
Economic Outlook and Portfolio Construction

Investment Challenge Program 2024 Annual Conference
Nashville, TN

Cambridge Associates

Celia Dallas
Chief Investment Strategist



ECONOMIC OUTLOOK AND PORTFOLIO CONSTRUCTION



CAMBRIDGE FIFTY
ASSOCIATES YEARS

APRIL 2024

Discretionary & Nondiscretionary



Total portfolios

We manage total portfolios on either a discretionary (OCIO) or advisory basis.



Asset class mandates

We also manage asset class mandates for clients —typically some mix of buyout, venture capital, growth equity, private credit, infrastructure, and other private investment strategies.

Staff Extension

Data & Tools

A day in the life of an Investment Director

1	Create and develop diversified portfolios to enable increased returns and lower volatility consistent with time horizon, risk tolerance and income needs to client
2	Conduct analyses, prepare materials and direct clients on investment and financial issues; lead and coordinate ad-hoc client requests
3	Work with and present directly to clients; develop relationships with clients, including Investment Committees, CIO/CFO of client institutions, outside advisors, etc.
4	Select and evaluate investment managers for virtually all asset classes, including alternative assets such as venture capital, private equity, hedge funds, real estate, timberland, and oil & gas
5	Represent Cambridge Associates externally through marketing presentations, conferences and other business development opportunities

Our investment philosophy

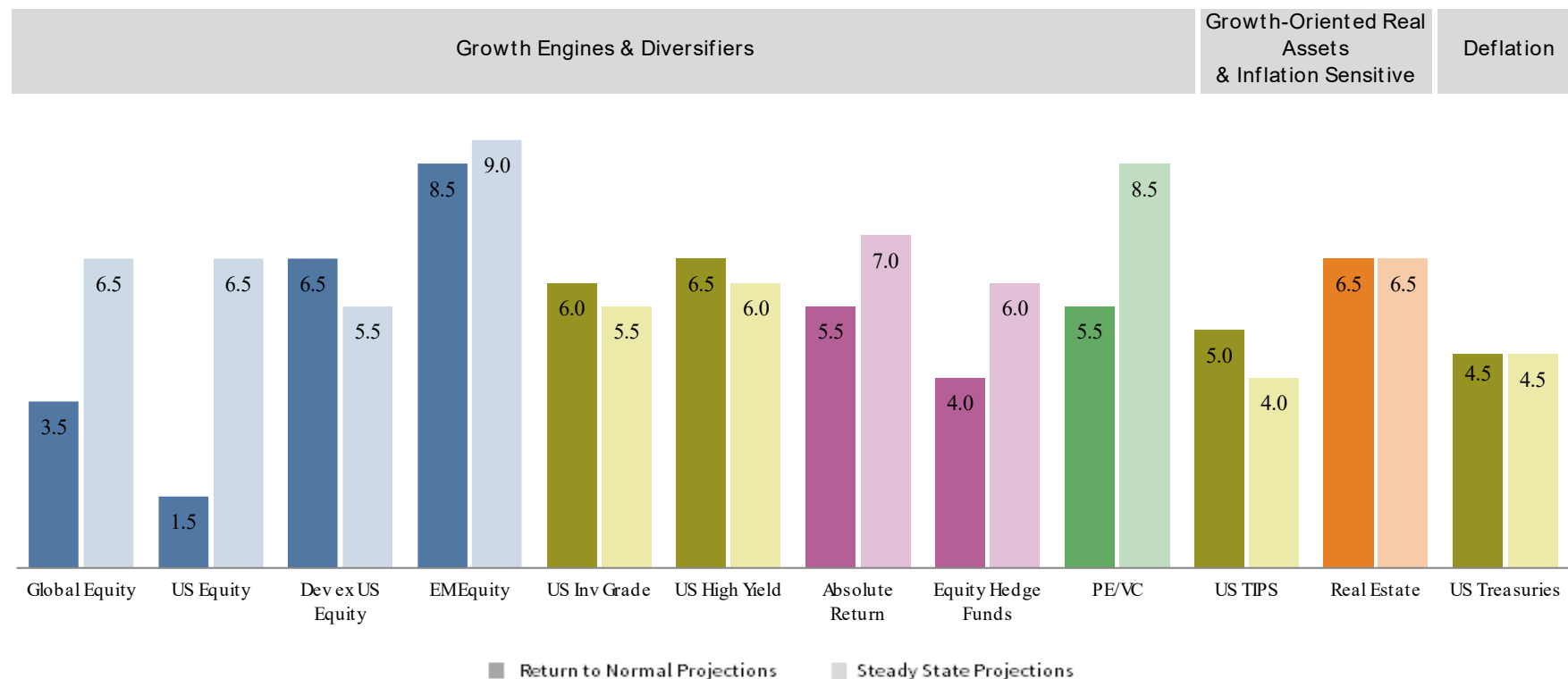
GOAL	Maximize return at an appropriate level of risk			
ROLE	DIVERSIFIED GROWTH		MACROECONOMIC RISK HEDGES	
	GROWTH ENGINE	DIVERSIFIERS	INFLATION SENSITIVE	DEFLATION SENSITIVE
	Support spending needs while maintaining corpus over long term	Mitigate volatility while attempting to improve risk/return profile	Stable value or appreciation in rising inflation environment	Stable value or appreciation in economic contraction (e.g., deflation) flight to quality
EXAMPLES OF ASSET CLASSES	GLOBAL PUBLIC EQUITIES LONG/SHORT EQUITY (LONG BIASED) VENTURE CAPITAL AND BUYOUTS OPPORTUNISTIC AND VALUE-ADDED PRIVATE HARD ASSETS OPEN MANDATE EVENT ARBITRAGE CREDIT	LONG/SHORT EQUITY (LESS DIRECTIONAL) CAPITAL STRUCTURE ARBITRAGE CONVERTIBLE ARBITRAGE GLOBAL MACRO ACTIVE CURRENCY OPEN MANDATE EVENT ARBITRAGE CREDIT	CORE PRIVATE REAL ESTATE COMMODITIES INFLATION-LINKED BONDS GOLD CASH	HIGH QUALITY/INTERMEDIATE LONG-TERM FIXED INCOME GOLD CASH

Note: Effectiveness of asset classes in these roles depends on valuations and implementation considerations.

Return to Normal Scenario looks worst for Global and US equities

TEN-YEAR NOMINAL RETURN SCENARIOS: "RETURN TO NORMAL" and "STEADY STATE"

As of February 29, 2024



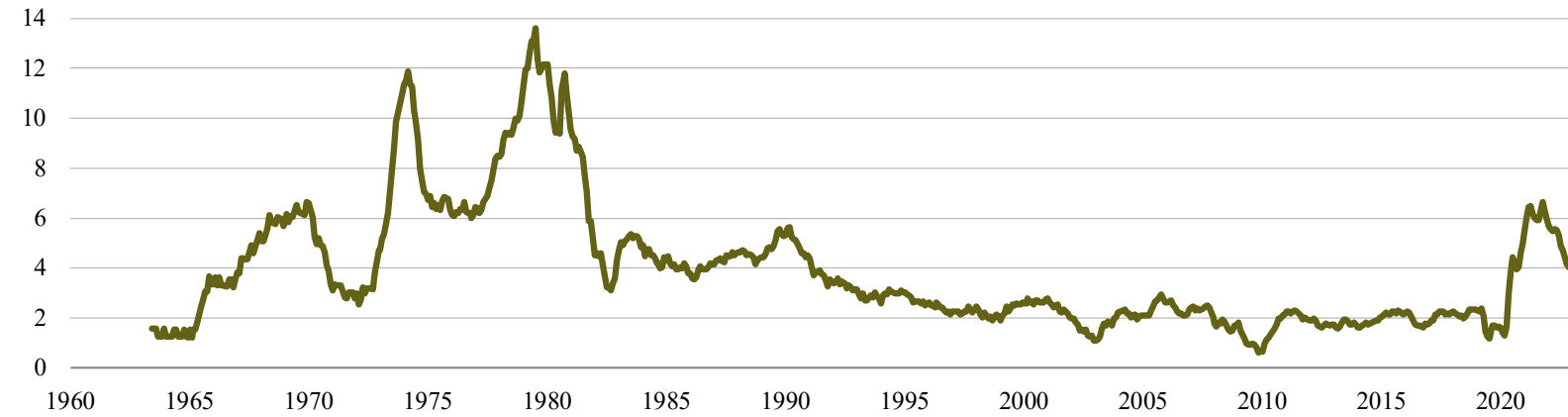
Key Assumptions: Return to Normal - Inflation: 3%; real EPS growth: 2% for US and Dev ex US, 3% for EMs; ending 10-Yr US Treasury yield: 5.0%; ending 10-Yr US TIPS yield: 2.0%; equity valuations: revert to long-term medians

