Board of Retirement Regular Meeting

Sacramento County Employees' Retirement System

Agenda Item 15

MEETING DATE: **March 19, 2025**

SUBJECT: **Strategic Asset Allocation**

SUBMITTED FOR: **_X__ Action** **___ Information**

RECOMMENDATION

Approve adjustments to Strategic Asset Allocation.

PURPOSE

This item supports the 2025 Annual Investment Plan, which identifies concluding the asset liability modeling study in the first half of 2025, and supports SCERS' Master Investment Policy Statement, which calls for an ALM study to be conducted at least every five years.

BACKROUND

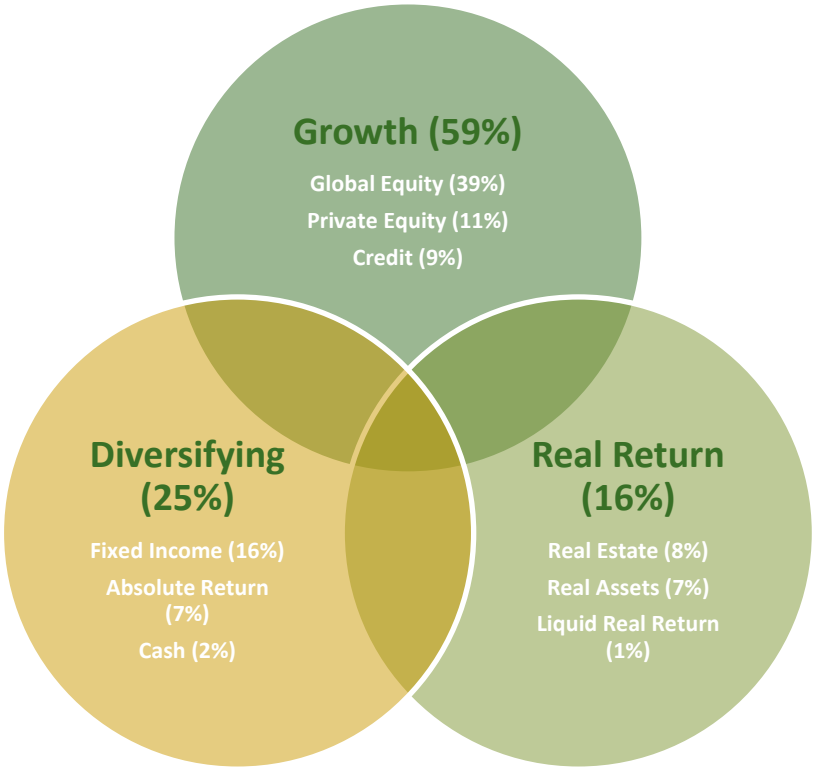
Over the past few months, SCERS has been working on an asset liability modeling (ALM) study with the assistance of SCERS' general consultant, Verus. At the February meeting, Verus presented revised asset allocation mixes incorporating the Board's feedback from initial modeling presented at last December's meeting. The February modeling included three mixes (A, B, and C) to compare against the current asset allocation. The mixes were fairly in line with each other, SCERS' current portfolio, and with SCERS' actuarial rate of return of 6.75%. In the current environment, targeting a higher return than that of the current portfolio entails taking on greater risk, both in the form of market volatility and illiquidity for marginal increases in return.

A takeaway from prior meetings is that SCERS' current Strategic Asset Allocation is in a good place and that significant changes do not need to be made at this time. SCERS' current strategic asset allocation takes a risk balanced approach that has ample return-generating, growth assets to drive performance toward the actuarial rate of return, while also maintaining enough uncorrelated/diversifying and inflation sensitive assets to reduce downside risk and the range of outcomes that the portfolio is subject to. It also has ample exposure to cash-flowing assets, given that SCERS is a mature public pension plan with negative cash flows (more benefit payments going out than contributions coming in). In addition, it has a reasonable liquidity profile to support SCERS' meaningful allocation to private/illiquid assets.

The key takeaway from the February and December discussions was that any changes to the strategic asset allocation should be minimal and should focus on improving SCERS' cash flow and risk/return profile. Out of the modeled mixes presented at the February Board meeting, the preference was toward Mix 2.

RECOMMENDED ASSET ALLOCATION

Verus and Staff recommend that the Board adopt Mix 2 from the February meeting as SCERS' revised policy allocation as shown below:



Asset Class	SCERS' Current Policy	Proposed Mix	Changes
Growth	**58.0%**	**59.0%**	**1.0%**
Global Equity	40.0%	39.0%	-1.0%
Private Equity	11.0%	11.0%	0.0%
Public Credit	2.0%	-	-
Private Credit	5.0%	-	-
Credit*	-	9.0%	2.0%
Diversifying	**25.0%**	**25.0%**	**0.0%**
Fixed Income	16.0%	16.0%	0.0%
Global Fixed Income	0.0%	0.0%	0.0%
Diversifying Absolute Return	7.0%	7.0%	0.0%
Cash	2.0%	2.0%	0.0%
Real Return	**17.0%**	**16.0%**	**-1.0%**
Real Estate	9.0%	8.0%	-1.0%
Real Assets	7.0%	7.0%	0.0%
Liquid Real Return	1.0%	1.0%	0.0%
	100.0%	100.0%	

* Credit combines Public and Private Credit into one asset class

The recommended asset allocation retains the core foundation of the current policy allocation, including a functional approach that groups and classifies segments of SCERS' portfolio to link those segments that are exposed to similar economic environments and risk factors. The functional grouping breaks the portfolio into three asset categories, Growth, Diversifying, Real Return, with several underlying asset classes.

The recommended asset allocation revisions slightly shift risk within the portfolio toward higher yielding assets. At the asset category level, it increases Growth assets, slightly decreases Real Return assets, while leaving Diversifying unchanged. At the asset class level, it:

- Reduces Public (Global) Equity by 1%
- Reduces Real Estate by 1%
- Increases Credit by 2%

This recommended asset allocation models to a 6.8% return and a 11.9% Standard Deviation, which are both the same as the current portfolio, though the Sharpe Ratio of 0.31 is slightly higher than the current portfolio's 0.30. The yield of this portfolio increases to 2.97% vs. 2.87% for the current portfolio.

KEY CHANGES

As discussed at prior meetings, the revised asset allocation consolidates the current Public Credit and Private Credit asset classes into a single asset class called "Credit." The Credit asset class simplifies the portfolio by incorporating a holistic view of credit across SCERS' portfolio and provides greater flexibility in implementation. While traditional loan origination private credit strategies would make up most of the asset class, allocations could also include liquid credit investments, strategies that purchase credit in the secondary markets, and other forms of credit. Staff and consultants are seeing more blurred lines between public and private credit, with many investment managers offering hybrid credit strategies that invest opportunistically across both public and private markets. A Credit asset class could also incorporate stressed credit strategies that currently reside within SCERS' Private Equity portfolio but might fit better from a risk and return profile within a broader Credit portfolio. The specific details of the Credit allocation will be presented later, including the portfolio construction characteristics and guidelines.

The overall increase in SCERS' Credit exposure is recommended given the higher yielding characteristics within the asset class. Both public and private credit have a cash yield, as shown in Verus' modeling, of over 8%, which is higher than any of the other asset classes. Given SCERS is a mature public pension plan with a negative cash flow profile, with more benefit payments going out than contributions coming in on an annual basis, having a meaningful allocation to cash flowing strategies becomes increasingly important.

It is recommended that the 2% net increase in the Credit allocation be funded from a slight decrease in the Global Equity and Real Estate allocations; 1% each. Credit, in particular Private Credit, has a higher return expectation versus public equities, and a lower risk forecast. It also generates meaningfully higher yields. In essence, Credit has the potential to generate equity-like returns with less risk and higher cash flows. While Global Equity is recommended to be trimmed on the margin, it still represents the largest asset class in SCERS' portfolio and is the primary driver of returns, along with Private Equity.

The 1% reduction in the Real Estate allocation is being recommended to right-size the asset class with its risk/return profile and the opportunity set. As a reminder, SCERS increased the Real Estate target allocation from 7% to 9% during the 2021 ALM study. Real Estate went through a significant boom/bust cycle over the next four years. SCERS' actual allocation

increased above the 9% target without implementing the 2021 changes due to the outsized returns that real estate generated during the inflationary period of 2021/2022. As interest rates rose, real estate quickly transitioned to a bust cycle, with SCERS' actual Real Estate allocation dropping to just over 6%, again with limited implementation since the 2021 study. SCERS was active last year allocating to a few high conviction non-core real estate opportunities, but the experience of the past four years serves as a good reminder how volatile real estate can be. While Staff and Verus support a meaningful allocation to Real Estate, reducing the allocation from 9% to 8% is a more prudent target. Given SCERS' current allocation is only 6.2%, there is plenty of implementation opportunities to consider getting to an 8% target. An 8% Real Estate allocation also serves as a good complement to the other major asset class in the Real Return asset category, Real Assets, which has a 7% target allocation.

LIQUIDITY

The modeling shows that the illiquidity of the portfolio increases with the recommended revisions, from 61% liquid / 39% illiquid for the current portfolio to 58% liquid / 42% illiquid for the recommended asset allocation This is due to the increase in the Credit allocation, where Verus models Credit as illiquid. There are a couple of considerations within this dynamic. While most of the Credit allocation would consist of private credit, it would also contain some liquid credit exposure. Also, while private credit is considered an illiquid asset class, almost all the returns are in the form of cash yield which is distributed back to investors quarterly from the inception of the investment, meaning that private credit is significantly more liquid than most private market asset classes.

NEXT STEPS

If the Board approves the adjustments to the strategic asset allocation, several subsequent tasks will need to be completed. First, Staff and consultants will identify and come back to the Board with any structural considerations to the major asset classes. Credit will have the most extensive revisions to its structure, so that will be introduced first at an upcoming meeting. Staff also expects some structuring changes within the Global Equity portfolio. Smaller revisions, if any, are expected across the other asset classes. Staff and consultants will also bring any benchmark revisions to the Board for discussion where warranted. Investment policy statements will also be adjusted and brought to the Board to incorporate the strategic asset allocation changes and any specific asset class changes.

ATTACHMENTS

- Board Order
- Verus Asset/Liability Study Presentation

Prepared by:

/S/

Steve Davis
Chief Investment Officer

Reviewed by:

/S/

Eric Stern
Chief Executive Officer

Retirement Board Order
Sacramento County Employees' Retirement System

Before the Board of Retirement
March 19, 2025

AGENDA ITEM:

Strategic Asset Allocation

THE BOARD OF RETIREMENT hereby approves Staff's recommendation to approve adjustments to Strategic Asset Allocation.

I HEREBY CERTIFY that the above order was passed and adopted on March 19, 2025 by the following vote of the Board of Retirement, to wit:

AYES:

NOES:

ABSENT:

ABSTAIN:

ALTERNATES:
(Present but not voting)

_____	_____
James Diepenbrock Board President	Eric Stern Chief Executive Officer and Board Secretary

Verus

PERSPECTIVES THAT DRIVE ENTERPRISE SUCCESS

MARCH 2025

Asset-Liability Study

Sacramento County Employees' Retirement System

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Introduction

Executive Summary

Objectives:

— Review asset allocation mixes and provide approval for a new policy asset allocation

Summary Findings:

— Achieving the actuarial rate of return in the current environment is reasonable but has recently become a bit more challenged

— The current Policy and generally similar portfolios are projected to achieve around the 6.75% actuarial rate of return

— Verus' CMA returns are based on 10-year projections which is far shorter than SCERS' investment horizon

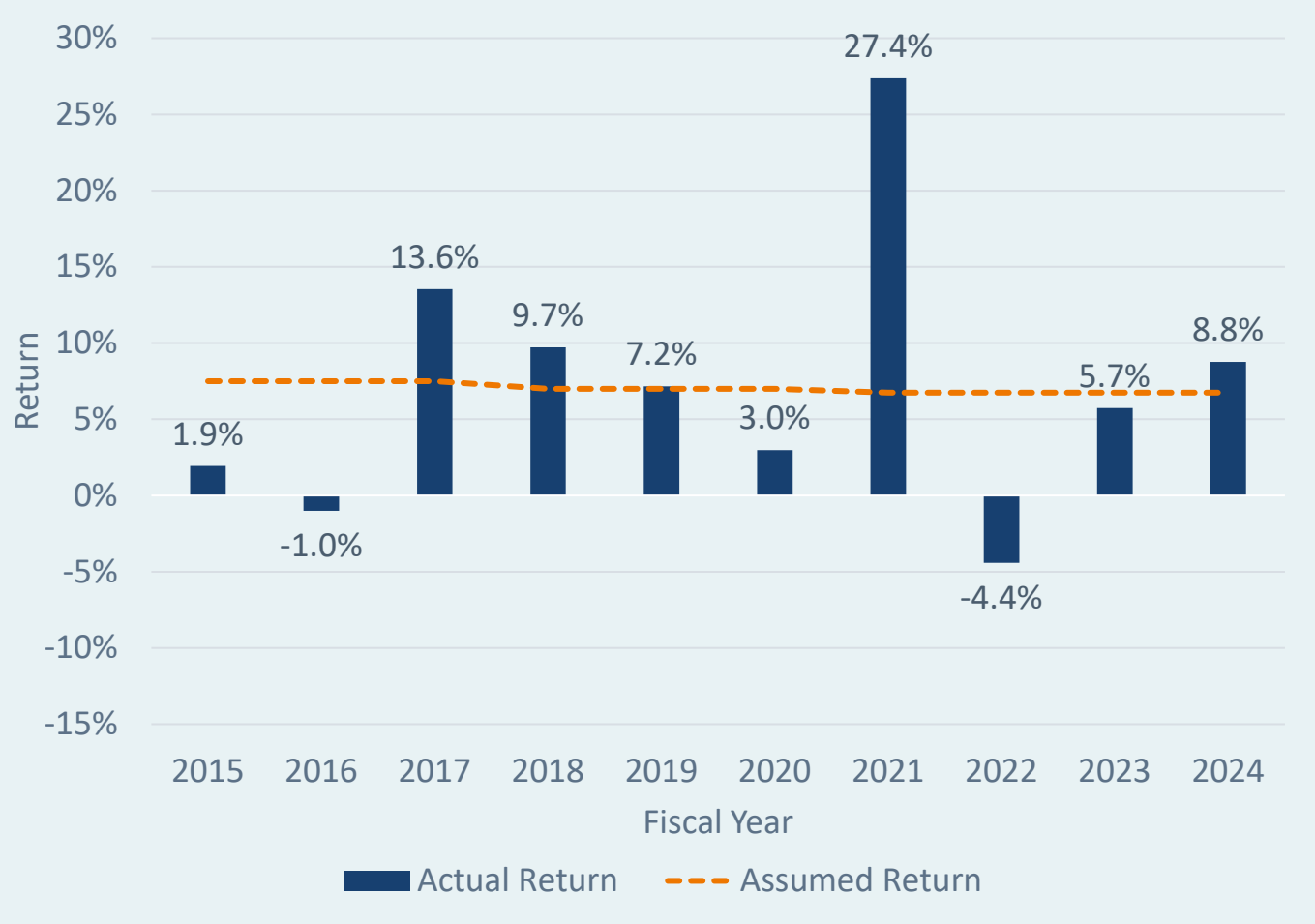
— The difference in projected returns across asset classes is narrower than in the past, primarily due to higher equity valuations and higher interest rates

— The range of projected return outcomes is wide so though we focus on the median return, we would caution against putting too much emphasis on a single number

Historical perspective

Investment returns

ACTUAL VS. ASSUMED RETURNS



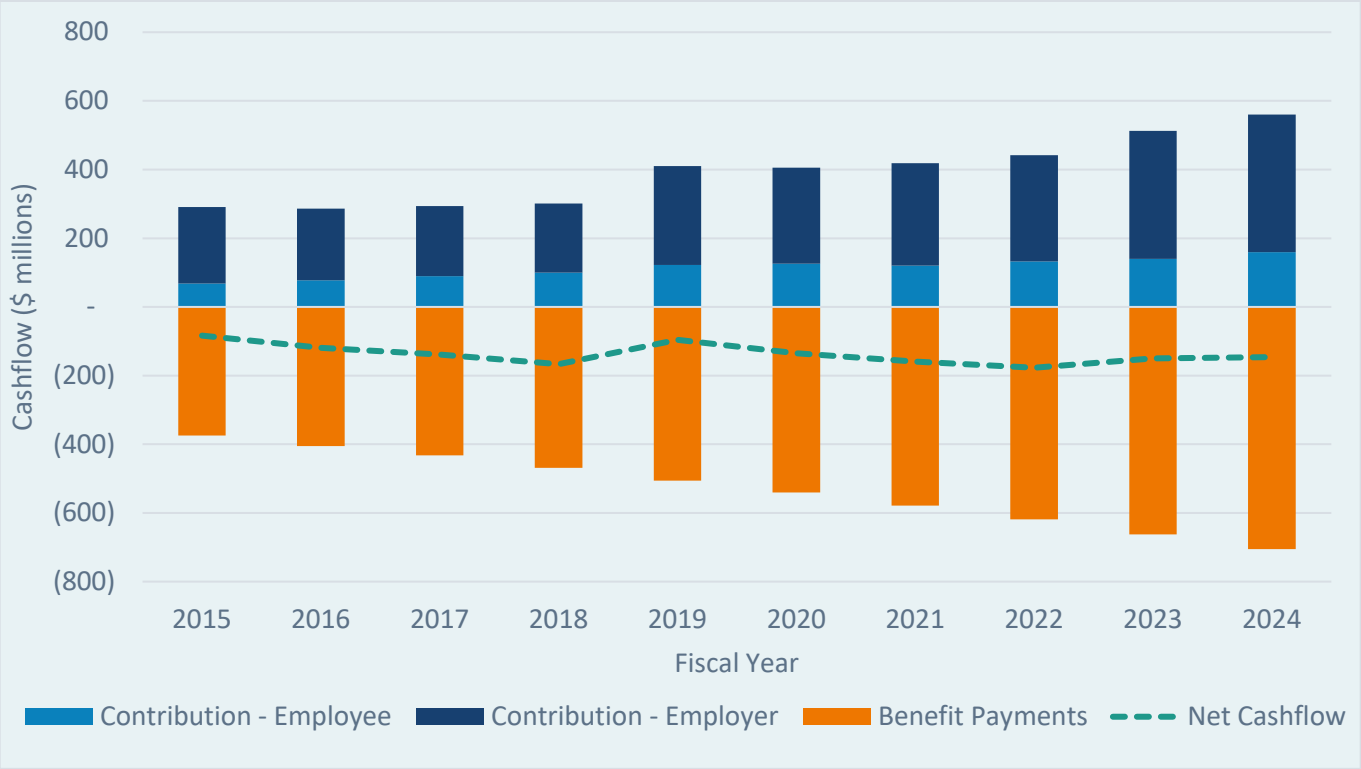
Annualized returns over the prior 10 years were 6.9%

The assumed investment return fell from 7.50% to 7.00% beginning in fiscal 2018 and fell to 6.75% beginning in fiscal 2021.

