Due to the termination of the statewide COVID-19 State of Emergency by the Governor of California, effective March 1, 2023, all meetings of the Oakland Police & Fire Retirement System Board and its Committees will be conducted in person.

Meetings are held in wheelchair accessible facilities.

The Board may take action on items not on the agenda only if findings pursuant to the Sunshine Ordinance and Brown Act are made that the matter is urgent or an emergency.

For additional information, contact the Retirement Unit by calling (510) 238-7295. or send an email to jlloyd2@oaklandca.gov

CITY OF OAKLAND

Retirement Unit
150 Frank H. Ogawa Plaza
Oakland, California 94612

AGENDA

INVESTMENT COMMITTEE MEMBERS

Jaime T. Godfrey
Chairperson

R. Steven Wilkinson
Member

Robert W. Nichelini
Member

**In the event a quorum of the Board participates in the Committee meeting, the meeting is noticed as a Special Meeting of the Board; however, no final Board action can be taken. In the event that the Investment Committee does not reach quorum, this meeting is noticed as an informational meeting between staff and the Chair of the Investment Committee.*

MEETING of the INVESTMENT AND FINANCIAL MATTERS COMMITTEE of the OAKLAND POLICE AND FIRE RETIREMENT SYSTEM ("PFRS")

WEDNESDAY, MARCH 26, 2025
10:30 AM
ONE FRANK H. OGAWA PLAZA, HEARING ROOM 2
OAKLAND, CA 94612

OBSERVE

- To observe the meeting by video conference, please click on this link: https://us02web.zoom.us/j/82880493983 at the noticed meeting time.
- To listen to the meeting by phone, please call the numbers below at the noticed meeting time: Dial (for higher quality, dial a number based on your current location):
- iPhone one-tap: US: +16699006833, 82880493983# or +13462487799, 82880493983#
- US: +1 669 900 6833 or +1 346 248 7799 or +1 253 215 8782 or +1 301 715 8592 or +1 312 626 6799 or +1 929 205 6099
- International numbers available: https://us02web.zoom.us/u/kctrX35uax
- Webinar ID: 828 8049 3983.
- If asked for a participant ID or code, press #.

PUBLIC COMMENTS

There are two ways to submit public comments.

- Speaker Card: All persons wishing to address the Board must complete a speaker's card, stating their name and the agenda item they wish to address, including "Open Forum".
- e-Comment: To send your comment directly to staff BEFORE the meeting starts, please email jlloyd2@oaklandca.gov with "PFRS Board Meeting Public Comment" in the subject line for the corresponding meeting. Please note that e-Comment submission **closes two (2) hours before the posted meeting time**.

  If you have any questions, please email Jessica Lloyd, Administrative Analyst I, at jlloyd2@oaklandca.gov

ORDER OF BUSINESS

1.	**Subject:**	**POLICE AND FIRE RETIREMENT SYSTEM ("PFRS") INVESTMENT AND FINANCIAL MATTERS COMMITTEE MEETING MINUTES**
	From:	Staff of the PFRS Board
	Recommendation:	**APPROVE** the February 25, 2025, Special Meeting of Investment and Financial Matters Committee Minutes
2.	**Subject:**	**INVESTMENT MANAGER PERFORMANCE UPDATE: VERSOR INVESTMENTS, LLC**
	From:	Versor Investments, LLC* *Versor Investments, LLC will present in-person and via Zoom. The presentation will be broadcast live in the hearing room, allowing the Board and all other in-person attendees to hear the presentation.
	Recommendation:	**ACCEPT** an informational report regarding the overview and managerial assessment of the firm, including its diversity and inclusion policy and practices, as well as the investment strategy and portfolio performance of PFRS' Systematic Trend Following Investment Strategy Manager, Versor Investments, LLC.
3.	**Subject:**	**INVESTMENT MANAGER PERFORMANCE REVIEW: VERSOR MANAGEMENT**
	From:	Meketa Investment Group
	Subject:	**ACCEPT** Meketa Investment Group's review and evaluation of the firm overview, managerial assessment, diversity and inclusion policy and practices, as well as the investment strategy and portfolio performance of PFRS' Systematic Trend Following Investment Strategy Manager, Versor Investments, LLC.
4.	**Subject:**	**ECONOMIC AND INVESTMENT MARKET OVERVIEW AS OF FEBRUARY 28, 2025**
	From:	Meketa Investment Group
	Recommendation:	**ACCEPT** the informational report regarding the Global Investment Markets as of February 28, 2025
5.	**Subject:**	**PFRS PRELIMINARY INVESTMENT FUND PERFORMANCE UPDATE AS OF FEBRUARY 28, 2025**
	From:	Meketa Investment Group
	Recommendation:	**ACCEPT** an informational report on the preliminary performance of the PFRS Investment Fund as of **FEBRUARY 28, 2025**.

6. **Subject:** **PFRS INVESTMENT POLICY UPDATE: ASSET ALLOCATION IMPLEMENTATION: FIXED INCOME**
   From: Meketa Investment Group
   Recommendation: **RECEIVE** an update regarding the status of the implementation of the new target asset allocation of the PFRS Investment Portfolio.

7. **Subject:** **$13.2 MILLION DRAWDOWN FOR PFRS MEMBER RETIREMENT ALLOWANCES FROM APRIL 1, 2025, THROUGH JUNE 30, 2025**
   From: Meketa Investment Group
   Recommendation: **ACCEPT** the informational report and **RECOMMEND BOARD APPROVAL** of Meketa Investment Group's proposed drawdown of $13.2 million. This amount includes an $8.7 million contribution from the City of Oakland and a $4.5 million contribution from the PFRS Investment Fund. The funds will be used to pay PFRS Member Retirement Allowances from April 1, 2025, through June 30, 2025.

8. **Subject:** **CAPITAL MARKETS EXPECTATIONS**
   From: Meketa Investment Group
   Recommendation: **ACCEPT** an informational report regarding Meketa Investment Group's 2025 Capital Markets Expectations.

9. **Subject:** **PFRS LONG-TERM INVESTMENT RETURN EXPECTATIONS**
   From: Meketa Investment Group
   Recommendation: **ACCEPT** an informational report regarding PFRS Fund Long-Term Investment Return Expectations.

10. **Subject:** **PROPOSAL TO AMEND THE PROFESSIONAL SERVICE AGREEMENT WITH PFRS INVESTMENT COUNCIL REGARDING FEE INCREASE**
    From: Meketa Investment Group
    Recommendation: **ACCEPT** the proposal to amend the professional service agreement with Meketa Investment Group for the provision of Investment Council for the City of Oakland Police and Fire Retirement Systems for a fee increase and **RECOMMEND BOARD APPROVAL** to amend the agreement and authorize the fee increase.

11. **SCHEDULE OF PENDING INVESTMENT COMMITTEE MEETING AGENDA ITEMS**
12. **NEW BUSINESS**
13. **OPEN FORUM**
14. **FUTURE SCHEDULING**
15. **ADJOURNMENT**

A SPECIAL MEETING OF THE INVESTMENT AND FINANCIAL MATTERS COMMITTEE of the Oakland Police and Fire Retirement System ("PFRS") was held Wednesday, February 25,2025 at One Frank Ogawa Plaza, Hearing Room 2, Oakland, California.

Committee Members	▪ Jaime T. Godfrey	Chairperson
	▪ Robert W. Nichelini	Member (EXCUSED)
	▪ R. Steven Wilkinson	Member
Additional Attendees	▪ David F. Jones	PFRS Plan Administrator & Secretary
	▪ Téir Jenkins	PFRS Investment & Operations Manager
	▪ Maxine Visaya	PFRS Staff Member
	▪ Jessica Lloyd	PFRS Staff Member
	▪ Selia Warren	PFRS Legal Counsel
	▪ David Sancewich	Meketa Investment Group
	▪ Paola Nealon	Meketa Investment Group
	▪ John Meyer	Loomis, Sayles & Company
	▪ Lynne A. Royer	Loomis, Sayles & Company
	▪ Scott Kimball	Loop Capital Asset Management
	▪ Jackson Smith	Loop Capital Asset Management
	▪ James Haddon	Ramirez Asset Management
	▪ Samuel Ramirez, Jr.	Ramirez Asset Management
	▪ Lyniese Harrison	Income Research + Management (IR+M)
	▪ Eric Mueller	Income Research + Management (IR+M)
	▪ Mike Sheldon	Income Research + Management (IR+M)
	▪ Scott Rosener	Reams Asset Management
	▪ Steve Singleton	Reams Asset Management
	▪ Nathan Wong	Reams Asset Management
	▪ Akin Greville	Wellington Management Company
	▪ Jeremy Forster	Wellington Management Company
	▪ Cara Early	Wellington Management Company

The meeting was called to order at 10:10 a.m. Pacific

1. APPROVAL OF INVESTMENT & FINANCIAL MATTERS COMMITTEE MEETING MINUTES:
Member Wilkinson made a motion to approve the minutes of the Investment & Financial Matters Committee Meeting held on January 29, 2025, as submitted; the motion was seconded by Chairperson Godfrey. Motion Passed.

[GODFREY – Y / NICHELINI – 0 / WILKINSON – Y]
(AYES: 2 / NOES: 0 / ABSTAIN: 0 / ABSENT: 0 / EXCUSED: 1)

2. PROSPECTIVE INVESTMENT STRATEGY MANAGER PRESENTATIONS:

CORE FIXED INCOME

The Investment Committee received presentations from the following perspective Core Fixed Income Investment Strategy Manager finalists.

a) Loomis, Sayles & Company
b) Loop Capital Asset Management
c) Ramirez Asset Management

Each firm presented information regarding a firm overview, strategy, Diversity, Equity and Inclusion (DEI) policies, and portfolio performance.

MOTION: Chairperson Godfrey made a motion to accept the informational presentations from the Core Fixed Income Investment Strategy Manager finalists, seconded by Member Wilkinson. Motion passed.

[GODFREY – Y / NICHELINI – 0 / WILKINSON – Y]
(AYES: 2 / NOES: 0 / ABSTAIN: 0 / ABSENT: 0 / EXCUSED: 1)

3. SELECTION OF INVESTMENT STRATEGY MANAGER PRESENTATIONS:

CORE FIXED INCOME

The committee selected Loop Capital Asset Management and Ramirez Asset Management to serve as OPFRS's Core Fixed Income Investment Managers and recommended advancing this matter to the Full Board of Administration for approval.

MOTION: Chairperson Godfrey made a motion to recommend Loop Capital Asset Management and Ramirez Asset Management to the OPFRS Board of Administration, with Member Wilkinson seconding the motion. Motion passed.

[GODFREY – Y / NICHELINI – 0 / WILKINSON – Y]
(AYES: 2 / NOES: 0 / ABSTAIN: 0 / ABSENT: 0 / EXCUSED: 1)

4. PROSPECTIVE INVESTMENT STRATEGY MANAGER PRESENTATIONS:

CORE PLUS FIXED INCOME

The Investment Committee received presentations from the following perspective Core Plus Fixed Income Investment Strategy Manager finalists.

a) Income Research + Management (IR+M)
b) Reams Asset Management
c) Wellington Management Company

Each firm presented information regarding a firm overview, strategy, Diversity, Equity and Inclusion (DEI) policies, and portfolio performance.

MOTION: Chairperson Godfrey made a motion to accept the informational presentations from the Core Plus Fixed Income Investment Strategy Manager finalists, seconded by Member Wilkinson. Motion passed.

[GODFREY – Y / NICHELINI – 0 / WILKINSON – Y]
(AYES: 2 / NOES: 0 / ABSTAIN: 0 / ABSENT: 0 / EXCUSED: 1)

5. SELECTION OF INVESTMENT STRATEGY MANAGER PRESENTATIONS:

CORE PLUS FIXED INCOME

The committee elected to retain the services of Wellington Management Company to serve as a PFRS's Core Fixed Income Investment Manager. A consensus could not be reached regarding the two-remaining finalist. David Sancewich, of the Meketa Investment Group, advised that they would provide additional analytical data to the full Board on February 26, 2025, regarding the two remaining finalists to assist in determining which one the Board should consider.

MOTION: Chairperson Godfrey proposed a motion to recommend Wellington Management Company to the OPFRS Board of Administration. He also suggested further discussing which of the remaining two finalists should be considered by the Board. Member Wilkinson seconded the motion. Motion passed.

[GODFREY – Y / NICHELINI – 0 / WILKINSON – Y]
(AYES: 2 / NOES: 0 / ABSTAIN: 0 / ABSENT: 0 / EXCUSED: 1)

6. SCHEDULE OF PENDING INVESTMENT COMMITTEE MEETING AGENDA ITEMS:

Chairperson Godfrey made a motion to move agenda items 6-14 to the full Board of Administration meeting, scheduled for February 26, 2025. Member Wilkinson seconded the motion. Motion passed.

7. NEW BUSINESS: None

8. OPEN FORUM: None

9. FUTURE SCHEDULING:

The next meeting of the OPFRS Investment & Financial Matters Committee is scheduled for March 26, 2025, at 10:00 AM, tentatively.

10. ADJOURNMENT:

Chairperson Godfrey made a motion to adjourn, seconded by Member Wilkinson. Motion passed.

[GODFREY – Y / NICHELINI – 0 / WILKINSON – Y]
(AYES: 2 / NOES: 0 / ABSTAIN: 0 / ABSENT: 0 / EXCUSED: 1)

The meeting adjourned at 2:58 PM.

JAIME T. GODFREY
COMMITTEE CHAIRPERSON

DATE

Versor Trend Following

Oakland Police and Fire Retirement Systems

March 2025

VERSOR

Deepak Gurnani

Founder and Managing Partner

Deepak Gurnani is the Founder and Managing Partner of Versor Investments. Deepak is the former CIO of Investcorp's Hedge Fund Group and was one of the founding members in 1996. He was also a member of the Management Committee there. Deepak retired from Investcorp in March 2013. Prior to Investcorp, Deepak Gurnani spent six years with Citicorp.

Deepak has conducted extensive research over the last 20+ years into various aspects of hedge fund investing – analyzing risk and return of hedge funds, quantifying alternative risk premia inherent in hedge fund returns, using tactical asset allocation to enhance hedge fund portfolio returns, integrating hedge funds into institutional asset allocation and using separate accounts for risk management. Deepak holds a BTech from the Indian Institute of Technology, Delhi, and an MBA from the Indian Institute of Management, Ahmedabad.

DeWayne Louis

Founding Partner

DeWayne Louis joined Versor Investments as a Founding Partner and is based in New York. DeWayne has over 20 years of experience in quantitative investment strategies, investment banking, private equity and hedge funds. Prior to Versor Investments, DeWayne joined Investcorp's Hedge Fund Group at the inception of the North America and Europe branches. He remained there for nearly a decade. Prior to Investcorp, DeWayne was an Associate Director in UBS' Private Equity Secondary Group, focusing on buying and selling private equity interests in the secondary market. Earlier in his career, DeWayne was an Associate in the Investment Banking Division of Credit Suisse where he focused on mergers, acquisitions and project finance transactions.

DeWayne serves on the board of the New York City Economic Development Corporation ("NYCEDC"). NYCEDC is the City's primary vehicle for promoting economic growth in each of the five boroughs. DeWayne also serves on the Board of the Brooklyn Public Library ("BPL"), one of the nation's largest public library systems. BPL is a recognized leader in cultural offerings, literacy, out-of-school-time services, workforce development programs, and digital literacy. DeWayne holds a BS in Finance and International Business with a French minor from Georgetown University. There, he was a four-year varsity letterman on the football team.

Versor Investments aims to create diversified sources of absolute returns across multiple asset classes. Within a scientific, hypothesis-driven framework, Versor leverages modern statistical methods and vast datasets to drive every step of the investment process.

AUM: $1.4 Billion[1]

Employees: 52[2]

1. As of December 31, 2024. AUM based on internal estimates. AUM as per SEC definition for the purposes of Item 5.F on the Form ADV Part 1a.
2. Data is as of December 31, 2024.

Client Centered

100% employee ownership and substantial co-investment from partners

Innovative Culture

Challenge the status quo, embrace change, and explore new ideas

Collaborative team culture fosters innovation

Early adoption of machine learning, artificial intelligence, natural language processing and alternative data sets

Experienced Team

25+ researchers with advanced degrees from a wide array of academic disciplines

Portfolio managers average 25+ years of experience

30+ published whitepapers

Novel Technology

Proprietary research platform to test new alpha models

State of the art technology infrastructure for risk management, portfolio optimization, and trade execution

Pioneer (amongst hedge funds) in leveraging power of cloud computing

Strong D&I

80% of the Firm's ownership is held by ethnic and racial minority groups

1. As of December 31, 2024. AUM is computed based on internal estimates. AUM as per SEC definition for the purposes of Item 5.F on the Form ADV Part 1a.
2. Net Asset Value as of December 31, 2024.
3. Net Asset Value as of December 31, 2024.
The AUM is allocated to the respective strategy across Versor advised multi-strategy accounts and AUM of a separate fund.

Merger Arbitrage - AUM represents Assets Under Management for the Versor Merger Arbitrage strategy. AUM for the strategy is estimated by applying a notional capital allocation to the AUM of the multi-strategy accounts and represents the AUM of a separate fund allocated to the strategy.

Quant Equity - AUM represents Assets Under Management for the Versor Stock Selection and Versor Equity Prism strategy. The AUM for the strategy is estimated by applying notional capital allocation to the AUM of the multi-strategy accounts, representing the AUM of a separate fund and the GMV (Gross Market Value) of fund of fund account allocated to the strategy.

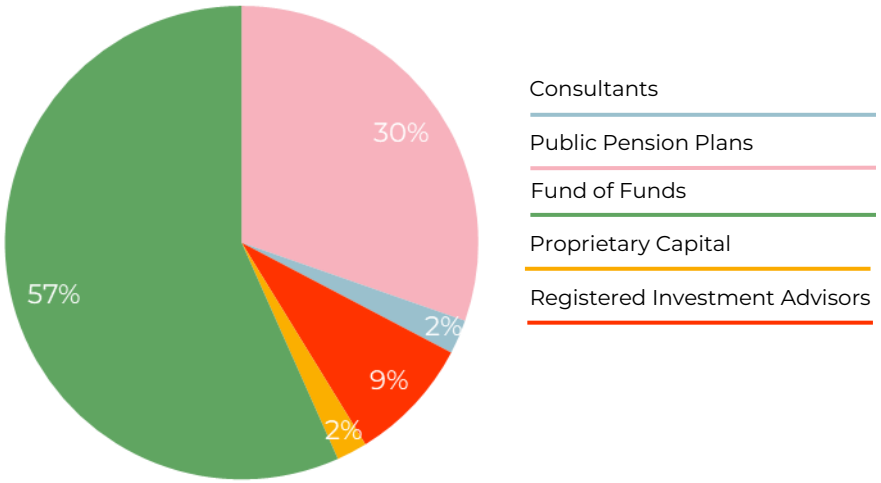
Futures and FX – AUM represents Assets Under Management for Versor Trend Following and Versor Global Macro strategies.

Versor Trend Following - AUM represents Assets Under Management for the Versor Trend Following Strategy. AUM for the strategy is estimated by applying a notional capital allocation to the AUM of the multi-strategy accounts and represents the AUM of a separate fund allocated to the strategy.

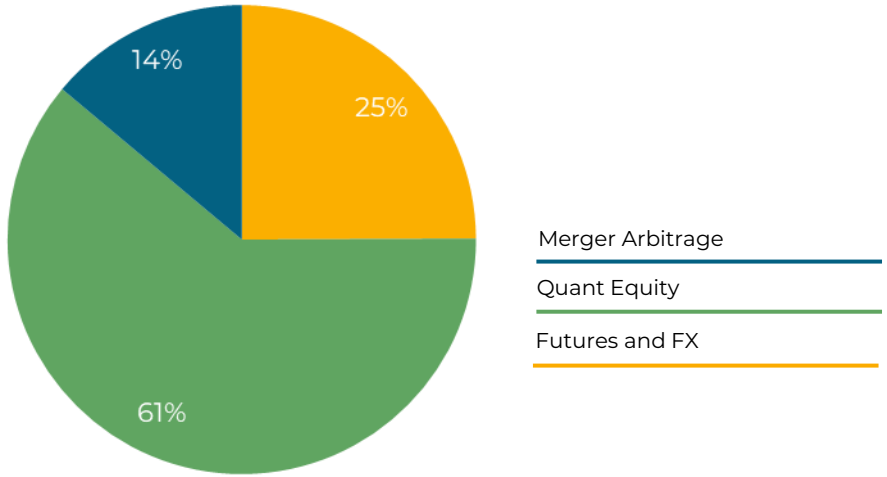
Versor Global Macro - AUM represents combined Assets Under Management for the Versor Global Macro strategies including its sub-strategies. The AUM for the strategy is estimated by applying notional capital allocation to the AUM of the multi-strategy accounts, representing the AUM of a separate fund and the GMV (Gross Market Value) of futures component of a fund of fund account allocated to the strategy.

As of December 31, 2024, Versor manages $1.4 billion[1] across a global group of institutional clients. Versor has co-investment in all the product offerings across hedge funds and alternative risk premia

AUM[2] by Investor Category



AUM[3] by Strategy %



Hedge Funds	Alternative Risk Premia
GETT	Global Macro
Equity Prism	Trend Following
Merger Arbitrage	Stock Selection
Equity Summit	Alternative Return Capture

ESG and diversity & inclusion are core components of Versor's DNA

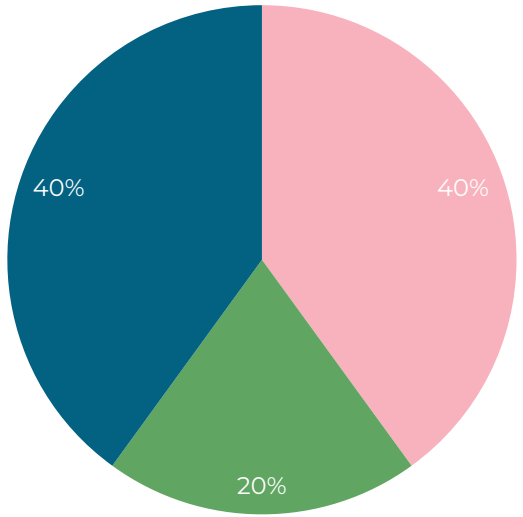
Key Pillars of Versor's DEI Policy

- Equal Opportunities: Fair hiring, compensation, and promotion policies
- Inclusive Workplace : Versor thrives on diverse perspectives and independent thinking
    - Respect & Dignity: Zero tolerance for discrimination or harassment
- Training & Education: D&I awareness programs and professional development for underrepresented groups
- Accountability: Robust reporting, compliance, and regular assessments of DEI initiatives

Key Initiatives

- **Internship Program**: Hired and trained diverse interns — some converted to full-time roles
- **Inclusive Hiring Practices**: Open job descriptions considering broader education & professional backgrounds
- **Industry Engagement**: Active involvement with organizations promoting diversity

Founding Partner Diversity



1. Data as of December 31, 2024.
2. References equity ownership of Versor Investments LP.

Diversity Representation Survey for Oakland Police and Fire

Data as of December 31, 2024

Firm Name	**Versor Investments LP**		
Product Name	**Versor Trend Following**		
Total Number of Employees	**52**		
	Percentage (%) of Board of Directors / Managing Members	**Percentage(%) of Firm (Entire Staff)**	**Percentage (%) of Firm (Investment Professionals)**
Race and Ethnicity			
African American/Black	20.00%	1.92%	-
Asian/Hawaiian/Pacific Islander	40.00%	94.23%	95.12%
Latino/Hispanic	-	-	-
White	40.00%	3.85%	4.88%
American Indian/Alaska Native	-	-	-
Other	-	-	-
Gender			
Male	100%	90.38%	92.68%
Female	-	9.62%	7.32%
Non-Identified/Other	-	-	-

1. Data as of December 31, 2024.

ORGANIZATION[1]

Deepak Gurnani
Founder and Managing Partner

DeWayne Louis
Founding Partner

Ludger Hentschel
Founding Partner
Investments

Nirav Shah
Founding Partner

Andrew Flynn
Founding Partner
COO

- Marketing (3)
- Futures and FX (10)
- Equities (22)
- Operations and Trading Technology (9)
- HR / Admin (1)
- Accounting and Compliance (2)

Versor Investments is 100% owned by the Partners

Diversity and inclusion are core components of Versor's DNA

1. Data as of December 31, 2024.

Trend Following invests in over 100 contracts of futures and futures-related instruments across four major asset classes: commodities, equity indices, bonds and currency markets globally. The portfolio takes long or short positions in any of these instruments in markets exhibiting price trends (up or down).

Universe

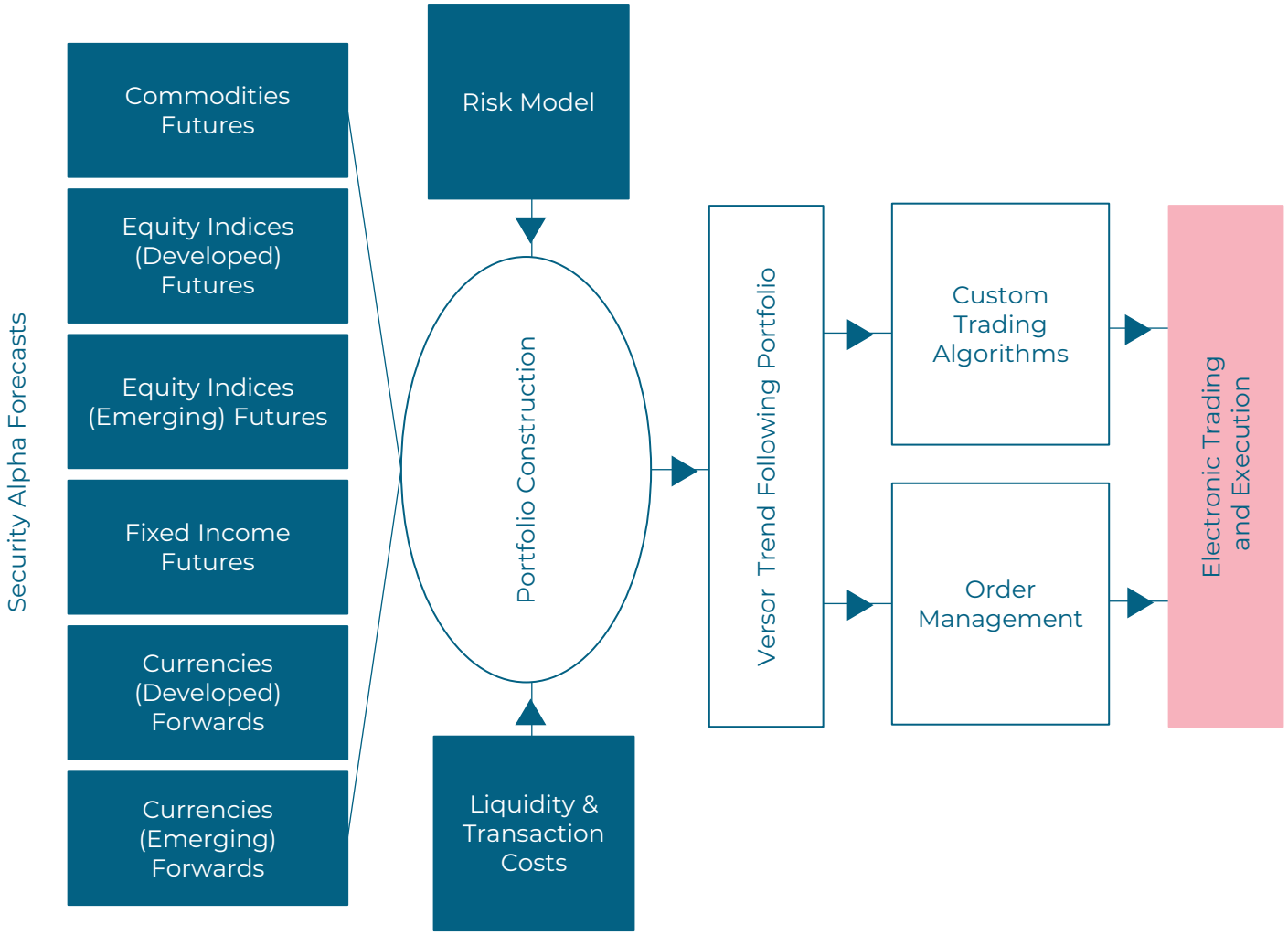
1. 100+ contracts across commodities, equities, fixed income and currencies
2. Developed and emerging markets
3. Most liquid contracts globally

Alpha Forecast Models

1. Multiple alpha forecast models: MA cross-over, time-series momentum, other trend models, futures curve (e.g., carry)
2. Multiple forecast horizons from 1 month to 1 year

Differentiators

1. Proprietary alpha forecast models
2. Dynamic allocations based on signal strength
3. Enhanced performance around trend reversals
4. Diversification across forecasts and contracts
5. Efficient electronic trading



The above chart shows a high-level picture of portfolio construction process. For illustrative purposes only.

Research Enhancements Over the Years

- Expanded alpha factors across all the asset classes and optimized rollover strategies to reduce costs while maintaining trend exposure
- Broadened investible universe with esoteric commodities and mini contracts for enhanced diversification and risk management
- Integrated short-term non-trend signals to improve convexity characteristics, particularly in volatile market environments

Strategic Research Initiatives and Expected Benefits

- Our current research initiative is a comprehensive review of the entire strategy, from universe selection to execution, aimed at enhancing robustness and maintaining our competitive edge
- Introduction of ten additional trend signals to enhance short-term performance stability and improve risk-adjusted returns
- Dynamic asset allocation to mitigate concentration risks and capitalize on shifting market conditions
- These enhancements aim to diversify the signal mix, optimize risk-adjusted returns, lower asset class concentration risk, and improve adaptability to evolving market trends

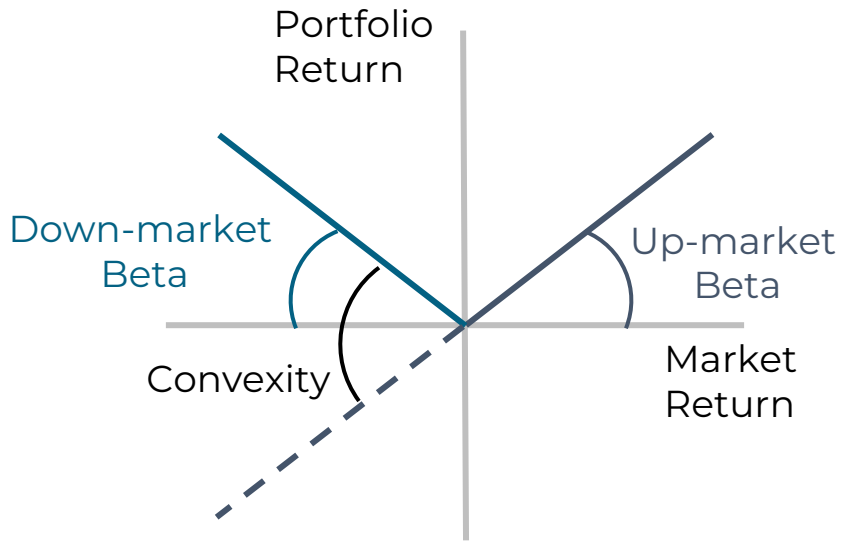
We remain dedicated to advancing our methodologies through deep quantitative research, empirical testing, and continuous learning.

Past performance is not indicative of future results. Performance results reflect the reinvestment of income. No assurance can be given that Versor Investments will successfully integrate this research into strategy.

RETURN CONVEXITY

Concept

Make money in up markets and down markets
Requires a change from “long” to ”short” exposures



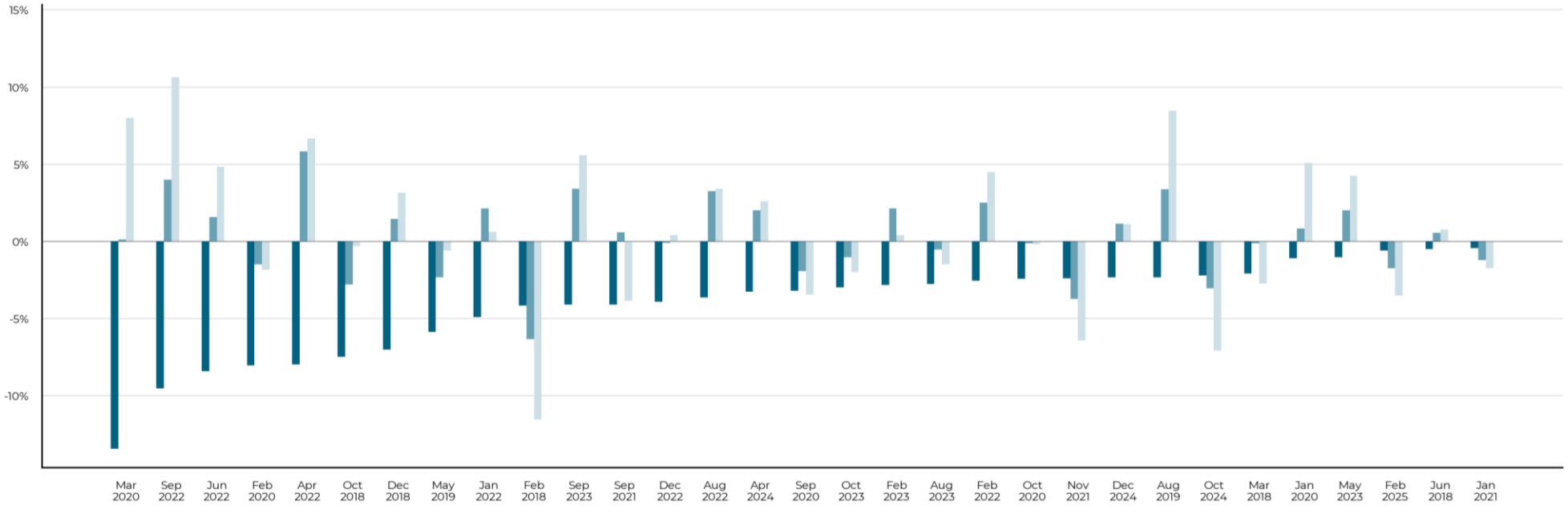
Results

Managers in the SG Trend Index have lost convexity over time

Period	Down Market Beta	Up Market Beta	Convexity
Long-term	-0.15	0.09	0.24
2000-2008	-0.37	0.15	0.52
2009-2021	0.15	0.04	-0.11

Past performance is not indicative of future results. Performance results reflect the reinvestment of income. Commodity interest trading involves substantial risk of loss.
Data received from Societe Generale, MSCI, Bloomberg and internally prepared by Versor Investments. Beta estimates based on monthly returns from January 2000 to April 2021. All returns in excess of TBill rates.

VERSOR TREND FOLLOWING PERFORMANCE IN THE MONTHS OF EQUITY DRAWDOWNS



Equity Index:
Mean -4.11%

SG CTA Index:
Mean 0.34%

Versor Trend Following:
Mean 0.77%

Equity Index:
Correlation: -0.25 | Beta: -0.23

SG CTA Index:
Correlation: 0.85 | Beta: 1.36

Past performance is not indicative of future results. Performance results reflect the reinvestment of income. Commodity interest trading involves substantial risk of loss.

"Equity Index" refers to the returns of the MSCI ACWI. "SG CTA Index" refers to the returns of the SG CTA Index. "Trend" refers to the live returns of the Versor Trend Following strategy. Correlation denotes the Pearson correlation between the Versor Trend Following with the MSCI ACWI. Beta denotes the beta of the Versor Trend Following w.r.t. the MSCI ACWI. Correlation and beta are estimated using monthly returns and include both positive and negative monthly returns to the MSCI ACWI.
The analysis covers the period May 04, 2017, to February 28, 2025, and includes 31 months with negative returns to MSCI ACWI. Data received by MSCI and internally prepared by Versor Investments.

- The Versor Trend Following strategy posted a -14.73% return for 2024, primarily due to losses in commodities, followed by fixed income and currencies. Positive contributions from equities helped offset some of these losses
    - Within commodities, energy and base metals drove the losses, followed by precious metals. However, gains in grains, softs, and livestock helped cushion some of the decline
    - The underperformance in commodities was largely driven by sharp trend reversals in challenging market conditions
    - Fixed income recorded losses across bonds and rates
    - Currencies contributed negatively across both developed and emerging markets
    - Equities helped mitigate overall losses by generating positive returns across developed and emerging markets
- At the signal level, long-term, medium-term, and short-term signals all posted losses. However, the futures curve model delivered positive returns, partially offsetting the overall decline

PERFORMANCE SUMMARY

Strategy	Start Date	Returns									Since Inception		
		Feb 2025	YTD	1 Year	2024	2023	2022	2021	3 Year	5 Year	Return	Std. Dev.[4]	Sharpe Ratio5
Versor Oakland PFRS Trend Following Portfolio[1]	01-Apr-2022	-3.52%	-5.11%	-21.61%	-14.73%	-6.74%	6.49%				-7.23%	14.01%	-0.81
Versor Trend Following[2]	04-May-2017	-3.52%	-5.11%	-21.61%	-14.73%	-6.74%	20.99%	-9.39%	-4.60%	-2.62%	-2.33%	13.71%	-0.34
SG CTA Index[3]	04-May-2017	-1.75%	-1.14%	-4.59%	2.26%	-3.49%	20.15%	6.17%	3.83%	5.27%	3.58%	8.95%[6]	0.13[7]

Reported returns are unaudited preliminary estimates, subject to revision and net of management fees. Certain investors may have higher management fees depending on applicable share class. Please note that the returns could be materially different from those stated here in case the strategy was managed in a dedicated standalone fund. In fact, the actual returns could be much lower than those shown here. Please see important disclosures at the end of the presentation.

Live Performance
1. "Versor Oakland PFRS Trend Following Portfolio" represents the returns of Versor Trend Following Fund, launched on April 1, 2022. The return estimates presented here are based on Versor Investments' internal systems, have not been reconciled with the Administrator and do not reflect the official books and records of the account. In the event of any discrepancy between the information contained herein and the information contained in an investor's audited account statements, the latter shall govern.
Returns are net of all expenses including 0.25% annual data fees and 0.90% annual management fees. Certain investors may have higher management fees depending on applicable share classes. Versor Investments also manages other accounts using the same investment strategy. Returns for the other accounts may differ from the returns shown here, depending on differences in risk levels and other investment restrictions, timing of cash flows, and fee structures.

2. Versor Investments launched the Versor Trend Following Fund on April 1, 2022. Prior to April 1, 2022, Versor Investments did not manage capital in the Versor Trend Following Fund as a dedicated Fund for this strategy. Versor Trend Following Strategy was part of a sub strategy under ARP Alternative Risk Premia 2x Fund, which is a multi-strategy fund. Returns from May 4, 2017, to December 22, 2020, for the Versor Trend Following strategy are estimated by applying a notional capital allocation (and applicable expenses) to the P/L associated with the portion of the ARP Alternative Risk Premia 2x Fund Ltd allocated to the strategy. When the strategy is managed in a dedicated standalone fund there will be excess cash upon meeting margin requirement. Hence the returns for the strategy have been adjusted by adding the US T-Bill return on the excess cash upon meeting margin requirement. From December 23, 2020, to March 31, 2022, the reported returns are for the dedicated Fund ["the Fund"] for the Versor Trend Following strategy. The return estimates presented here are based on Versor Investments' internal systems, have not been reconciled with the Administrator and do not reflect the official books and records of the account. In the event of any discrepancy between the information contained herein and the information contained in an investor's audited account statements, the latter shall govern.
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Benchmark Index
3. Returns shown here are of the SG CTA Index. The SG CTA Index calculates the net daily rate of return for a pool of CTAs selected from the largest managers open to new investment. It is equal-weighted and reconstituted annually. The comparison of the performance of the various strategies presented to these indices may be inappropriate because the various strategies are not as diversified as the indices, may be more or less volatile than the indices, and may include securities which are substantially different than the securities in the indices.

4. The standard deviation is computed using Newey-West estimator with 22 lags to daily returns. The Newey-West estimator is designed to handle autocorrelation in returns.

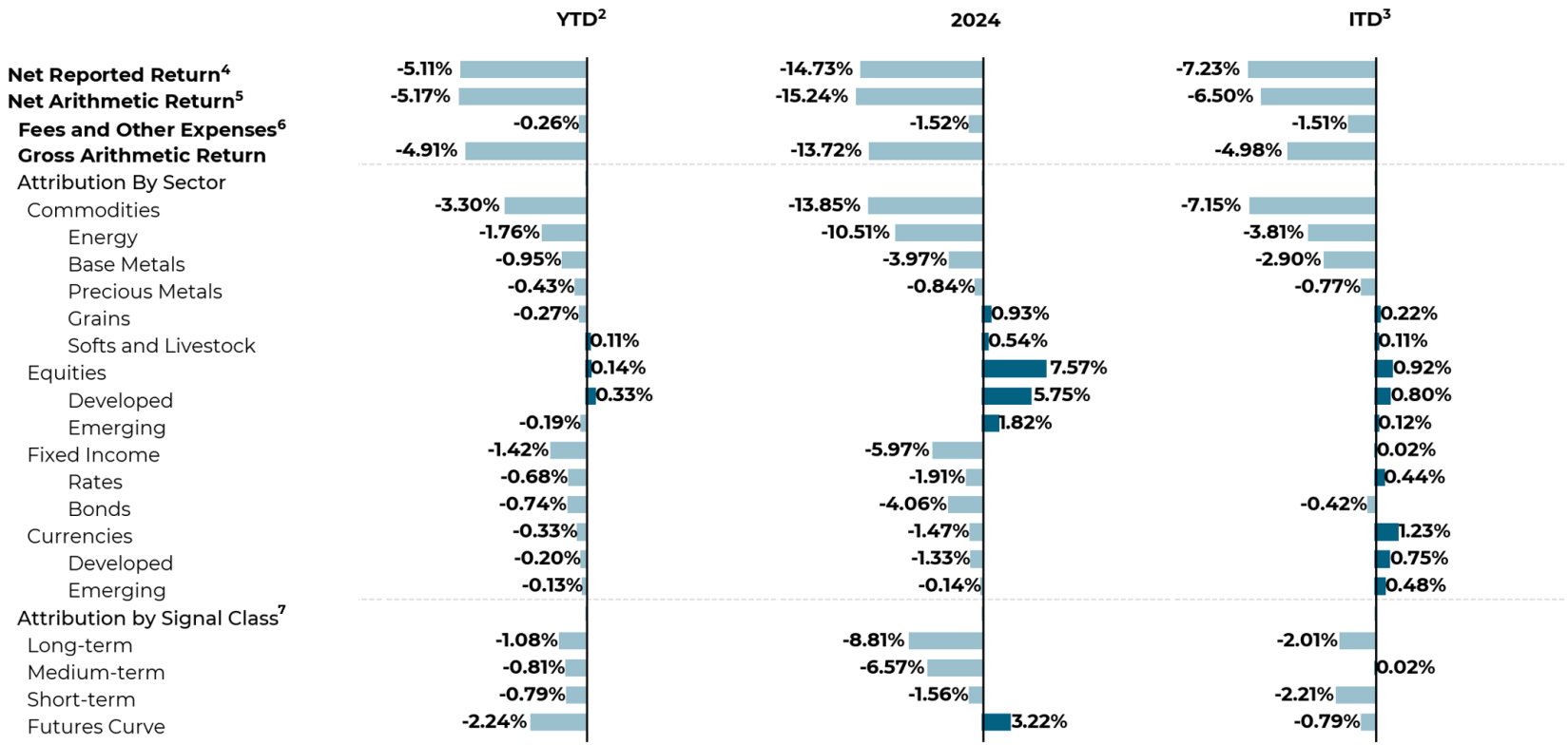
5. The Sharpe ratio is a measure of the excess return per unit of risk, where risk is estimated using Newey-West estimator with 22 lags to daily returns.

6. The standard deviation is computed using monthly returns as daily returns for the index are not available.

7. The Sharpe ratio is a measure of the excess return per unit of risk, where risk is estimated by computing standard deviation using monthly returns as daily returns for the index are not available.

Past performance is not indicative of future results. Performance results reflect the reinvestment of income. Commodity interest trading involves substantial risk of loss.

PERFORMANCE ATTRIBUTION: VERSOR TREND FOLLOWING – OAKLAND PFRS PORTFOLIO[1]



1. Versor Trend Following refers to the live returns of the Versor Trend Following strategy.

2. YTD refers to the returns for the period January 01, 2025, to February 28, 2025.

3. ITD refers to annualized returns for the period April 01, 2022, to February 28, 2025.

4. Net Reported returns are cumulative returns (not annualized) for the period, unaudited preliminary estimates and subject to revision. Refer to "Strategy Disclosures" in disclosures section, note 1 for performance disclosures of Versor Trend Following strategy.

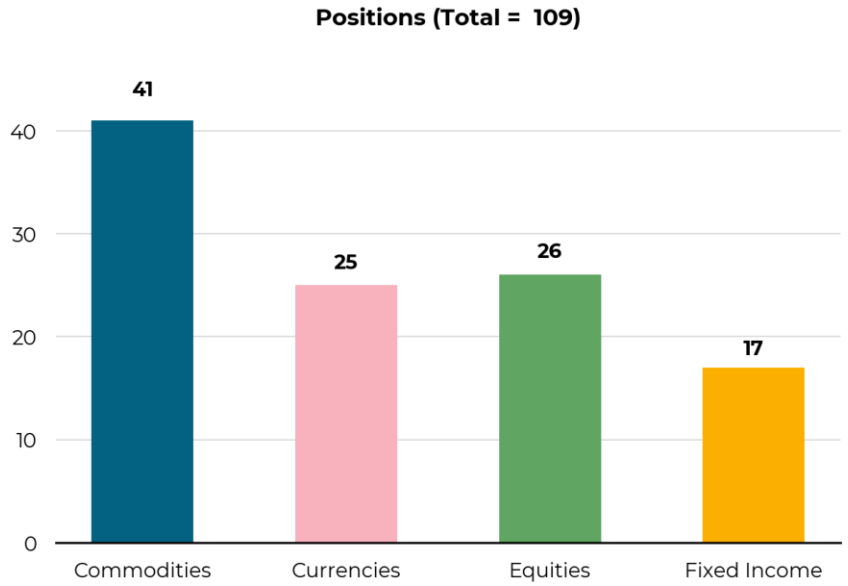
5. Net Arithmetic Return may slightly differ from Net Reported Returns due to compounding.

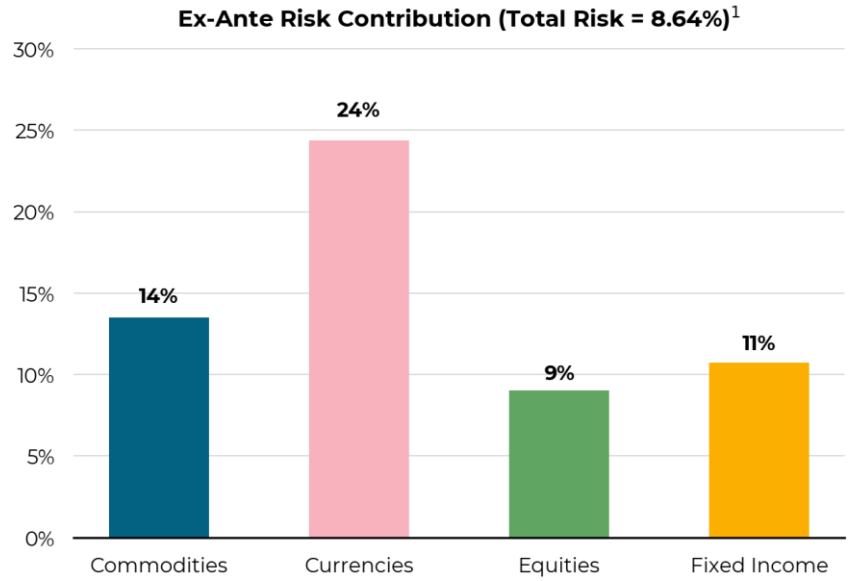
6. Monthly fees and other expenses, include 0.02% data fees, 0.075% management fees and administration, audit and other expenses..