Key Assumptions: Steady State - Inflation: 2.1% for US, 2.1% for World, 3.0% for EM, based on consensus estimates; real EPS growth is based on rolling 20-yr compound earnings growth rates: 3.2% for US, 1.0% for Dev ex US, 3.2% for EM; yields and equity valuations remain constant at today's levels

Bonds provide less diversification when inflation is high and volatile

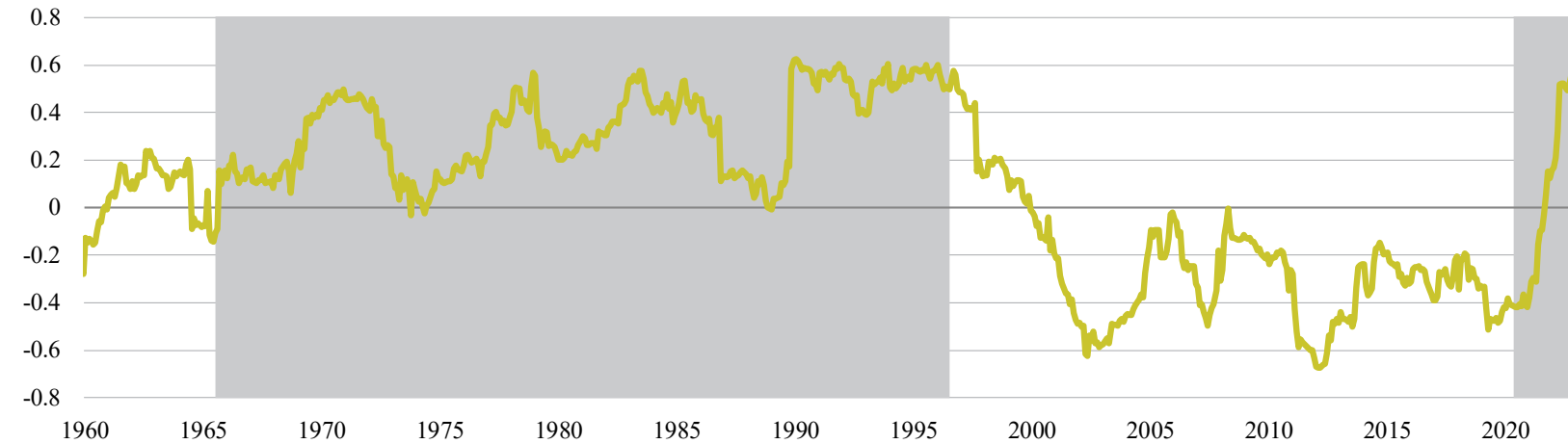
US CORE CPI (YOY%)

December 31, 1960 – February 29, 2024

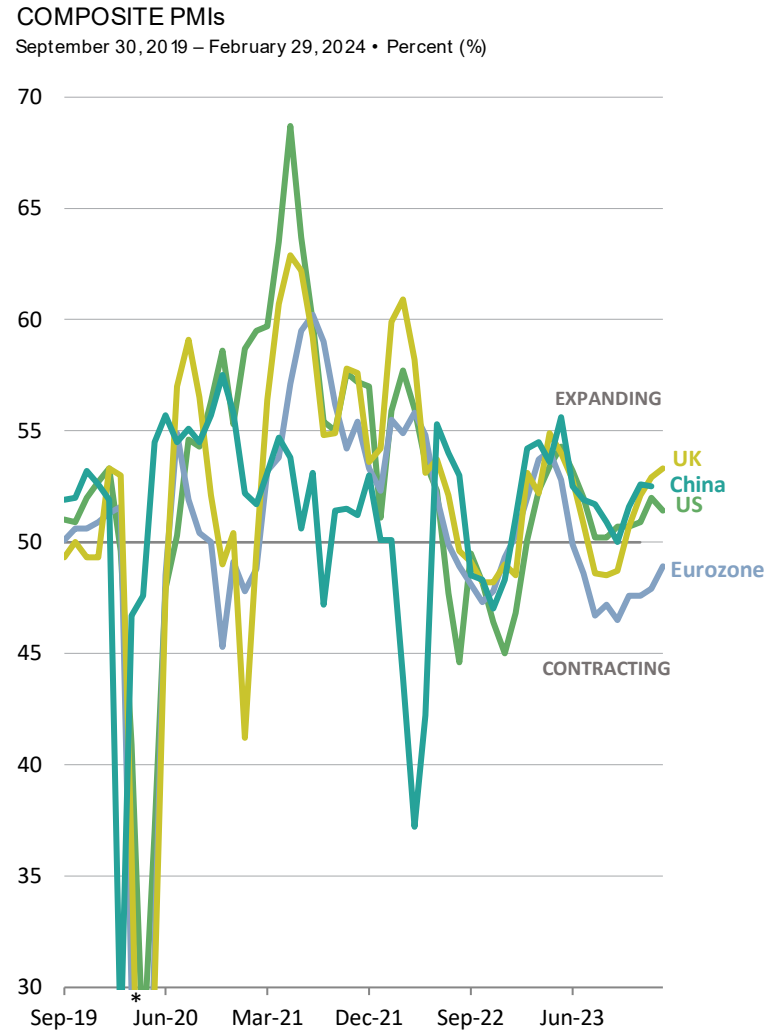


US STOCK-BOND CORRELATION (ROLLING 3YR)