Source: SCERS' actuarial valuation reports.

Cash flows

TOTAL CASH INFLOWS VS. OUTFLOWS



Net Cashflow	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
$M	-84	-119	-139	-167	-95	-135	-159	-177	-150	-146
% of BOY Assets	-1.1%	-1.5%	-1.8%	-1.9%	-1.0%	-1.4%	-1.6%	-1.4%	-1.3%	-1.2%

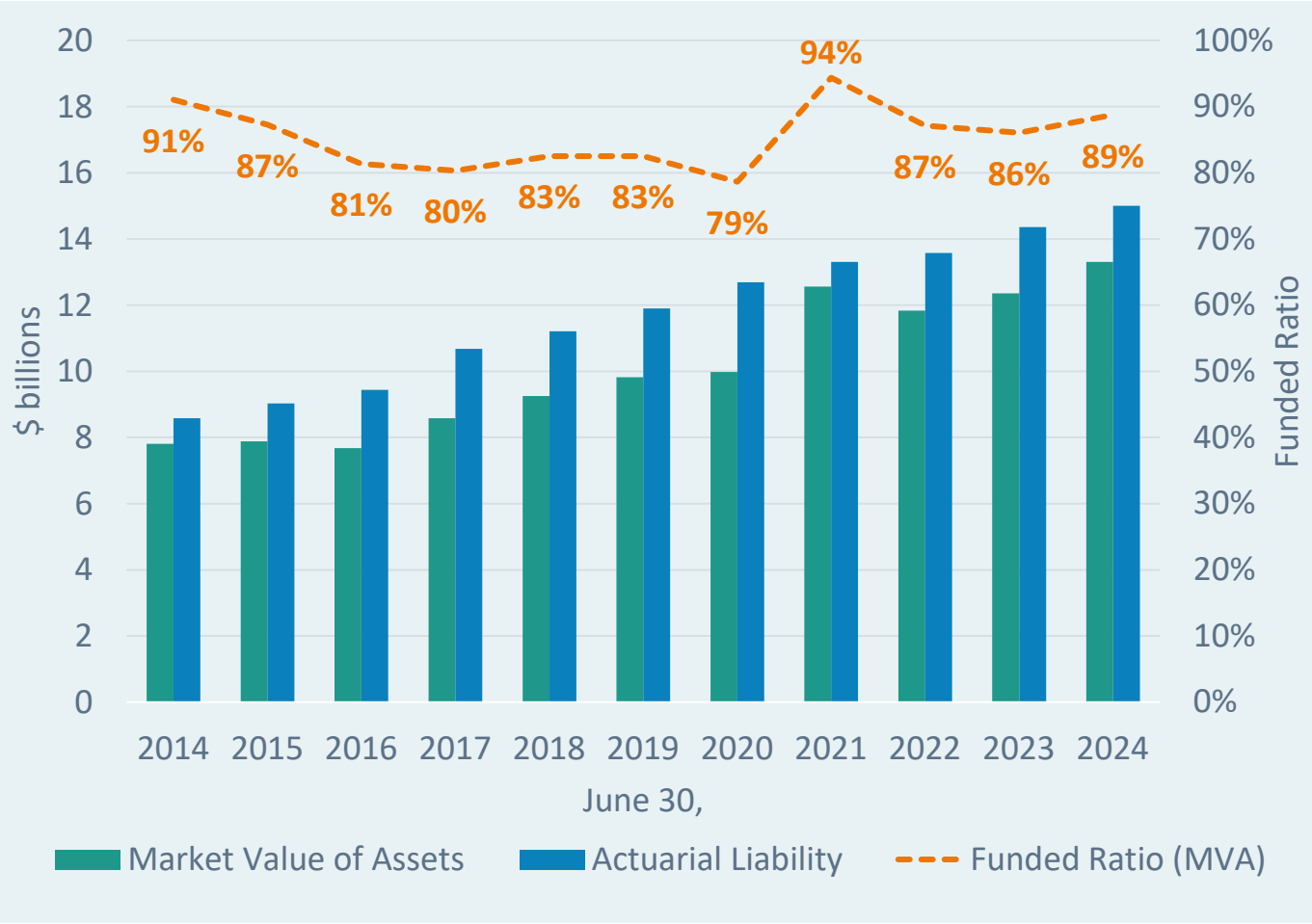
SCERS has made contributions in accordance with the actuarial funding policy over the last ten years.

As a percentage of assets, the cash outflow position has remained a relatively stable 1-2%.

Source: SCERS' actuarial valuation reports.

Funded status

ACTUARIAL VALUE OF ASSETS VS. ACTUARIAL LIABILITIES



The asset growth has kept pace with liability growth and the funding levels have remained relatively stable over the last 10 years on a market basis.

Without decreasing the assumed investment return by 0.75% over the period, the plan would be 97% funded today.

Source: SCERS' actuarial valuation reports.

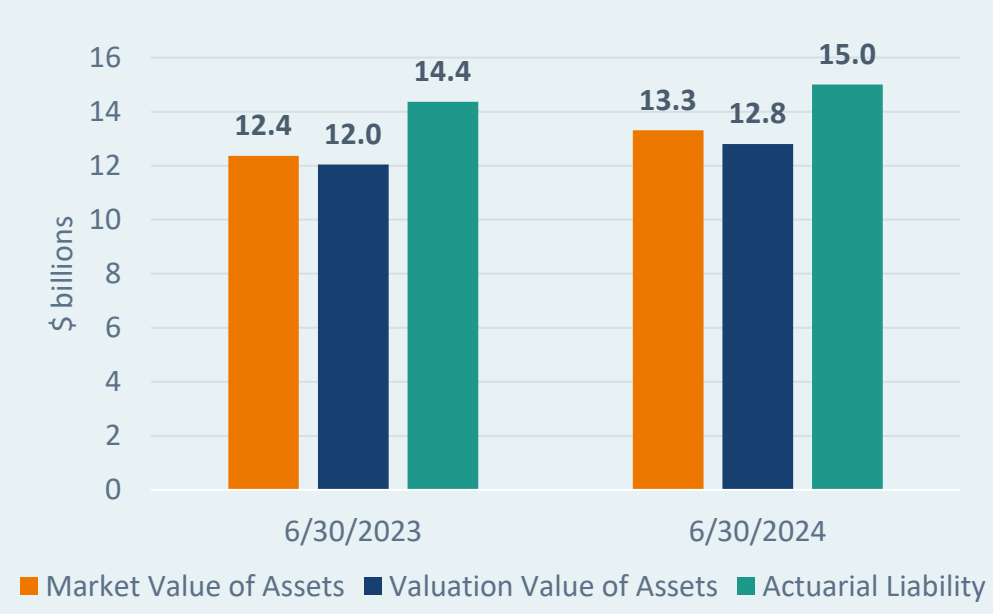
Current state

2025 vs. 2024 return forecast

Source: Verus, as of 9/30/24

Current state

ASSETS AND LIABILITIES ($ BILLIONS)[1]



6/30/2023		6/30/2024
86%	MVA Funded Ratio	89%
84%	VVA Funded Ratio	85%
6.75%	Discount Rate	6.75%

	Current Policy
Allocation	
Total Growth	58.0
Total Diversifying	25.0
Total Real Return	17.0
Portfolio Metrics	
Forecast 10-Year Return	6.7
Standard Deviation	11.9
Return / Std. Deviation	0.57
1st Percentile Return	-17.5
Sharpe Ratio	0.30
% Illiquid	39%

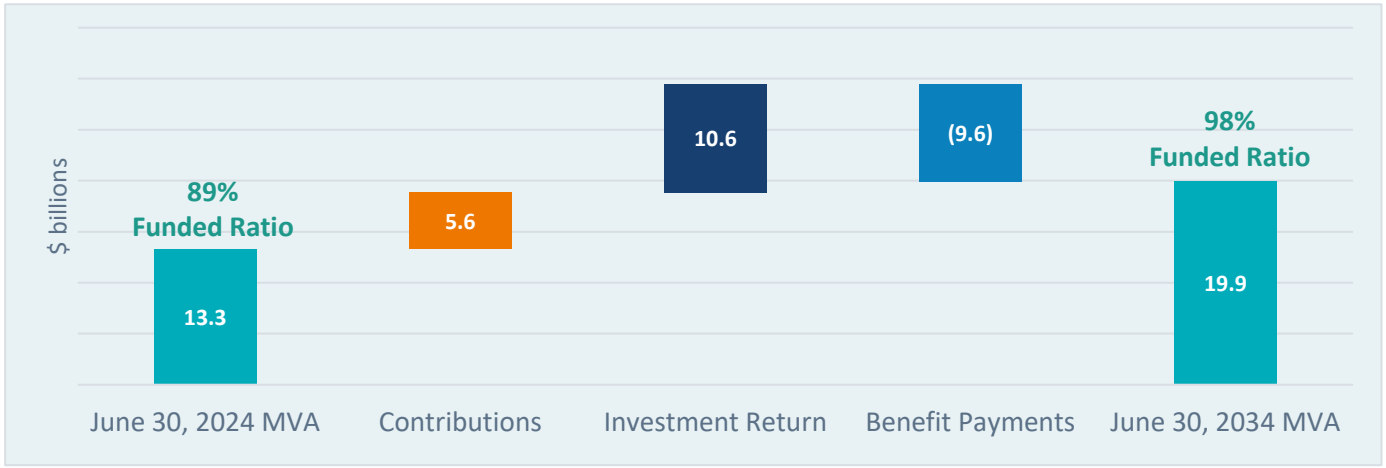
- SCERS' funding levels improved during fiscal 2024
- Contributions equaling the ADC are expected in the future
- A portion of excess returns on an AVA basis are allocated to the contingency reserve, which reduces valuation value of assets[2]
- Return forecast of current Policy allocation is 6.7%, relative to a 6.75% actuarial return assumption

[1]Based on SCERS' 2024 actuarial valuation reports.

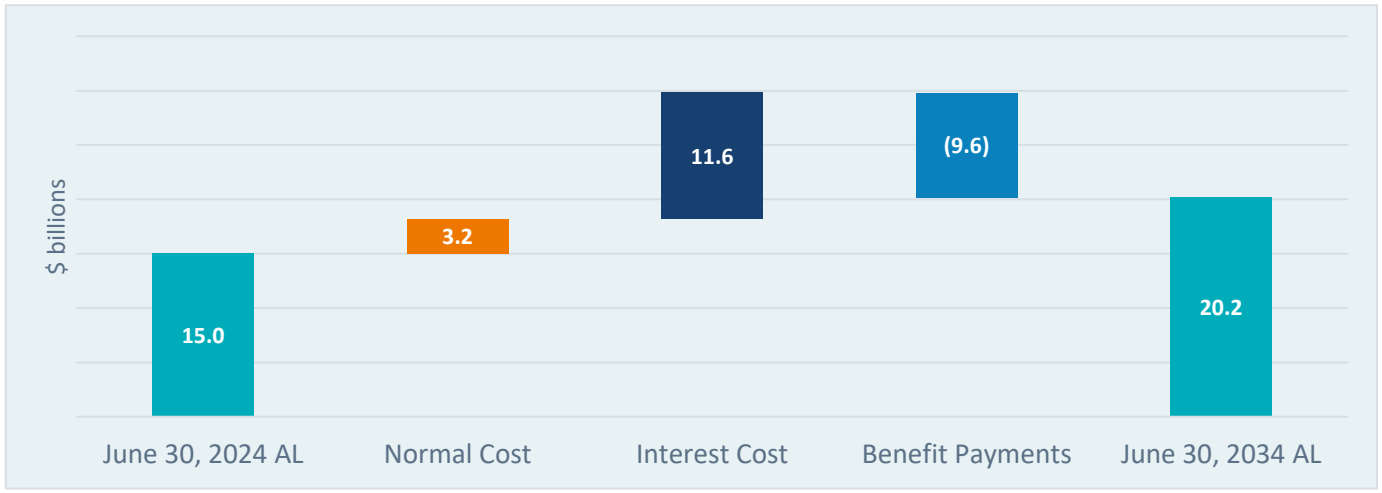
[2]Contingency reserve is credited with excess returns until it reaches 3% of the market value of assets. Reserve is $399M at 6/30/2024.

Median stochastic projection

10-YEAR MEDIAN STOCHASTIC MARKET VALUE OF ASSET PROJECTION



10-YEAR MEDIAN STOCHASTIC ACTUARIAL LIABILITY PROJECTION



Metric	Median	1-in-20 Worst Case
2034 MVA Funded Ratio	98%	52%
10-Year Total Employer Contributions	$4.0B	$4.6B
2034 Employer Contribution ($M)	$396M	$585M
2034 Employer Contribution (% of Pay)	23%	33%

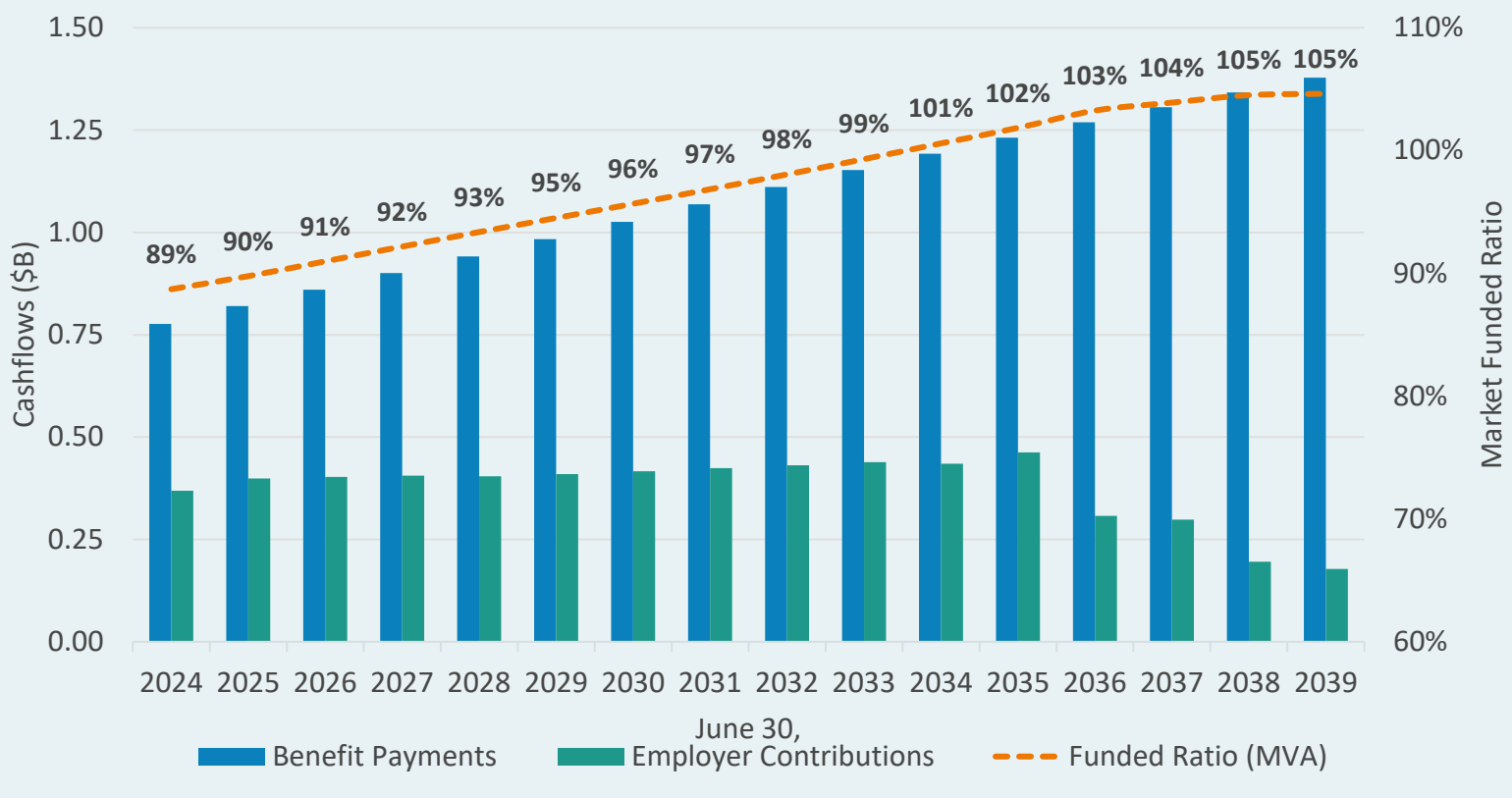
Under the current Policy allocation, the Plan's funded ratio is expected to improve to 98% in ten years.

Reflects the median stochastic projection under the current Policy allocation. See appendix for additional details.

Deterministic projections

Funded status and cashflow projection

Baseline return scenario



Net Cashflow	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
$B	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5	-0.6	-0.6	-0.8	-0.8	-1.0	-1.0
% of BOY Assets	-2.0%	-1.9%	-2.1%	-2.2%	-2.4%	-2.5%	-2.6%	-2.6%	-2.7%	-2.8%	-2.9%	-2.8%	-3.6%	-3.6%	-4.1%	-4.2%

Assumes returns of 6.7% each year. See appendix for additional details.

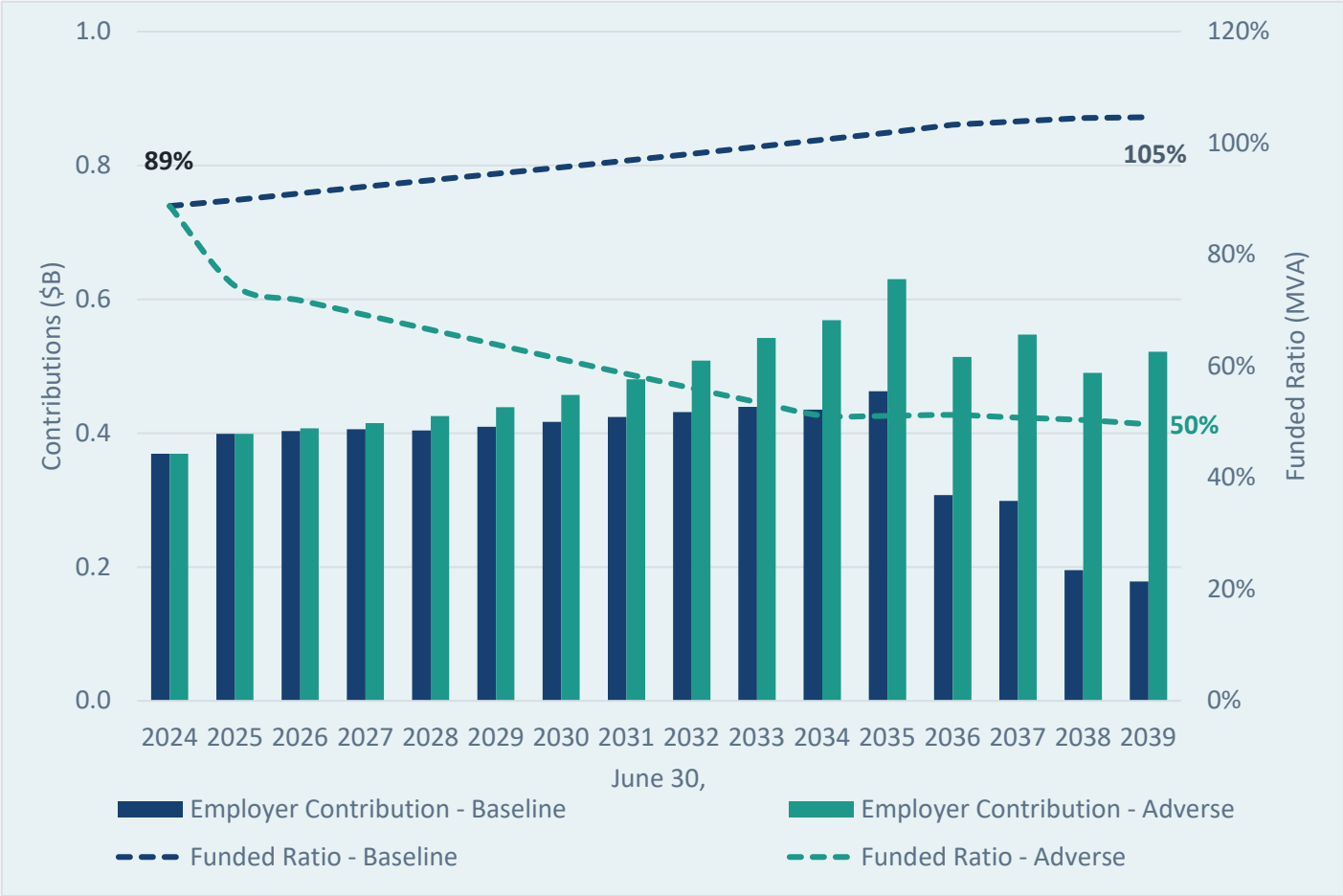
Assuming the 6.7% forecasted return of the current Policy portfolio is earned annually, the plan reaches full funding in 2034.