7. Long-term represents signals with time horizon of 4-6 months, Medium-term represents signals with time horizon of 2-4 months and Short-term represents signals with time horizon of 0-2 months.

Past performance is not indicative of future results. Performance results reflect the reinvestment of income. Commodity interest trading involves substantial risk of loss.

VERSOR TREND FOLLOWING POSITIONS: MARCH 03, 2025





Risk Exposures - Top Contributors (Ex - Ante Risk)[1]

	Ex-Ante Risk	Long MV[2]	Short MV[2]
Commodities	13.50%	41.20%	-33.21%
Emissions ECX	2.19%		
Mt Belv Prop	1.97%		
TTF NAT GAS	1.96%		
Fixed Income	10.75%	27.58%	-90.17%
SOFR 3M	4.26%		
US 2yr Bond	1.24%		
US 10yr Bond	1.17%		

	Ex-Ante Risk	Long MV[2]	Short MV[2]
Equities	9.01%	46.86%	-6.52%
SPI 200	2.19%		
OMXS30	1.48%		
FTSE KLCI	1.26%		
Currencies	24.36%	11.36%	-64.73%
CHF	4.03%		
Dollar Index	3.37%		
EUR	3.33%		

1. Ex-Ante risk is based on Versor Investments' internal risk systems. Risk contribution is calculated at 16% annualized target volatility.

2. Long MV (Short MV) is computed as market value of futures contracts of Long (Short) positions as a percentage of the net asset value. Fixed income Long MV (Short MV) is expressed in US 10 years bond futures equivalent Long MV (Short MV).

- Scientific, data-intensive investment process
    - Differentiated investment process
    - Deep and experienced team of 50+ specialists
    - 250+ human work years spent on developing superior research and trading technology
- Versor Trend Following offers attractive diversification to portfolios dominated by equity risk
- Uncertain macro economic environment presents attractive investment opportunities

Disclosures

Past performance is not indicative of future results. Performance results reflect the reinvestment of income. Commodity interest trading involves substantial risk of loss.
Reported returns are unaudited preliminary estimates, subject to revision and net of management fees. Certain investors may have higher management fees depending on applicable share class. Please note that the returns could be materially different from those stated here in case the strategy was managed in a dedicated standalone fund. In fact, the actual returns could be much lower than those shown here. Please see important disclosures at the end of the presentation.

Live Performance
1. "Versor Oakland PFRS Trend Following Portfolio" represents the returns of Versor Trend Following Fund, launched on April 1, 2022. The return estimates presented here are based on Versor Investments' internal systems, have not been reconciled with the Administrator and do not reflect the official books and records of the account. In the event of any discrepancy between the information contained herein and the information contained in an investor's audited account statements, the latter shall govern.
Returns are net of all expenses including 0.25% annual data fees and 0.90% annual management fees. Certain investors may have higher management fees depending on applicable share classes. Versor Investments also manages other accounts using the same investment strategy. Returns for the other accounts may differ from the returns shown here, depending on differences in risk levels and other investment restrictions, timing of cash flows, and fee structures.

2. Versor Investments launched the Versor Trend Following Fund on April 1, 2022. Prior to April 1, 2022, Versor Investments did not manage capital in the Versor Trend Following Fund as a dedicated Fund for this strategy. Versor Trend Following Strategy was part of a sub strategy under ARP Alternative Risk Premia 2x Fund, which is a multi-strategy fund. Returns from May 4, 2017, to December 22, 2020, for the Versor Trend Following strategy are estimated by applying a notional capital allocation (and applicable expenses) to the P/L associated with the portion of the ARP Alternative Risk Premia 2x Fund Ltd allocated to the strategy. When the strategy is managed in a dedicated standalone fund there will be excess cash upon meeting margin requirement. Hence the returns for the strategy have been adjusted by adding the US T-Bill return on the excess cash upon meeting margin requirement. From December 23, 2020, to March 31, 2022, the reported returns are for the dedicated Fund ["the Fund"] for the Versor Trend Following strategy. The return estimates presented here are based on Versor Investments' internal systems, have not been reconciled with the Administrator and do not reflect the official books and records of the account. In the event of any discrepancy between the information contained herein and the information contained in an investor's audited account statements, the latter shall govern.
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The index returns are provided for purposes of comparison and include dividends and/or interest income and, unlike the returns presented for the various strategies, do not reflect fees or expenses. Unlike the various strategies presented which are actively managed and periodically may maintain cash positions, an index is unmanaged and fully invested. The comparison of the performance of the various strategies presented to these indices may be inappropriate because the various strategies are not as diversified as the indices, may be more or less volatile than the indices, and may include securities which are substantially different than the securities in the indices. Although information and analysis contained herein has been obtained from sources the Adviser believes to be reliable, its accuracy and completeness cannot be guaranteed. Investors cannot invest directly in indices. The indices referenced herein have been selected because they are well known, easily recognized by investors, and reflect those indices that the adviser believes, in part based on industry practice, provide a suitable benchmark against which to evaluate the investment or broader market described herein. The exclusion of "failed" or closed hedge funds may mean that each hedge fund index overstates the performance of hedge funds generally.

The **HFRX Global Hedge Fund Index** includes managers and is designed to be representative of the overall composition of the hedge fund universe. It is comprised of all eligible hedge fund strategies; including but not limited to convertible arbitrage, distressed securities, equity hedge, equity market neutral, event driven, macro, merger arbitrage, and relative value arbitrage. The strategies are asset weighted based on the distribution of assets in the hedge fund industry.

The **HFRX EH: Equity Market Neutral Index** includes managers employing the Equity Market Neutral strategies. Equity Market Neutral managers typically employ sophisticated quantitative techniques of analyzing stock price and fundamental data to ascertain information about future price movement and relationships between securities, select securities for purchase and sale. These can include both Factor-based and Statistical Arbitrage/Trading strategies.

The **HFRX Event Driven Index** measures the performance of an event-driven index; its exposure includes a combination of sensitivities to equity markets, credit markets, and idiosyncratic, company-specific developments. Investment theses are typically predicated on fundamental characteristics (as opposed to quantitative), with the realization of the theses predicated on a specific development exogenous to the existing capital structure.

The **HFRI EH: Equity Hedge (Total) Index** includes Investment Managers who maintain positions both long and short in primarily equity and equity derivative securities. A wide variety of investment processes can be employed to arrive at an investment decision, including both quantitative and fundamental techniques; strategies can be broadly diversified or narrowly focused on specific sectors and can range broadly in terms of levels of net exposure, leverage employed, holding period, concentrations of market capitalizations and valuation ranges of typical portfolios. EH managers would typically maintain at least 50% exposure to, and may in some cases be entirely invested in, equities, both long and short.

The **SG Trend Index** includes managers employing the Systematic Diversified CTA strategy. Systematic Diversified CTA managers typically employ an investment process designed to identify opportunities in markets exhibiting trending or momentum characteristics across individual instruments or asset classes. Strategies utilize quantitative processes which focus on statistically robust or technical patterns in the return series of the asset, and typically focus on highly liquid instruments.

The **HFRX Macro: Systematic Diversified CTA Index** includes managers employing the Systematic Diversified CTA strategy. CTA managers typically employ an investment process designed to identify opportunities in markets exhibiting trending or momentum characteristics across individual instruments or asset classes. Strategies utilize quantitative processes which focus on statistically robust or technical patterns in the return series of the asset, and typically focus on highly liquid instruments.

The **Barclays CTA Index** (BARCCTA Index**)** provides a benchmark of representative performance of commodity trading advisors (CTAs). In order to qualify for inclusion nust have four years of prior performance history. Refer to om for more details on index construction methodology.

A combination of HFRX Macro: Systematic Diversified CTA Index and BARCCTA Index is used as the benchmark index for the Trend Following risk premia strategy returns. BARCCTA Index (monthly) returns are used for the period January 1990 to December 2008. HFRX

Macro: Systematic Diversified CTA Index (daily) returns are used from January 2009 onwards. Combination index used due to availability of daily return data from HFRX Macro: Systematic Diversified CTA index (from January 2009 onwards).

Equity Long/Short managers are typically considered long-biased when the average net long exposure of their portfolio is greater than 35%.

The **BarclayHedge Equity Long Bias Index** is recalculated and updated real-time on this page as soon as the monthly returns for the underlying funds are recorded. Only funds that provide us with net returns are included in the index calculation. The number of funds that are currently included in the calculations for the most recent months can be found in the footnotes above. Please note that the calculation for the number of funds is time-stamped and that the number of funds will continue to increase until all funds categorized within the sector have reported monthly returns.

The **Barclays Global Aggregate Index** provides a broad-based measure of the global investment-grade fixed income markets. The three major components of this index are the U.S. Aggregate, the Pan-European Aggregate, and the Asian-Pacific Aggregate Indices. The index also includes Eurodollar and Euro-Yen corporate bonds, Canadian government, agency and corporate securities, and USD investment grade 144A securities.

The **Barclays Global Treasury Index** tracks fixed-rate, local currency government debt of investment grade countries, including both developed and emerging markets. The index represents the treasury sector of the Global Aggregate Index and contains issues from 37 countries denominated in 24 currencies.

The **Barclays Global High Yield Index** represents the US High Yield Index, Pan-European High Yield Index, High Yield CMBS Index, and non-investment grade portion of the Barclays Global Emerging Markets Index.

The **MSCI World Index** represents a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets. As of February 2013, it includes 24 developed market country indices: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

The **MSCI ACWI** captures large and mid cap representation across

23 Developed Markets (DM) and 24 Emerging Markets (EM) countries. With 2,490 constituents, the index covers approximately 85% of the global investable equity opportunity set.

The **S&P GSCI™ Total Return index** measures a fully collateralized commodity futures investment that is rolled forward from the 5th to the 9th business day of each month. Currently the index includes 24 commodity nearby futures contracts. The Total Return is significantly different than the return from buying physical commodities.

The **S&P 500 index** covers the 500 largest companies that are in the United States. These companies can vary across various sectors. The S&P 500 is one of the most important indices in the world as it widely tracks how the United States stock market is performing.

The **SG CTA Index** calculates the net daily rate of return for a pool of CTAs selected from the largest managers open to new investment. It is equal-weighted and reconstituted annually.

The **SG Macro Trading Index** is a broad based performance measure for constituents that trade Global Macro strategies. The **SG Macro Trading Index (Quantitative)** is a sub-index of the SG Macro Trading Index covering quantitative Global Macro strategies. The **SG Macro Trading Index (Discretionary)** is a sub-index of the SG Macro Trading Index covering the discretionary strategies.

The **Eurekahedge Multi-Factor Risk Premia Index** is composed of multiple strategies managed by large global banks, and is designed to provide a broad measure of the performance of a diversified portfolio of systematic drivers of risk and return across asset classes.

The **Bloomberg Barclays US Treasury: 20+ Year Total Return Index** measures US dollar-denominated, fixed-rate, nominal debt issued by the US Treasury. Treasury bills are excluded by the maturity constraint.

The **S&P U.S. Treasury Bill Index** is a broad, comprehensive, market-value weighted index that seeks to measure the performance of the U.S. Treasury Bill market. U.S. Treasury Bill 0-3 Month Index is designed to measure the performance of U.S. Treasury bills maturing in 0 to 3 months.

The **SG Multi Alternative Risk Premia Index** calculates the daily rate of return for a group of the largest ten multi-asset, multi-alternative risk premia programs managed by investment managers. These managers often trade equity indices, fixed income, currencies, commodities, and single name equities. Managers aims to systematically capture a diversity of discrete risk premia, including value, carry, momentum, and equity style premia. The index is equally weighted, and reconstituted and rebalanced onan annual basis.

The **Russell 1000 Value Index** measures the performance of those

Russell 1000 companies with lower price-to-book ratios and lower forecasted growth values. The index was developed with a base value of 200 as of August 31, 1992.

The **Russell 2000 Value Index** measures the performance of those Russell 2000 companies with lower price-to-book ratios and lower forecasted growth values.

he **Russell 1000 Growth Index** measures the performance of thos Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values. The index was developed with a base value of 200 as of August 31, 1992.

The **Russell 2000 Growth Index** measures the performance of thos Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values.

The HFR Bank Systematic Risk Premia Indices are a series of benchmarks designed to reflect the performance of the universe of managers that employ a portfolio allocation strategy based on targeting risk levels across the various components of an investment portfolio.

HFR Bank Systematic Risk Premia Commodity Index: A composite of all Bank Systematic Risk Premia Commodity styles.

HFR Bank Systematic Risk Premia Credit Index: A composite of all Bank Systematic Risk Premia Credit styles

HFR Bank Systematic Risk Premia Currency Index: A composite of all Bank Systematic Risk Premia Currency styles.

HFR Bank Systematic Risk Premia Equity Index: A composite of all Bank Systematic Risk Premia Equity styles.

HFR Bank Systematic Risk Premia Rates Index: A composite of all Bank Systematic Risk Premia Rates styles.

Refer to HFR, Societe Generale, Barclayshedge, MSCI, Barclays, Russell and S&P websites for more details on their respective indices construction methodology.

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Because these results are simulated, they are subject to all of the material inherent limitations of backtested data. Due to these limitations (among others), the U.S. Commodity Futures Trading Commission requires that the following disclaimer accompany such information:

These results are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results shown in an actual performance record, these results do not represent actual trading. Also, because these trades have not actually been executed, these results may have under-or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated or hypothetical trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. Specifically, Versor Investments continuously seeks to enhance its methodologies and therefore a survivorship bias is present as these hypothetical performance results are continuously updated to apply what Versor Investments believes to be the most optimal approach at that point in time. No representation is being made that any account will or is likely to achieve profits or losses similar to these being shown. An investment with Versor Investments is speculative and involves substantial risks; investors may lose their entire investment. No one should rely on any simulated performance in determining whether to invest with Versor Investments.

Certain analysis or statements included herein may constitute forward-looking statements. The forward-looking statements are not historical facts but reflect Versor Investments' current statistical conclusions regarding future results or events. These forward-looking statements are subject to a number of risks and uncertainties that could cause actual results or events to differ materially from history or current expectations. Although Versor Investments believes that the assumptions inherent in the forward-looking statements are reasonable, forward-looking statements are not guarantees of future results or events and, accordingly, readers are cautioned not to place undue reliance on such statements due to the inherent uncertainty therein.

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It should not be assumed that any ESG initiatives, standards, or metrics described herein will apply to each asset in which Versor invests or that any ESG initiatives, standards, or metrics described herein have applied to Versor's prior investments. ESG is only one of many considerations that affect Versor's investment decisions. Other considerations outweigh ESG considerations in certain circumstances. The information provided herein is intended solely to provide an indication of the ESG initiatives and standards that Versor applies when seeking to evaluate and/or improve the ESG characteristics of its investments as part of the larger goal of maximizing financial returns on investments. Any ESG initiatives described herein will be implemented with respect to a portfolio investment only to the extent Versor determines these initiatives to be consistent with its broader investment goals and applicable laws. Accordingly, certain investments may exhibit characteristics that are inconsistent with the ESG initiatives, standards, or metrics described herein.

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References to specific securities, asset classes and financial markets are for illustrative purposes only and are not intended to be, and should not be interpreted as, recommendations.

The utilization of AI Tools in investment management, driven by advancements in computing technology and data analytics, is on the rise. These tools are applied to various aspects of portfolio management, trading, and portfolio risk management, with some market participants exploring increased autonomy. The Investment Manager integrates AI Tools for pre-trade analysis, trade execution, and post-trade analysis, encompassing descriptive, predictive, or prescriptive tasks. They are employed not only in quantitative or algorithmic trading but also in sophisticated fundamental analysis, including textual analysis, and optimizing asset allocations within the Fund's portfolio. It's important to acknowledge that while AI Tools offer advantages, potential risks exist. Many AI Tools are relatively recent developments and may harbor undetected errors, defects, or security vulnerabilities. Some errors may only surface after widespread use or substantial marketplace operations, potentially leading to significant financial losses, liabilities, or sanctions. The rapid execution capabilities of AI-integrated trading technology, particularly when combined with other algorithmic systems, can amplify the impact of these flaws. Additionally, certain technological and operational limitations may hinder or prevent human intervention. Investors considering initial or additional investments in the Fund should be aware of these risks associated with AI Tools and exercise caution. Careful due diligence and ongoing monitoring are advisable to mitigate potential drawbacks.

Undetected Errors and Security Risks: AI Tools, being relatively recent developments, may harbor undetected errors, defects, or security vulnerabilities. Some issues may only surface after extensive use, potentially leading to substantial financial losses, material liabilities, or sanctions. The rapid integration of AI Tools into trading technology may magnify the impact of such flaws, especially when interacting with other algorithmic systems.

Implementation Risk: Despite our commitment to implement AI Tools diligently, their use in portfolio management, trading, and risk assessment may produce results that do not align with our existing models or expectations, possibly resulting in losses to the Fund. If AI Tools are employed in line with the standard of care outlined herein, the Investment Manager will not be held liable for such losses.

Regulatory Risk: Governmental entities are increasingly active in considering regulations and market restrictions on algorithmic and machine-assisted trading strategies. Such regulations may include requirements for pre-testing, automatic volume controls, or liability for negative market impacts. These rules might limit our ability to fully employ AI Tools, potentially affecting the Fund's performance.

Interdependence and Opacity: Understanding and explaining the inferences made by most AI Tools can be challenging due to their complexity. As AI Tools rely on historical data, predicting their behavior in "black swan" events is difficult. This opacity can introduce risks, such as cascading market crashes, especially when multiple asset management companies use similar AI Tools.

Incorrect Outputs: AI Tools may make erroneous decisions based on irrelevant data patterns. Complex analytical frameworks used by AI Tools can make it challenging to identify such errors, especially when integrating new data, which may differ from the training data.

Data Quality: AI Tools depend on the quality and sufficiency of data. Poor-quality data can lead to suboptimal performance. As AI Tools become more complex, identifying data-related issues becomes harder, potentially resulting in market instability.

Learning Limitations: AI Tools lack human judgment and context, which may limit their effectiveness in certain environments. Learning limitations may affect strategic deployment and risk-based reviews, leading to unexpected issues.

Potential Attacks: The use of AI Tools increases the risk of potential malicious attacks, including data privacy breaches, data poisoning, and model extraction. Such attacks may compromise data privacy, affect AI Tool performance, or lead to the extraction of investment models. These attacks can harm the Fund's investment performance.

Bias Risk: AI Tools may amplify risks related to biased outcomes or discrimination. The evolving nature of data ethics and fairness introduces the risk of unfair outcomes. Governmental entities may impose restrictions on AI Tool use, potentially affecting Fund operations.

Drift: Drift may introduce various errors and risks in AI Tools. Changing relationships between variables over time can impact tool accuracy. Detecting drift and mitigating associated risks is a priority, but it may be challenging to do so before losses occur. If monitoring is implemented in line with the standard of care outlined herein, the Investment Manager will not be liable for losses due to drift.

Disclaimer: The use of AI Tools in investment management involves risks, and the effectiveness of these tools may vary. Investors should exercise caution and conduct thorough due diligence. The information provided is for informational purposes only and should not be considered as financial advice. Investment decisions should be made after consulting with qualified financial professionals and considering individual circumstances. Past performance is not indicative of future results.

MEKETA

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MEMORANDUM

TO: Oakland Police and Fire Retirement System ("OPFRS")
FROM: Meketa Investment Group ("Meketa")
DATE: March 26, 2025
RE: Versor Investments - Manager Update

Manager: Versor Investments			
Inception Date:	April 2022	**OPFRS AUM (02/28/2025):**	$12.1 million
Strategy:	Systematic Trend Following	**Strategy AUM (02/28/2025):**	$12.5 million
Benchmark:	Société Générale Trend Index	**Firm-wide AUM[1] (06/30/2024):**	$1.3 billion

Summary

Versor has managed the Systematic Trend Following sleeve within the Crisis Risk Offset component since April 2022. As of February 28, 2025, the portfolio is approximately $12.1 million or about 2.6% of OPFRS's total portfolio.

While the strategy has exhibited underperformance since account inception in 2022, the strategy's overall characteristics and performance has remained within expectations and guidelines for the portfolio. No major organizational changes or personnel turnover in the portfolio management team have been observed since the last review in September 2023. ***Therefore, Meketa does not have any major concerns with Versor Investments and its Trend Following Fund and recommends that it be removed from the monitoring watchlist.***

Investment Performance Review Summary

As of February 28, 2025, Versor Trend Following strategy has underperformed the benchmark Société Générale (SG) Trend Index quarter-to-date, over the 1-year trailing period, and since account inception in April 2022, on net of fees basis. Since account inception in April 2022, the strategy has generated an annualized net-of-fees investment return of -7.2%.

Portfolio Performance (as of 02/28/2025)[2]

	QTD	1 Yr	Since Inception	CY 2024	CY 2023
Versor Trend Following (Net)	**-5.1**	**-21.5**	**-7.2**	**-14.7**	**-6.7**
SG Trend Index	*-3.0*	*-7.7*	*1.1*	*2.6*	*-4.2*
Excess Return	-2.0	-13.9	-8.3	-17.3	-2.6

It should be noted that OPFRS has invested in the strategy for less than 3 years; as a long-term investment within the Crisis Risk Offset (CRO) segment, it ought to be evaluated contextually considering its characteristics and the surrounding market conditions, which are presented using the fund's historical product characteristics in the following section.

[1] Source: Versor website.
[2] Performance is annualized for periods longer than one year.

Investment Product Characteristics (As of 12/31/2024)[3]

The Crisis Risk Offset (CRO) component, which Versor Trend Following is a part of, is expected to exhibit lower correlations to the traditional equity and fixed income markets and developed to serve as a diversifier and mitigate both the equity risk and nominal interest rate risk of the total portfolio.

Long-Term Correlations to Board Market Indices

Versor Trend Following Fund has exhibited relatively low (within the range of -0.5 to +0.5) correlations to equity markets (represented by MSCI All Country World Index), fixed income markets (represented by Bloomberg Global Aggregate Index) and commodities (represented by Bloomberg Commodity Index) since product inception in May 2017.[4]

	Correlation
MSCI All Country World Index (Net)	-0.3
Bloomberg Global Aggregate Index	-0.3
Bloomberg Commodity Index	-0.1

Volatility

Versor Trend Following Fund has also exhibited lower volatility (measured as Standard Deviation) in comparison to the equity markets since the product's inception while exhibiting a slightly higher volatility compared to the Bloomberg Commodity Index. Compared to the fixed income markets, it has significantly higher volatility as expected.

	Standard Deviation
Versor Trend Following (Net)	**14.5**
MSCI All Country World Index (Net)	15.7
Bloomberg Global Aggregate Index	6.7
Bloomberg Commodity Index	13.8

Down Market Performance

One of the CRO component's primary objective is to be a risk-mitigating component during market downturns. The following table illustrates the performance of Versor Trend Following fund during the periods when the benchmark (index) generated negative returns.

Down Market Performance	Versor Product Return	Benchmark Return	Excess
MSCI All Country World Index (Net)	10.0	-41.1	+51.0
Bloomberg Global Aggregate Index	0.6	-16.3	+16.9
Bloomberg Commodity Index	-0.9	-29.6	+28.7

Since product inception, the strategy has had significant outperformance during the periods of equity market downturns as well as those of downturns in the global fixed income markets.

[3] Source: eVestment. Product inception date is May 2017. Bloomberg Global Aggregate Index is unhedged.
[4] The calculations include Versor Trend Following strategy's history as a sub-strategy under ARP Alternative Risk Premia 2x Fund.

Product and Organization Review Summary

Versor Investments	Level of Concern	Areas of Potential Impact: Investment Process	Investment Team	Performance Track Record	Team/Firm Culture
Product					
Key people changes	None				
Changes to team structure or individuals' roles	None				
Product client gain/losses	None				
Changes to investment process	None				
Personnel turnover	None				
Organization					
Ownership changes	None				
Key people changes	None				
Firm wide client gain/losses	None				
Recommended Action	**None - X**	**Watch Status**		**Termination**	

A review of Versor Investments and the Trend Following Fund revealed no concerning organizational issues or changes since last review in September 2023.

Investment Summary

Versor Trend Following derives absolute returns from long, medium, and short-term directional moves in various markets. The strategy invests in 100+ futures and forwards contracts across four major asset classes globally: commodities, equities, fixed income, and currency markets. The strategy takes long or short positions in these instruments where markets exhibit price trends.

The key investment theme is to generate absolute returns through trend following. This strategy aims to profit from persistent price trends in futures markets. The internally developed trend following models use different statistical signals such as moving average cross over and time series momentum to identify trends. In addition to different kinds of signals, the models also implement the signals across different time horizons ranging from short-term (typically about 1 month) to long-term (typically up to 1 year). The portfolio will take long or short position in any of these contracts based on their trends.

Risk management is integrated into the investment process. Versor uses proprietary risk models for quantifying risk. Risk adjustment of positions in individual contracts is done using short-term volatility measures and both long and short positions are levered up or down to maintain target volatility. Risk-adjusted positions in individual contracts are then combined to form four sector portfolios: commodities, equities, fixed income, and currencies. Risk adjustment is also done at the sector level to maintain target risk contribution to overall portfolio risk from each of the four sector portfolios.

DS/PN/JLC/mn

MEKETA

Economic and Market Update

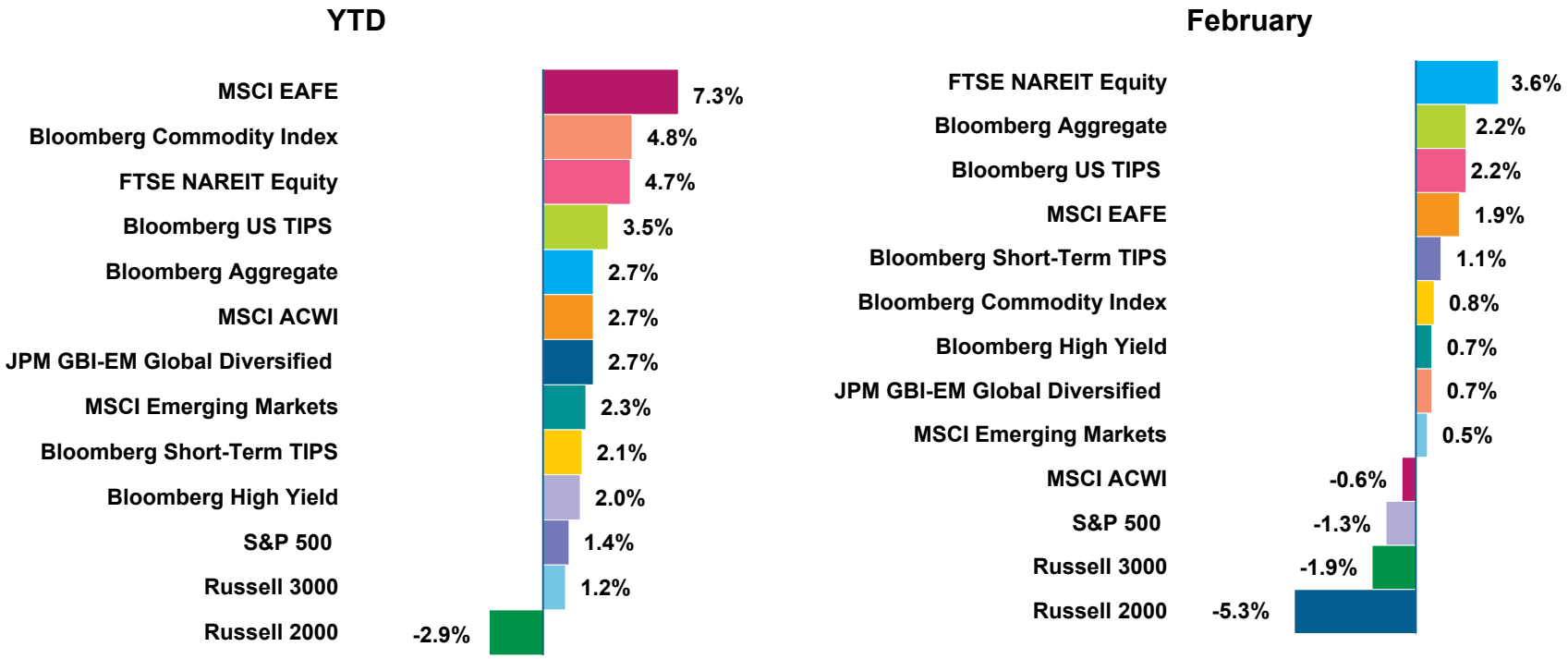
February 2025 Report

Commentary

After a positive start to 2025, stock and bond markets had mixed returns in February with investors largely rotating away from US equities.

- → Domestic equity markets (Russell 3000) fell -1.9% in February, with value outperforming growth.
- → Non-US developed market stocks (MSCI EAFE +1.9%) continued to outperform US markets, supported by rate cuts from the ECB, EU planned increases in defense spending, and a weakening US dollar.
- → Emerging market equities returned +0.5% for the month, underperforming non-US developed markets given tariff risks from the US. However, Chinese stocks rose an impressive +11.8% in February on DeepSeek AI enthusiasm.
- → The Federal Reserve held policy rates steady at the end of January as inflation remained above the target level and the labor market was relatively healthy.
- → Most fixed income markets posted positive returns, with TIPS (+2.2%) and the US bond market (+2.2%) outperforming most other fixed income sectors.
- → Looking ahead, uncertainty related to the Trump Administration's policies and their impact on the economy, inflation, and Fed policy will be key. The path of China's economy and concerns over elevated valuations and technology-driven concentration in the US equity market will also be important focuses of 2025.

Index Returns[1]



- → On a year-to-date basis most major markets remain in positive territory.
- → In February, non-US equities outperformed US equities as markets re-priced their outlook for US stocks in 2025 while fixed income markets benefited from cooling inflation and economic growth.

[1] Source: Bloomberg. Data is as of February 28, 2025.

Domestic Equity Returns[1]

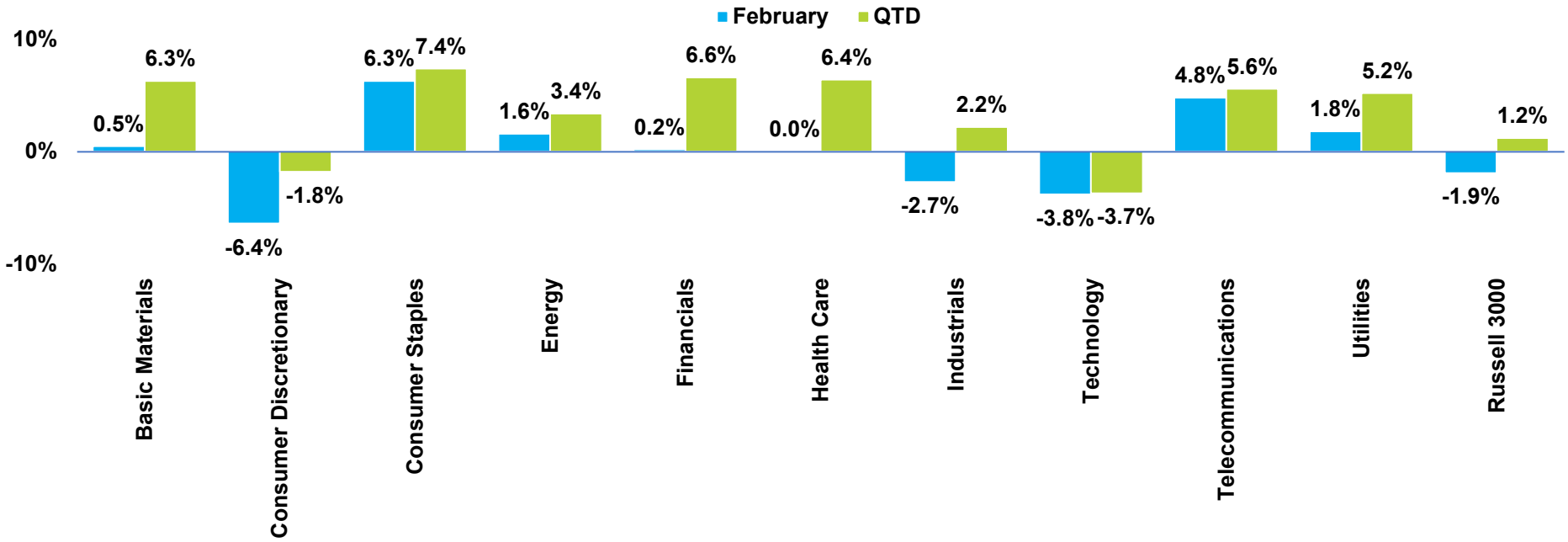
Domestic Equity	February (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
S&P 500	-1.3	1.4	18.4	12.5	16.8	13.0
Russell 3000	-1.9	1.2	17.5	11.6	16.1	12.3
Russell 1000	-1.7	1.4	18.1	12.1	16.5	12.7
Russell 1000 Growth	-3.6	-1.7	19.7	14.8	19.7	16.0
Russell 1000 Value	0.4	5.1	15.8	8.6	12.5	8.9
Russell MidCap	-2.8	1.3	12.2	7.2	12.4	9.3
Russell MidCap Growth	-5.7	0.3	14.5	9.5	12.9	11.0
Russell MidCap Value	-1.8	1.6	11.7	6.1	11.7	8.0
Russell 2000	-5.3	-2.9	6.7	3.3	9.4	7.2
Russell 2000 Growth	-6.8	-3.8	5.8	3.6	7.9	7.2
Russell 2000 Value	-3.8	-1.9	7.6	2.8	10.3	6.9

US Equities: The Russell 3000 fell -1.9% in February, bringing the year-to-date return to +1.2%.

- → After approaching record highs in early February, US stocks finished the month lower. Investors grew concerned over tariff policies, a potentially weakening consumer, and the sustainability of earnings growth from tech stocks.
- → Consumer discretionary stocks (-6.4%) were hardest hit among sectors in February. Tesla was the largest detractor in the Russell 3000 index as the stock dropped ~27% during the month. Other “Magnificent 7” names were among the largest detractors, such as Alphabet (-16%), Amazon (-11%), and Microsoft (-4%).
- → Value stocks outperformed growth stocks during February, continuing the trend from January. This dynamic was most pronounced in the large cap space, where the Russell 1000 Value index was 6.8% ahead of the Russell 1000 Growth index year to date. Small cap stocks declined more than large cap stocks for the month due to weakening growth expectations.

[1] Source: Bloomberg. Data is as of February 28, 2025.

Russell 3000 Sector Returns[1]



- → Sector results were mixed in February with defensive sector consumer staples (+6.3%) leading the way and cyclical consumer discretionary stocks (-6.4%) suffering the largest decline. The drop in consumer discretionary stocks was largely driven by slowing European sales weighing on Tesla's share price.
- → Technology stocks, a previous bright spot, declined in January and in February, with NVIDIA, Broadcom, Microsoft, and Apple driving results.
- → Industrial stocks declined in February amid concerns regarding the sustainability of economic growth, but remain positive for the year so far.

[1] Source: Bloomberg. Data is as of February 28, 2025.

Foreign Equity Returns[1]

Foreign Equity	February (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
MSCI ACWI Ex US	1.4	5.5	9.7	4.6	7.5	4.8
MSCI EAFE	1.9	7.3	8.8	6.4	8.7	5.3
MSCI EAFE (Local Currency)	0.9	5.8	11.4	10.5	10.9	6.8
MSCI EAFE Small Cap	-0.3	3.1	6.4	0.7	5.7	5.2
MSCI Emerging Markets	0.5	2.3	10.1	0.5	4.3	3.5
MSCI Emerging Markets (Local Currency)	0.7	2.3	14.1	3.9	6.5	5.7
MSCI EM ex China	-3.8	-1.8	0.8	0.9	6.9	4.2
MSCI China	11.8	12.8	39.0	0.0	-0.3	2.5

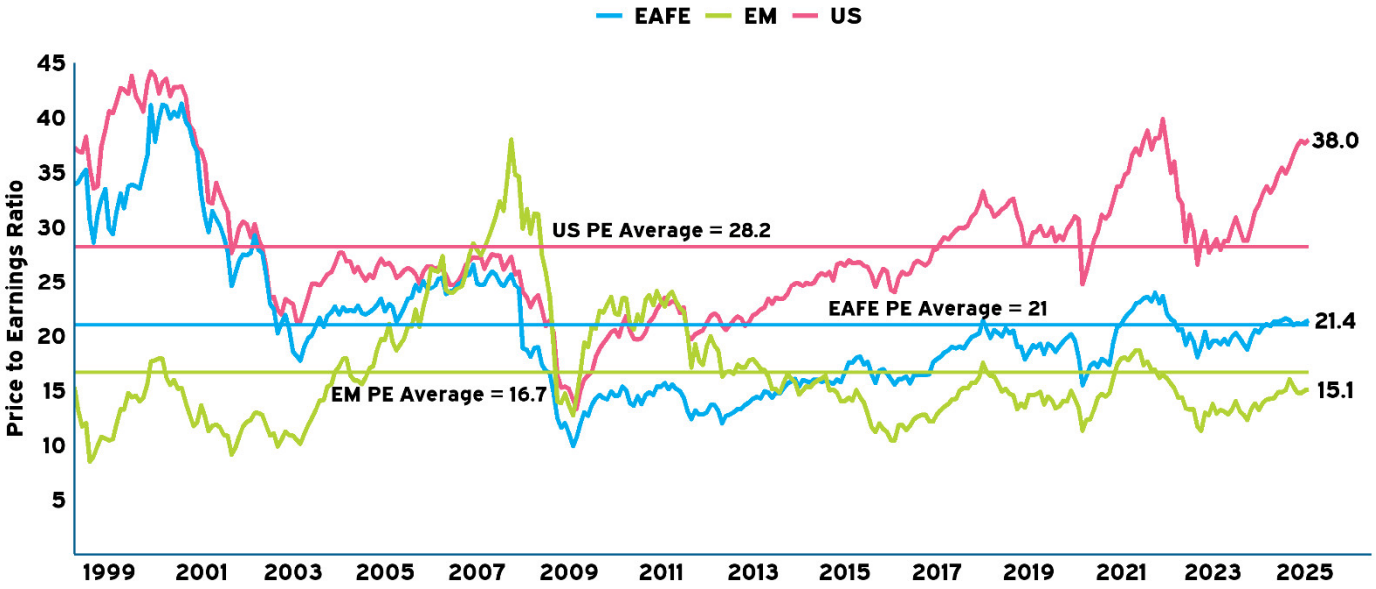
Foreign Equity: Developed international equities (MSCI EAFE) returned 1.4% in February and emerging market equities (MSCI Emerging Markets) rose 0.5%.

→ Developed markets saw modest gains in February, due in part to a weaker USD, outperforming US peers. Eurozone equities were the top performer among developed markets, boosted by continued strength in European financials, a growing focus on defense spending, and the prospect of a ceasefire in Ukraine. The UK followed shortly behind, with a similar story of large banks, defense, and health care driving returns. Japanese stocks fell, with sentiment driven by namely uncertainty surrounding US trade policies.

→ Emerging markets rose slightly in February, with gains driven by China, the top performer globally. China continues to benefit from excitement around DeepSeek, stimulus efforts, and the prospect of a more favorable regulatory environment following meetings between Xi Jingping and major business leaders. South Korea saw slight negative returns following a downgraded GDP growth forecast. Indian equities fell by over 7% amid continued signs of a growth slowdown and stretched valuations.

[1] Source: Bloomberg. Data is as of February 28, 2025.

Equity Cyclically Adjusted P/E Ratios[1]



- → Valuations in US stocks remained at a significant premium to non-US developed and emerging market stocks at the end of February.
- → US equities, priced at 38.0 times earnings, continued to trade well above their long-run P/E average of 28.2.
- → Non-US developed market valuations (21.4 times) are trading near their long-term average. Emerging market valuations (15.1 times) are below their long-run average.

[1] US Equity Cyclically Adjusted P/E on S&P 500 Index. Source: Robert Shiller, Yale University, and Meketa Investment Group. Developed and Emerging Market Equity (MSCI EAFE and EM Index) Cyclically Adjusted P/E Source: Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years. Data is as of February 2025. The average line is the long-term average of the US, EM, and EAFE PE values from April 1998 to the recent month-end, respectively.

Fixed Income Returns[1]

Fixed Income	February (%)	YTD (%)	1 Yr (%)	3 YR (%)	5 YR (%)	10 YR (%)	Current Yield (%)	Duration (Years)
Bloomberg Universal	2.1	2.7	6.3	0.1	-0.1	1.9	4.8	6.0
Bloomberg Aggregate	2.2	2.7	5.8	-0.4	-0.5	1.5	4.6	6.2
Bloomberg US TIPS	2.2	3.5	6.4	-0.8	1.9	2.4	4.3	6.9
Bloomberg Short-term TIPS	1.1	2.1	6.6	2.6	3.6	2.7	4.2	2.5
Bloomberg US Long Treasury	5.2	5.6	3.4	-8.6	-6.6	-0.4	4.5	15.1
Bloomberg High Yield	0.7	2.0	10.1	4.9	4.9	5.1	7.1	3.3
JPM GBI-EM Global Diversified (USD)	-0.7	2.7	2.4	1.7	-0.4	0.8	--	--

Fixed Income: The Bloomberg Universal index rose 2.1% in February.

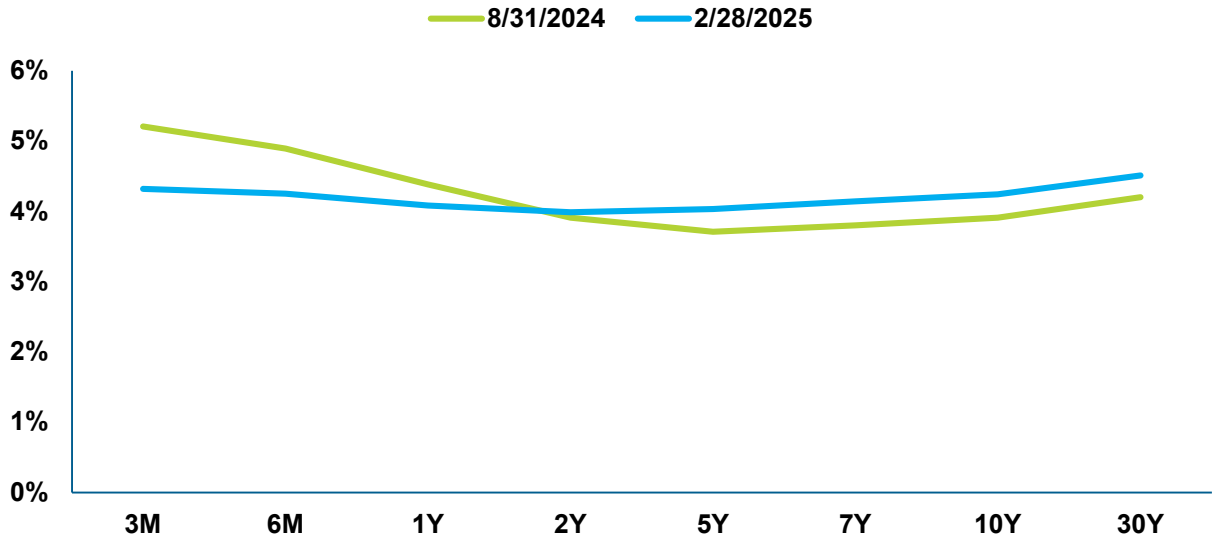
→ Investors sought the safety of high quality bonds in February given policy uncertainty in the US and weakening economic data particularly related to the consumer. Corporate bonds did not perform as well in this risk adverse environment.

→ The broad US bond market (Bloomberg Aggregate) rose 2.2% for the month, along with the broad US TIPS index. Long-term Treasuries performed particularly well in the declining interest rate environment.

→ High yield bonds experienced less demand from investors, and emerging market debt fell.

[1] Source: Bloomberg. Data is as of February 28, 2025. The yield and duration data from Bloomberg is defined as the index's yield to worst and modified duration, respectively. JPM GBI-EM data is from J.P. Morgan. Current yield and duration data is not available.

US Yield Curve[1]

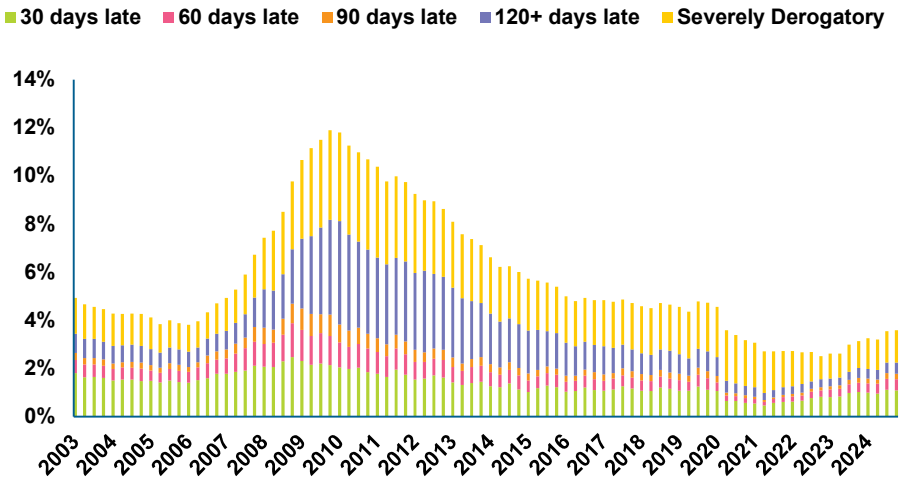


- → US Treasury yields declined significantly over the month, as investors expressed concern about the potential policies of the new US administration, economic data related to consumers weakened, and overall growth expectations fell.
- → The more policy sensitive 2-year Treasury yield fell from 4.20% to 3.99%, while the 10-year Treasury yield declined from 4.54% to 4.24%.
- → After the Fed started reducing interest rates in September 2024, the yield curve stopped being inverted (short-term interest rates higher than long-term interest rates) given expectations for inflation to continue to decline and policy rates to continue lower.

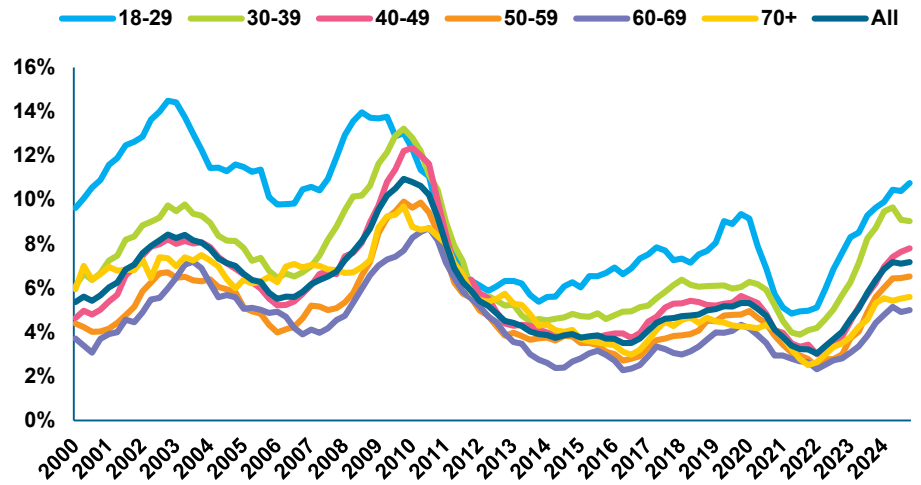
[1] Source: Bloomberg. Data is as of February 28, 2025. The August 2024 Treasury yields are shown as a reference before the first interest rate cut.