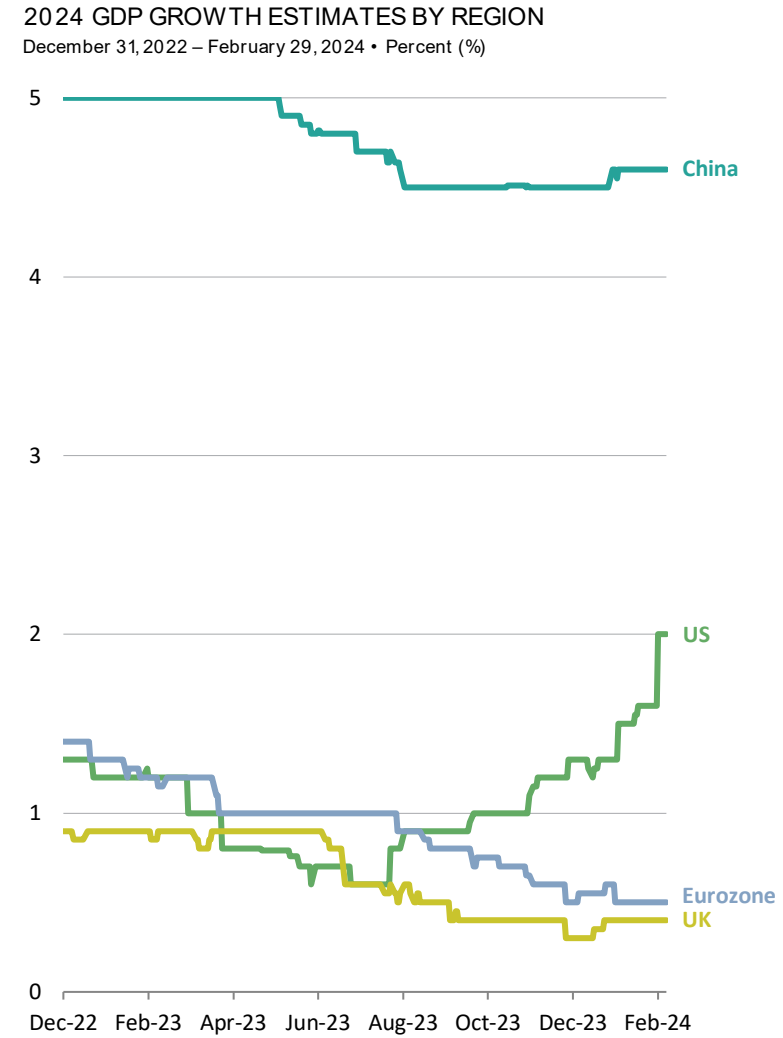
December 31, 1960 – February 29, 2024



Economic activity indicators and US growth expectations are improving

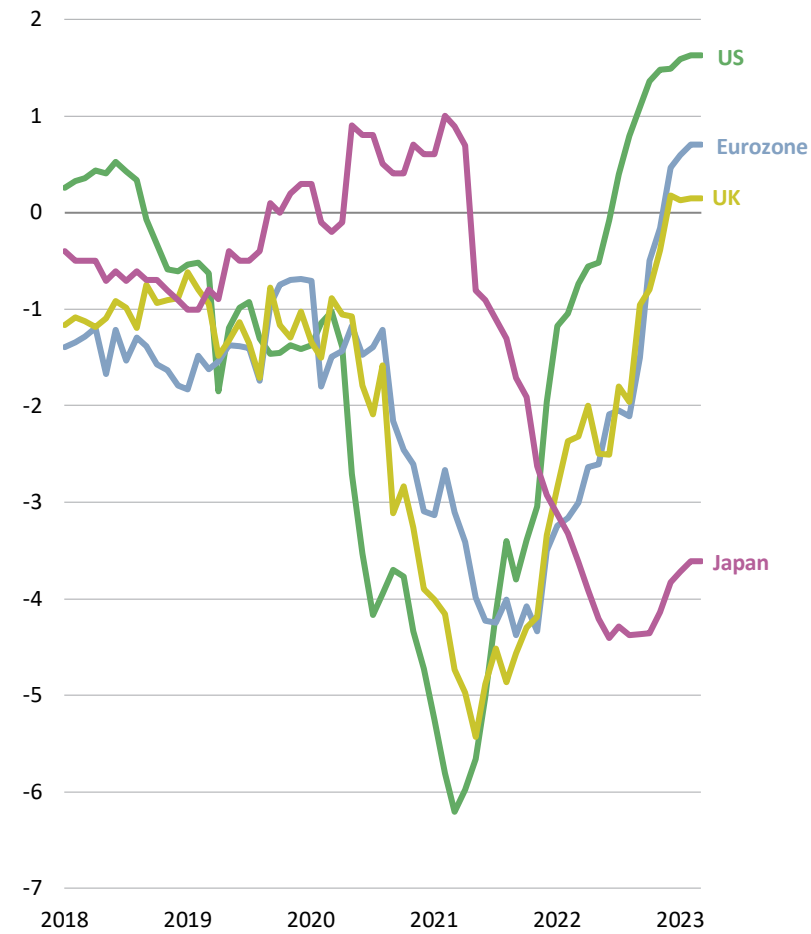


* Chart is capped for scaling purposes.

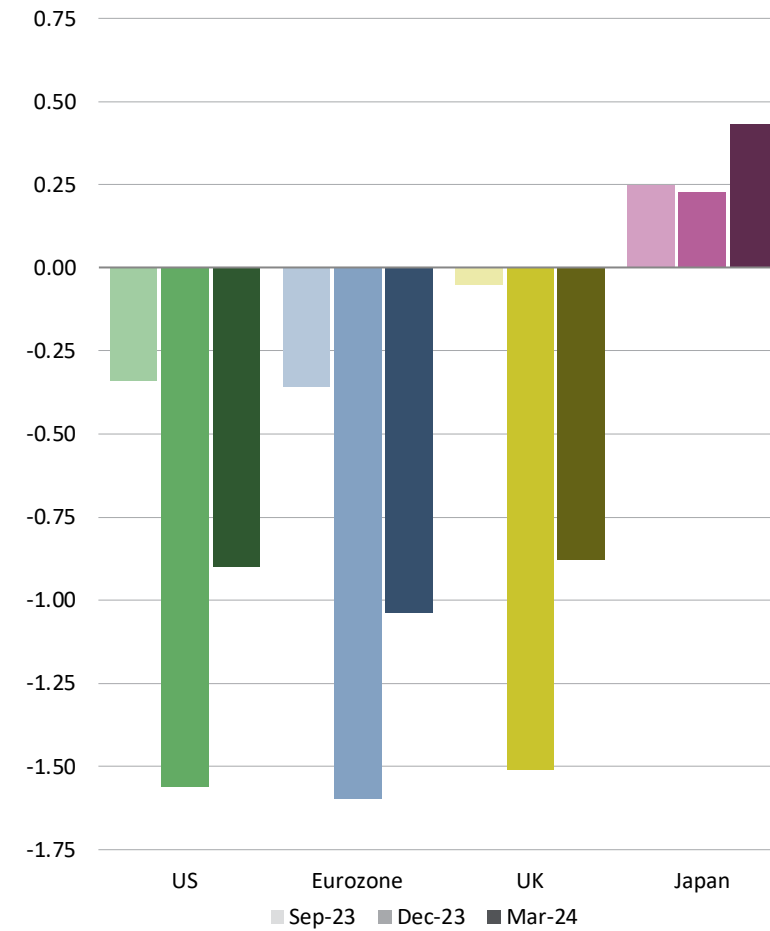


Restrictive policy rates give room for some easing later in the year

REAL POLICY RATES FOR SELECT REGIONS
December 31, 2018 – February 29, 2024 • Percent (%)

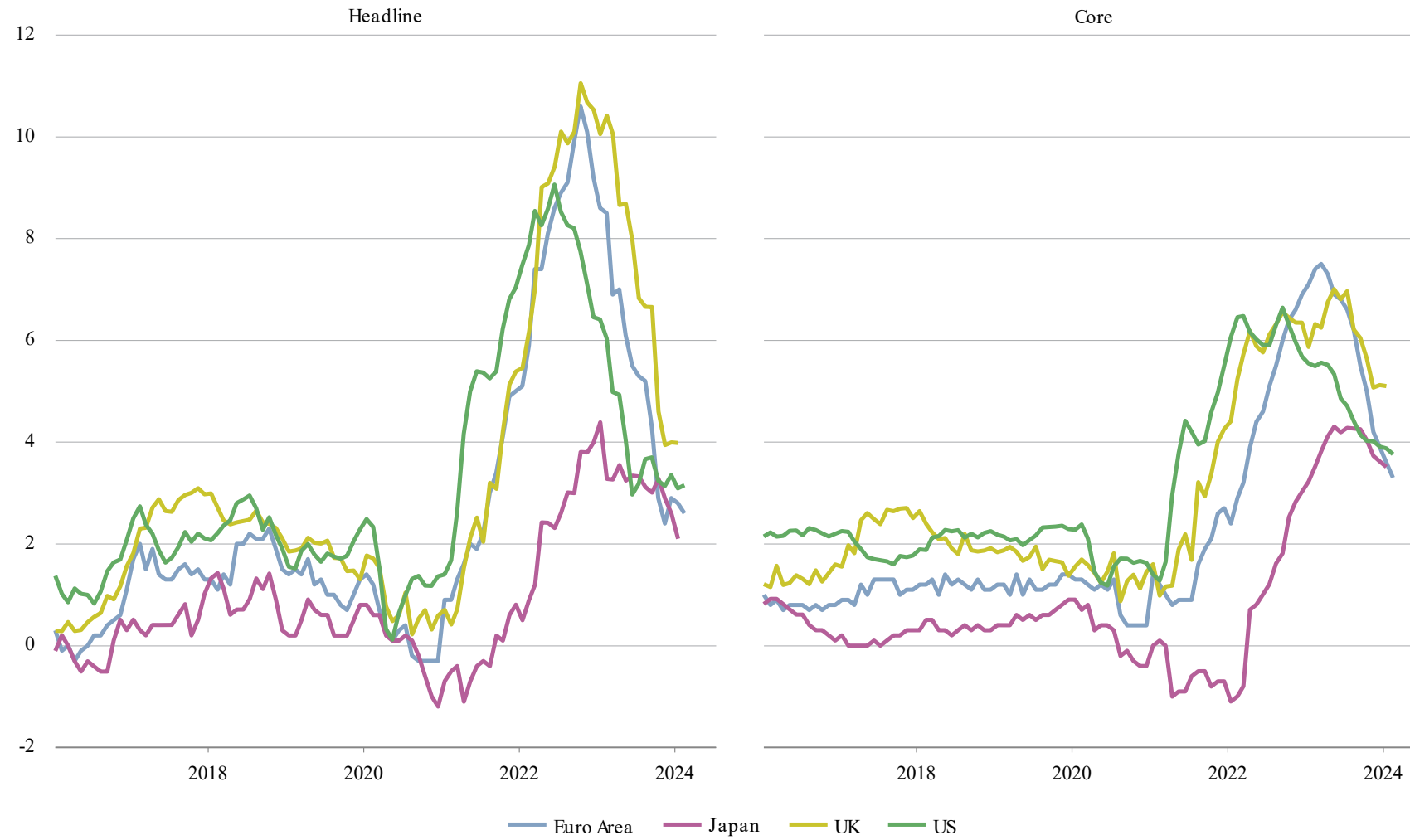


MARKET-IMPLIED CHANGE IN POLICY RATES OVER 1-YR HORIZON
As of March 20, 2024 • Percentage Point Difference (%)



We expect key inflation rates will continue to moderate in 2024

ANNUAL INFLATION RATES
January 2016 – February 2024 • Percent (%)



