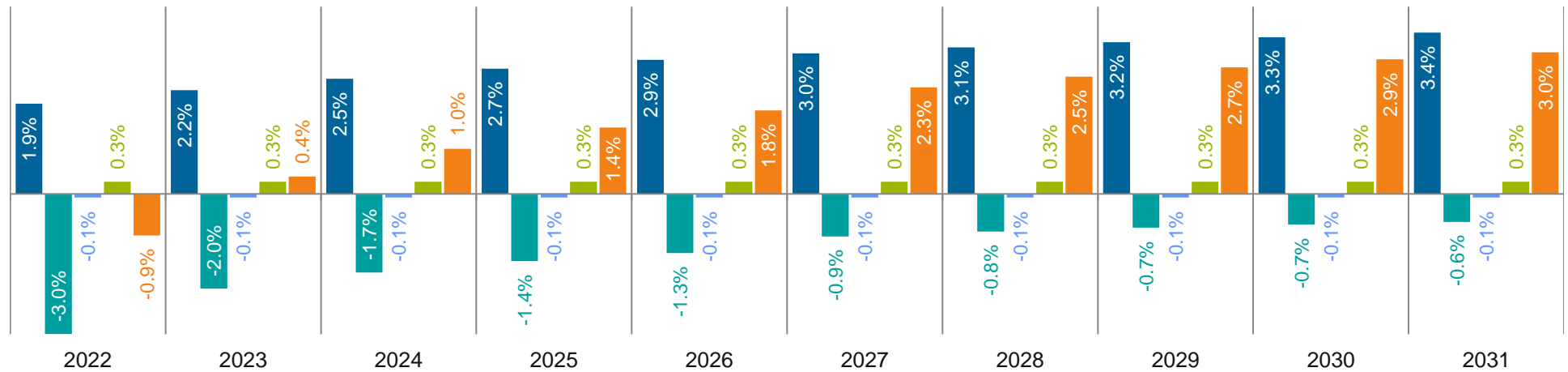
*Percentiles based on 20-year history of OAS for each respective index.
Source: Bloomberg

Comparison of Core Fixed Income Return Components

Total Return Attribution: Callan 2023 Projection



Total Return Attribution: Callan 2022 Projection



Source: Callan

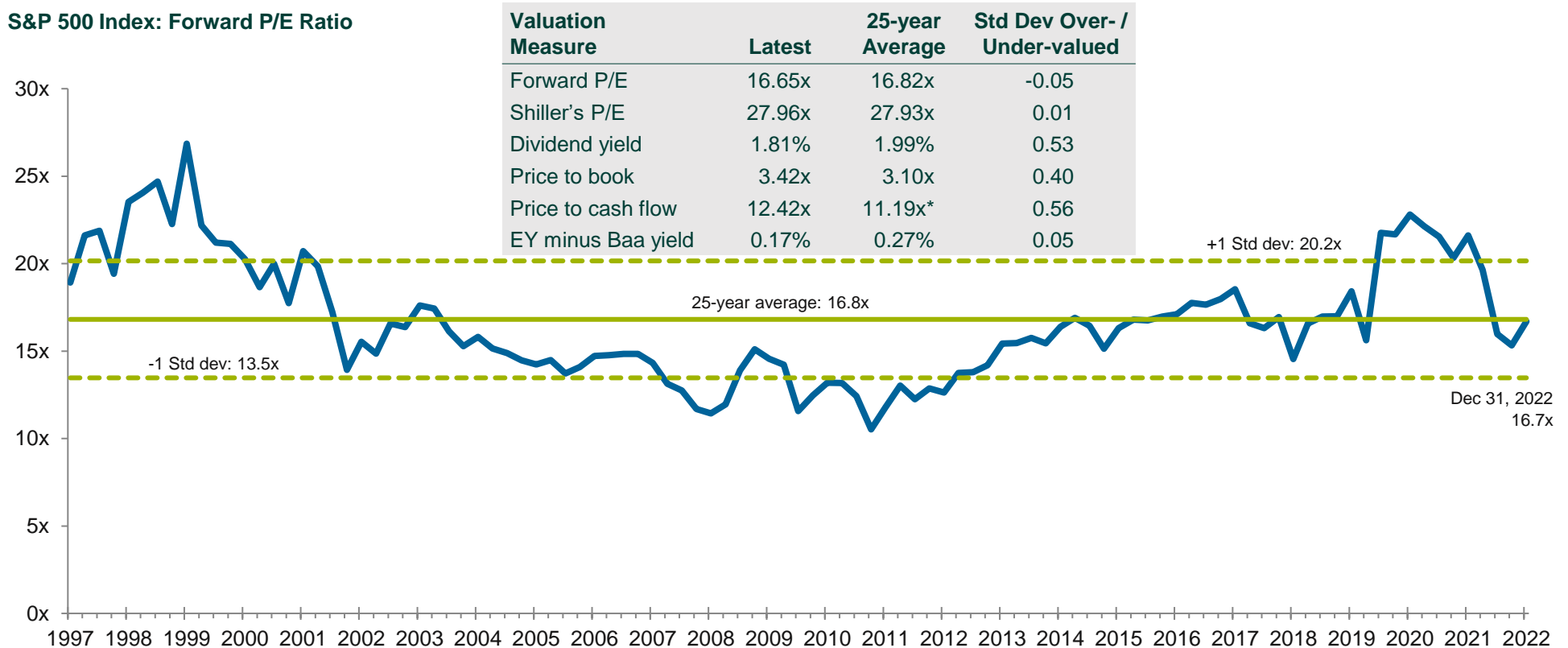
Callan

Equity

U.S. Equity Market: Key Metrics

S&P 500 valuation measures

S&P 500 Index: Forward P/E Ratio



- All valuation measures are now within +/- one standard deviation of 25-year averages.
- Forward P/E is near the long-term average, but if we enter a recession both prices and earnings are likely to decline.

Source: FactSet, FRB, Refinitiv Datastream, Robert Shiller, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management.

Price-to-earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months as provided by IBES since December 1997 and by FactSet since January 2022. Current next 12 months consensus earnings estimates are \$231. Average P/E and standard deviations are calculated using 25 years of history. Shiller's P/E uses trailing 10 years of inflation-adjusted earnings as reported by companies. Dividend yield is calculated as the next 12 months consensus dividend divided by most recent price. Price-to-book ratio is the price divided by book value per share. Price-to-cash flow is price divided by NTM cash flow. EY minus Baa yield is the forward earnings yield (consensus analyst estimates of EPS over the next 12 months divided by price) minus the Moody's Baa seasoned corporate bond yield. Std. dev. over-/under-valued is calculated using the average and standard deviation over 25 years for each measure. *P/CF is a 20-year average due to cash flow availability. Guide to the Markets – U.S. Data are as of Dec. 31, 2022

U.S. Equity Market: Price Relative to History

S&P 500 Index at inflection points

S&P 500 Price Index



- The S&P is still up almost 80% from the pandemic low.
- Valuations have fallen dramatically throughout 2022.

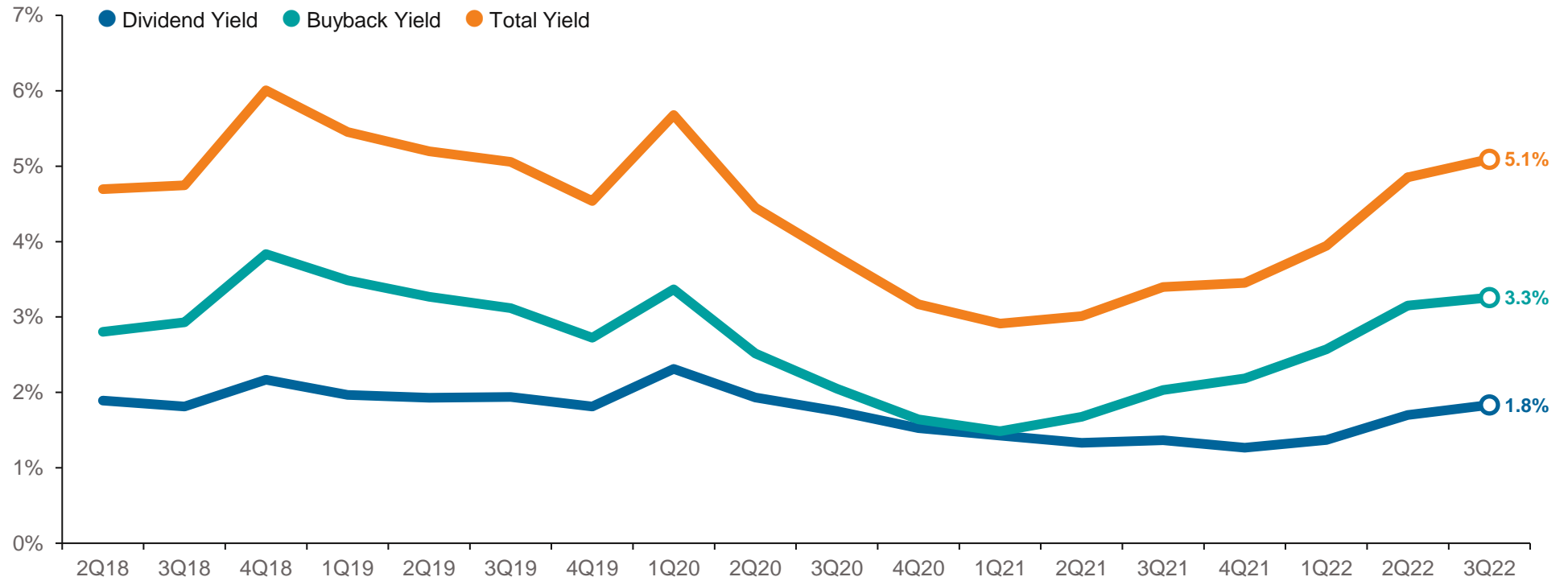
Sources: Compustat, FactSet, Federal Reserve, Refinitiv Datastream, S&P Dow Jones Indices, J.P. Morgan Asset Management.

Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price-to-earnings ratio is a bottom-up calculation based on IBES estimates and FactSet estimates since January 2022. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns.

Guide to the Markets – U.S. Data are as of December 31, 2022.

U.S. Equity Market: Return of Cash

S&P 500 yield broken down



Return of cash has risen in dollar terms and yields were further buoyed by declining share prices

Source: S&P Dow Jones Indices

Equity Forecasts

Building blocks

Index	Current Dividend Yield*	Forecast Dividend Yield	Net Buyback Yield	Inflation	Real Earnings Growth**	Valuation Adjustment	Total Geometric Return
S&P 500	1.77%	2.00%	0.50%	2.50%	2.25%	0.00%	7.25%
Russell 2500	1.61%	1.75%	0.00%	2.50%	3.20%	0.00%	7.45%
Russell 3000	1.72%	1.95%	0.45%	2.50%	2.45%	0.00%	7.35%
MSCI World ex USA	3.21%	3.75%	0.00%	1.75%	1.75%	0.00%	7.25%
MSCI Emerging Markets	3.27%	3.55%	-2.90%	3.00%	3.80%	0.00%	7.45%
Aggregate							4.25%
Cash							2.75%

Index	Forecast ERP Cash	Historical ERP Cash^	Delta ERP Cash	Forecast ERP Bonds	Historical ERP Bonds^^	Delta ERP Aggregate
S&P 500	4.50%	7.56%	-3.06%	3.00%	4.95%	-1.95%
Russell 2500	4.70%	7.22%	-2.52%	3.20%	4.61%	-1.41%

* Index yields as of Dec. 31, 2022

** S&P 500 real earnings growth is forecast real GDP growth. R 2500 real earnings growth is 100 bps spread over S&P 500. Developed and emerging markets earnings growth in line with their respective GDP assumptions.

^ Return relative to 90-day T-bills for 40 years ended Dec. 31, 2022

^^ Return relative to the Bloomberg Aggregate for 40 years ended Dec. 31, 2022

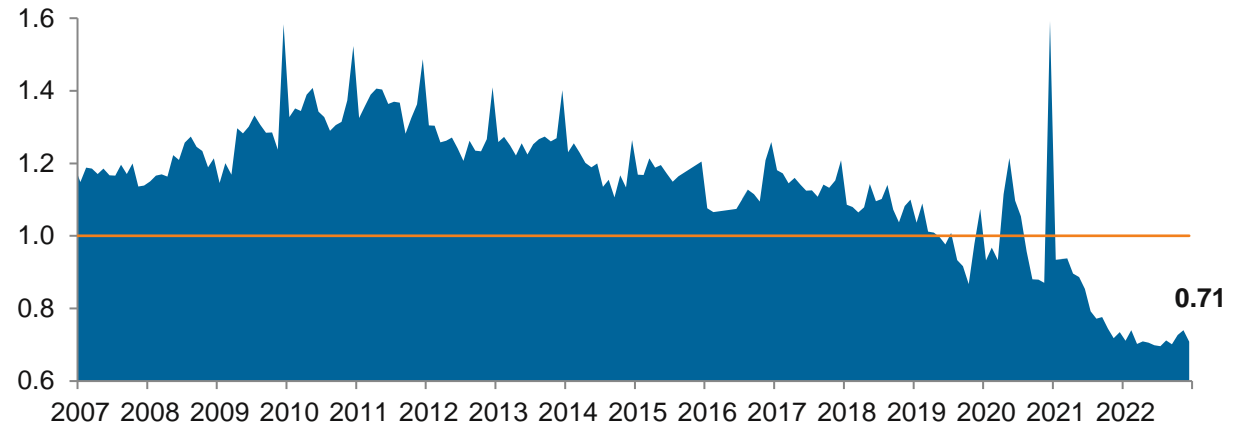
Source: Callan

U.S. Equity Assumptions

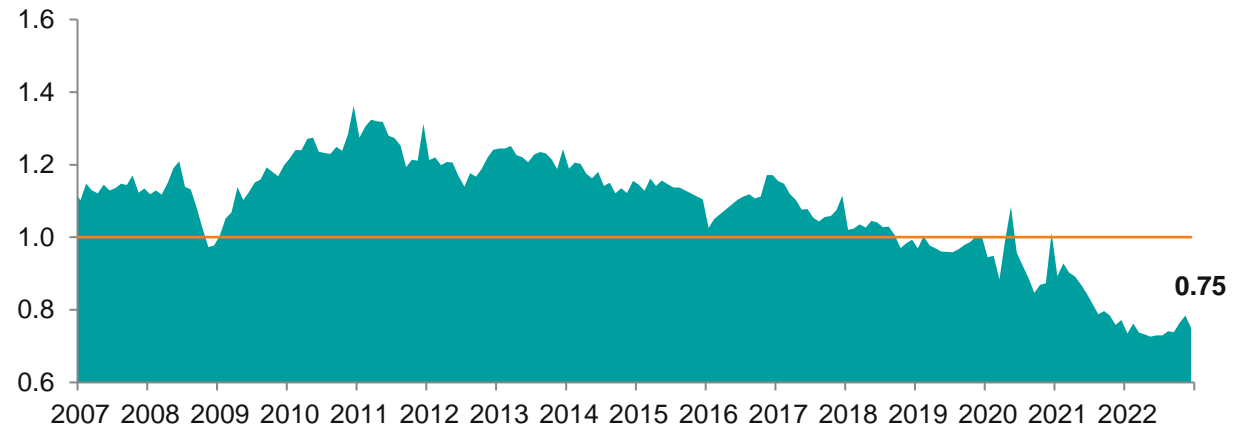
Mid and small cap relative valuations

- ▶ Large capitalization stocks still have relatively high valuations.
- ▶ Historically, smaller cap stocks have had higher valuations than large caps.
 - Investors buying future rather than historical earnings
- ▶ The small cap S&P 600 P/E is only 71% of the S&P 500 P/E.
- ▶ The mid cap S&P 400 P/E is only 75% of the S&P 500 P/E.
- ▶ Lower valuations improve the potential for higher returns relative to large cap going forward.

S&P 600/S&P 500 Relative Forward P/E Ratios



S&P 400/S&P 500 Relative Forward P/E Ratios

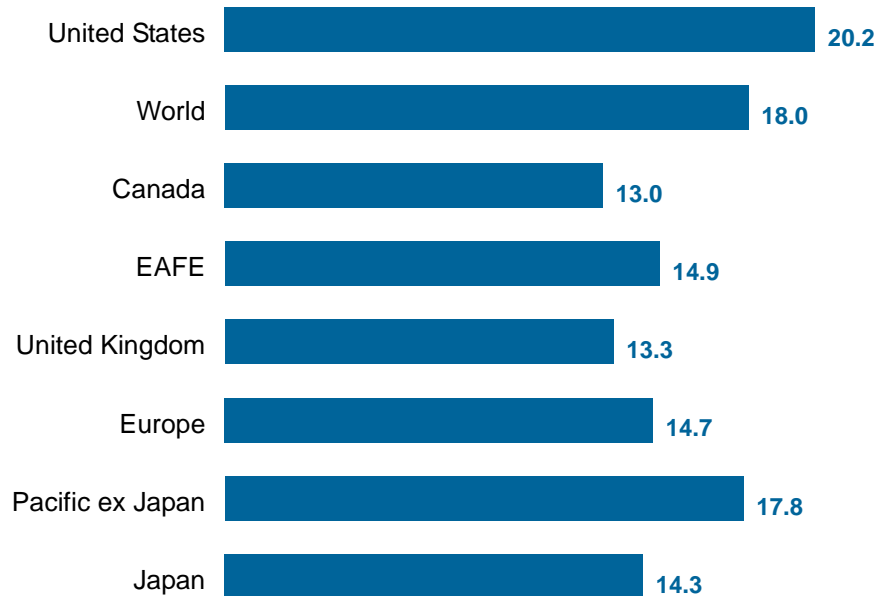


Source: S&P Dow Jones Indices

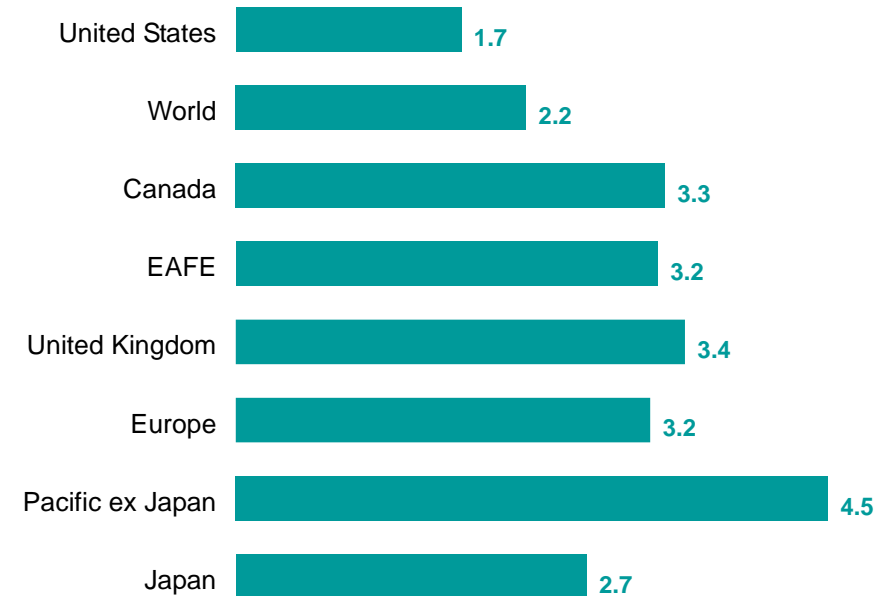
Global ex-U.S. Equity Assumptions

Developed market valuations and dividend yield

Price Earnings Ratio



Dividend Yield



Valuations have come down over the past year across each of these developed market indices.

► U.S. continues to have the highest valuations.

Dividend yields have risen since last year for all indices shown except the U.K.

Source: MSCI (Dec. 31, 2022)

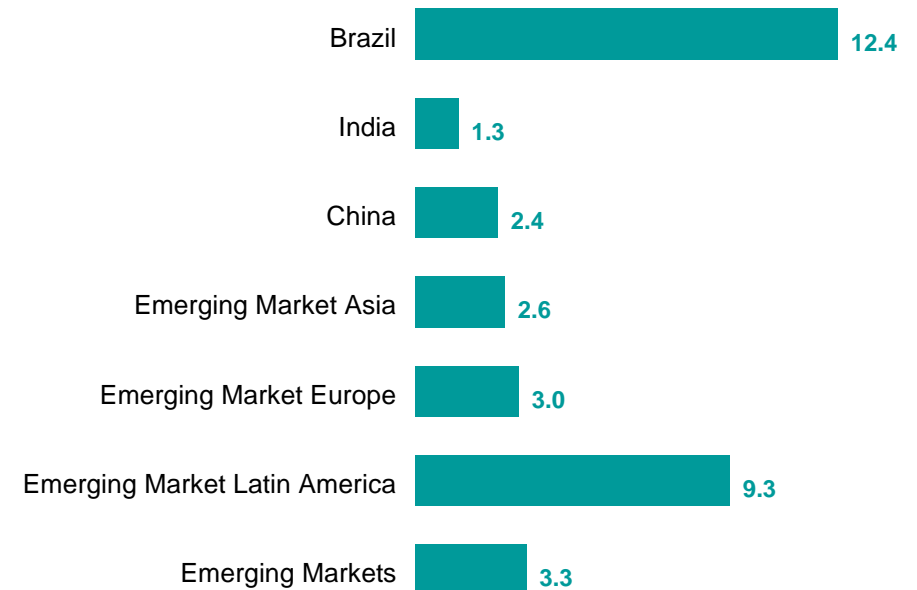
Global ex-U.S. Equity Assumptions

Emerging market valuations and dividend yield

Price Earnings Ratio



Dividend Yield



Emerging market valuations have also come down over the last year, but moderately compared to developed market valuations.

► Asia has the highest regional valuations, Emerging Europe the lowest.

Dividend yields have risen meaningfully across emerging market indices.

Significant dilution is realized as growing companies issue more shares.

Source: MSCI (Dec. 31, 2022)

Callan

Alternatives

Core Real Estate

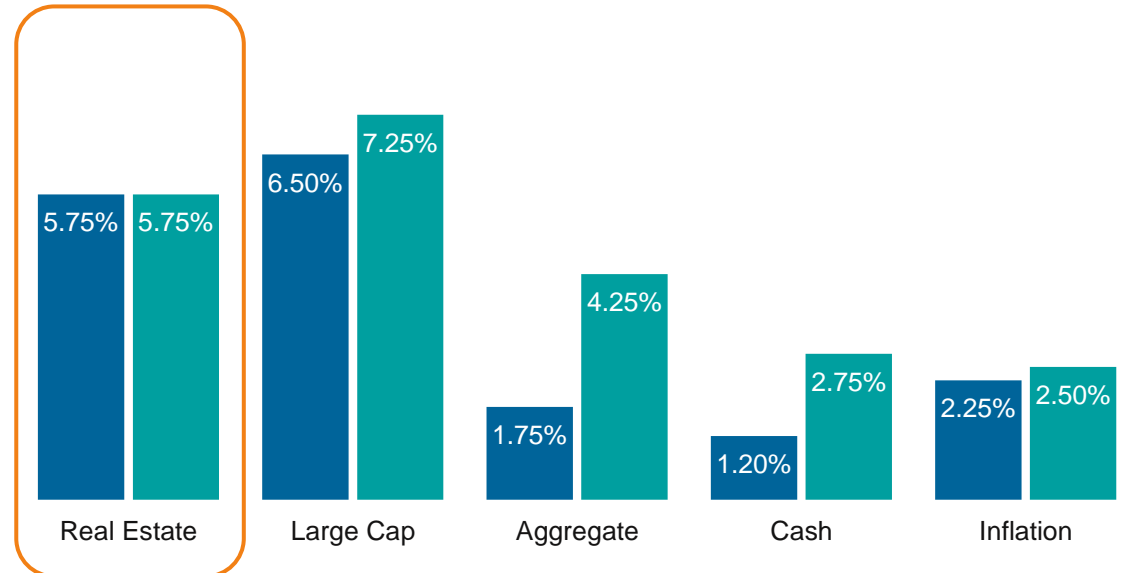
Background

- Real estate has characteristics of equity (ownership and appreciation) and bonds (income from rents). While both public equities and public fixed income saw meaningful increases in projected returns, we believe real estate valuations already reflect much of the potential forward-looking gains, as core real estate logged record appreciation in 2021 and 2022.
- No change to the outlook for real estate returns compared to last year.