Stress is Building on US Consumers

Total Balance by Delinquency Status[1]



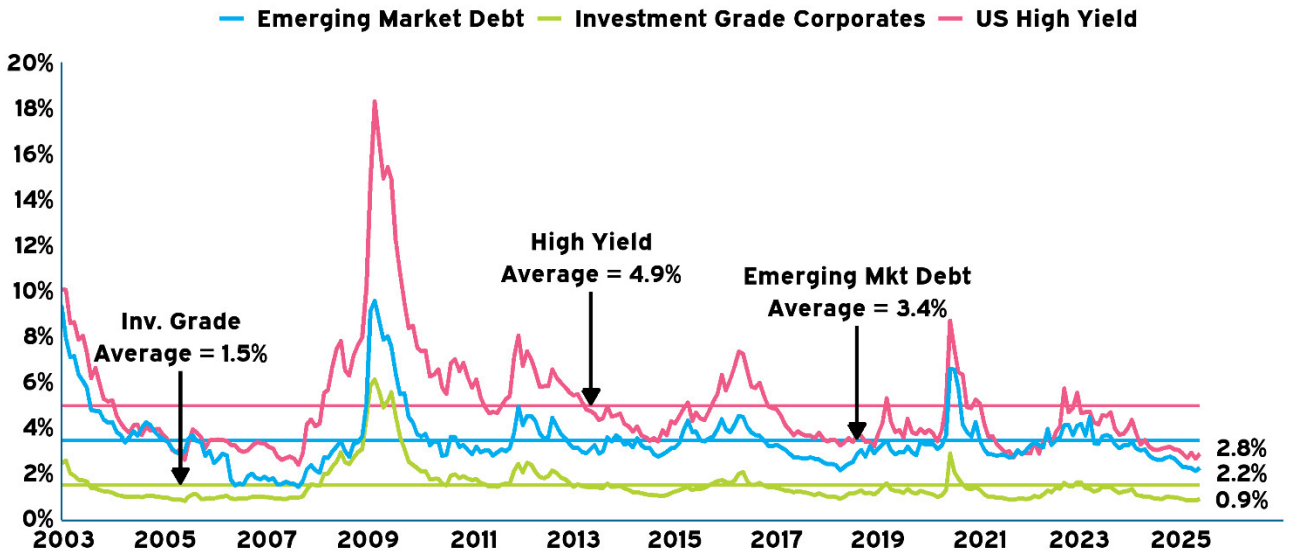
Transition into Serious Delinquency for Credit Cards by Age[2]



- → Some signs of stress on the US consumer have started to emerge given persistently higher prices and interest rates.
- → After falling to historic lows during the pandemic, loan delinquencies recently started rising.
- → While some segments of the credit market have started to show signs of stress, total delinquencies remain well below pre-pandemic levels.
- → While total delinquency rates are below pre-pandemic rates, the credit card segment is showing more signs of distress where borrowers are subject to variable and higher borrowing costs.
- → Credit card delinquencies are rising rapidly, especially for borrowers under the age of 40.

[1] Source: New York Federal Reserve, Quarterly Household Debt and Credit Report, February 2025. See also FRED. Data is as of February 28, 2025.
[2] Source: FRED. Data is as of February 28, 2025.

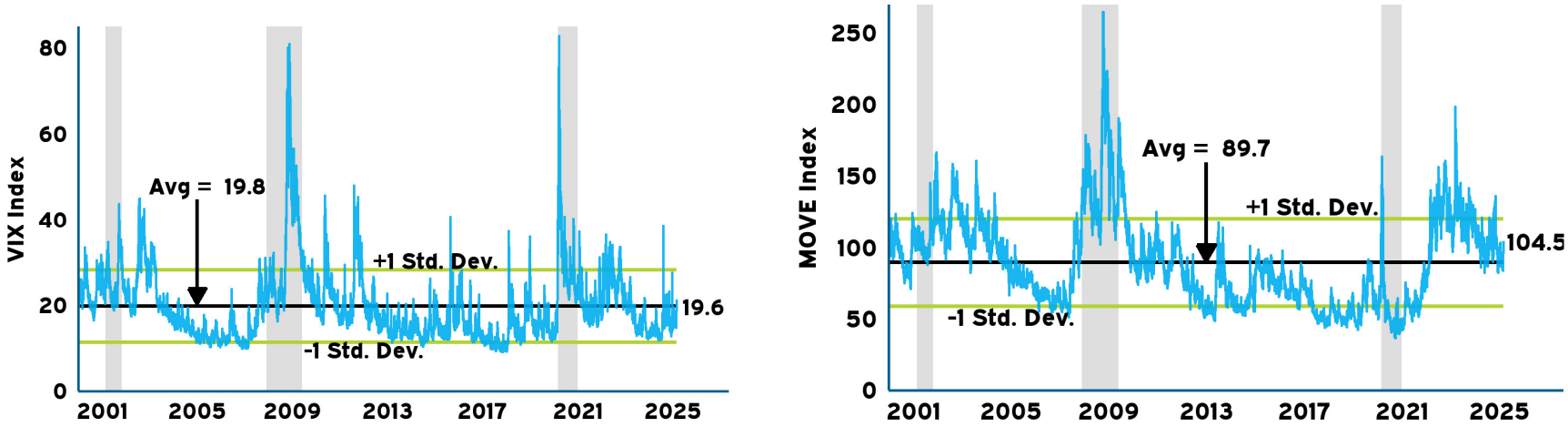
Credit Spreads vs. US Treasury Bonds[1]



- → Spreads (the yield above a comparable maturity Treasury) widened slightly in February for riskier bonds and were stable for investment grade issues.
- → All yield spreads remained below their respective long-run averages, particularly high yield (2.8% versus 4.9%).
- → Although spreads are tight, absolute yields remain at above-average levels compared to the last two decades.

[1] Source: Bloomberg. Data is as February 28, 2025. Average lines denote the average of the investment grade, high yield, and emerging market spread values from September 2002 to the recent month-end, respectively.

Equity and Fixed Income Volatility[1]

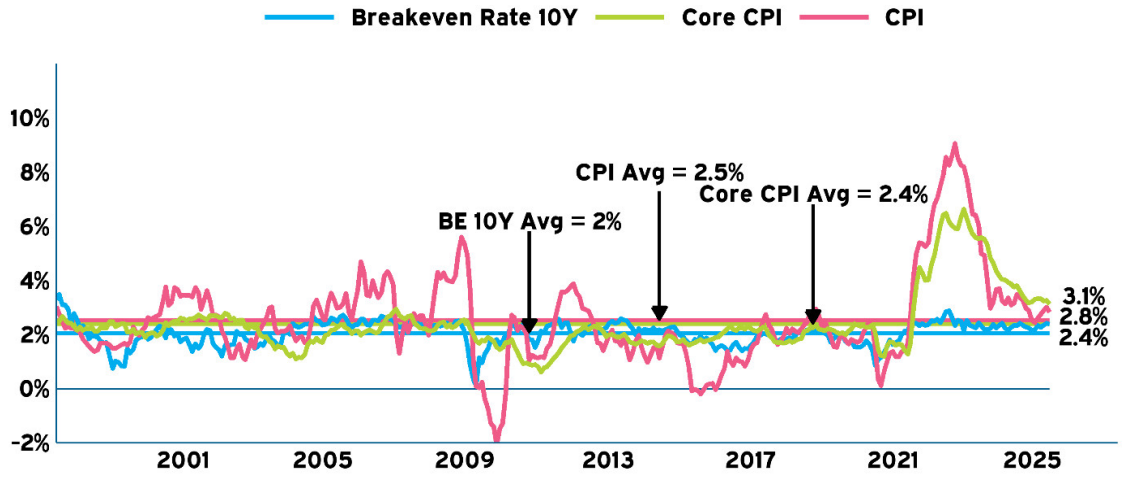


→ Bond and equity volatility rose in February mainly driven by policy and trade uncertainty.

→ Volatility levels (VIX) in the US stock market finished February below its long-run average, while volatility in the bond market (MOVE) finished the month above its long-run average.

[1] Equity Volatility – Source: FRED. Fixed Income Volatility – Source: Bloomberg. Implied volatility as measured using VIX Index for equity markets and the MOVE Index to measure interest rate volatility for fixed income markets. Data is as of February 28, 2025. The average line indicated is the average of the VIX and MOVE values between January 2000 and February 2025.

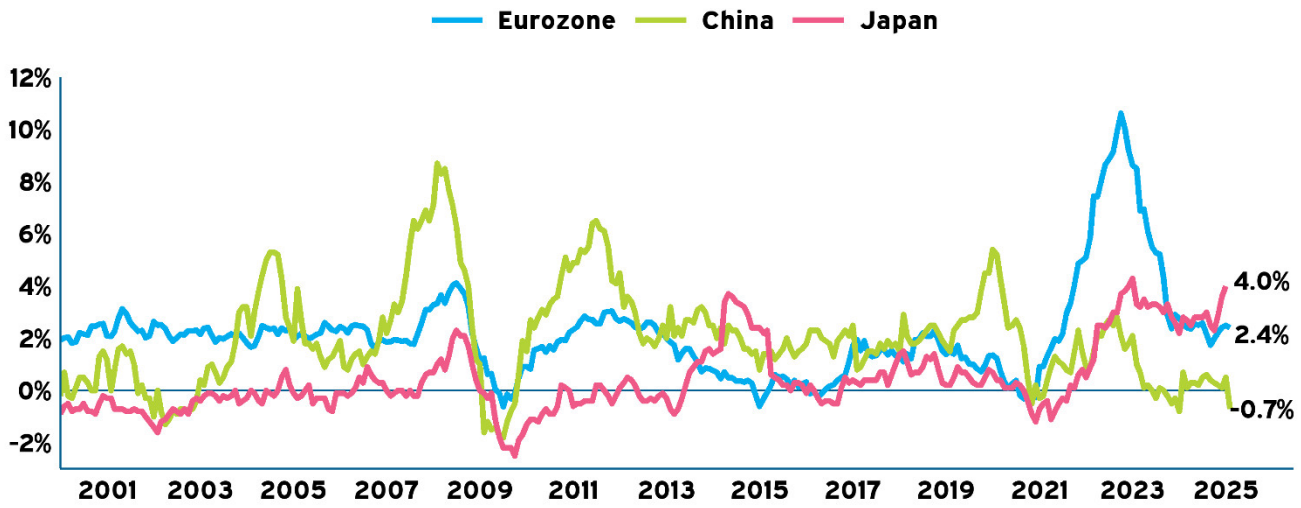
US Ten-Year Breakeven Inflation and CPI[1]



- In February, inflation came in slightly below expectations, month-over-month (0.2% versus 0.3%) and fell compared to the January level of 0.5%; headline inflation rose 2.8% over the past twelve months also a decline from the prior reading and below of expectations of 2.9%.
- Shelter continued to drive both headline and core inflation in February, with the shelter index rising 0.3% month-over-month and accounting for nearly half of the headline inflation for the month.
- Core inflation rose 0.2% month-over-month in February and increased 3.1% year-on-year (both below expectations and below the January readings). Owners' equivalent rent rose 4.2% over the last 12 months, while vehicle insurance (11.1%), medical care (2.9%), and education (3.7%) also contributed to core inflation.
- Inflation expectations (breakevens) fell slightly over the month as concerns related to the potential inflationary impacts of the new US administration's policies shifted to concerns over economic growth.

[1] Source: FRED. Data is as of February 2025. The CPI and 10 Year Breakeven average lines denote the average values from February 1997 to the present month-end, respectively. Breakeven values represent month-end values for comparative purposes.

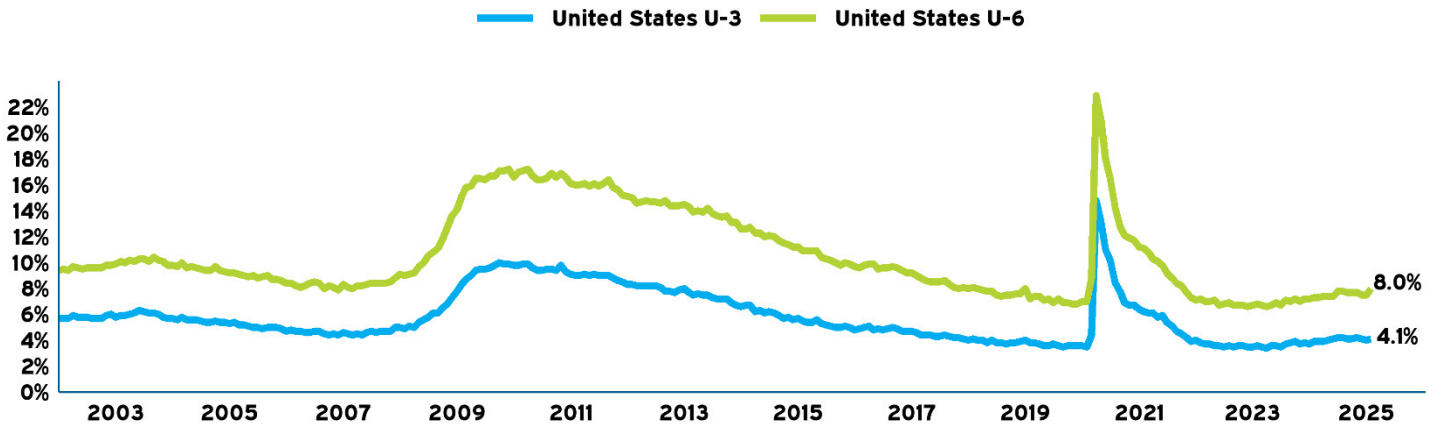
Global Inflation (CPI Trailing Twelve Months)[1]



- → After four monthly increases, inflation in the eurozone declined slightly (2.5% to 2.4%) in February, but levels remain below the US. The increase from the lows was driven by last year's significant fall in energy prices no longer being included in the calculation.
- → The latest reading of inflation in Japan rose from 3.6% to 4.0% due in part to an increase in food prices and the end of energy subsidies driving electricity and gas prices higher.
- → In China, despite record policy stimulus consumer prices fell in February by 0.7% (exceeding the expectations of a 0.5% decline). Despite years of policy stimulus to counter the real estate crisis, the Chinese consumer has remained weak; contributing to the first negative inflation print since January 2024.

[1] Source: Bloomberg. Data is as February 2025, except Japan which is as of January 2025.

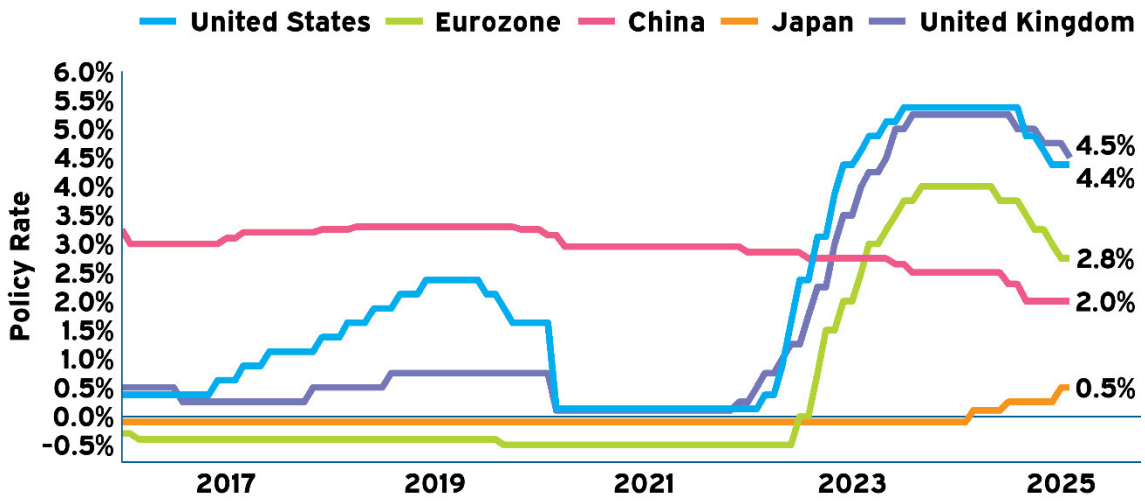
US Unemployment[1]



- → The US economy added 151,000 jobs in February below expectations for 160,000 new jobs with the unemployment rate rising slightly from 4.0% to 4.1%, with 7.1 million jobseekers looking for work (little changed from the prior reading).
- → A broader measure of total unemployed (U-6) that includes those marginally attached to the labor force and employed part-time for economic reasons, rose slightly to 8.0%, the highest level since late 2021.
- → Health care, financial activities, transport/warehouse, and social assistance sectors added jobs in February while the Federal government lost 10,000 jobs in the month.
- → The last reading of job openings came in at around 7.7 million, a level well below the pandemic highs (>12 million); the number of openings exceeds the number of unemployed workers looking for work (7.1 million).
- → Separations (5.3 million) and hires (5.4 million) remained steady and average hourly wages continued to grow at approximately 4.0% a year.

[1] Source: FRED and BLS. Data is as of February 28, 2025.

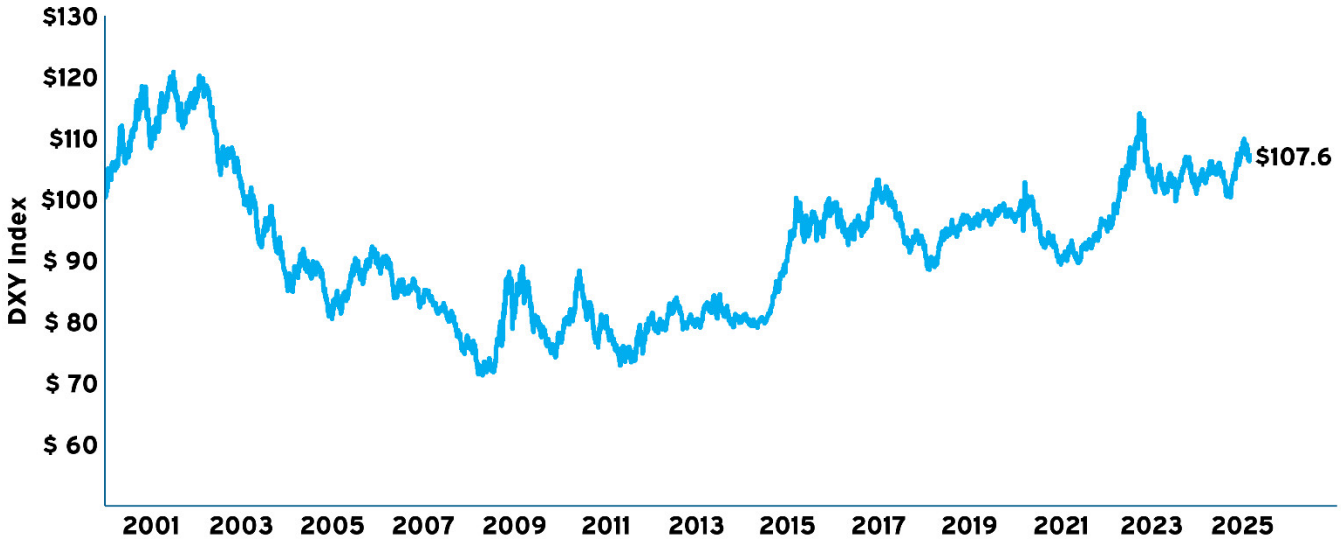
Policy Rates[1]



- → The Fed kept US interest rates steady at their January meeting after reducing rates by 0.25% twice over the final quarter of 2024 to a range of 4.25% to 4.50%. Given growing concerns about growth, markets recently increased expectations for the amount of rate cuts in 2025 to between two and three.
- → In February, the Bank of England cut interest rates for the third time by 0.25% to 4.5%, and after month-end the European Central Bank cut rates by another 0.25% to 2.5%. The People's Bank of China also continues to maintain measures to try to stimulate the economy with increasing debt issuance and defending the yuan.
- → In contrast to many other central banks, the Bank of Japan increased interest rates in January to 0.5%, in the face of persistent inflation. Rate cutting by other major central banks are complicating prospects for further policy rate hikes in Japan.

[1] Source: Bloomberg. Data is as of February 28, 2025. United States rate is the mid-point of the Federal Funds Target Rate range. Eurozone rate is the ECB Deposit Facility Announcement Rate. Japan rate is the Bank of Japan Unsecured Overnight Call Rate Expected. China rate is the China Central Bank 1-Year Medium Term Interest Rate. UK rate is the UK Bank of England Official Bank Rate.

US Dollar vs. Broad Currencies[1]



- → After largely strengthening through 2024 the US dollar recently started to weaken.
- → Concerns over slower growth in the US and corresponding lower yields have recently weighed on the value of the dollar.

[1] Source: Bloomberg. Data as of February 28, 2025.

Summary

Key Trends:

- According to the International Monetary Fund's (IMF) January report, global growth in 2025 is expected to be slightly higher than 2024 (3.3% versus 3.2%). Growth forecast in the US (+2.7%) and China (+4.6%) are lower for this year compared to last, while growth in the EU (+1.0%) is projected to be slightly higher in 2025.
- Questions remain about what policies will be implemented by the new administration in the US, with particularly concerns about tariffs' potential impact on growth. Although deregulation and tax cuts could support growth, these policies, along with higher tariffs and restrictive immigration, could fan inflation. This will likely lead to additional uncertainty regarding the timing and pace of interest rate cuts in the coming year.
- Signs of pressure have started to emerge on the US consumer with sentiment weakening. Overall risk to economic growth and to inflation from tariffs, as well elevated borrowing costs, could put further pressure on consumers and lead to a weaker job market.
- US equities have recently come under pressure. A focus going forward will be whether earnings can remain resilient if growth slows. Also, the future paths of the large technology companies that have driven market gains will continue to be important.
- We have started to see divergence in monetary policies. The Fed is likely to cut interest rates at a much slower pace than previously expected in 2025. On the other hand, additional rate cuts are expected from the European Central Bank and the Bank of England, while the Bank of Japan has increased interest rates. This disparity will likely influence capital flows and currencies.
- China appears to have shifted focus to more policy support for the economy/asset prices with a suite of fiscal and financial policy stimulus measures. Advances in AI technologies have also contributed to optimism. Despite the policy support consumer spending remains weak and issues remain in the real estate sector. It is not clear what the long-term economic impact of these policies will be, and if policy makers will remain committed to these efforts.

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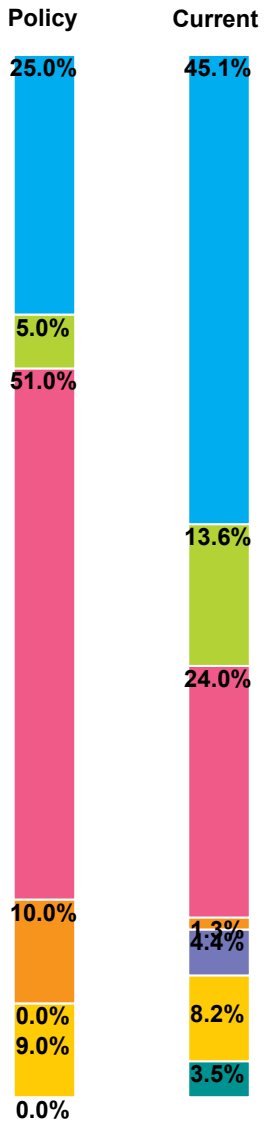
MEKETA

Oakland Police and Fire Retirement System

March 26, 2025

February Flash Report

As of February 28, 2025



Allocation vs. Targets and Policy

	Balance ($)	Current (%)	Long-Term Policy (%)	Difference (%)	Interim Policy (%)	Policy Range (%)	Within Range?
Domestic Equity	212,308,645	45.1	25.0	20.1	34.0	15.0 - 35.0	No
International Equity	64,100,061	13.6	5.0	8.6	12.0	2.0 - 22.0	Yes
Fixed Income	113,179,337	24.0	51.0	-27.0	44.0	31.0 - 71.0	No
Credit	6,022,488	1.3	10.0	-8.7	0.0	0.0 - 16.0	Yes
Covered Calls	20,573,694	4.4	0.0	4.4	0.0	0.0 - 5.0	Yes
Crisis Risk Offset	38,443,626	8.2	9.0	-0.8	10.0	4.0 - 14.0	Yes
Cash	16,496,878	3.5	0.0	3.5	0.0	0.0 - 5.0	Yes
Total	**471,124,727**	**100.0**	**100.0**	**0.0**	**100.0**		

The new asset allocation policy established after the completion of the 2023 Asset-Liability Study became effective in July 2024. The asset classes may be out of policy ranges due to pending transitions.

Asset Class Performance Summary | As of February 28, 2025

Asset Class Performance Summary

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	FYTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	Inception Date
OPFRS Total Plan	**471,124,727**	**100.0**	**0.0**	**2.4**	**6.4**	**9.0**	**4.8**	**7.2**	**6.7**	**6.7**	**Dec-88**
OPFRS Policy Benchmark			*0.6*	*2.4*	*6.4*	*10.5*	*5.9*	*7.9*	*7.1*	*8.0*	
Excess Return			-0.6	-0.1	0.0	-1.5	-1.2	-0.7	-0.4	-1.3	
Domestic Equity	**212,308,645**	**45.1**	**-1.9**	**1.2**	**9.3**	**12.9**	**8.6**	**13.7**	**10.9**	**9.2**	**Jun-97**
Russell 3000 (Blend)			*-1.9*	*1.2*	*10.3*	*17.5*	*11.6*	*16.1*	*12.4*	*9.8*	
Excess Return			0.0	0.1	-1.0	-4.6	-2.9	-2.5	-1.4	-0.5	
International Equity	**64,100,061**	**13.6**	**1.4**	**6.1**	**6.9**	**10.4**	**6.6**	**8.5**	**6.0**	**5.6**	**Jan-98**
MSCI ACWI ex US (Blend)			*1.4*	*5.5*	*5.3*	*9.7*	*4.6*	*7.6*	*4.8*	*5.3*	
Excess Return			0.0	0.6	1.6	0.7	1.9	0.9	1.2	0.3	
Fixed Income	**113,179,337**	**24.0**	**2.4**	**2.9**	**4.9**	**6.0**	**-0.2**	**-0.1**	**2.0**	**4.5**	**Jan-94**
Fixed Income & Credit Benchmark			*2.2*	*2.7*	*5.1*	*6.4*	*0.1*	*-0.1*	*1.9*	*4.5*	
Excess Return			0.2	0.2	-0.2	-0.4	-0.3	0.0	0.1	-0.1	
Credit	**6,022,488**	**1.3**	**0.5**	**1.5**	**5.3**	**8.0**	**4.7**	**5.9**	**5.1**	**5.3**	**Feb-15**
Blmbg. U.S. Corp: High Yield Index			*0.7*	*2.0*	*7.6*	*10.1*	*4.9*	*4.9*	*5.1*	*5.3*	
Excess Return			-0.1	-0.5	-2.3	-2.1	-0.2	0.9	0.0	0.0	
Covered Calls	**20,573,694**	**4.4**	**-0.5**	**1.9**	**9.6**	**15.7**	**10.3**	**13.8**	**10.2**	**9.9**	**Apr-14**
Cboe S&P 500 Buy Write Index			*-0.6*	*1.6*	*13.5*	*17.7*	*7.7*	*9.2*	*7.0*	*6.8*	
Excess Return			0.0	0.2	-3.8	-2.0	2.6	4.6	3.2	3.1	
Crisis Risk Offset	**38,443,626**	**8.2**	**1.7**	**2.5**	**-2.9**	**-2.6**	**-3.6**	**-8.6**	**--**	**-6.5**	**Aug-18**
Crisis Risk Offset Benchmark			*0.7*	*1.4*	*-0.4*	*1.1*	*3.6*	*1.1*	*--*	*0.5*	
Excess Return			1.0	1.1	-2.4	-3.7	-7.1	-9.6	--	-7.0	
Cash	**16,496,878**	**3.5**	**0.0**	**0.2**	**0.6**	**0.9**	**0.3**	**0.3**	**0.8**	**0.6**	**Mar-11**

Performance shown is net of fees, except for Total Plan, Domestic Equity, and International Equity composites which have a mix of gross and net of fees performance. Please see the Addendum for more details.
Since inception date and performance begin in the month following an investment's initial funding. Fiscal year begins on July 1. Please see Benchmark History section for custom benchmark compositions.

Asset Class & Manager Performance | As of February 28, 2025

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	FYTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	Inception Date
OPFRS Total Plan	**471,124,727**	**100.0**	**0.0**	**2.4**	**6.4**	**9.0**	**4.8**	**7.2**	**6.7**	**6.7**	**Dec-88**
OPFRS Policy Benchmark			*0.6*	*2.4*	*6.4*	*10.5*	*5.9*	*7.9*	*7.1*	*8.0*	
Excess Return			-0.6	-0.1	0.0	-1.5	-1.2	-0.7	-0.4	-1.3	
Domestic Equity	**212,308,645**	**45.1**	**-1.9**	**1.2**	**9.3**	**12.9**	**8.6**	**13.7**	**10.9**	**9.2**	**Jun-97**
Russell 3000 (Blend)			*-1.9*	*1.2*	*10.3*	*17.5*	*11.6*	*16.1*	*12.4*	*9.8*	
Excess Return			0.0	0.1	-1.0	-4.6	-2.9	-2.5	-1.4	-0.5	
Northern Trust Russell 1000	111,341,190	23.6	-1.8	1.4	10.4	18.0	12.0	16.4	12.6	14.1	Jun-10
Russell 1000 Index			*-1.7*	*1.4*	*10.5*	*18.1*	*12.1*	*16.5*	*12.7*	*14.2*	
Excess Return			0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	
EARNEST Partners	41,754,921	8.9	-3.6	0.5	5.3	4.4	4.1	11.5	10.5	9.2	Apr-06
Russell Midcap Index			*-2.8*	*1.3*	*11.3*	*12.2*	*7.2*	*12.4*	*9.3*	*9.1*	
Excess Return			-0.8	-0.8	-6.0	-7.9	-3.1	-0.9	1.2	0.1	
Wellington Select Quality Equity	26,120,583	5.5	0.1	2.3	8.0	8.7	--	--	--	8.3	May-22
Russell 1000 Index			*-1.7*	*1.4*	*10.5*	*18.1*	*--*	*--*	*--*	*15.2*	
Excess Return			1.9	0.9	-2.5	-9.4	--	--	--	-6.9	
Brown Fundamental Small Cap Value	14,304,364	3.0	-4.2	-3.3	5.4	7.4	7.7	--	--	7.0	Apr-21
Russell 2000 Value Index			*-3.8*	*-1.9*	*7.0*	*7.6*	*2.8*	*--*	*--*	*2.5*	
Excess Return			-0.4	-1.4	-1.6	-0.2	4.9	--	--	4.5	
Rice Hall James	18,787,587	4.0	-0.4	4.4	17.1	15.2	5.1	10.3	--	8.3	Aug-17
Russell 2000 Growth Index			*-6.8*	*-3.8*	*6.0*	*5.8*	*3.6*	*7.9*	*--*	*7.4*	
Excess Return			6.4	8.2	11.1	9.3	1.5	2.4	--	0.9	

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Asset Class & Manager Performance | As of February 28, 2025

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	FYTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	Inception Date
International Equity	**64,100,061**	**13.6**	**1.4**	**6.1**	**6.9**	**10.4**	**6.6**	**8.5**	**6.0**	**5.6**	**Jan-98**
MSCI ACWI ex US (Blend)			*1.4*	*5.5*	*5.3*	*9.7*	*4.6*	*7.6*	*4.8*	*5.3*	
Excess Return			0.0	0.6	1.6	0.7	1.9	0.9	1.2	0.3	
Vanguard Developed Markets ETF	17,101,556	3.6	2.3	6.8	5.2	8.4	5.5	8.5	--	7.7	Sep-19
FTSE Developed All Cap ex-U.S. Index			*1.4*	*6.3*	*5.4*	*8.6*	*5.6*	*8.9*	*--*	*8.0*	
Excess Return			0.8	0.5	-0.2	-0.2	-0.1	-0.4	--	-0.2	
SGA ACWI ex-U.S. Equity	46,998,505	10.0	1.1	5.8	7.6	11.1	6.9	8.6	--	6.3	Dec-19
MSCI AC World ex USA (Net)			*1.4*	*5.5*	*5.3*	*9.7*	*4.6*	*7.6*	*--*	*5.8*	
Excess Return			-0.3	0.3	2.3	1.4	2.3	1.1	--	0.5	
Fixed Income	**113,179,337**	**24.0**	**2.4**	**2.9**	**4.9**	**6.0**	**-0.2**	**-0.1**	**2.0**	**4.5**	**Jan-94**
Fixed Income & Credit Benchmark			*2.2*	*2.7*	*5.1*	*6.4*	*0.1*	*-0.1*	*1.9*	*4.5*	
Excess Return			0.2	0.2	-0.2	-0.4	-0.3	0.0	0.1	-0.1	
Ramirez	76,644,195	16.3	2.4	3.0	4.8	5.7	-0.3	-0.4	--	2.0	Jan-17
Blmbg. U.S. Aggregate Index			*2.2*	*2.7*	*4.8*	*5.8*	*-0.4*	*-0.5*	*--*	*1.6*	
Excess Return			0.2	0.2	0.0	-0.1	0.1	0.1	--	0.4	
Wellington Core Bond	7,363,315	1.6	2.3	2.8	5.1	6.6	0.0	--	--	-0.5	Apr-21
Blmbg. U.S. Aggregate Index			*2.2*	*2.7*	*4.8*	*5.8*	*-0.4*	*--*	*--*	*-0.7*	
Excess Return			0.1	0.1	0.3	0.8	0.4	--	--	0.2	
Reams	29,171,826	6.2	2.4	2.9	5.1	6.4	0.3	2.2	3.0	4.9	Feb-98
Fixed Income & Credit Benchmark			*2.2*	*2.7*	*5.1*	*6.4*	*0.1*	*-0.1*	*1.9*	*4.2*	
Excess Return			0.2	0.2	0.0	0.0	0.2	2.3	1.2	0.7	

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Asset Class & Manager Performance | As of February 28, 2025

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	FYTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	Inception Date
Credit	**6,022,488**	**1.3**	**0.5**	**1.5**	**5.3**	**8.0**	**4.7**	**5.9**	**5.1**	**5.3**	**Feb-15**
Blmbg. U.S. Corp: High Yield Index			*0.7*	*2.0*	*7.6*	*10.1*	*4.9*	*4.9*	*5.1*	*5.3*	
Excess Return			-0.1	-0.5	-2.3	-2.1	-0.2	0.9	0.0	0.0	
Polen Capital	6,022,488	1.3	0.5	1.5	5.3	8.0	4.7	5.9	5.1	5.3	Feb-15
ICE BofA U.S. High Yield Index			*0.7*	*2.0*	*7.6*	*10.1*	*4.9*	*4.8*	*5.0*	*5.2*	
Excess Return			-0.1	-0.5	-2.3	-2.0	-0.2	1.1	0.1	0.1	
Covered Calls	**20,573,694**	**4.4**	**-0.5**	**1.9**	**9.6**	**15.7**	**10.3**	**13.8**	**10.2**	**9.9**	**Apr-14**
Cboe S&P 500 Buy Write Index			*-0.6*	*1.6*	*13.5*	*17.7*	*7.7*	*9.2*	*7.0*	*6.8*	
Excess Return			0.0	0.2	-3.8	-2.0	2.6	4.6	3.2	3.1	
Parametric BXM	9,836,826	2.1	-0.1	2.0	9.7	14.9	8.9	11.2	8.4	8.0	Apr-14
Cboe S&P 500 Buy Write Index			*-0.6*	*1.6*	*13.5*	*17.7*	*7.7*	*9.2*	*7.0*	*6.8*	
Excess Return			0.5	0.4	-3.8	-2.8	1.2	2.1	1.4	1.2	
Parametric DeltaShift	10,736,867	2.3	-0.9	1.7	9.6	16.5	11.5	16.0	11.6	11.9	Apr-14
Cboe S&P 500 Buy Write Index			*-0.6*	*1.6*	*13.5*	*17.7*	*7.7*	*9.2*	*7.0*	*6.8*	
Excess Return			-0.4	0.1	-3.9	-1.2	3.8	6.8	4.6	5.1	

Performance shown is net of fees. Since inception date and performance begin in the month following an investments initial funding. Fiscal year begins on July 1. Please see the Benchmark History for custom benchmark compositions.

Asset Class & Manager Performance | As of February 28, 2025

	Market Value ($)	% of Portfolio	1 Mo (%)	QTD (%)	FYTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	Inception Date
Crisis Risk Offset	**38,443,626**	**8.2**	**1.7**	**2.5**	**-2.9**	**-2.6**	**-3.6**	**-8.6**	**--**	**-6.5**	**Aug-18**
Crisis Risk Offset Benchmark			*0.7*	*1.4*	*-0.4*	*1.1*	*3.6*	*1.1*	*--*	*0.5*	
Excess Return			1.0	1.1	-2.4	-3.7	-7.1	-9.6	--	-7.0	
Kepos Alternative Risk Premia	13,406,042	2.8	3.5	7.1	10.6	15.9	10.5	--	--	10.0	Feb-22
SG Multi Alternative Risk Premia Index			*0.2*	*1.7*	*3.0*	*7.1*	*7.4*	*--*	*--*	*6.9*	
Excess Return			3.3	5.4	7.6	8.8	3.1	--	--	3.0	
Versor Trend Following	12,065,057	2.6	-3.5	-5.1	-19.6	-21.5	--	--	--	-7.2	Apr-22
SG Trend Index			*-3.2*	*-3.0*	*-8.5*	*-7.7*	*--*	*--*	*--*	*1.1*	
Excess Return			-0.3	-2.0	-11.1	-13.9	--	--	--	-8.3	
Vanguard Long-Term Treasury ETF	12,972,526	2.8	5.1	5.8	4.0	3.3	-8.6	-6.7	--	-3.1	Jul-19
Blmbg. U.S. Gov Long Index			*5.2*	*5.6*	*4.1*	*3.4*	*-8.6*	*-6.6*	*--*	*-3.1*	
Excess Return			0.0	0.1	-0.1	-0.1	0.0	-0.1	--	0.0	
Cash	**16,496,878**	**3.5**	**0.0**	**0.2**	**0.6**	**0.9**	**0.3**	**0.3**	**0.8**	**0.6**	**Mar-11**

Performance shown is net of fees. Since inception date and performance begin in the month following an investments initial funding. Fiscal year begins on July 1. Please see the Benchmark History for custom benchmark compositions.

Financial Reconciliation | February 28, 2025

Cash Flow Summary Month to Date

	Beginning Market Value($)	Net Cash Flow($)	Net Investment Change($)	Ending Market Value($)
Northern Trust Russell 1000	113,324,976	-	-1,983,786	111,341,190
EARNEST Partners	43,301,851	-	-1,546,930	41,754,921
Wellington Select Quality Equity	27,582,871	-1,500,000	37,712	26,120,583
Brown Fundamental Small Cap Value	14,926,652	-	-622,287	14,304,364
Rice Hall James	18,845,731	-	-58,144	18,787,587
Vanguard Developed Markets ETF	16,723,158	-	378,397	17,101,556
SGA ACWI ex-U.S. Equity	46,467,049	-	531,456	46,998,505
Ramirez	74,852,772	-	1,791,424	76,644,195
Wellington Core Bond	7,197,552	-	165,764	7,363,315
Reams	28,493,972	-	677,854	29,171,826
Polen Capital	5,989,978	-	32,510	6,022,488
Parametric BXM	9,844,571	-	-7,745	9,836,826
Parametric DeltaShift	10,835,523	-	-98,656	10,736,867
Kepos Alternative Risk Premia	12,952,698	-	453,344	13,406,042
Versor Trend Following	12,497,171	-	-432,114	12,065,057
Vanguard Long-Term Treasury ETF	12,383,068	-45,978	635,436	12,972,526
Cash - Money Market	6,569,353	79,625	6,900	6,655,878
Cash - Treasury	9,974,000	-133,000	-	9,841,000
Securities Lending Northern Trust	-	-11,522	11,522	-
OPFRS Total Plan	**472,762,945**	**-1,610,875**	**-27,343**	**471,124,727**

Benchmark History		
From Date	To Date	Benchmark
OPFRS Total Plan		
01/01/2025	Present	34.0% Russell 3000 Index, 12.0% MSCI AC World ex USA (Net), 44.0% Blmbg. U.S. Aggregate Index, 10.0% Crisis Risk Offset Benchmark
07/01/2024	01/01/2025	34.0% Russell 3000 Index, 12.0% MSCI AC World ex USA (Net), 44.0% Blmbg. U.S. Universal Index, 10.0% Crisis Risk Offset Benchmark
06/01/2022	07/01/2024	40.0% Russell 3000 Index, 12.0% MSCI AC World ex USA (Net), 31.0% Blmbg. U.S. Universal Index, 2.0% Blmbg. U.S. Corp: High Yield Index, 5.0% Cboe S&P 500 Buy Write Index, 10.0% Crisis Risk Offset Benchmark
01/01/2019	06/01/2022	40.0% Russell 3000 Index, 12.0% MSCI AC World ex USA index, 31.0% Blmbg. U.S. Universal Index, 5.0% Cboe S&P 500 Buy Write Index, 2.0% Blmbg. U.S. Treasury: Long, 10.0% Crisis Risk Offset Benchmark
05/01/2016	01/01/2019	48.0% Russell 3000 Index, 12.0% MSCI AC World ex USA index, 20.0% Blmbg. U.S. Universal Index, 20.0% CBOE BXM
10/01/2015	05/01/2016	43.0% Russell 3000 Index, 12.0% MSCI AC World ex USA index, 20.0% Blmbg. U.S. Universal Index, 15.0% CBOE BXM, 10.0% CPI - All Urban Consumers (unadjusted) +3%
01/01/2014	10/01/2015	48.0% Russell 3000 Index, 12.0% MSCI AC World ex USA index, 20.0% Blmbg. U.S. Universal Index, 10.0% CBOE BXM, 10.0% CPI - All Urban Consumers (unadjusted) +3%
03/01/2013	01/01/2014	40.0% Russell 3000 Index, 10.0% MSCI AC World ex USA index, 17.0% Blmbg. U.S. Universal Index, 33.0% ICE BofA 3 Month U.S. T-Bill
08/01/2012	03/01/2013	20.0% Russell 3000 Index, 7.0% MSCI AC World ex USA index, 18.0% Blmbg. U.S. Universal Index, 55.0% ICE BofA 3 Month U.S. T-Bill
10/01/2007	08/01/2012	53.0% Russell 3000 Index, 17.0% MSCI AC World ex USA index, 30.0% Blmbg. U.S. Universal Index
04/01/2006	10/01/2007	35.0% Russell 3000 Index, 15.0% MSCI AC World ex USA index, 50.0% Blmbg. U.S. Universal Index
01/01/2005	04/01/2006	35.0% Russell 3000 Index, 50.0% Blmbg. U.S. Aggregate Index, 15.0% MSCI AC World ex USA index
04/01/1998	01/01/2005	20.0% Russell 1000 Value Index, 10.0% Russell 1000 Index, 5.0% Russell Midcap Index, 50.0% Blmbg. U.S. Aggregate Index, 15.0% MSCI EAFE (Net)
01/01/1978	04/01/1998	40.0% S&P 500 Index, 55.0% Blmbg. U.S. Aggregate Index, 5.0% FTSE 3 Month T-Bill

Benchmark History		
From Date	**To Date**	**Benchmark**
Domestic Equity		
01/01/2005	Present	100.0% Russell 3000 Index
04/01/1998	01/01/2005	57.1% Russell 1000 Value Index, 28.6% Russell 1000 Index, 14.3% Russell Midcap Index
09/01/1988	04/01/1998	100.0% S&P 500 Index
International Equity		
01/01/2005	Present	100.0% MSCI AC World ex USA (Net)
01/01/1998	01/01/2005	100.0% MSCI EAFE Index
Fixed Income & Credit		
01/01/2025	Present	100.0% Blmbg. U.S. Aggregate Index
04/01/2006	01/01/2025	100.0% Blmbg. U.S. Universal Index
01/01/1976	04/01/2006	100.0% Blmbg. U.S. Aggregate Index
Covered Calls		
04/01/2014	Present	Cboe S&P 500 Buy Write Index
Crisis Risk Offset		
01/01/2023	Present	33.3% SG Trend Index, 33.3% SG Multi Alternative Risk Premia Index, 33.3% Blmbg. U.S. Government: Long Term Bond Index
08/01/2018	01/01/2023	100.0% SG Multi Alternative Risk Premia Index
Cash		
03/01/2011	Present	FTSE 3 Month T-Bill

Additional Information

Performance Return Types: Performance shown is net of fees, except for OPFRS Total Plan, Domestic Equity, and International Equity Composites, which have a mix of gross and net of fees performance. Performance shown for OPFRS Total Plan and International Equity composite is gross of fees prior to January 2016. Performance shown for Domestic Equity composite is gross of fees prior to January 2017.

Inception Date: Since inception date and performance begin in the month following an investments initial funding.

Fiscal Year: Fiscal year begins on July 1.

Fair Value Pricing Methodology: Though Vanguard Developed Markets ETF is a passive strategy, short-term performance may appear to diverge from the index it tracks more than would be expected. This is due to Fair Value Pricing (FVP) adjustments that address the pricing discrepancies that may arise from time-zone differences among global securities markets. The resulting temporary divergence is expected to correct itself when the foreign markets reopen.

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Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security).

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. Portfolio Return- [Risk Free Rate+Beta*(market return-Risk Free Rate)].

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about is future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a "basis book." For example, a 5% bond pays $5 a year interest on each $100 par value. To figure its current yield, divide $5 by $95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay $100 for the bond that can be bought now for $95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{\text{5\% (discount)}}{\text{5 (yrs. to maturity)}} = \text{1\% pro rata, plus 5.26\% (current yield)} = \text{6.26\% (yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.

MEKETA

Oakland Police and Fire Retirement System

March 26, 2025

Fixed Income Manager Allocations

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Background

At the meeting in February 2025, the Board approved a total of four fixed income managers (two for Core and two for Core Plus) for hire, namely:

→ Ramirez and Loop Capital (LCAM) as Core Fixed Income managers, and

→ Reams and Wellington* as Core Plus Fixed Income managers.

In aggregate, these four managers will manage the Fixed Income component which makes up 61 of the PFRS total portfolio per the long-term allocation policy**.

→ As of February 28, 2025, this amounts to approximately $287 million.

*Wellington currently manages a portion of OPFRS's fixed income with a Core Fixed Income mandate, which will be revised and amended to become a Core Plus Fixed Income mandate.
**The long-term allocation policy was established in early 2024 at the completion of an asset-liability study and became effective on July 1, 2024.