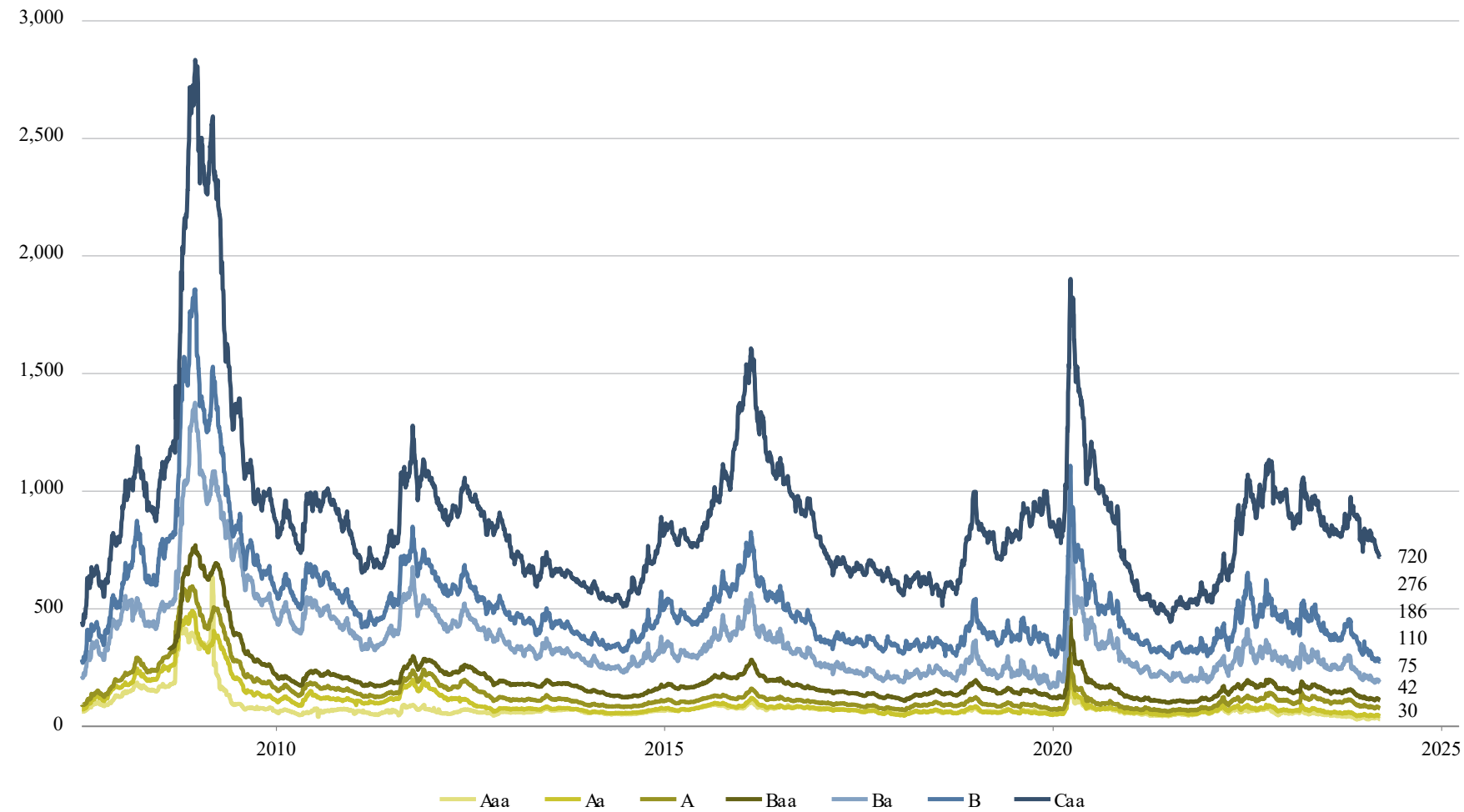
We like sovereigns and a modest bias to long maturities

TEN-YEAR SOVEREIGN BOND YIELDS
December 31, 2007 – March 18, 2024 • Percent (%)



We believe private credit offers more value than most public bond segments

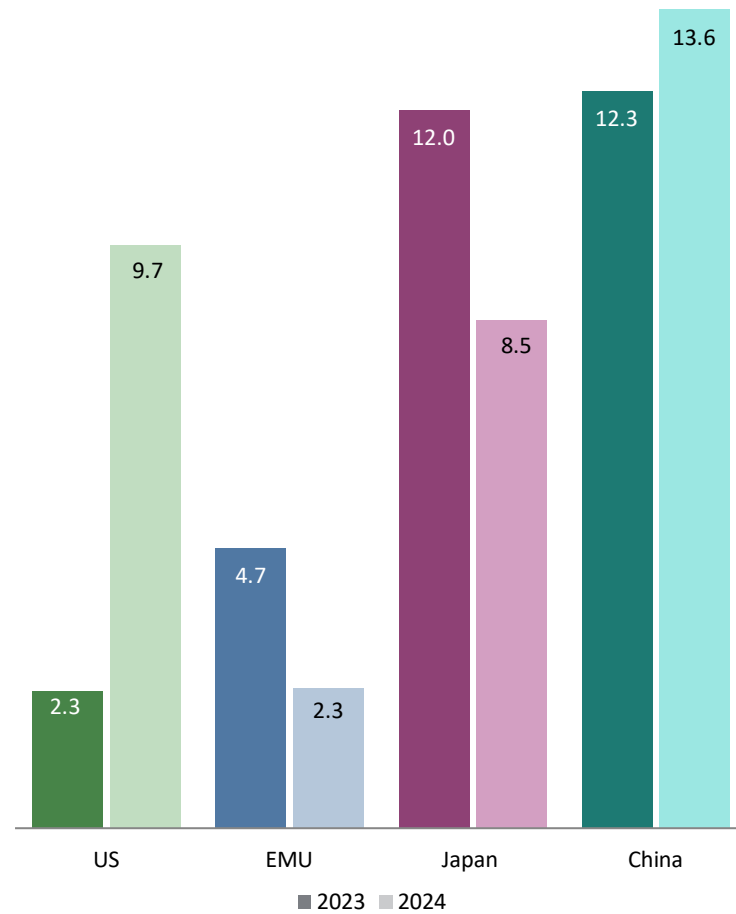
US CORPORATE BOND OPTION-ADJUSTED SPREAD BY CREDIT QUALITY
 July 02, 2007 – March 18, 2024 • Basis Points



Consensus expects growth stocks, large caps, and the US to outperform in EPS terms in 2024

FY EPS GROWTH ESTIMATES BY REGION

As of February 29, 2024 • Percent (%)



FY EPS GROWTH ESTIMATES BY INDEX

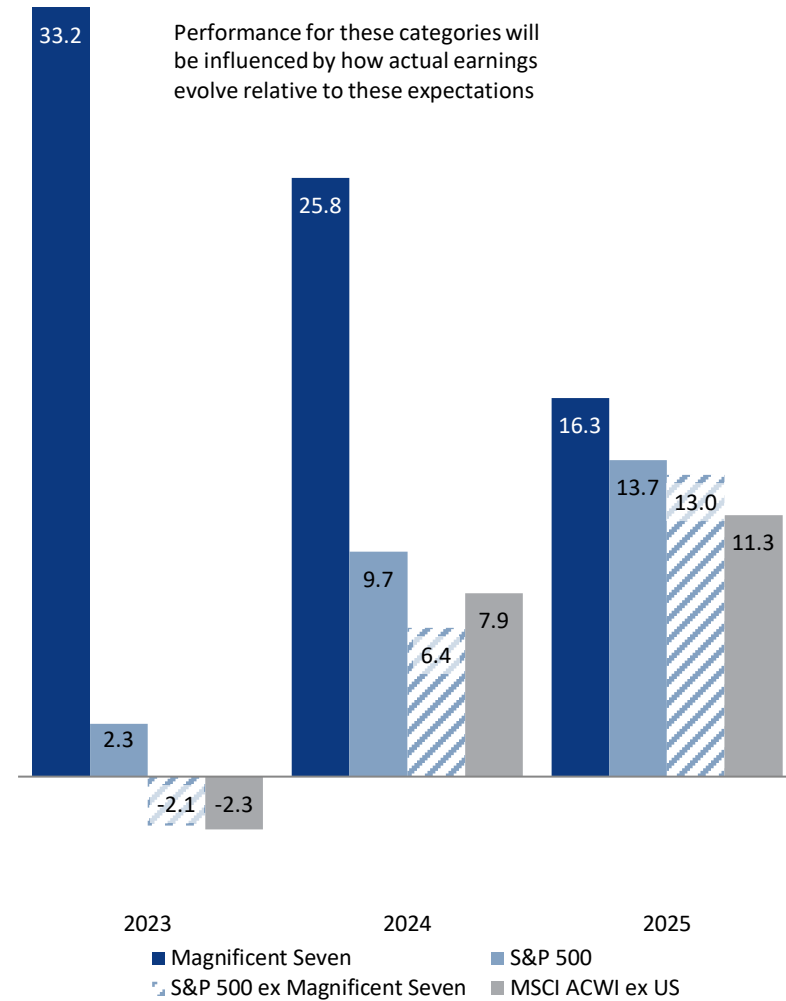
As of February 29, 2024 • Percent (%)