Employer contributions are expected to fall by ~$150M after fiscal 2036 and another ~$100M after fiscal 2038

Chart reflects employer contributions only. Annual employee contributions of ~$150M - $200M are expected annually in addition.

Funded status and cashflow projection

Baseline vs. adverse return scenario



The adverse return scenario is intended to represent a 1-in-20 worst case outcome:

Time	Return	Descriptions
Year 1	-11.0%	1-in-20 1-year performance
Year 2-10	2.2%	1-in-20 10-year performance
Year 11+	6.7%	Baseline

Relative to the baseline projection, the adverse scenario results in $1.7B in additional cash and the funded ratio is 55% lower after 15 years.

Assumes returns are as stated each year. See appendix for additional details.

Heat map

Funded status and contributions

Funded Ratio (MVA)																
June 30,	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
1%	89%	85%	81%	77%	74%	70%	67%	63%	60%	56%	53%	50%	47%	44%	40%	36%
2%	89%	86%	83%	80%	77%	74%	71%	68%	65%	63%	60%	57%	54%	51%	48%	45%
3%	89%	87%	84%	82%	80%	78%	76%	74%	72%	69%	67%	65%	63%	60%	57%	54%
Annual 4%	89%	87%	86%	85%	84%	82%	81%	79%	78%	77%	75%	74%	72%	70%	68%	65%
Investment 5%	89%	88%	88%	88%	87%	87%	86%	86%	85%	84%	84%	83%	83%	81%	80%	78%
Return 6%	89%	89%	90%	90%	91%	91%	91%	92%	92%	93%	93%	93%	94%	94%	93%	92%
7%	89%	90%	91%	93%	94%	96%	97%	99%	100%	102%	103%	105%	107%	107%	108%	109%
8%	89%	91%	93%	96%	98%	100%	103%	106%	108%	111%	113%	116%	119%	121%	123%	124%
9%	89%	92%	95%	98%	102%	105%	109%	113%	117%	121%	125%	128%	132%	136%	139%	143%

Annual Employer Contributions ($B)																
Fiscal Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	Total
1%	0.38	0.39	0.41	0.41	0.42	0.43	0.44	0.46	0.48	0.51	0.53	0.59	0.47	0.50	0.44	**6.87**
2%	0.38	0.39	0.41	0.41	0.42	0.43	0.44	0.46	0.48	0.50	0.52	0.57	0.44	0.47	0.41	**6.73**
3%	0.38	0.39	0.41	0.41	0.42	0.43	0.44	0.45	0.47	0.49	0.50	0.55	0.42	0.44	0.37	**6.58**
Annual 4%	0.38	0.39	0.41	0.41	0.42	0.43	0.44	0.45	0.46	0.48	0.49	0.53	0.39	0.41	0.33	**6.41**
Investment 5%	0.38	0.39	0.41	0.41	0.42	0.42	0.43	0.44	0.46	0.47	0.47	0.51	0.37	0.37	0.28	**6.23**
Return 6%	0.38	0.39	0.40	0.41	0.41	0.42	0.43	0.43	0.44	0.45	0.45	0.48	0.33	0.33	0.24	**6.01**
7%	0.38	0.39	0.40	0.40	0.40	0.41	0.41	0.42	0.43	0.43	0.43	0.45	0.29	0.28	0.17	**5.71**
8%	0.38	0.39	0.40	0.40	0.39	0.40	0.40	0.38	0.37	0.36	0.33	0.34	0.16	0.12	0.00	**4.81**
9%	0.38	0.39	0.40	0.40	0.38	0.38	0.37	0.34	0.31	0.28	0.23	0.21	0.01	0.00	0.00	**4.08**

The heat map shows the impacts of varying returns to the plan's funded status and contribution requirements.

Assumes returns are as stated in each year of the projection. See appendix for additional details. Total column reflects cumulative contributions from fiscal 2025 – 2039.

Asset Mixes

Asset mixes for consideration

Shown alongside the current Policy is the proposed Policy mix, which incorporates slight tilts around the current Policy to improve risk/return tradeoff

The proposed Policy mix consolidates Bank Loans, High Yield, and Private Credit into a single Credit asset class.

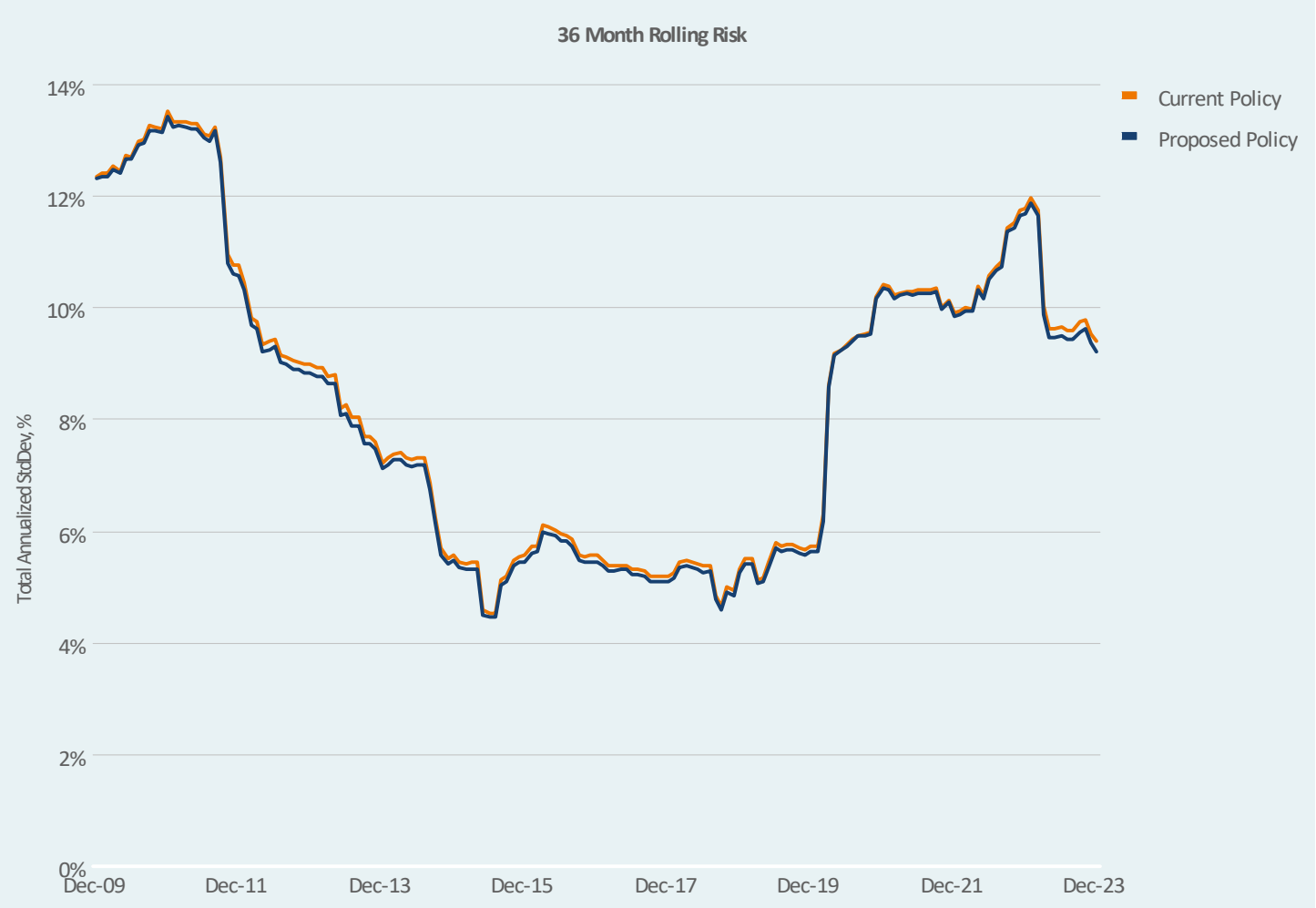
Portfolio alternatives

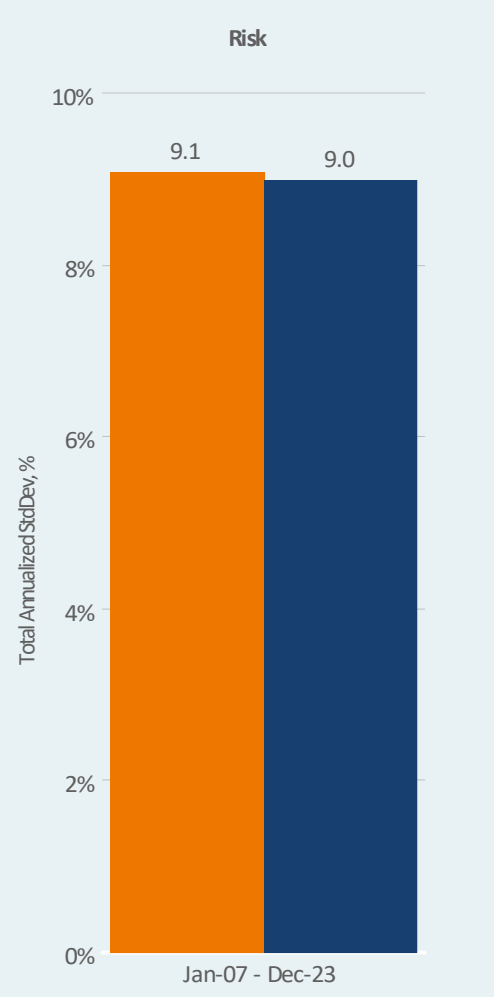
	Current Policy	Proposed Policy	Verus 2025 CMAs Return (g)	Standard Deviation	Sharpe Ratio (g)	Asset Class Yield
Global Equity	40	39	*6.0*	*16.7*	*0.13*	*1.8%*
High Yield Corp. Credit	1	-	*5.6*	*10.8*	*0.35*	*7.5%*
Bank Loans	1	-	*6.9*	*8.8*	*0.16*	*8.6%*
Private Equity	11	11	*8.0*	*10.9*	*0.37*	*0.0%*
Private Credit	5	-	*8.2*	*11.8*	*0.42*	*8.2%*
Credit*	-	9	*8.2*	*11.8*	*0.42*	*8.2%*
Total Growth Assets	***58***	***59***				
Core Plus Fixed Income	12	12	*4.4*	*4.7*	*0.13*	*5.1%*
US Treasury	4	4	*3.8*	*7.1*	*0.00*	*4.5%*
Absolute Return*	7	7	*5.4*	*6.3*	*0.25*	*0.0%*
Cash	2	2	*3.8*	*1.1*	-	*3.8%*
Total Diversifying	***25***	***25***				
Core Real Estate	6	5	*7.2*	*12.5*	*0.27*	*4.0%*
Value Add Real Estate	1.5	1.5	*9.2*	*15.4*	*0.35*	*1.5%*
Opportunistic Real Estate	1.5	1.5	*10.2*	*21.2*	*0.30*	*0.0%*
Liquid Real Return*	1	1	*6.3*	*16.0*	*0.16*	*4.1%*
Private Real Assets*	7	7	*8.1*	*16.8*	*0.26*	*5.8%*
Total Real Return	***17***	***16***				
Total Allocation	**100**	**100**				

	Current Policy	Proposed Policy
Mean Variance Analysis		
Forecast 10 Year Return	***6.8***	***6.8***
Standard Deviation	11.9	11.9
1st percentile ret. 1 year	*-17.5*	*-17.3*
Sharpe Ratio	0.30	0.31
% in Liquid Assets	61%	58%
% in Illiquid Assets	39%	42%

**Credit modeled with Private Credit; Diversifying Absolute Return modeled with Asymmetric Hedge Funds; Liquid Real Return modeled with Commodities; Private Real Assets modeled with Infrastructure*

Risk - long term





Left chart illustrates the historical annualized volatility (3-year rolling) of the current portfolio mix over time, if the current portfolio were held for this historical period and rebalanced according to the specified rebalancing frequency.

Performance during historical stress periods

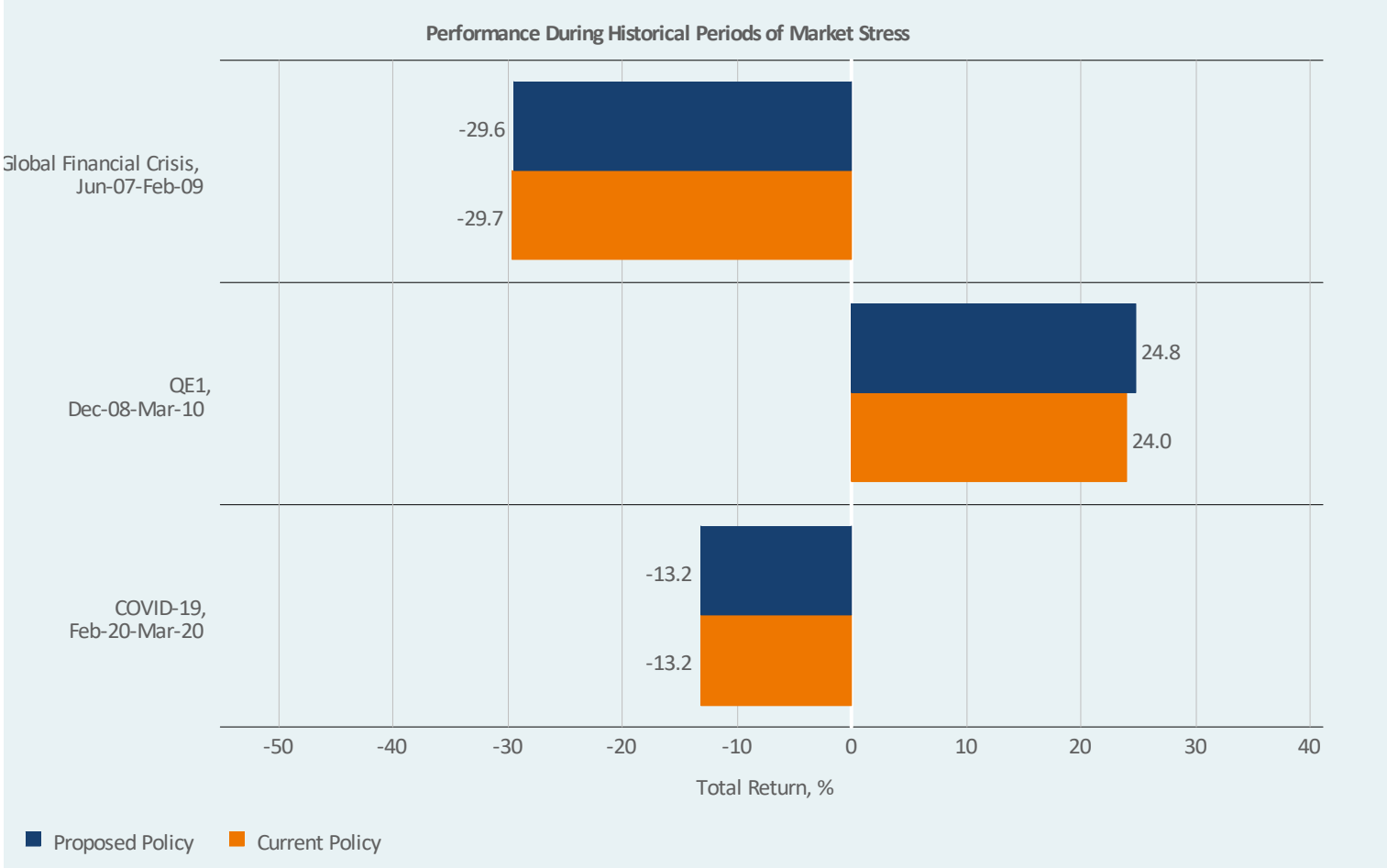


Chart illustrates how each portfolio asset mix performed during a variety of historical periods, given conditions at that historical time, and given the specified