Portfolio Optimization

Using Meketa's Portfolio Builder tool, optimal allocation between these managers (specifically, the intended products) are modeled in a few different ways.

→ There is no one optimal model as the optimization process depends upon the intended purpose and objective.

For PFRS's Fixed Income component, the following four objectives are selected:

1. Maximize Sharpe Ratio
2. Maximize Alpha
3. Maximize Information Ratio
4. Minimize Tracking Error

Finally, all of these approaches are aggregated as the Combined Model which is the recommended model.*

The following section includes the description of these objectives.

*The recommended allocations rounded the decimal points to nearest 0.5 point.

Optimization Model Descriptions & Outputs

Maximizing Risk-Adjusted Returns

Sharpe Ratio, Alpha, and Information Ratio are three commonly used risk-adjusted performance measurements, each with adjustments for different kinds of risks.

Sharpe Ratio

A portfolio taking on risk, instead of investing in cash, is expected to generate higher returns.

→ **Sharpe Ratio** measures how well the portfolio generated returns with that risk above the safety of earning interests in cash.

Information Ratio

An actively managed investment takes on additional risk above a benchmark and is expected to earn higher returns.

→ **Information Ratio** measures how well the portfolio generated returns per unit of active risk taken above the benchmark.

→ Information ratio aims to provide an insight into the consistency of a manager by considering not only the excess returns but also the volatility of those excess returns over time.

Alpha

Alpha is a measurement of risk-adjusted performance given a portfolio's beta to benchmark (i.e., sensitivity of the portfolio's return relative to the benchmark's returns) and the average benchmark return.

→ **Alpha** in this context is the portfolio's excess return above risk-free rate that cannot be explained by benchmark risk.

→ A positive alpha implies that the portfolio provides positive value even when adjusting for risk and benchmark forces.

Allocation Outputs from Risk-Adjusted Return Maximization Models

	Max Sharpe	Max Info Ratio	Max Alpha	Benchmark*
Ramirez Core	20.0	20.0	20.0	--
LCAM Core	20.0	20.0	20.0	--
Reams Core Plus	39.3	20.0	40.0	--
Wellington Core Plus	20.7	40.0	20.0	--
Total Allocation	**100.0**	**100.0**	**100.0**	**--**
Portfolio Statistics*				
Return (%)	4.5	4.4	4.5	2.6
Standard Deviation (%)	5.1	4.8	5.1	4.3
Sharpe Ratio	0.7	0.7	0.7	0.3
Information Ratio	0.9	1.0	0.9	--
Alpha (%)	1.8	1.7	1.8	--
Tracking Error (%)	2.1	1.7	2.1	--

*Portfolio Statistics uses eVestment product data from 01/2009 through 12/2024, which is the common history for all four managers. Investment return data is gross of fees. Benchmark is Bloomberg US Aggregate Bond Index.

Minimizing Risk

Tracking Error is the amount of active risk taken by a portfolio.

→ A higher tracking error indicates a higher level of risk, not necessarily a higher level of return, being taken relative to the specified benchmark.

Tracking error accounts for deviations away from the benchmark, but it does not signal in which directions these deviations occur (positive or negative).

Allocation Outputs

	Min Track. Error	Benchmark*
Ramirez Core	27.4	--
LCAM Core	27.5	--
Reams Core Plus	20.0	--
Wellington Core Plus	25.1	--
Total Allocation	**100.0**	**--**
Portfolio Statistics*		
Return (%)	4.2	2.6
Standard Deviation (%)	4.8	4.3
Sharpe Ratio	0.7	0.3
Information Ratio	1.0	--
Alpha (%)	1.7	--
Tracking Error (%)	1.6	--

*Portfolio Statistics uses eVestment product data from 01/2009 through 12/2024, which is the common history for all four managers. Investment return data is gross of fees. Benchmark is Bloomberg US Aggregate Bond Index.

Combined Model

The four selected measurement specifications are equally weighted and combined to arrive at the Combined Model.

	Max Sharpe	Max Info Ratio	Max Alpha	Min Track. Error	Combined	Benchmark*
Ramirez Core	20.0	20.0	20.0	27.4	21.8	--
LCAM Core	20.0	20.0	20.0	27.5	21.9	--
Reams Core Plus	39.3	20.0	40.0	20.0	29.8	--
Wellington Core Plus	20.7	40.0	20.0	25.1	26.5	--
Total Allocation	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**--**
Portfolio Statistics*						
Return (%)	4.5	4.4	4.5	4.2	4.4	2.6
Std. Dev. (%)	5.1	4.8	5.1	4.8	4.9	4.3
Sharpe Ratio	0.7	0.7	0.7	0.7	0.7	0.3
Info Ratio	0.9	1.0	0.9	1.0	1.0	--
Alpha (%)	1.8	1.7	1.8	1.7	1.7	--
Tracking Error (%)	2.1	1.7	2.1	1.6	1.9	--

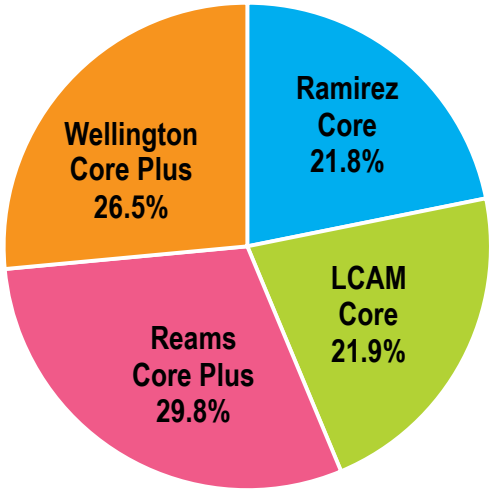
*Portfolio Statistics uses eVestment product data from 01/2009 through 12/2024, which is the common history for all four managers. Investment return data is gross of fees. Benchmark is Bloomberg US Aggregate Bond Index.

Recommendations

Recommendation

We recommend allocating the fixed income managers with the Combined optimized model's results.

Combined Model	Of Fixed Income (%)	Of Total Portfolio* (%)	Approximate Balance* ($M)
Ramirez Core	21.8	13.5	63.6
LCAM Core	21.9	13.5	63.6
Reams Core Plus	29.8	18.0	84.8
Wellington Core Plus	26.5	16.0	75.4
Total	**100.0**	**61.0**	**287.4**



*Percentages scaled to Total Portfolio are rounded. Approximate Balance is based on the market values as of 02/28/2025.

Appendix

Portfolio Builder Optimization Model Parameters

The portfolio optimization was run using Meketa's Portfolio Builder tool.

- **Performance Data:** Calculations use gross of fees performance data of the strategies/products provided by eVestment.
- **Allocation Constraints:** Each manager is given a minimum of 20% allocation.
- **Benchmark:** Bloomberg US Aggregate Index.
- **Risk-Free Rate:** 1.1%
- **Time Period:** January 2009 through December 2024, which is the common period available for all managers included.
- **Rolling Periods:** 36 months (3 years).
- **Rebalancing Interval:** Quarterly.

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MEKETA

Oakland Police and Fire Retirement System

March 26, 2025

Recommendation for 2025 Q2 Cash Flows

Asset Class / Manager Liquidity

Asset Class	Fund	Liquidity Tier
US Equity	Northern Trust Russell 1000	1
US Equity	EARNEST Partners	3
US Equity	Wellington Select Quality Equity	3
US Equity	Rice Hall James	3
US Equity	Brown Small Cap Value	3
International Equity	SGA ACWI ex US	3
International Equity	Vanguard Developed Markets	1
Fixed Income	Ramirez	2
Fixed Income	Reams	2
Fixed Income	Wellington Core	3
Credit	Polen Capital High Yield	2
Covered Calls	Parametric	2
Crisis Risk Offset	Kepos Alternative Risk Premia	3
Crisis Risk Offset	Versor Trend Following	3
Crisis Risk Offset	Vanguard Long-Term Treasury	1
Cash	Cash	1

Description of Liquidity Tiers

Tier	Description	Balance ($M)	In Months[1]
1	Public, Scheduled Withdrawal Allowances	157.9	105.3
2	Public, Accommodating of Withdrawals	132.4	88.3
3	Public; Must Plan Withdrawals	180.8	120.5
4	Privately Held / Illiquid	0.0	-
	Total	**471.1**	

[1] Illustrates liquidity in months per liquidity tier assuming a net drawdown of $1.5 million per month estimated for FYE2025 based on prior fiscal year's actuarial valuations..

Oakland PFRS Asset Allocation as of February 28, 2025[1]

	Current Market Value		Long-Term Targets	Interim Target[2]	Variance from Interim Target		Planned Cash Flows for Current Quarter		Suggested Cash Flows for Next Quarter	
	($M)	(%)	(%)	(%)	($M)	(%)	In ($M)	Out ($M)	In ($M)	Out ($M)
Northern Trust Russell 1000	111.3	23.6	15.0	21.0	12.4	2.6	--	--	--	--
EARNEST Partners	41.8	8.9	5.0	6.0	13.5	2.9	--	--	--	--
Wellington Select Quality Equity	26.1	5.5	0.0	0.0	26.1	5.5	--	(4.5)	--	--
Rice Hall James	18.8	4.0	2.5	3.5	2.3	0.5	--	--	--	--
Brown Small Cap Value	14.3	3.0	2.5	3.5	(2.2)	(0.5)	--	--	--	--
US Equity	**212.3**	**45.1**	**25.0**	**34.0**	**52.1**	**11.1**	**--**	**(4.5)**	**--**	**--**
SGA ACWI ex US	47.0	10.0	--*	8.4	7.4	1.6	--	--	--	--
Vanguard Developed Markets	17.1	3.6	--*	3.6	0.1	0.0	--	--	--	--
International Equity	**64.1**	**13.6**	**5.0**	**12.0**	**7.6**	**1.6**	**--**	**--**	**--**	**--**
Parametric (BXM & DeltaShift)	20.6	4.4	0.0	0.0	20.6	4.4	--	--	--	--
Covered Calls	**20.6**	**4.4**	**0.0**	**0.0**	**20.6**	**4.4**	**--**	**--**	**--**	**--**
Kepos Alternative Risk Premia	13.4	2.8	3.0	3.3	(2.1)	(0.5)	--	--	--	--
Versor Trend Following	12.1	2.6	3.0	3.3	(3.6)	(0.8)	--	--	--	--
Vanguard Long-Term Treasury	13.0	2.8	3.0	3.3	(2.8)	(0.6)	--	--	--	--
Crisis Risk Offset	**38.4**	**8.2**	**9.0**	**10.0**	**(8.5)**	**(1.8)**	**--**	**--**	**--**	**--**
Ramirez Core	76.6	16.3	--*	--*	--*	--*	--	--	--	--
Loop Core	0.0	0.0	--*	--*	--*	--*	--	--	--	--
Reams Core Plus	29.2	6.2	--*	--*	--*	--*	--	--	--	--
Wellington Core Plus*	7.4	1.6	--*	--*	--*	--*	--	--	--	--
Polen Capital High Yield	6.0	1.3	0.0	0.0	6.0	1.3	--	--	--	(4.5)
Fixed Income (IG & Credit)	**119.2**	**25.3**	**61.0**	**44.0**	**(88.1)**	**(18.7)**	**--**	**--**	**--**	**(4.5)**
Cash & City Contributions	16.5	3.5	0.0	0.0	16.5	3.5	8.7	(8.7)	8.7	(8.7)
Total Portfolio	**471.1**	**100.0**	**100.0**	**100.0**	**0.0**	**0.0**	**8.7**	**(13.2)**	**8.7**	**(13.2)**

*Long-term and interim targets to be determined due to ongoing investment manager review and search. Wellington currently manages a core fixed income mandate which is currently being revised as a core plus mandate.

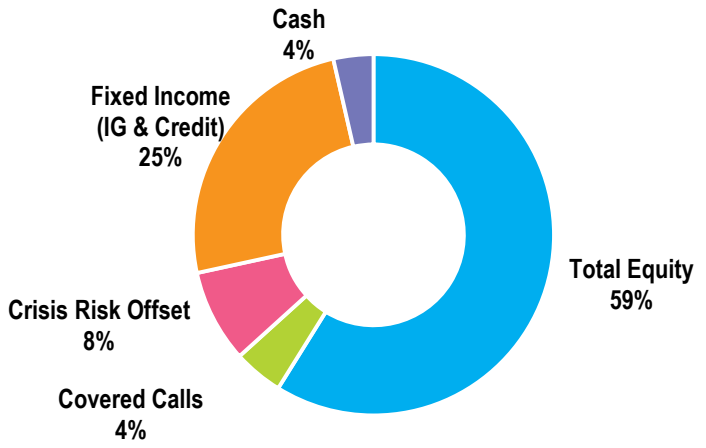
[1] Benefit payments and expenses are estimated at $13.2 million quarterly for FYE2025 based on prior fiscal year's actuarial valuations. The expected quarterly contribution from the City is $8.7 million. Benefits are payable on first of each month.

[2] The interim targets are the revised implementation targets effective the 2nd half of 2024. Some investment manager/product targets and variances are omitted due to ongoing asset class reviews and transition planning.

Allocations by Portfolio Segment

Portfolio Segment	Balance Before Cash Flows ($M)	Allocations Before Cash Flows (%)	Allocations After Cash Flows (%)
US Equity	212.3	45.1	45.0
International Equity	64.1	13.6	13.9
Covered Calls	20.6	4.4	4.5
Crisis Risk Offset	38.4	8.2	8.3
Fixed Income (IG & Credit)	119.2	25.3	24.8
Cash	16.5	3.5	3.6
Total Portfolio	**471.1**	**100.0**	**100.0**

Projected Allocations After Cash Flows



Suggested Cash Withdrawals

Source	Amount ($M)
Treasury Cash / City Contributions	8.7
Polen Capital High Yield	4.5
Total	**13.2**

Projected OPFRS Asset Allocation as of June 30, 2025[1]

	Estimated Market Value ($M)	Estimated Market Value (%)	Interim Targets (%)	Variance from Interim Targets ($M)	Variance from Interim Targets (%)
Northern Trust Russell 1000	111.3	24.1	21.0	14.3	3.1
EARNEST Partners	41.8	9.0	6.0	14.0	3.0
Wellington Select Quality Equity	21.6	4.7	0.0	21.6	4.7
Rice Hall James	18.8	4.1	3.5	2.6	0.6
Brown Small Cap Value	14.3	3.1	3.5	(1.9)	(0.4)
US Equity	**207.8**	**45.0**	**34.0**	**50.7**	**11.0**
SGA ACWI ex US	47.0	10.2	--*	--*	--*
Vanguard Developed Markets	17.1	3.7	--*	--*	--*
International Equity	**64.1**	**13.9**	**12.0**	**8.6**	**1.9**
Parametric	20.6	4.5	0.0	20.6	4.5
Covered Calls	**20.6**	**4.5**	**0.0**	**20.6**	**4.5**
Kepos Alternative Risk Premia	13.4	2.9	3.3	(1.8)	(0.4)
Versor Trend Following	12.1	2.6	3.3	(3.3)	(0.7)
Vanguard Long-Term Treasury	13.0	2.8	3.3	(2.5)	(0.5)
Crisis Risk Offset	**38.4**	**8.3**	**10.0**	**(7.6)**	**(1.7)**
Ramirez Core	76.6	16.6	--*	--*	--*
Loop Core	0.0	0.0	--*	--*	--*
Reams Core Plus	29.2	6.3	--*	--*	--*
Wellington Core Plus*	7.4	1.6	--*	--*	--*
Polen Capital High Yield	1.5	0.3	0.0	1.5	0.3
Fixed Income (IG & Credit)	**114.7**	**24.8**	**44.0**	**(88.6)**	**(19.2)**
Cash	16.5	3.6	0.0	16.5	3.6
Total Portfolio	**462.1**	**100.0**	**100.0**	**--***	**--***

*Long-term and interim targets to be determined due to ongoing investment manager review and search. Wellington currently manages a core fixed income mandate which is currently being revised as a core plus mandate.**

[1] Estimated ending market value accounts for the remaining cash flows (recommended previously) for the current quarter and expected cash flows for the following quarter. The interim targets reflect the targets effective in 2nd half of 2024 transitioning towards upon the long-term targets adopted in 2024 Q1. Some manager/product targets and variances are omitted due to ongoing asset class reviews and transition planning.

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PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

MEKETA

Oakland Police and Fire Retirement System

March 26, 2025

2025 Capital Markets Expectations

Table of Contents

Executive Summary

Executive Summary

- → We update our capital markets expectations ("CMEs") each year in January.
  - Capital markets are dynamic, and regular updates ensure that assumptions accurately reflect the current market environment.
- → Changes in our CMEs are driven by shifts in the capital markets, including factors such as interest rates, credit spreads, cap rates, and equity prices.
  - Yields increased for much of the investment grade bond market, while credit spreads tightened, especially for lower quality credit such as high yield.
  - Stock market valuations continued to rise, especially in the US, where equity markets rallied at a faster pace than the gain in earnings.
  - Cap rates for real estate moved higher, while the rebound in buyout multiples lagged the valuation gains for public markets.
  - Not only did current Treasury yields increase, but projections for future Treasury yields also increased.
- → Our 10-year CMEs continue to be lower than our 20-year CMEs for every asset class, largely due to a higher assumed "risk-free" rate in the future.
- → The return assumption decreased for two-thirds of the asset classes over the 10-year horizon, while it increased for half the asset classes over the 20-year horizon.
- → Our lower return assumptions over the 10-year horizon implies that investors might be well served by moderating their return expectations for the next ten years.

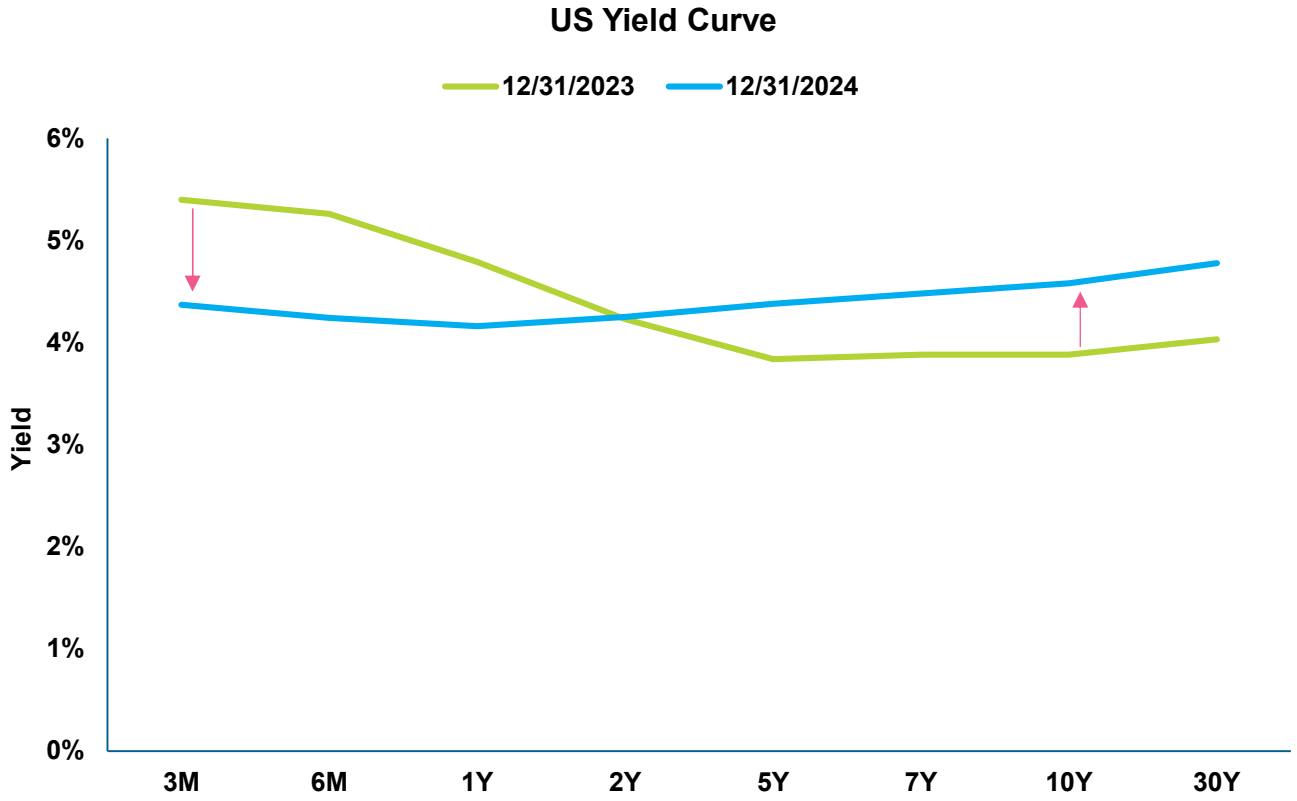
Expected Return and Changes for Major Asset Classes

Asset Class	10-year Expected Return (%)	Δ From 2024 (%)	20-year Expected Return (%)	Δ From 2024 (%)
Cash Equivalents	2.8	+0.4	3.1	+0.6
Investment Grade Bonds	4.9	+0.3	5.3	+0.5
Long-term Government Bonds	5.0	+0.7	5.7	+0.7
TIPS	4.3	0.0	5.0	+0.3
High Yield Bonds	6.3	-0.2	7.1	+0.3
Bank Loans	6.3	-0.2	6.8	+0.2
Emerging Market Debt	6.3	NA	6.8	NA
Private Debt	8.7	-0.5	9.1	-0.1
US Equity	6.4	-0.5	8.4	-0.1
Developed Non-US Equity	7.2	-0.5	8.7	-0.2
Emerging Non-US Equity	7.1	-0.5	8.7	-0.2
Global Equity	6.7	-0.5	8.5	-0.2
Private Equity	9.8	-0.1	11.2	0.0
Real Estate	6.9	+0.6	8.5	+0.5
Infrastructure	7.2	-0.2	9.2	+0.2
Commodities	5.5	+0.6	5.9	+0.6
Hedge Funds	4.2	-0.3	6.0	+0.2
Inflation	2.3	-0.1	2.7	-0.1

Market Overview

Rising Interest Rates

- While the short end of the yield curve moved down, the long end of the curve moved up.
- The result was a shift away from the inverted curve of the last two years to a slightly "U"-shaped curve with a nadir at the one-year maturity.



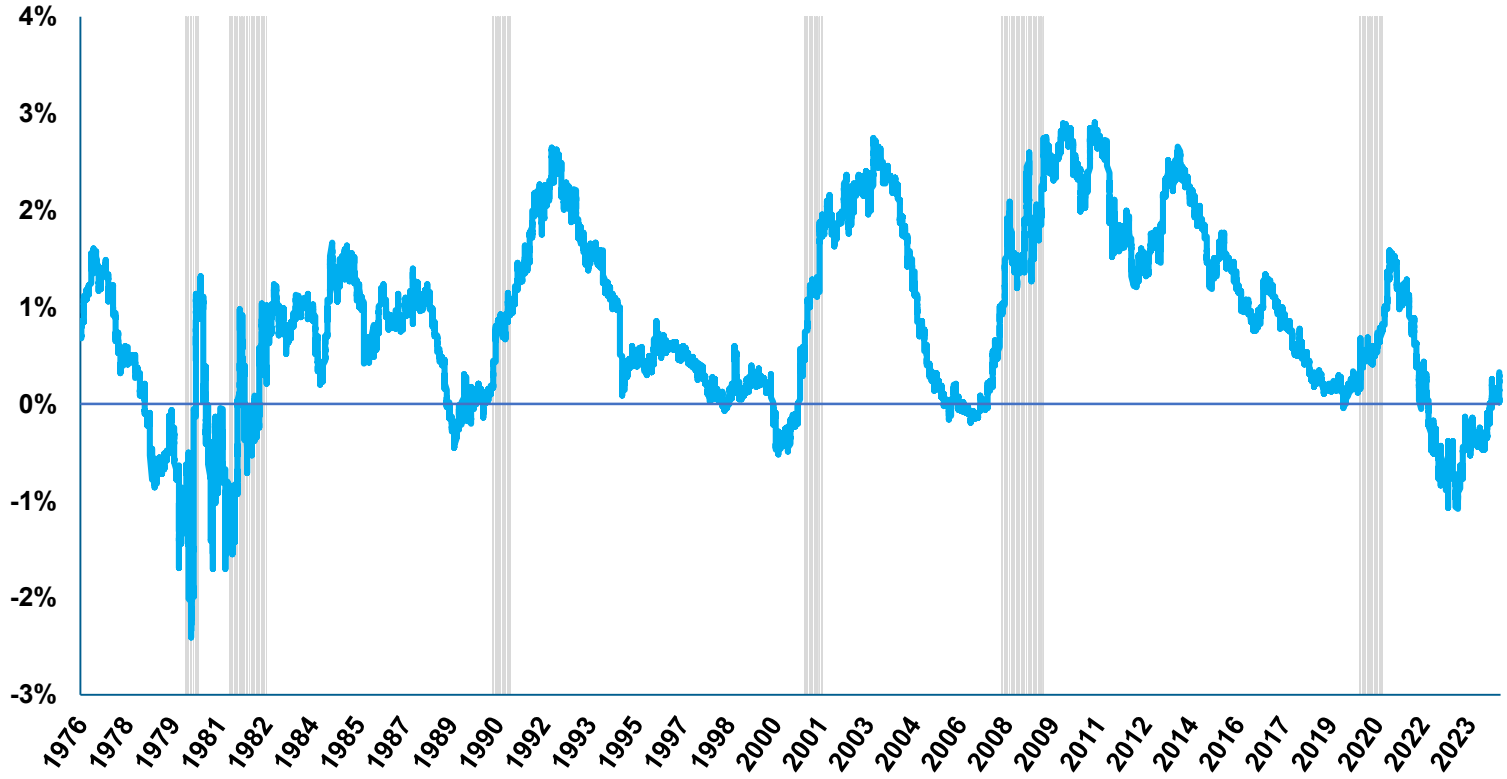
Source: Bloomberg. Data is as of December 31, 2024.

Normalizing Yield Curve

→ The yield curve began the year in inverted territory but gradually moved toward a positive slope.

- The 2-10 spread moved positive before year-end; however, the curve is still inverted in other sections.

Yield Curve Slope (Ten Minus Two)

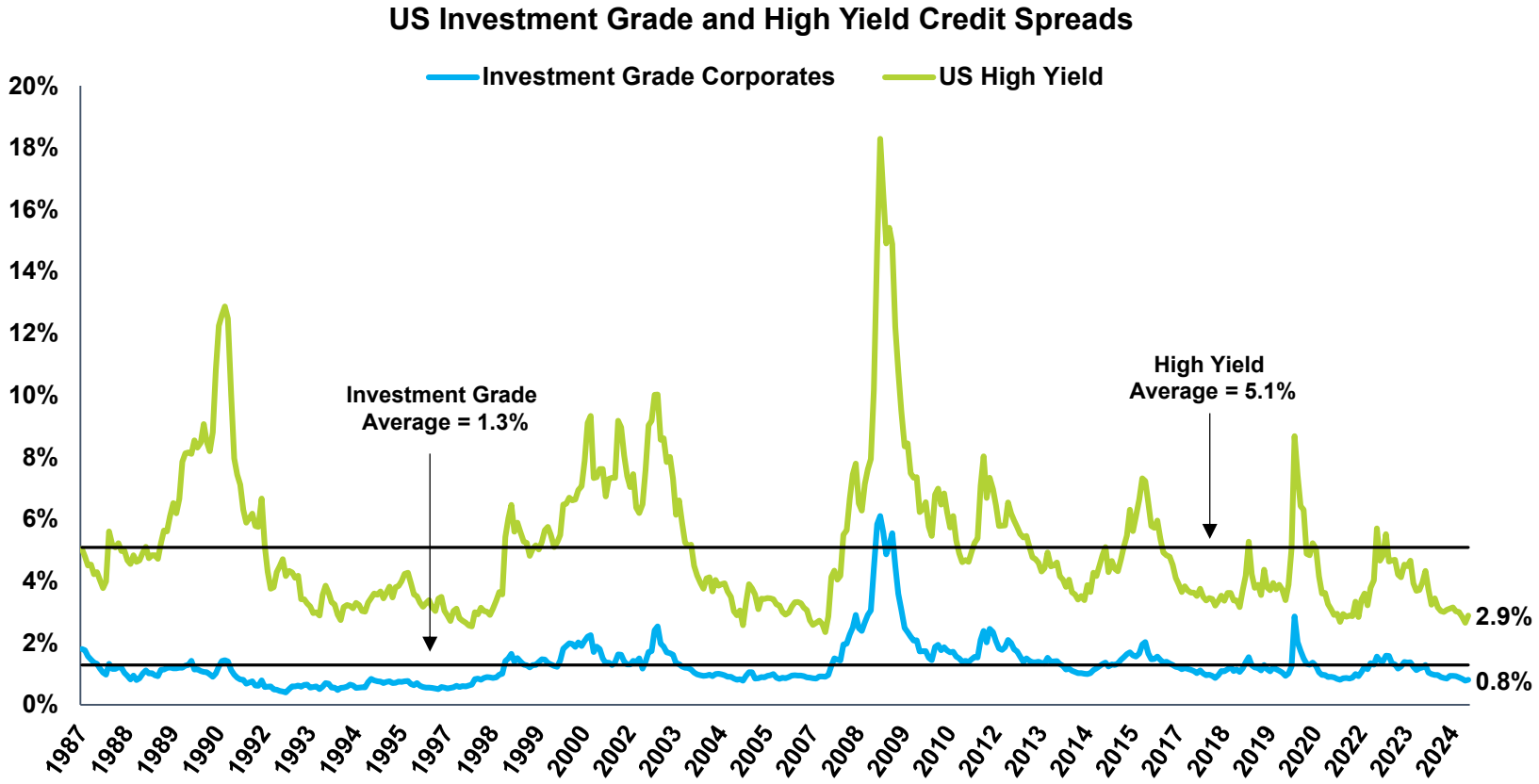


Source: FRED. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield. Data is as of December 31, 2024.

Narrower Credit Spreads

→ Credit spreads tightened again in 2024, moving further below their long-term averages.

- The spread for high yield bonds declined from 323 basis points to 287 basis points, while the spread for investment grade corporates declined from 99 basis points to 80 basis points.



Source: Bloomberg. High Yield is proxied by the Bloomberg High Yield Index and Investment Grade Corporates are proxied by the Bloomberg US Corporate Investment Grade Index. Spread is calculated as the difference between the Yield to Worst of the respective index and the 10-Year US Treasury yield. Data is as of December 31, 2024.

Similar or Higher Yields

- → Short-term interest rates declined as the Fed cut its target rate, yet the yield on the 10-year Treasury increased.
- → Despite tighter credit spreads, yields increased for all but the lower quality bond markets.

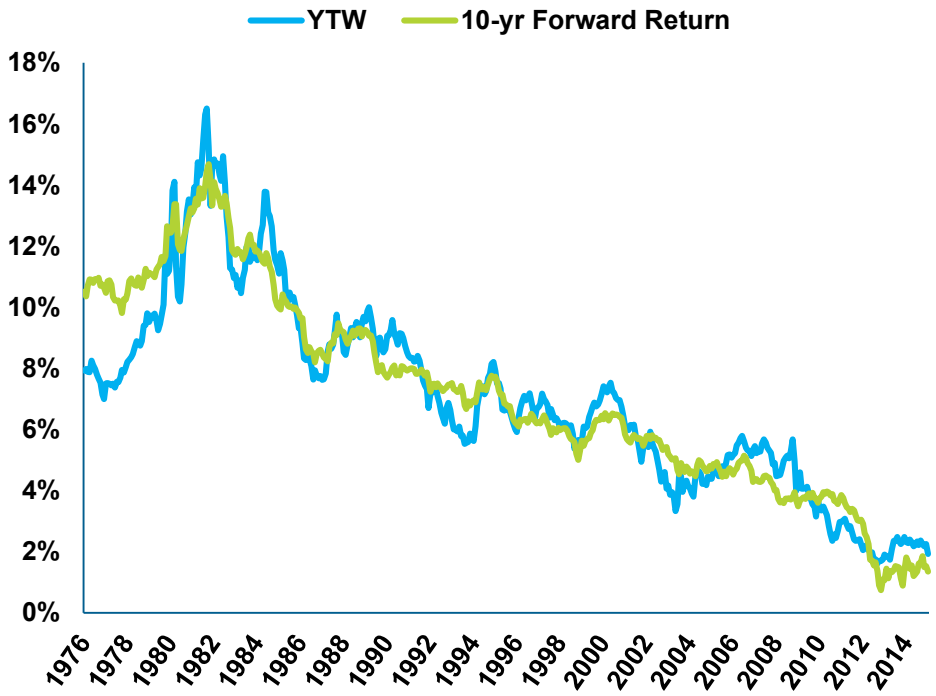
Index	Yield to Worst 12/31/23 (%)	Yield to Worst 12/31/24 (%)
Fed Funds Rate	5.25-5.50	4.25-4.50
10-year Treasury	3.88	4.58
Bloomberg Aggregate	4.53	4.91
Bloomberg Corporate	5.06	5.33
Bloomberg Securitized	4.72	5.25
Bloomberg Global Aggregate	3.51	3.68
Bloomberg US Corporate High Yield	7.59	7.49

Source: Bloomberg. Data is as of December 31, 2023 and December 31, 2024.

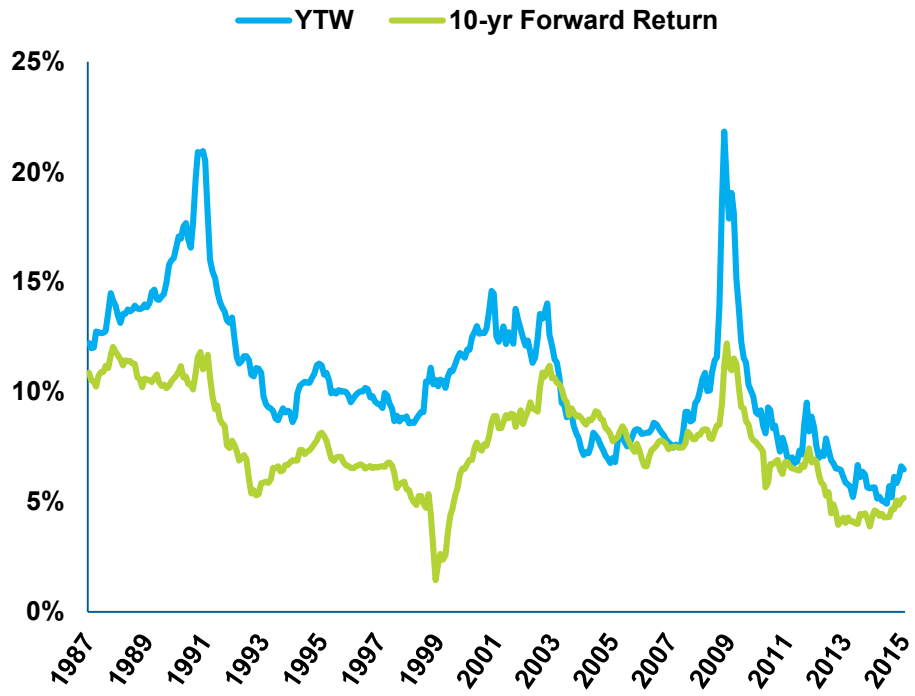
Yields Drive Future Returns

→ Changes in interest rates matter because yields are a very good predictor of future returns for bonds[1], at least over a 10-year horizon.

YTW and Returns for Investment Grade Bonds



YTW and Returns for High Yield Bonds

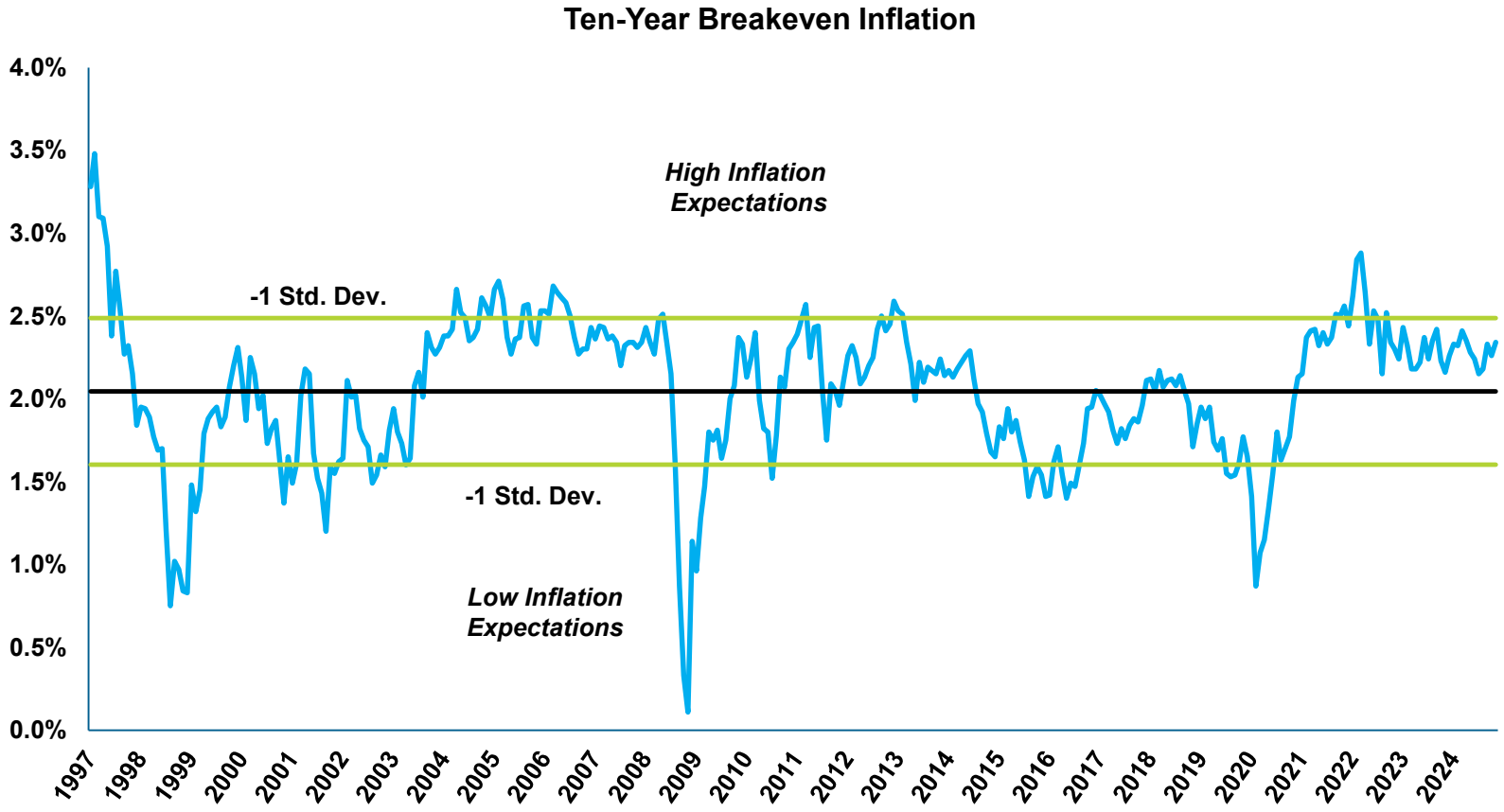


[1] When predicting returns for bonds, default risk should also be taken into account. For example, defaults are why the return for high yield bonds have generally been below the starting yield.
Source: Bloomberg Aggregate and Bloomberg High yield indices. Data is as of December 31, 2024.

Slightly Lower Inflation Expectations

→ After substantial changes in inflation expectations in recent years, the market's expectations for inflation were little changed at the end of 2024.

- The 10-year BEI rate increased from 2.2% to 2.3%. The 5-year BEI was slightly higher, at 2.4%.

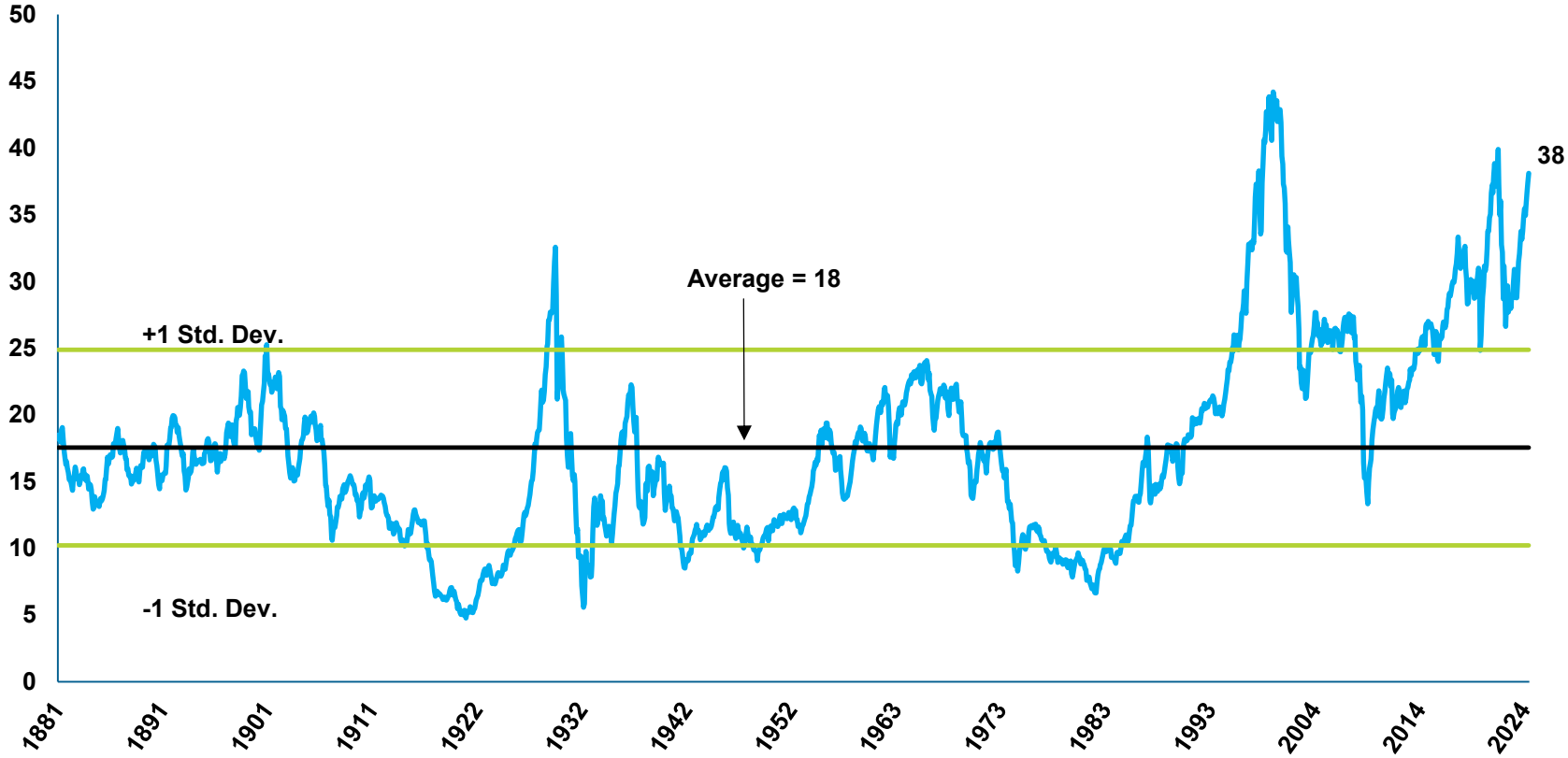


Source: US Treasury and Federal Reserve. Inflation is measured by the Consumer Price Index (CPI-U NSA). Data is as of December 31, 2024.

Higher Prices for US Equities

- US stocks had another good year, with the S&P 500 index gaining 25%.
- Valuations increased and remain elevated relative to their long-term history.

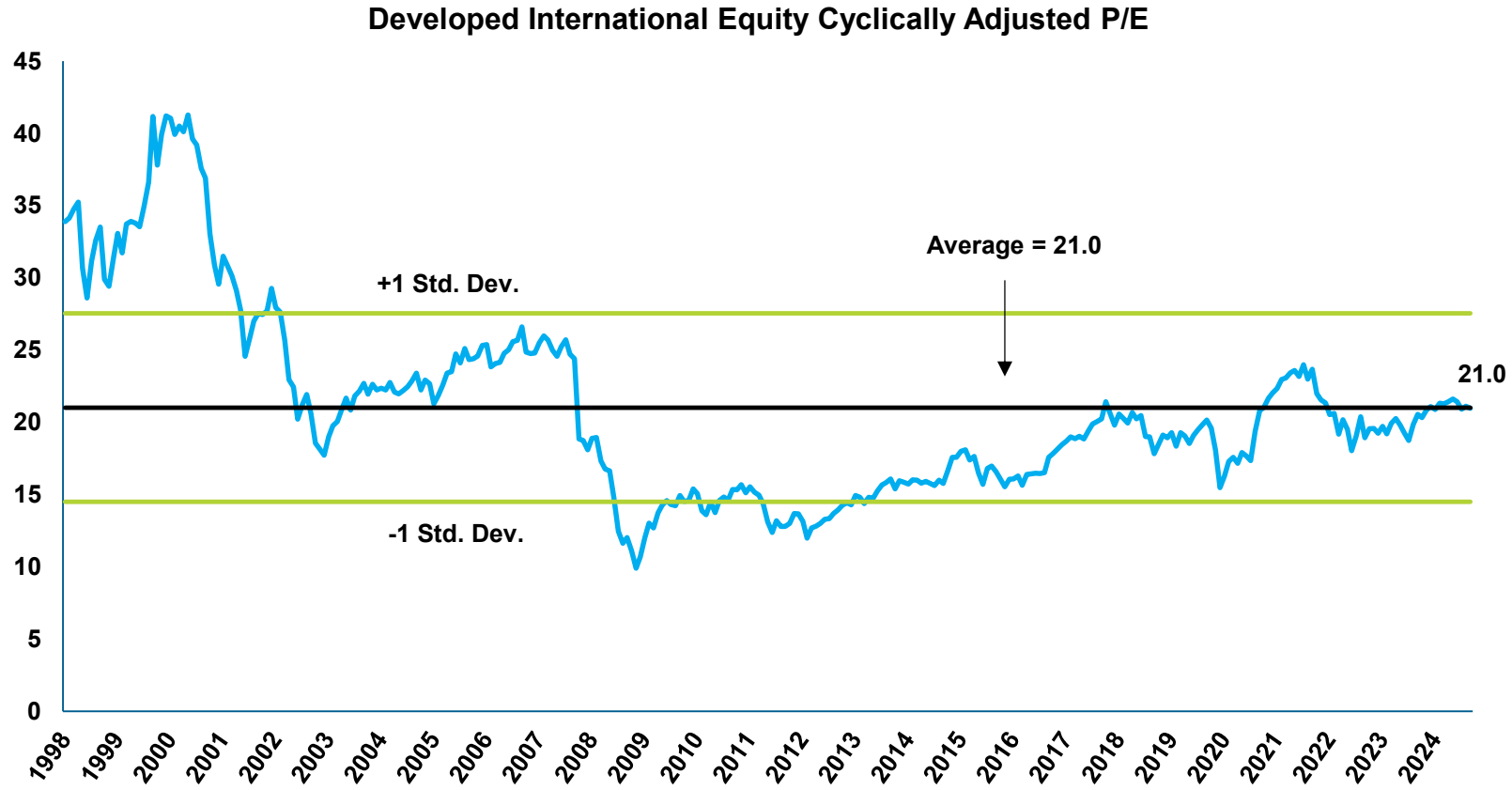
US Equity Cyclically Adjusted Price/Earnings



Source: Robert Shiller, Yale University, and Meketa Investment Group. Data is as of December 31, 2024 for the S&P 500 Index.