2023 real estate return projection:
5.75% (unchanged)

Return Projections

● 2022 ● 2023



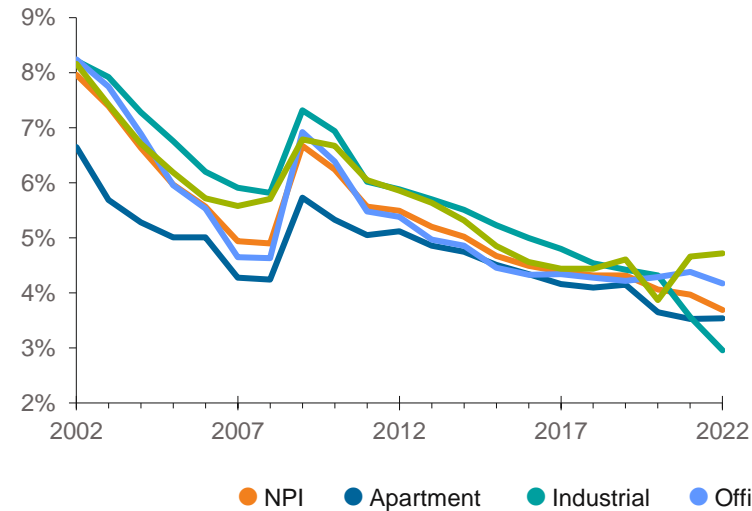
Source: Callan

Core Real Estate

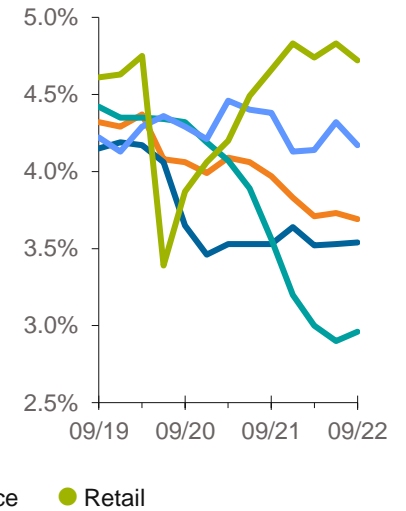
- ▶ 5.75% core real estate compound return (net of fees)
- ▶ Return calculations assume 4.7% cost of leverage and 0.4x debt-to-equity (30% loan-to-value)

Income Return (unlevered property)	5.1%
Appreciation (unlevered property)	0.7%
Total Return (before leverage)	5.8%

Annual Cap Rates



Quarterly



Callan Return Assumptions (unlevered property returns)

	Office	Retail	Industrial	Apartments	Other	NPI Index
Income	4.9%	5.7%	4.8%	5.0%	5.9%	5.1%
Appreciation	-0.1%	0.1%	1.4%	0.9%	0.9%	0.7%
Total Return	4.8%	5.7%	6.2%	5.9%	6.8%	5.8%

Source: NCREIF Property Index (NPI) cap rates correspond to unlevered property valuations

Hedge Funds

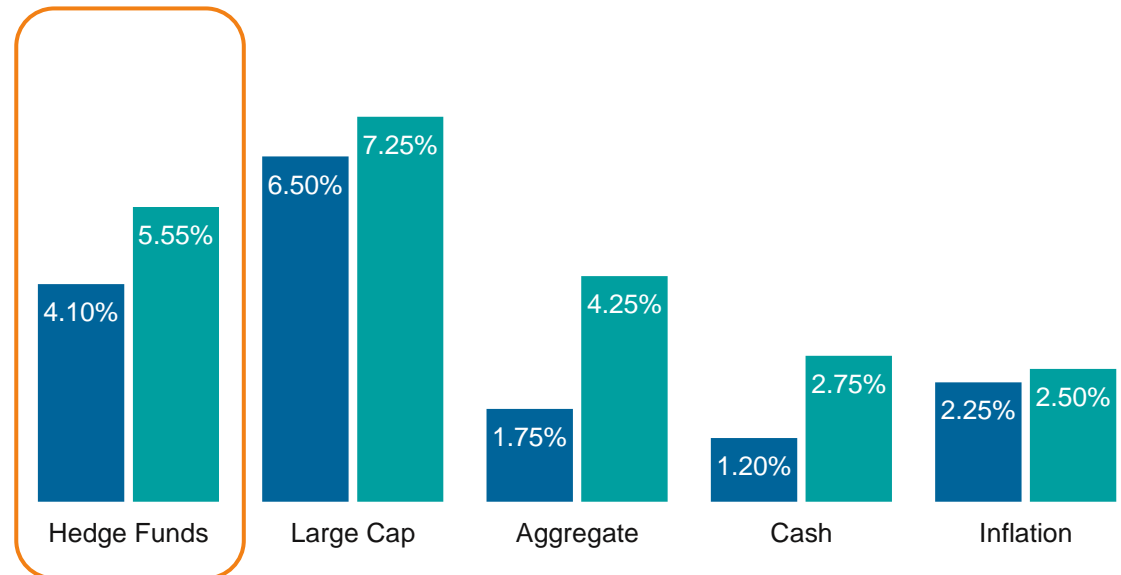
Background

- ▶ Hedge funds can be evaluated in a multi-factor context using the following relationship:
- ▶ Expected Return = Cash + Equity Beta x (Equity-Cash) + Exotic Beta + Net Alpha
- ▶ Callan's 10-year cash forecast is 2.75%.
- ▶ Diversified hedge fund portfolios have historically exhibited equity beta relative to the S&P 500 of about 0.4.
- ▶ Combined with our equity risk premium forecast, this results in an excess return from equity beta of 1.8%.
- ▶ Return from hedge fund exotic beta and illiquidity premia is forecast to be 0.5% to 1.0%, to arrive at an overall expected return of 5.55%.

2023 hedge fund return projection:
5.55% (up 145 bps)

Return Projections

● 2022 ● 2023



Source: Callan

Private Equity

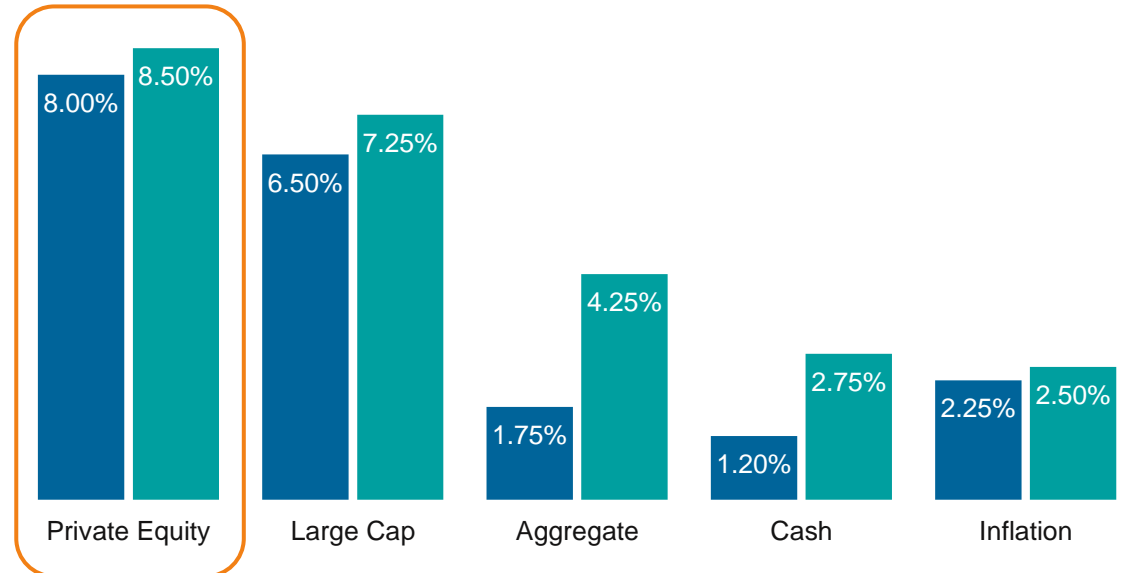
Background

- ▶ The private equity market in aggregate is driven by many of the same economic factors as public equity markets. However, we expect private equity to experience some write-downs that have not yet been reflected in performance.
- ▶ Consequently, the private equity performance expectations did not rise as much as public equity expectations.
- ▶ We see tremendous disparity between the best- and worst-performing private equity managers.
- ▶ The ability to select skillful managers could result in realized returns significantly greater than projected here.

2023 private equity return projection:
8.50% (up 50 bps)

Return Projections

● 2022 ● 2023



Source: Callan

Private Credit

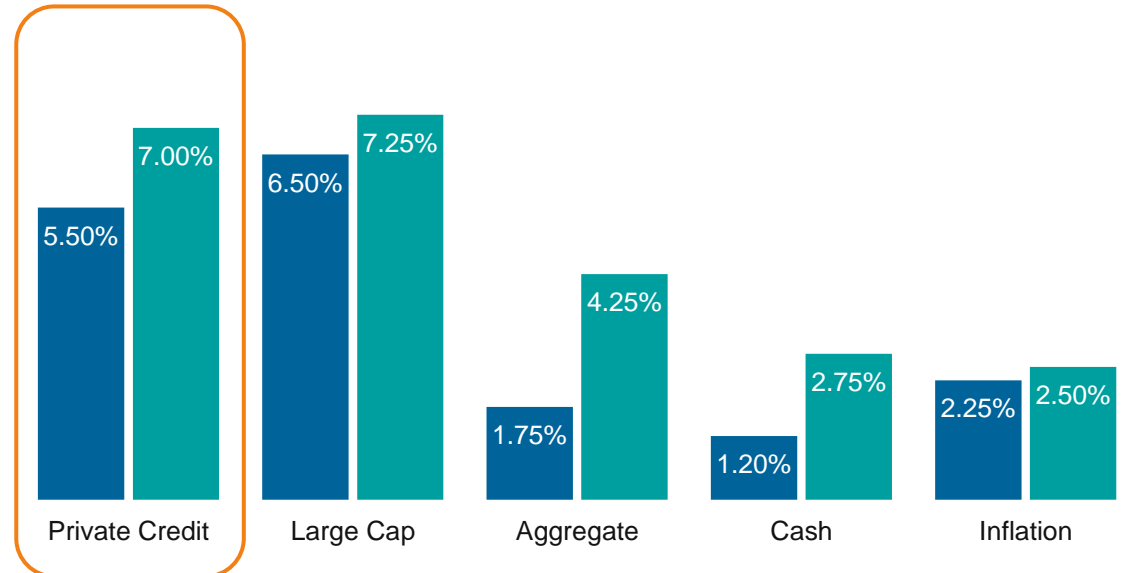
Background

- ▶ Return projection is anchored on middle market direct lending where yields have risen along with public fixed income yields.
- ▶ While banks are no longer major investors in this market, there is strong appetite from institutional and retail investors.
- ▶ A portfolio with more distressed and specialty finance exposure would have a higher return though with a lower current yield and higher volatility and higher correlation to public and private equity.

2023 private credit return projection:
7.0% (up 150 bps)

Return Projections

● 2022 ● 2023



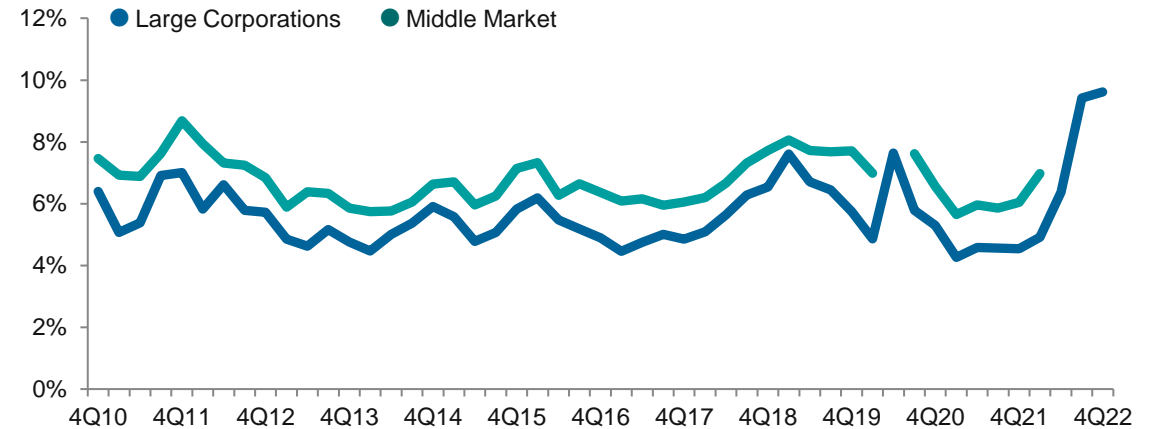
Source: Callan

Private Credit

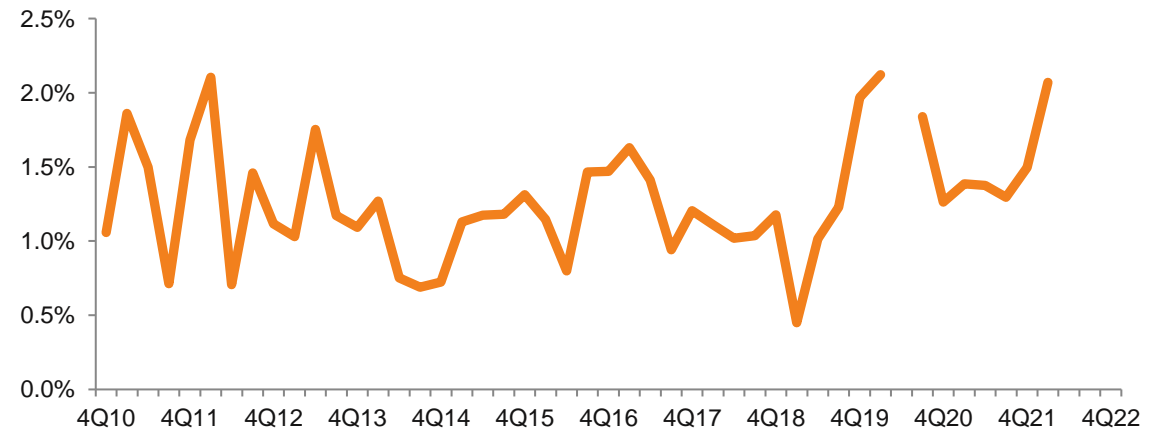
- ▶ Return calculations assume 5.25% cost of leverage and 1% unlevered loss ratio
- ▶ Corresponds to 7% compound return

Unlevered Yield	9.25%
Leverage	0.85x
Levered Yield	12.65%
Management Fee and OpEx	1.7%
Incentive Rate	15%
Hurdle	4%
Incentive Fee	1%
Total Fees and Expenses	2.7%
Loss Ratio	1.85%
Net Arithmetic	8%

Loan Yields



Middle Market Premium



Source: Refinitiv LPC. All-in yield (LIBOR + Spread + OID) assuming 3-year takeout

Note: 2Q20, 2Q22, and 3Q22 not shown due to lack of data points to calculate a MM institutional all-in yield statistic.

Callan

Detailed 2023 Expectations and Resulting Portfolio Returns and Risks

2023 vs. 2022 Risk and Returns Assumptions

Summary of Callan's Long-Term Capital Markets Assumptions (2023–2032)

		Projected Return		Real	Projected Risk	2022–2031			vs. 2022	
		1-Year Arithmetic	10-Year Geometric*		Standard Deviation	1-Year Arithmetic	10-Year Geometric*	Standard Deviation	Geometric* Delta	Std Dev Delta
Asset Class	Index									
Equities										
Broad U.S. Equity	Russell 3000	8.75%	7.35%	4.85%	18.05%	8.00%	6.60%	17.95%	0.75%	0.10%
Large Cap U.S. Equity	S&P 500	8.60%	7.25%	4.75%	17.75%	7.85%	6.50%	17.70%	0.75%	0.05%
Smid Cap U.S. Equity	Russell 2500	9.60%	7.45%	4.95%	22.15%	8.75%	6.70%	21.30%	0.75%	0.85%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.45%	7.45%	4.95%	21.25%	8.70%	6.80%	20.70%	0.65%	0.55%
Developed ex-U.S. Equity	MSCI World ex USA	9.00%	7.25%	4.75%	20.15%	8.25%	6.50%	19.90%	0.75%	0.25%
Emerging Market Equity	MSCI Emerging Markets	10.45%	7.45%	4.95%	25.70%	9.80%	6.90%	25.15%	0.55%	0.55%
Fixed Income										
Short Duration Gov/Credit	Bloomberg 1-3 Year Gov/Credit	3.75%	3.80%	1.30%	2.30%	1.50%	1.50%	2.00%	2.30%	0.30%
Core U.S. Fixed	Bloomberg Aggregate	4.25%	4.25%	1.75%	4.10%	1.80%	1.75%	3.75%	2.50%	0.35%
Long Government	Bloomberg Long Gov	4.55%	3.70%	1.20%	13.50%	1.85%	1.10%	12.50%	2.60%	1.00%
Long Credit	Bloomberg Long Credit	5.75%	5.20%	2.70%	11.75%	2.60%	2.10%	10.50%	3.10%	1.25%
Long Government/Credit	Bloomberg Long Gov/Credit	5.25%	4.75%	2.25%	11.35%	2.30%	1.80%	10.40%	2.95%	0.95%
TIPS	Bloomberg TIPS	4.10%	4.00%	1.50%	5.30%	1.35%	1.25%	5.05%	2.75%	0.25%
High Yield	Bloomberg High Yield	6.75%	6.25%	3.75%	11.75%	4.40%	3.90%	10.75%	2.35%	1.00%
Global ex-U.S. Fixed	Bloomberg Global Agg ex US	2.70%	2.25%	-0.25%	9.80%	1.20%	0.80%	9.20%	1.45%	0.60%
Emerging Market Sov Debt	EMBI Global Diversified	6.25%	5.85%	3.35%	10.65%	4.00%	3.60%	9.50%	2.25%	1.15%
Alternatives										
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.25%	14.20%	6.60%	5.75%	14.20%	0.00%	0.00%
Private Infrastructure	MSCI GI Infra/FTSE Dev Core 50/50	7.15%	6.15%	3.65%	15.45%	7.10%	6.10%	15.45%	0.05%	0.00%
Private Equity	Cambridge Private Equity	11.95%	8.50%	6.00%	27.60%	11.45%	8.00%	27.60%	0.50%	0.00%
Private Credit	N/A	8.00%	7.00%	4.50%	15.50%	6.40%	5.50%	14.60%	1.50%	0.90%
Hedge Funds	Callan Hedge FOF Database	5.80%	5.55%	3.05%	8.45%	4.35%	4.10%	8.20%	1.45%	0.25%
Commodities	Bloomberg Commodity	5.05%	3.50%	1.00%	18.00%	4.05%	2.50%	18.00%	1.00%	0.00%
Cash Equivalents	90-Day T-Bill	2.75%	2.75%	0.25%	0.90%	1.20%	1.20%	0.90%	1.55%	0.00%
Inflation	CPI-U		2.50%		1.60%		2.25%	1.60%	0.25%	0.00%

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Source: Callan

2023–2032 Callan Capital Markets Assumptions Correlations

Large Cap U.S. Equity	1.00																				
Smid Cap U.S. Equity	0.88	1.00																			
Dev ex-U.S. Equity	0.73	0.79	1.00																		
Em Market Equity	0.79	0.83	0.89	1.00																	
Short Dur Gov/Credit	0.05	0.01	0.04	-0.01	1.00																
Core U.S. Fixed	0.02	-0.02	0.00	-0.04	0.80	1.00															
Long Government	-0.05	-0.06	-0.03	-0.06	0.67	0.83	1.00														
Long Credit	0.45	0.40	0.40	0.40	0.64	0.80	0.65	1.00													
TIPS	-0.07	-0.08	-0.09	-0.11	0.56	0.70	0.50	0.52	1.00												
High Yield	0.75	0.74	0.73	0.75	0.10	0.09	0.00	0.45	0.02	1.00											
Global ex-U.S. Fixed	0.10	0.07	0.13	0.12	0.50	0.60	0.50	0.55	0.45	0.18	1.00										
EM Sovereign Debt	0.65	0.65	0.65	0.69	0.16	0.19	0.10	0.47	0.08	0.62	0.21	1.00									
Core Real Estate	0.44	0.42	0.42	0.41	0.16	0.14	0.05	0.30	0.09	0.31	0.16	0.29	1.00								
Private Infrastructure	0.48	0.47	0.46	0.46	0.14	0.15	0.10	0.33	0.08	0.34	0.18	0.32	0.76	1.00							
Private Equity	0.79	0.77	0.76	0.75	-0.01	-0.09	-0.13	0.30	-0.11	0.61	0.08	0.51	0.55	0.60	1.00						
Private Credit	0.69	0.68	0.65	0.68	0.11	0.00	-0.05	0.33	-0.12	0.63	0.12	0.50	0.25	0.27	0.67	1.00					
Hedge Funds	0.67	0.63	0.63	0.63	0.23	0.29	0.20	0.55	0.20	0.60	0.25	0.54	0.28	0.30	0.48	0.51	1.00				
Commodities	0.20	0.20	0.20	0.20	-0.05	-0.04	-0.10	0.05	0.00	0.20	0.10	0.15	0.18	0.15	0.20	0.17	0.23	1.00			
Cash Equivalents	-0.06	-0.08	-0.10	-0.10	0.30	0.15	0.12	0.00	0.12	-0.09	0.05	-0.06	0.00	-0.04	0.00	-0.04	-0.04	-0.02	1.00		
Inflation	-0.02	0.02	0.00	0.03	-0.21	-0.23	-0.30	-0.20	0.25	0.00	-0.15	-0.04	0.20	0.10	0.06	-0.05	0.05	0.35	0.05	1.00	
	Large Cap	Smid Cap	Dev	Em Mkts	Short Dur	Core Fixed	Long Gov	Long Credit	TIPS	High Yield	Global ex-US Fixed	EM	Core Real Estate	Private Infra	Private Equity	Private Credit	Hedge Funds	Comm	Cash Equiv	Inflation	

Source: Callan

MCERA Asset Classes - Return and Risk

Asset Class	10-Year Compound Return	Projected Standard Deviation	Real Return
Broad Domestic Equity	7.35%	18.05%	4.85%
Global ex-US Equity	7.45%	21.25%	4.95%
Domestic Fixed Income	4.25%	4.10%	1.75%
Private Equity	8.50%	27.60%	6.00%
Real Assets	6.20%	11.55%	3.70%
Cash Equivalents	2.75%	0.90%	0.25%
Inflation	2.50%	1.60%	

Total Real Assets portfolio:

- 8% private real estate, 7% public real assets
- Public real assets = 25% TIPS, 25% Commodities, 25% REITs, 25% Natural Resource Equity

The Opportunistic allocation has a 0% target, so it is not included in these projections.

Source: Callan LLC

MCERA Asset Classes - Correlation

	Broad Domestic Equity	Global Ex-U.S. Equity	Domestic Fixed	Private Equity	Real Assets	Cash Equivalents	Inflation
Broad Domestic Equity	1.00						
Global Ex-U.S. Equity	0.80	1.00					
Domestic Fixed	0.02	-0.01	1.00				
Private Equity	0.80	0.78	-0.09	1.00			
Real Assets	0.66	0.65	0.12	0.72	1.00		
Cash Equivalents	-0.06	-0.10	0.15	0.00	-0.01	1.00	
Inflation	-0.01	0.01	-0.23	0.06	0.28	0.05	1.00

Total Real Assets portfolio:

- 8% private real estate, 7% public real assets
- Public real assets = 25% TIPS, 25% Commodities, 25% REITs, 25% Natural Resource Equity

Source: Callan LLC

Alternative Asset Mixes

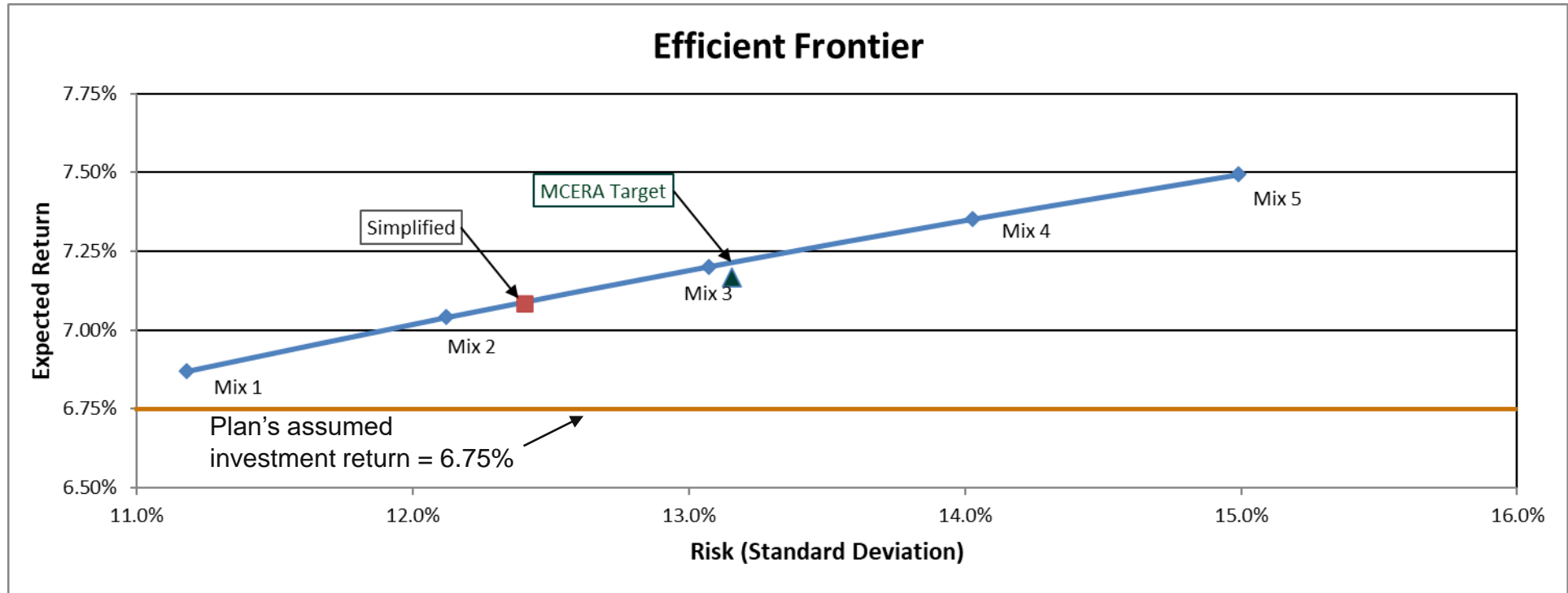
Real Assets Constrained to 15% of Portfolio

Alternative Asset Mixes - 15% Real Assets									
Asset Class	MCERA Target	Simplified Target	Min Alloc	Max Alloc	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad US Equity	32%	30%	0%	100%	24%	26%	28%	31%	33%
Broad International Equity	22%	20%	0%	100%	16%	18%	20%	21%	23%
Broad US Fixed Income	23%	30%	0%	100%	35%	30%	25%	20%	15%
Core US Real Estate	0%	10%	0%	0%	0%	0%	0%	0%	0%
Real Assets	15%	0%	15%	15%	15%	15%	15%	15%	15%
Private Equity	8%	10%	0%	100%	10%	11%	12%	13%	14%
Totals	100%	100%			100%	100%	100%	100%	100%
Expected Return	7.2%	7.1%			6.9%	7.0%	7.2%	7.4%	7.5%
Real Return	4.7%	4.6%			4.4%	4.5%	4.7%	4.9%	5.0%
Risk (Standard Deviation)	13.2%	12.4%			11.2%	12.1%	13.1%	14.0%	15.0%
% equity	62%	60%			50%	55%	60%	65%	70%
% fixed income	23%	30%			35%	30%	25%	20%	15%
% real assets	15%	10%			15%	15%	15%	15%	15%
% illiquid	16%	20%			18%	19%	20%	21%	22%

- Mixes are constrained to hold 15% real assets
 - Real assets expands the real estate allocation to include other real assets, all publicly traded: TIPS, commodities, natural resource equity and REITs
- Maximum private equity allocation = 25% of public equity exposure
- Simplified Target suggests de-risking the portfolio by increasing fixed income from 23% to 30%. The simplification comes from eliminating publicly traded real assets, increasing real estate from 8% to 10%, and increasing private equity from 8% to 10%. The result is a portfolio with a return similar to that of the current Target, with lower risk.