“Magnificent 7” valuation gap has moderated but EPS outperformance is expected to extend

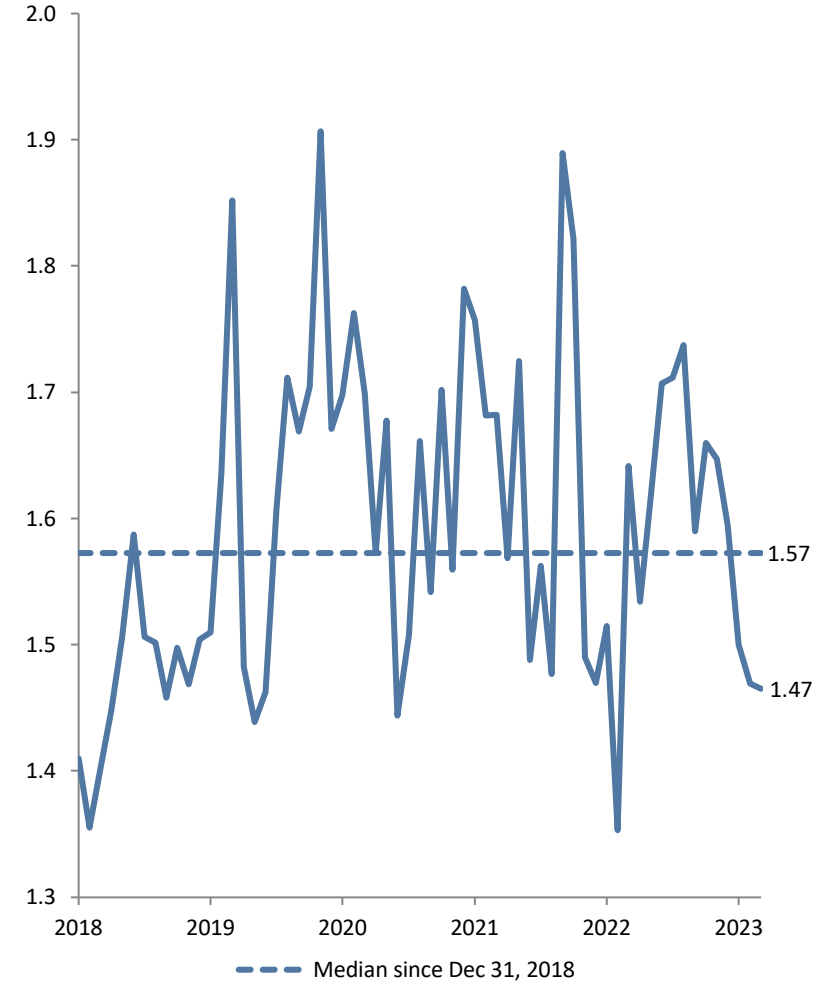
CALENDAR YEAR EPS GROWTH FORECASTS

As of February 29, 2024 • US Dollar • Percent (%)



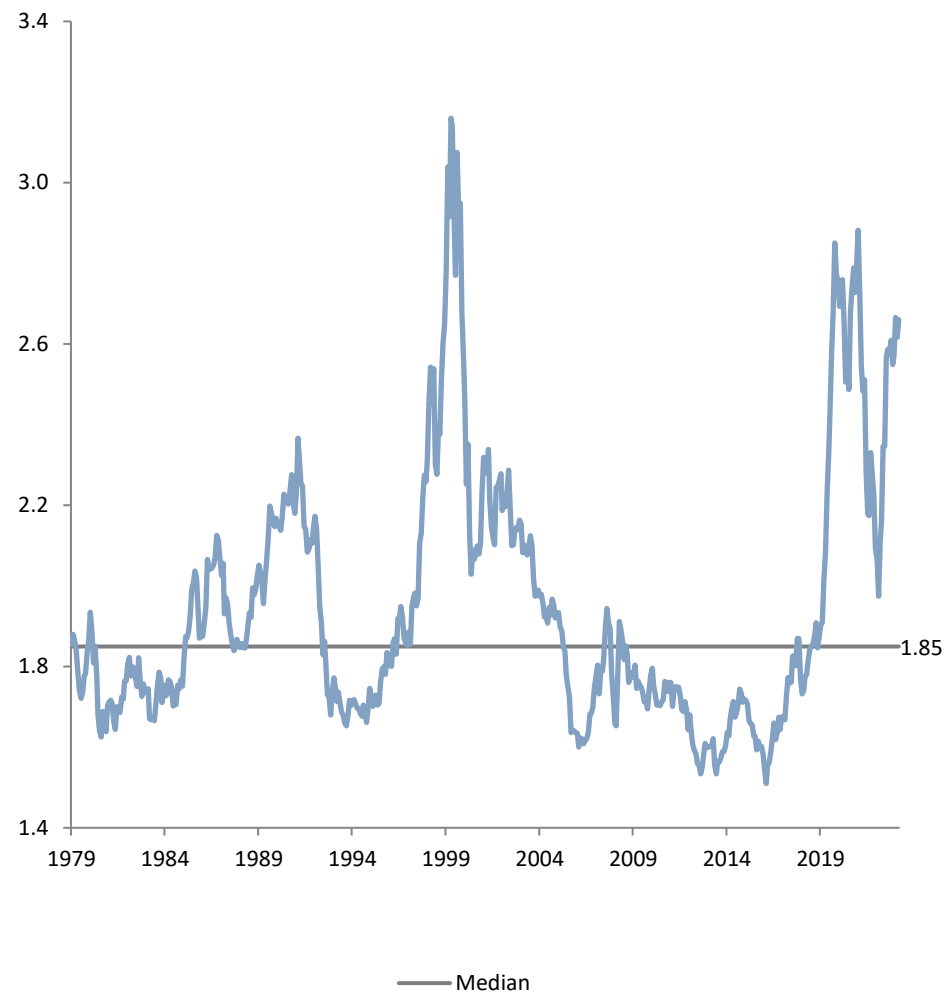
RELATIVE FORWARD P/E RATIO: MAGNIFICENT SEVEN VS S&P 500

December 31, 2018 – February 29, 2024

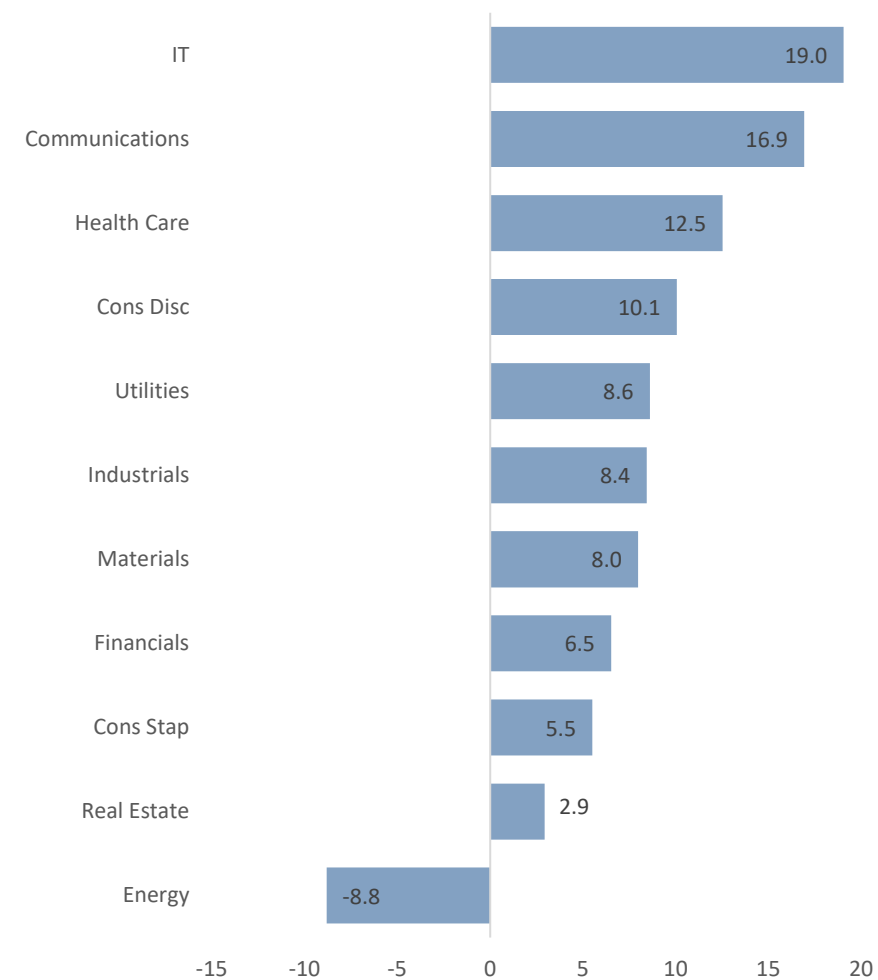


Growth stock valuations are back towards their highs, while EPS expectations are also elevated