Little Change in Non-US Equity Valuations

- EAFE equities had a good year in local currency terms (+11.3%), but a currency headwind ate into most of these gains for USD investors who only saw a 3.8% return.
- EAFE valuations are little changed from one year ago and remain close to their historical average.

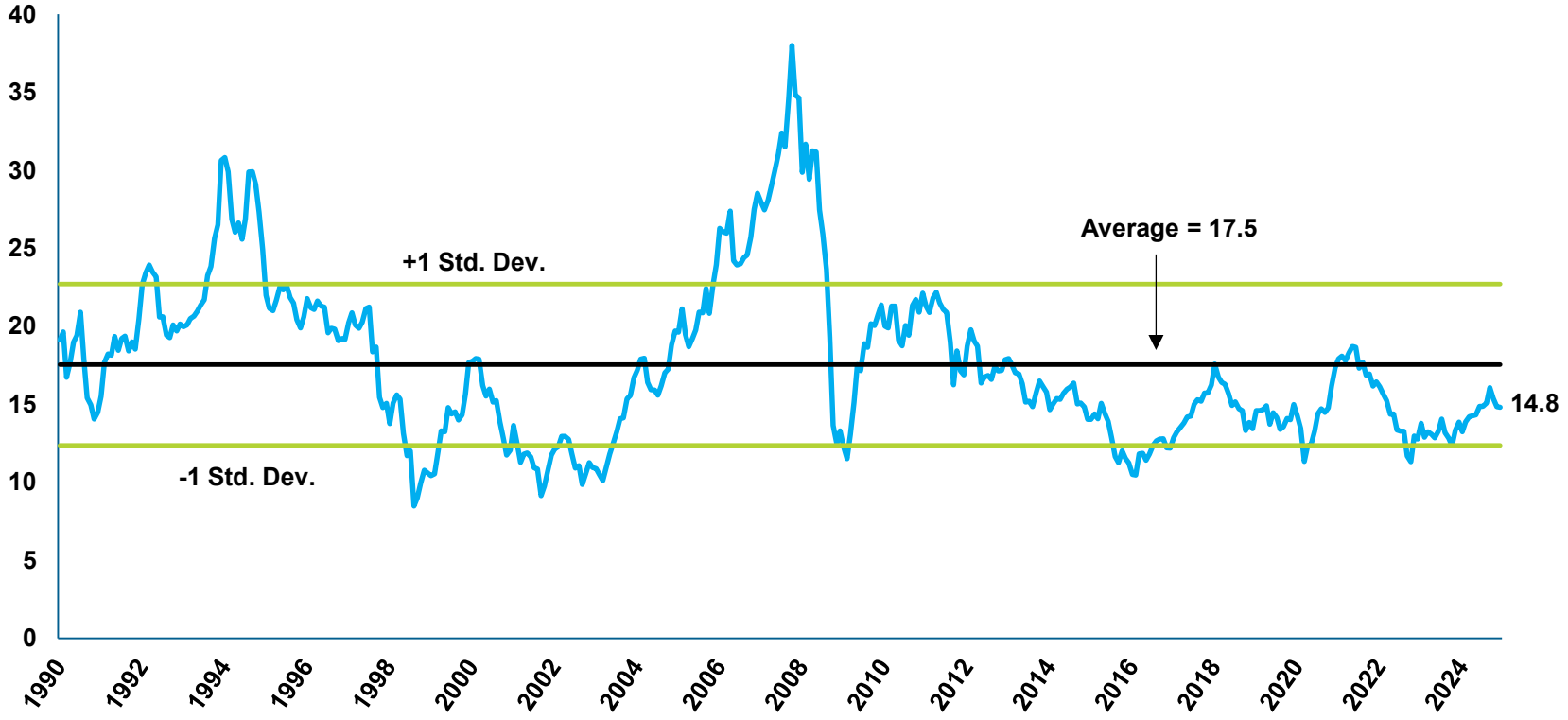


Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years. Data is as of December 31, 2024.

Slightly Higher Prices in Emerging Market Equities

- → Emerging market equities gained 13.1% in local currency terms, but the rising dollar cut returns to 7.5% for USD investors.
- → EM equity valuations remain below their long-term average, with the EM ex-China index continuing to trade at higher valuations than the China index.

Emerging Market Equity Cyclically Adjusted P/E

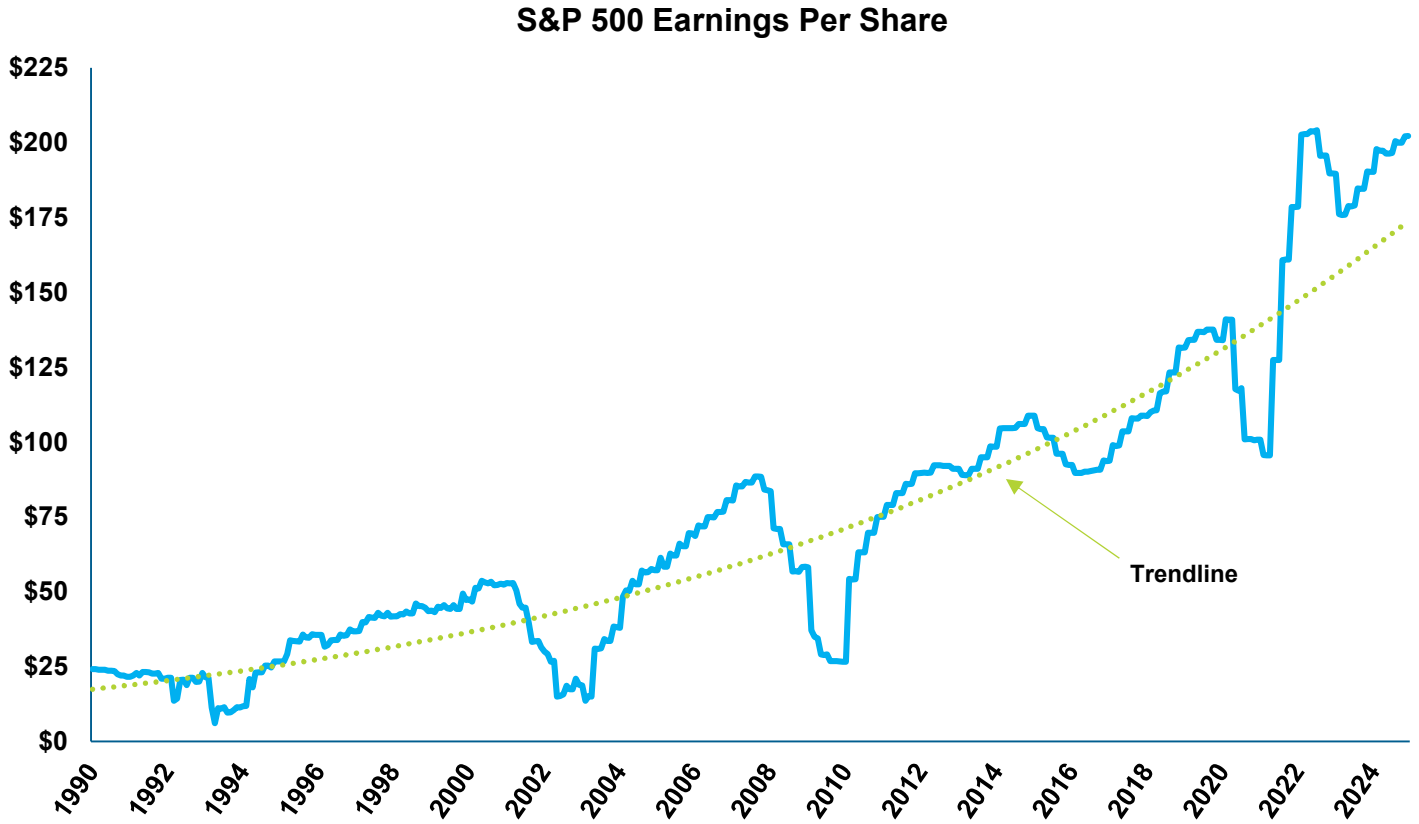


Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.. Data is as of December 31, 2024.

US Earnings Growth

→ S&P 500 earnings (EPS) rebounded after a short-lived dip in 2023.

- At year-end, estimates were that EPS was just shy of its peak in July 2022.

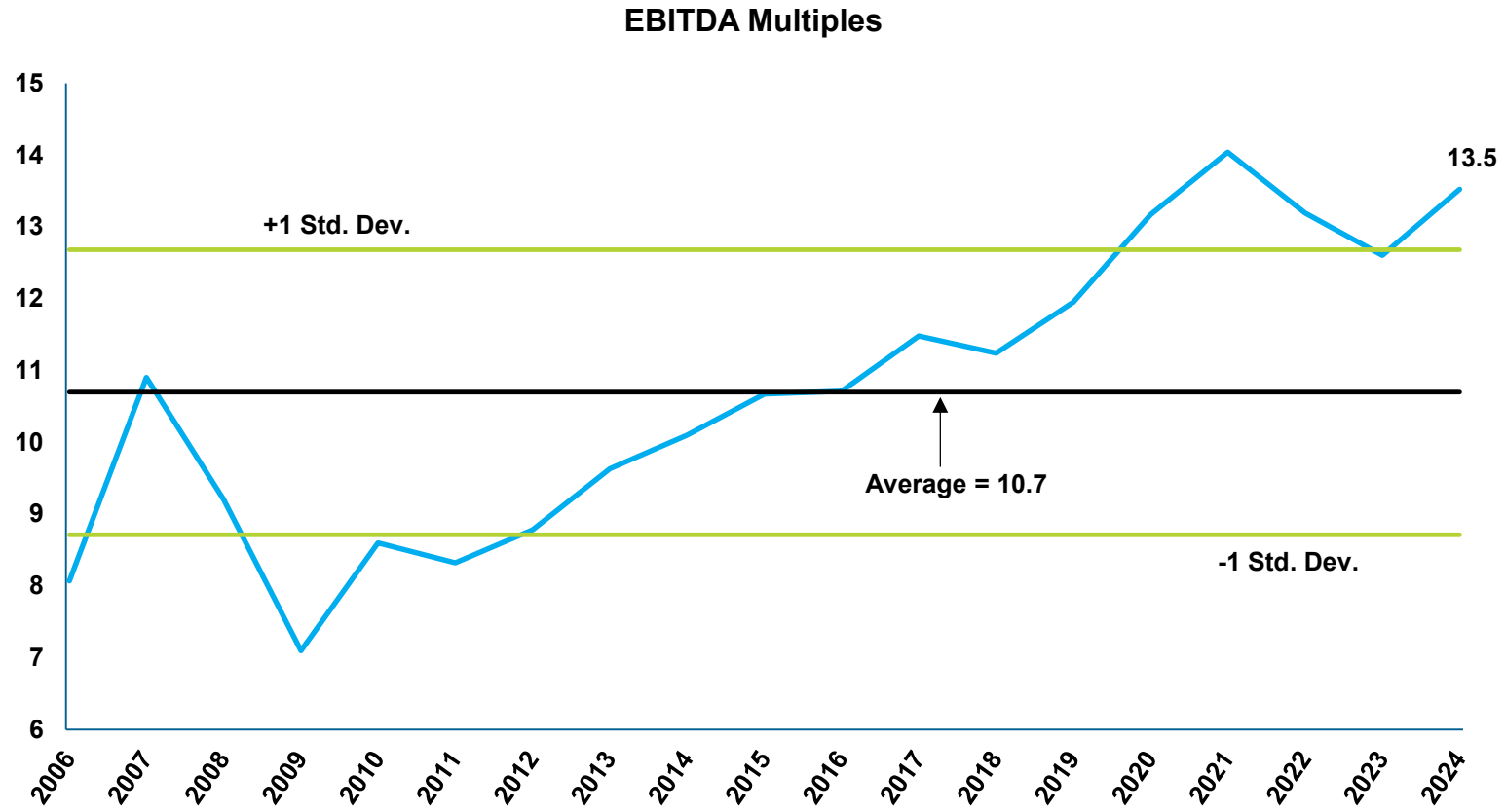


Source: S&P 500 Index data from Bloomberg. Represents trailing 12-month "as reported" earnings per share. Data is as of December 31, 2024.

Private Equity Prices Rebounding

→ EBITDA multiples rose from year end (note that the endpoint is as of September 30).

- Like public equities, valuations have been trending up since the GFC, though they did not rise as quickly as those for US equities over the past year.



Source: Preqin Median EBITDA Multiples Paid in All LBOs, as of September 30, 2024.

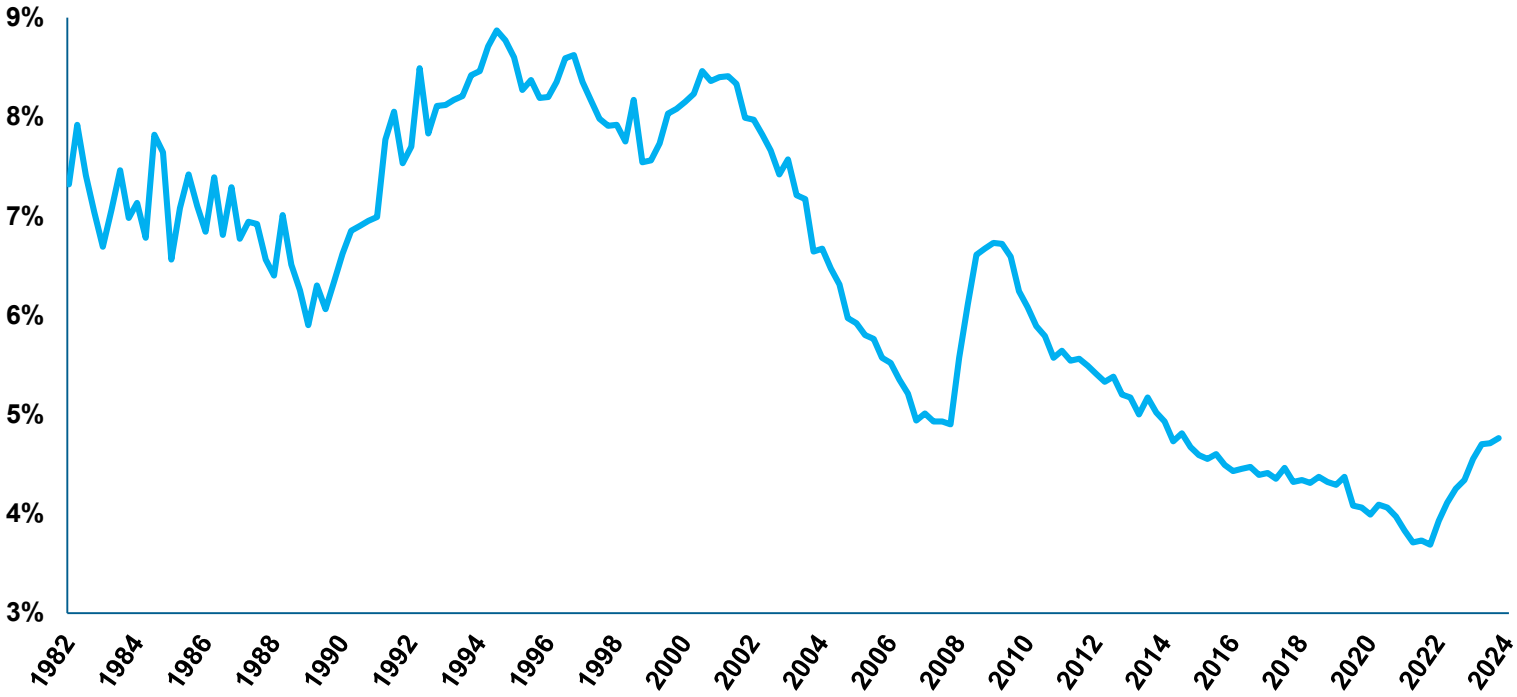
Real Estate Valuations Improving

→ Cap rates for core real estate continued to improve in 2024.

- This is despite a challenging year for many real estate segments.

→ Higher cap rates may be indicative of better returns going forward.

Core Real Estate Cap Rates



Source: NCREIF NPI value-weighted cap rates. As of September 30, 2024.

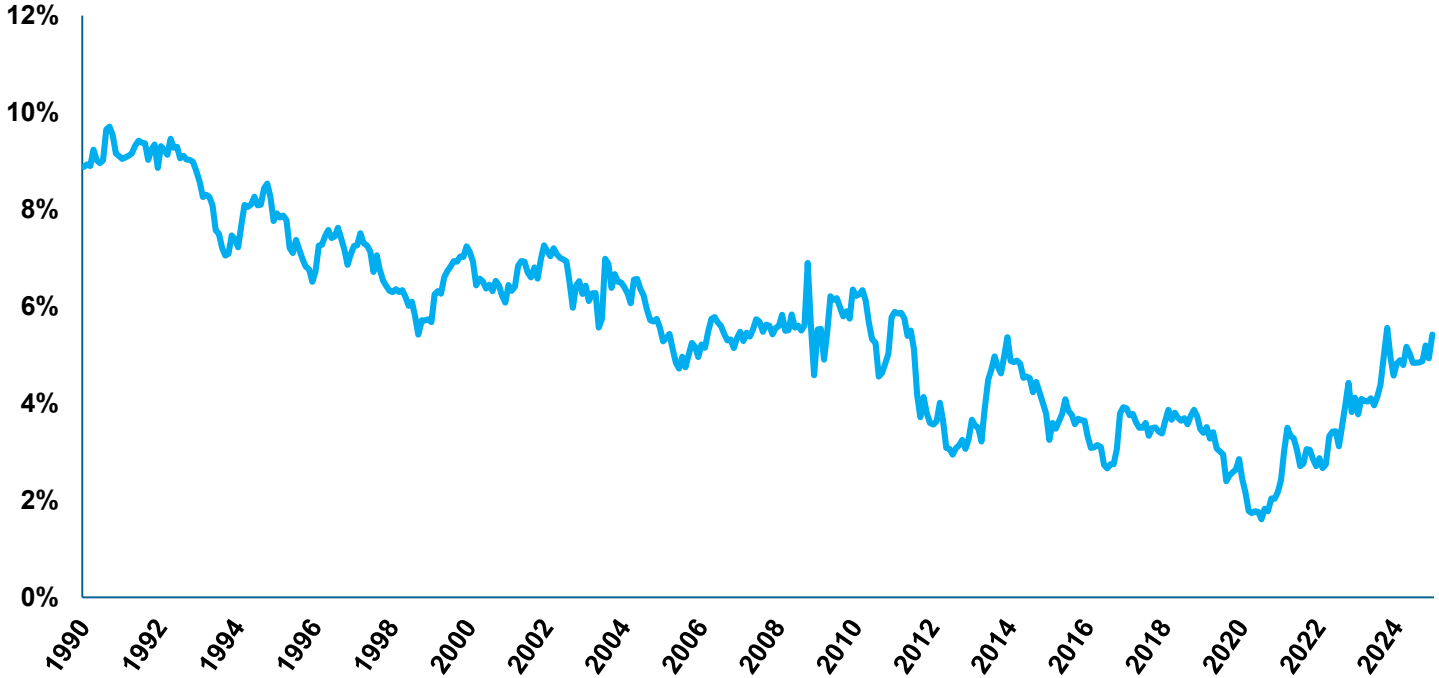
Higher Projected Rates in the Future

→ As interest rates have risen, so have the market's predictions for future interest rates.

- The market is forecasting that the 10-year Treasury yield in ten years will be 5.42%, versus a prediction of 4.57% twelve months ago.

→ Higher future interest rates implies higher expected returns for any forecasting model that includes a risk premium approach.

Market Projection for the 10-Year Treasury Yield in Ten Years



Source: FRED. Represents the Fitted Instantaneous Forward Rate 10 Years Hence, as of December 31, 2024.

FAQs

FAQs for 2025

How do these CMEs compare to prior years' assumptions?

- → To help evaluate this, we created a weighted average of expected returns for the asset classes that comprise a typical institutional portfolio.[1]
- → The value of the expected return for the portfolio is not a precise expected return (i.e., it has not been run via MPT), but the magnitude of the change is what is relevant.
- → In short, the average of 20-year expected returns is 10 basis points higher than last January.

Year	Weighted Average Expected Return (%)	Change from Prior Year (%)
2025	8.1	+0.1
2024	8.0	-0.2
2023	8.2	+1.7
2022	6.5	+0.4
2021	6.1	-0.7
2020	6.8	-0.6
2019	7.4	+0.7

[1] The weights are as follows: 10% investment grade bonds, 3% LT government bonds, 4% TIPS, 3% high yield, 2% bank loans, 3% EM debt, 3% private debt, 25% US equity, 12% EAFE equity, 8% EM equity, 10% private equity, 10% real estate, 2% natural resources, 3% infrastructure, 2% hedge funds.

FAQs for 2025

What is driving the changes from last year?

- → US equity markets rallied, pushing them to higher valuations, thus reducing their forward-looking returns.
- → Interest rates moved up, increasing yields and hence expected returns for higher quality bonds.
- → Credit spreads tightened, leading to lower yields for riskier fixed income assets.
- → Higher anticipated cash yields helped expected returns for hedge funds and related asset classes.
- → Cap rates for real estate moved up, pushing up the expected returns.
- → Higher anticipated long-term interest rates also provide a tailwind in our 20-year projections, as the bridge from 10 to 20 years is made via a risk premium being added to a (higher) future risk-free rate.
  - The market projection for the 10-year risk-free rate jumped from 4.57% to 5.42%.

FAQs for 2025

How do Meketa's CMEs compare to peers?

- → Our CMEs are typically in the same ballpark as our peers.
- → While we expect be above or below the median for various asset classes, we tend not to be systematically above or below for the entire group.
- → We generally cite the survey conducted each year by Horizon Actuarial Services for making peer comparisons, as it is the most comprehensive survey of CMEs of which we are aware.
  - However, this survey is usually not published until July or August.
- → It is important to distinguish between intermediate-term assumptions (e.g., 7-10 years) and long-term assumptions (e.g., 20-30 years) when making these comparisons.
  - The average intermediate-term return assumptions tend to be lower than the long-term assumptions across the peer group, particularly for riskier asset classes.

FAQs for 2025

What model changes were made?

→ We reduced the equity risk premium we assume for years 11-20 by 50 basis points.

- The 5.5% historical average risk premium for US equities is based on a history that includes significant multiple expansion (e.g., increase in P-E ratio).
  - Using this same level of risk premium implies that we would assume multiple expansion in the future.
  - Therefore, we decided to use a lower risk premium.
- We are making this change not just for US equities, but for every equity/growth-oriented asset class.
  - We have observed valuation multiples expand over time for most of these asset classes where we have available metrics (e.g., EBITDA multiples, cap rates).

→ We changed to using two distinct currency models, one for developing markets that emphasizes interest rate parity and one for emerging markets that emphasizes purchasing power parity.

- This was partly driven by the observation that central banks have intervened in their foreign exchange markets.
- Currency movements are the portion of our CMEs that we probably have the least confidence in (hence why we have capped them historically).
- For 2025, developed markets switches from a 50 basis point tailwind to a 20 basis point headwind, while there is no impact on emerging markets.
  - There are a few asset classes (e.g., foreign bonds, foreign equities) that feel the full impact and others (e.g., global equities, buyouts, natural resources) that will experience a more modest impact.

FAQs for 2025

What model changes were made?

→ We switched from using historical *real* income to nominal income to predict near-term income for timberland and farmland.

- The inflation of recent years dispelled the notion of a direct link between income and inflation in the short term for these asset classes.

→ We started incorporating data from third parties for two private market asset classes where such data has traditionally been hard to come by:

- In private credit, we are including yield and spread data from Lincoln Senior Debt Index.
- In private infrastructure, we are including valuation metrics from Macquarie.

→ For various private markets where we use a public market proxy to estimate valuations, we modified the composites to reflect the changing natures of those industries:

- We added an AI index to our VC model.
- We added an Energy Efficiency index to our Energy model.
- We added a Clean Energy index to our Sustainability model

→ We assume lower leverage for buyouts (range dropped from 1.4x – 1.6x to 1.3x - 1.5x) as leverage has declined over the past 5-10 years.

FAQs for 2025

What structural changes were made for 2025?

→ We added the following "asset classes" (total now at 113):

- Multi-sector credit
- High yield municipal bonds
- Emerging market corporate bonds
- Emerging market bonds aggregate

Did volatility expectations change?

→ Not systematically; there were very few changes, and most were +/- 1%.

→ The biggest change was a 5% decrease in digital currencies. This reflects the growing institutionalization of the asset class (e.g., with bitcoin ETFs being introduced).

→ Our methodology includes a 20-year look back, which includes the volatile years of 2022, 2020, and 2008.

Were there any qualitative adjustments?

→ We typically make some qualitative adjustments to the CMEs, though they have grown fewer in number over the years as we have refined our models.

→ We made a manual adjustment to the 10-year foreign equity return given concerns we had about the data for geographic revenue sources provided by the vendor for the underlying index.

FAQs for 2025

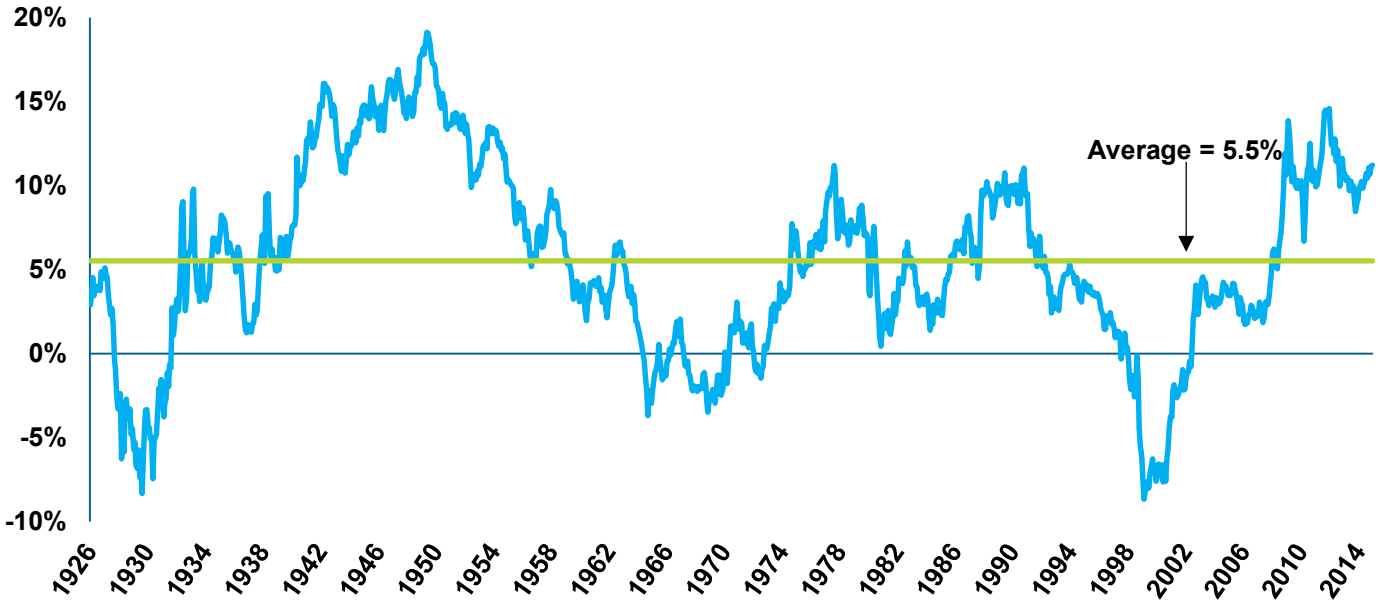
What is the equity risk premium implied by the CMEs?

→ We assume a long-term risk premium of 5.0% for US equities over 10-year Treasuries in our model.

- However, our 10-year assumptions imply an equity risk premium of ~1.5%.
- This averages out to a 20-year implied equity risk premium of ~3.0%.

→ Historically, the risk premium for the S&P 500 over the yield for the 10-year Treasury has averaged 5.5%, though the range has varied considerably.

US Equity Risk Premium over 10-year Treasury[1]



[1] Represents the ten-year risk premium for the S&P 500 index over the 10-year Treasury yield at the start of the period. Data is through December 31, 2024.

FAQs for 2025

Is Meketa assuming that interest rates will go up or down?

- → We use the market's projections for future rates, based on what was priced in at the time of our analysis.
- → For example, the market is projecting that the ten-year Treasury will be yielding approximately 5.4% in ten years, versus the actual yield of 4.6% at the end of December 2024.
- → By contrast, the FOMC is expecting the fed funds rate to fall to ~3.4% by 2026, implying a return to a more normally shaped yield curve.

What is the steepness of the yield curve you imply?

- → Just as our equity models assume mean reversion in pricing, our bond models assume a kind of mean reversion in the shape of the yield curve over the next ten years.
  - The yield on the 10-year Treasury has averaged 141 basis points over that for T-bills since 1962.
  - The 2-10 spread has averaged 86 basis points since 1976.
- → This is consistent with the market's projections for short-term and longer-term rates noted above.

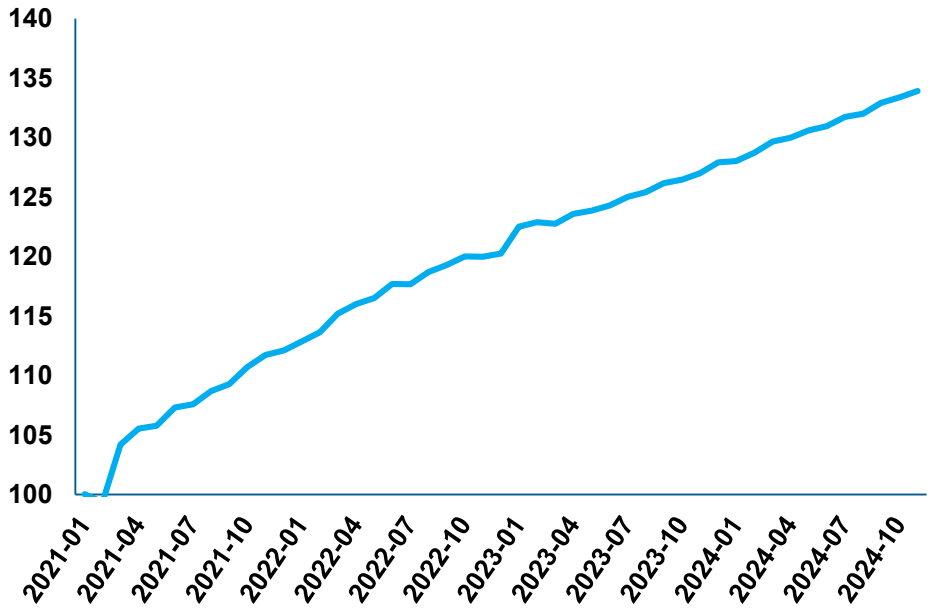
Source: FRED. 3-Month Treasury Bill Secondary Market Rate, Market Yield on US Treasury Securities at 10-Year Constant Maturity, 10-Year Treasury Constant Maturity Minus 2-Year Treasury Constant Maturity.

FAQs for 2025

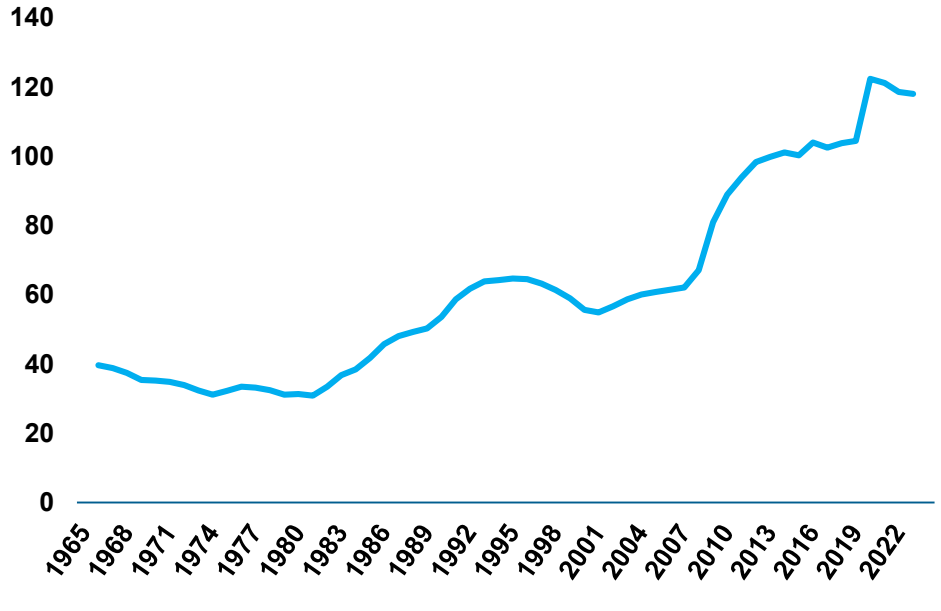
Why is the market projecting rates will be higher in ten years?

- → Expectations of high inflation could necessitate a demand by investors for higher nominal yields to compensation them for the loss of purchasing power.
- → Likewise, expectations of a widening government deficit that will be filled with additional borrowing could be perceived as increasing the credit risk of Treasury issuance, thereby increasing the yield investors seek to compensate them for this new, higher level of risk.

Cumulative PCE Inflation Since January 2021



Federal Debt as a % of GDP



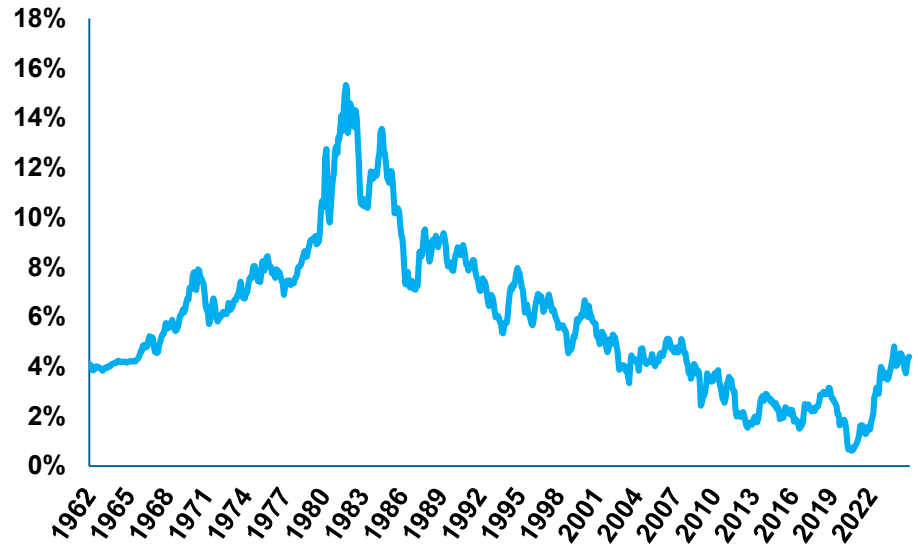
Source: FRED. Personal Consumption Expenditures indexed to 100 on Jan 2021. Federal Debt: Total Public Debt as Percent of Gross Domestic Product, Percent of GDP, Seasonally Adjusted.

FAQs for 2025

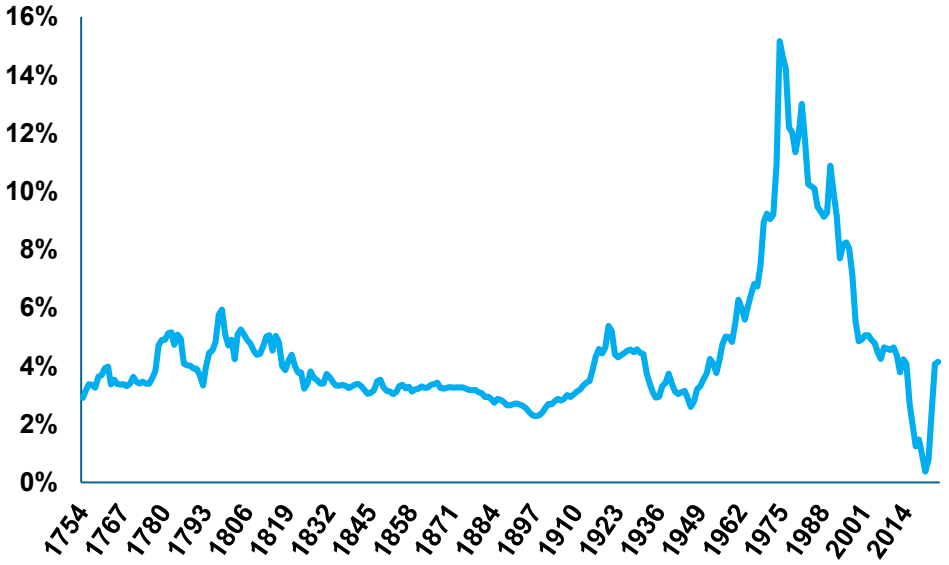
Is it reasonable to believe that Treasury yields will be that high (5.4%) in ten years?

- → Looking back, a 5.4% rate on the 10-year Treasury is not unreasonable, as the 10-year has spent roughly half of the past 62 years at that level or higher.
- → However, when viewed over a (much) longer timeframe, the period from the late 1960s to the late 1990s appears to be a bit of an outlier.
  - From this viewpoint, a 5.4% yield on the debt issuance of the world's (perceived) safest government bonds would typically be associated with an unusually high bout of inflation.

Yield on 10-Year US Treasury Bonds Since 1962



Long-Term Bond Yields in the UK Since 1755

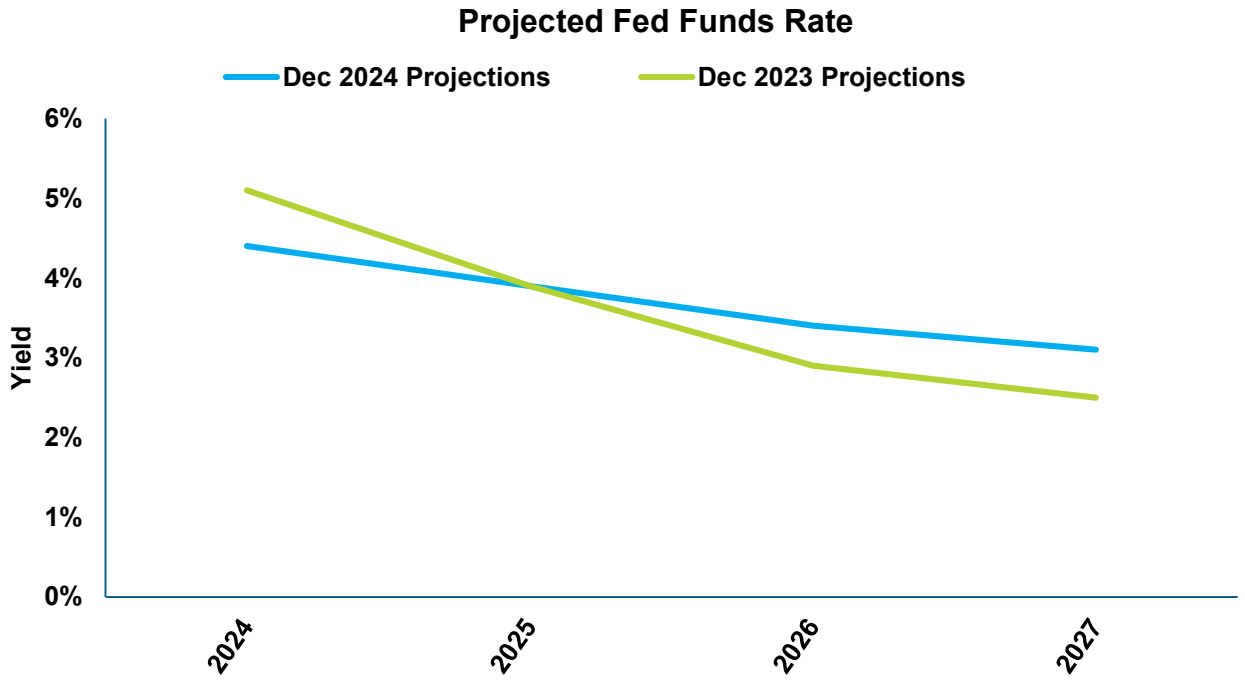


Source: FRED. Market Yield on US Treasury Securities at 10-Year Constant Maturity 1962-2024. Consol (Long-Term Bond) Yields in the United Kingdom 1754-2016, UK Long-Term (10-Year) Government Bond Yields 2017-2024.

FAQs for 2025

Why is the expected return for cash increasing when short-term rates decreased during 2024?

- → Our expected returns are long-term projections, reflecting where we expect interest rates to settle in (i.e., the new "normal" rate).
- → Many economists (including the FOMC) and futures markets are expecting short-term rates to settle in much higher in 2-3 years than they were a year ago.
- → Most of the horizon will be at these rates that are projected to be higher than they were one year ago.



Source: FRED. FOMC Summary of Economic Projections for the Fed Funds Rate, Median.

FAQs for 2025

How does Meketa arrive at its inflation assumption? Is it based on a combination of breakeven rates and other data?

→ Most of our economic projections come from the IMF's World Economic Outlook. Their inflation projections are in the table below.

- They were projecting slightly lower inflation for the US in 2025, followed by benign levels thereafter.

→ We combine the five-year average for the US with the 5-year-5 inflation swap (i.e., what the market is projecting 5-year inflation will be five years from now), to arrive at our 10-year number.

Inflation Estimates

	2025	2026	2027	2028	2029	5-Year Average	5-yr-5 Inflation Swap	10-year Inflation Estimate
US	1.9	2.1	2.1	2.1	2.1	2.1	2.5	2.3
Euro Area	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1
UK	2.1	2.0	2.0	2.0	2.0	2.0	3.2	2.6
Japan	2.0	2.0	2.0	2.0	2.0	2.0	NA	1.7
China	1.7	2.0	2.0	2.0	2.0	1.9	NA	2.8

Sources: IMF World Economic Outlook, October 2024; Bloomberg.

FAQs for 2025

Are US earnings expected to grow faster than the broad economy?

→ The companies in the US market have grown their earnings much faster than the broad market since the 1990s.

→ We assume this trend will continue, based on structural advantages enjoyed by the US market, including:

- A global footprint that provides access to potentially faster growth overseas economies.
- A different sector composition than the broader economy that favors faster growing sectors (e.g., IT).
- Stable pricing power as exhibited by steady profit margins.
- Favorable societal norms (e.g., a culture that values risk-taking and innovation).

How does the growth of S&P 500 earnings compare to your forward EPS growth projections?

→ Our long-term US EPS growth projections are 6.4%, which are reasonably consistent with the 6.9% EPS growth rate observed since 1990, and conservatively below the 9.7% rate observed since 2010.

Is trailing 20 years the right period to use to look at mean reversion for equities? Why not use the longest period possible for each asset class?

→ We use 20 years because we are trying to do apples-to-apples comparisons across similar asset classes.

→ While we have a long history of data for US equities, the available history (especially of earnings) is much shorter for non-US markets.

FAQs for 2025

Do we believe US companies will continue to be net buyers of their stock, and why does that matter?

- → We believe US companies will continue to be net buyers of their shares over the next decade, though perhaps to a lesser extent than they have for the past decade.
- → Investors have generally rewarded US-based companies who have decided that the best use of their "excess" cash is to repurchase shares.
  - So long as markets continue to support this decision, and so long as companies continue to generate sufficient cash to make buybacks, they are likely to continue to do so.
- → Moreover, a mature and active venture capital market in the US allows companies to fund significant growth while they are still private, thereby not diluting public market shareholders.
- → The buyback assumption matters in our models because it impacts EPS growth.
  - If companies are more profitable and they are buying back shares, this will be much more beneficial to EPS than if companies are less profitable and are diluting their shares (e.g., via new issuance).
  - That is, buybacks will be a net tailwind to EPS and thus expected returns.
- → We expect non-US markets to be net issuers of shares (i.e., this will be dilutive to shareholder wealth).
  - This is most pronounced in emerging markets, due to their anticipated economic growth.

FAQs for 2025

How do you account for the percentage of earnings/revenues that companies derive from foreign countries?

- → Many large corporations operate internationally, allowing them to generate significant revenues and profits from overseas markets.
- → Hence, exposure to faster-growing economies could help profits to grow faster than domestic economic growth alone would allow.
- → Therefore, we estimating earnings growth for a market, we adjust for the geographic revenue source.

Revenue Source by Market

	Revenues from US (%)	Revenues from EAFE (%)	Revenues from EM (%)	Revenues from Frontier (%)
MSCI USA	61.7	17.1	19.6	1.6
MSCI EAFE	22.9	52.9	22.1	2.0
MSCI Emerging Markets	14.8	7.9	76.0	1.2

Source: MSCI Economic Exposure indices for USA, EAFE, Emerging Markets, and Frontier Markets as of December 31, 2024.

FAQs for 2025

How is your outlook on China affecting your expected returns?

→ Our outlook for China has declined in recent years due to a number of factors, including:

- The lackluster post-COVID economic rebound.
- A shift in prioritization by the CCP to favor Marxism over growth.
- Geopolitical tensions and “de-risking” by Western investors.
- Real estate and debt challenges.

→ As a result, we place a significant discount on Chinese (and hence, emerging market) growth translating to EPS growth.

- This discount is greater than for EAFE and EM ex-China indices.

→ This serves as a drag on expected returns for EM and Chinese equities.

- It is also consistent with Chinese EPS growth substantially lagging GDP growth over the past twenty years.

FAQs for 2025

Why did the spread for private equity over public equity increase?

→ Valuations increased to a greater extent for public equities (e.g., PE ratios) than they did for private equity (e.g., EBITDA multiples).

- Of note, the private equity data (as always) is one quarter lagged (i.e., as of 9/30/24).

How does Meketa look at valuations for venture capital?

→ Venture capital tends to be focused on a smaller part of the broad economy, concentrating mostly on a few sectors such as technology and healthcare.

→ To get a feel for how VC is currently priced, we create a proxy composed of public market indices that focus on these sectors.

→ The proxy is currently composed of: the NASDAQ; Pharma, Biotech & Life Sciences; IT Services; financial technology; AI; and Clean Tech/Environment.

- The composition and weightings have changed over time.

→ That said, we take our VC model with a large grain of salt, as there is very little private market data available.

FAQs for 2025

Why did the 10-year expected returns for private real estate increase while it went down for REITs?

→ Cap rates and REIT yields moved in opposite directions.

- Value-weighted cap rates are ~80 basis points above REIT yields.

→ Higher cap rates pushed up our expected returns for core and non-core real estate, while lower yields pushed down our expected returns for REITs.

Do we consider inflation when building expected returns for real assets like real estate, infrastructure, and natural resources?

→ Yes, for the vast majority of real assets, inflation is generally linked with either income or growth in our models.

Why did the yield for EM local debt increase when it decreased for most other credit-focused asset classes?

→ We use the JPM GBI EM Global Diversified Index as our proxy for EM local debt.

→ JPM added India to the index in 1% monthly increments starting in June, and the yield for Indian bonds was generally higher than that for the rest of the index.

- This had the effect of pulling up the overall yield.

FAQs for 2025

How are you accounting for the non-linear return profile of Long Vol?