Performance during historical stress scenarios

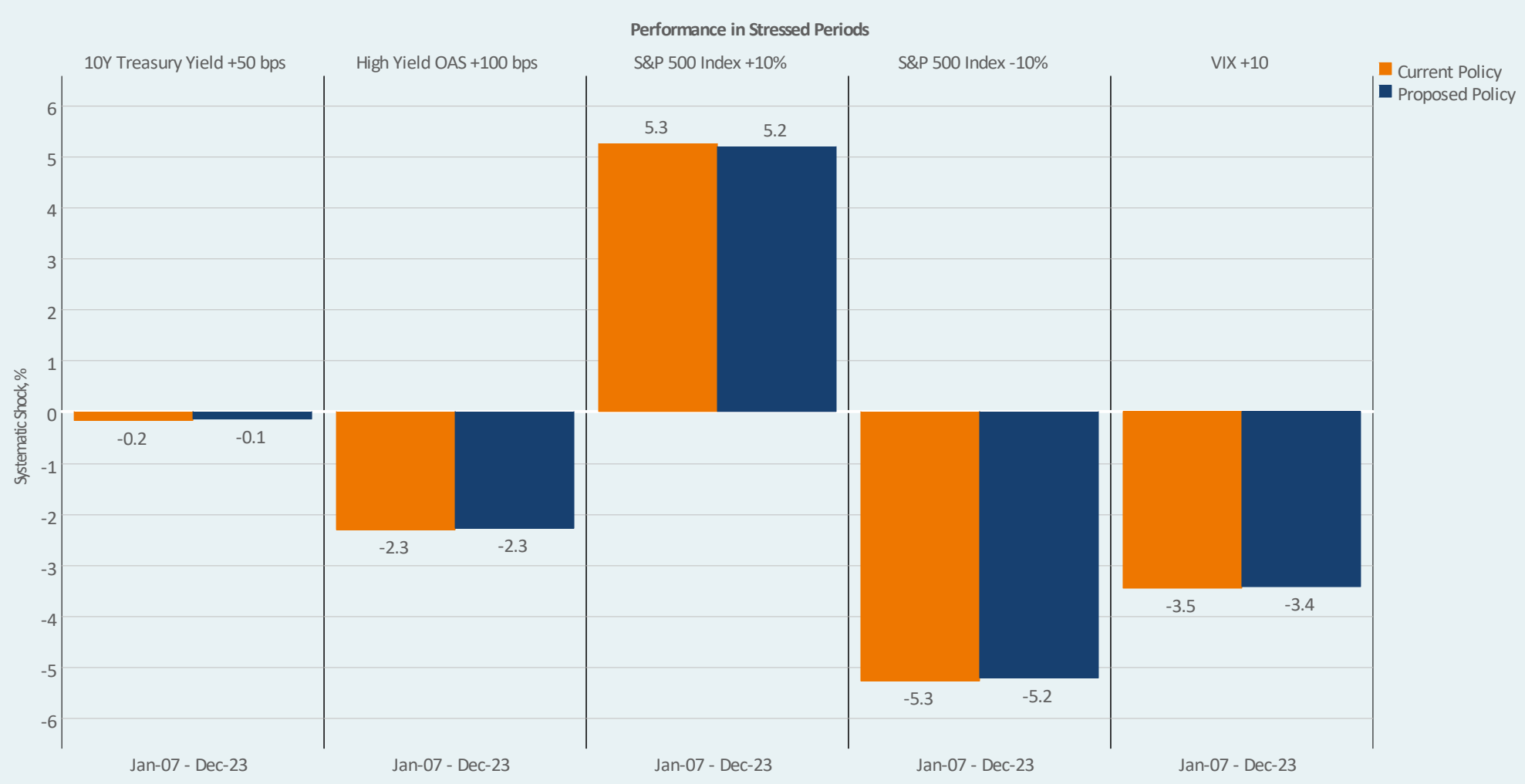
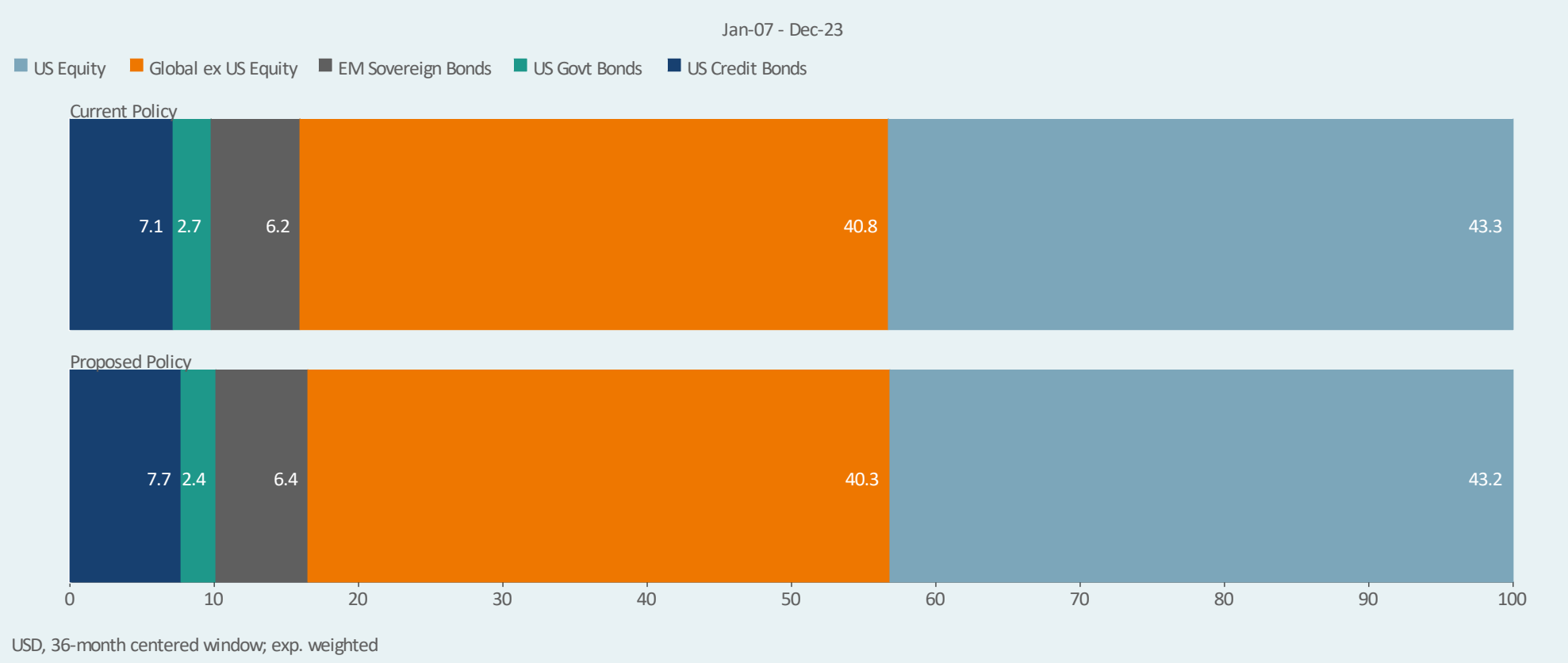


Chart estimates the total portfolio performance of each asset mix, given a specific shock to the portfolio. This is calculated based on the sensitivity of all of the

Historical asset loadings

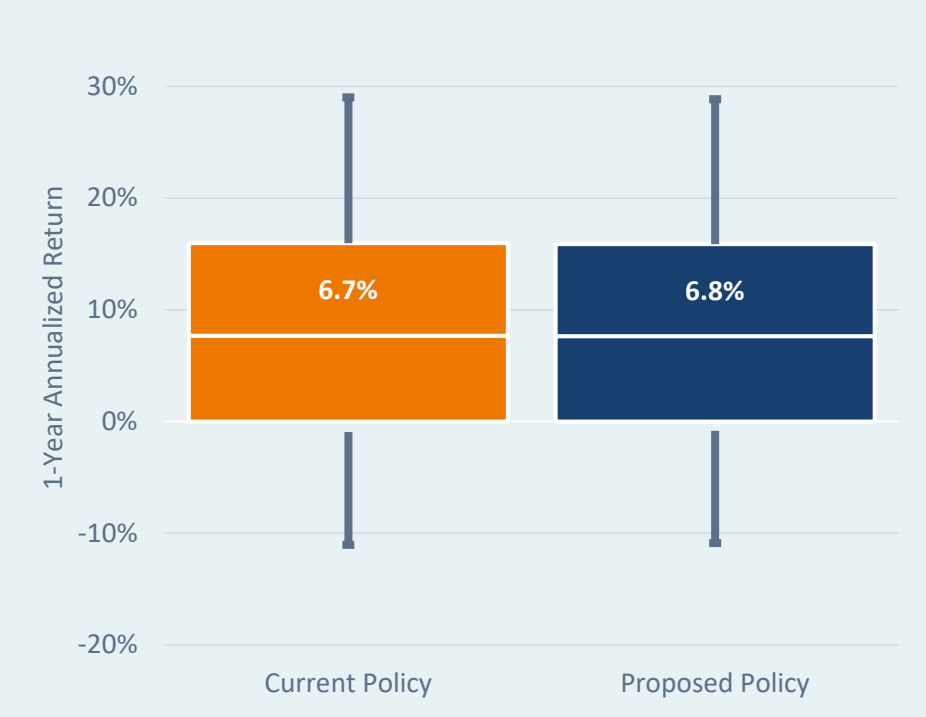


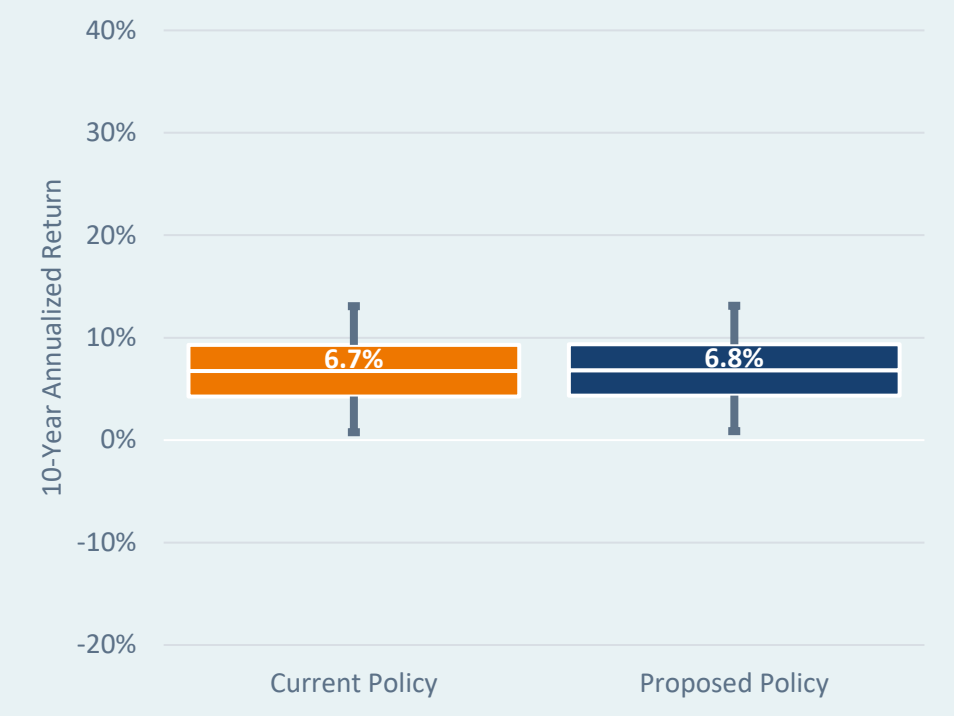
This chart is used to demonstrate the likely allocation of the fund's assets to different factors (US Equity, Global ex-US Equity, U.S Bonds, U.S Credit Bonds, and EM Sovereign Bonds). This chart is exponentially-weighted, meaning more emphasis is placed on more recent market behavior and less emphasis is placed on older data.-

Stochastic projections

Range of potential return outcomes

1 -YEAR			10-YEAR	
Current Policy	Proposed Policy	Percentile	Current Policy	Proposed Policy
28.1%	28.0%	95th	13.1%	13.1%
15.0%	15.1%	75th	9.3%	9.4%
6.7%	**6.8%**	**50th**	**6.7%**	**6.8%**
-0.9%	-0.8%	25th	4.3%	4.3%
-11.0%	**-10.9%**	**5th**	**0.8%**	**0.9%**

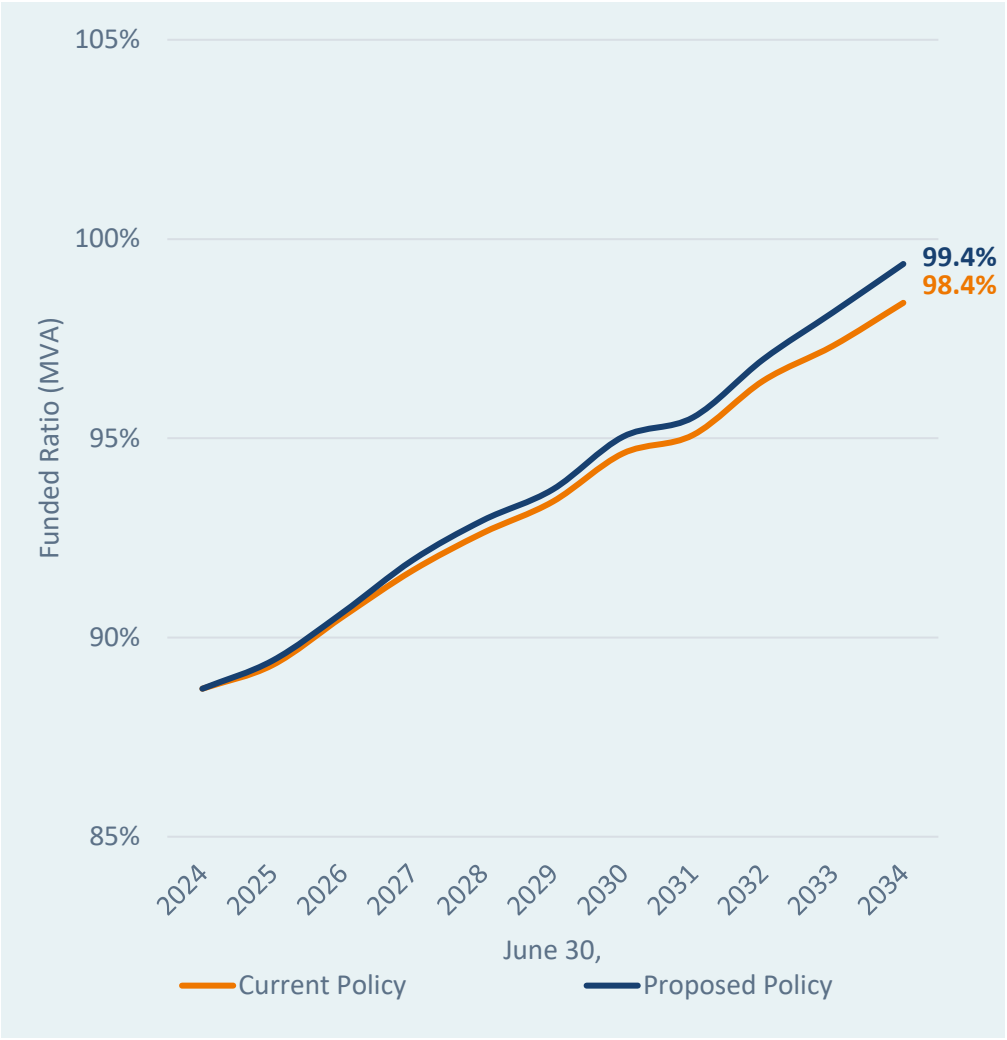




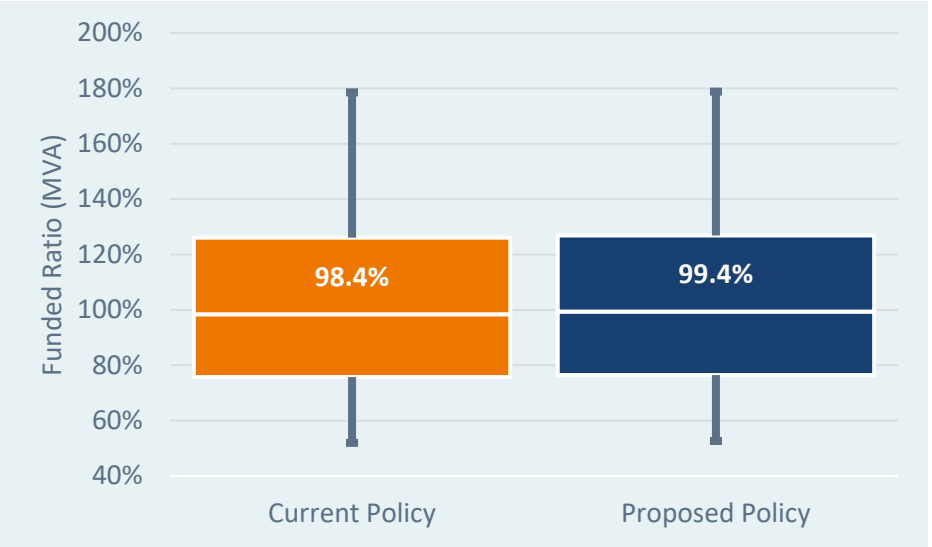
Source: MPI and Verus' 2025 capital market assumptions

Funded ratio (MVA)

FUNDED RATIO (MVA) MEDIAN PROJECTION



JUNE 30, 2034 FUNDED RATIO (MVA) DISTRIBUTION

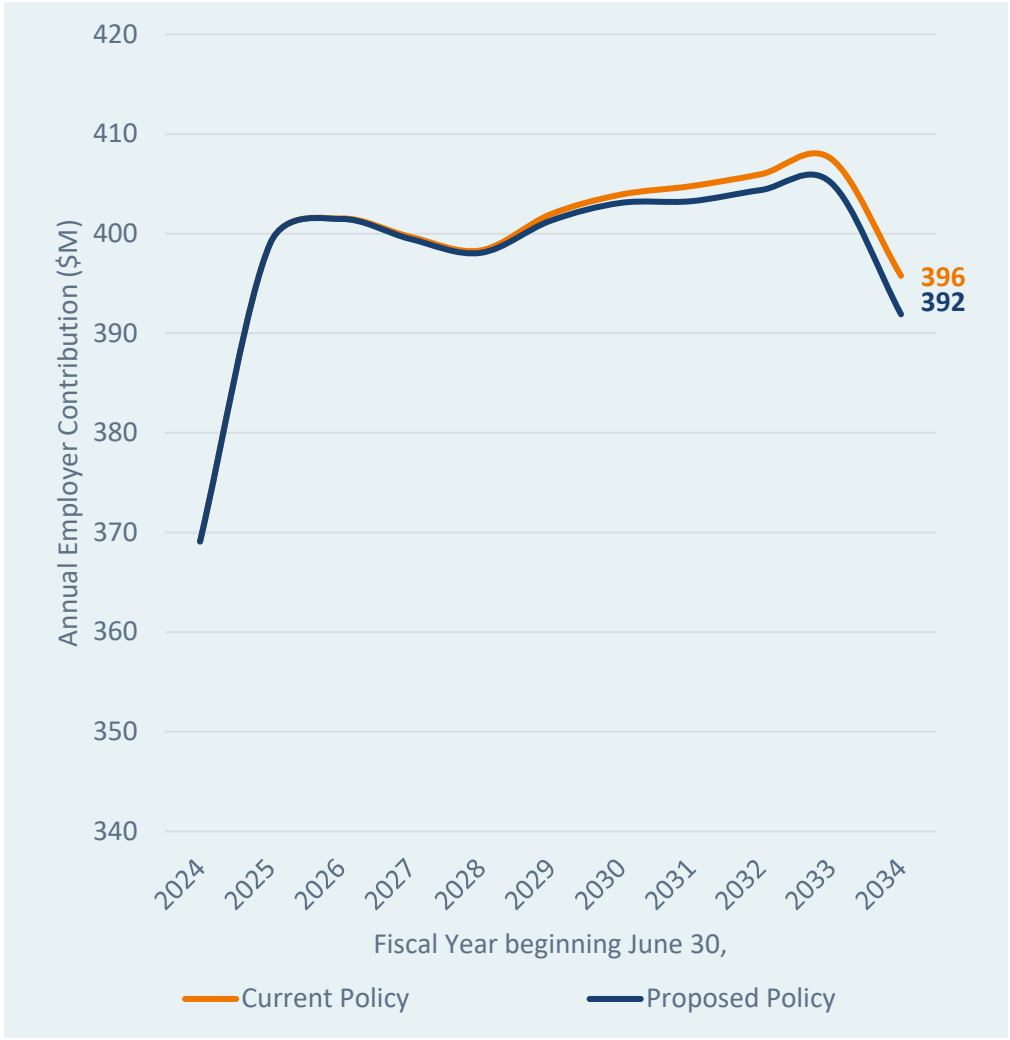


2034 Funded Ratio (MVA)	Current Policy	Proposed Policy
Percentile		
95%	178.5%	178.8%
75%	126.1%	126.8%
50%	**98.4%**	**99.4%**
25%	75.7%	76.4%
5%	**52.0%**	**52.6%**
Probability		
> Policy	N/A	80%
> 100% Funded	48%	49%
> 89% Funded	61%	61%