RELATIVE 5-YR CAPCE: MSCI US GROWTH VS US VALUE
November 30, 1979 – February 29, 2024



2024 EPS GROWTH ESTIMATES BY GLOBAL EQUITY SECTOR
As of February 29, 2024 • Percent (%)



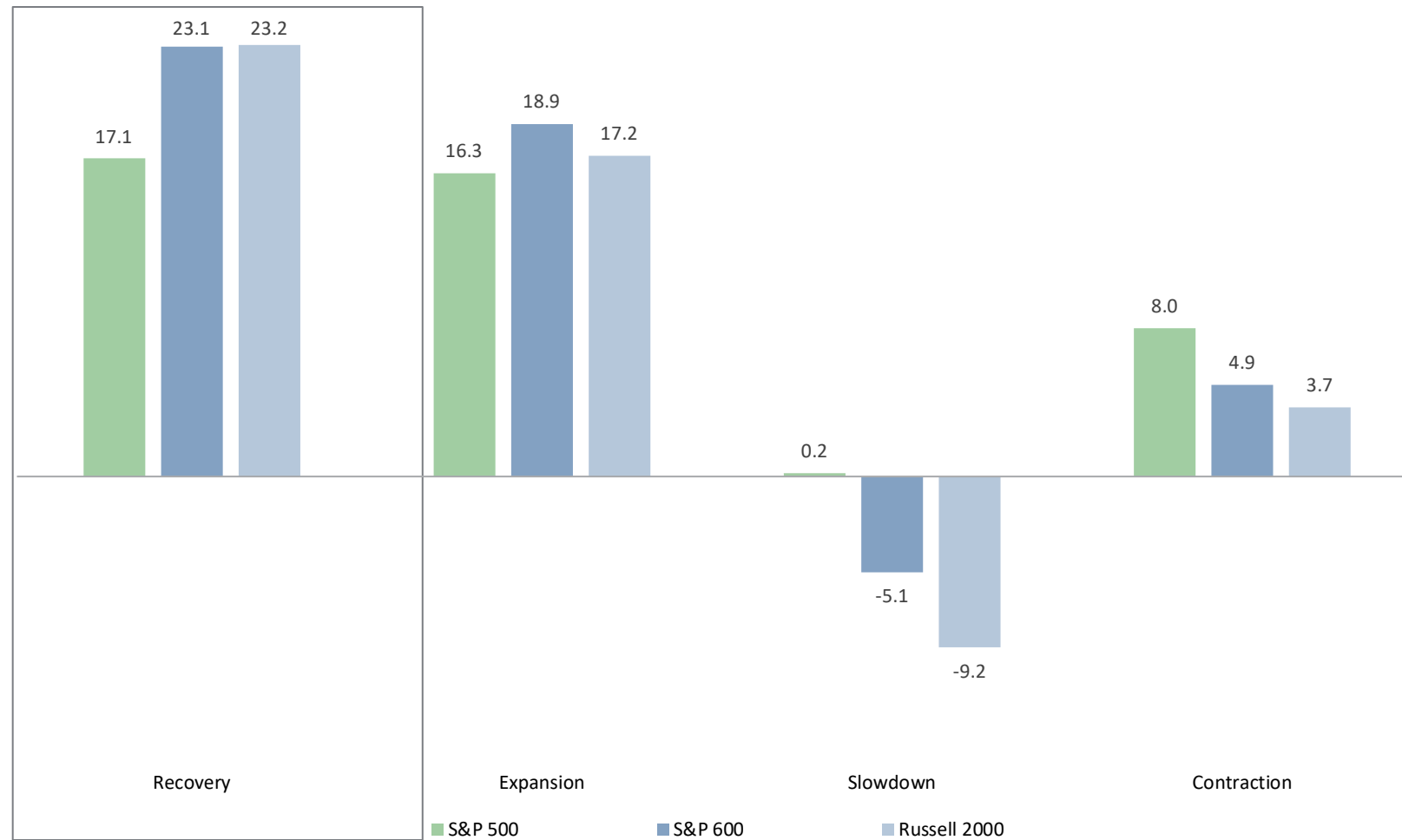
We like small-cap equities

DM SMALL CAP VS. DM RELATIVE CYCLICALLY-ADJUSTED PRICE-CASH EARNINGS MULTIPLE
May 31, 2004 – February 29, 2024



Large-cap equities have outperformed during economic slowdowns and contractions while small-cap equities have outperformed during recoveries and expansions

PERFORMANCE DURING THE US ECONOMIC CYCLE
January 31, 1995 – February 29, 2024 • Annualized Nominal Gross Returns (%)



Sources: Cambridge Associates LLC, FTSE Russell, NASDAQ eVestment, and Standard & Poor's.
Notes: Data excludes passive strategies. Cambridge Associates LLC's (CA) manager universe statistics are derived from CA's proprietary Investment Manager Database and NASDAQ eVestment's database. Performance is shown in US dollars and is generally reported gross of investment management fees.



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TVA

Eric Davis, CFA
Director, Corporate Investments



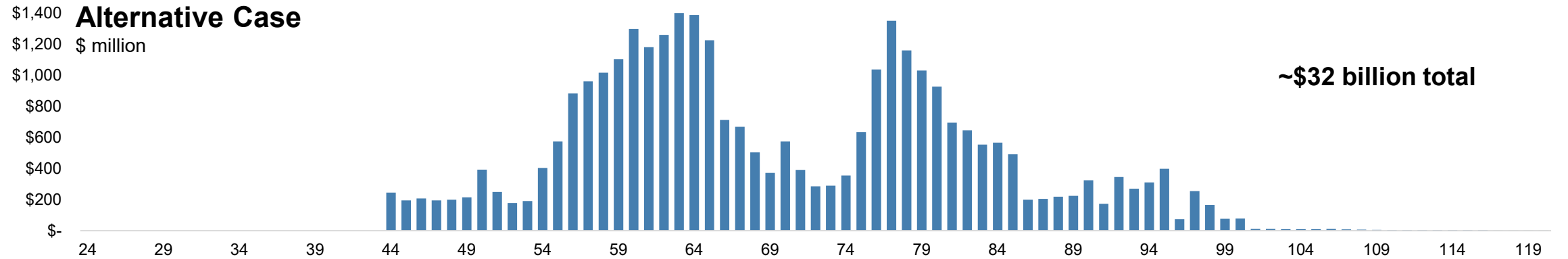
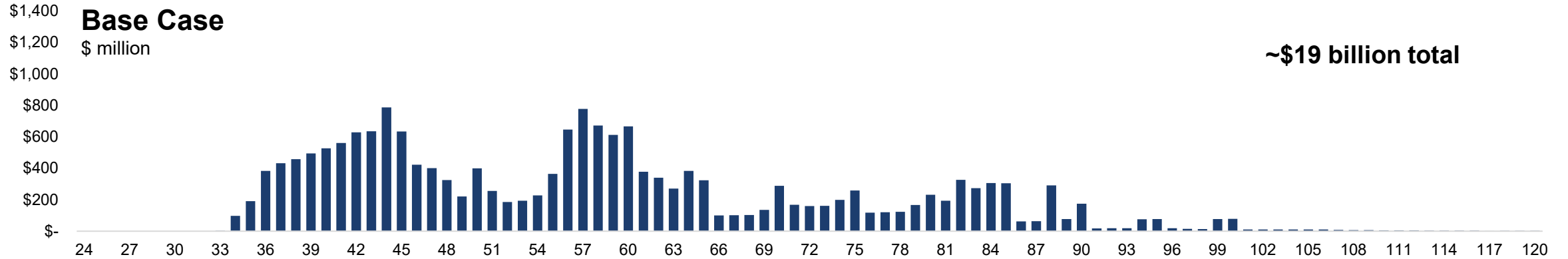
Asset Allocation Process