- We assume that the payoff of a long vol strategy is significantly and positively skewed during periods of poor equity market returns (e.g., when equity markets increase or decrease by 10%).
- However, the average return in most years is driven by the effective “insurance premium” investors pay for this strategy.

How much confidence do you have in your model for cryptocurrencies?

- We have the lowest amount of confidence in our projections for digital currencies.
- The lack of associated cash flows makes them challenging to model relative to most other financial assets, as does their sensitivity to government policy changes.

2025 Expected Returns and Changes from Prior Years

10-year Geometric Expected Returns
Rate Sensitive

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Cash Equivalents	2.4	2.8	0.4	Higher projected short-term rates
Short-term Investment Grade Bonds	3.8	4.2	0.4	Higher projected short-term rates
Investment Grade (Core) Bonds	4.6	4.9	0.3	Higher yields
Intermediate Government Bonds	4.0	4.4	0.4	Higher yields
Long-term Government Bonds	4.3	5.0	0.7	Higher yields
Mortgage-Backed Securities	4.7	5.3	0.6	Higher yields
Investment Grade Corporate Bonds	5.2	5.4	0.2	Higher yields
Long-term Corporate Bonds	5.2	5.9	0.7	Higher yields
Short-term TIPS	3.8	3.9	0.1	Higher real yields
TIPS	4.3	4.3	0.0	Higher real yields
Long-term TIPS	4.7	5.0	0.3	Higher real yields
Global ILBs	4.3	4.2	-0.1	Switched to currency headwind
Foreign Bonds	3.1	2.4	-0.7	Switched to currency headwind
US Inflation	*2.4*	*2.3*	*-0.1*	*Slightly lower near-term economist and market projections*

10-year Geometric Expected Returns
Credit

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
High Yield Bonds	6.5	6.3	-0.2	Tighter spreads
Bank Loans	6.5	6.3	-0.2	Higher projected short-term rates offset by tighter spreads
Multi-Sector Credit	NA	6.3	NA	
Collateralized Loan Obligations (CLOs)	8.1	6.9	-1.2	Substantial decline in yield
Emerging Market Bonds (major)	7.0	6.9	-0.1	Lower yields
Emerging Market Bonds (local)	6.3	6.5	0.2	Higher yields with addition of India
Emerging Market Corporate Bonds	NA	5.6	NA	
Private Debt	9.2	8.7	-0.5	Tighter spreads
Direct Lending	8.2	7.6	-0.6	Tighter spreads
Asset Based Lending	9.7	9.3	-0.4	Tighter spreads
Special Situations Lending	9.7	9.4	-0.3	Tighter spreads

10-year Geometric Expected Returns
Equities

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
US Equity	6.9	6.4	-0.5	Higher valuations, partly offset by higher projected earnings growth
Developed Non-US (EAFE) Equity	7.7	7.2	-0.5	Switched to currency headwind
Emerging Market Equity	7.6	7.1	-0.5	Higher valuations and lower projected earnings growth
Emerging Market ex-China	7.8	7.5	-0.3	Lower dividends and projected earnings growth
China Equity	7.1	6.0	-1.1	Higher valuations and lower projected earnings growth
Frontier Market Equity	9.6	8.9	-0.7	Lower projected earnings growth
Global Equity	7.2	6.7	-0.5	Higher valuations and some currency headwind
Low Volatility Equity	6.5	6.0	-0.5	Higher valuations
Private Equity	9.9	9.8	-0.1	Higher valuations
Buyouts	9.5	9.5	0.0	Lower valuations relative to public markets offset by lower amount of leverage
Growth Equity	10.4	10.1	-0.3	Higher valuations
Venture Capital	10.8	10.4	-0.4	Higher valuations

10-year Geometric Expected Returns
Real Estate and Infrastructure

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Real Estate	6.3	6.9	0.6	Higher cap rates
US REITs	5.6	5.3	-0.3	Lower yields
Core Private Real Estate	4.8	5.5	0.7	Higher cap rates
Value-Added Real Estate	7.3	8.4	1.1	Higher cap rates
Opportunistic Real Estate	8.4	9.5	1.1	Higher cap rates
Infrastructure	7.4	7.2	-0.2	Higher expected borrowing costs, no more currency tailwind
Infrastructure (Public)	8.0	7.6	-0.4	Higher valuations
Infrastructure (Core Private)	6.5	6.2	-0.3	Higher expected borrowing costs, no more currency tailwind
Infrastructure (Non-Core Private)	8.0	8.2	0.2	Higher income growth partly offset by higher borrowing costs, no more currency tailwind

10-year Geometric Expected Returns
Natural Resources and Commodities

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Natural Resources	7.8	7.4	-0.4	Higher valuations
Natural Resources (Public)	8.3	7.8	-0.5	Slightly higher valuations, currency headwind
Natural Resources (Private)	7.7	7.4	-0.3	Higher valuations
Energy	9.1	8.8	-0.3	Slightly higher valuations
Mining	8.6	8.3	-0.3	Slightly higher valuations, currency headwind
Timberland	5.5	5.3	-0.2	Higher valuations
Farmland	5.0	3.6	-1.4	Higher valuations
Sustainability	8.4	8.6	0.2	Lower relative valuations
MLPs	6.6	5.7	-0.9	Higher valuations
Gold Mining	8.0	7.9	-0.1	Slightly higher valuations
Gold (Metal)	2.4	2.3	-0.1	Slightly lower inflation expectations
Commodities	4.9	5.5	0.6	Higher cash yield, moved to positive roll return

10-year Geometric Expected Returns
Hedge Funds and Miscellaneous

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Hedge Funds	4.5	4.2	-0.3	Higher equity valuations, tighter spreads
Long-Short	3.2	3.1	-0.1	Higher equity valuations, partly offset by higher cash yields
Event Driven	7.0	5.1	-1.9	Higher equity valuations, tighter spreads
Global Macro	4.2	4.5	0.3	Higher yields
CTA – Trend Following	3.8	3.4	-0.4	Less favorable signals for rates and equities
Fixed Income/L-S Credit	5.0	4.9	-0.1	Tighter spreads
Relative Value/Arbitrage	5.6	4.9	-0.7	Lower projected arb spreads
RMS Aggregate	3.6	3.7	0.1	Higher cash yields offset by less favorable trend signals
Long Vol	0.7	0.7	0.0	
Insurance Linked Strategies	5.3	4.8	-0.5	Higher expected losses
Alternative Risk Premia	4.8	5.2	0.4	Higher cash yields
Risk Parity (10% vol)	6.3	6.1	-0.2	Higher equity valuations, tighter spreads
Digital Currencies	2.4	2.9	0.5	Growing institutionalization

20-year Geometric Expected Returns
Rate Sensitive

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Cash Equivalents	2.5	3.1	0.6	Higher yields
Short-term Investment Grade Bonds	3.7	4.3	0.6	Higher yields
Investment Grade (Core) Bonds	4.8	5.3	0.5	Higher yields
Intermediate Government Bonds	4.1	4.6	0.5	Higher yields
Long-term Government Bonds	5.0	5.7	0.7	Higher yields
Mortgage-Backed Securities	4.9	5.5	0.6	Higher yields
Investment Grade Corporate Bonds	5.4	5.9	0.5	Higher yields
Long-term Corporate Bonds	6.0	6.7	0.7	Higher yields
Short-term TIPS	3.7	4.1	0.4	Higher real yields
TIPS	4.7	5.0	0.3	Higher real yields
Long-term TIPS	5.2	5.7	0.5	Higher real yields
Global ILBs	4.7	5.0	0.3	Higher yields
Foreign Bonds	3.9	3.9	0.0	Higher yields offset by currency headwind
US Inflation	*2.8*	*2.7*	*-0.1*	*Slightly lower near-term economist and market projections*

20-year Geometric Expected Returns
Credit

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
High Yield Bonds	6.8	7.1	0.3	Higher yields offset by tighter spreads
Bank Loans	6.6	6.8	0.2	Higher yields offset by tighter spreads
Multi-Sector Credit	NA	7.0	NA	
Collateralized Loan Obligations (CLOs)	7.2	7.0	-0.2	Higher yields offset by tighter spreads
Emerging Market Bonds (major)	6.8	7.1	0.3	Higher yields
Emerging Market Bonds (local)	6.2	6.7	0.5	Higher yields with addition of India
Emerging Market Corporate Bonds	NA	6.5	NA	
Private Debt	9.2	9.1	-0.1	Higher yields offset by tighter spreads
Direct Lending	8.4	8.2	-0.2	Higher yields offset by tighter spreads
Asset Based Lending	9.4	9.3	-0.1	Higher yields offset by tighter spreads
Special Situations Lending	9.9	9.9	0.0	Higher yields offset by tighter spreads

20-year Geometric Expected Returns
Equities

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
US Equity	8.5	8.4	-0.1	Higher valuations, partly offset by higher projected earnings growth
Developed Non-US (EAFE) Equity	8.9	8.7	-0.2	Switched to currency headwind
Emerging Market Equity	8.9	8.7	-0.2	Higher valuations and lower projected earnings growth
Emerging Market ex-China	9.0	9.0	0.0	
China Equity	8.6	8.1	-0.5	Higher valuations and lower projected earnings growth
Frontier Market Equity	10.0	9.8	-0.2	Lower projected earnings growth
Global Equity	8.7	8.5	-0.2	Higher valuations and some currency headwind
Low Volatility Equity	7.8	7.7	-0.1	Higher valuations
Private Equity	11.2	11.2	0.0	
Buyouts	10.8	10.9	0.1	Lower valuations relative to public markets offset by lower amount of leverage
Growth Equity	11.5	11.4	-0.1	Higher valuations
Venture Capital	12.0	11.9	-0.1	Higher valuations

20-year Geometric Expected Returns
Real Estate and Infrastructure

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Real Estate	8.0	8.5	0.5	Higher cap rates
US REITs	7.8	7.8	0.0	
Core Private Real Estate	6.9	7.4	0.5	Higher cap rates
Value-Added Real Estate	9.0	9.6	0.6	Higher cap rates
Opportunistic Real Estate	10.3	10.9	0.6	Higher cap rates
Infrastructure	9.0	9.2	0.2	Higher income growth
Infrastructure (Public)	9.1	9.0	-0.1	Higher valuations
Infrastructure (Core Private)	8.0	8.0	0.0	
Infrastructure (Non-Core Private)	10.0	10.3	0.3	Higher income growth partly offset by higher borrowing costs

20-year Geometric Expected Returns
Natural Resources and Commodities

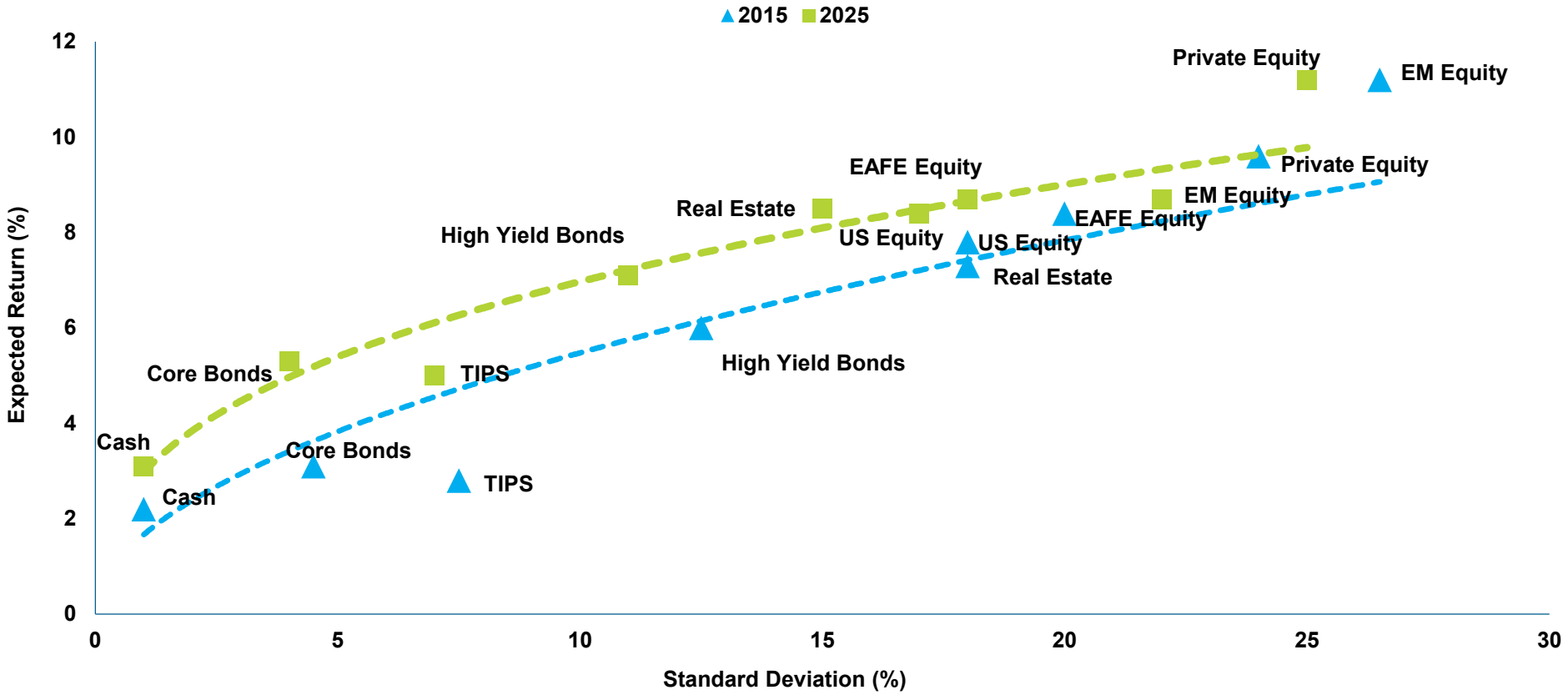
	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Natural Resources	9.3	9.2	-0.1	Higher valuations
Natural Resources (Public)	9.2	9.1	-0.1	Slightly higher valuations
Natural Resources (Private)	9.3	9.2	-0.1	Slightly higher valuations
Energy	10.4	10.3	-0.1	Slightly higher valuations
Mining	9.9	9.8	-0.1	Slightly higher valuations
Timberland	7.3	7.3	0.0	
Farmland	7.0	6.5	-0.5	Higher valuations
Sustainability	10.0	10.2	0.2	Lower relative valuations
MLPs	8.4	8.0	-0.4	Higher valuations
Gold Mining	9.5	9.5	0.0	
Gold (Metal)	3.5	3.6	0.1	
Commodities	5.3	5.9	0.6	Higher cash yield

20-year Geometric Expected Returns
Hedge Funds and Miscellaneous

	2024 E(R) (%)	2025 E(R) (%)	Δ From 2024 (%)	Notes
Hedge Funds	5.8	6.0	0.2	Higher valuations offset by higher cash yields
Long-Short	5.3	5.5	0.2	Higher valuations offset by higher cash yields
Event Driven	7.6	6.7	-0.9	Higher equity valuations, tighter spreads
Global Macro	5.4	5.9	0.5	Higher yields
CTA – Trend Following	4.7	4.9	0.2	
Fixed Income/L-S Credit	6.1	6.4	0.3	Higher yields
Relative Value/Arbitrage	6.5	6.5	0.0	
RMS Aggregate	4.4	4.8	0.4	Higher cash yields
Long Vol	1.2	1.5	0.3	
Insurance Linked Strategies	6.2	6.3	0.1	
Alternative Risk Premia	5.2	5.8	0.6	Higher cash yields
Risk Parity (10% vol)	7.2	7.4	0.2	
Digital Currencies	3.5	4.1	0.6	Growing institutionalization

The Big Picture: Higher Return for Similar Risk[1]

- → The relationship between long-term return expectations and the level of risk accepted is not static.
- → The higher interest rates compared to a decade ago mean that many investors have greater flexibility in how they structure a portfolio to achieve their target returns.



[1] Expected return and standard deviation are based upon Meketa Investment Group's 2015 and 2025 20-year capital market expectations.

Summary Data and Track Record

Return and Risk Data

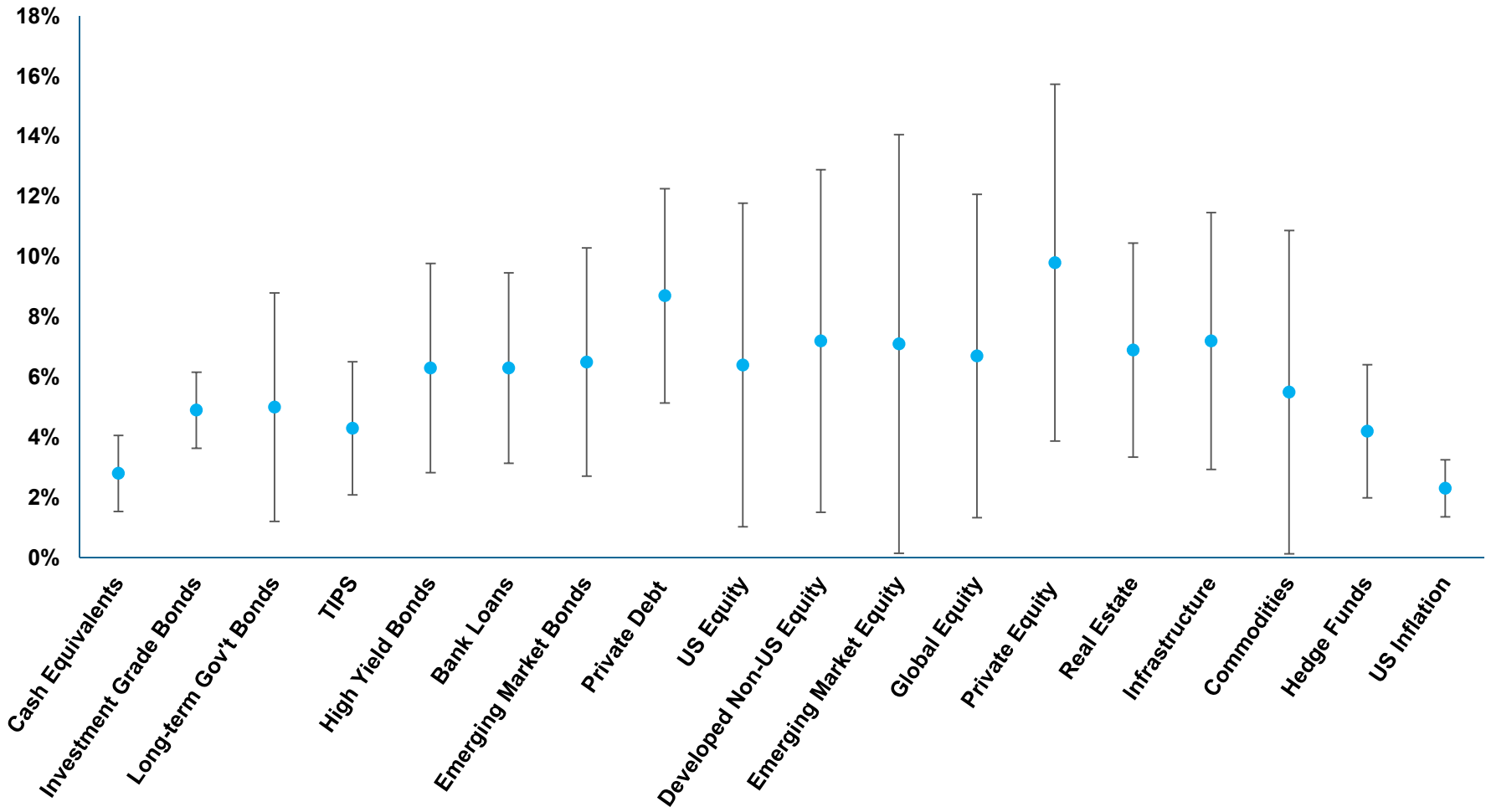
Asset Class	10-year Expected Return (%)	20-year Expected Return (%)	Standard Deviation (%)	Years 11-20 Risk Premium[1] (%)
Cash Equivalents	2.8	3.1	1.0	-2.0
Investment Grade Bonds	4.9	5.3	4.0	0.4
Long-term Government Bonds	5.0	5.7	12.0	1.0
TIPS	4.3	5.0	7.0	0.4
High Yield Bonds	6.3	7.1	11.0	2.5
Bank Loans	6.3	6.8	10.0	2.0
Emerging Market Debt	6.3	6.8	11.0	1.8
Private Debt	8.7	9.1	15.0	4.1
US Equity	6.4	8.4	17.0	5.0
Developed Non-US Equity	7.2	8.7	18.0	4.9
Emerging Non-US Equity	7.1	8.7	22.0	5.0
Global Equity	6.7	8.5	17.0	5.0
Private Equity	9.8	11.2	25.0	7.3
Real Estate	6.9	8.5	15.0	4.8
Infrastructure	7.2	9.2	18.0	5.7
Commodities	5.5	5.9	17.0	1.0
Hedge Funds	4.2	6.0	7.0	2.4
Inflation	2.3	2.7	NA	NA

[1] Risk premia are calculated relative to the market's projection for the yield on the 10-year Treasury in ten years..

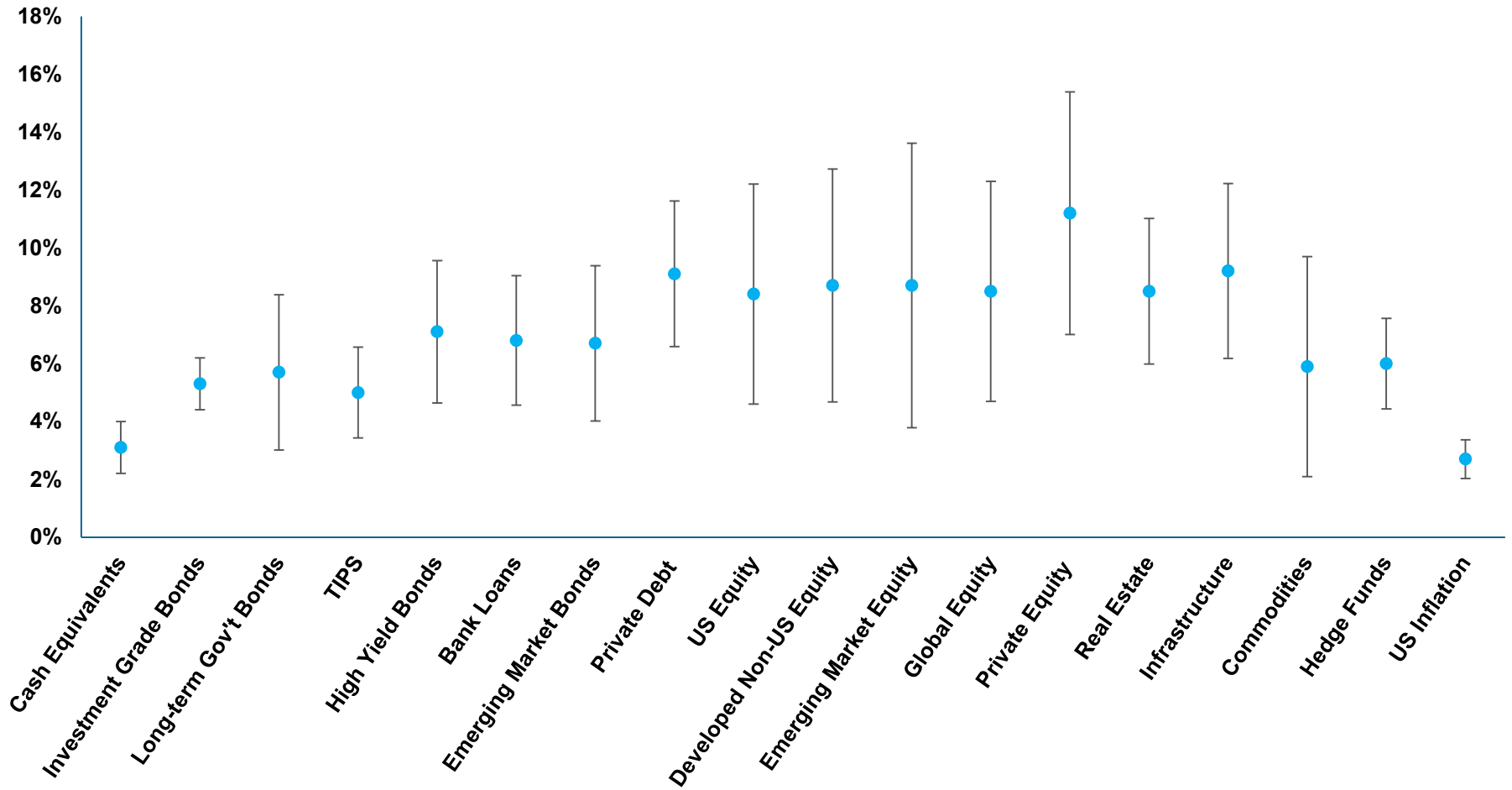
Correlation Data

	Inv. Grade Bonds	Long-Term Gov't Bonds	TIPS	High Yield Bonds	US Equity	Dev. Non-US Equity	Em. Market Equity	Private Equity	Real Estate	Commod.	Infra.	Hedge Funds
Investment Grade Bonds	1.00											
Long-Term Government Bonds	0.86	1.00										
TIPS	0.77	0.61	1.00									
High Yield Bonds	0.35	-0.03	0.47	1.00								
US Equity	0.18	-0.13	0.25	0.74	1.00							
Developed Non-US Equity	0.28	-0.07	0.34	0.77	0.87	1.00						
Emerging Market Equity	0.26	-0.06	0.35	0.72	0.71	0.85	1.00					
Private Equity	0.00	-0.10	0.03	0.66	0.90	0.83	0.79	1.00				
Real Estate	0.26	0.07	0.16	0.56	0.53	0.49	0.42	0.48	1.00			
Commodities	-0.01	-0.24	0.27	0.48	0.48	0.55	0.59	0.23	0.15	1.00		
Infrastructure	0.31	0.14	0.32	0.65	0.64	0.68	0.59	0.51	0.61	0.41	1.00	
Hedge Funds	0.15	-0.17	0.30	0.78	0.79	0.83	0.80	0.53	0.47	0.64	0.61	1.00

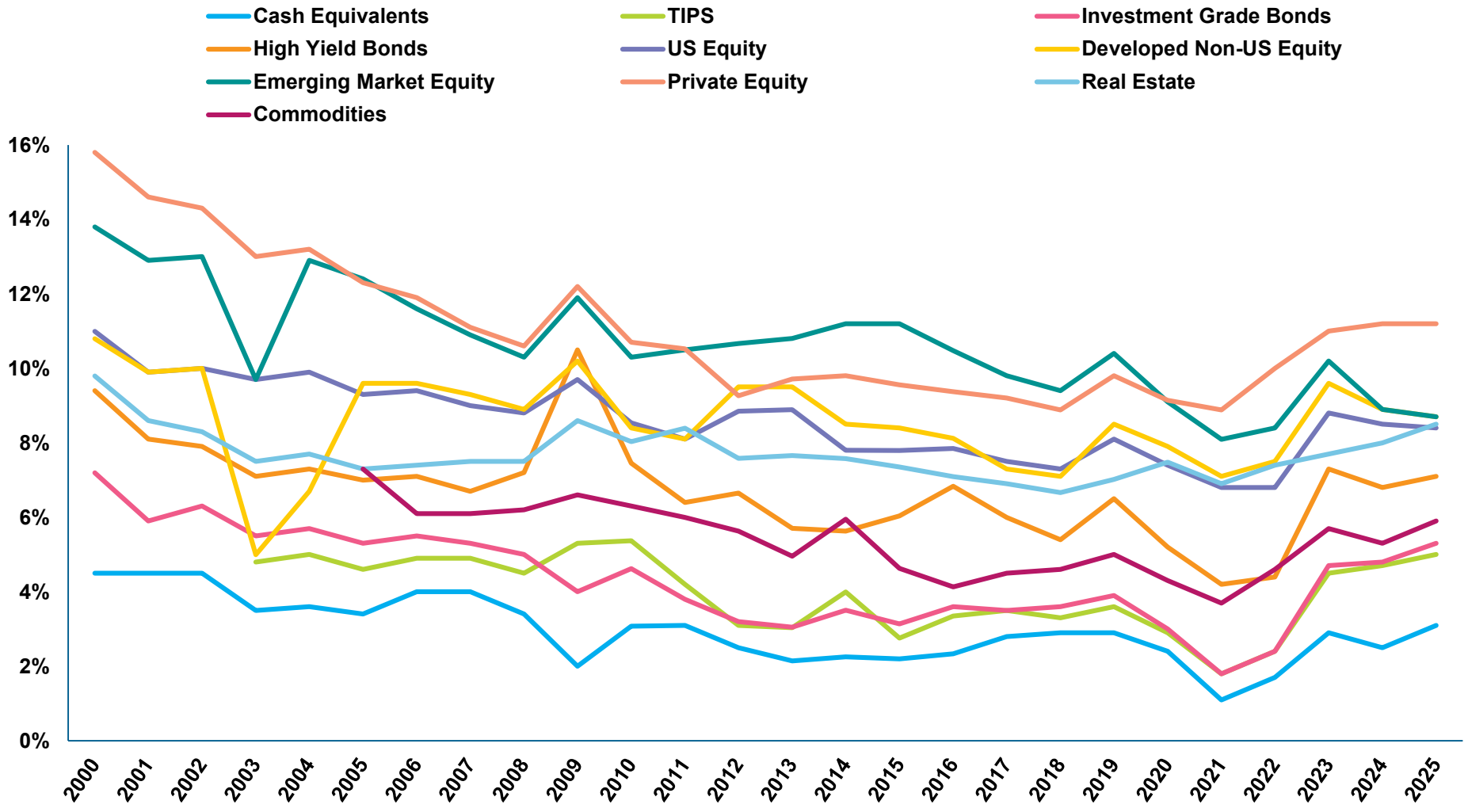
10-Year Return Forecasts and Likely Range



20-Year Return Forecasts and Likely Range

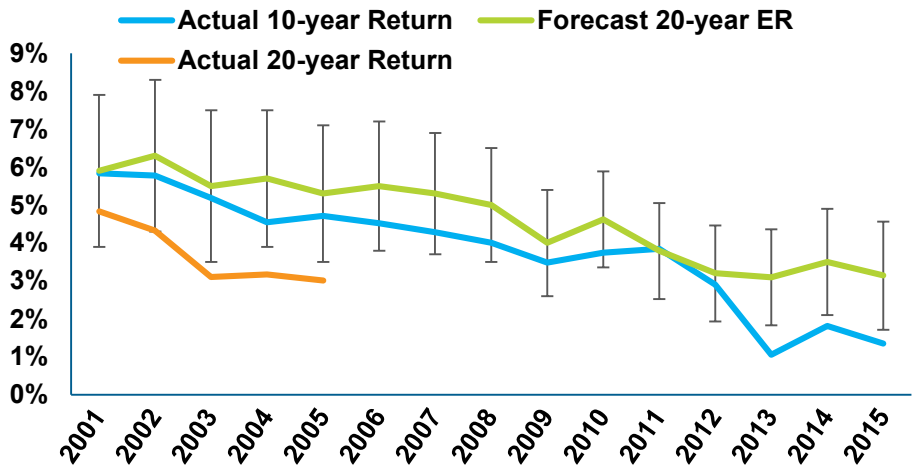


Our 20-Year CMEs Since 2000

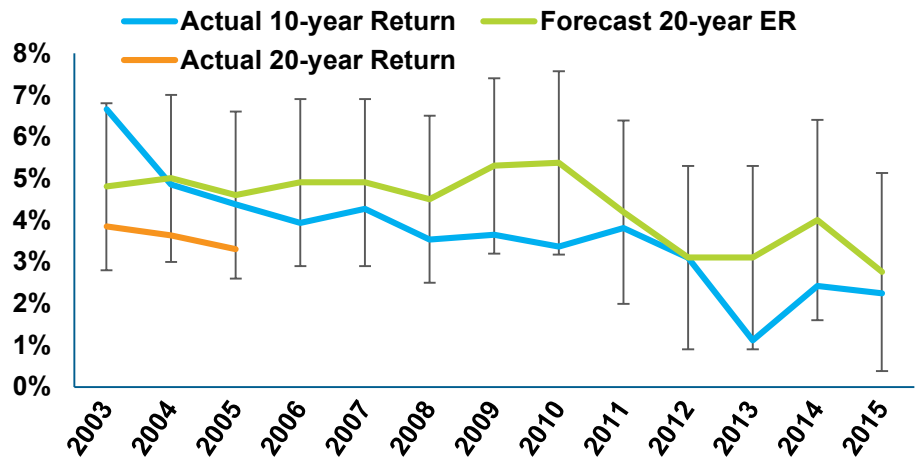


Our Track Record

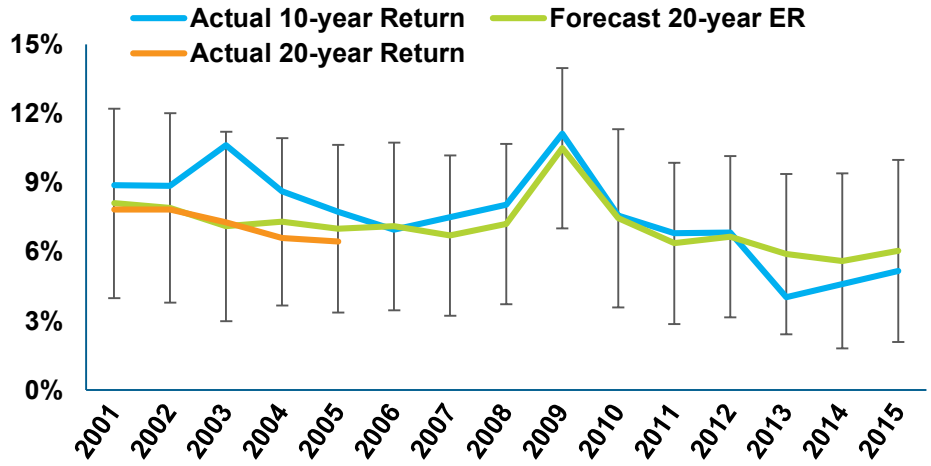
Investment Grade Bonds



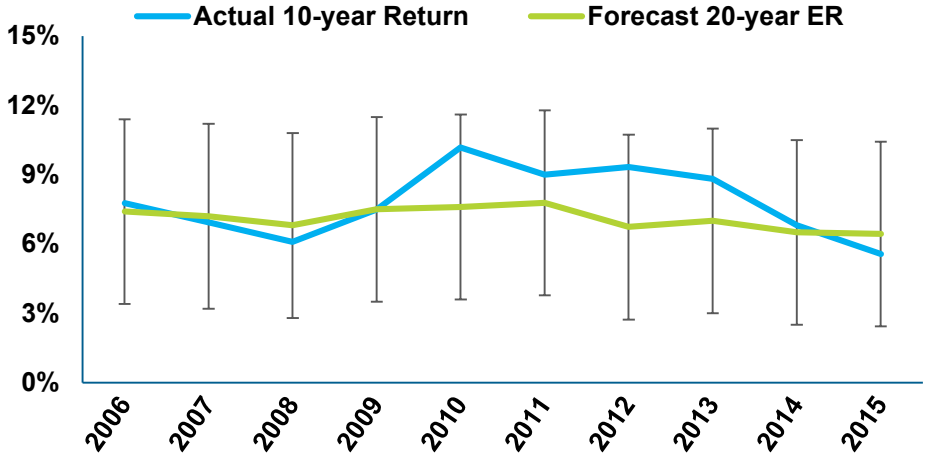
TIPS



High Yield Bonds

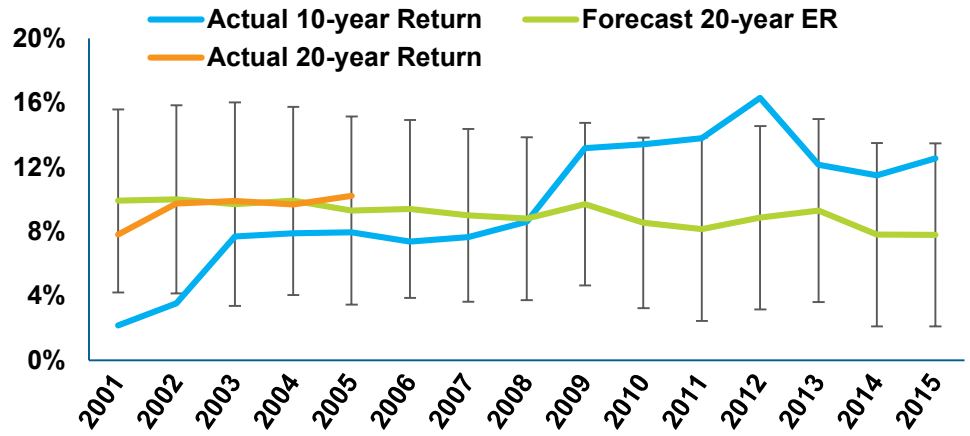


Core Real Estate

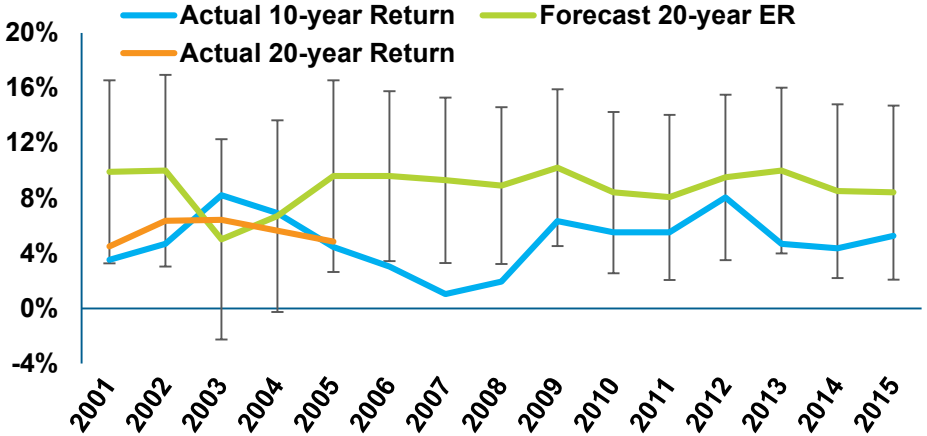


Our Track Record (continued)

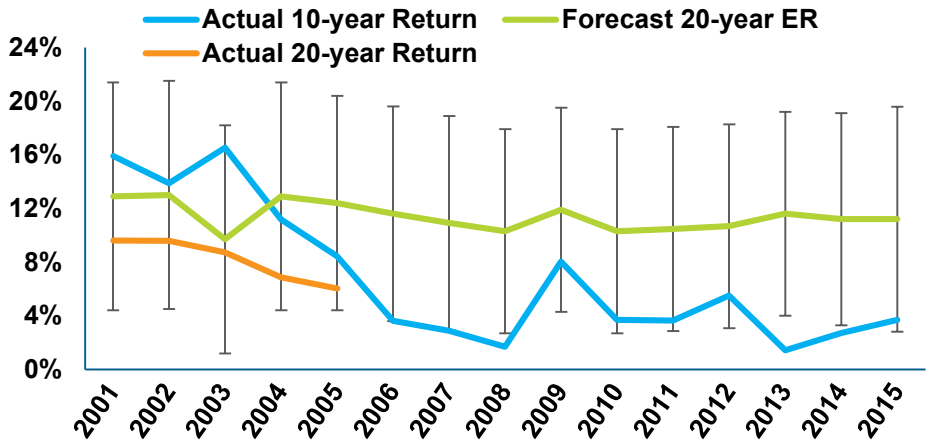
US Equity



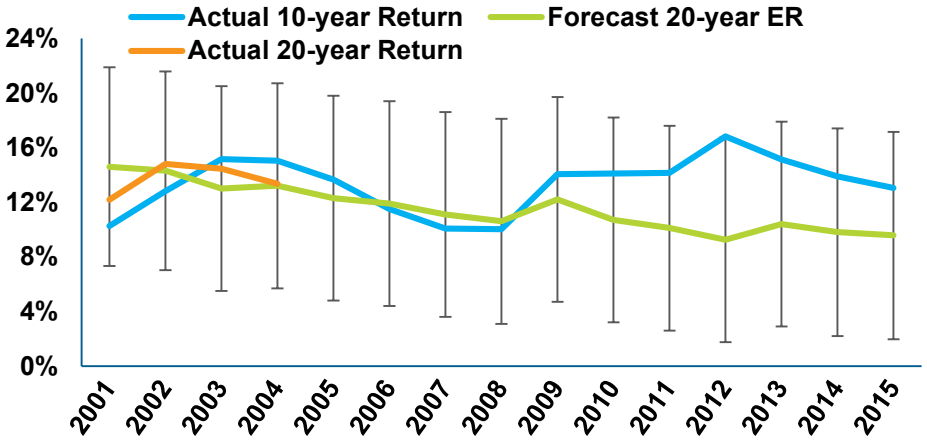
EAFE Equity



Emerging Markets Equity



Private Equity



2024 Peer Survey

- Annually, Horizon Actuarial Services, LLC publishes a survey of capital market assumptions that they collect from various investment advisors.[1]
- The Horizon survey is a useful tool to determine whether a consultant's expectations for returns (and risk) are reasonable.

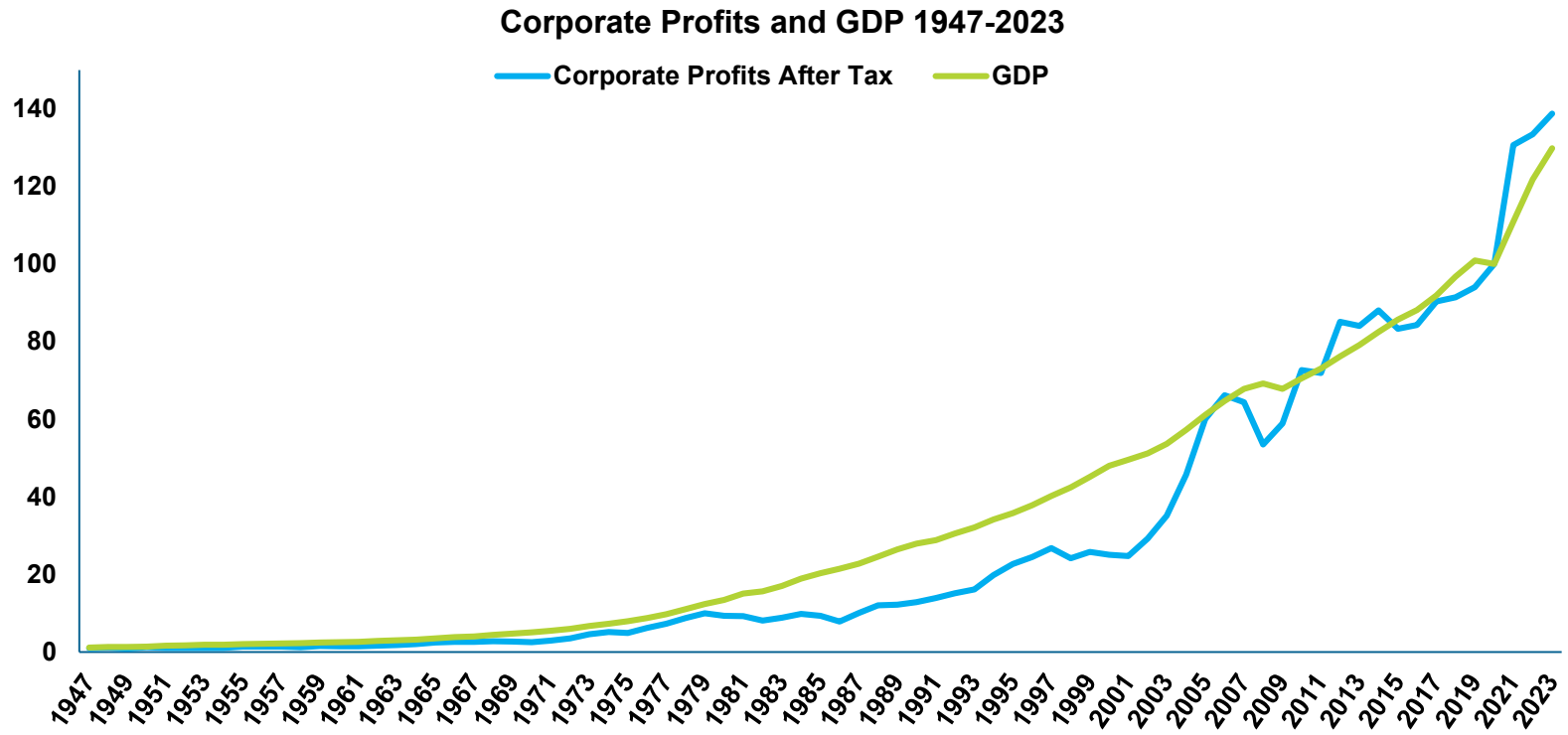
Asset Class	Horizon 10-Year Average (%)	Meketa 10-Year (%)	Horizon 20-Year Average (%)	Meketa 20-Year (%)
Cash Equivalents	3.7	2.4	3.4	2.5
TIPS	4.4	4.3	4.3	4.7
US Core Bonds	4.9	4.6	4.9	4.8
US High Yield Bonds	6.1	6.5	6.4	6.8
Emerging Market Debt	6.2	6.3	6.3	6.2
Private Debt	8.3	9.2	8.4	9.2
US Equity (large cap)	6.5	6.9	7.0	8.5
Developed Non-US Equity	7.1	7.7	7.5	8.9
Emerging Non-US Equity	7.7	7.6	8.2	8.9
Private Equity	9.1	9.9	9.7	11.2
Real Estate	6.1	6.3	6.2	8.0
Infrastructure	7.3	7.4	7.4	9.0
Commodities	4.9	4.9	5.0	5.3
Hedge Funds	5.9	4.5	6.2	5.8
Inflation	2.4	2.4	2.4	2.8

[1] The 10-year horizon included all 41 respondents to the survey, and the 20-year horizon included 26 respondents. Figures are based on Meketa's 2024 CMEs. The survey is typically published in August.

Long-Term Theme:
The Sustainability of US Earnings

The Long-Term Link Between Profits and GDP

- There is an intuitive appeal to the idea that long-term earnings growth is linked to economic growth.
- Corporate profitability is based on factors such as consumption, investment, and spending that are the key ingredients of economic growth.
- Indeed, growth features in the discounted cash flow formula commonly used by investors to calculate the present value of a stock (or any asset).