MCERA - 2023 Efficient Frontier – Nominal Return

Maximum Private Equity Allocation = 25% of Public Equity Exposure



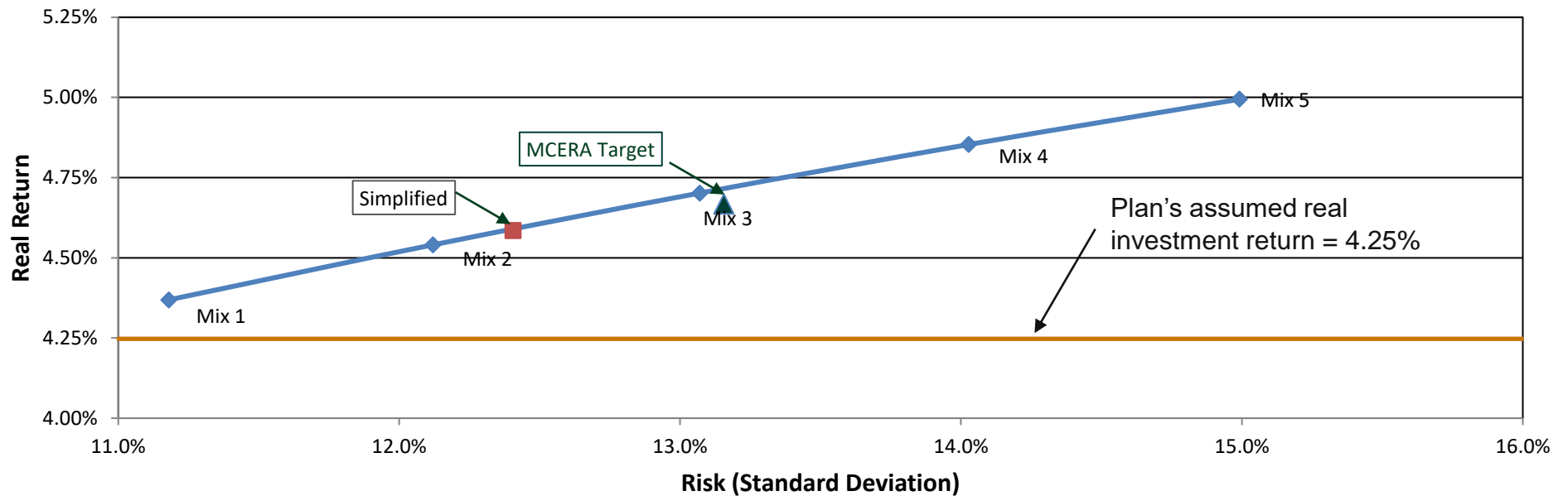
- MCERA's asset allocation target is an optimal allocation, since it lies on the efficient frontier depicting risk and return.
- Current target is a well-diversified portfolio that includes fixed income, public equity, private equity and real assets, including private real estate.
- All of the alternative mixes would meet the 6.75% plan return target in the expected case
- Simplified Portfolio offers a projected return just below that of the current target, with meaningfully less risk.

Source: Callan LLC

MCERA - 2023 Efficient Frontier – Real Return

Maximum Private Equity Allocation = 25% of Public Equity Exposure

Efficient Frontier



MCERA's long term nominal return assumption of 6.75% and inflation assumption of 2.5% suggest a long term real return target of 4.25%.

Callan's 10-year return expectation for the target asset allocation is 7.2%, and combined with our inflation assumption of 2.5%, yields a real return expectation of 4.7%, higher than the 4.25% assumed in the actuarial valuation.

Simplified Portfolio offers a projected real return just below that of the current target, with meaningfully less risk.

Source: Callan LLC

Alternative Asset Mixes

Real Assets Constrained to 15% of Portfolio and Private Equity to 10%

					Alternative Asset Mixes - 15% Real Assets				
Asset Class	MCERA Target	Simplified Target	Min Alloc	Max Alloc	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad US Equity	32%	30%	0%	100%	24%	26%	29%	32%	35%
Broad International Equity	22%	20%	0%	100%	16%	19%	21%	23%	25%
Broad US Fixed Income	23%	30%	0%	100%	35%	30%	25%	20%	15%
Core US Real Estate	0%	10%	0%	0%	0%	0%	0%	0%	0%
Real Assets	15%	0%	15%	15%	15%	15%	15%	15%	15%
Private Equity	8%	10%	0%	10%	10%	10%	10%	10%	10%
Totals	100%	100%			100%	100%	100%	100%	100%
Expected Return	7.2%	7.1%			6.9%	7.0%	7.2%	7.3%	7.4%
Real Return	4.7%	4.6%			4.4%	4.5%	4.7%	4.8%	4.9%
Risk (Standard Deviation)	13.2%	12.4%			11.2%	12.1%	12.9%	13.8%	14.7%
% equity	62%	60%			50%	55%	60%	65%	70%
% fixed income	23%	30%			35%	30%	25%	20%	15%
% real assets	15%	10%			15%	15%	15%	15%	15%
% illiquid	16%	20%			18%	18%	18%	18%	18%

- Mixes above are similar to those on the prior page though with private equity limited to a maximum of 10%
- Private equity allocations above 10% are reallocated to public equity
- The resulting impact on total portfolio return and risk is modest
 - Slight reduction in return and risk for Mixes 2 through 5 relative to the prior page

Alternative Asset Mixes

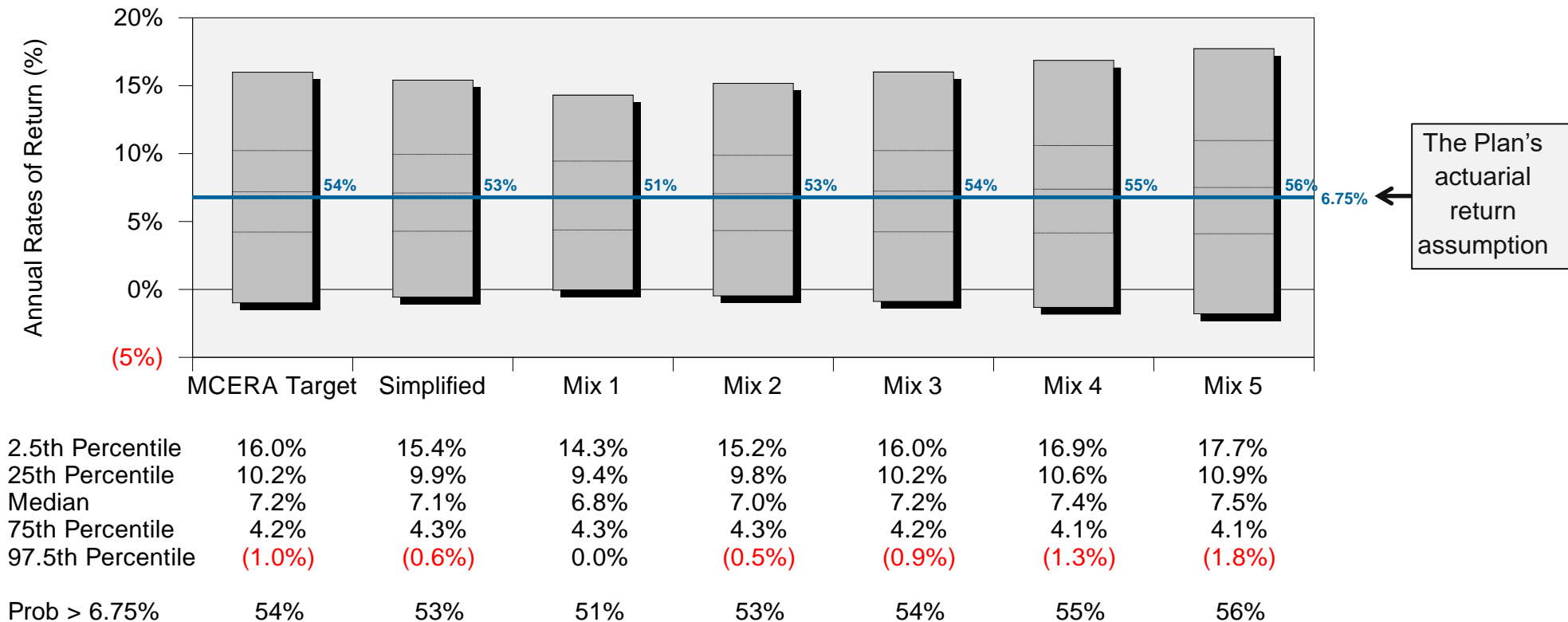
Real Assets Constrained to 15% of Portfolio and Private Equity to 8%

Alternative Asset Mixes - 15% Real Assets									
Asset Class	MCERA Target	Simplified Target	Min Alloc	Max Alloc	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad US Equity	32%	30%	0%	100%	24%	27%	30%	33%	36%
Broad International Equity	22%	20%	0%	100%	18%	20%	22%	24%	26%
Broad US Fixed Income	23%	30%	0%	100%	35%	30%	25%	20%	15%
Core US Real Estate	0%	10%	0%	0%	0%	0%	0%	0%	0%
Real Assets	15%	0%	15%	15%	15%	15%	15%	15%	15%
Private Equity	8%	10%	0%	8%	8%	8%	8%	8%	8%
Totals	100%	100%			100%	100%	100%	100%	100%
Expected Return	7.2%	7.1%			6.8%	7.0%	7.1%	7.2%	7.4%
Real Return	4.7%	4.6%			4.3%	4.5%	4.6%	4.7%	4.9%
Risk (Standard Deviation)	13.2%	12.4%			11.1%	11.9%	12.8%	13.7%	14.6%
% equity	62%	60%			50%	55%	60%	65%	70%
% fixed income	23%	30%			35%	30%	25%	20%	15%
% real assets	15%	10%			15%	15%	15%	15%	15%
% illiquid	16%	20%			16%	16%	16%	16%	16%

- Mixes above are similar to those on the prior page though with private equity limited to a maximum of 8%
- Private equity allocations above 8% are reallocated to public equity
- The resulting impact on total portfolio return and risk is modest
 - Slight reduction in return and risk for Mixes 2 through 5 relative to page 66

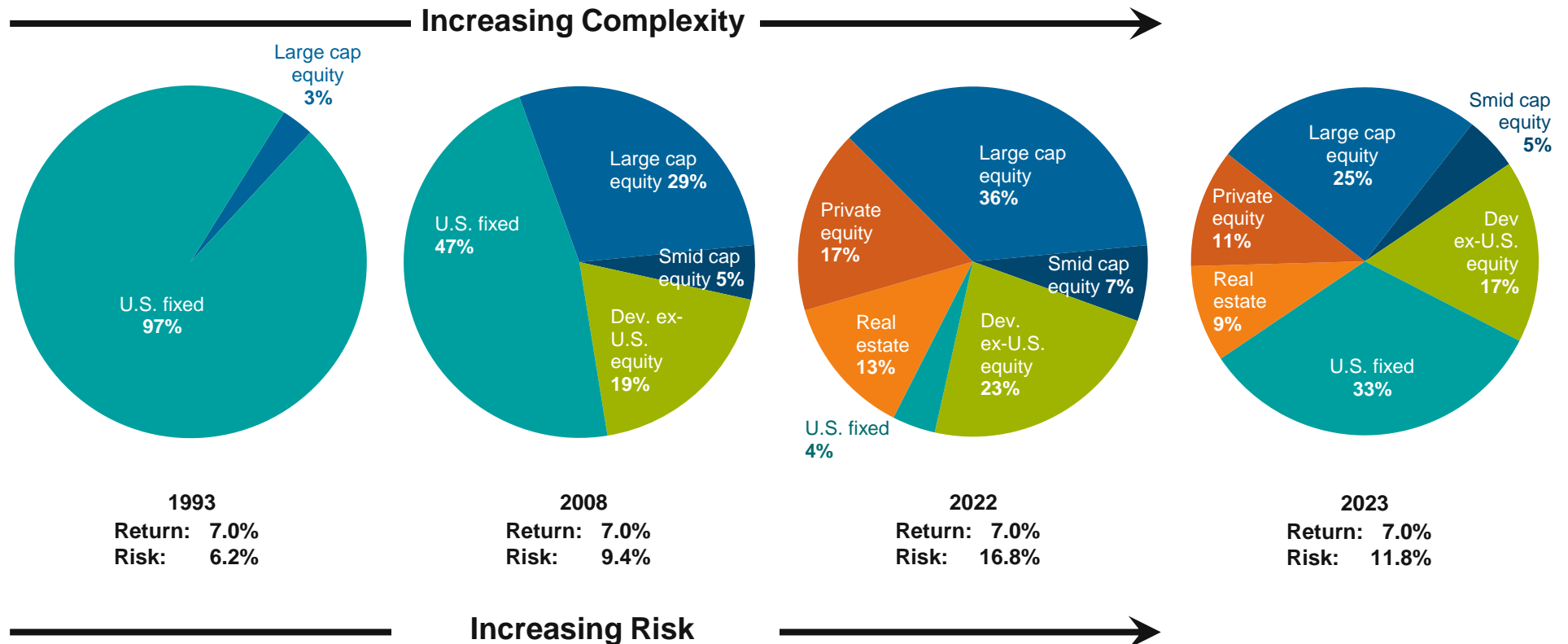
Projected Rates of Return (10 Years)

Range of Projected Rates of Return
 Projection Period: 10 Years
 Optimization Set: 2023



- Chart reflects annualized return distribution over the next ten years
- Bar heights proportional to return volatility
 - Higher expected (median) returns associated with higher volatilities
 - Increased volatility leads to lower worse-case (97.5th percentile) returns
- The target has a reasonable chance (>54%) of earning 6.75% or better over the next 10 years; Simplified mix has a 53% chance.

7% Expected Returns Over Past 30 Years



In 1993, our return expectation for broad U.S. fixed income was 6.85%.

Just 3% in return-seeking assets was required to earn a 7% projected return.

15 years later, an investor would have needed over half of the portfolio in public equities to achieve a 7% projected return.

In 2022 an investor was required to include 96% in return-seeking assets (including 30% in private market investments) to earn a 7% projected return at almost 3x the volatility compared to 1993.

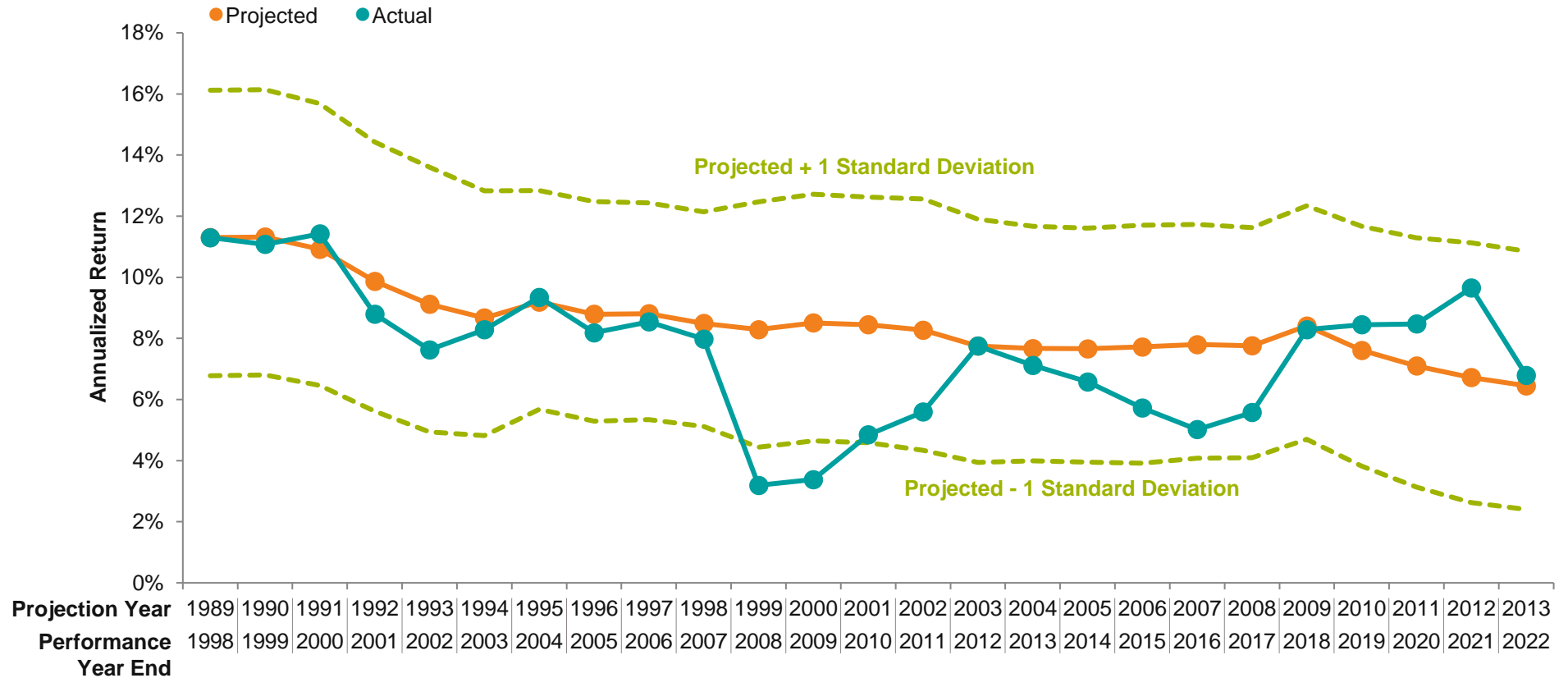
Today's 7% expected return portfolio is much more reasonable than it was just a year ago. The allocation to fixed income jumps to 33%, while risk drops by 30%. Illiquid alternatives (PE and private RE) also drop by 1/3.

Actual Returns versus Callan Projections

Projection Years 1989–2013

Historical Comparison: Actual Returns vs. Callan Capital Markets Projections

Portfolio (60% Equity, 30% Fixed, 10% Real Estate)



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C.6 Future Meetings

This is a discussion with no backup.

Callan

March 29, 2023



**Fourth Quarter 2022
Summary Investment
Presentation**

Jim Callahan, CFA
President

Anne Heaphy
Senior Vice President

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Callan

Economic and Capital Markets Review

Equity and Fixed Income Markets Down Together in 2022

Declines for both stocks and bonds for three straight quarters are extremely unusual

Global equity markets down sharply in 2022 despite rebound in 4Q

- Similar impact across all equity market segments: developed, emerging, small cap

Fixed income down with sharply higher inflation and interest rates

- Bloomberg Aggregate: -13% for the year, worst year ever for the index by a wide margin
- CPI-U: +6.5% for the year ended Dec. 2022
- ▶ Number of times stocks and bonds have been down together
 - 38 quarters in almost 100 years, about 10% of the quarters
 - But just twice on annual basis
- ▶ Inflation at highest rate in decades
- ▶ Economic data show growth hit ‘pause’
 - GDP rose 2.9% in 4Q22, after a 3.2% rise in 3Q, a 0.6% drop in 2Q, and a 1.6% decline in 1Q.

Returns for Periods ended 12/31/22

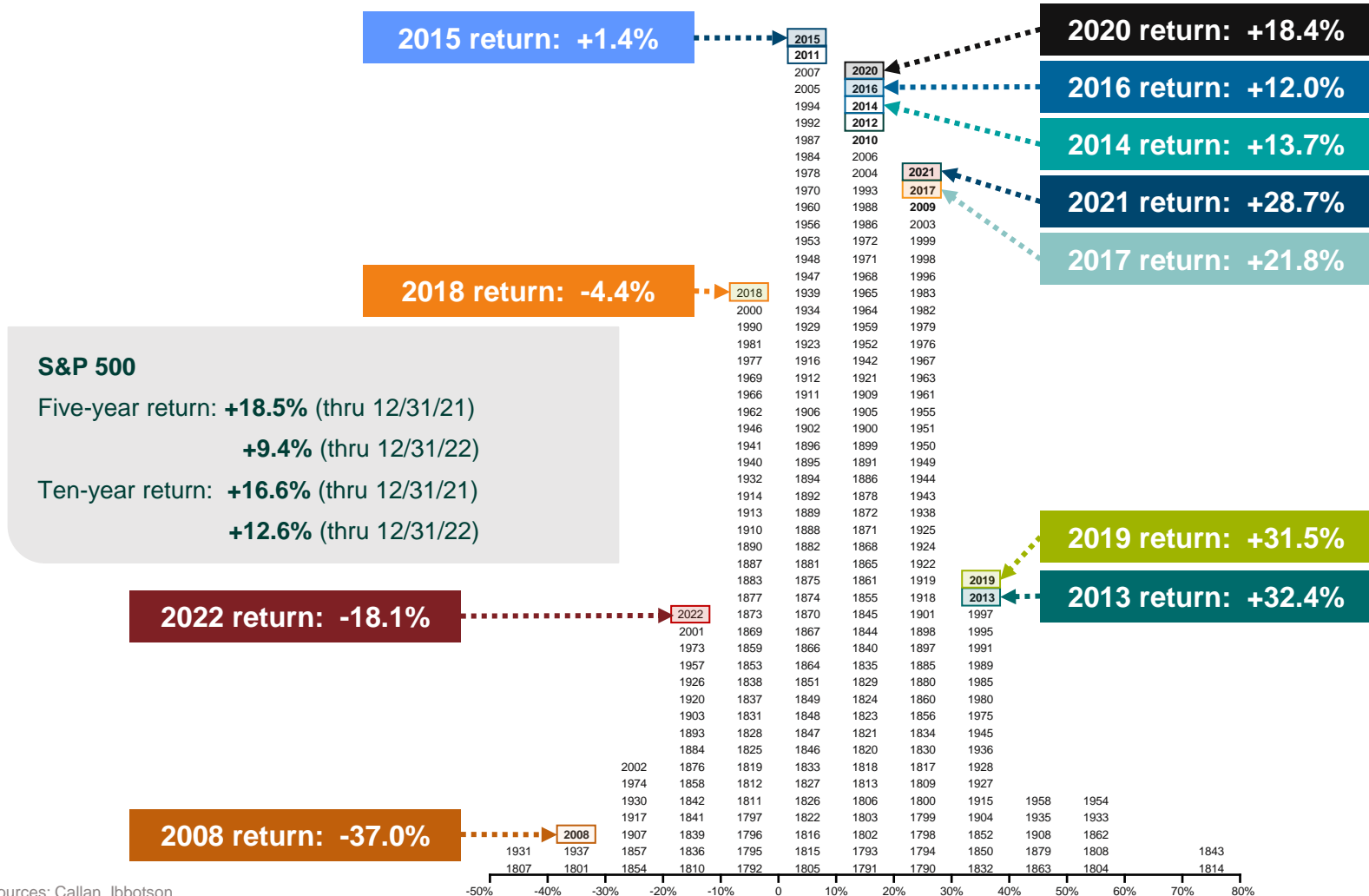
	Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
U.S. Equity						
Russell 3000	7.18	-19.21	-19.21	8.79	12.13	7.68
S&P 500	7.56	-18.11	-18.11	9.42	12.56	7.64
Russell 2000	6.23	-20.44	-20.44	4.13	9.01	7.13
Global ex-U.S. Equity						
MSCI World ex USA	16.18	-14.29	-14.29	1.79	4.59	4.65
MSCI Emerging Markets	9.70	-20.09	-20.09	-1.39	1.44	--
MSCI ACWI ex USA Small Cap	13.31	-19.97	-19.97	0.67	5.24	6.87
Fixed Income						
Bloomberg Aggregate	1.87	-13.01	-13.01	0.02	1.06	3.97
90-day T-Bill	0.84	1.46	1.46	1.26	0.76	1.91
Bloomberg Long Gov/Credit	2.61	-27.09	-27.09	-1.21	1.57	5.38
Bloomberg Global Agg ex-US	6.81	-18.70	-18.70	-3.07	-1.64	2.71
Real Estate						
NCREIF Property	-3.50	5.53	5.53	7.46	8.82	9.04
FTSE Nareit Equity	5.24	-24.37	-24.37	3.68	6.53	7.87
Alternatives						
CS Hedge Fund Index	0.92	1.06	1.06	4.25	4.24	5.81
Cambridge Private Equity*	-1.84	-3.77	-3.77	16.84	15.31	14.31
Bloomberg Commodity	2.22	16.09	16.09	6.44	-1.28	1.87
Gold Spot Price	9.22	-0.13	-0.13	6.88	0.86	7.64
Inflation - CPI-U	0.00	6.45	6.45	3.78	2.60	2.47

*Cambridge PE data through 09/30/22.

Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

Stock Market Returns by Calendar Year

2022 YTD performance in perspective: History of the U.S. stock market (233 years of returns)



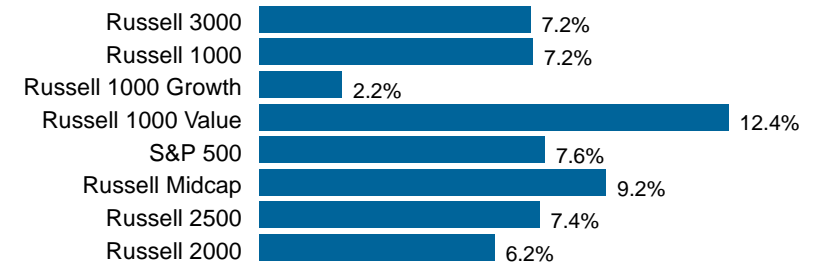
Sources: Callan, Ibbotson

U.S. Equity Performance: 4Q22

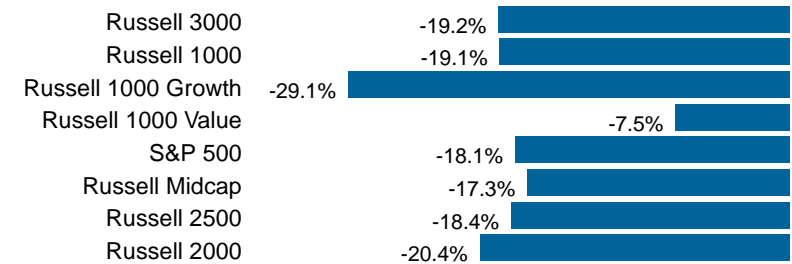
Markets retrace in December after gains in the prior two months

- ▶ The S&P 500 Index posted positive returns in both October and November but fell in December. The index was up 7.6% during 4Q22 but ended 2022 down 18.1%.
- ▶ Energy was the best-performing sector during the quarter and 2022, returning 23% and 66% respectively. Consumer Discretionary and Communication Services were the only two sectors that posted negative returns in 4Q.
- ▶ Value stocks outperformed growth across the market capitalization spectrum, and for both 4Q and the full year.
- ▶ Large cap stocks (Russell 1000) outperformed small caps (Russell 2000) last quarter and for the year.
- ▶ Continued macroeconomic concerns (e.g., inflation, potential recession, geopolitical issues) led to higher volatility and a down-year for U.S. equities.

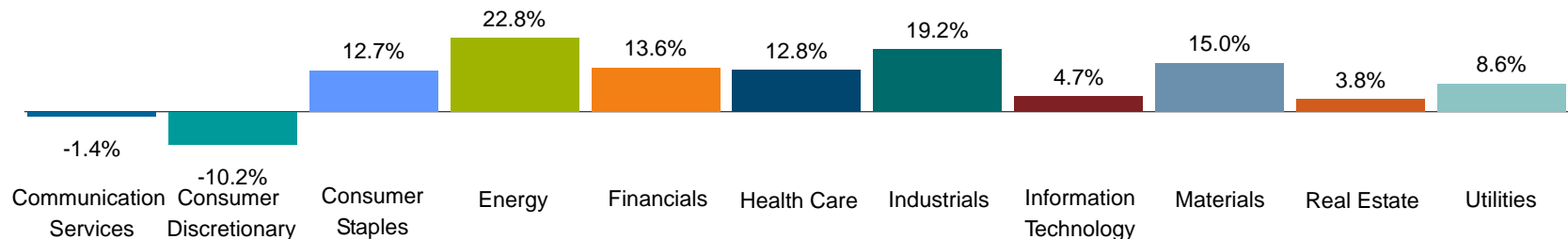
U.S. Equity Returns: Quarter Ended 12/31/22



U.S. Equity Returns: One Year Ended 12/31/22



Industry Sector Quarterly Performance (S&P 500) as of 12/31/22



Sources: FTSE Russell, S&P Dow Jones Indices

Global/Global ex-U.S. Equity Performance: 4Q22

Ending on a high note

4Q22 was a bright spot during a tough calendar year in global and global ex-U.S. equity markets.

Encouraging signs

- ▶ Lower-than-expected U.S. inflation data buoyed market optimism at the end of the year.
- ▶ The Fed slowed its pace of tightening with further slowing expected in 2023.
- ▶ China reversed its zero-COVID policies, prompting exuberance from investors.

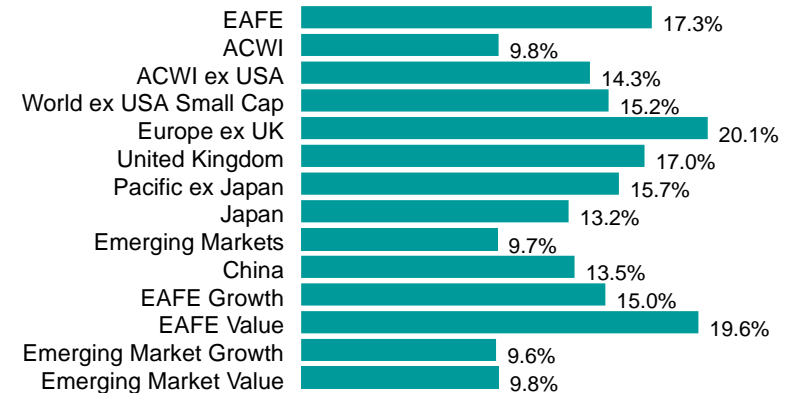
Growth vs. value

- ▶ Value outpaced growth across developed and emerging markets.
 - Economically sensitive sectors (e.g., Financials and Industrials) benefited from the anticipation of improved growth; Energy was the largest outperformer.

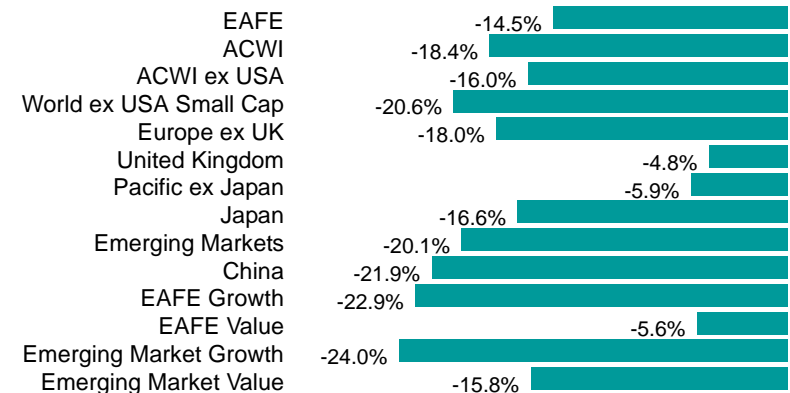
U.S. dollar vs. other currencies

- ▶ After reaching a multi-decade high, the dollar fell against all major currencies with signs of inflation easing.
 - Despite the 7.7% decline in 4Q22, the dollar still gained nearly 8% over the full year.

Global Equity Returns: Quarter Ended 12/31/22



Global Equity Returns: One Year Ended 12/31/22



Source: MSCI

U.S. Fixed Income Performance: 4Q22

Bonds were up in 4Q but 2022 results remain negative

- ▶ Aggregate: positive return driven by coupon income and spread tightening; interest rates rose modestly
- ▶ Rates were volatile intra-quarter
 - UST 10-year yield: high 4.22% on 11/7; low 3.42% on 12/7
 - Curve remained inverted at quarter-end; 10-year yield 3.88% and 2-year yield 4.41%; most since 1981
- ▶ Fed raised rates, bringing target to 4.25%-4.50%
 - Median expectation from Fed is 5.1% for year-end 2023
 - Inflation showed signs of moderating but job market remained tight with solid wage growth

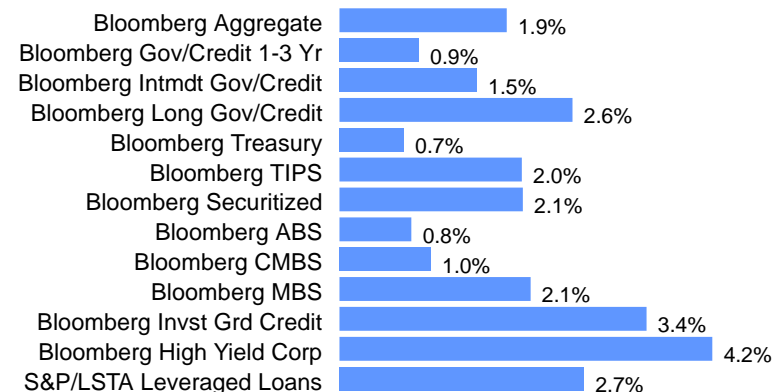
Corporates and mortgages outperformed Treasuries in 4Q but underperformed for the year

- ▶ 4Q: Corporates +289 bps excess return; RMBS +110 bps
- ▶ 2022: Corporates -125 bps excess return; RMBS -223 bps
- ▶ RMBS had worst month ever (September: -191 bps) and best month ever (November: +135 bps) in excess returns.

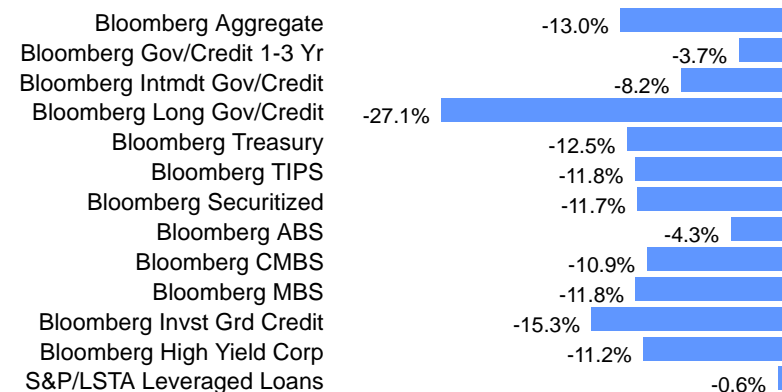
Valuations fair

- ▶ While absolute yields are higher, spreads have not widened materially and most are close to historical averages.
- ▶ An economic slowdown/recession could impact credit spreads.
- ▶ Higher yields boosting forward-looking return outlooks across sectors

U.S. Fixed Income Returns: Quarter Ended 12/31/22



U.S. Fixed Income Returns: One Year Ended 12/31/22



Sources: Bloomberg, S&P Dow Jones Indices

U.S. Private Real Estate Performance: 4Q22

Appreciation returns negative once again

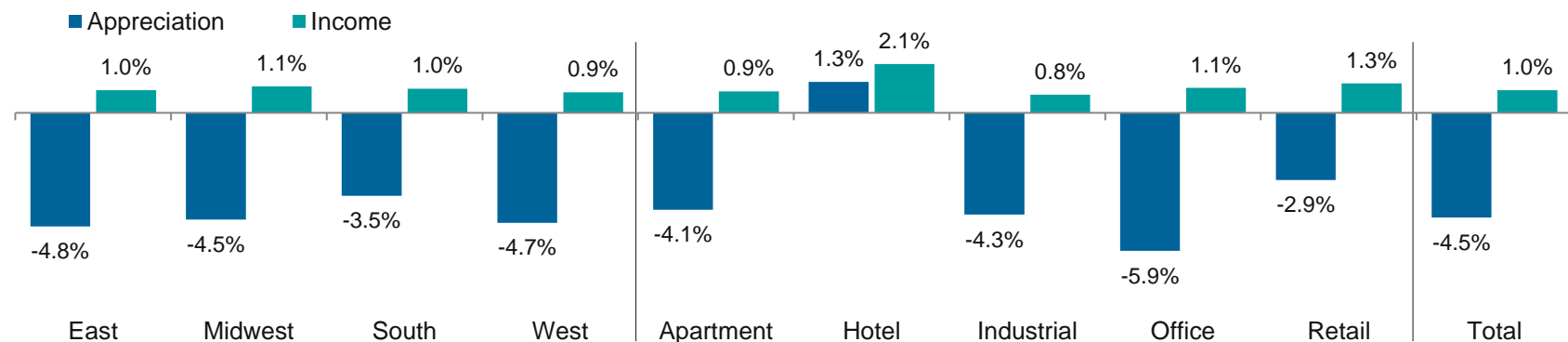
Negative appreciation in four major sectors

- Income returns were positive across sectors and regions.
- All property sectors and regions, except for Hotel, experienced negative appreciation.
- Valuations are reflective of higher interest rates, which have put upward pressure on capitalization rate and discount rate assumptions.
- Return dispersion by manager within the ODCE Index was due to the composition of underlying portfolios.

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
NCREIF ODCE	-5.2%	6.6%	9.0%	7.7%	9.1%
Income	0.6%	2.6%	2.9%	3.0%	3.4%
Appreciation	-5.8%	3.9%	6.0%	4.6%	5.5%
NCREIF Property Index	-3.5%	5.5%	8.1%	7.5%	8.8%
Income	1.0%	3.9%	4.1%	4.3%	4.7%
Appreciation	-4.5%	1.6%	3.8%	3.1%	4.0%

Returns are geometrically linked

NCREIF Property Index Quarterly Returns by Region and Property Type



Source: NCREIF, ODCE return is net

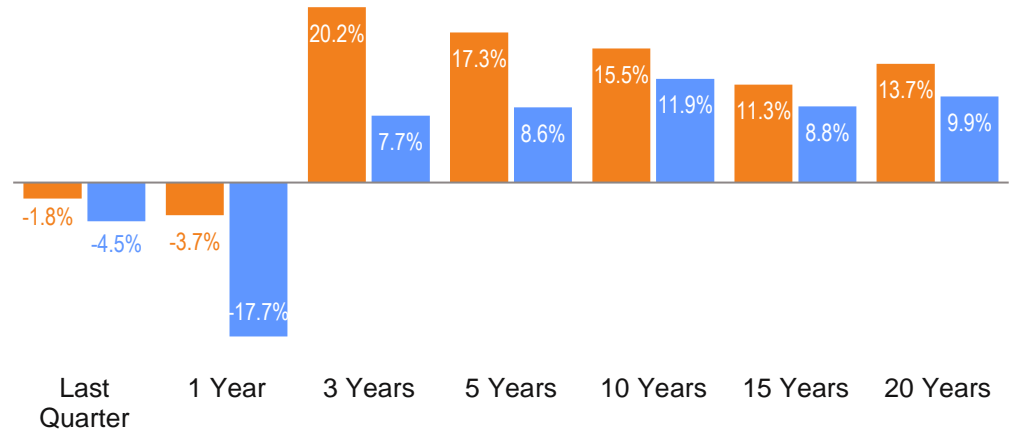
Private Equity Performance

Smoothing effect in 3Q22 private equity returns

- ▶ As is typical for the asset class, private equity returns have experienced a smoothing effect in 2022 compared to the sharp declines seen in the public markets.
- ▶ Private equity was only down about a third as much as the public markets during 2022, on a PME basis.
- ▶ Portfolio companies are typically valued internally by the manager on a quarterly basis. Valuations are based on the operating metrics of the company, recent comparable transactions, and public market comps.
- ▶ Venture capital and growth equity experienced the sharpest declines so far this year, given their technology focus as well as post-IPO public equity holdings.

Net IRRs as of 09/30/22

■ Private Equity



Net IRRs by Strategy as of 09/30/22

Strategy	Last Quarter	1 Year	3 Years	5 Years	10 Years	20 Years
Venture Capital	-2.7%	-9.1%	28.4%	23.8%	19.4%	12.4%
Growth Equity	-1.8%	-9.4%	20.8%	18.4%	15.7%	14.3%
Buyouts	-1.9%	-1.4%	18.5%	16.1%	15.2%	14.7%
Mezzanine	0.2%	5.0%	11.8%	11.1%	11.3%	11.1%
Credit Opportunities	0.7%	3.9%	8.4%	7.2%	8.3%	9.9%
Control-Oriented Distressed	-0.2%	11.3%	19.4%	13.8%	12.7%	11.9%
Total Private Equity	-1.8%	-3.7%	20.2%	17.3%	15.5%	13.7%

Source: Refinitiv/Cambridge

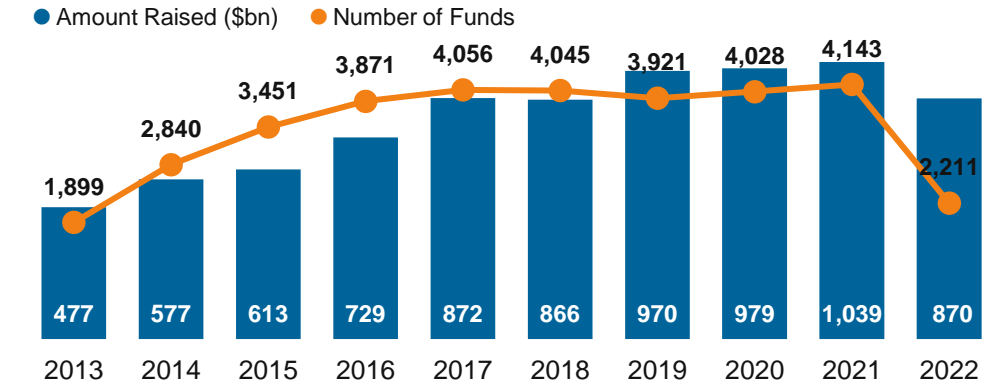
Private Equity Overview

Fundraising slows and timelines become extended

Fundraising slows

- ▶ In terms of dollars raised, fundraising down 16% in 2022, compared to the prior year
- ▶ Significantly fewer funds closed this year, with fundraising concentrated in larger funds: “flight to quality”
- ▶ Fundraising timelines extending due to so many funds in the market, slowing distributions, and constrained LP commitment budgets because of the “denominator effect,” delaying many final closes

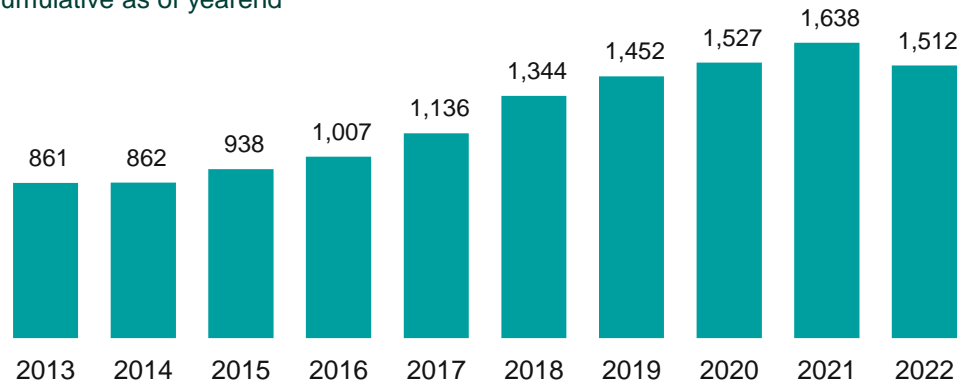
Annual Fundraising



Dry powder levels off

- ▶ Level of dry powder influenced by two factors: fundraising and capital deployment
- ▶ Dry powder peaked in 2021 at \$1.6 trillion due to strong annual fundraising levels
- ▶ Dry powder dropped in 2022 due to a slower fundraising environment

Dry Powder (\$bn) Cumulative as of yearend



Source: PitchBook

Private Equity Key Themes

Investors grappling with 'denominator effect'

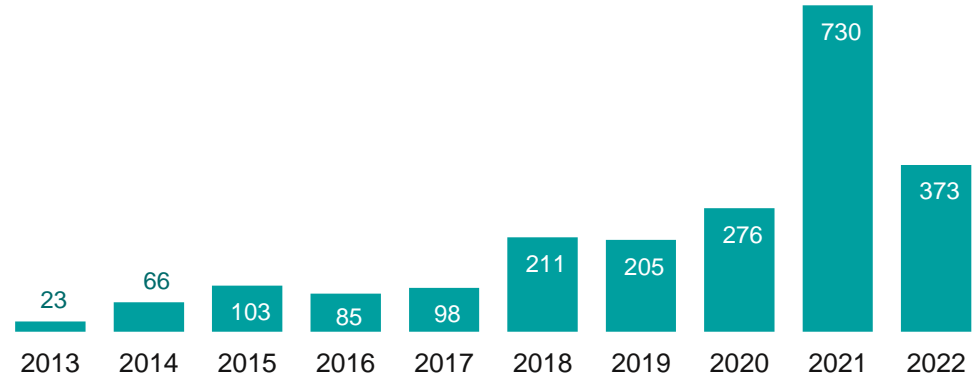
Denominator effect

- ▶ Due to the smoothing effect in short-term private equity performance
- ▶ Occurs when public equity allocations drop (pulling down the denominator), but PE allocations do not drop as far (the numerator)
 - Private equity now a larger percentage of a portfolio
- ▶ Investors unable to rebalance these illiquid exposures; now overallocated to private equity

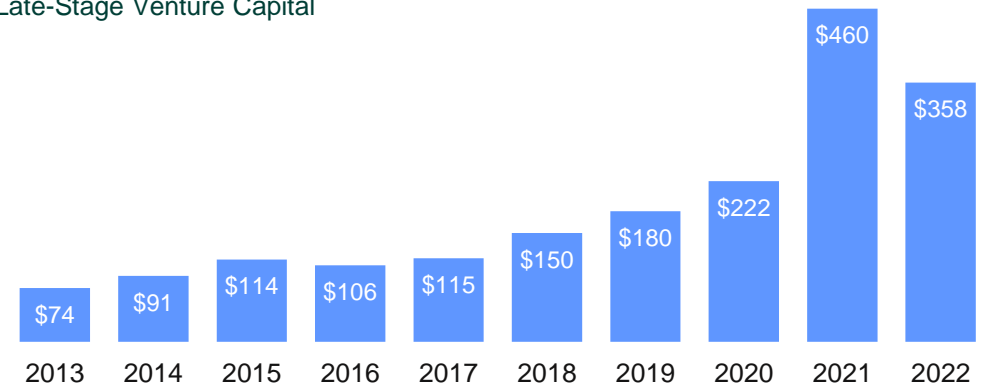
The fading unicorn

- ▶ The number of unicorn deals (financing rounds valued >\$1 billion) spiked in 2021 amid a frenzy of activity within late-stage venture capital
- ▶ Many venture-backed companies looking to delay their next financing round to avoid a down round, resulting in layoffs and cost cuts across the industry
- ▶ Late-stage activity and valuations have normalized in 2022, although still elevated compared to earlier years

Number of Unicorn Deals



Median Pre-Money Valuation (\$m) Late-Stage Venture Capital

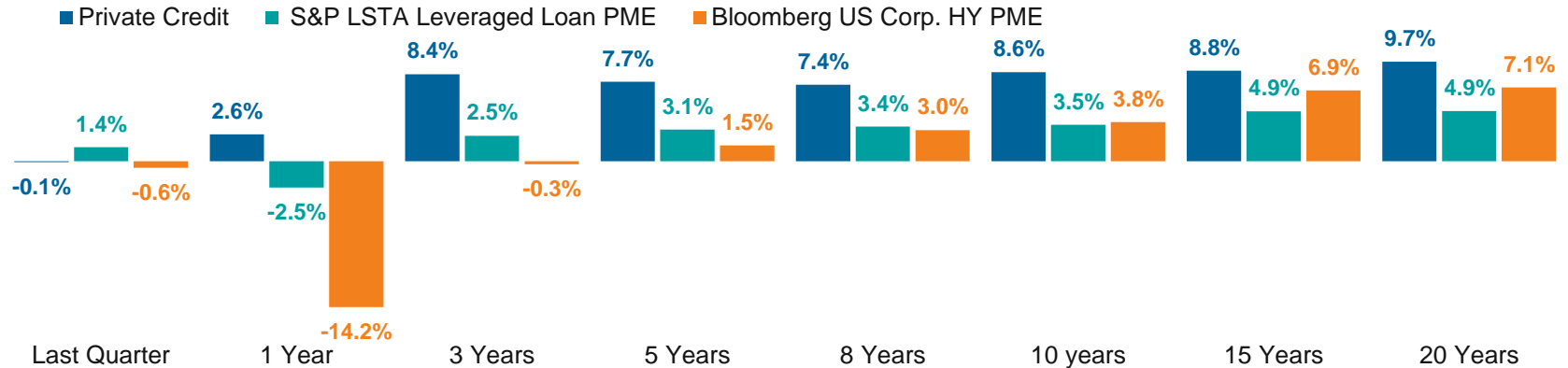


Source: PitchBook

Private Credit Market Overview

Performance over time and compared to relevant indices

Pooled Horizon Net IRRs as of 9/30/22



Pooled Horizon Net IRRs by Strategy as of 9/30/22

Strategy	Last Quarter	1 Year	3 Years	5 Years	8 Years	10 Years	15 Years	20 Years
Senior Debt	-2.4%	-3.5%	4.6%	5.1%	5.7%	5.9%	6.3%	6.1%
Mezzanine	0.2%	5.0%	11.8%	11.1%	10.8%	11.3%	10.5%	11.3%
Credit Opportunities	0.7%	3.9%	8.4%	7.2%	6.6%	8.3%	8.6%	9.7%
Total Private Credit	-0.1%	2.6%	8.4%	7.7%	7.4%	8.6%	8.8%	9.7%

- ▶ Private credit performance varies across sub-asset class and underlying return drivers. On average, the asset class has generated net IRRs of 8% to 10% for trailing periods ended Sept. 30, 2022. Higher-risk strategies performed better than lower-risk strategies.