2024

Trust Principles

- Establish and **maintain trusts to** collect, segregate, and invest funds to **mitigate future** capital **obligations** and capital projects
 - Capital obligations include debt and other financing obligations
 - Capital projects include asset retirement activities as well as the capital projects approved each year as part of the budget Board package
- Collect funds over a time period that takes into consideration intergenerational fairness
- Invest trust assets to reduce the funds required from rates or debt
- **Distribute funds** as required by law or **when a high level of confidence** has been **achieved** of fully funding the remaining capital obligations and capital projects

Projected Liabilities



Investment Principles

- **Manage assets to achieve a high confidence** of fully funding capital obligations and capital projects
- **Invest assets** in a **return and risk efficient** manner
 - Consider investments that align with TVA's mission and values
- **Invest assets** in a **capital efficient** manner
- **Add value** over time through the **active management** of trust assets

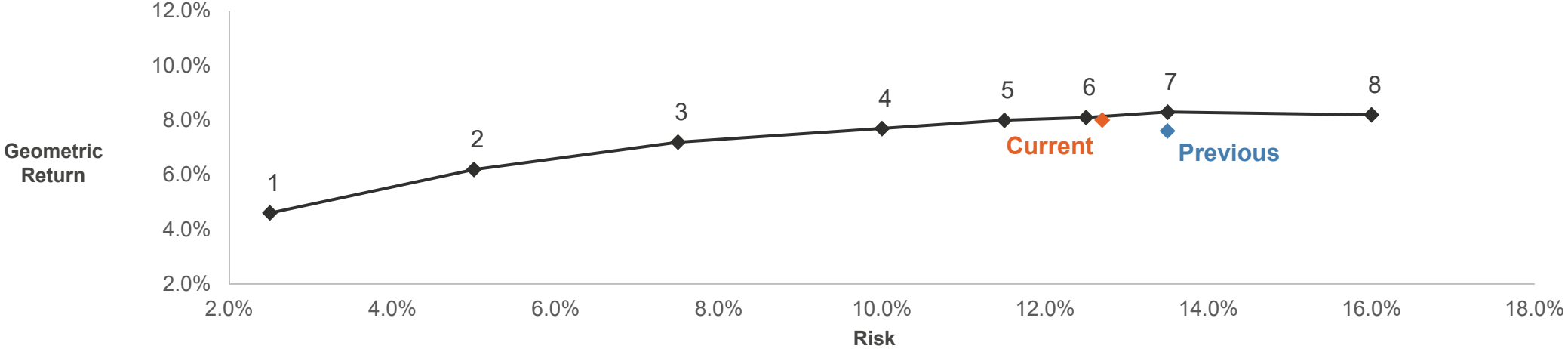
Returns/Risk Assumptions

		Geometric				Arithmetic				ST DEV
		Steady State	Return-to-Normal	Equilibrium	Blended	Steady State	Return-to-Normal	Equilibrium	Blended	
Public Equity	Global Equity	7.2%	5.7%	8.6%	7.4%	8.6%	7.1%	10.0%	8.8%	17.5%
Private Equity	Venture Capital		7.7%	10.6%	9.4%		11.6%	14.5%	13.3%	30.5%
	Private Equity	9.2%	7.7%	10.1%	9.1%	11.6%	10.1%	12.5%	11.5%	23.6%
Public Real Assets	Natural Resource Equity		5.5%	7.5%	6.7%		7.0%	9.0%	8.2%	18.2%
	Real Estate Securities		2.4%	7.5%	5.4%		3.9%	9.0%	6.9%	18.1%
	Commodities	6.7%	7.5%	5.9%	6.5%	8.3%	9.1%	7.5%	8.1%	19.0%
	U.S. TIPS	4.0%	4.9%	4.8%	4.9%	4.2%	5.1%	5.0%	5.0%	6.0%
Private Real Assets	Real Estate	5.2%	2.4%	7.7%	5.5%	7.0%	4.2%	9.5%	7.4%	20.0%
	Oil & Gas		7.5%	7.9%	7.7%		9.6%	10.0%	9.9%	22.0%
Fixed Income	US Investment Grade Credit	5.6%	5.7%	5.7%	5.7%	5.9%	6.0%	6.0%	6.0%	8.0%
	U.S. Government Bonds	3.8%	3.7%	5.3%	4.6%	4.1%	3.9%	5.5%	4.9%	7.0%
	High Yield Bonds	6.6%	7.3%	6.8%	7.0%	7.2%	8.0%	7.5%	7.7%	12.0%
Private Credit	Private Credit	8.6%	9.3%	8.8%	9.0%	9.6%	10.3%	9.9%	10.1%	15.3%
Cash	Cash	4.4%	4.4%	3.5%	3.9%	4.4%	4.4%	3.5%	3.9%	2.0%

Correlations

		GLE	VC	PE	NRE	REIT	CMD	TIPS	RE	OG	USIGC	USGov	USHYB	PCR	CA
Public Equity	Global Equity (GLE)	1.00	0.64	0.73	0.70	0.77	-0.02	-0.01	0.45	0.20	0.33	-0.02	0.56	0.64	-0.05
Private Equity	Venture Capital (VC)	0.64	1.00	0.48	0.45	0.50	-0.02	0.00	0.29	0.12	0.25	0.00	0.37	0.43	-0.03
	Private Equity (PE)	0.73	0.48	1.00	0.51	0.57	-0.02	0.00	0.34	0.14	0.28	0.01	0.42	0.77	-0.03
Public Real Assets	Natural Resource Equity (NRE)	0.70	0.45	0.51	1.00	0.57	0.44	-0.05	0.35	0.47	0.18	-0.09	0.29	0.45	-0.01
	Real Estate Securities (REIT)	0.77	0.50	0.57	0.57	1.00	0.05	0.03	0.58	0.21	0.41	0.06	0.54	0.53	0.00
	Commodities (CMD)	-0.02	-0.02	-0.02	0.44	0.05	1.00	-0.05	0.03	0.53	-0.12	-0.20	0.00	0.01	0.06
	U.S. TIPS (TIPS)	-0.01	0.00	0.00	-0.05	0.03	-0.05	1.00	0.02	-0.02	0.34	0.40	0.06	0.04	0.22
Private Real Assets	Real Estate (RE)	0.45	0.29	0.34	0.35	0.58	0.03	0.02	1.00	0.15	0.23	0.05	0.28	0.30	0.01
	Oil & Gas (OG)	0.20	0.12	0.14	0.47	0.21	0.53	-0.02	0.15	1.00	0.00	-0.08	0.03	0.10	0.03
Fixed Income	US IG Credit (USIGC)	0.33	0.25	0.28	0.18	0.41	-0.12	0.34	0.23	0.00	1.00	0.72	0.57	0.44	0.19
	U.S. Gov Bonds (USGov)	-0.02	0.00	0.01	-0.09	0.06	-0.20	0.40	0.05	-0.08	0.72	1.00	0.11	0.06	0.28
	High Yield Bonds (USHYB)	0.56	0.37	0.42	0.29	0.54	0.00	0.06	0.28	0.03	0.57	0.11	1.00	0.77	0.02
Private Credit	Private Credit (PCR)	0.64	0.43	0.77	0.45	0.53	0.01	0.04	0.30	0.10	0.44	0.06	0.77	1.00	0.00
Cash	Cash (CA)	-0.05	-0.03	-0.03	-0.01	0.00	0.06	0.22	0.01	0.03	0.19	0.28	0.02	0.00	1.00