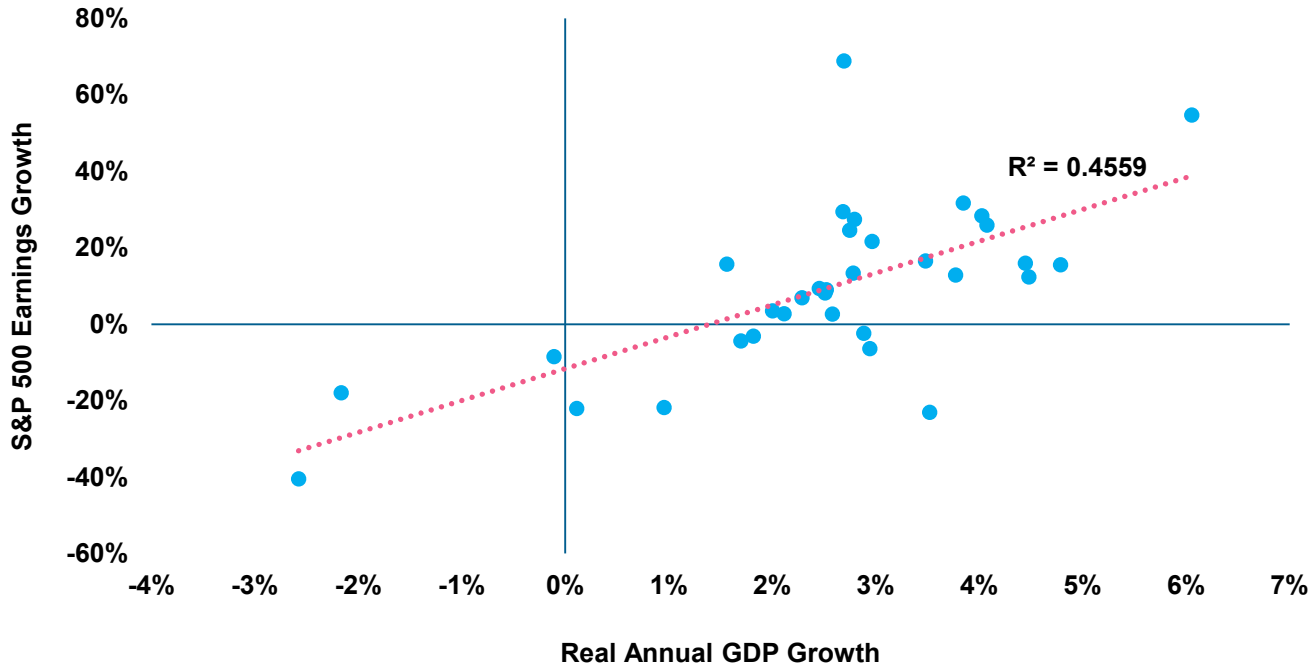


Source: Meketa analysis of FRED data as of December 2023. US annual GDP and corporate profits indexed annual growth to March 2020. Corporate profits include both private and publicly traded companies as calculated by the Bureau of Economic Analysis.

The Long-Term Link Between Profits and GDP

- There appears to be a relationship between economic growth and earnings growth, at least in the US.
- Since 2000, there is a clear positive correlation between the earnings growth of S&P 500 companies and real GDP growth.
- The r-squared value of 0.456 implies that while economic growth is partly responsible for earnings growth, it is far from the full story.

S&P 500 Earnings Growth and US Real Economic Growth Relationship



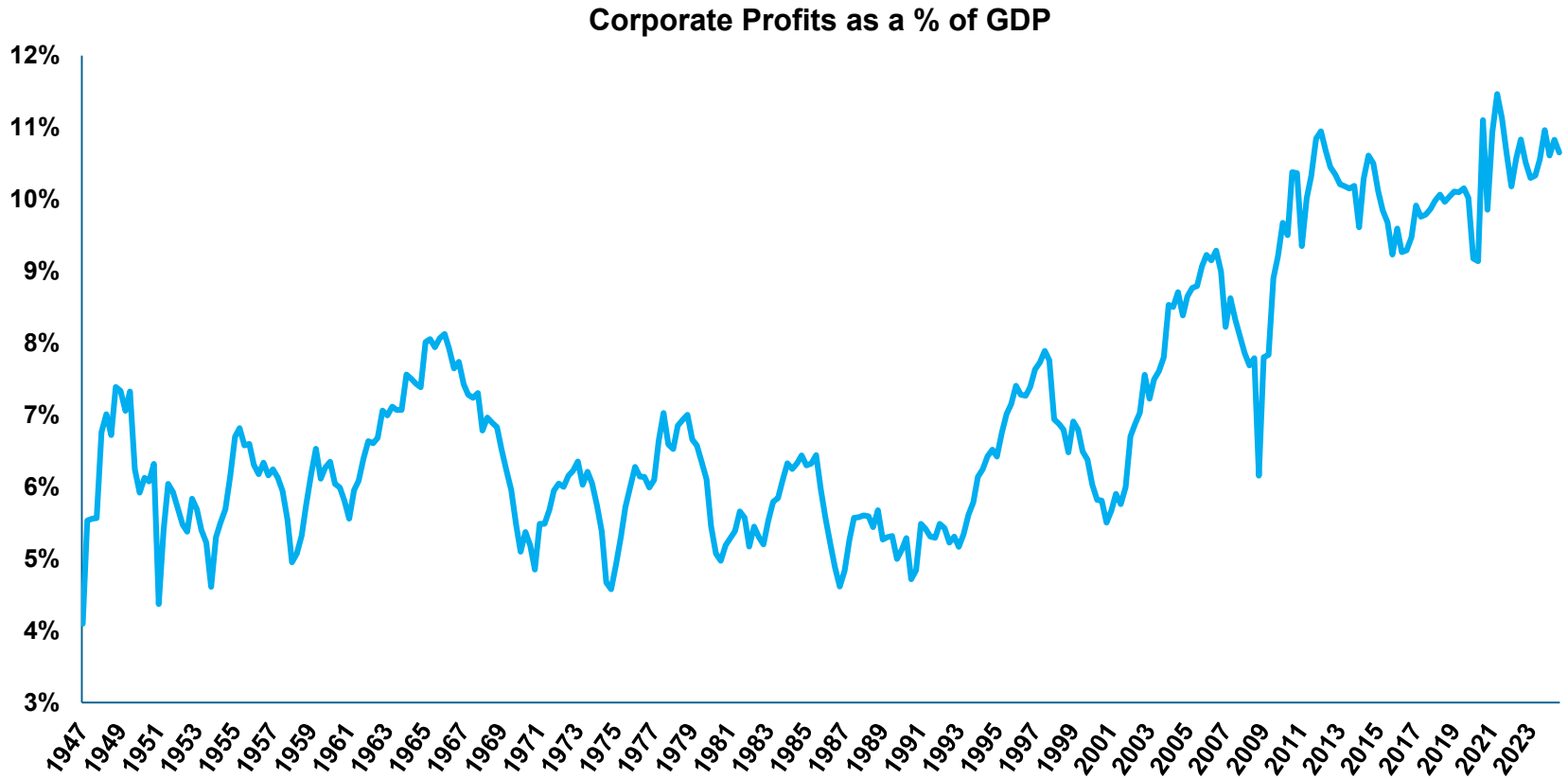
Source: Meketa analysis of FactSet and FRED data as of December 2023.

US Profitability

→ In the US, corporate profits have grown considerably faster than the broader economy since the 1990s.

→ This is coincident with profits consuming a greater proportion of the economic pie.

- Since 2000, corporate profits averaged 9.1% of GDP, vs 6.1% prior to that.



Source: Meketa analysis of FRED data. Series uses Seasonally Adjusted Annual Rate for Nominal GDP and Corporate Profits After Tax with Inventory Valuation Adjustment (IVA) and Capital Consumption Adjustment (CCAdj). Data is from 1Q1947 through 3Q2024.

Recent Corporate Profits

→ The strong growth in US earnings since 1990 is linked in part to profits consuming a greater proportion of the economic pie.

Growth of US GDP, Corporate Earnings, and EPS

	US Nominal GDP Growth Per Annum (%)	US Corporate Earnings Growth Per Annum (%)	S&P 500 EPS Growth Per Annum (%)
Since 1990	4.8	7.0	6.9
Since 2010	4.9	5.6	9.7

→ This begs the question of why US corporate profits have grown faster than the broader economy (as well as other markets), and more importantly, whether this is sustainable.

- Justifying higher future earnings growth implies that profits will continue to comprise a higher percentage of GDP.

Source: Federal Reserve Economic Data, S&P. Corporate earnings defined as Corporate Profits After Tax (with IVA and CCAdj). Seasonally Adjusted Annual Rate for Nominal GDP. Data is as of September 30, 2024.

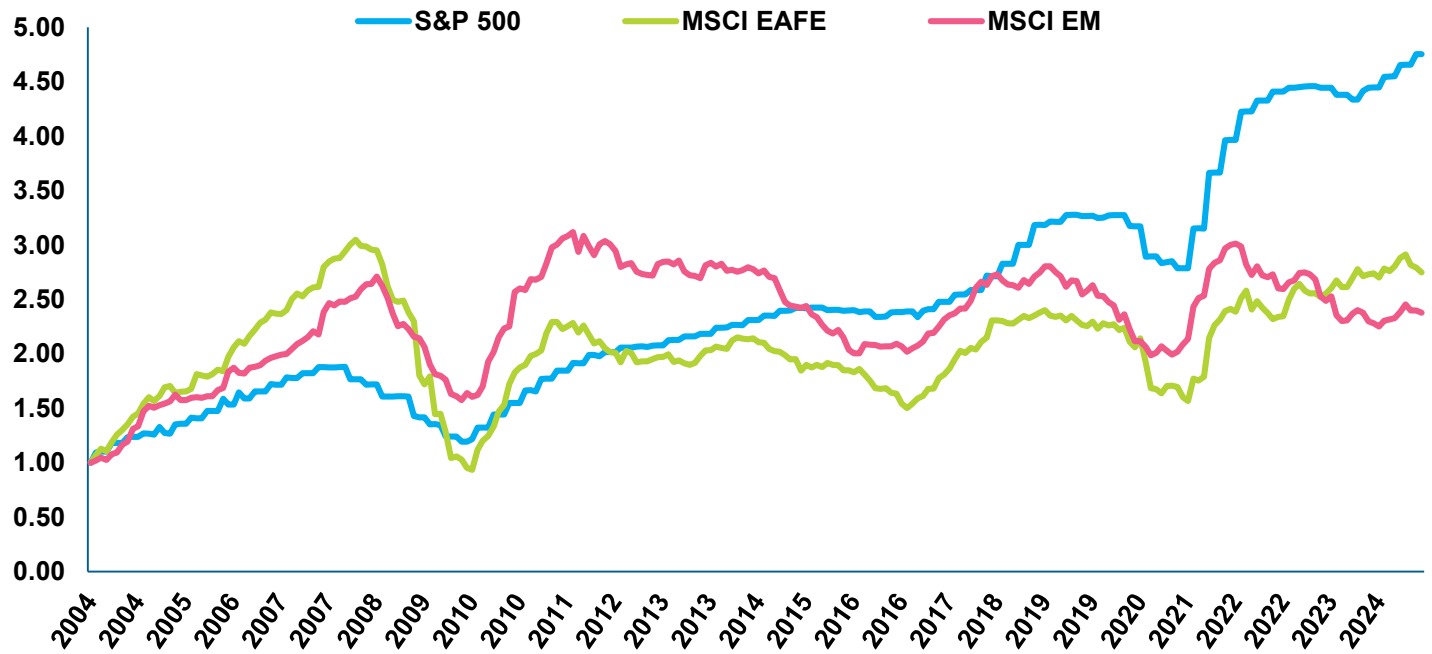
EPS Growth

→ EPS growth for the EAFE and Emerging Markets indices has been essentially zero since 2011.

- Meanwhile, US EPS growth has been strong over the past two decades.

→ There has been a meaningful difference in EPS growth for the US versus other global markets, and it has not been due to a difference in GDP growth.

20-Year EPS Growth, Indexed to $1



Source: Meketa analysis of MSCI and Bloomberg data. Series uses Trailing 12-month earnings per share in local currency. As of December 31, 2024.

Reasons Why Profitability May Decouple from GDP Growth

→ There are several reasons why profits have likely comprised a higher (or lower) percentage of GDP:

- The global footprint of companies
- Market composition
- Technological advancements
- Labor market dynamics
- Government policies
- The level of interest rates

→ In addition, EPS can decouple from earnings.

- Net issuance vs buybacks affects EPS.

→ The question is to what extent some or all of these explanations will remain in place.

A Global Footprint

- → Many large corporations (i.e., most of the biggest publicly traded companies) operate internationally, allowing them to generate significant revenues and profits from overseas markets.
  - For example, the companies in the MSCI USA index derived an estimated 38.3% of their revenues from outside the US in 2024.
- → Many of these companies expanded to international markets in the hope of taking advantage of faster growth in the target market for their product or service.
- → Hence, exposure to faster-growing economies (e.g., many emerging markets countries) could help boost US profits to grow faster than US economic growth alone would allow.

Revenue Source for the Stock Market

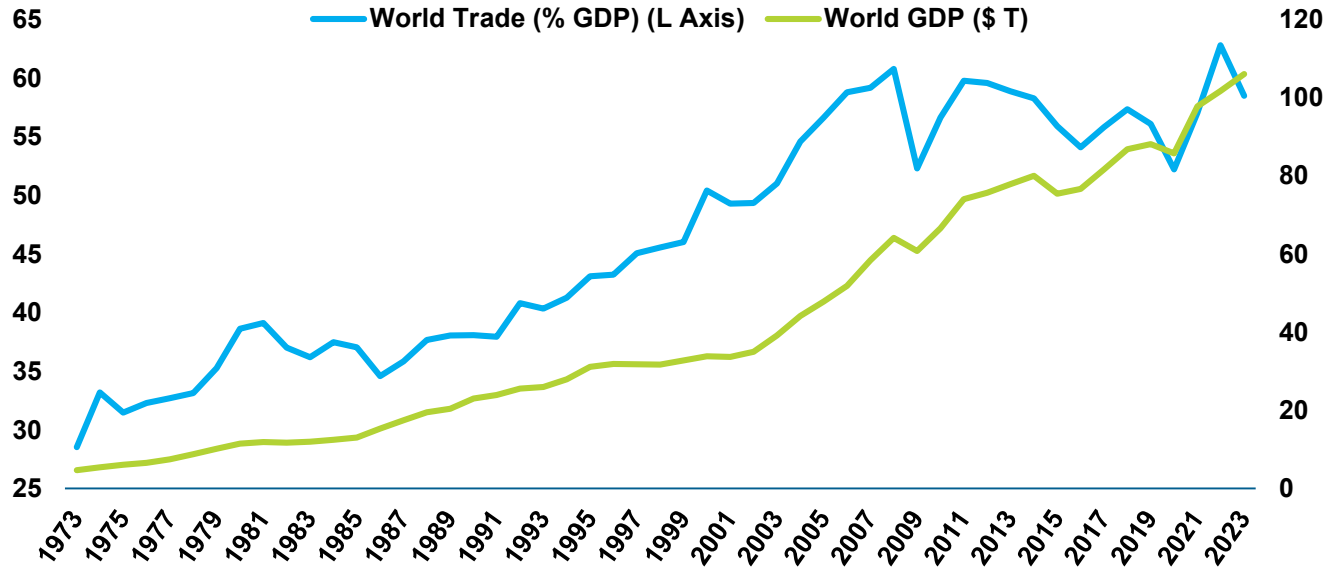
	% Revenues from US	% Revenues from EAFE	% Revenues from EM	% Revenues Frontier
MSCI USA	61.7	17.1	19.6	1.6
MSCI EAFE	22.9	52.9	22.1	2.0
MSCI Emerging Markets	14.8	7.9	76.0	1.2

Source: Meketa analysis of data provided by MSCI as of December 31, 2024.

Shifting Winds in Global Trade

- → Starting around 1990, the world experienced extraordinary growth in trade as countries adopted trade liberalization policies.
- → Global trade grew from 20% of global GDP in 1970 to a peak of over 50% in 2008.
  - However, it has since plateaued and appears to be declining.
- → As a result, the share of profits for US-based companies coming from outside the US may have peaked.
- → Hence, the tailwind of expanded global trade has likely faded and may even be turning into a headwind if the world continues on its recent path of deglobalization.

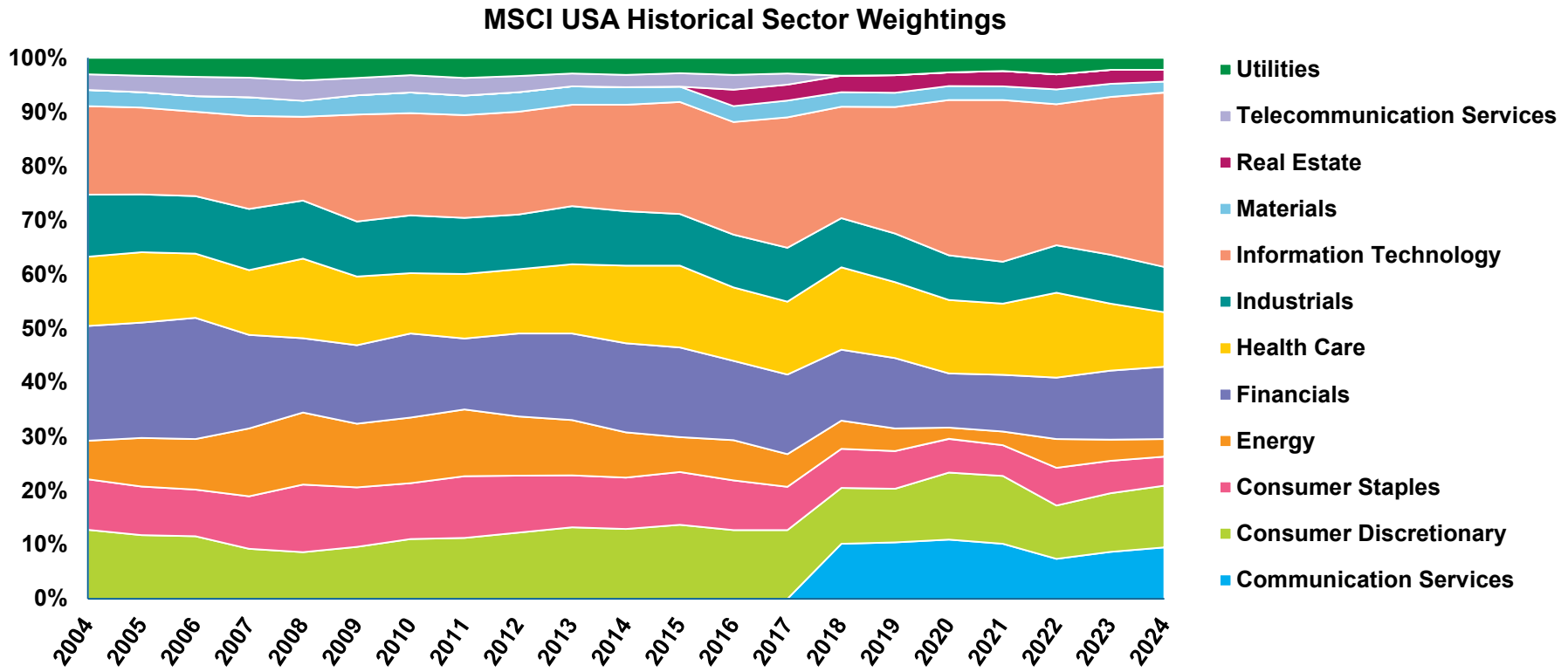
Annual Global Trade and GDP (1970 – 2023)



Source: World Bank, as of December 2023. World trade shown in current US dollars.

Market Composition

- The composition of the US stock market is constantly evolving.
- At any point in time, it is often led by those companies that are driving change in the economy, from the railroad stocks of the late 1800s to the AI-related stocks of today.
- In the last two decades, it has become increasingly concentrated in the information technology sector.

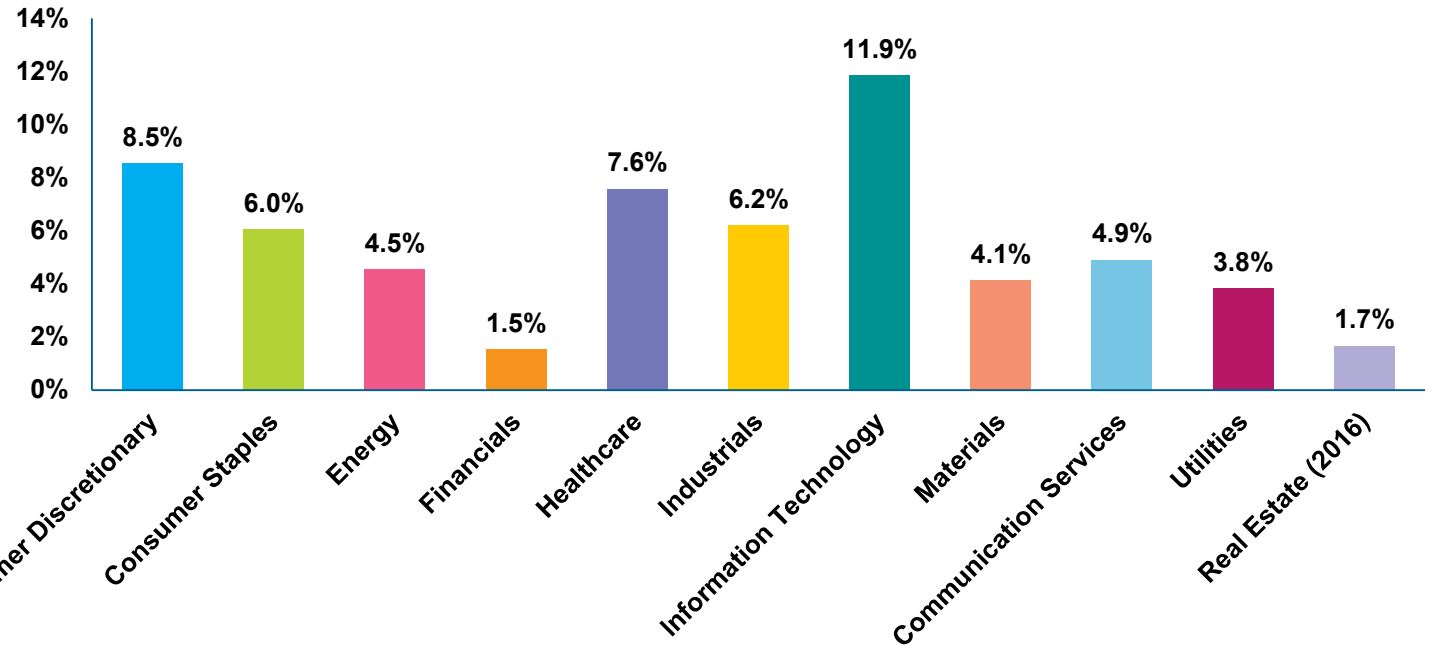


Source: MSCI as of December 2024. In 2017, the Communications sector was created from the telecommunications sector and some social media companies. And in 2017, Real Estate sector was introduced to the index

Market Composition, continued

- This evolution in sector composition is important as different sectors have exhibited varied earnings growth profiles.
- For example, the two sectors that have exhibited the highest earnings growth since 2000 are now the two largest sectors in the S&P 500.
- If these sectors continue to grow faster than the rest of the market, their larger weighting supports the concept of the equity market growing faster than the broader economy.

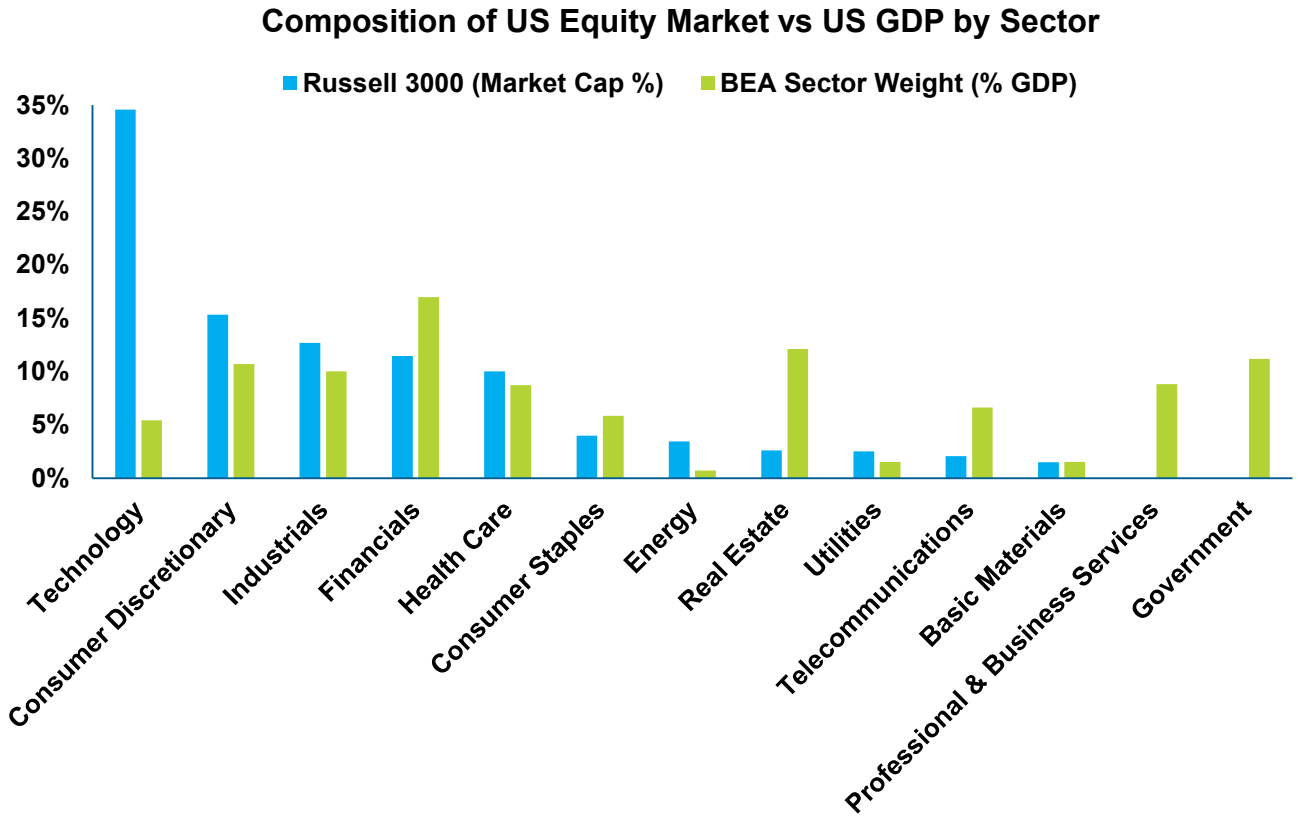
Annualized Average US Earnings Growth by Sector



Source: MSCI USA index. Data as for the twenty years ending December 2024. Real estate established in 2016 and showing since inception return. Note that Meta and Alphabet were moved to communication services in 2016..

Market Composition (continued)

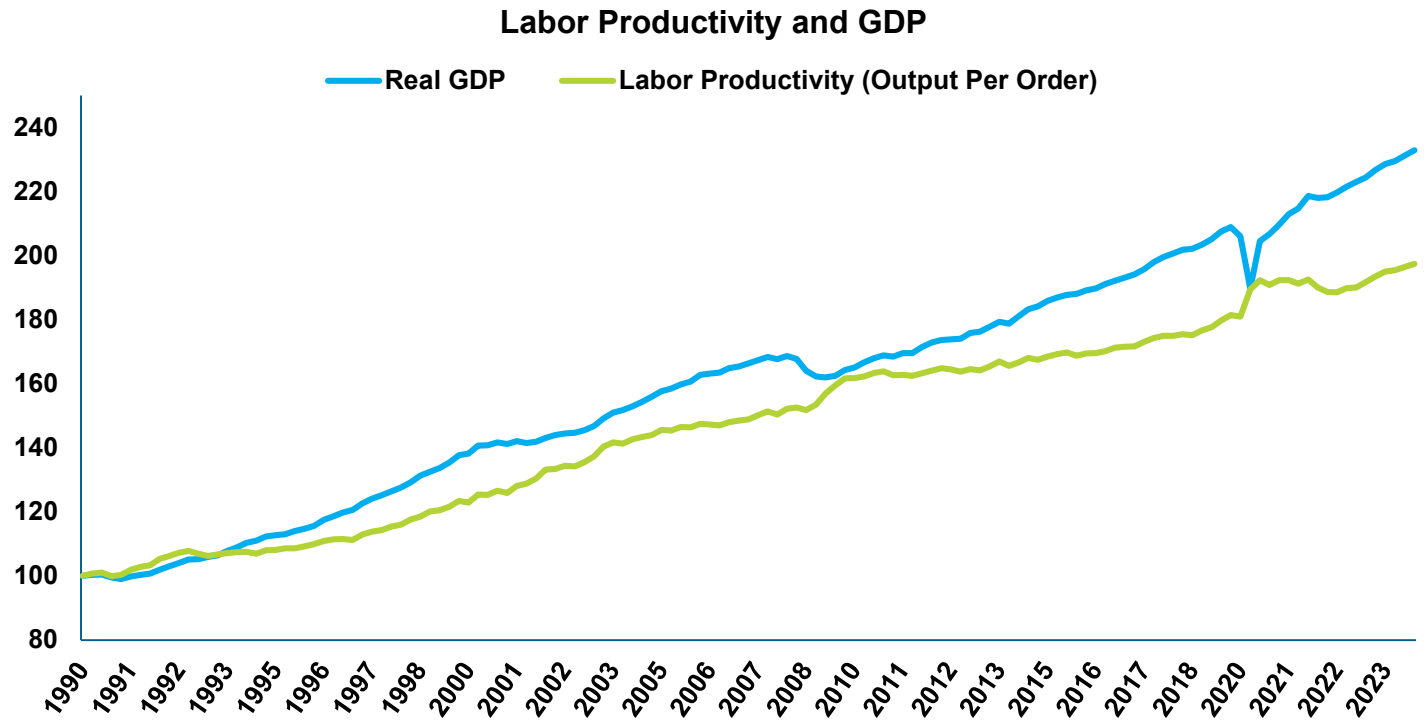
- Just as important as the changes in the composition of the equity market are the differences between the stock market and the broad economy.
- For example, IT comprises a substantially larger portion of the stock market than it does of US GDP.



Source: Russell 3000 index fact sheet as of December 2024. Bureau of Economic Analysis as of September 2024. For GDP analysis at the sector level, the BEA uses the 'valued added' approach to GDP calculation. Meketa estimated weights for BEA sectors into GICS sectors.

Profitability and Productivity

- → Productivity is a driver of growth at both the macroeconomic and microeconomic levels.
- → Increases in labor productivity, for example, mean that more output is produced per hour worked, which directly contributes to GDP growth.
- → Likewise, improvements in total factor productivity, often driven by technological advancements and innovation, can lead to significant increases in GDP.



Source: FRED. Data is for the period 1990 through 3Q2024.

Profitability, Productivity, and Labor Market Dynamics

→ Companies that can increase output without a corresponding increase in labor costs will enjoy higher productivity, leading to higher profits.

- At the macro level, the economy has shifted such that labor has less pricing power.
- As a result, a smaller share of economic gains goes to labor, while a larger share goes to corporate profits.

→ The decreasing share of union workers in the workforce may be both a measure of and cause of this.

- This decline is due to a number of factors, including the decrease as a % of the economy of heavily unionized industries like manufacturing, mining, and transportation.
- As these industries have shrunk in relative terms, the economy has shifted towards sectors with traditionally lower unionization rates, such as services and technology.
- The offshoring of manufacturing and other “low skill” jobs, as well as the automation of much of those industries, has also played a part.
- More recently, the rise of the gig economy represents yet another area where labor has limited pricing power.

Profitability, Productivity, and Scale

→ Productivity can also be driven by economies of scale.

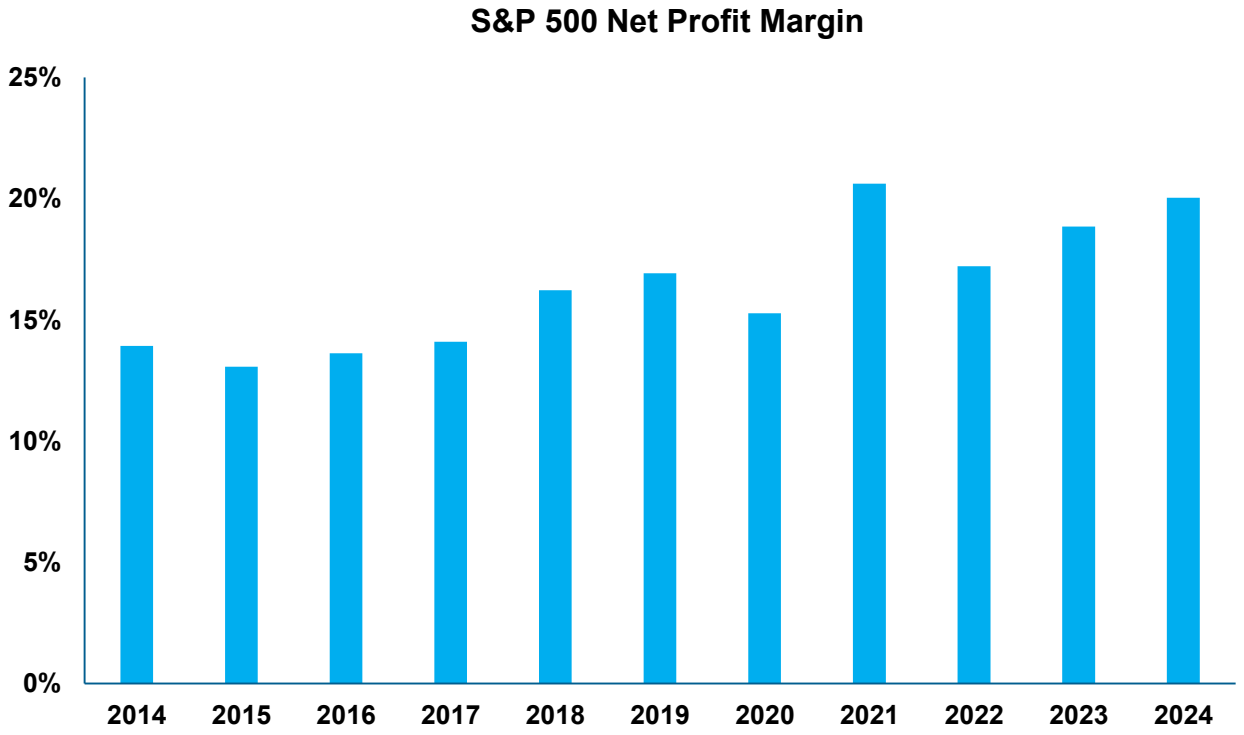
- For example, companies in the tech sector, particularly those involved in software development and data centers, enjoy significant economies of scale.
- Once the initial development costs are covered, the cost of producing additional "units" (e.g., software licenses) is minimal.
- The pharmaceutical industry benefits from economies of scale in research and development (R&D) and production.
- High initial costs for R&D can be spread over a large volume of drug sales, reducing the average cost per unit.

→ If the stock market is more heavily weighted in industries/companies that have more favorable productivity characteristics, it might help explain why the market has been able to grow earnings faster than the broader economy.

- Indeed, industries that enjoy low comparative labor costs and high comparative economies of scale represent a disproportionate share of the stock market relative to the economy.

Profit Margins

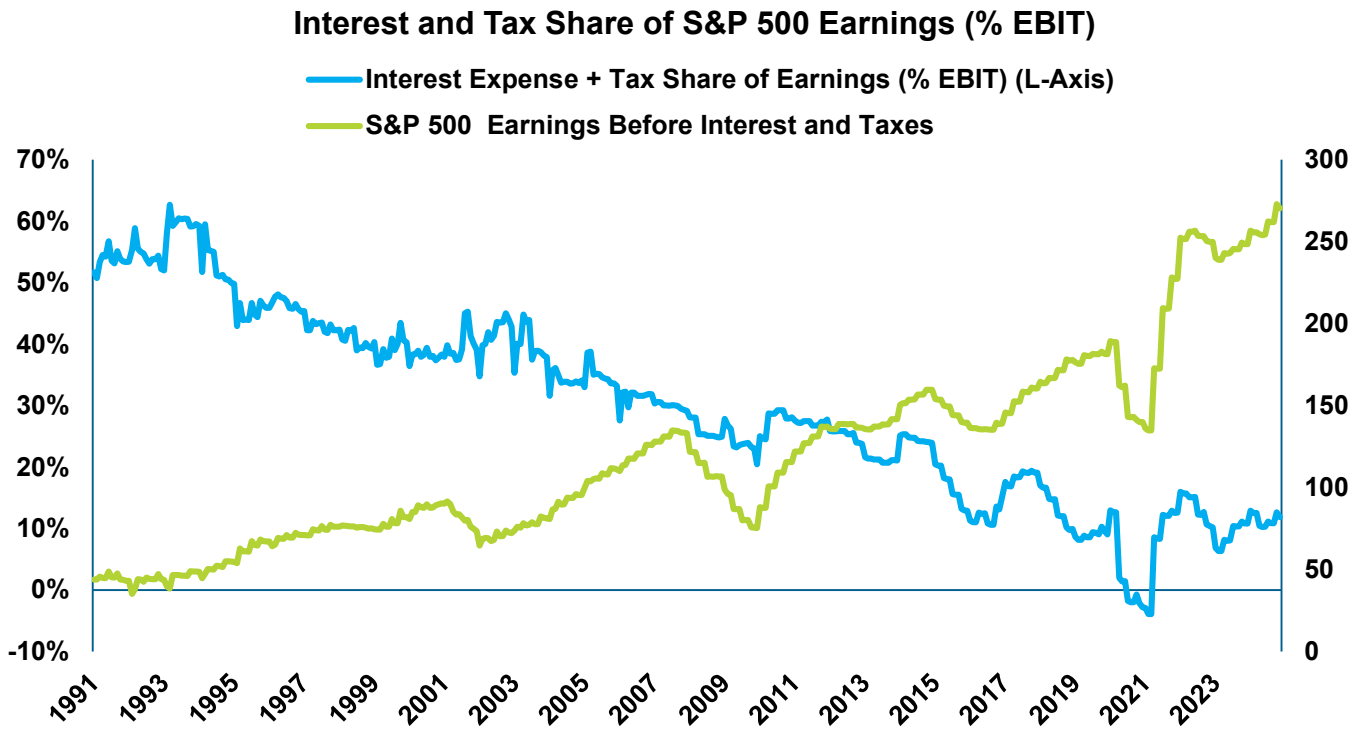
- Profit margins for the S&P 500 have proved to be quite steady over the past decade, even during the global pandemic.
- This implies stable pricing power on behalf of listed companies, no matter the political administration, inflationary environment, or stage of the business cycle.



Source: FactSet as of December 31, 2024. Data pulled on January 7, 2025.

Government Policies: Taxes and Interest Rates

- → Declining effective tax rates, combined with lower interest rates, have served as a tailwind for profitability since the 1990s.
- → In June of 2023, the Federal Reserve published a research note that found that between 1989 and 2019, falling tax rates and borrowing costs accounted for around forty percent of corporate profit growth.
- → Indeed, corporate taxes and interest expense have fallen from around sixty percent of earnings in the early 1990s to about ten percent of earnings in 2024.



Source: Bloomberg as of February 2024.

Societal Norms

→ The US has a culture that encourages risk-taking, individualism, and entrepreneurial activities.

- This is perhaps best exemplified by the venture capital industry, which is fairly unique to the US.
- Venture capital tends to emphasize sectors that, on average, are growing faster than the broad economy, it has served as the breeding ground for many of the companies that are currently driving earnings growth in the US.
- It is not too far-fetched to believe that the companies that will be powering earnings growth ten or twenty years in the future will come out of the US venture ecosystem of today.

→ In the US, maximizing shareholder wealth has long been the primary goal of the boards and executives that run public companies.

- Arguably, this results in companies seeking to maximize their long-term earnings per share growth.
- However, the degree to which shareholder wealth is a primary motivation varies by market, and this changes over time.
- For example, many European companies are focused on improving outcomes for all “stakeholders” in a company (i.e., stakeholder capitalism).

Societal Norms (continued)

- → Perhaps less benevolently, intervention by the state and structural inefficiencies such as lack of property rights or clear rule of law, may also affect earnings growth.
  - State-owned or state-controlled enterprises may pursue motives beside shareholder wealth.
  - State-backed companies may be more willing to tolerate low margins or even operate at a loss in order to achieve other strategic objectives.
  - Likewise, countries that lack clear property rights or rule of law are more likely to be subject to direct intervention by the state that can harm shareholders.
- → Corruption, graft, and nepotism can affect the link between economic growth and earnings growth.
  - Capitalism, at least in theory, allows for the efficient allocation of resources and capital, as determined by the marketplace.
  - A culture where corruption is common is more likely to result in the misallocation of resources, where capital is directed from productive to unproductive uses (e.g., bribes).
  - Emerging economies tend to have the lowest scores on the global Corruption Perceptions Index published by Transparency International.
- → A favorable regulatory environment can boost after-tax profits, while a high or unfavorable regulatory environment can detract them.
  - When comparing the relative ease of doing business, the World Bank finds that regulatory burdens are higher in countries with lower national income (i.e., many emerging market countries).

Source: Transparency International, Corruption Perceptions Index, 2023. The CPI measures the perceived levels of public sector corruption in countries and territories around the world.
Source: World Bank Group, "Doing Business 2020: Company Business Regulation in 190 Countries," 2020.

Earnings Growth

- EPS has grown faster than earnings in the US in recent years, acting as a tailwind.
- This is primarily due to companies using excess cash to repurchase their shares.[1]

EPS with no change in shares	EPS with 2% reduction in shares
$1,578B / 10.5M shares	$1,578B / 10.3M shares
= $150.3 per share	= $153.2 per share
	EPS 2% higher

- Over ten years, this can have a significant compounding effect.

EPS with 2% reduction in shares for ten years
$1,578B / 8.6M shares
= $183.9 per share[2]
EPS 22% higher

- Data shows that this trend is almost two decades long.[3]
- This bucks the longer-term trend (still common in non-US markets) of companies being net issuers of shares.

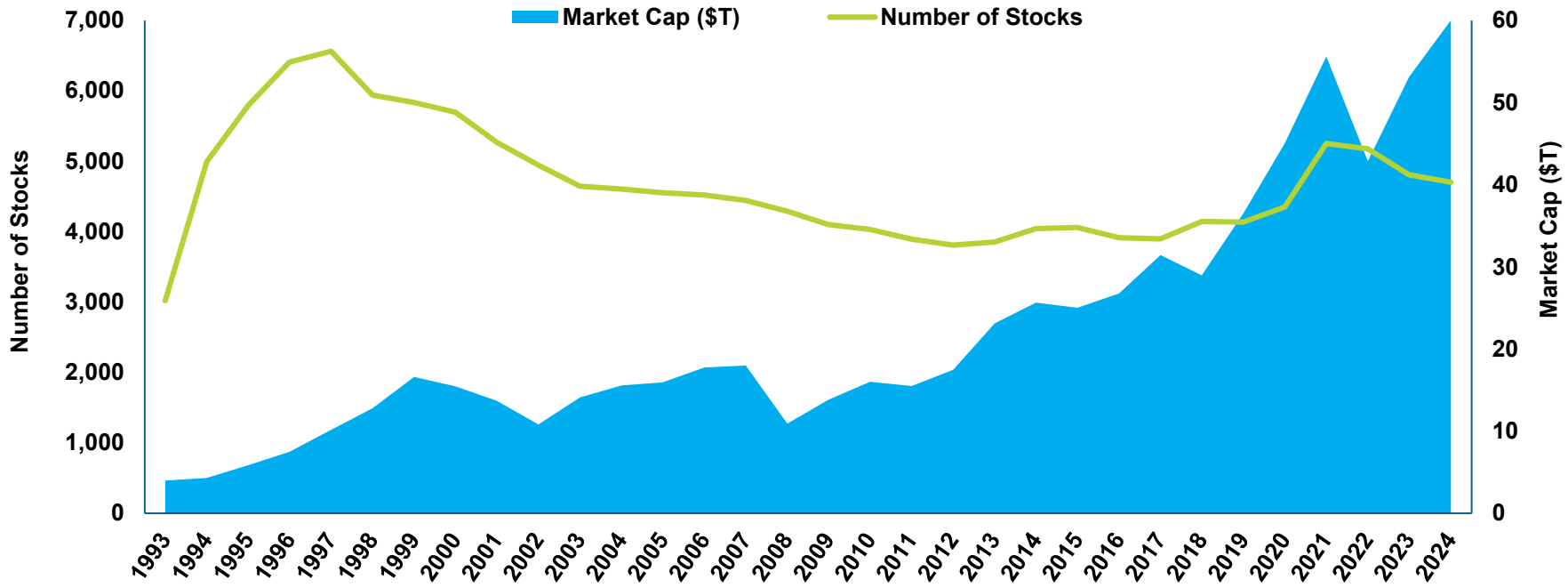
[1] Buying back shares reduces the denominator in the Earnings per Share equation, thus increasing the result of the calculation. The example shown is illustrative.
[2] Throughout this document, numbers may not sum due to rounding.
[3] Source: Yardeni research.

Long-Term Theme:
The Decreasing Number of Public Companies

Historical Perspective

- → Throughout most of US market history, the number of publicly listed companies grew.
  - This trend peaked in 1997, when there were more than 6,500 listed companies.
- → The number then declined by more 40% until reaching a nadir of just 3,800 companies in 2012.
- → Market capitalization was relatively unhampered, increasing by nearly 6x to $60 trillion in June 2024.

Number and Market Cap of US Listed Companies 1980 – June 2024

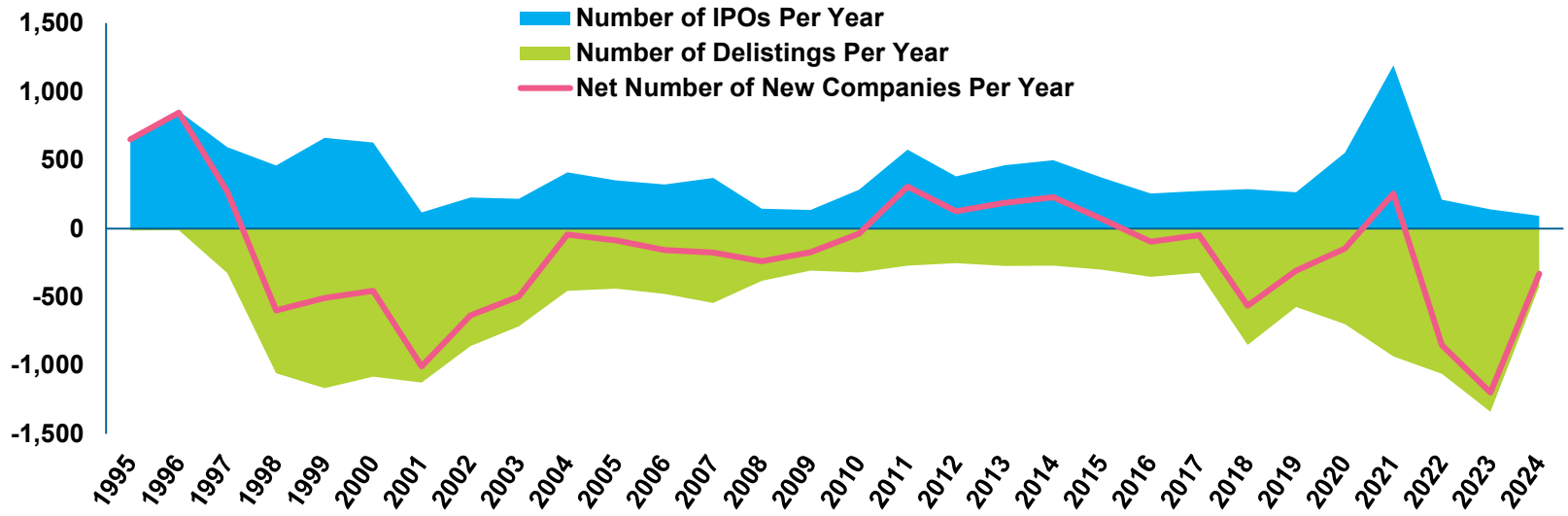


Source: Bloomberg. Stock count from NASDAQ, New York Stock Exchange (NYSE), and New York Stock Exchange American. Note that estimates of the total number of listed stocks vary. For example, data from the World Bank shows a peak of just over 8,000 stocks, while data from CRSP US Stocks Databases shows it peaking at 7,300.