*PME: Public market equivalent, a benchmark that applies the cash flows of the private credit funds to a public market index and then calculates an IRR.

Source: Refinitiv/Cambridge

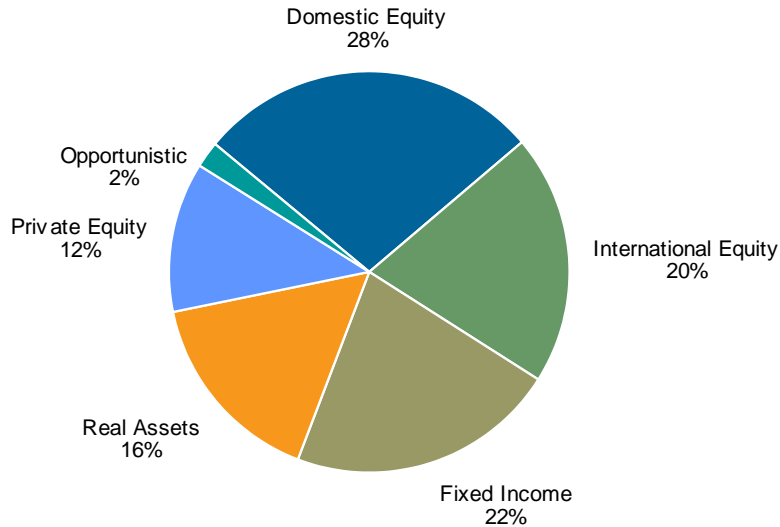
Callan

MCERA Total Fund Review

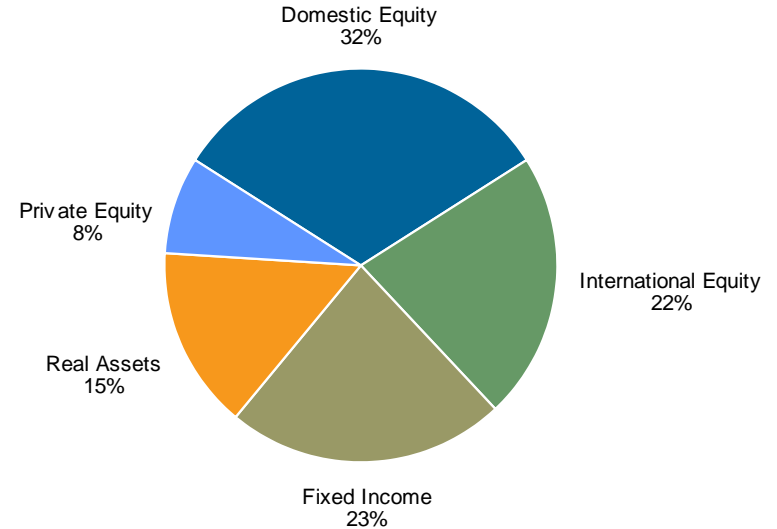
Total Fund Asset Allocation

As of December 31, 2022

Actual Asset Allocation



Target Asset Allocation



Asset Class	\$000s Actual	Weight Actual	Min Target	Target	Max Target	Percent Difference	\$000s Difference
Domestic Equity	827,105	27.8%	28.0%	32.0%	36.0%	(4.2%)	(124,645)
International Equity	601,373	20.2%	19.0%	22.0%	25.0%	(1.8%)	(52,954)
Fixed Income	647,814	21.8%	20.0%	23.0%	26.0%	(1.2%)	(36,256)
Real Assets	475,410	16.0%	12.0%	15.0%	18.0%	1.0%	29,277
Private Equity	360,001	12.1%	0.0%	8.0%	12.0%	4.1%	122,064
Opportunistic	62,514	2.1%	0.0%	0.0%	5.0%	2.1%	62,514
Total	2,974,217	100.0%		100.0%			

Total Fund Asset Distribution

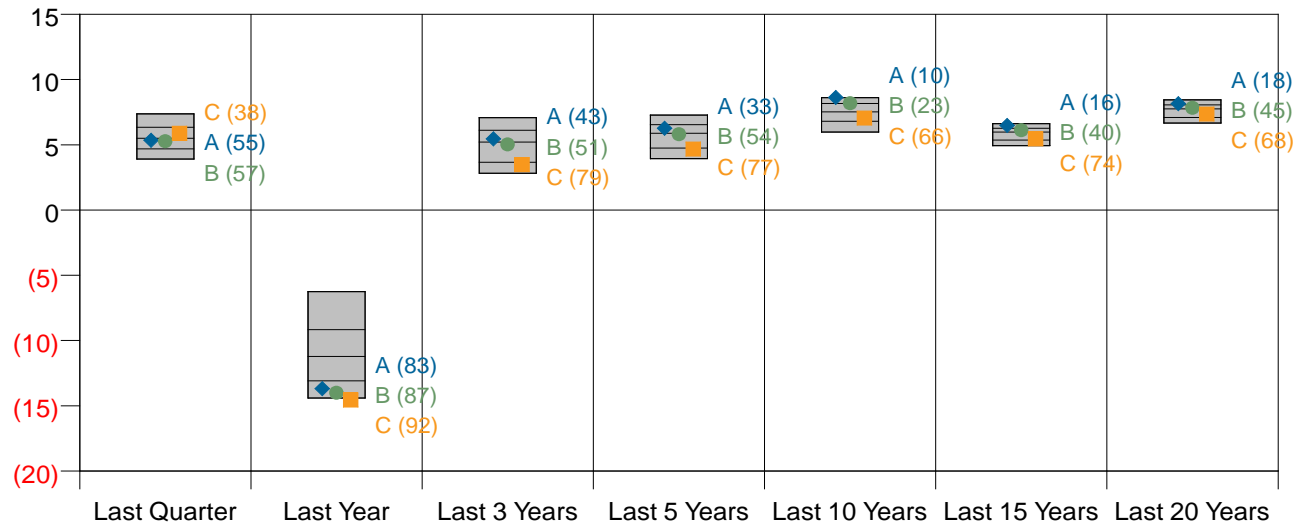
	December 31, 2022				September 30, 2022	
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
Domestic Equity	\$827,104,991	27.81%	\$(684,377)	\$62,943,058	\$764,846,310	27.05%
Parametric Domestic Equity Futures (1)	-41,238,865	(1.39%)	3,115,223	(2,087,079)	-42,267,009	(1.50%)
SSGA Russell 1000 Index (2)	645,335,745	21.70%	(2,840,105)	44,041,484	604,134,366	21.37%
DFA Small Cap Core	223,008,111	7.50%	(959,495)	20,988,653	202,978,953	7.18%
International Equity	\$601,373,392	20.22%	\$(14,961,375)	\$81,118,483	\$535,216,284	18.93%
Morgan Stanley Value	182,278,462	6.13%	0	28,251,162	154,027,300	5.45%
Artisan Partners Growth	177,639,655	5.97%	0	24,653,412	152,986,243	5.41%
TimesSquare Intl Small Cap	95,396,278	3.21%	(188,784)	11,353,895	84,231,167	2.98%
FIAM Select Emerging Equity	95,491,601	3.21%	0	8,562,217	86,929,384	3.07%
Parametric International Equity Futures	50,567,396	1.70%	(14,772,591)	8,297,797	57,042,190	2.02%
Fixed Income	\$647,813,959	21.78%	\$12,520,352	\$3,824,545	\$631,469,062	22.34%
Wellington Core Plus	280,094,086	9.42%	(2,680,304)	7,077,817	275,696,573	9.75%
Western Core Plus	295,829,628	9.95%	143,143,860	921,214	151,764,554	5.37%
Colchester Global	0	0.00%	(133,387,358)	(1,854,657)	135,242,015	4.78%
Parametric Fixed Income Futures	71,890,245	2.42%	5,444,154	(2,319,829)	68,765,920	2.43%
Real Assets	\$475,409,515	15.98%	\$(2,283,014)	\$803,152	\$476,889,377	16.87%
Real Estate	\$256,970,623	8.64%	\$(2,187,438)	\$(12,637,351)	\$271,795,412	9.61%
Woodmont	18,099,990	0.61%	0	0	18,099,990	0.64%
UBS Trumbull Property Fund	109,932,429	3.70%	(933,919)	(6,044,133)	116,910,481	4.14%
AEW Core Property Trust	128,938,204	4.34%	(1,253,519)	(6,593,218)	136,784,941	4.84%
Public Real Assets	\$218,438,892	7.34%	\$(95,576)	\$13,440,503	\$205,093,965	7.25%
INVESCO Commodities Fund	54,968,803	1.85%	(95,576)	3,556,967	51,507,412	1.82%
BlackRock TIPS Index Fund	55,750,067	1.87%	0	1,029,178	54,720,889	1.94%
KBI Global Resources Fund	56,400,899	1.90%	0	6,538,831	49,862,067	1.76%
Blackrock REIT Index Fund	51,319,124	1.73%	0	2,315,527	49,003,597	1.73%
Opportunistic (3)	\$62,514,375	2.10%	\$7,393,509	\$1,398,627	\$53,722,238	1.90%
CarVal Credit Value V	22,389,031	0.75%	6,618,343	330,732	15,439,956	0.55%
Fortress Credit Opps Fund V	11,571,353	0.39%	870,249	0	10,701,104	0.38%
Varde Dislocation Fund	28,553,991	0.96%	(95,083)	1,067,895	27,581,178	0.98%
Private Equity (4)	\$360,001,254	12.10%	\$(4,888,452)	\$(0)	\$364,889,706	12.91%
Abbott ACE VI	38,978,454	1.31%	(2,490,981)	(0)	41,469,435	1.47%
Abbott ACE VII	42,422,872	1.43%	(2,792,015)	0	45,214,887	1.60%
Abbott 2016	69,485,150	2.34%	(800,000)	0	70,285,150	2.49%
Abbott 2017	20,699,132	0.70%	531,295	(0)	20,167,837	0.71%
Abbott 2021	8,382,674	0.28%	668,750	0	7,713,924	0.27%
Pathway PPEF 2008	47,820,266	1.61%	(1,019,054)	0	48,839,320	1.73%
Pathway PE I-7	35,167,273	1.18%	(96,042)	(0)	35,263,315	1.25%
Pathway PE I-8	63,644,878	2.14%	(420,046)	0	64,064,924	2.27%
Pathway PE I-9	16,698,327	0.56%	57,501	0	16,640,826	0.59%
Pathway PE I-10	16,702,228	0.56%	1,472,140	(0)	15,230,088	0.54%
Total Fund	\$2,974,217,485	100.0%	\$(2,903,357)	\$150,087,866	\$2,827,032,976	100.0%

Colchester removed
in October

Total Fund Performance – Annualized

Returns for Periods Ended December 31, 2022

Group: Callan Public Fund Sponsor - Large (>1B)



10th Percentile	7.38	(6.24)	7.08	7.29	8.62	6.62	8.45
25th Percentile	6.35	(9.16)	6.12	6.54	8.18	6.28	8.07
Median	5.51	(11.21)	5.22	5.89	7.53	5.99	7.76
75th Percentile	4.69	(13.08)	3.66	4.76	6.81	5.37	7.10
90th Percentile	3.91	(14.40)	2.82	3.95	5.99	4.94	6.68

MCERA Total Fund - Gross	◆ A	5.35	(13.68)	5.46	6.27	8.63	6.50	8.16
MCERA Total Fund - Net	● B	5.27	(14.00)	5.03	5.81	8.20	6.11	7.83
MCERA Total Fund Target	■ C	5.89	(14.56)	3.49	4.67	7.06	5.46	7.36

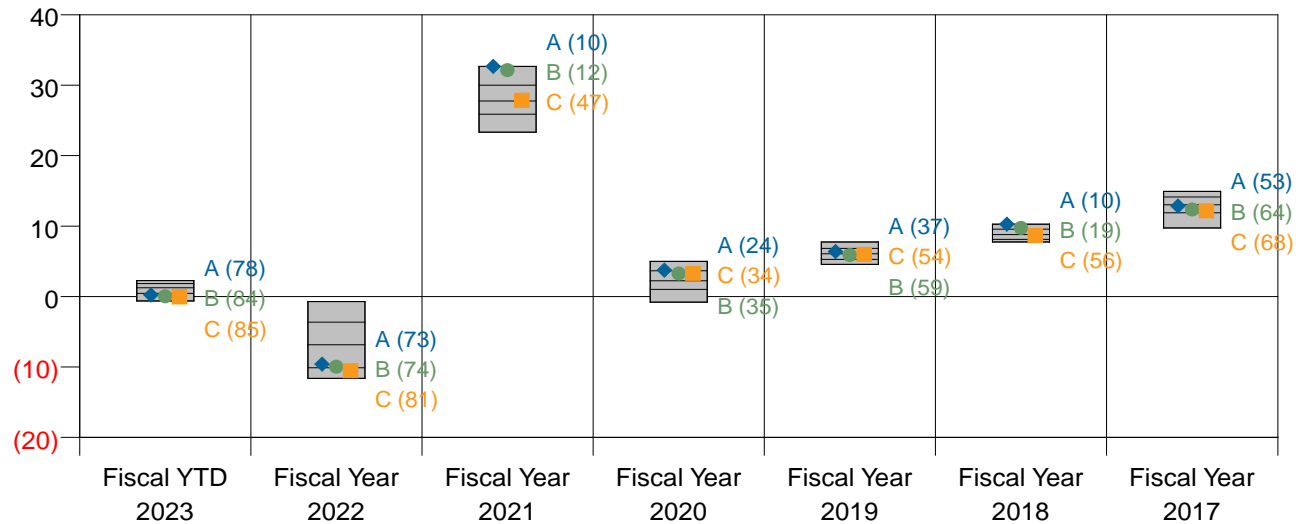
Note: Fortress 4Q22 data not available yet.

Current Quarter Target = 32.0% Russell 3000 Index, 22.0% MSCI ACWI ex US IMI Index, 11.5% Bloomberg Aggregate Index, 5.8% Bloomberg Intermediate Credit Index, 5.8% FTSE World Government Bond Index, 8.0% NCREIF NFI-ODCE Equal Weight Net, 1.8% Bloomberg Commodity Price Index, 1.8% S&P Global Natural Resources Index, 1.8% S&P DJ US Select REIT Index, 1.8% Bloomberg US TIPS Index, 4.8% Russell 3000 Index (Lagged) and 3.2% MSCI ACWI ex US IMI Index (Lagged).

Total Fund Performance – Fiscal Year

Fiscal Year Returns

Group: Callan Public Fund Sponsor - Large (>1B)



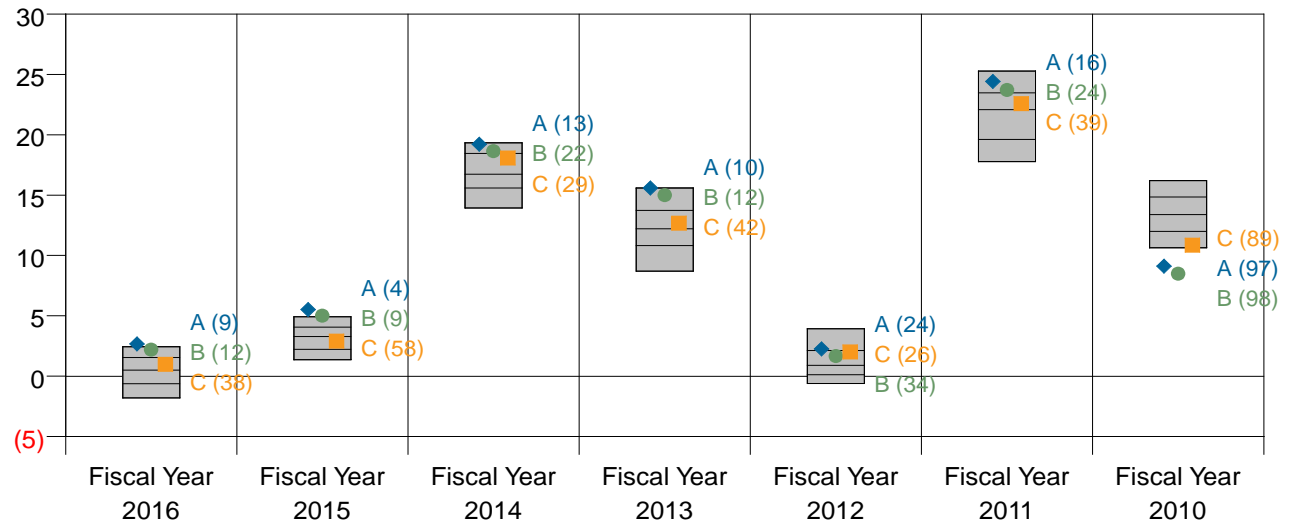
10th Percentile	2.28	(0.70)	32.70	4.99	7.76	10.29	14.95
25th Percentile	1.86	(3.63)	30.02	3.66	6.86	9.56	14.14
Median	1.25	(6.83)	27.79	2.25	6.08	8.81	13.04
75th Percentile	0.46	(10.10)	25.89	1.04	5.28	8.13	11.89
90th Percentile	(0.61)	(11.60)	23.33	(0.78)	4.56	7.76	9.73

MCERA Total Fund - Gross	◆ A	0.22	(9.60)	32.69	3.74	6.39	10.29	12.88
MCERA Total Fund - Net	● B	0.04	(9.95)	32.15	3.26	5.88	9.74	12.37
MCERA Total Fund Target	■ C	(0.05)	(10.52)	27.89	3.29	5.99	8.67	12.20

Total Fund Performance – Fiscal Year

Fiscal Year Returns

Group: Callan Public Fund Sponsor - Large (>1B)



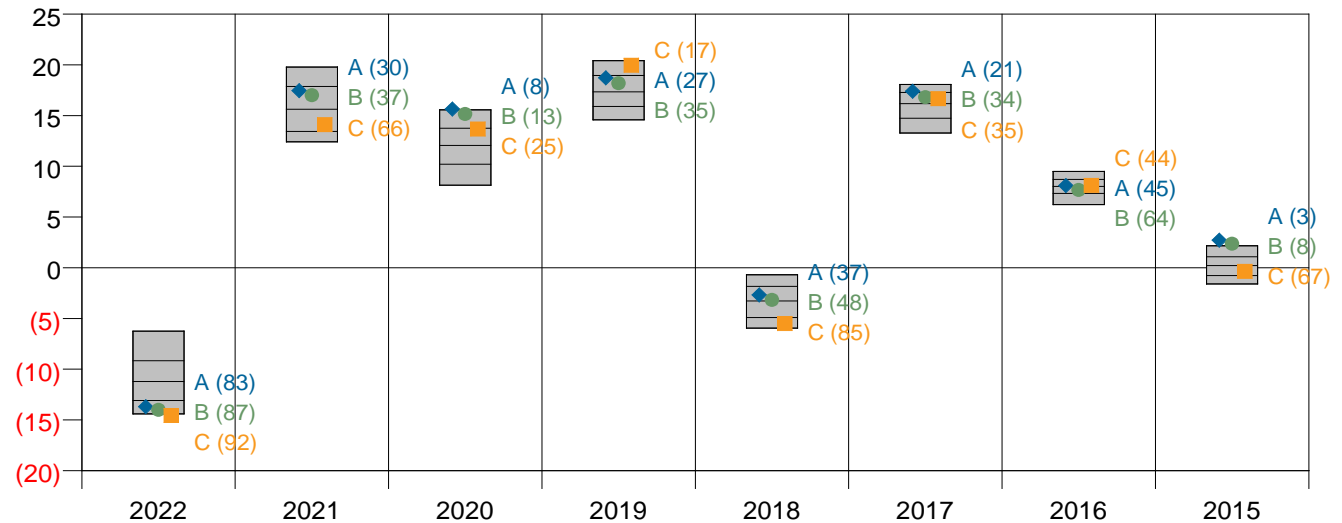
10th Percentile	2.44	4.92	19.33	15.59	3.93	25.29	16.21
25th Percentile	1.55	4.08	18.46	13.74	2.13	23.48	14.86
Median	0.50	3.29	16.74	12.22	0.90	22.09	13.39
75th Percentile	(0.62)	2.22	15.59	10.82	0.12	19.62	12.00
90th Percentile	(1.80)	1.38	13.95	8.70	(0.60)	17.79	10.64

MCERA Total Fund - Gross	◆ A	2.68	5.52	19.22	15.60	2.26	24.42	9.11
MCERA Total Fund - Net	● B	2.19	5.02	18.65	15.01	1.67	23.71	8.49
MCERA Total Fund Target	■ C	0.98	2.91	18.09	12.68	2.02	22.58	10.87

Total Fund Performance – Calendar Years

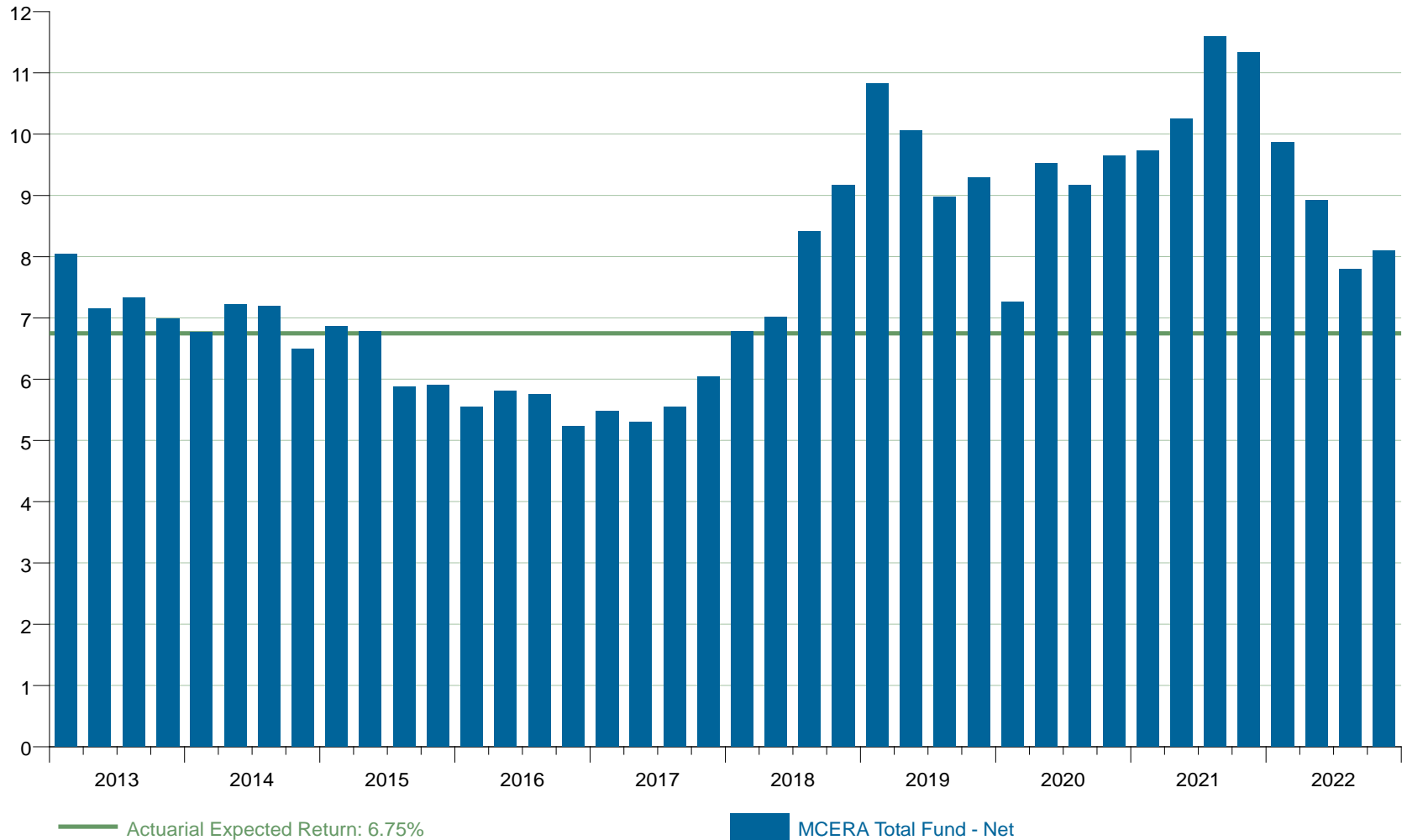
Returns for Periods Ended December 31, 2022

Group: Callan Public Fund Sponsor - Large (>1B)



10th Percentile	(6.24)	19.79	15.58	20.43	(0.67)	18.07	9.50	2.17
25th Percentile	(9.16)	17.88	13.76	18.95	(1.82)	17.29	8.71	1.10
Median	(11.21)	15.63	12.06	17.35	(3.26)	16.18	8.02	0.22
75th Percentile	(13.08)	13.44	10.21	15.91	(4.90)	14.75	7.33	(0.75)
90th Percentile	(14.40)	12.42	8.14	14.59	(5.94)	13.29	6.23	(1.60)
Total Fund - Gross	◆ A (13.68)	17.47	15.66	18.73	(2.68)	17.41	8.10	2.73
MCERA Total Fund - Net	● B (14.00)	17.01	15.16	18.19	(3.16)	16.81	7.68	2.37
Total Fund Target	■ C (14.56)	14.12	13.68	19.97	(5.49)	16.68	8.13	(0.34)