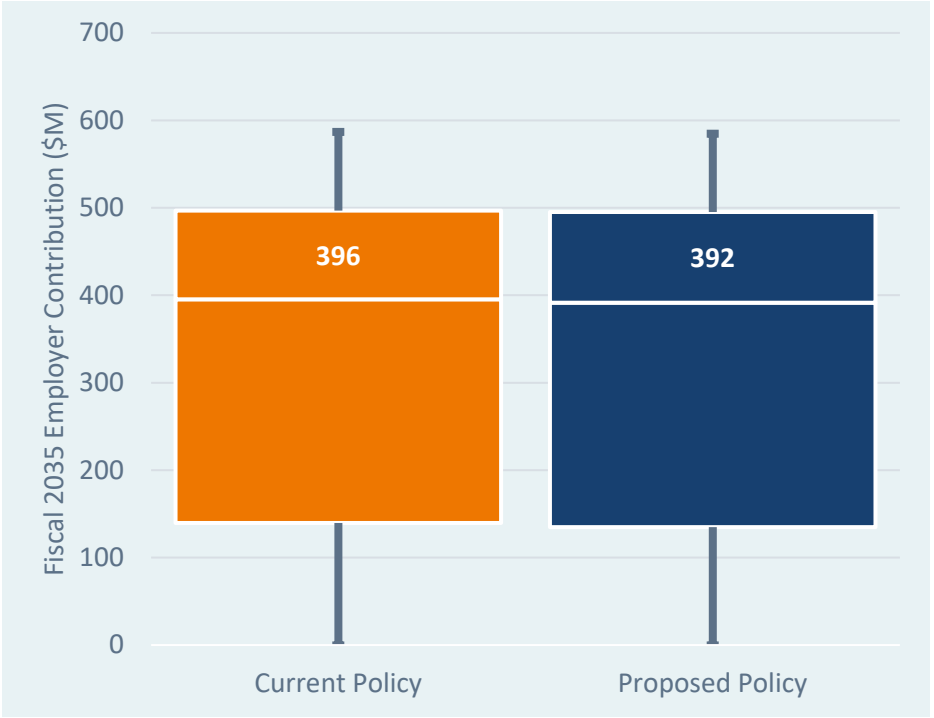
Source: Reflects 5,000 simulations of assets and liabilities based on Verus' 2025 capital market assumptions. See appendix for details.

Annual employer contribution

ANNUAL EMPLOYER CONTRIBUTION ($M)



FISCAL 2035 EMPLOYER CONTRIBUTION ($M) DISTRIBUTION

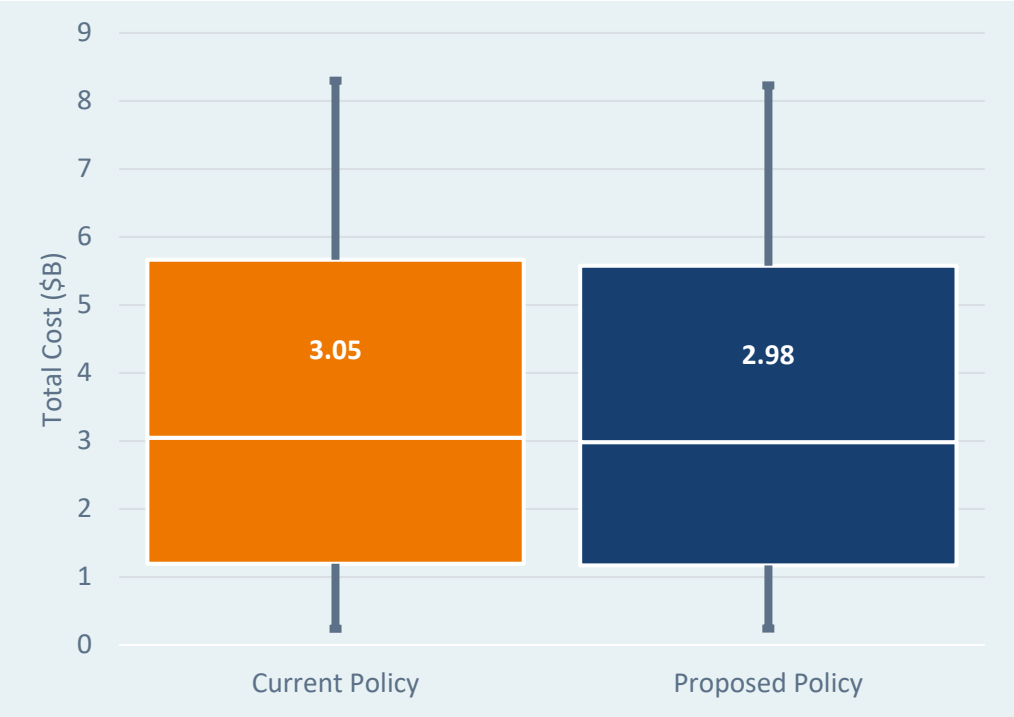


Fiscal 2035 ER Contribution ($M)	Current Policy	Proposed Policy
Percentile		
95%	**587**	**585**
75%	497	496
50%	**396**	**392**
25%	140	135
5%	0	0

Source: Reflects 5,000 simulations of assets and liabilities based on Verus' 2025 capital market assumptions. See appendix for details.

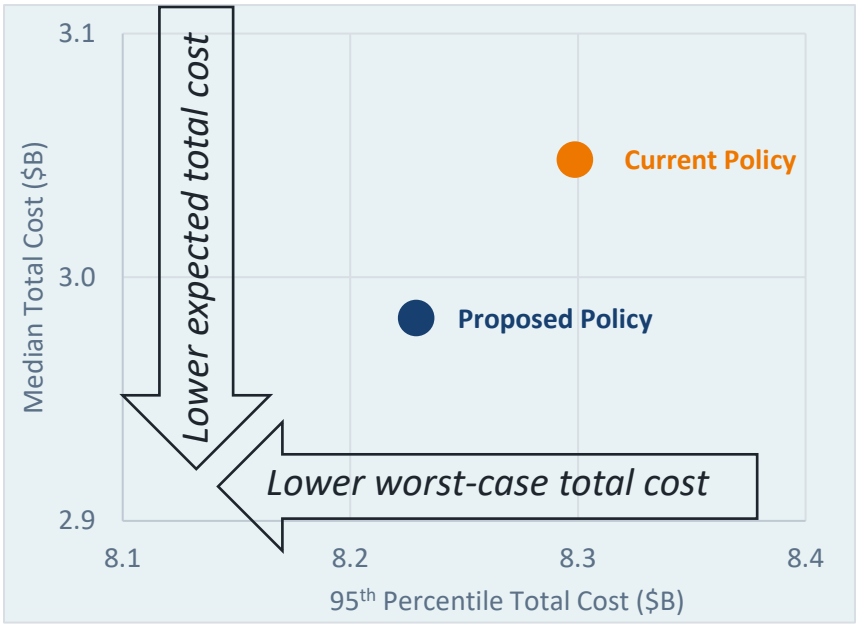
Total full funding cost

TOTAL COST DISTRIBUTION ($M)



Total full funding cost ($B)	Current Policy	Proposed Policy
Percentile		
95%	**8.30**	**8.23**
75%	5.67	5.58
50%	**3.05**	**2.98**
25%	1.20	1.17
5%	0.24	0.24

ILLUSTRATION OF RISK REWARD TRADEOFF



Metric estimates the total cost to achieve full funding, by summing together the following:

- Fiscal 2025 through 2034 cumulative contributions:
  - "What did we contribute during the projection?"
- Remaining deficit at 6/30/2034:
  - "What would we still need to contribute at the end of the projection to achieve full funding?"

Source: Reflects 5,000 simulations of assets and liabilities based on Verus' 2025 capital market assumptions. Metric is calculated on a present value basis with a 6.75% discount rate. See appendix for details.

Conclusions

Summary

- Projected returns across asset classes are narrower than in the past
- Expected returns across most asset classes (2024 vs. 2025 CMAs) have declined
- Achieving higher returns requires taking more of these risks:
  - Increased reliance on manager selection/skill
  - Increased reliance on private investments and illiquid investment structures
  - Increased reliance on use of leverage (implicitly or explicitly)
- Some implications of these risks to consider include:
  - Ability to source, select, and monitor investments with the same level of diligence and care as the current program
  - Higher explicit costs including fees, sourcing, managing, monitoring – private, illiquid investments are not scalable in the same way as liquid, transparent investments
  - Increase to private investments will take several years to achieve, interim asset allocation glidepath decisions should be taken into consideration
  - Growth in negative cash flows as plan matures will require increased liquidity
- However, with narrower projected returns across asset classes, there may be an opportunity to improve efficiency (the risk/return tradeoff).

Since projected returns across asset classes are narrower than in the past, the amount of additional return per a unit of additional risk is lower.

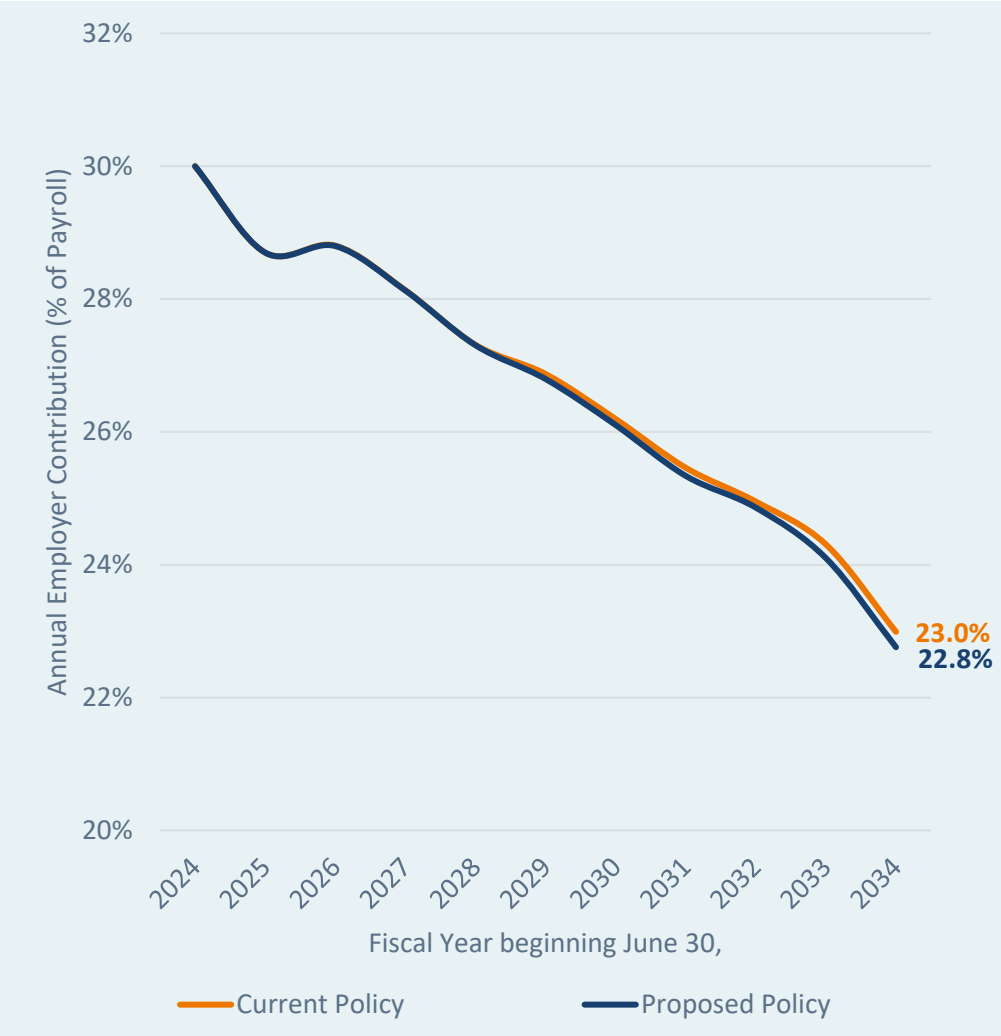
Therefore, targeting a return materially higher than the assumed rate may not be worth the additional risk.

Appendix

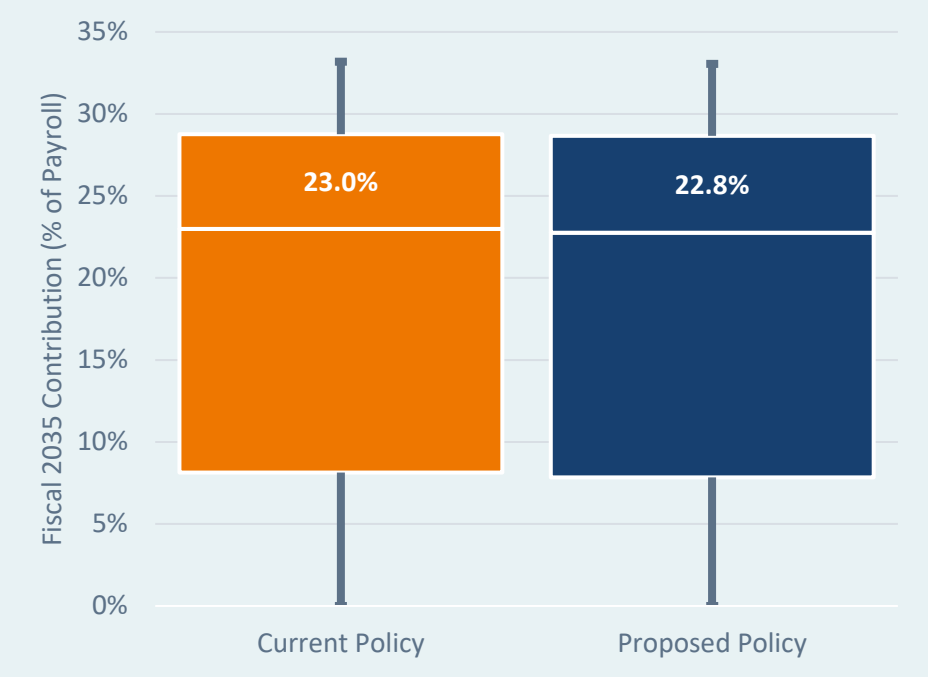
Stochastic projections

Annual employer contribution (% of payroll)

ANNUAL EMPLOYER CONTRIBUTION (% OF PAYROLL)



FISCAL 2035 EMPLOYER CONTRIBUTION (% OF PAYROLL) DISTRIBUTION



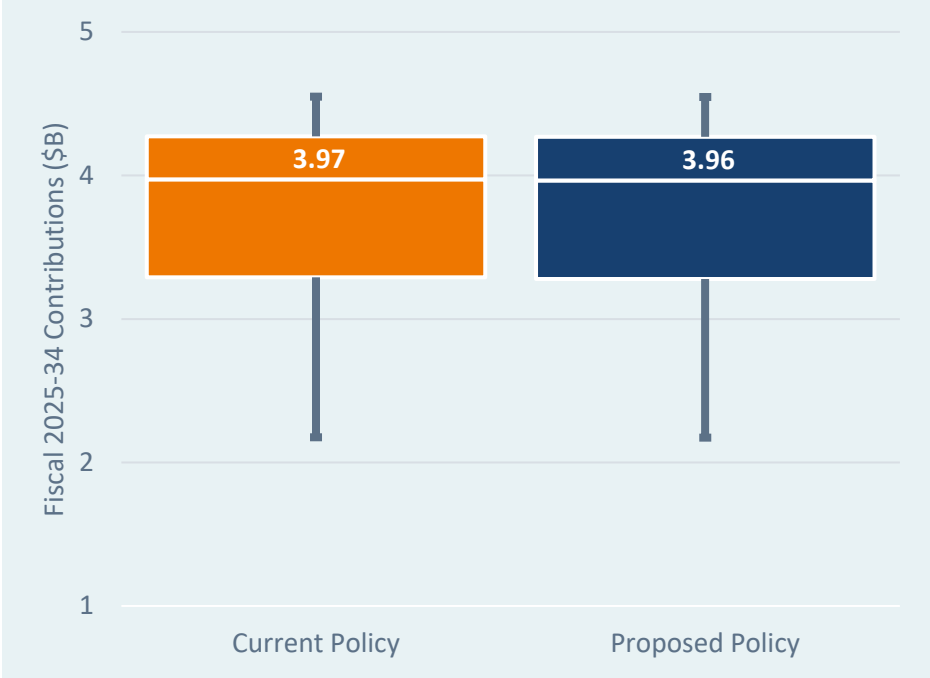
Fiscal 2035 ER Contribution (% of Payroll)	Current Policy	Proposed Policy
Percentile		
95%	**33.2%**	**33.1%**
75%	28.8%	28.7%
50%	**23.0%**	**22.8%**
25%	8.1%	7.8%
5%	0.0%	0.0%

Source: Reflects 5,000 simulations of assets and liabilities based on Verus' 2025 capital market assumptions. See appendix for details.