Delistings Rise as Initial Public Offerings (IPOs) Fall

- → For the majority of the past thirty years, the number of net new companies has declined.
  - The number is impacted by both additions (i.e., IPOs) and subtractions (i.e., delistings).
- → Delistings experienced two prolonged surges, one starting in 1997-98 and the other in 2018.
- → IPOs declined from a peak in the mid 1990s, aside from a spike in 2021.
- → Other developed markets (e.g., the UK) have seen similar trends of a decreasing number of public companies.
  - However, some emerging markets (e.g., China) have seen the opposite trend.

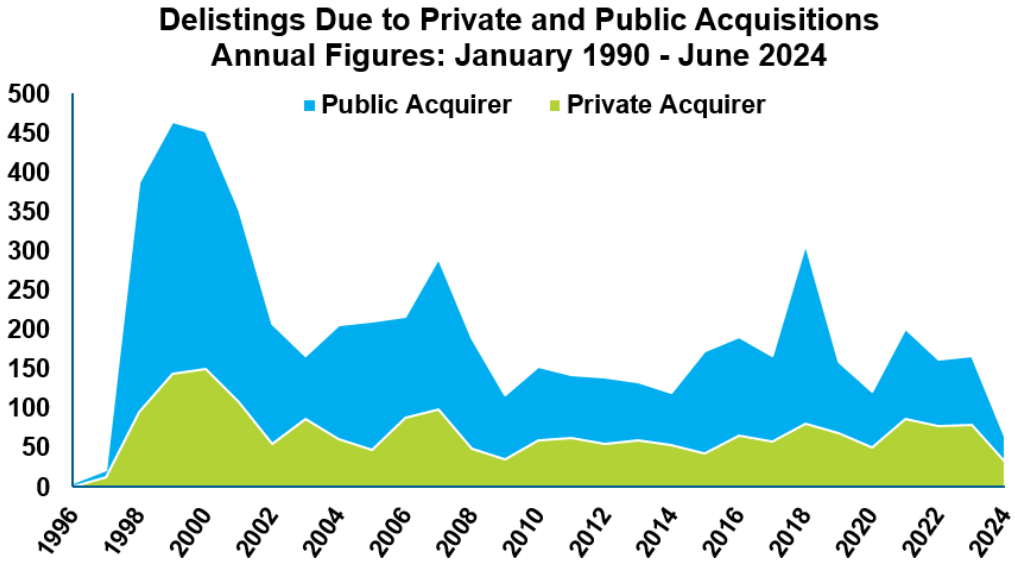
Net Changes to Number of US Listed Companies (IPOs – Delistings)



Source: London Stock Exchange as June 2024 and Shanghai Stock Exchange as of August 16, 2024.
Source: Bloomberg data for delisting from NASDAQ, NYSE and NYSE American. Represents annual figures for 1996 through 2023 and partial year through June 2024. IPOs Data accounts only for "Primary Share Offerings," excludes "Secondary Share Offerings" and "Best Efforts." Delistings are based on delistings from NYSE and NASDAQ. "Other" reasons for delisting include reorganization, bankruptcy, liquidation, and not available.

Delisting By Public and Private Acquisition

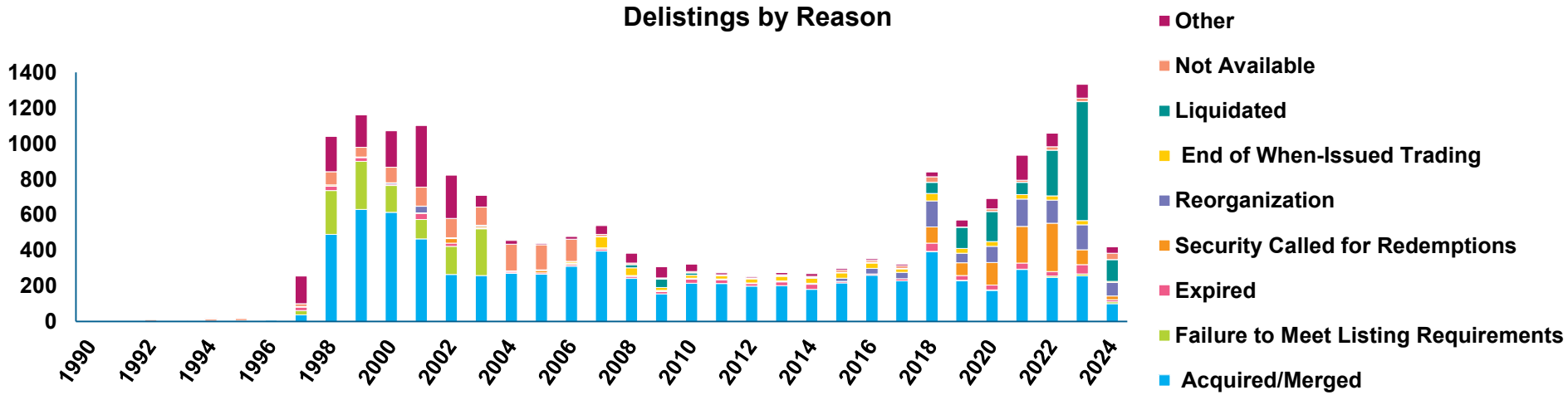
- → If a company delists, shareholders may be bought out or offered new shares.
- → Delistings due to M&A peaked in the late 1990s and early 2000s.
  - It has averaged ~250 companies per year since.
- → Delistings due to acquisitions has been driven more by public companies' M&A activity than private companies taking public companies private.
  - When public companies acquire other public companies, investors continue to have access to the growth and revenues of the acquired companies through the merged entity.



Source: NBER Market Microstructure Meetings 2002, J. Macey et. Al., "Down and Out in the Stock Market: The Law and Economics of the Delisting Process," 2002 and updated in February 2005.
Source: Bloomberg data as of June 2024 for NASDAQ, NYSE and NYSE American exchanges.

Exchange and SEC Regulatory Changes

- → Between 1990 and 1998, regulatory efforts to separate "penny stocks" from more valuable shares resulted in the creation of the Over-the-Counter Bulletin Board (OTCBB).
  - The number of penny stocks declined from ~6,000 to ~4,000 stocks.
- → In 1996, NASDAQ increased its minimum market cap and share price requirements.
- → In 2002, with the passage of Sarbanes-Oxley (SOX) regulation, all US exchanges amended their listing standards to include additional corporate governance requirements such as independent audits.
  - Between 1996 and 2002 more than 7,350 stocks delisted from US exchanges, with half of them being forced to delist for not meeting minimum asset, volume, and shareholder minimums.

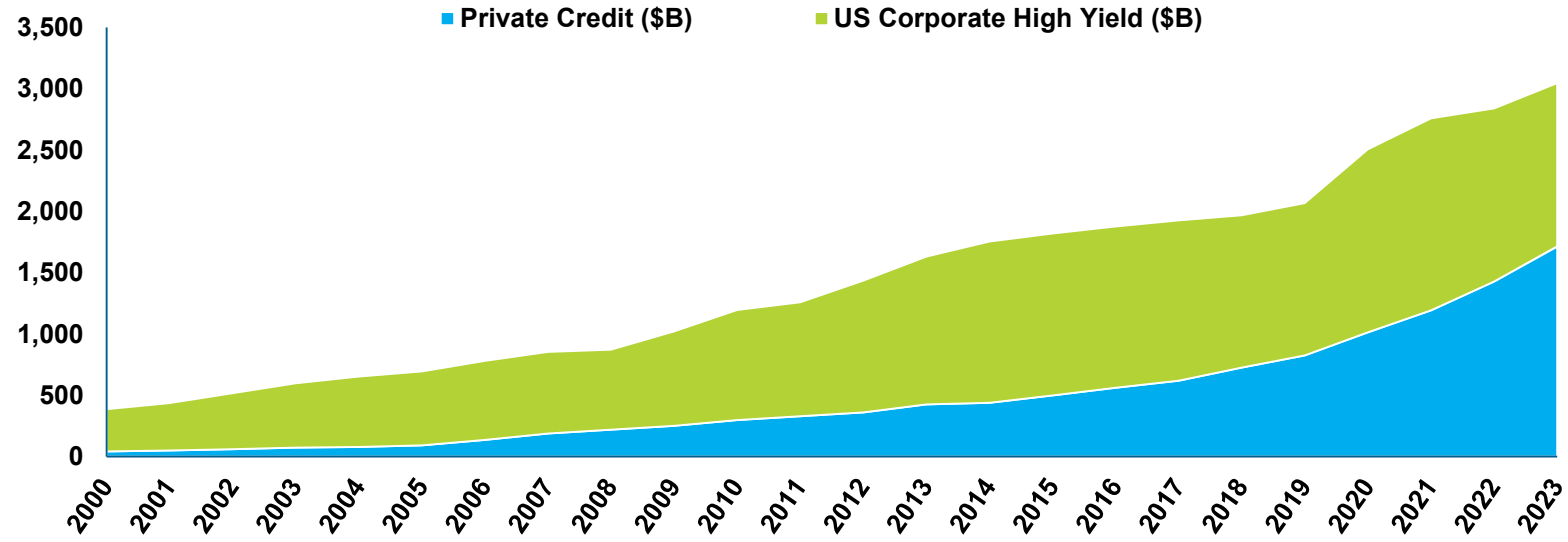


Source: NBER Market Microstructure Meetings 2002, J. Macey et. Al., "Down and Out in the Stock Market: The Law and Economics of the Delisting Process," 2002 and updated in February 2005.
Source: Doidge, Karolyi, and Stulz, "The US listing gap," July 2015.
Source: Bloomberg. Represents the period January 1990 to June 2024. IPOs Data accounts only for "Primary Share Offerings," excludes "Secondary Share Offerings" and "Best Efforts." Delistings are based on delistings from NYSE, NYSE American and NASDAQ. Chart does not include all of the reasons cited for delisting but focuses on the most often cited reasons.

Private Equity and Shadow Banking

- → In October 1996, the National Securities Markets Improvement Act ("NSMIA") "made it easier for both private start-ups and private equity funds investing in them to raise private capital."
- → In an effort to de-risk systemically important banks and promote financial stability, Congress passed the Dodd-Frank Act in 2010.
  - As a result, many banks took a more conservative approach to lending and many companies found themselves unable to secure loans from banks.
  - Into this void stepped hedge funds, private credit funds, and other lenders, resulting in the rise of the "shadow banking" system.

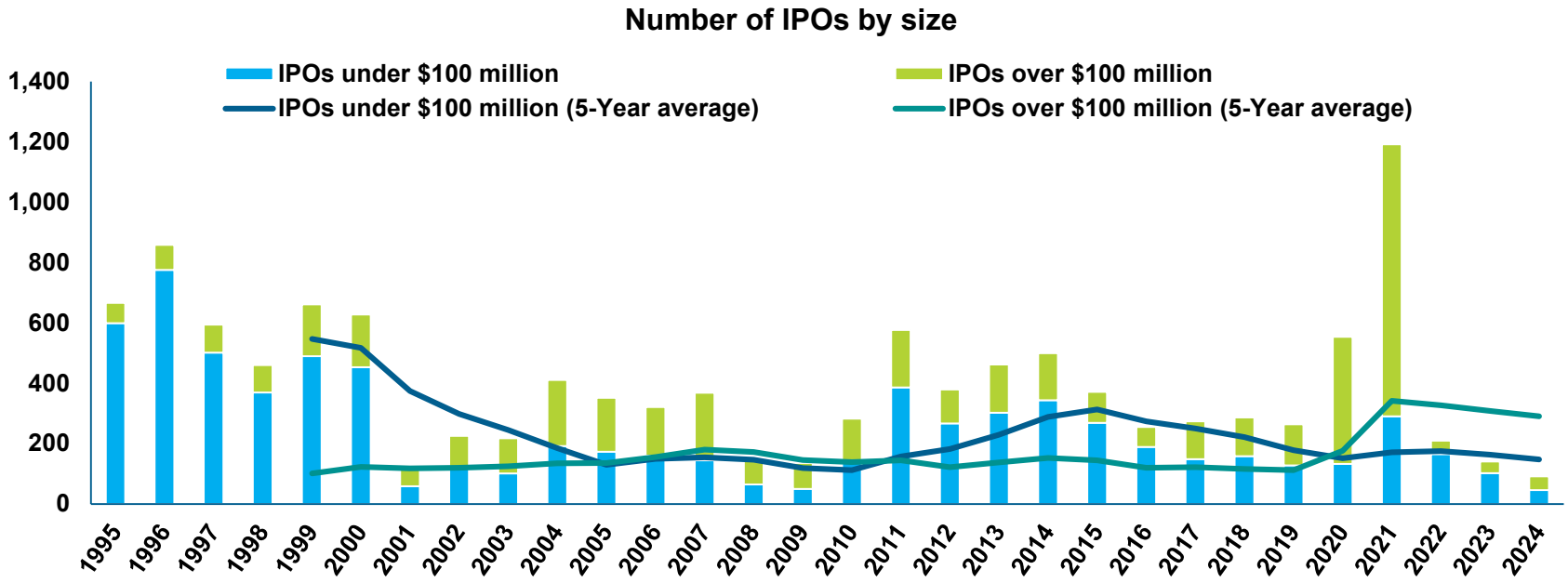
Growth in Private Credit and High Yield Assets Under Management



Source: Prequin private credit assets under management as of December 2023. Barclays Live high yield amount outstanding as of December 2023.

Annual Number and Size of IPOs Has Declined

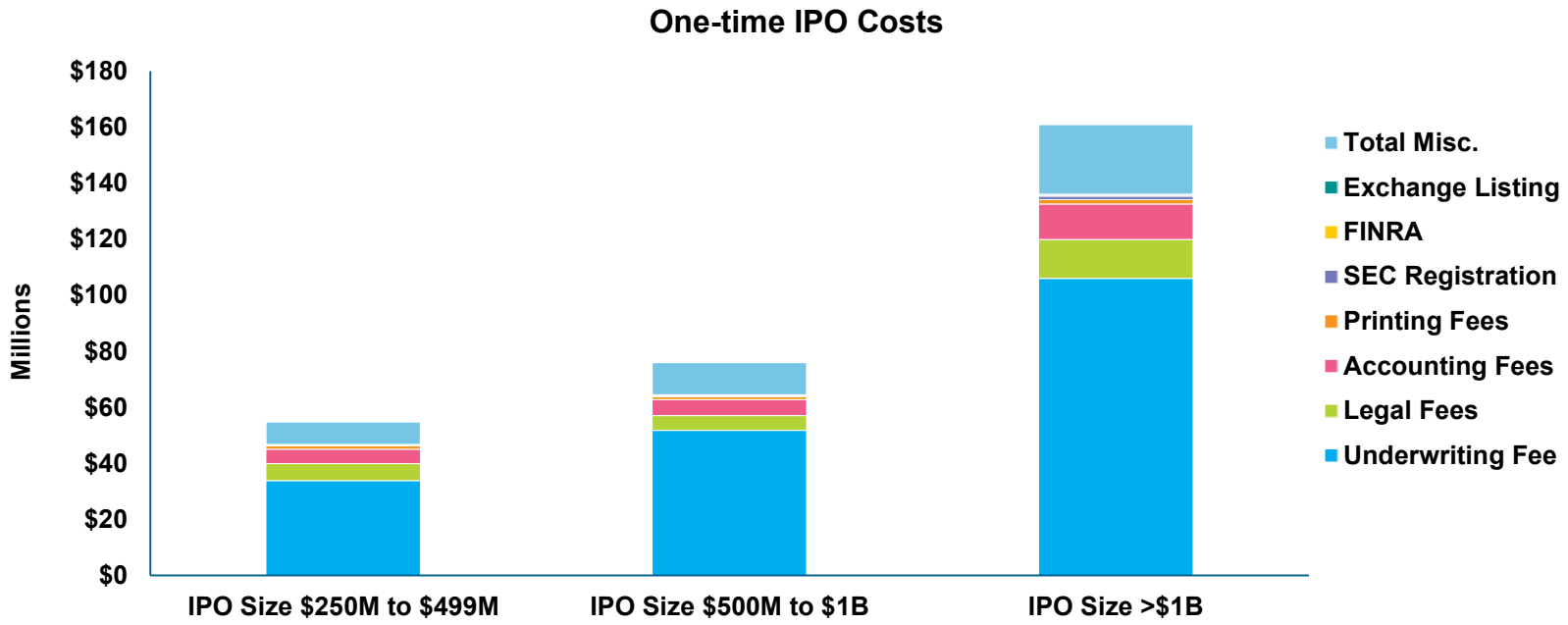
- → Between 1980 and 2000, approximately 300 companies IPO'd each year, but for the subsequent decade, the annual average number of IPOs fell to just over 100.
- → In recent years, companies are waiting longer, on average, to go public.
  - For example, the average age of a venture-backed IPO has doubled.
- → Moreover, some of the most successful IPOs over the past decade were cashflow positive companies with an initial valuation of over $1 billion dollars – the so-called unicorns.



Source: Pitchbook, P. Mathur, "The Meteoric Rise of US Unicorns in 2021," January 5, 2024.
Source: Bloomberg. Represents annual figures for 1995 through 2023 and partial year through June 2024 for NYSE, NASDAQ and NYSE American.

IPO Costs

- → The higher investor limit provides private companies with more flexibility to access private capital without the burden (and costs) of compliance reporting or becoming public.
- → These costs include expenses for accounting, legal, underwriting, and other services.
  - The smaller the company, the greater the proportion the IPO costs would be of their revenues and presumably of their value.
    - – The decline in the number of IPOs appears to have been concentrated among small companies.

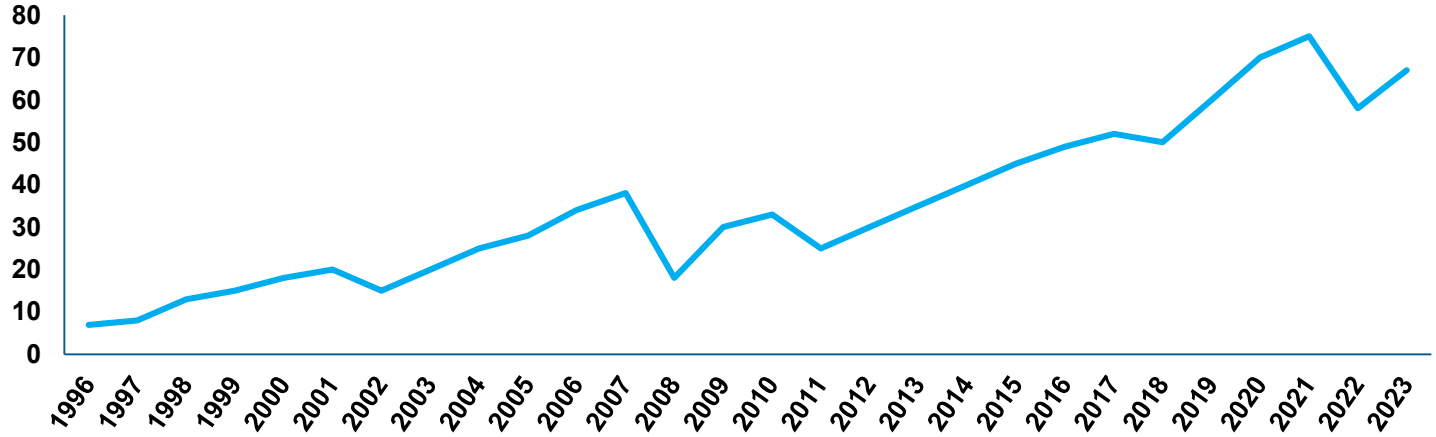


Source: SEC, X. Gao et al., "Where Have All the IPO's Gone?" April 3, 2024.
Source: PriceWaterHouse Coopers "Considering an IPO to fuel your company's future?" as of September 2024.

Intangible Assets

- → The increasing importance of intangible corporate assets may also be a factor in a company's decision to stay private or go public.
  - Intangibles include patents, software and databases, trademarks, customer lists, franchise agreements, organization capital, and firm-specific human capital.
- → Establishing and enforcing exclusive property rights for intangible assets can be challenging.
  - Unlike physical capital, an intangible can be readily copied or imitated.
- → Companies heavily investing in intangibles may prefer to stay private.
  - This lowers the risk of proprietary information being divulged to competitors via regulatory disclosures.

Global Market Value of Intangible Assets (USD T)



Source: Source: Journal of Economic Perspectives, N. Crouzet et. Al., "The Economics of Intangible Capital," Summer 2022.
Source: Brand Finance Global Intangible Finance Tracker (GIFT) as of December 2023. Journal of Economic Perspectives, N. Crouzet et. Al., "The Economics of Intangible Capital," Summer 2022.

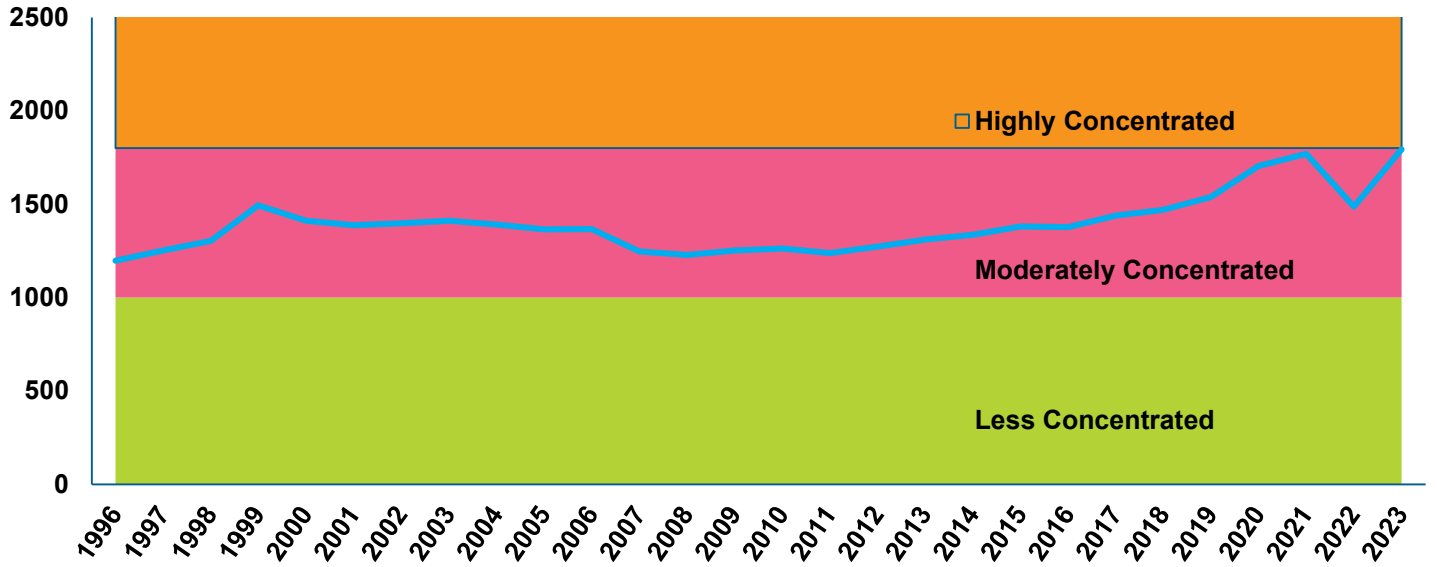
US Stock Market Concentration

→ The change in the number of public US companies has potential ramifications for investors:

- An increased level of concentration in public markets.
- A broader opportunity set in private markets.

→ The US stock market recently reached a peak level of concentration (for the past thirty years).

US Stock Market Concentration based on HHI
Annual Figures: 1996 – June 2024

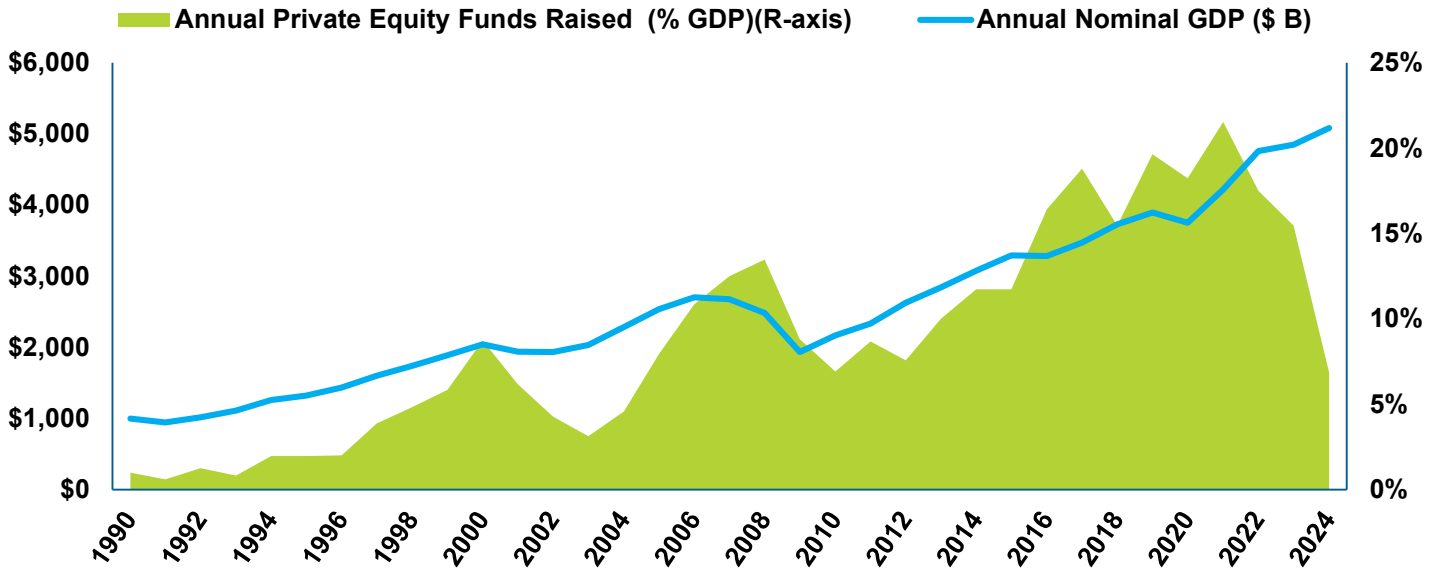


Source: Bloomberg and MSCI data. Represents annual figures from 1996 through 2023 and partial year as of June 2024. Based on the MSCI USA Index and GICS sector weights. Mechanics of the calculation make the result hold at the stock level as well. HHI refers to the Herfindahl-Hirschman Index, a widely used measure of market concentration. The metric calculates the sum of the squared market shares (or weights) for each member of the sample, and the higher the total, the more concentrated a market is. At the extreme, a market with only one company, or a monopoly, would be the most concentrated, with a HHI index of 10,000 (100^2).

The Shift to Private Markets

- → If investors want to access the growth of a broader swath of companies, they may want to consider investing more in private equity.
  - More than 85% of companies with annual revenues over $100 million are private companies.
- → Some recent analysis suggests that the return on investment for firms backed by venture capital and private equity are notably higher than those of the companies in the S&P 500.

Private Equity Funds Raised as a % of US GDP



Source: FRED nominal GDP as of June 30, 2024. Prequin annual private equity fund raising as of June 30, 2024. Private equity funds raised includes venture, buyouts and growth equity. Bain & Company, using data from S&P Capital IQ as of December 2022 and Statistics of US Businesses as of 2017.
Source: NBER, B. Jovanovic et al., "Private Equity and Growth" October 2020. The authors' analysis suggest that venture and buyout equity investment of approximately 5% to 7% may contribute to growth between 14% and 21% between 2001 and 2019. See also, NBER, N. Garleau et al., "Finance in a Time of Disruptive Growth," March 2024.

Summary

- The number of publicly traded companies in the US has decreased by 40-50% since its peak in 1996.
- The decline may be explained by a variety of developments, including:
  - Fewer companies going public,
  - Rising regulatory burdens from exchanges and federal legislation,
  - The growth and availability of private capital,
  - A surge of mergers and acquisitions, and
  - The rise of propriety technology and intellectual property.
- The changes have improved investor rights and corporate transparency for publicly traded companies.
- One possible side effect is a higher level of market concentration.
- Private equity provides an avenue for investing in many of the same types of companies that would have been public a generation ago.

Long-Term Theme: China

Why the Pessimism on China?

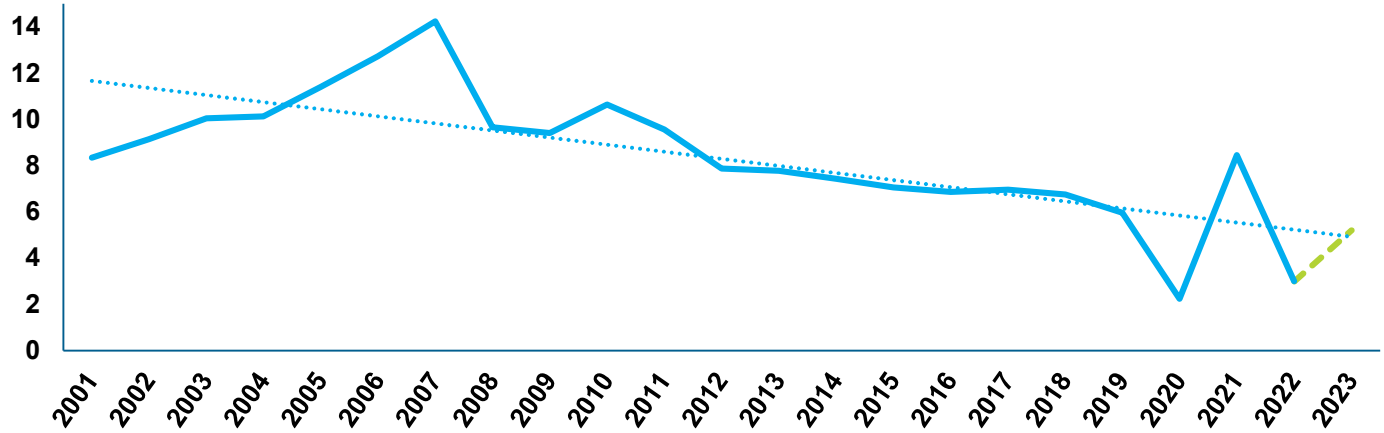
- The anticipated economic rebound from exiting zero-COVID did not materialize.
- Real estate bubble is getting worse, not better.
- Investors have responded by voting with their feet.
- Xi's policies seem to be backfiring.

The Economic Rebound That Wasn't

Chinese growth has disappointed in 2023 and into 2024.

- → China exited their zero-COVID policy in late 2022.
- → Many investors and economists alike anticipated a surge in growth as the economy re-opened.
- → But the economic rebound did not materialize.
- → Growth projections are being ratcheted down.
- → Major causes include:
  - Debt overhang in the property sector – nearly ¼ of China's economy.
  - Domestic demand/consumption has been weak.

China Real GDP Growth (YoY %)



Source: World Bank as of December 2023. World Bank data is from China's National Bureau of Statistics.

The Real Estate Bubble

Property market turns from tailwind to headwind.

- → The issue is systemic.
- → Both the private and public sectors are heavily indebted.
- → The worst problems are with property developers and local governments.
- → In 2021, it was Evergrande; in 2023, it was Country Garden.
- → Old model:
  - CCP sold land to developers, filling local government coffers in the process.
  - This allowed CCP to spend freely while taking on more debt themselves.
  - Local governments are responsible for ~85% of expenditures.
  - Developers borrowed heavily and pre-sold properties to finance their acquisitions.
  - No other good savings options, so ~70% of household wealth tied up in the property market.
- → Current status:
  - Housing prices falling.
  - Some property owners now refusing to make payments on unfinished properties.
  - This can turn into a vicious cycle where developers do not have the cash flow to complete projects.

CCP Reaction Has Not Been Helpful

- Focus has become national security, not growth.
- Emphasizing nationalistic policies and self-sufficiency.
- CCP has clamped down on foreign businesses (e.g., office raid, iPhone restrictions).
- Wants to reign in the debt bubble, so little/no support for property developers.
- PBoC providing minimal stimulus.
- Relationships with trading partners and neighbors are becoming increasingly strained.
- Many investors and business have responded by seeking to reduce their ties to China.
- Missing and replaced ministers signal challenges at the top of party leadership.

If growth continues to falter, China will face a choice:
Backtrack or double down on security and repression.

The Change in the CCP under President Xi

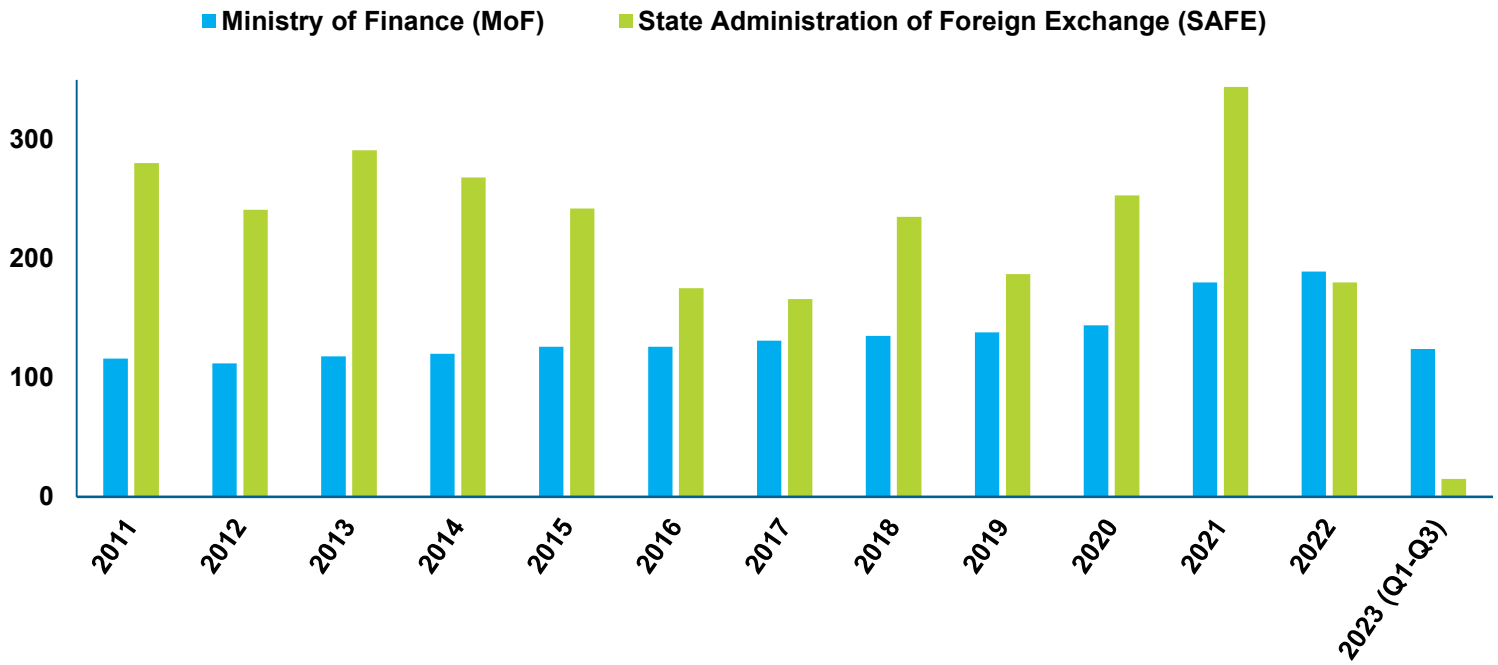
- → Pragmatism appears to be fading in favor of nationalism and autarky, led by President Xi Jinping.
- → Xi may have an additional goal that takes priority over the others:
  - Personal dominance and cementing his legacy
- → Xi has consolidated power in a way that means he is going to be the final decision maker on major policy issues.
- → The goals announced at the October 2022 Party Congress may be at odds with each other[1]:
  - Reinvigorate Party ideological discipline and adherence to Marxist doctrine
  - Achieve first world economic wealth by 2035
  - Build "fortress China" that is self-sufficient in tech, military capacity, and geopolitical power
- → The West has reacted to Xi's assertive nationalism and now pursues an open policy of China containment.

[1] Source: TS Lombard October 2022.

Investor Concerns Turn into Portfolio Flows

→ In Q3 2023, China recorded its first quarterly decline in direct investments since 1998 (-$11.8B).[1]

Foreign Direct Investment Inflows to China 2011-2023 (USD in Billions)[2]

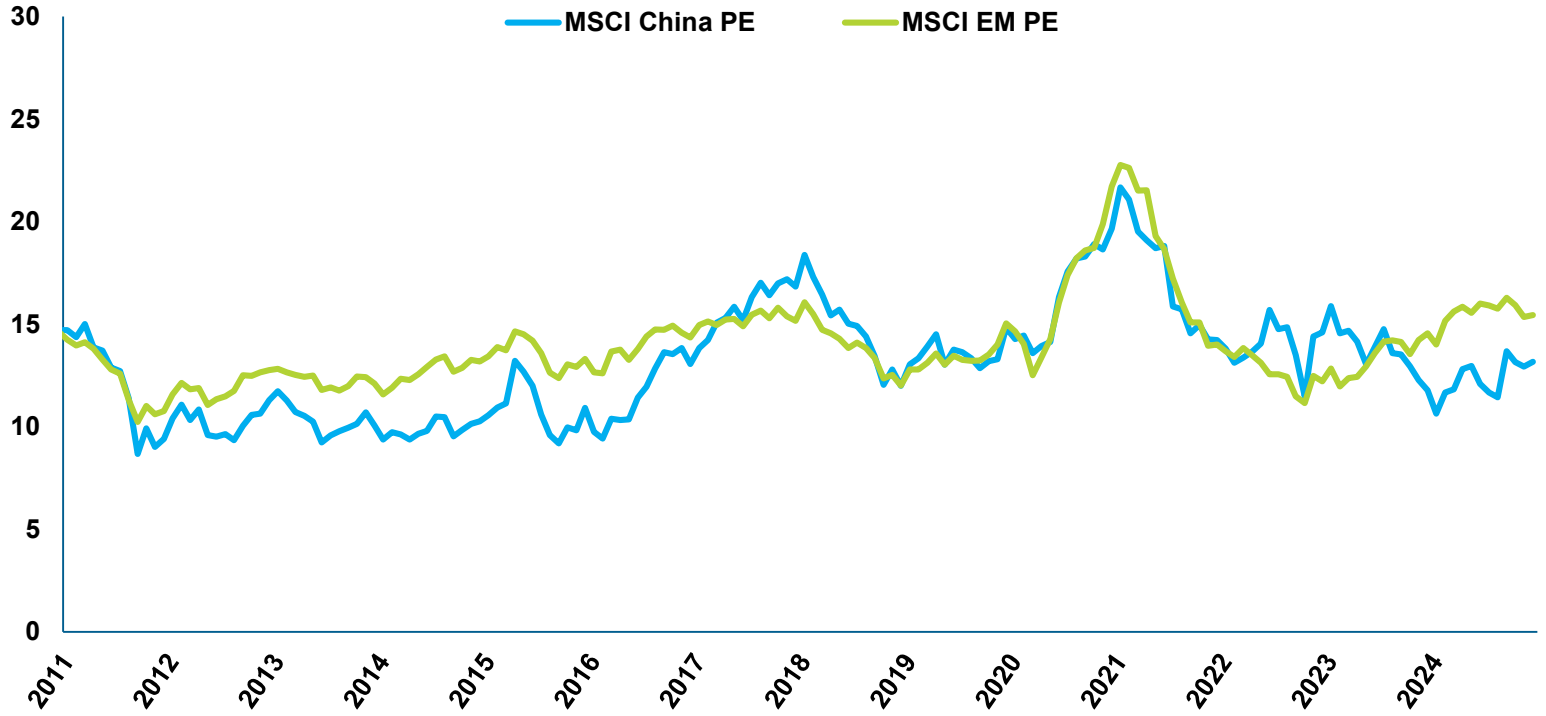


[1] Source: Reuters, "West's de-risking starts to bite China's prospects," November 27, 2023. Article based on preliminary balance of payment data as of September 30, 2023.
[2] Source: Peterson Institute for International Economics, N. Lardy "Foreign direct investment is exiting China, new data show," November 17, 2023. SAFE tracks net FDI while the Ministry of Finance tracks gross inflows.

Cheap…for a Reason?

- → Investors' lack of confidence in the economy and CCP policies continues to weigh on Chinese asset prices.
- → Despite a rally in Chinese equities in 2024, valuations remain lower than the broader EM index.
- → An important question is: Do valuations fairly represent the risks?

Emerging Market and Chinese P-E Ratios[1]



[1] Source: Bloomberg, as of December 31, 2024. Indices used: MSCI China, MSCI Emerging Markets.

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MEKETA

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MEMORANDUM

TO: Oakland Police and Fire Retirement System ("PFRS")
FROM: Meketa Investment Group ("Meketa")
DATE: March 26, 2025
RE: Total Portfolio Expected Return Update – 2025 Capital Markets Assumptions

Background

At least once a year, Meketa generates forward-looking capital market expectations ("CMEs") to provide clients with our best estimates of long-term returns, volatilities, and correlations across a wide range of asset classes and strategy types[1]. These assumptions are developed for both 10-year (i.e., intermediate) and 20-year (i.e., long-term) timeframes using a multitude of quantitative and qualitative inputs, and this development process is updated each year with additional data sets and more refined approaches or models. As one of the primary uses, these CMEs allow clients to review the expected return and volatility (risk) of their long-term policy target portfolios to obtain a general understanding of the positioning of their policy portfolio and whether it is still aligned with their long-term objectives.

Discussion

Applying Meketa's 2025 Capital Market Expectations to PFRS's long-term policy targets (effective July 1, 2024), the *PFRS investment portfolio is well structured to perform above its 5.0% actuarial objective in the long-term over both 10- and 20-year time horizons*.

Asset Class	Long-Term Policy Targets (%)
Equities	**30**
US Equity	25
International Equity	5
Fixed Income	**61**
Crisis Risk Offset	**9**
Long-Term Government Bonds	3
Systematic Trend Following	3
Alternative Risk Premia	3
Total Portfolio	
Expected Return (10-year)	**5.7**
Expected Return (20-year)	**6.6**
Annual Volatility	**6.2**

The OPFRS policy portfolio is positioned to generate an expected return of 5.7%–6.6% depending on the investment horizon. When examining the portfolio from holistic perspective, Meketa believes that the portfolio remains prudently constructed to achieve and modestly exceed the actuarial rate without assuming unnecessary risk. It is important to note that the expected return of the portfolio and the actuarial assumed investment return do not need to be equal at all times, however, they should be similar to one another and directionally track over time.

[1]A total of 113 different asset classes or strategy types are included in Meketa's 2025 Capital Market Expectations.

20-Year Risk & Return Expectations

The following table illustrates the long-term (20-year) expected risk and return assumptions used in the table in the previous page along with the return assumptions from last year for comparison.

	20-Year Expected Return (%)			Volatility (Standard Deviation) (%)
	2025 CME	2024 CME	Change	
Equities				
US Equity	8.4	8.5	-0.1	17.0
International Equity	8.7	8.9	-0.2	18.0
Fixed Income				
Fixed Income	5.3	4.8	+0.5	4.0
Crisis Risk Offset				
Long-Term Government Bonds	5.7	5.0	+0.7	12.0
Systematic Trend Following	4.9	4.7	+0.2	15.0
Alternative Risk Premia	5.8	5.2	+0.6	7.0
Total Portfolio	**6.6**	**6.2**	**+0.4**	**6.2**

DS/PN/JLC/mn

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MEMORANDUM

TO: Oakland Police and Fire Retirement System (OPFRS)
FROM: Meketa Investment Group (Meketa)
DATE: March 26, 2025
RE: Proposed Fee Increase

Meketa and previously PCA began working with the Oakland Police and Fire Retirement System in July 2004. Currently, we charge $100,000 per year (which represents about 0.02 percent of the total value of the portfolio), inclusive of travel costs, for our services. We are requesting an increase in our annual retainer to $165,000 per year (or approximately 0.03 percent), inclusive of travel.

The request for a fee increase results from an assessment of the time, resources, and travel costs involved in advising the OPFRS, as well as from an increase in the general costs of providing our services. We value our relationship greatly and are asking for your consideration in granting this request, after 20+ years of providing investment advisory services.

Since Meketa was hired, the Plans have weathered numerous market cycles and two Pension Obligation Bonds'(POB). Meketa has attended Investment Committee and Board meetings on a monthly basis, participated in update calls with staff and attended quarterly city council meetings. We have dedicated substantial time and resources to developing content and educational materials on various investment issues, while also enhancing the structure, diversification and manager roster within the portfolio. Since 2004, we have conducted numerous asset-liability studies, manager searches, IPS reviews, educational pieces, and ad hoc requests (annual letters, auditor reports, etc.). In addition, we negotiated fee savings with OPFRS portfolio managers over the 20+ years of service.

Finally, since we were hired, Meketa has continued to invest in human and technological capital to ensure that research and resources are always available for our clients. We value and enjoy our relationship with the OPFRS and appreciate the Board's continued confidence in Meketa.

MEKETA

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MEMORANDUM

TO: Oakland Police and Fire Retirement System ("OPFRS")
FROM: Meketa Investment Group ("Meketa")
DATE: March 26, 2025
RE: 2025 Preliminary Investment Program Agenda

On an ongoing (monthly) basis, Meketa develops a list of projects that we expect to work closely with OPFRS to complete over the calendar year (see table below). In an attempt to coordinate the scheduling of these tasks, this memo details a Preliminary Investment Program Agenda by calendaring and prioritizing the expected tasks and deliverables that would be required to fulfill the Agenda.

Meketa welcomes any suggestions and/or modifications to the proposed timeline.

2025 Preliminary Investment Program Agenda

Date	Task
April 2025	→ Flash Performance (March 2025) → Annual Diversity Survey Results → Investment Policy Statement (IPS) Update: Fixed Income Benchmark → Information/Educational: TBD
May 2025	→ Flash Performance (April) → Quarterly Performance Report (2025 Q1) → Manager Finalist Interviews: International Equity[1]
June 2025	→ Flash Performance (May 2025) → Cash Flow Recommendations (2025 Q3) → Investment Policy Statement (IPS) Annual Review
July 2025	→ Flash Performance (June 2025) → Information/Educational: TBD
August 2025	→ Flash Performance (July 2025) → Quarterly Performance Report (2025 Q2)
September 2025	→ Flash Performance (August 2025) → Cash Flow Recommendations (2025 Q4)
October 2025	→ Flash Performance (September 2025) → Thermal Coal List Update: 2025
November 2025	→ Flash Performance (October 2025) → Quarterly Performance Report (2025 Q3) → Information/Educational: TBD

[1] Manager finalist interviews are expected to be conducted on a different day before the regular Investment Committee/Board meetings on last Wednesdays of the month

Date	Task
December 2025	→ Flash Performance (November 2025) → Cash Flow Recommendations (2026 Q1) → 2026 Preliminary Investment Program Agenda

This agenda includes only major strategic items. Meketa also expects to work with the Staff and Board to complete more routine tasks and projects, as expected.

DS/PN/JLC/mn