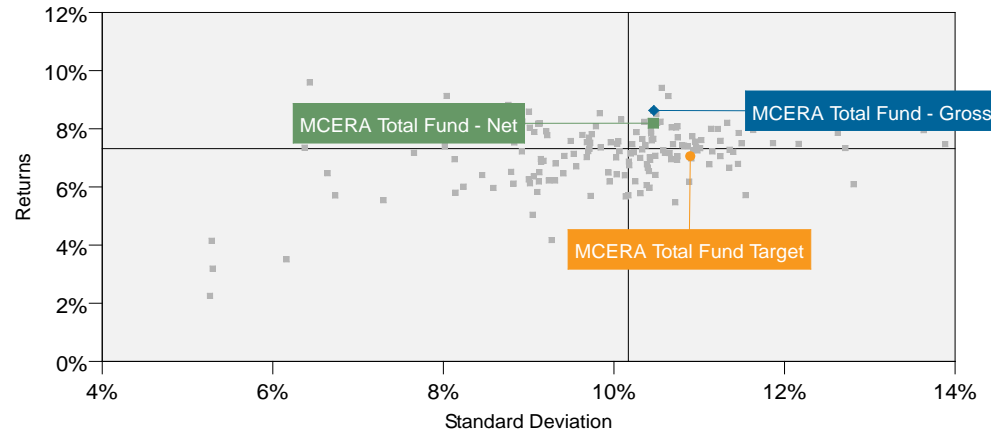
Annualized 10 Year Total Fund Net Returns (Quarterly Roll)



Total Fund – Cumulative Returns Relative to Target

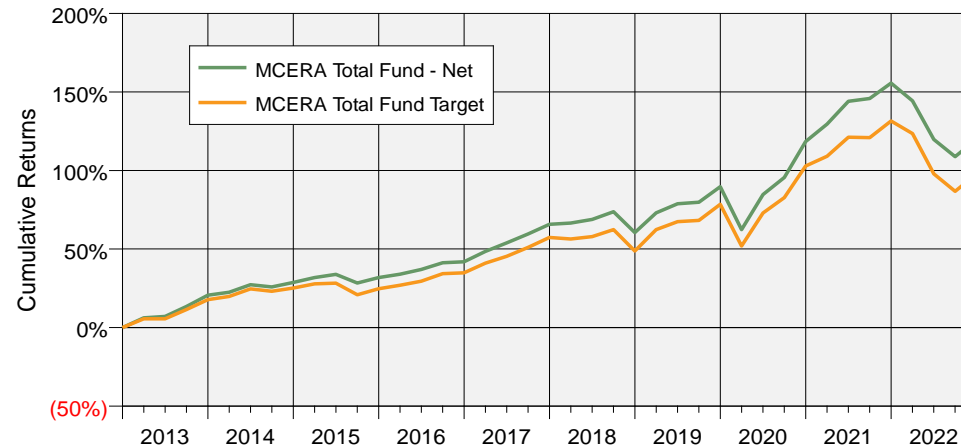
Ten Year Annualized Risk vs. Return

As of December 31, 2022



Total Fund Cumulative Returns vs. Target

10 Years Ended December 31, 2022



Watchlist

Investment Manager Monitoring Summary Report Active Managers as of December 31, 2022

Investment Manager	Organization/ Team	3 Year Performance vs Benchmark	3 Year Performance vs Peers	5 Year Performance vs Benchmark	5 Year Performance vs Peers	Qualify for Watchlist?	Date Added
DFA Small Cap Core Equity <i>Russell 2000 Index</i>				N/A	N/A		
Morgan Stanley International Value Equity <i>MSCI EAFE Index</i>						Yes	4Q17
Artisan International Growth Equity <i>MSCI EAFE Index</i>						Yes	4Q17
TimesSquare International Small Cap Equity <i>MSCI EAFE Small Cap Index</i>				N/A	N/A		
Fidelity Emerging Markets Equity <i>MSCI Emerging Markets Index</i>		N/A	N/A	N/A	N/A		
Wellington Core Plus Fixed Income <i>Bloomberg U.S Aggregate Index</i>						No	
Western Asset Core Plus Fixed Income <i>Bloomberg U.S Aggregate Index</i>		N/A	N/A	N/A	N/A		
Invesco Balanced Risk Commodity Fund <i>Bloomberg Commodity Index</i>						Yes	4Q20
KBI Global Natural Resources Fund <i>S&P Global Natural Resource Index</i>			N/A		N/A	No	
UBS Trumbull Property Fund* <i>NFI-ODCE Index</i>		N/A	N/A	N/A	N/A		4Q19

*UBS Trumbull Property Fund placed on watch for organizational concerns. Quantitative criteria for private market portfolios under review by Governance Committee.

Quantitative Criteria

If a manager trails its relevant benchmark by more than 100 basis points (net of fees) and ranks in the bottom quartile of its peer universe (gross of fees ranking) for the trailing three years, or if a manager trails its relevant benchmark (net of fees) or ranks below median of its peer universe (gross of fees ranking) for the trailing five years, then the manager may be placed on the Watchlist.

Color Code

	meets watch list criteria, no concerns, no actions recommended
	concerns exist, no actions recommended
	violates watch list criteria, concerns exist, action to be determined

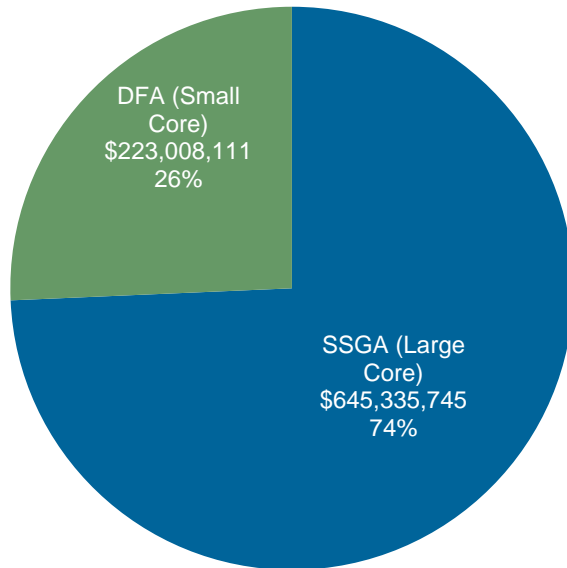
Watchlist

Investment Manager	3 Year Net Return Trails Benchmark by more than 100 bps (relative return shown in bps)	<u>AND</u>	3 Year Gross Return Ranks 75th - 100th%	<u>OR</u>	5 Year Net Return Trails Benchmark (relative return shown in bps)	<u>OR</u>	5 Year Gross Return Ranks 50th - 100th%	Qualify for Watchlist (Quantitative)
DFA Small Cap Core Equity <i>Russell 2000 Index</i>	481		22nd		N/A		N/A	No
Morgan Stanley International Value Equity <i>MSCI EAFE Index</i>	-44		76th		-37		27th	Yes
Artisan International Growth Equity <i>MSCI EAFE Index</i>	-257		84th		41		50th	Yes
TimesSquare International Small Cap Equity <i>MSCI EAFE Small Cap Index</i>	-429		95th		N/A		N/A	Yes
Fidelity Emerging Markets Equity <i>MSCI Emerging Markets Index</i>	N/A		N/A		N/A		N/A	No
Wellington Core Plus Fixed Income <i>Bloomberg U.S Aggregate Index</i>	92		43rd		80		38th	No
Western Asset Core Plus Fixed Income <i>Bloomberg U.S Aggregate Index</i>	N/A		N/A		N/A		N/A	No
Invesco Balanced Risk Commodity Fund <i>Bloomberg Commodity Index</i>	-69		63rd		-92		77th	Yes
KBI Global Natural Resources Fund <i>S&P Global Natural Resource Index</i>	302		N/A		286		N/A	No
UBS Trumbull Property Fund <i>NCREIF NFI-ODCE Index</i>	Quantitative criteria for private markets portfolios under review by Governance Committee. On watch due to organizational changes.							Under Review

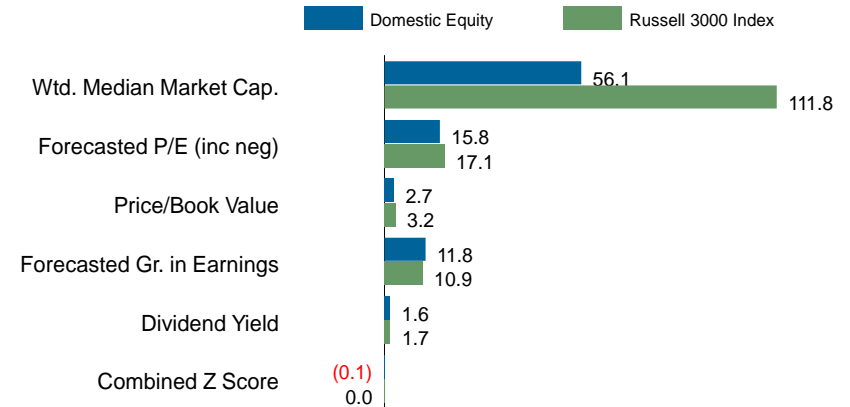
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MCERA Asset Class Review

Domestic Equity Composite



Portfolio Characteristics as of December 31, 2022

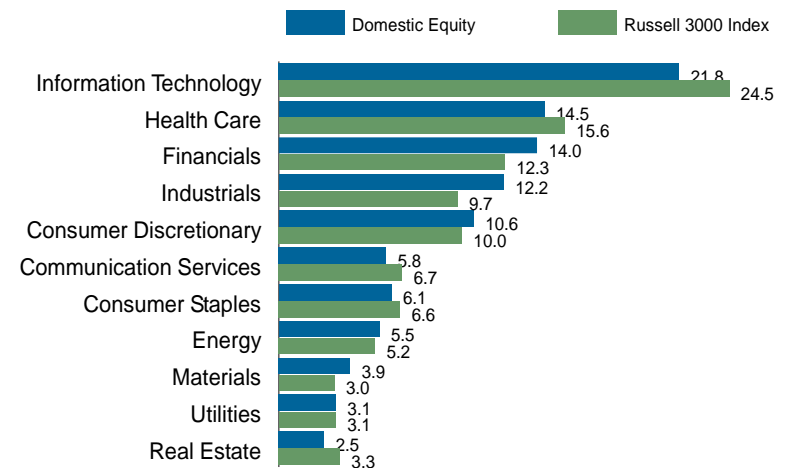


Style Exposure Matrix

Holdings as of December 31, 2022

	-- Domestic Equity				-- Russell 3000 Index			
	Value	Core	Growth	Total	Value	Core	Growth	Total
Large	14.9% (100)	17.5% (94)	29.8% (100)	62.2% (294)	18.7% (100)	21.9% (94)	37.3% (100)	77.9% (294)
Mid	5.1% (179)	5.7% (202)	6.1% (204)	17.0% (585)	5.3% (181)	5.0% (202)	5.2% (207)	15.5% (590)
Small	4.8% (240)	6.8% (357)	6.0% (278)	17.6% (875)	1.5% (300)	2.3% (507)	2.0% (372)	5.8% (1179)
Micro	1.5% (385)	1.2% (249)	0.6% (130)	3.3% (764)	0.2% (264)	0.4% (456)	0.2% (164)	0.8% (884)
Total	26.3% (904)	31.2% (902)	42.5% (712)	100.0% (2518)	25.7% (845)	29.6% (1259)	44.7% (843)	100.0% (2947)

Sector Allocation as of December 31, 2022



Domestic Equity Composite

Returns and Rankings for Periods Ended December 31, 2022

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Domestic Equity - Net	8.22	(17.43)	8.08	9.00	12.02
Domestic Equity Target	7.18	(19.21)	7.07	8.79	12.13
SSGA - Net	7.28	(19.06)	6.79	8.89	12.30
Large Cap Blended Benchmark	7.24	(19.13)	6.78	8.89	12.29
Ranking vs. Large Cap Equity	57	55	58	49	53
DFA Small Core - Net	10.24	(12.97)	7.91	--	--
Russell 2000 Index	6.23	(20.44)	3.10	4.13	9.01
Ranking vs. Small Cap Equity	33	21	22	--	--

Returns and Rankings for Calendar Years

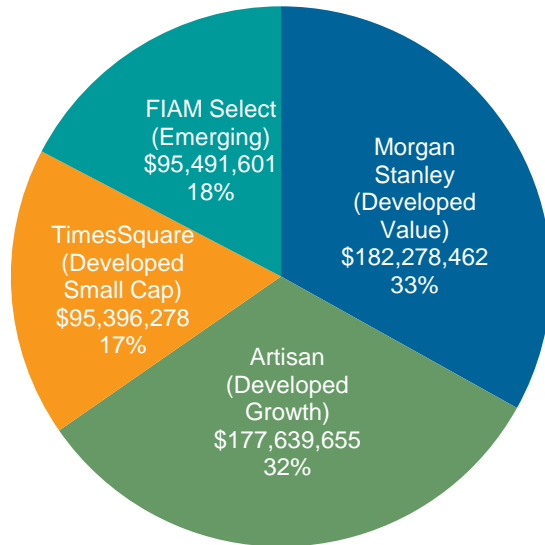
	2022	2021	2020	2019	2018	2017
Domestic Equity - Net	(17.43)	29.74	17.85	28.77	(5.34)	20.61
Domestic Equity Target	(19.21)	25.66	20.89	31.02	(5.24)	21.13
SSGA - Net	(19.06)	27.16	18.33	31.43	(4.38)	21.83
Large Cap Blended Benchmark	(19.13)	27.15	18.40	31.49	(4.38)	21.83
Ranking vs. Large Cap Equity	55	49	53	43	46	51
DFA Small Core - Net	(12.97)	29.22	11.74	21.77	--	--
Russell 2000 Index	(20.44)	14.82	19.96	25.52	(11.01)	14.65
Ranking vs. Small Cap Equity	21	21	54	71	--	--

- The domestic equity composite outperformed the benchmark over the quarter and year. DFA's relative outperformance has been positive for the composite's relative returns.
- DFA outperformed its benchmark over the fourth quarter and last year due to its exclusion of stocks with the lowest profitability and highest relative prices.

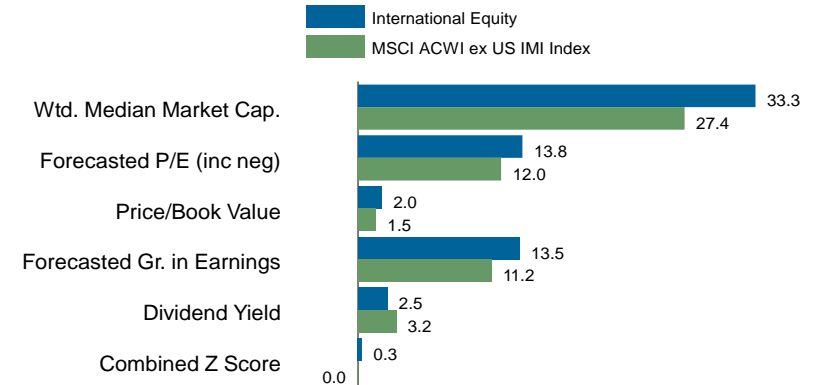
The Domestic Equity Target is comprised of 51.1% S&P/BARRA Value, 22.2% S&P 500, 15.6% Russell 2000 and 11.1% S&P/BARRA Growth through 12/31/1999, 80% S&P 500 and 20% Russell 2000 from 12/31/1999 to 06/30/2010, and 100% Russell 3000 from 06/30/2010 to present.

The Large Cap Blended Benchmark consists of the S&P 500 Index to 7/31/2021 and the Russell 1000 Index thereafter.

International Equity Composite



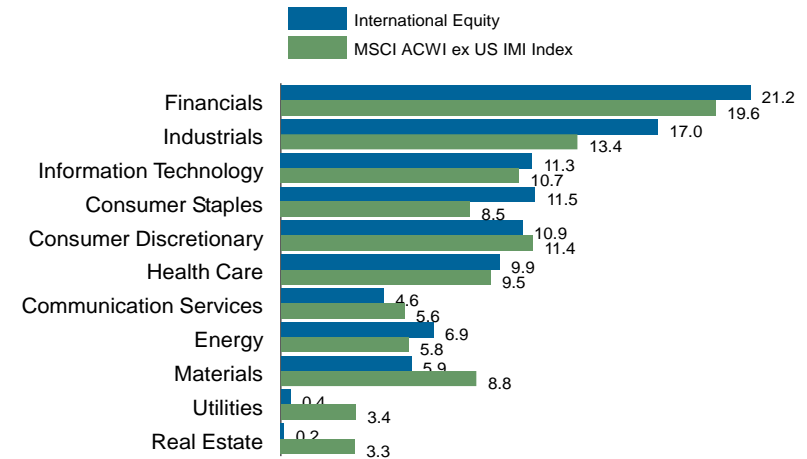
Portfolio Characteristics as of December 31, 2022



Region & Style Exposure Matrix Holdings as of December 31, 2022

	-- International Equity				-- MSCI ACWI ex US IMI Index			
	Value	Core	Growth	Total	Value	Core	Growth	Total
Europe	13.8% (28)	12.8% (31)	32.3% (63)	58.9% (122)	12.4%	11.4%	16.2%	40.0%
N. America	0.7% (1)	1.7% (3)	6.5% (10)	9.0% (14)	1.5%	2.0%	1.5%	5.0%
Pacific	0.9% (4)	1.5% (5)	8.4% (25)	10.8% (34)	9.1%	7.6%	8.5%	25.1%
Emerging	3.5% (30)	8.9% (44)	8.9% (41)	21.3% (115)	8.1%	10.5%	11.3%	29.9%
Total	18.9% (63)	24.9% (83)	56.1% (139)	100.0% (285)	31.0%	31.5%	37.5%	100.0%

Sector Allocation as of December 31, 2022



International Equity Composite

Returns and Rankings for Periods Ended December 31, 2022

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
International Equity - Net	14.82	(19.28)	(1.99)	0.12	4.07
International Equity - Target	14.15	(16.58)	0.20	0.85	3.98
MSIM - Net	18.18	(13.62)	0.43	1.17	4.16
MSCI EAFE Index	17.34	(14.45)	0.87	1.54	4.67
Ranking vs. Non-US Developed Value Equity	69	92	76	27	64
Artisan - Net	16.11	(19.08)	(1.70)	1.95	4.62
MSCI EAFE Index	17.34	(14.45)	0.87	1.54	4.67
Ranking vs. Non-US Developed Growth Equity	12	28	84	50	68
TimesSquare - Net	13.49	(26.82)	(5.22)	--	--
MSCI EAFE Small Cap	15.79	(21.39)	(0.93)	(0.05)	6.21
Ranking vs. International Small Cap Equity	71	74	95	--	--
FIAM Select EM - Net	9.85	(23.89)	--	--	--
MSCI Emerging Markets Index	9.70	(20.09)	(2.69)	(1.39)	1.44
Ranking vs. Emerging Markets Equity	53	70	--	--	--

Returns and Rankings for Periods Ended December 31, 2022

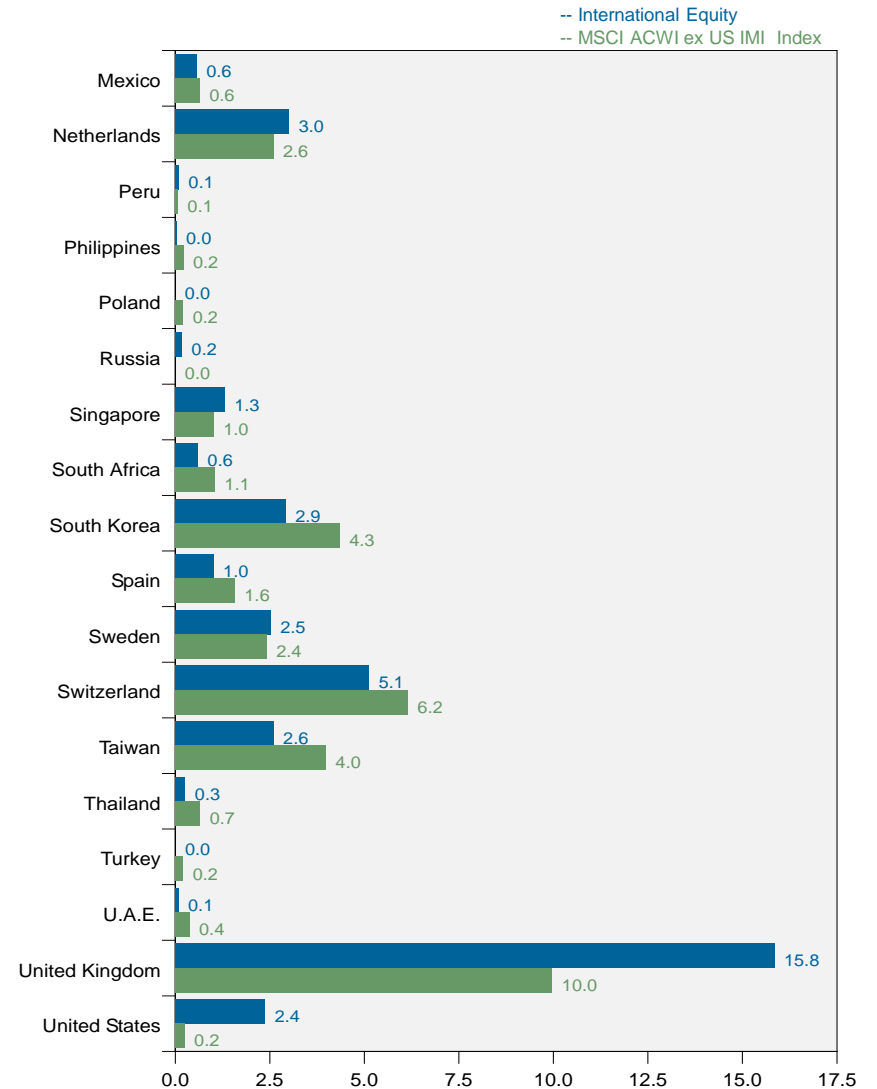
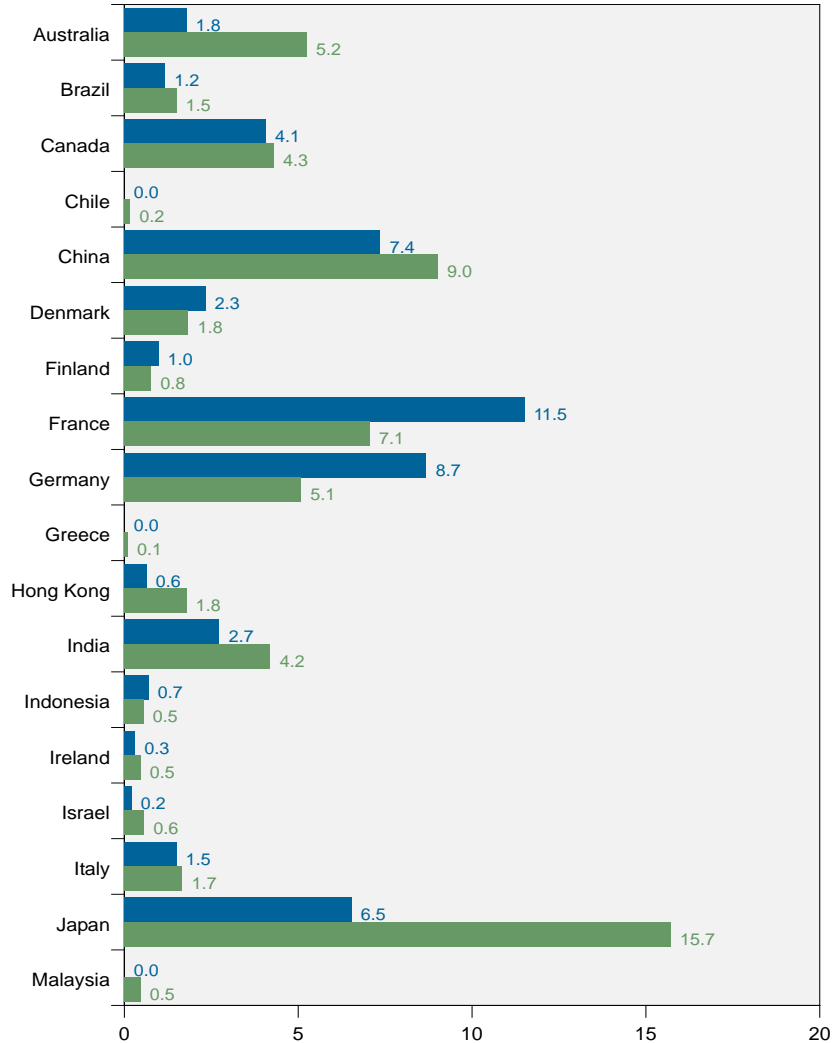
	2022	2021	2020	2019	2018
International Equity - Net	(19.28)	5.28	10.79	23.52	(13.50)
International Equity - Target	(16.58)	8.53	11.12	21.63	(14.76)
MSIM - Net	(13.62)	4.70	12.00	20.93	(13.46)
MSCI EAFE Index	(14.45)	11.26	7.82	22.01	(13.79)
Ranking vs. Non-US Developed Value Equity	92	98	1	34	14
Artisan - Net	(19.08)	8.59	8.09	29.62	(10.53)
MSCI EAFE Index	(14.45)	11.26	7.82	22.01	(13.79)
Ranking vs. Non-US Developed Growth Equity	28	60	96	26	13
TimesSquare - Net	(26.82)	2.18	13.87	--	--
MSCI EAFE Small Cap	(21.39)	10.10	12.34	24.96	(17.89)
Ranking vs. International Small Cap Equity	74	93	39	--	--
FIAM Select EM - Net	(23.89)	--	--	--	--
MSCI Emerging Markets Index	(20.09)	(2.54)	18.31	18.44	(14.57)
Ranking vs. Emerging Markets Equity	70	--	--	--	--

- The International Equity composite outperformed on a relative basis during the last quarter but trailed over the last year.
 - Morgan Stanley: stock selection in consumer staples and industrials were the top contributors to performance for the quarter and year.
 - Artisan: underperformed over the year as growth stocks were out of favor. Additionally, Artisan's underperformance primarily stems from 1Q22 with the outbreak of the Russia-Ukraine war. The market swung swiftly from growth to value stocks, and Artisan also owned two Russian names.
 - TimesSquare: the portfolio's quality growth style has weighed on performance.
 - FIAM: slight outperformance versus the benchmark over the last quarter was helped by materials and financials stock selection. Chinese stock selection in IT and health care were large detractors during the year.