Frontier - Constrained

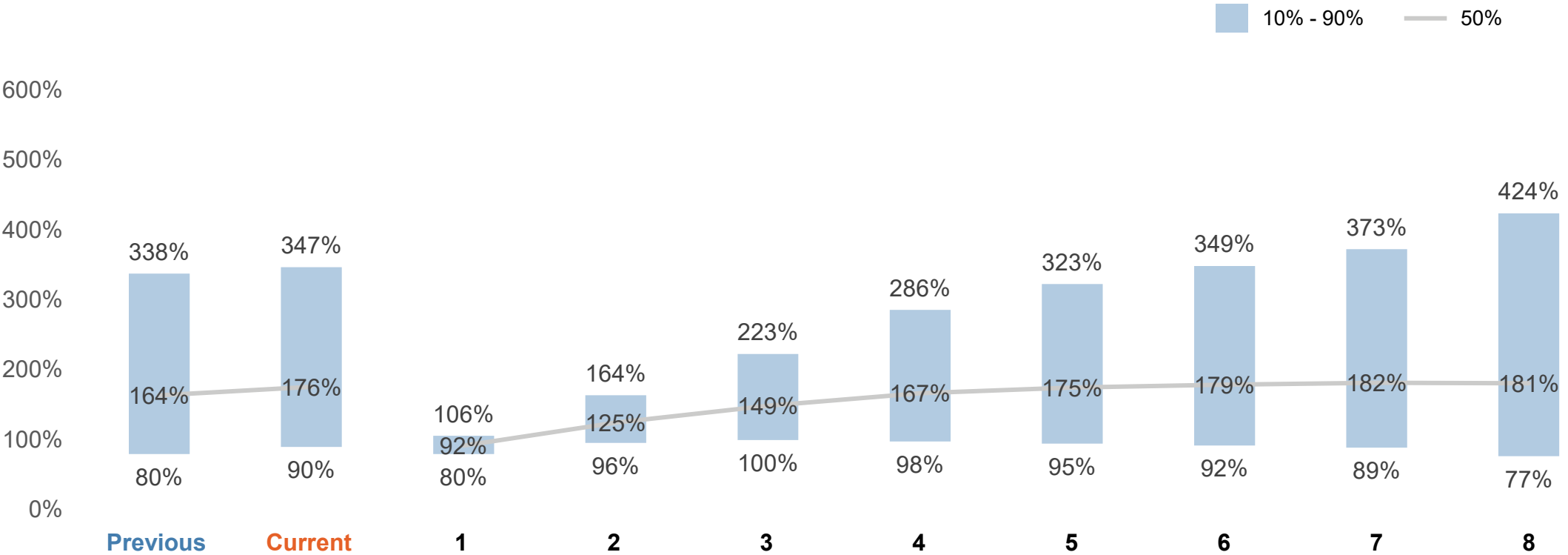


	Previous	Current	1	2	3	4	5	6	7	8
Return	7.6%	8.0%	4.6%	6.2%	7.2%	7.7%	8.0%	8.1%	8.3%	8.2%
Risk	13.5%	12.7%	2.5%	5.0%	7.5%	10.0%	11.5%	12.5%	13.5%	16.0%

Asset Allocation

	Previous	Current	1	2	3	4	5	6	7	8
Global Equity	50.0%	37.5%	-	-	4.3%	20.9%	29.4%	32.9%	40.4%	61.8%
PE/VC	10.0%	20.0%	-	7.2%	15.0%	15.0%	15.0%	15.0%	15.0%	20.0%
Real Assets	10.0%	10.0%	6.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	0.7%
Private Real Assets	10.0%	7.5%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Fixed Income	15.0%	15.0%	2.7%	22.2%	30.0%	30.0%	23.1%	19.6%	12.1%	-
Private Credit	5.0%	7.5%	1.8%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	5.0%
Cash	-	2.5%	79.5%	40.5%	20.7%	4.1%	2.5%	2.5%	2.5%	2.5%

Projected Funded Status



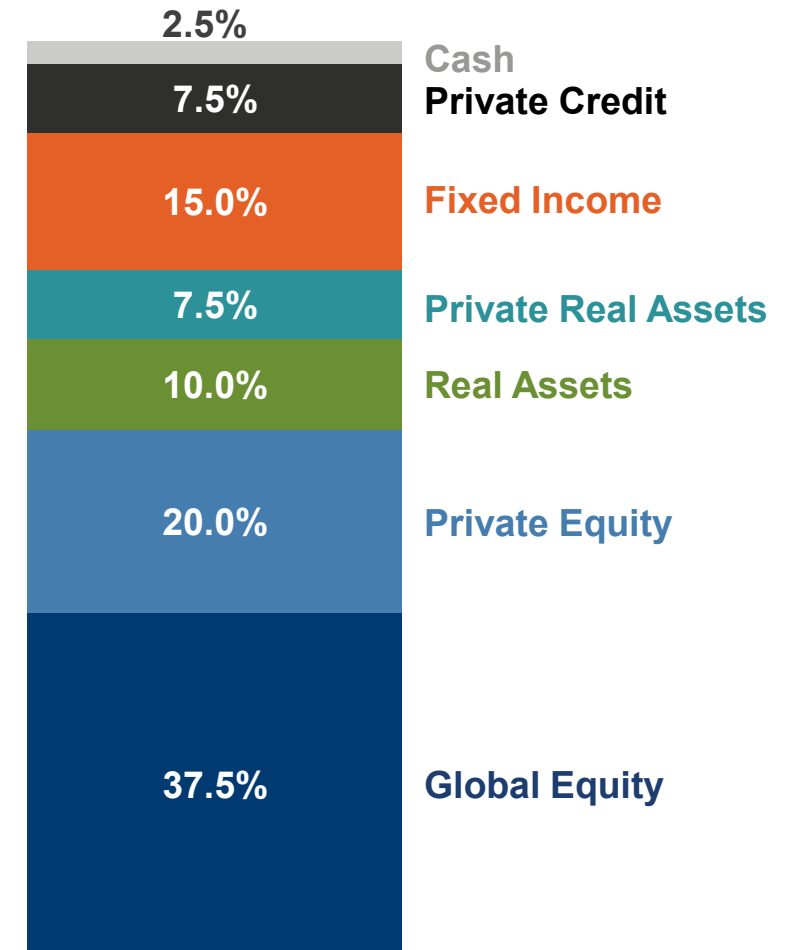
Return/Risk (%)	7.6 / 13.5	8.0 / 12.7	4.6 / 2.5	6.2 / 5.0	7.2 / 7.5	7.7 / 10.0	8.0 / 11.5	8.1 / 12.5	8.3 / 13.5	8.2 / 16.0
Projected Funding Confidence	81%	85%	21%	85%	90%	89%	88%	86%	85%	81%
Projected Assets (\$B)		+\$0.84	-\$5.08	-\$2.74	-\$1.05	+\$0.21	+\$0.78	+\$1.07	+\$1.28	+\$1.21

Asset Allocation Summary

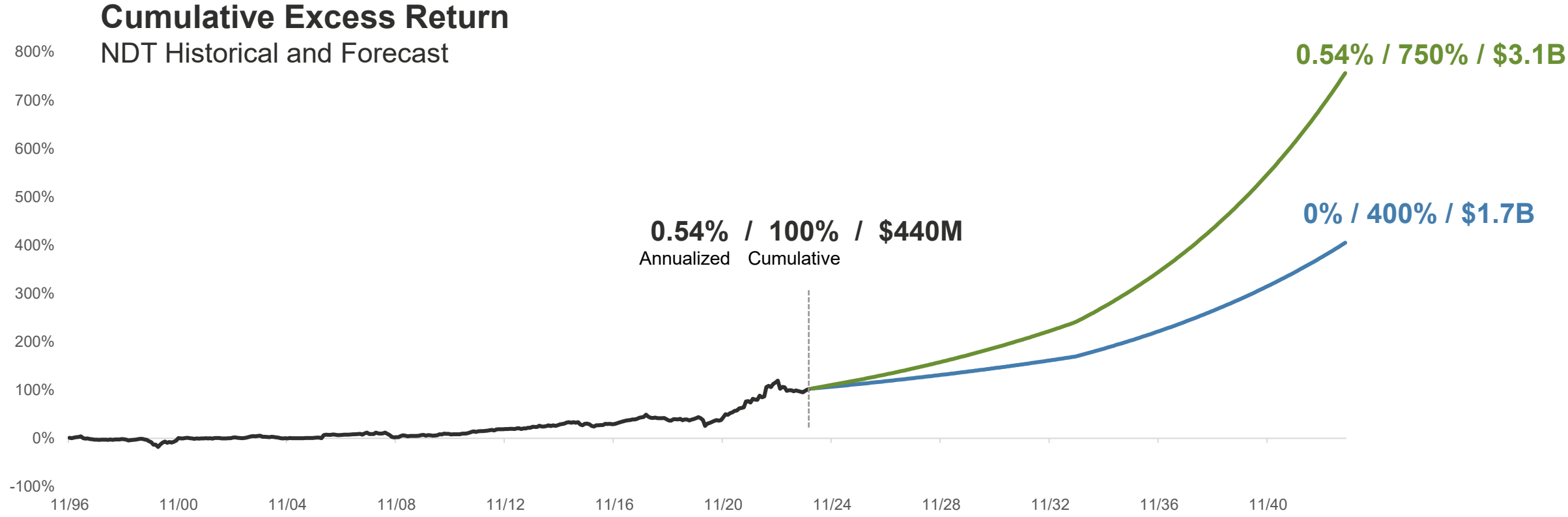
Asset allocation set based on:

- Consideration of needs and purpose of assets
- Risk efficient portfolios
- Characteristics of asset classes (return, risk, correlations)
- Capital efficient portfolios
- Consideration of assets, cash flows, and contributions
- Implemented through manager selection and monitoring

Reviewed and rebalanced on ongoing basis with formal updates occurring periodically



Why Active Management?



TVA

**TENNESSEE
VALLEY
AUTHORITY**