Cumulative employer contribution

CUMULATIVE EMPLOYER CONTRIBUTION ($B)

FISCAL 2025-34 EMPLOYER CONTRIBUTION ($B) DISTRIBUTION

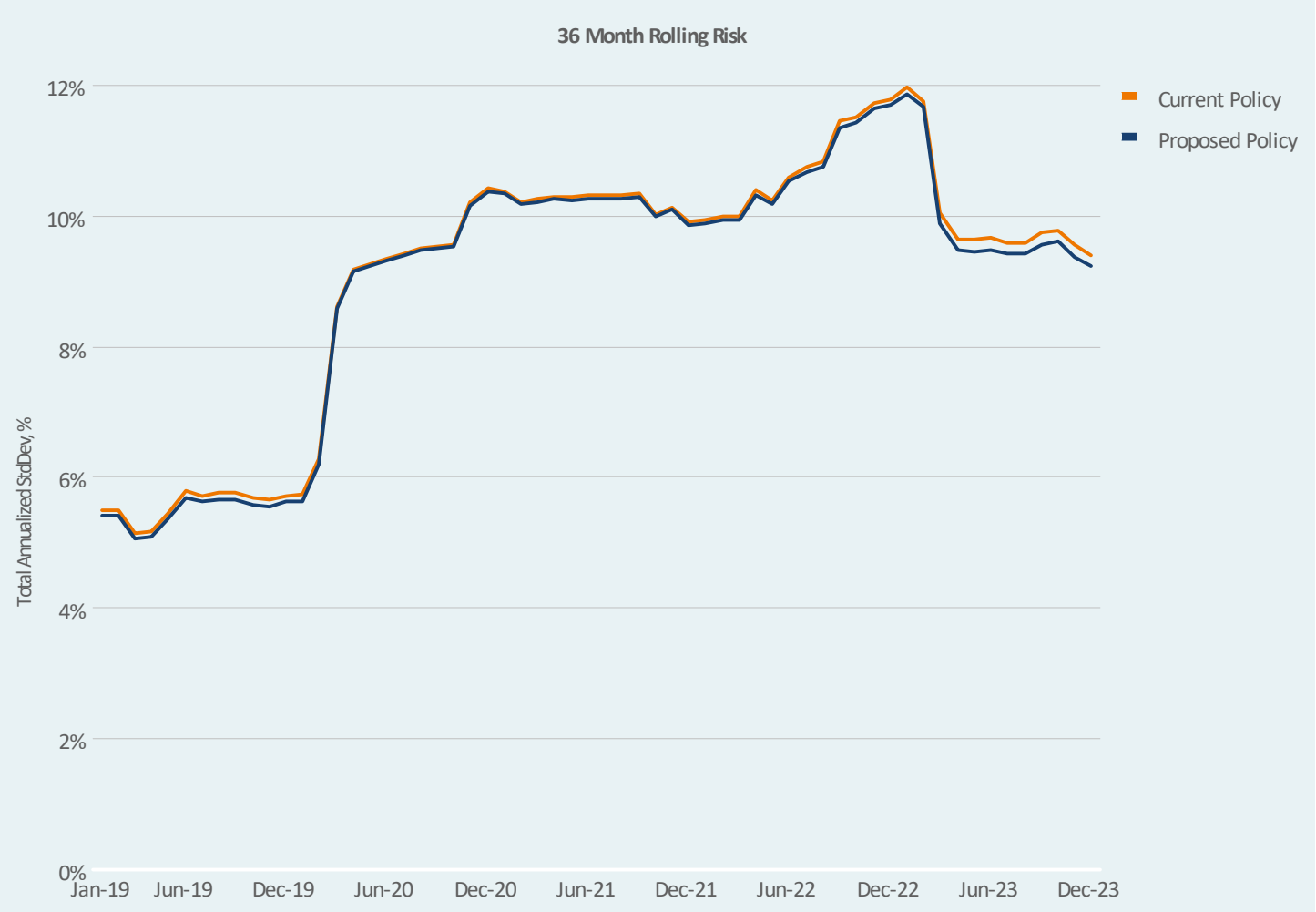


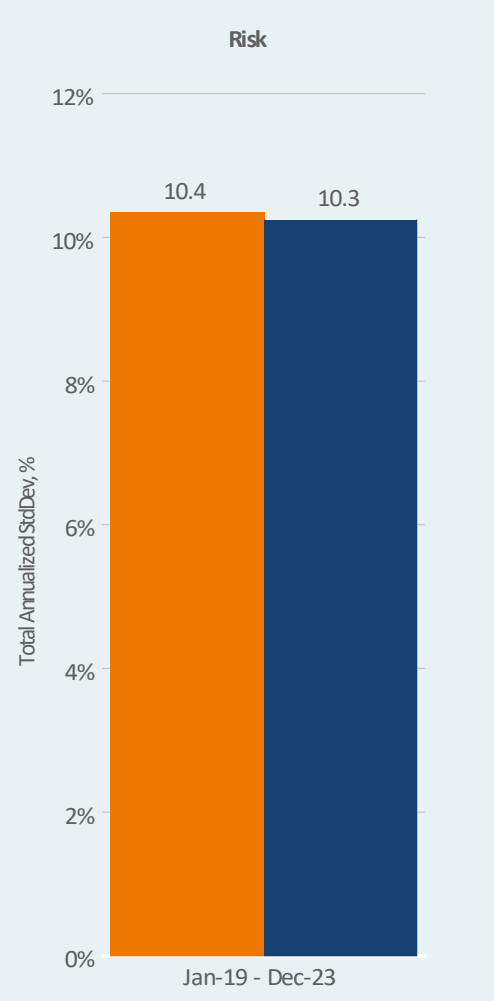
Fiscal 2025-34 ER Contribution Percentile	Current Policy	Proposed Policy
95%	**4.55**	**4.55**
75%	4.27	4.27
50%	**3.97**	**3.96**
25%	3.29	3.28
5%	2.18	2.17

Source: Reflects 5,000 simulations of assets and liabilities based on Verus' 2025 capital market assumptions. See appendix for details.

Portfolio risk analytics

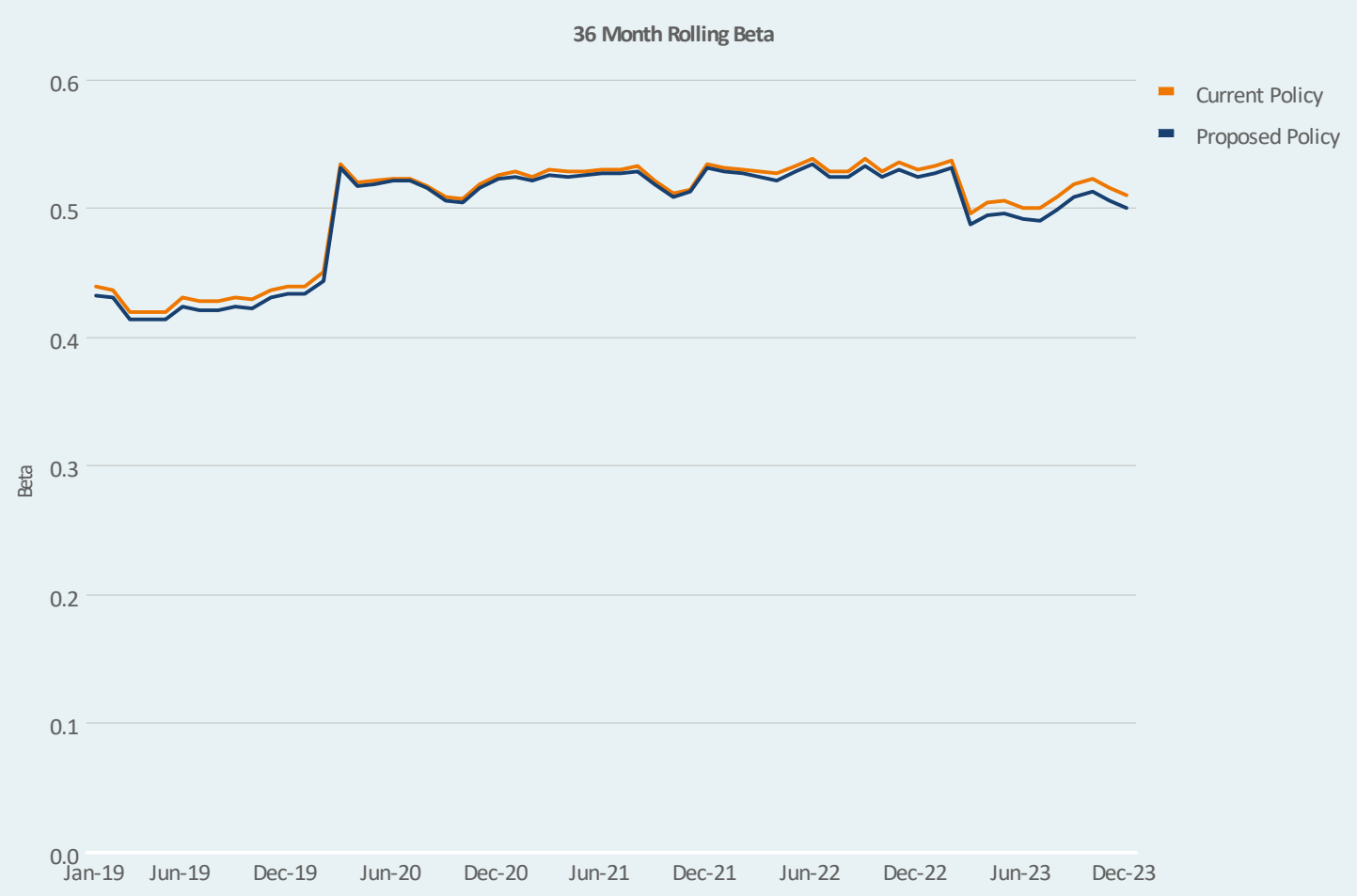
Risk - short term

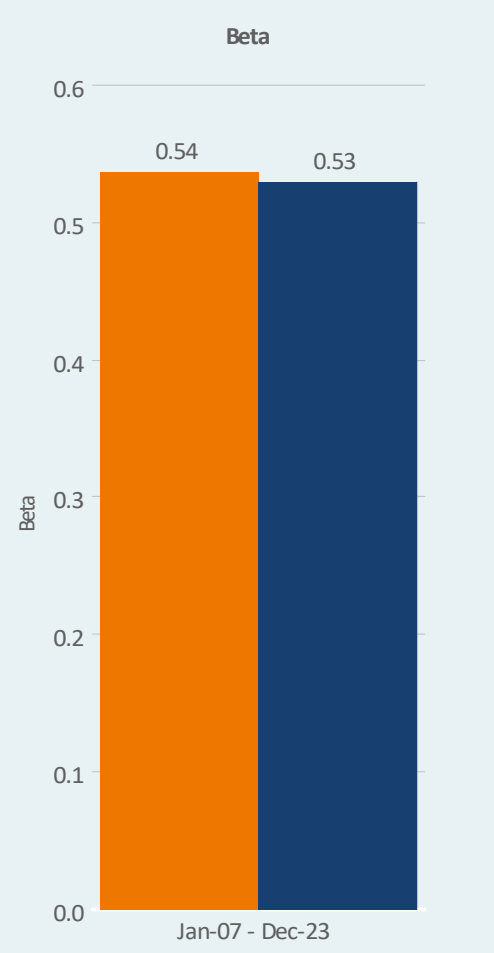




Left chart illustrates the historical annualized volatility (3-year rolling) of the current portfolio mix over time, if the current portfolio were held for this historical period and rebalanced based on the specified rebalancing frequency.

Beta vs S&P 500 Index





Left chart illustrates the equity Beta (3-year rolling) of the current portfolio mix over time, if the current portfolio asset mix was held for this historical period and rebalanced according to the specified rebalancing frequency. Beta is calculated based on every exposure in the portfolio and how sensitive each exposure has been to equity market movements through history, using a regression of monthly returns.

Performance during historical stress scenarios

Scenario Name	Description
Bond Market Stress	Treasury rates at 2-Year, 5-Year, and 20-Year maturities rise simultaneously with investment grade and high yield spreads, all by 100 bps. (Note: This shock will only work appropriately in Stylus v11.5 and above)
Yield Curve Parallel +100 bps	Parallel upward shift of the yield curve at 2-Year, 5-Year, and 20-Year constant maturity rates. (Note: This shock will only work appropriately in Stylus v11.5 and above)
Yield Curve Steepens 2Y, 5Y, 20Y	Upward steepening of the Treasury yield curve with 2-Year, 5-Year, and 20-Year constant maturity rates. (Note: This shock will only work appropriately in Stylus v11.5 and above)

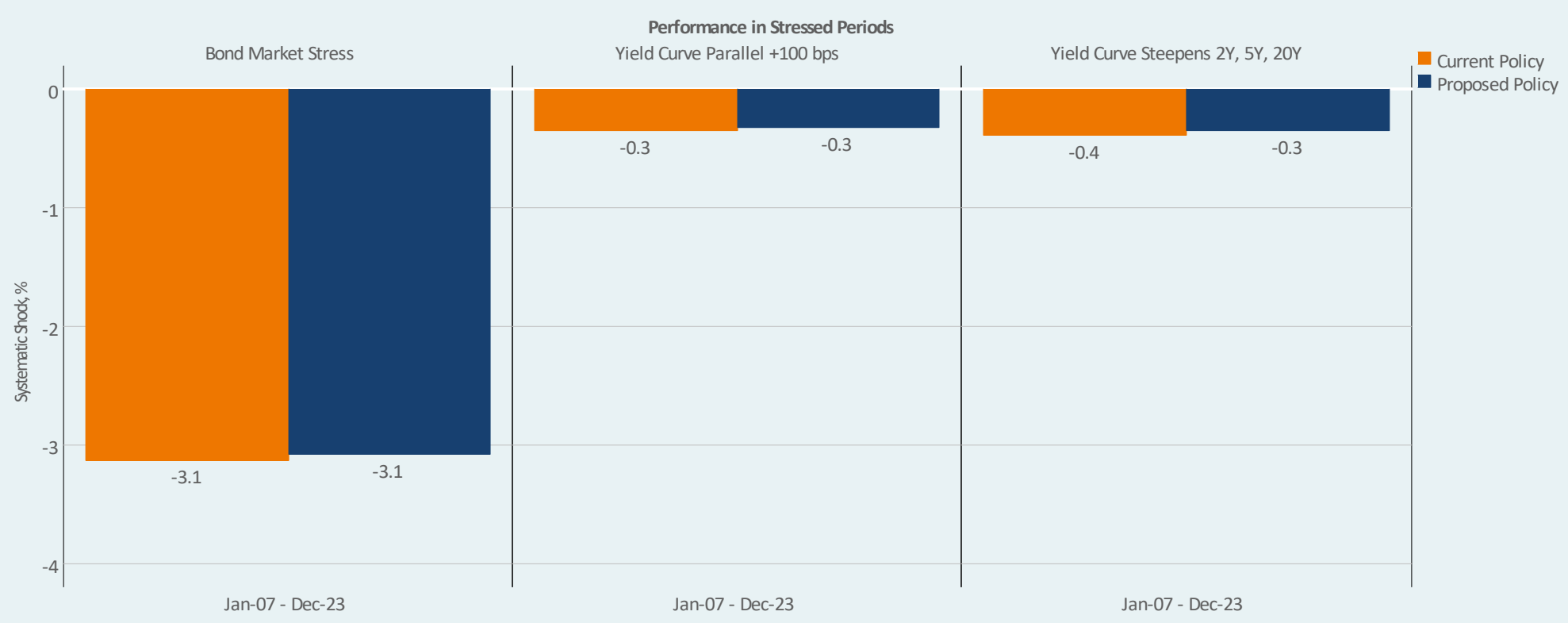
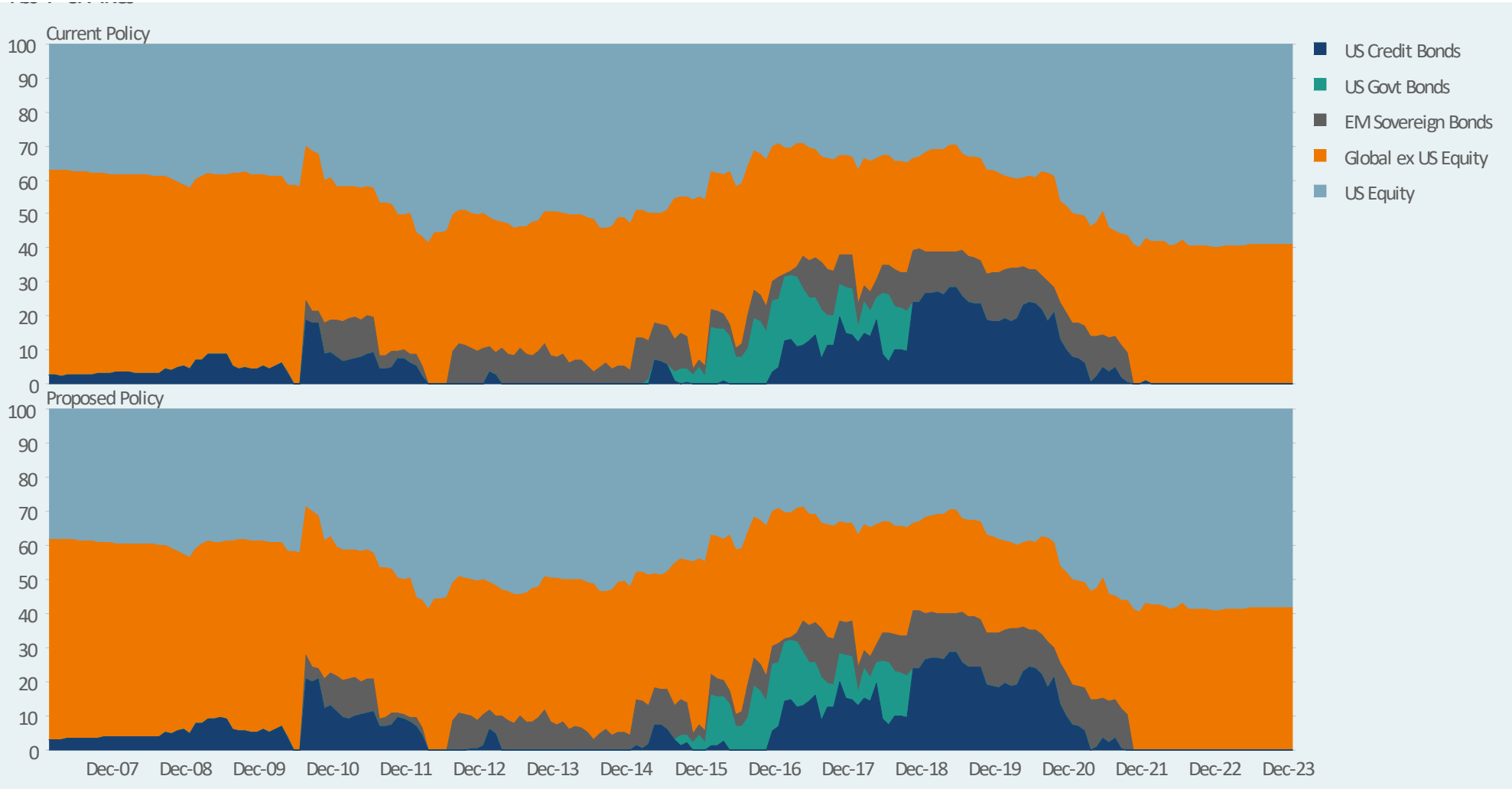


Chart estimates the total portfolio performance of each asset mix, given a specified shock to the portfolio. This is calculated based on the current asset loadings of the portfolio across all asset classes, which then estimates the sensitivity of total portfolio to a given shock. For example, the historical sensitivity of all asset classes (the