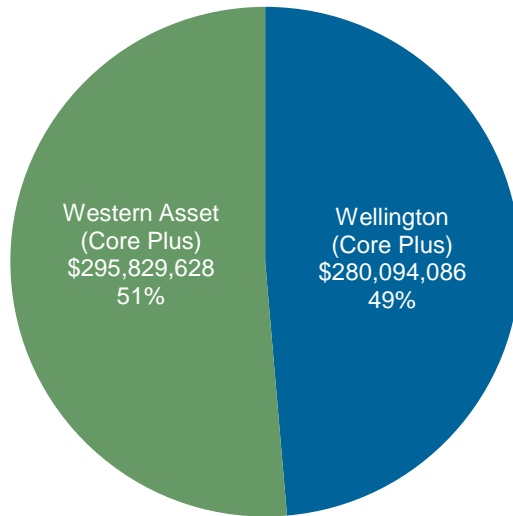
The International Equity Target is comprised of 100% MSCI EAFE Index through 06/30/2010, and 100% MSCI ACWI ex-US IMI Index thereafter.

International Equity Composite

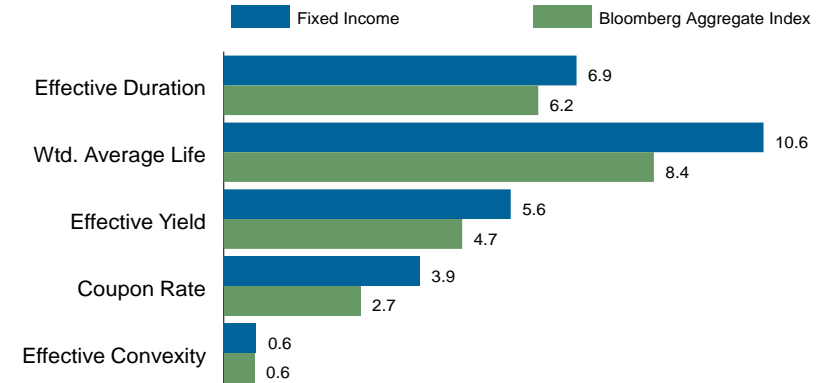
Country Allocations as of September 30, 2022



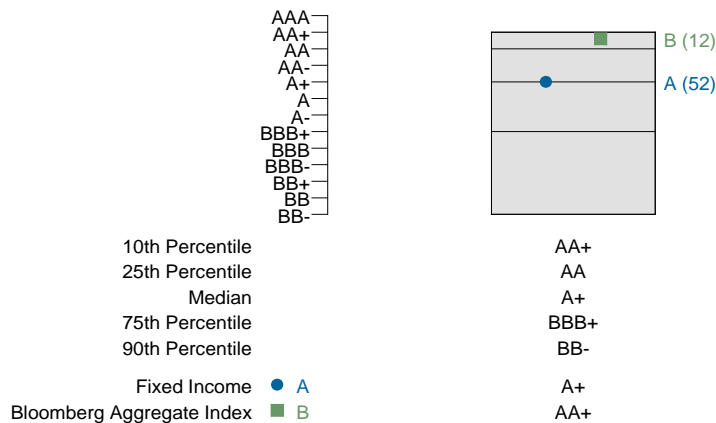
Fixed Income Composite



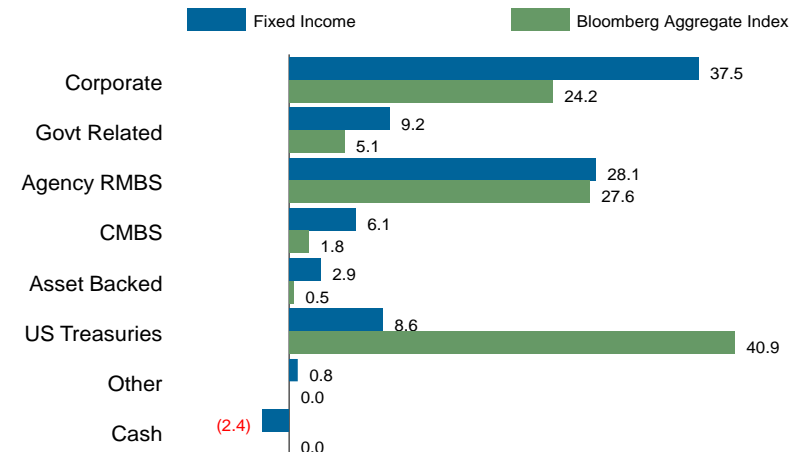
Portfolio Characteristics as of December 31, 2022



Quality Rating as of December 31, 2022 Total Domestic Fixed Income Database



Sector Allocation as of December 31, 2022



Fixed Income Composite

Returns and Rankings for Periods Ended December 31, 2022

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Fixed Income - Net	0.28	(15.56)	(2.82)	(0.13)	1.14
Fixed Income Target	1.87	--	--	--	--
Wellington - Net	2.54	(13.68)	(1.97)	0.63	1.85
Bloomberg Aggregate Index	1.87	(13.01)	(2.71)	0.02	1.06
Ranking vs. Core Plus Fixed Income	19	63	43	38	47
Western Asset - Net	0.37	(11.71)	(1.10)	1.14	2.00
Western Asset Blended Benchmark	0.37	(11.01)	(1.93)	0.65	1.38

Returns and Rankings for Calendar Years

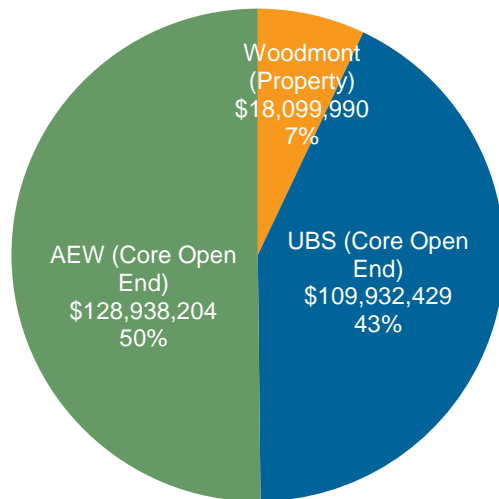
	2022	2021	2020	2019	2018	2017
Fixed Income - Net	(15.56)	(2.50)	11.47	8.60	(0.34)	5.15
Fixed Income Target	--	--	--	--	--	--
Wellington - Net	(13.68)	(0.71)	9.93	9.95	(0.39)	4.87
Bloomberg Aggregate Index	(13.01)	(1.54)	7.51	8.72	0.01	3.54
Ranking vs. Core Plus Fixed Income	63	64	26	44	42	41
Western Asset - Net	(11.71)	(0.43)	10.03	9.82	(0.35)	4.13
Western Asset Blended Benchmark	(11.01)	(1.03)	7.08	9.52	0.01	3.67

- The Fixed Income composite underperformed during the quarter and last year versus the benchmark.
 - Wellington: while investment grade credit and high yield allocations helped in the fourth quarter, they detracted from relative performance during the year.
 - Western Asset: underperformance during the year was partially due to overweights in consumer cyclicals and banking.
- It was decided to restructure the fixed income allocation to 100% U.S. Core Plus managed by Wellington and Western Asset. Colchester was terminated in October and the assets were moved to Western Asset. They repositioned their current portfolio to Core Plus in November.

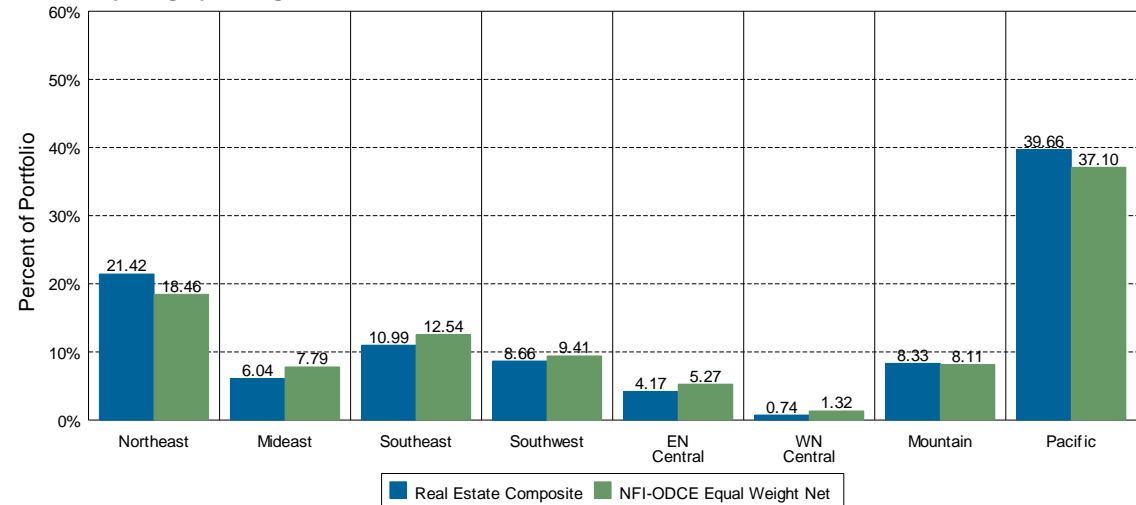
Fixed Income Target is comprised of 100% Bloomberg Aggregate Index until March 2014, 50% Bloomberg Aggregate Index, 25% Bloomberg Intermediate Credit Index, and 25% FTSE World Government Bond Index until November 2022, and 100% Bloomberg Index thereafter.

Western Asset Blended Benchmark is comprised of the Bloomberg US Aggregate Index until March 2014, the Bloomberg US Intermediate Credit Index to 11/6/2022, and the Bloomberg US Aggregate Index thereafter.

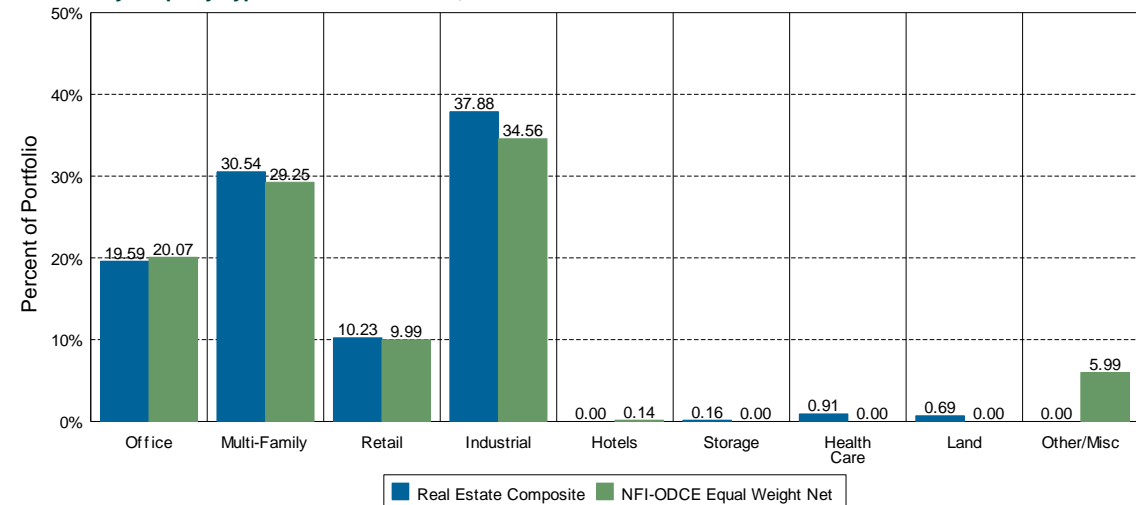
Real Estate Composite



Diversification by Geographic Region as of December 31, 2022



Diversification by Property Type as of December 31, 2022



Real Estate Composite

Returns and Rankings for Periods Ended December 31, 2022

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Real Estate - Net	(4.84)	6.20	6.42	5.25	9.26
Real Estate Target	(5.08)	7.56	9.72	8.31	9.41
AEW Core Property Trust - Net	(5.03)	7.95	9.52	8.11	--
NFI-ODCE Equal Wt Net Index	(5.08)	7.56	9.72	8.31	9.46
Ranking vs. Core Open End Funds	70	71	65	64	--
UBS Trumbull Property Fund - Net	(5.36)	5.21	5.00	3.59	--
NFI-ODCE Equal Wt Net Index	(5.08)	7.56	9.72	8.31	9.46
Ranking vs. Core Open End Funds	77	89	94	100	--

Returns and Rankings for Calendar Years

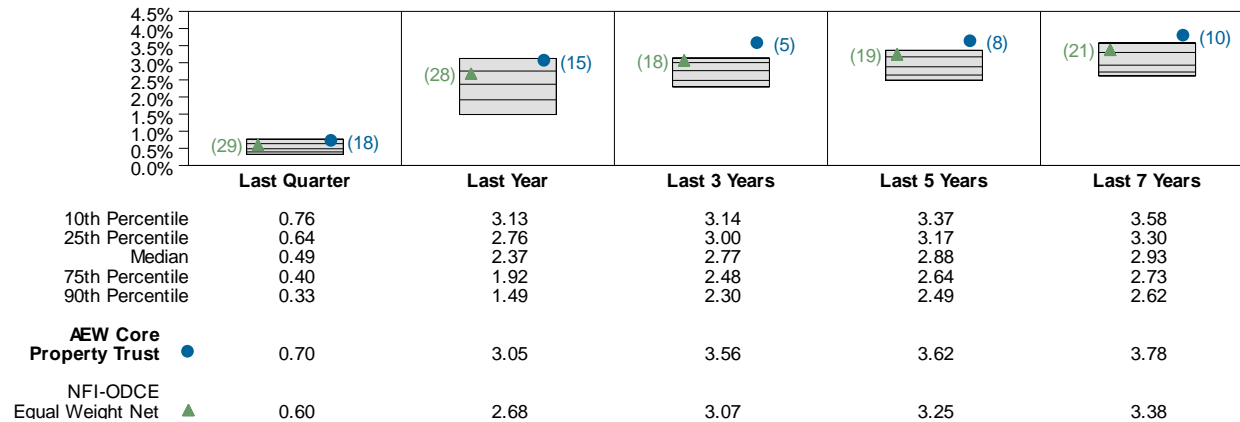
	2022	2021	2020	2019	2018	2017
Real Estate - Net	6.20	16.16	(2.29)	0.64	6.46	5.66
Real Estate Target	7.56	21.88	0.75	5.18	7.30	6.92
AEW Core Property Trust - Net	7.95	21.00	0.57	5.29	6.77	6.99
NFI-ODCE Equal Wt Net Index	7.56	21.88	0.75	5.18	7.30	6.92
Ranking vs. Core Open End Funds	71	59	66	71	76	43
UBS Trumbull Property Fund - Net	5.21	15.41	(4.68)	(2.88)	6.12	5.32
NFI-ODCE Equal Wt Net Index	7.56	21.88	0.75	5.18	7.30	6.92
Ranking vs. Core Open End Funds	89	89	96	96	89	85

- The AEW Core Property Trust's current leverage is 25% (NFI-ODCE leverage: 22.7%).
 - All sectors produced negative returns for AEW during the quarter.
- The UBS Trumbull Property Fund's current leverage is 19.1%.
 - During the quarter, retail produced positive returns, but all other sectors were negative.

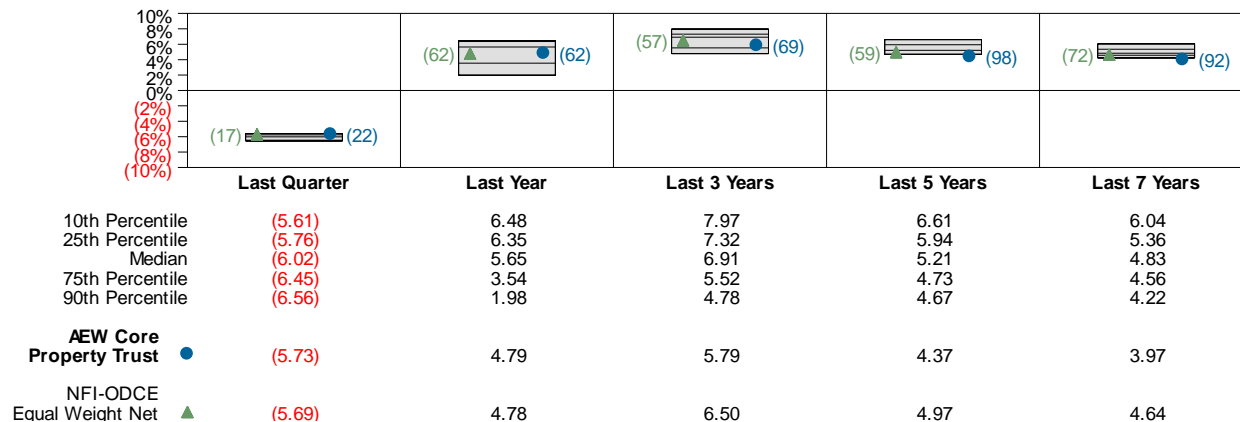
The Real Estate Target is comprised of the NCREIF Classic Index through 12/31/2004, NCREIF Total Property Index through 12/31/2014, and the NFI-ODCE Equal Weight Net thereafter.

AEW Income and Appreciation Returns

Income Rankings vs Callan Real Estate ODCE Periods ended December 31, 2022

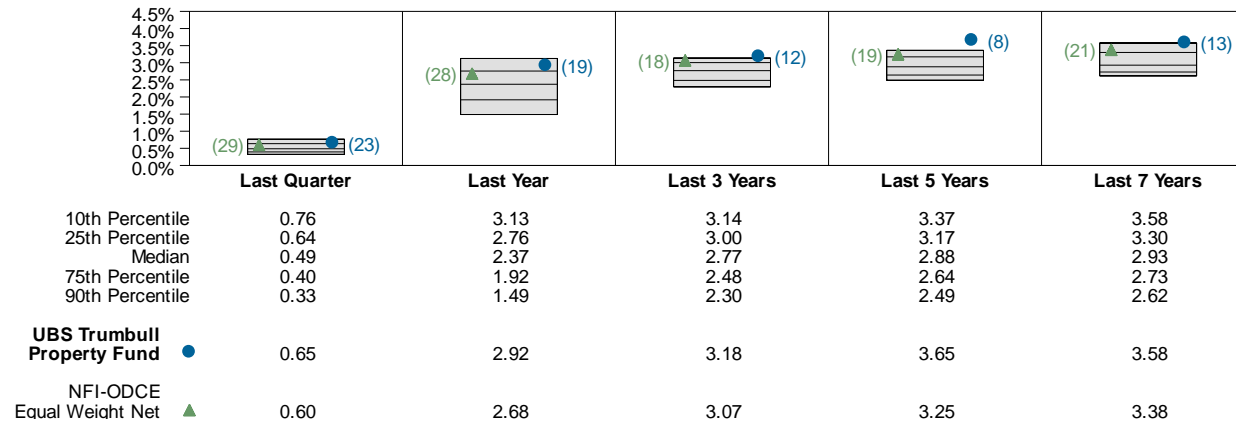


Appreciation Rankings vs Callan Real Estate ODCE Periods ended December 31, 2022

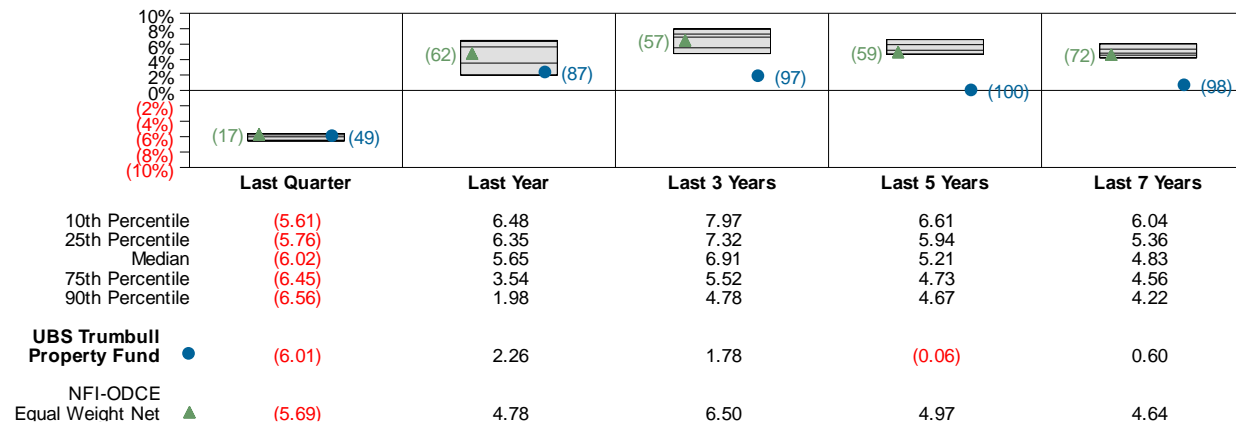


UBS Income and Appreciation Returns

Income Rankings vs Callan Real Estate ODCE Periods ended December 31, 2022



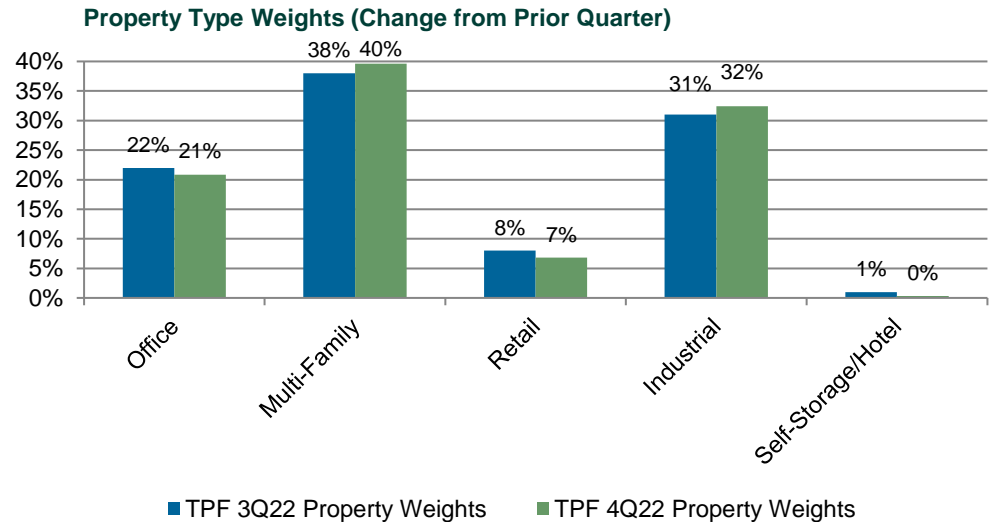
Appreciation Rankings vs Callan Real Estate ODCE Periods ended December 31, 2022



UBS Trumbull Property Fund Snapshot

As of December 31, 2022

As of 4Q 2022	
Gross Asset Value	\$16.8B
Net Asset Value	\$13.5B
Leverage	19.1%
Number of Investments	144
Number of Investors	439
Redemption Queue	\$7.0 billion
4Q22 Redemption Queue Payout	\$0 million
Contribution Queue	\$0 million



- The Fund has a current redemption pool of \$7.0 billion. The Fund did not make a 4Q 2022 redemption payment in January 2023. The Fund's initial target for 2022 redemption payments was \$2.5 billion; following the fourth payment in October 2022, a total of \$1.85 billion was paid out. The Non-Strategic Asset portfolio began with 44 properties and now has five assets representing 2.6% of the total fund remaining. UBS expects the Non-Strategic Asset portfolio to be fully liquidated by year-end 2023.
- MCERA submitted a partial redemption request for \$20 million in January 2020 and has now received the full amount.
- In September 2019, the fund announced investors would have a choice between two fee incentives: Loyalty Incentive (discounted fees of 15% over 3 years or 25% over 4 years) and Top-up Incentive (\$0 base fee on additional dollars deposited). UBS recently announced they are extending these programs.
 - In 2019, MCERA elected for the 4 year/25% discount loyalty incentive on approximately \$100 million NAV (effective January 2020).

NFI-ODCE Funds - Net of Fee Returns

As of December 31, 2022

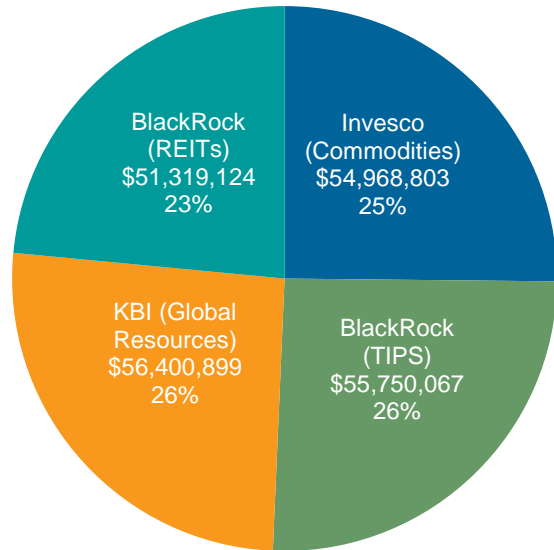
Fund Name	Last Quarter	Last Year	Last 3 Years	Last 5 Years
AEW Core Property Trust	-5.03%	7.95%	9.52%	8.11%
AFL-CIO Building Investment Trust	-7.01%	-3.55%	2.58%	3.58%
ARA Core Property Fund	-5.65%	8.28%	9.51%	8.28%
ASB Allegiance Real Estate Fund	-4.21%	9.77%	8.28%	6.92%
Bailard Real Estate Fund	-1.72%	15.31%	12.56%	12.04%
Barings Core Property Fund	-3.25%	2.42%	6.84%	6.67%
BentallGreenOak BGO Diversified	-5.92%	8.09%	9.93%	8.31%
BlackRock U.S. Core Property Fund	-3.89%	9.09%	9.86%	8.55%
CBRE U.S. Core Partners LP	-9.20%	7.05%	13.74%	11.60%
CIM Urban Income Investments	-4.74%	8.60%	9.29%	8.84%
Clarion Lion Property Fund	-5.33%	8.83%	10.58%	9.37%
DWS RREEF America REIT II	-3.73%	7.65%	10.48%	9.00%
GWL U.S. Property Fund L.P.	-6.17%	7.71%	10.81%	8.58%
Heitman America Real Estate Trust	-4.93%	9.69%	10.37%	7.80%
Intercontinental U.S. Real Estate Investment Fund	-6.31%	7.47%	9.27%	9.07%
Invesco Core Real Estate USA	-5.15%	6.89%	7.87%	7.59%
J.P. Morgan Strategic Property Fund	-5.22%	3.60%	7.61%	6.60%
LaSalle US Property Fund	-4.73%	11.44%	9.98%	8.70%
MetLife Core Property Fund	-5.41%	8.95%	11.51%	9.93%
Morgan Stanley Prime Property Fund	-3.70%	6.12%	9.28%	8.39%
NYL Madison Core Property Fund	-3.72%	13.75%	12.68%	10.61%
PGIM PRISA	-5.83%	5.61%	9.11%	8.11%
Principal U.S. Core Property	-6.22%	4.18%	8.77%	8.10%
Stockbridge Smart Markets Fund	-4.32%	9.24%	11.74%	9.81%
TA Realty	-5.52%	8.89%	14.16%	--
UBS Trumbull Property Fund	-5.36%	5.21%	5.00%	3.59%

NFI-ODCE Funds - Gross of Fee All Sector Returns

As of December 31, 2022

Fund	Retail 4Q 2022	Apartment 4Q 2022	Industrial 4Q 2022	Office 4Q 2022
AEW	-2.62%	-4.64%	-1.70%	-3.68%
AFL-CIO	-3.97%	-5.42%	-5.39%	-10.45%
ARA	-2.02%	-4.12%	-4.34%	-6.47%
ASB	-3.06%	-2.82%	-1.87%	-3.17%
Bailard	1.13%	-1.70%	-0.70%	-2.52%
Barings	-2.42%	-2.88%	-0.51%	-3.58%
BGO	-0.32%	-3.63%	-4.16%	-6.70%
BlackRock	-0.92%	-1.81%	-1.86%	-5.64%
CBRE	-2.40%	-8.88%	-7.15%	-9.14%
CIM Group	-1.00%	-2.18%	-0.67%	-5.54%
Clarion	-0.37%	-4.57%	-3.26%	-5.78%
DWS	0.24%	-3.02%	-2.42%	-5.95%
Everwest	0.58%	-2.57%	-4.06%	-14.44%
Heitman	-1.60%	-4.19%	-3.33%	-7.13%
Intercontinental	-4.09%	-5.53%	-7.33%	-5.18%
Invesco	-1.02%	-4.66%	-3.64%	-5.14%
JP Morgan	0.13%	-3.33%	-4.52%	-4.96%
LaSalle	-1.27%	-5.02%	-2.58%	-5.15%
MetLife	1.37%	1.00%	0.70%	1.23%
MSIM	-1.87%	-0.56%	-4.53%	-6.00%
NYLIM	-0.52%	-3.89%	1.56%	-5.34%
PGIM	-1.25%	-4.94%	-5.21%	-6.06%
Principal	0.12%	-6.18%	-3.77%	-7.05%
Stockbridge	-1.47%	-3.20%	-4.59%	-3.17%
TA Realty	-1.20%	-5.76%	-3.48%	-3.26%
UBS	1.50%	-2.78%	-2.98%	-9.15%

Real Assets Composite



- The BlackRock TIPS and REITs Funds are passive.
- The Invesco Balanced Risk Commodities Fund has been underweight to natural gas. While this underweight helped in the fourth quarter as natural gas declined 36%, it was the largest detractor over the year.
- KBI underperformed the index with the agribusiness segment being the largest detractor as fertilizer prices declined.

Returns and Rankings for Periods Ended December 31, 2022

	Last Quarter	Last Year	Last 3 Years	Last 5 Years
Real Assets - Net	6.44	(9.41)	7.65	5.81
Real Assets Target	6.52	(3.52)	6.82	5.21
BlackRock TIPS Index Fund - Net	1.87	(11.96)	1.21	2.14
Bloomberg US TIPS Index	2.04	(11.85)	1.21	2.11
Ranking vs. Real Returns Database	81	75	56	39
BlackRock REIT Index Fund - Net	4.71	(26.08)	(1.46)	2.44
S&P Dow Jones US Select REIT	4.76	(25.96)	(1.37)	2.50
Ranking vs. Real Estate Mutual Funds	14	50	79	81
Invesco Commodity Fund - Net	6.72	9.00	11.96	5.52
Bloomberg Commodity Index	2.22	16.09	12.65	6.44
Ranking vs. Commodities Funds	17	80	63	77
KBI Global Resources Fund - Net	12.88	(7.85)	13.88	9.50
S&P Global Natural Resources Index	17.07	9.59	10.86	6.64
KBI Custom Benchmark	7.34	(16.01)	9.76	7.98

Returns and Rankings Calendar Years

	2022	2021	2020	2019
Real Assets - Net	(9.41)	23.96	11.08	15.51
Real Assets Target	(3.52)	25.60	0.57	14.08
BlackRock TIPS Index Fund - Net	(11.96)	5.92	11.17	8.49
Bloomberg US TIPS Index	(11.85)	5.96	10.99	8.43
Ranking vs. Real Returns Database	75	41	18	32
BlackRock REIT Index Fund - Net	(26.08)	45.80	(11.21)	23.08
S&P Dow Jones US Select REIT Index	(25.96)	45.91	(11.20)	23.10
Ranking vs. Real Estate Mutual Funds	50	17	96	89
Invesco Commodity Fund - Net	9.00	19.68	7.58	5.49
Bloomberg Commodity Index	16.09	27.11	(3.12)	7.69
Ranking vs. Commodities Funds	80	87	1	81
KBI Global Resources Fund - Net	(7.85)	24.08	29.17	24.81
S&P Global Natural Resources Index	9.59	24.40	(0.05)	16.41
KBI Custom Benchmark	(16.01)	7.22	46.83	28.74

The Real Assets Target is comprised of 25% Bloomberg US TIPS Index, 25% Bloomberg Commodity Index, 25% S&P Dow Jones US Select REIT Index, and 25% S&P Global Natural Resources Index.

The KBI Custom Benchmark consists of 1/3 each: S-Network Global Water Index, Wilderhill New Energy Global Innovation Index, and Dax Global Agribusiness Index.

Private Equity Portfolio (as of 9/30/22)

- 90% Paid-In through 9/30/22.
- When ranked against the Thomson-Cambridge Private Equity Database, MCERA is ranked in the second quartile for Total Value to Paid-In (TVPI) basis.
- The total portfolio is well diversified by vintage year and investment type.

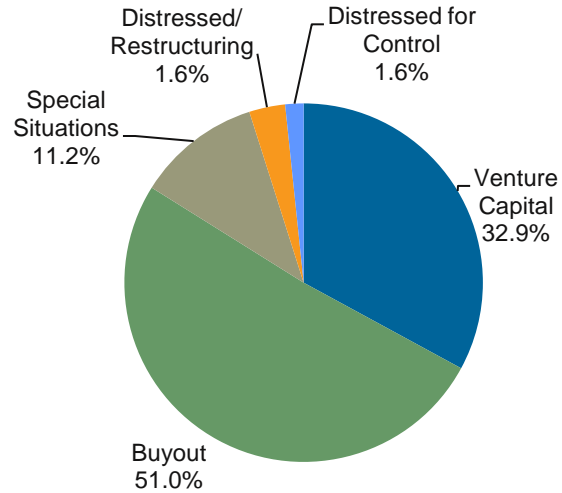
	September 30, 2022	Quarter Change	June 30, 2022
Summary			
Vintage Years	16 in 2008-2023		15 in 2008-2022
# Total Partnerships	530	14	516
# Active Partnerships	501	4	497
# Liquidated Partnerships	21	2	19
Changes in Value			
Capital Commitments	\$450,000,000	-	\$450,000,000
Paid-In Capital	\$406,082,845	\$3,895,196	\$402,187,649
Uncalled Capital	\$58,885,550	\$(3,607,168)	\$62,492,718
% Paid-In	90.24%	0.87%	89.38%
Distributed Capital	\$449,547,321	\$10,592,544	\$438,954,777
Net Asset Value	\$364,889,706	\$(16,300,166)	\$381,189,872
Total Realized and Unrealized Value	\$814,437,027	\$(5,707,622)	\$820,144,649
Ratios and Performance			
Distributions to Paid-In Capital (DPI)	1.11x	0.02x	1.09x
Residual Value to Paid-In Capital (RVPI)	0.90x	(0.05)x	0.95x
Total Value to Paid-In Capital (TVPI)	2.01x	(0.03)x	2.04x
Quartile Ranking	2nd		2nd
Net IRR	15.82%	(0.48%)	16.31%
Additional Performance Metrics			
Distribution Rate, as % of Beginning NAV		2.78%	
Unrealized Gain/(Loss), Dollars		\$(9,602,818)	
Unrealized Gain/(Loss), %		(2.52%)	

Quartile Rankings against the All Private Equity, All Regions Refinitiv/Cambridge Database.

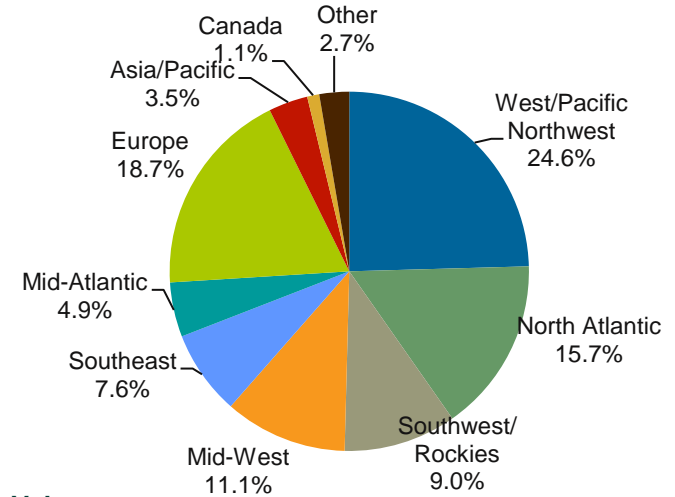
Uncalled capital above does not reflect currency fluctuations for Pathway's investments in foreign partnerships.

Private Equity Portfolio Exposure

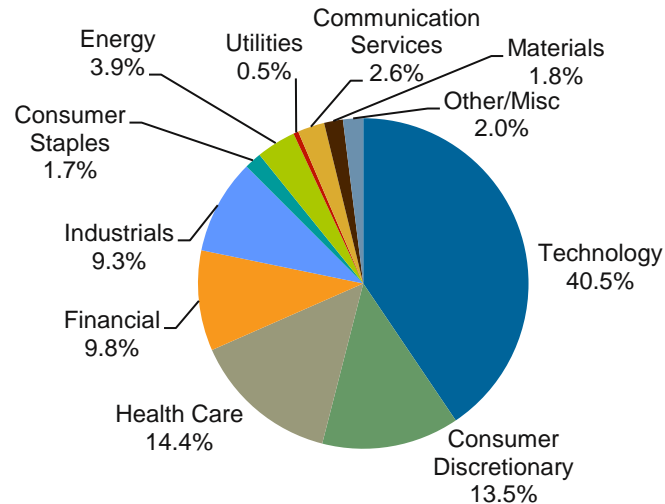
Strategy Mix by Net Asset Value



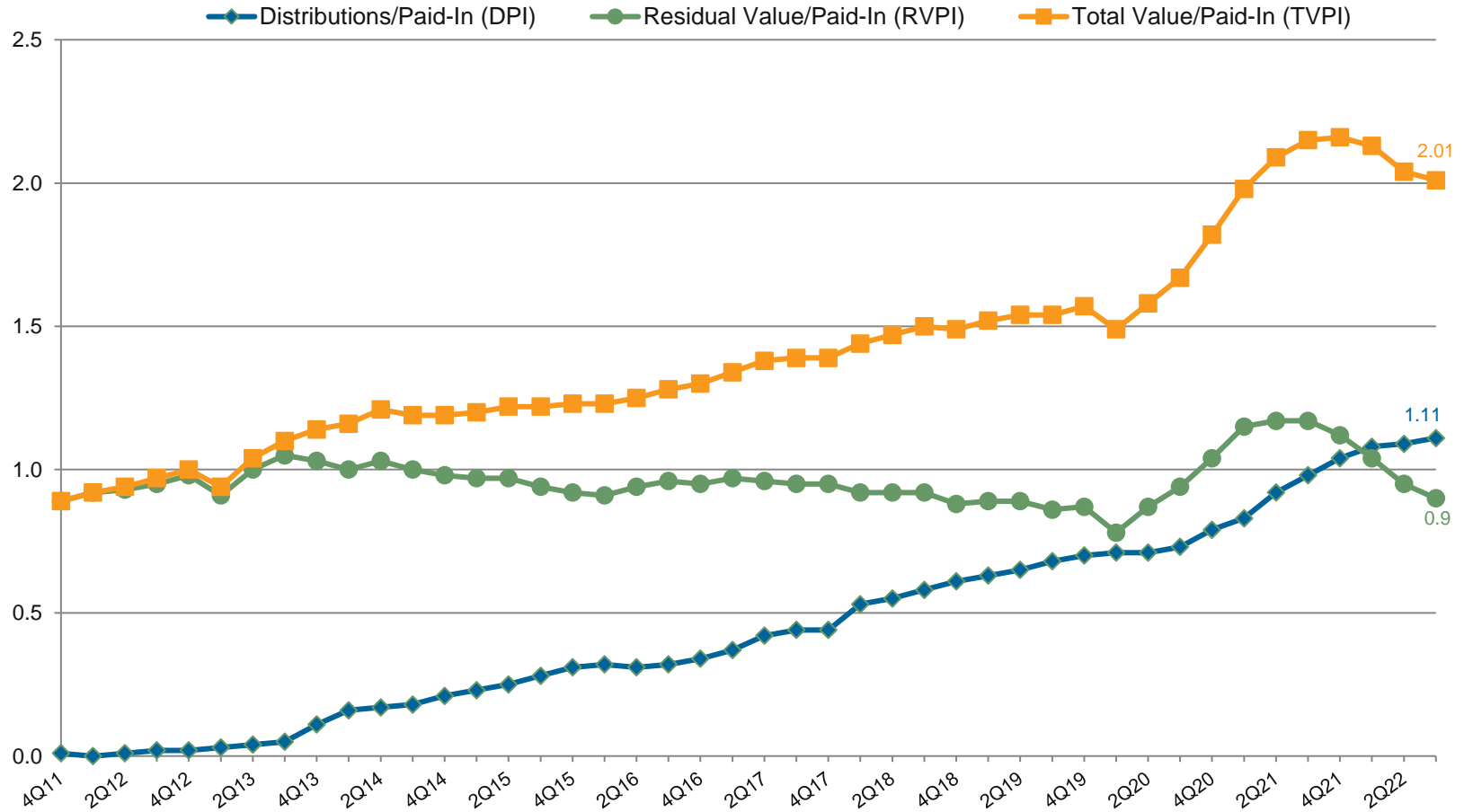
Geographic Mix by Net Asset Value



Industry Mix by Net Asset Value



Private Equity Ratios – Changes Over Time



Opportunistic Portfolio

- 60.7% Paid-In through 12/31/2022.
- The total portfolio is diversified by industry type and geographic location.

	December 31, 2022	Quarter Change	September 30, 2022
Summary			
Vintage Year	2020		2020
# Total Partnerships	193	-	193
# Active Partnerships	193	-	193
# Liquidated Partnerships	0	-	0
Changes in Value			
Capital Commitments	\$100,000,000	-	\$100,000,000
Paid-In Capital	\$60,729,376	\$7,570,249	\$53,159,127
Uncalled Capital	\$41,099,533	\$(7,570,249)	\$48,669,782
% Paid-In	60.73%	7.57%	53.16%
Distributed Capital	\$2,142,541	-	\$2,142,541
Net Asset Value	\$62,514,375	\$8,792,137	\$53,722,238
Total Realized and Unrealized Value	\$64,656,916	\$8,792,137	\$55,864,779
Ratios and Performance			
Distributions to Paid-In Capital (DPI)	0.04x	(0.01)x	0.04x
Residual Value to Paid-In Capital (RVPI)	1.03x	0.02x	1.01x
Total Value to Paid-In Capital (TVPI)	1.06x	0.01x	1.05x
Quartile Ranking	3rd		3rd
Net IRR	5.23%	0.77%	4.46%
Additional Performance Metrics			
Distribution Rate, as % of Beginning NAV		0.00%	
Unrealized Gain/(Loss), Dollars		\$1,221,888	
Unrealized Gain/(Loss), %		2.27%	

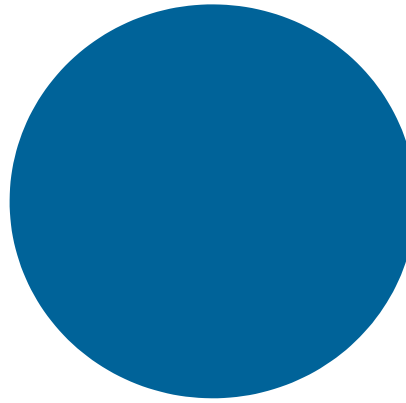
Note: Fortress 4Q22 data not available yet.

Quartile rankings against the 2020 vintage Control Oriented Distressed and Credit Opportunities Refinitiv/Cambridge Database.

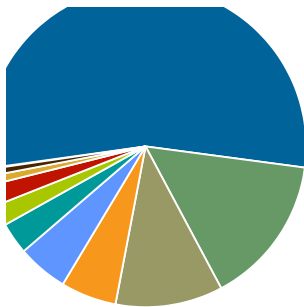
Opportunistic Portfolio Exposure

Strategy Mix by Net Asset Value

Special Situations
100.0%

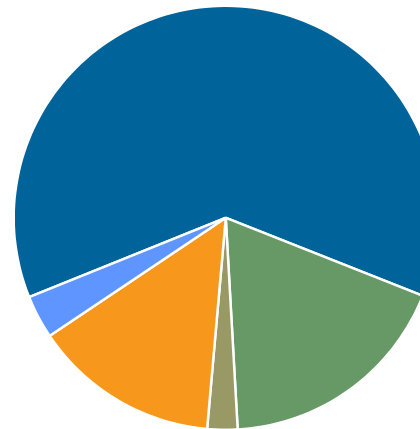


Industry Mix by Net Asset Value



Other/Misc	54.32%
Financial	15.11%
Consumer Discretionary	10.77%
Energy	5.62%
Communication Services	5.12%
Materials	3.22%
Industrials	2.14%
Utilities	2.13%
Consumer Staples	0.87%
Technology	0.71%

Geographic Mix by Net Asset Value



United States	62.84%
Europe	18.72%
Other	2.87%
Asia/Pacific	12.61%
Latin America & Caribbean	2.97%

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**Marin County Employees' Retirement Association
Defined Benefit Plan**

Managers	February 2023 Market Value	Fiscal Year To Date 7/1/22 - 2/28/23	Calendar Year To Date 1/1/23 - 2/28/23
Domestic Equity	\$966,425,457	8.9%	5.3%
<i>Russell 3000 Index</i>		6.9%	4.4%
SSGA Russell 1000 Index	\$670,689,159	6.6%	4.2%
<i>Russell 1000 Index</i>		6.6%	4.2%
Dimensional Fund Advisors	\$241,629,571	15.7%	8.5%
<i>Russell 2000 Index</i>		12.1%	7.9%
Parametric Domestic Equity Overlay	\$54,106,727		
International Equity	\$679,785,096	9.4%	5.7%
<i>MSCI ACWI ex-US IMI Index</i>		7.6%	4.3%
Morgan Stanley	\$194,300,848	11.0%	6.5%
Artisan Partners	\$187,973,825	13.2%	5.8%
<i>MSCI EAFE Index</i>		12.6%	5.8%
TimesSquare	\$102,436,284	11.8%	7.5%
<i>MSCI EAFE Small Cap Index</i>		9.8%	5.1%
FIAM Emerging Markets	\$105,426,388	-1.1%	2.3%
<i>MSCI Emerging Markets Index</i>		-2.1%	0.9%
Parametric International Equity Overlay	\$89,647,751		
Fixed Income	\$686,365,485	-3.7%	1.1%
<i>Fixed Income Benchmark*</i>		-2.9%	0.4%
Wellington	\$280,961,091	-1.0%	1.0%
<i>Bloomberg US Aggregate Index</i>		-2.6%	0.4%
Western Asset	\$298,148,182	-1.2%	1.3%
<i>Blended Benchmark**</i>		-2.3%	0.4%
Parametric Fixed Income Overlay	\$107,256,212		

All market values and returns shown are preliminary and subject to revision.

*Fixed Income Benchmark = 100% Bloomberg US Aggregate until 03/2014, 50% Bloomberg US Aggregate, 25% Bloomberg Intermediate Credit, and 25% FTSE WGBI until 11/2022, and 100% Bloomberg US Aggregate thereafter. Colchester was removed in October 2022.

**Blended Benchmark = Bloomberg US Intermediate Credit Index to 11/6/2022, Bloomberg US Aggregate Index thereafter.

**Marin County Employees' Retirement Association
Defined Benefit Plan**

Managers	February 2023 Market Value	Fiscal Year To Date 7/1/22 - 2/28/23	Calendar Year To Date 1/1/23 - 2/28/23
Public Real Assets	\$210,113,740	0.8%	2.2%
<i>Blended Benchmark</i>		0.6%	0.6%
BlackRock TIPS Index Fund	\$56,094,919	-2.8%	0.6%
<i>Bloomberg US TIPS Index</i>		-2.8%	0.4%
BlackRock REIT Index Fund	\$54,156,631	-1.1%	5.5%
<i>DJ S&P US Select REIT Index</i>		-0.9%	5.5%
Invesco Balanced Risk Commodities Fund	\$53,566,781	-5.0%	-2.6%
<i>Bloomberg Commodities Index</i>		-7.0%	-5.2%
KBI Global Resources Fund	\$59,461,628	12.9%	5.4%
<i>S&P Global Natural Resources Index</i>		13.3%	1.6%
Parametric Real Assets Overlay	-\$13,166,219		
Real Estate(1)	\$238,468,031	-6.5%	-2.6%
<i>NFI-ODCE Equal Weight Net(1)</i>		-7.1%	-2.9%
Woodmont	\$18,099,990	-	-
UBS Trumbull Property Fund	\$109,932,429	-	-
AEW Core Property Trust	\$128,938,204	-	-
Parametric Real Estate Overlay	-\$18,502,592		
Private Equity(2)	\$222,601,903	-2.5%	0.0%
Abbott ACE VI	\$38,978,454	-	-
Abbott ACE VII	\$42,422,872	-	-
Abbott AP 2016	\$69,485,150	-	-
Abbott AP 2017	\$20,699,132	-	-
Abbott AP 2021	\$8,382,674	-	-
Pathway PPEF 2008	\$47,820,266	-	-
Pathway PPEF I-7	\$35,167,273	-	-
Pathway PPEF I-8	\$63,644,878	-	-
Pathway PPEF I-9	\$16,698,327	-	-
Pathway PPEF I-10	\$16,702,228	-	-
Parametric Private Equity Overlay	-\$137,399,351		
Opportunistic(3)	\$62,514,375	7.9%	3.1%
CarVal Credit Value Fund V	\$22,389,031	-	-
Fortress Credit Opportunities Fund V Expansion	\$11,571,353	-	-
Varde Dislocation Fund	\$28,553,991	-	-
Total Fund	\$3,066,274,087	2.7%	2.8%

(1)Market values as of December 31, 2022. FYTD and YTD returns use MCERA's and ODCE's pro-rata performance of prior quarter.

(2)Market values as of September 30, 2022. FYTD and YTD returns use MCERA's pro-rata performance of prior quarter.

(3)Market values as of December 31, 2022. FYTD and YTD returns use MCERA's pro-rata performance of prior quarter.

All market values and returns shown are preliminary and subject to revision.