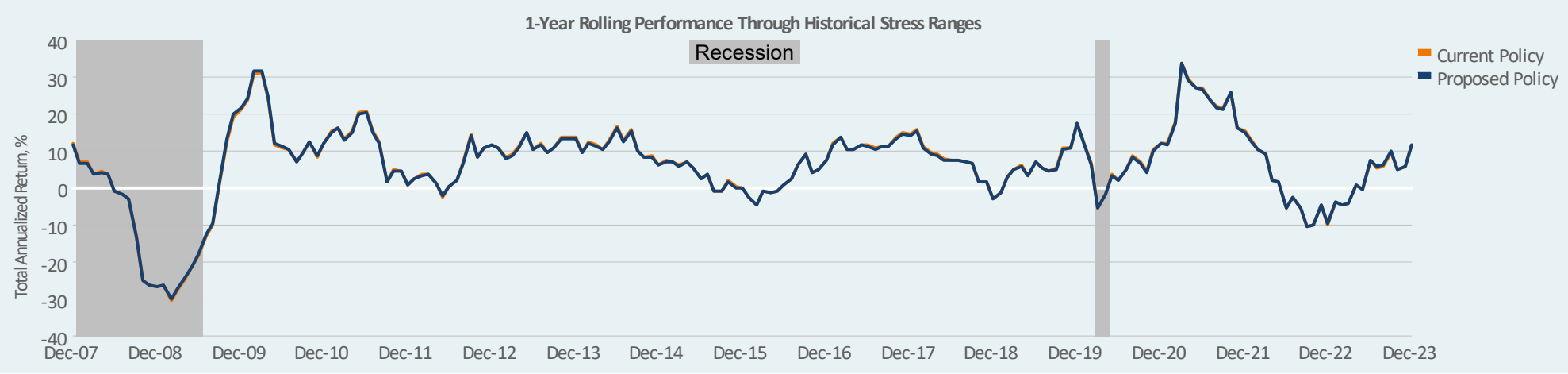
Historical asset loadings - 3yr rolling

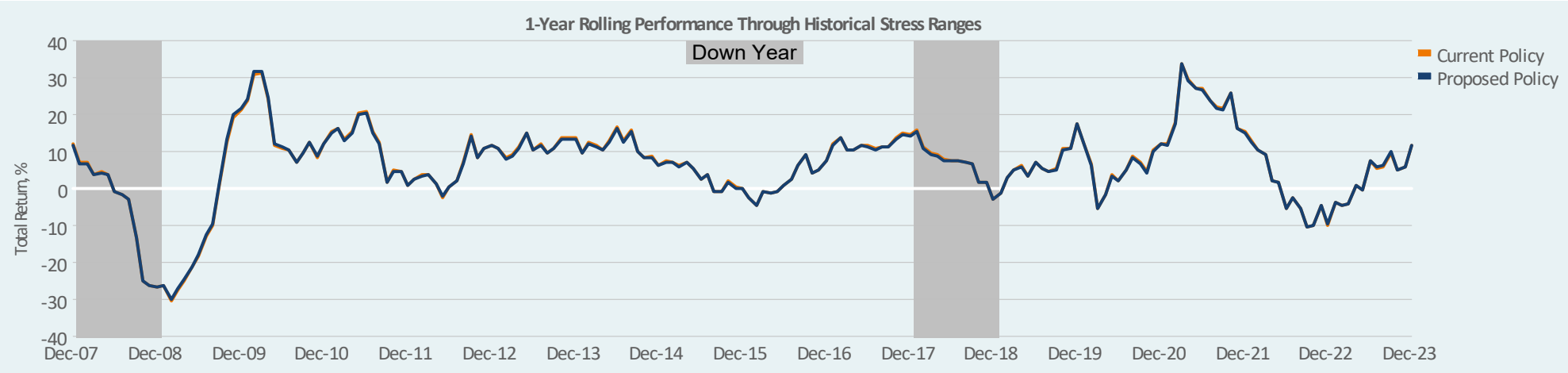


This chart is used to demonstrate the likely allocation of the fund's assets to different factors (US Equity, Global ex-US Equity, U.S Bonds, U.S Credit Bonds, and EM

Returns during recession & S&P 500 down years

Regime Group	Description
Market Up/Down Years	Positive and Negative Calendar Year Returns for the S&P 500
Recession/Expansion	Recession regimes using NBER based Recession Indicators for the United States.

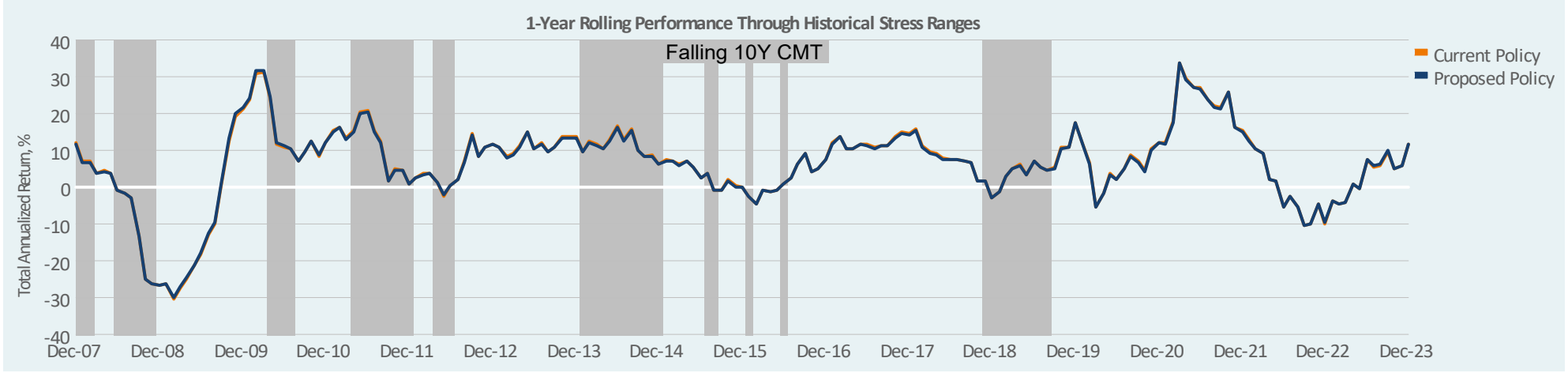


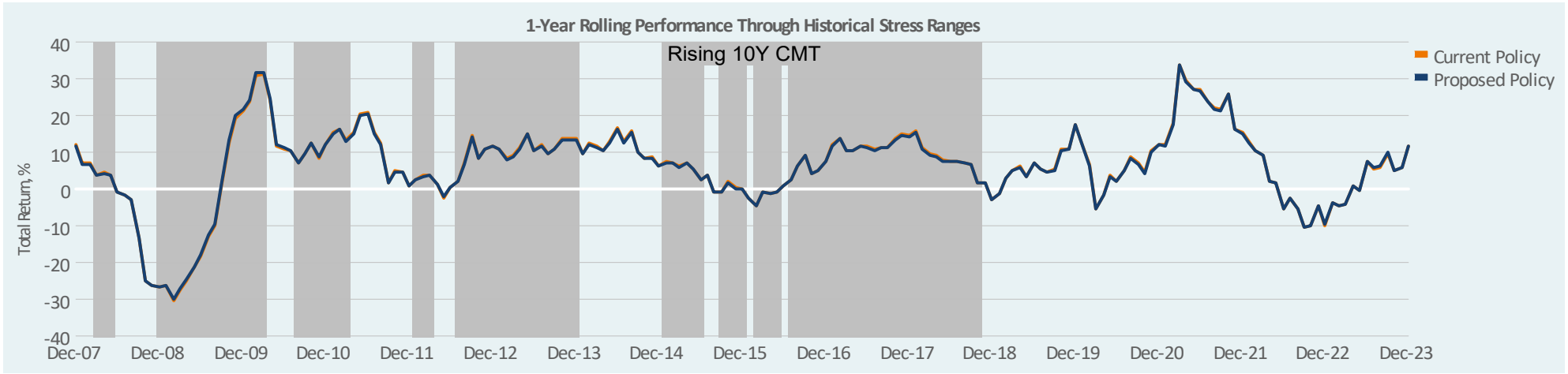


This chart shows 1 year rolling performance of the portfolio, assuming current asset mix weights. Then, times of Recession or market Down Years are highlighted in

Returns during rising/falling 10y yields

Regime Group	Description
Rising/Fallling 10Y CMT Rate	Rate regimes by 10-Year Constant Maturity Rate increase or decrease by more than 5% of its previous level over rolling 3-month periods.

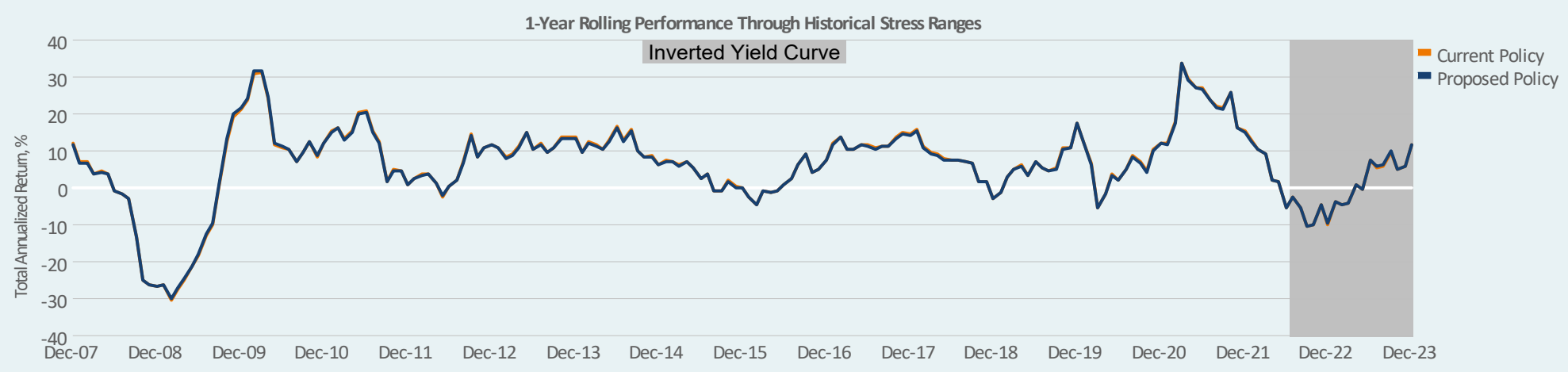


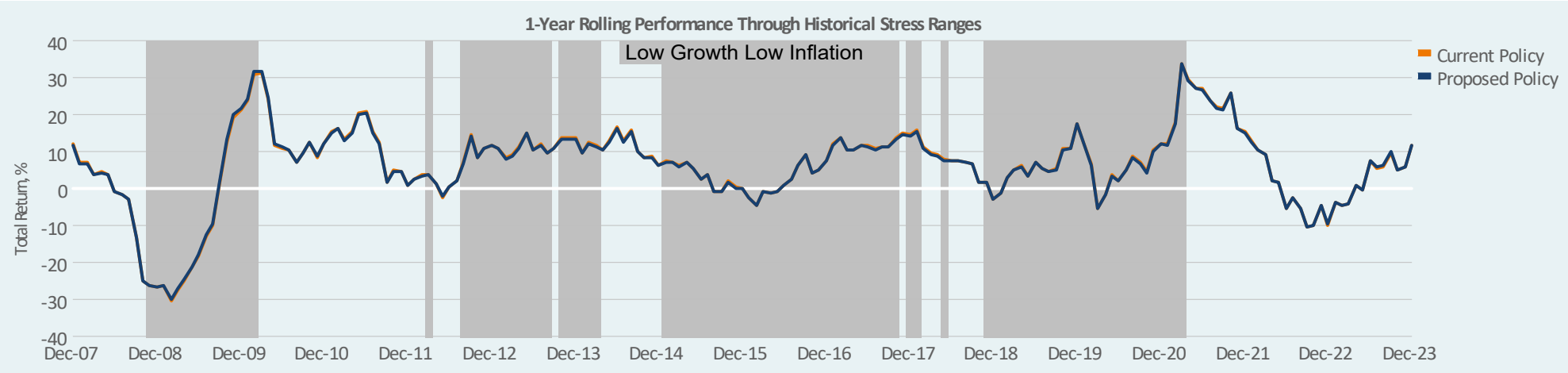


This chart shows 1 year rolling performance of the portfolio, assuming current asset mix weights. Then, times of Falling 10-Year US Treasury Yields or Rising 10-Year

Returns during inversion & low growth/ inflation

Regime	Rule
Normal/Flat/Inverted Yield Curve	Yield curve regimes by 10-Year minus 2-Year Treasury Constant Maturity Rate Spread with breaks at 0% and 0.8%.
Low Growth Low Inflation	Industrial Production Index and Consumer Price Index for all Urban Consumers: All Items are both equal to or below 50th percentile YoY





This chart shows 1 year rolling performance of the portfolio, assuming current asset mix weights. Then, times of an Inverted Yield Curve or Low Growth / Low

Return during inflation & growth regimes

This chart illustrates annualized return during different market inflation & growth environments. Each month in history is bucketed into different inflation and growth regimes.

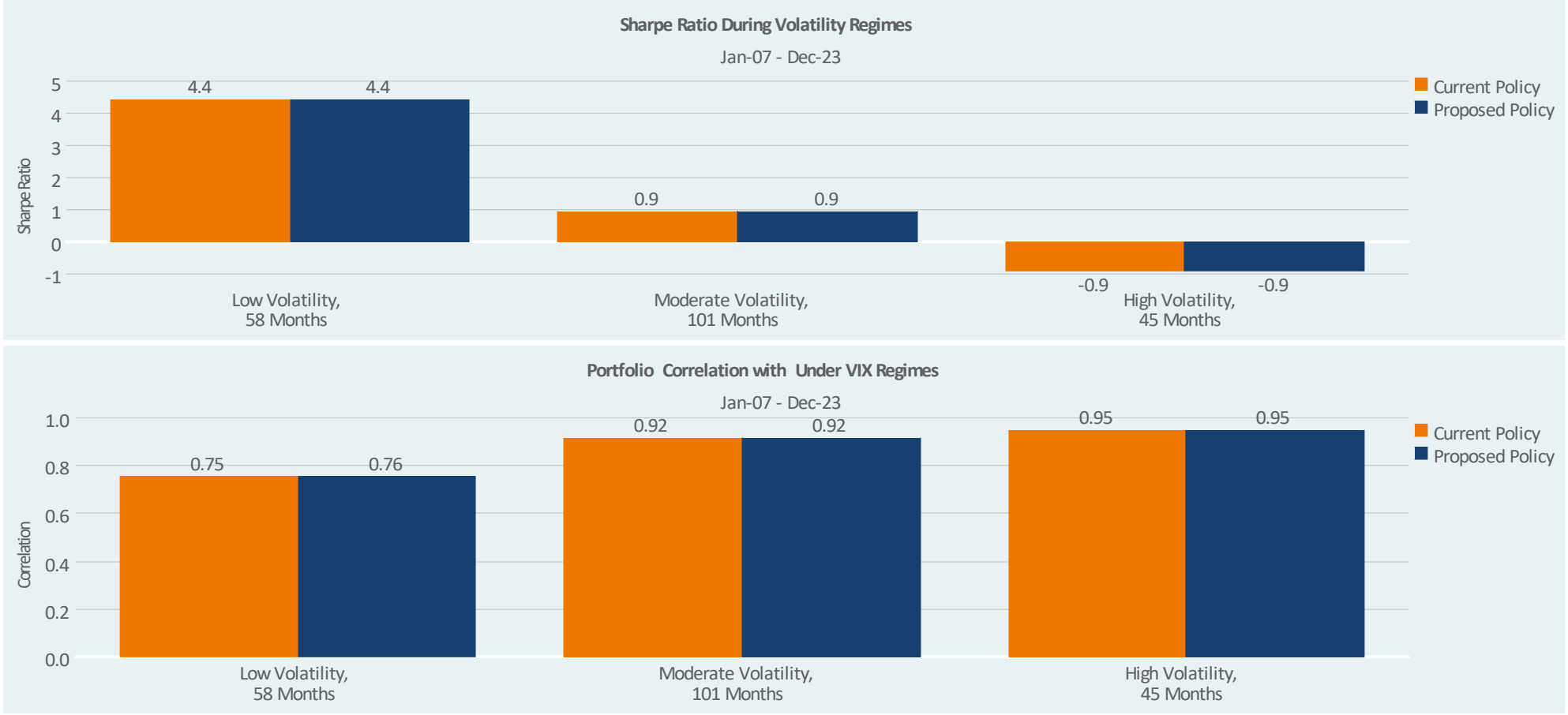
Risk and return during VIX regimes

Regime Group	Description
Volatility by Threshold	Volatility regimes by CBOE VIX with breaks at 15 and 25.

The top chart illustrates portfolio volatility during different market volatility environments. Markets often go through extended periods of muted or elevated volatility. Each month in history is bucketed into either Low, Moderate, or High Volatility, and the average characteristics of all of those months are shown. The bottom chart illustrates the performance of each portfolio during each of these market volatility environments. Lower volatility environments tend to coincide

Sharpe and equity correlation during VIX regimes

Regime Group	Description
Volatility by Threshold	Volatility regimes by CBOE VIX with breaks at 15 and 25.



The top chart illustrates portfolio Sharpe Ratio during different market volatility environments. Each month in history is bucketed into either Low, Moderate, or High Volatility, and the average characteristics of all of those months are shown.

The bottom chart illustrates the correlation of each portfolio with the US Equity market during each of these market volatility environments. Correlations tend to be

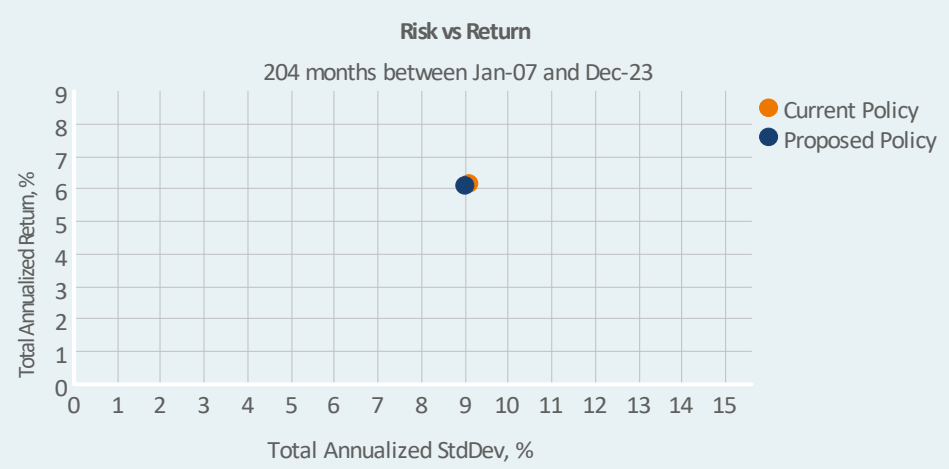
Performance extremes during VIX regimes

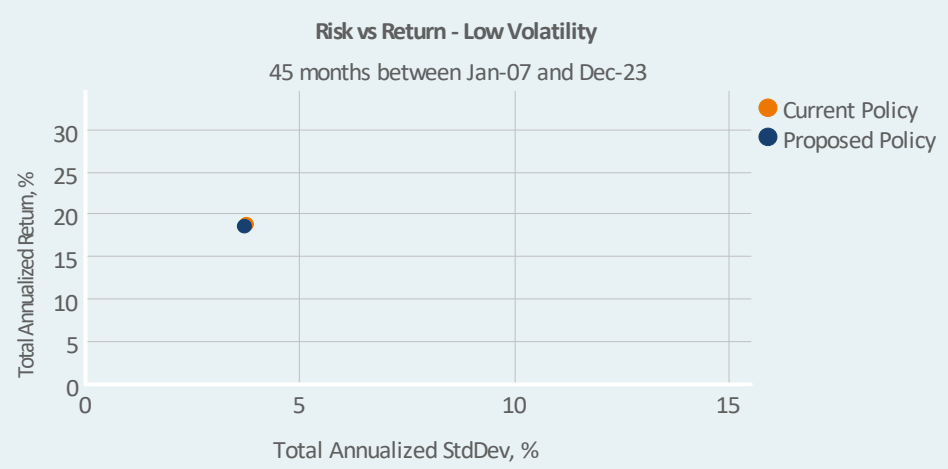
Regime Group	Description
Volatility by Threshold	Volatility regimes by CBOE VIX with breaks at 15 and 25.

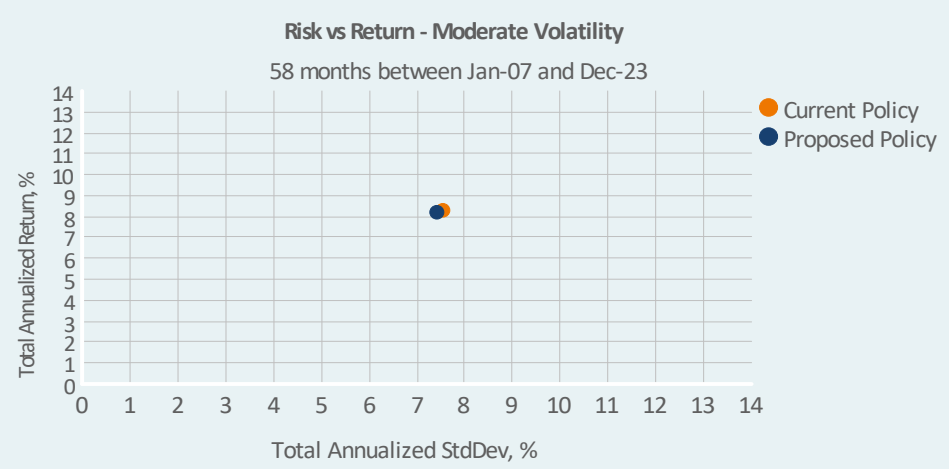
This chart illustrates the best and worst portfolio monthly returns during different market volatility environments. High volatility environments of course tend to

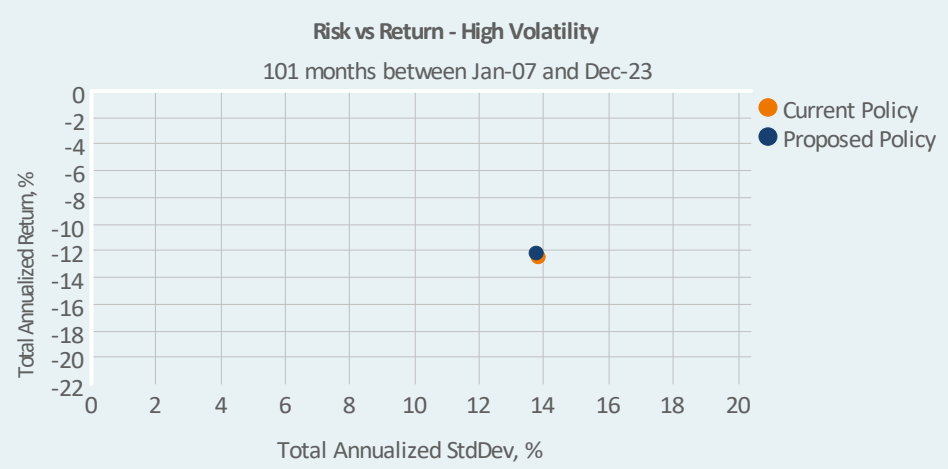
Risk v Return

Regime Group	Description
Volatility by Threshold	Volatility regimes by CBOE VIX with breaks at 15 and 25.



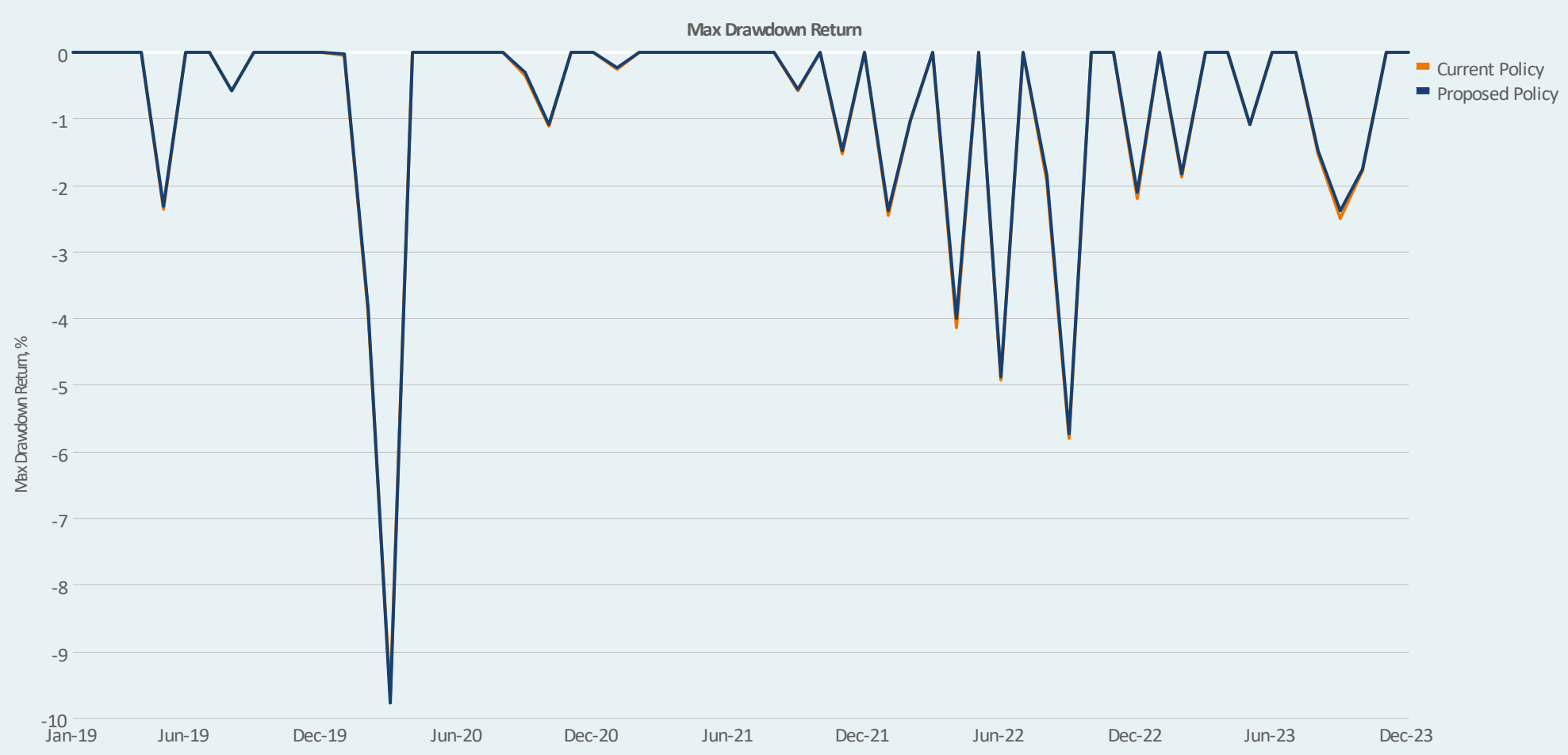






Top left chart illustrates the average historical annualized monthly return of each portfolio mix.

Max drawdown



The Max Drawdown statistics show the highest percentage loss a fund investor could have realized on their investment, assuming they bought at the peak and sold at

Assumptions and documentation

Assumptions and methods

Unless otherwise stated, all assumptions and methods are consistent with SCERS' 2023 actuarial valuation report.

Assets	**Cashflows:** Contributions are assumed to be made at the beginning of the fiscal year. Benefit payments and administrative expenses are assumed to occur at mid-year. **Stochastic assumptions:** Modeled using Verus 2025 CMAs. See appendix for details. Returns in stochastic scenarios are modeled randomly starting June 30, 2024. **Allocation:** Allocations are assumed to remain constant during projection. **Contingency Reserve Transfers:** Excess returns on an actuarial basis are credited to the contingency reserve, until it reaches 3% of the market value of assets. The contingency reserve offsets the valuation value of assets and is not assumed to be used for any purpose.
Liabilities	**Actuarial projection provider:** Liability projections were provided by Segal. **Actuarial Cost Method:** Entry Age Normal **Census Date:** June 30, 2023 **Discount Rate:** 6.75% Adjustments were made to reflect the actual starting assets and liabilities based on the June 30, 2024 valuation, which was produced after Segal furnished Verus with the requested information but before the asset-liability analysis was finalized.
Funding Methodology (ADC)	Future valuation gains and losses are amortized over a 20-year period, as a level percent of pay.
Actuarial Value of Assets	Six-year smoothing, subject to 30% corridor

Methodology

SUMMARY OF THE VERUS APPROACH

— We use a fundamental building block approach to forecast asset class returns, based on several inputs. These include practitioner best-in-class thinking, historical data, and academic research. Each year Verus conducts an in-depth review of our methodology, analyzing new industry research findings and evaluating alternative forecasting approaches to determine whether an improvement to our methodology might be warranted. We maintain flexibility and openness to adjusting our approach if strong evidence suggests change is appropriate.
— For most asset classes, we use the long-term historical volatility after adjusting for autocorrelation.
— Correlations between asset classes are calculated based on the last 10 years. For illiquid assets, such as private equity and private real estate, we use BarraOne correlation estimates.

Asset	Return Methodology	Volatility Methodology*
Inflation	25% weight to the University of Michigan Survey 5-10 year ahead inflation expectation and the Survey of Professional Forecasters (Fed Survey), and the remaining 50% to the market's expectation for inflation as observed through the 10-year TIPS breakeven rate	-
Cash	1/3 * current federal funds rate + 1/3 * U.S. 10-year Treasury yield + 1/3 * Federal Reserve long-term interest rate target	Long-term volatility
Bonds	Nominal bonds: current yield; Real bonds: real yield + inflation forecast	Long-term volatility
International Bonds	Current yield	Long-term volatility
Credit	Current option-adjusted spread + U.S. 10-year Treasury – effective default rate	Long-term volatility
International Credit	Current option-adjusted spread + foreign 10-year Treasury – effective default rate	Long-term volatility
Private Credit	Levered gross return (SOFR + spread + original issuance discounts) – management fees – carried interest	Estimated volatility
Equity	Current yield + real earnings growth (historical average) + inflation on earnings (inflation forecast) + expected P/E change	Long-term volatility
Intl Developed Equity	Current yield + real earnings growth (historical average) + inflation on earnings (intl. inflation forecast) + expected P/E change	Long-term volatility
Private Equity**	US large cap domestic equity forecast * 1.85 beta adjustment	Implied annualized volatility, using actual historical private equity performance distribution
Commodities	Collateral return (cash) + spot return (inflation forecast) + roll return (assumed to be zero)	Long-term volatility
Hedge Funds	Return coming from traditional market betas + historical idiosyncratic/alpha return	Long-term volatility
Core Real Estate	Cap rate + real income growth – capex + inflation forecast	65% of REIT volatility
REITs	Core real estate	Long-term volatility
Value-Add Real Estate	Core real estate + 2%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Opportunistic Real Estate	Core real estate + 3%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Infrastructure	Current yield + real income growth + inflation on earnings (inflation forecast)	Long-term volatility
Risk Parity	Modeled as the 10-year return expectations of a *representative selection of Risk Parity strategies*	Target volatility

**Long-term historical volatility data is adjusted for autocorrelation (see Appendix)*

***Private Equity is modeled assuming an 8.0% floor for expected return, and a 3% return premium ceiling over U.S. Large Cap Equity. These adjustments are in place to recognize that higher interest rates (cost of leverage) act as a drag on expected Private Equity returns but that this drag has had limits historically, and to recognize that future Private Equity total universe performance is likely to be more anchored to public equity performance than in past times, given a more competitive market environment*

10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
Equities								
U.S. Large	S&P 500	5.3%	6.4%	15.5%	0.10	0.17	0.77	0.80
U.S. Small	Russell 2000	6.3%	8.4%	21.3%	0.12	0.22	0.35	0.44
International Developed	MSCI EAFE	6.7%	8.1%	17.5%	0.17	0.25	0.27	0.33
International Small	MSCI EAFE Small Cap	8.8%	10.8%	21.4%	0.23	0.33	0.27	0.35
Emerging Markets	MSCI EM	7.0%	9.6%	24.2%	0.13	0.24	0.14	0.22
Global Equity	MSCI ACWI	6.0%	7.3%	16.7%	0.13	0.21	0.52	0.57
Global Equity ex USA	MSCI ACWI ex USA	7.0%	8.7%	19.3%	0.17	0.25	0.24	0.31
Private Equity	CA Private Equity	8.0%	10.9%	26.0%	0.16	0.27	-	-
Private Equity Direct	CA Private Equity	9.0%	11.9%	26.0%	0.20	0.31	-	-
Private Equity (FoF)	CA Private Equity	7.0%	10.0%	26.0%	0.12	0.23	-	-
Fixed Income								
Cash	30 Day T-Bills	3.8%	3.8%	1.1%	-	-	-	-
U.S. TIPS	Bloomberg U.S. TIPS 5-10	4.0%	4.2%	5.5%	0.04	0.07	0.18	0.20
Non-U.S. Inflation Linked Bonds	Bbg World Govt. Inflation Linked ex U.S.	3.4%	3.7%	7.4%	-0.05	-0.01	-0.03	0.01
U.S. Treasury	Bloomberg Treasury 7-10 Year	3.8%	4.0%	7.1%	0.00	0.03	-0.02	0.01
Long U.S. Treasury	Bloomberg Treasury 20+ Year	4.1%	4.9%	13.4%	0.02	0.08	-0.06	0.01
Global Sovereign ex U.S.	Bloomberg Global Treasury ex U.S.	2.2%	2.7%	10.0%	-0.16	-0.11	-0.30	-0.26
Global Aggregate	Bloomberg Global Aggregate	3.4%	3.6%	6.7%	-0.06	-0.03	-0.17	-0.14
Core Fixed Income	Bloomberg U.S. Aggregate Bond	4.3%	4.4%	4.7%	0.11	0.13	0.04	0.06
Core Plus Fixed Income	Bloomberg U.S. Universal	4.4%	4.5%	4.7%	0.13	0.15	0.10	0.13
Investment Grade Corp. Credit	Bloomberg U.S. Corporate IG	4.6%	4.9%	8.4%	0.10	0.13	0.19	0.22
Short-Term Gov't/Credit	Bloomberg U.S. Gov't/Credit 1-3 Year	3.9%	3.9%	3.6%	0.03	0.03	0.00	0.00
Short-Term Credit	Bloomberg Credit 1-3 Year	4.2%	4.3%	3.6%	0.11	0.14	0.28	0.29
Intermediate Credit	Bloomberg U.S. Intermediate Credit	4.3%	4.5%	5.9%	0.08	0.12	0.19	0.25
Long-Term Credit	Bloomberg Long U.S. Credit	4.6%	5.2%	11.1%	0.07	0.13	0.13	0.19
High Yield Corp. Credit	Bloomberg U.S. Corporate High Yield	5.6%	6.1%	10.8%	0.17	0.21	0.45	0.47
Bank Loans	S&P/LSTA Leveraged Loan	6.9%	7.3%	8.8%	0.35	0.40	0.58	0.59
Global Credit	Bloomberg Global Credit	4.1%	4.4%	7.8%	0.04	0.08	0.07	0.10
Emerging Markets Debt (Hard)	JPM EMBI Global Diversified	7.7%	8.2%	10.5%	0.37	0.42	0.18	0.22
Emerging Markets Debt (Local)	JPM GBI-EM Global Diversified	5.8%	6.5%	12.1%	0.17	0.22	-0.10	-0.04
Securitized Credit	Bloomberg U.S. Securitized	4.7%	4.8%	4.0%	0.23	0.25	-0.03	-0.01

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
Fixed Income (continued)								
Private Credit	S&P LSTA Leveraged Loan Index	8.2%	8.8%	11.8%	0.37	0.42	-	-
Private Credit (Direct Lending - Unlevered)	S&P LSTA Leveraged Loan Index	7.1%	7.5%	8.8%	0.38	0.42	-	-
Private Credit (Direct Lending - Levered)	S&P LSTA Leveraged Loan Index	8.3%	8.9%	11.8%	0.38	0.43	-	-
Private Credit (Credit Opportunities)	S&P LSTA Leveraged Loan Index	8.8%	9.6%	13.4%	0.37	0.43	-	-
Private Credit (Junior Capital / Mezzanine)	S&P LSTA Leveraged Loan Index	8.6%	9.4%	12.9%	0.37	0.43	-	-
Private Credit (Distressed)	S&P LSTA Leveraged Loan Index	9.1%	12.7%	29.1%	0.18	0.31	-	-
Other								
Commodities	Bloomberg Commodity	6.3%	7.4%	16.0%	0.16	0.23	-0.11	-0.04
Hedge Funds	HFRI Fund Weighted Composite	5.0%	5.3%	7.5%	0.16	0.20	0.55	0.56
Hedge Fund of Funds	HFRI Fund of Funds Composite	4.0%	4.3%	7.5%	0.03	0.07	0.39	0.41
Hedge Funds (Equity Style)	Custom HFRI Benchmark Mix*	5.4%	6.3%	13.9%	0.12	0.18	0.37	0.42
Hedge Funds (Credit Style)	Custom HFRI Benchmark Mix*	5.2%	5.6%	9.2%	0.15	0.20	0.61	0.62
Hedge Funds (Assymetric Style)	Custom HFRI Benchmark Mix*	5.4%	5.6%	6.3%	0.25	0.29	0.55	0.56
Real Estate Debt	Bloomberg CMBS IG	6.8%	7.1%	7.4%	0.41	0.45	0.20	0.22
Core Real Estate	NCREIF Property	7.2%	7.9%	12.5%	0.27	0.33	-	-
Value-Add Real Estate	NCREIF Property + 200bps	9.2%	10.3%	15.4%	0.35	0.42	-	-
Opportunistic Real Estate	NCREIF Property + 300bps	10.2%	12.1%	21.2%	0.30	0.39	-	-
REITs	Wilshire REIT	7.2%	8.8%	19.2%	0.18	0.26	0.34	0.41
Global Infrastructure	S&P Global Infrastructure	8.1%	9.4%	16.8%	0.26	0.33	0.24	0.31
Risk Parity**	S&P Risk Parity 10% Vol Index	6.3%	7.1%	10.0%	0.25	0.33	0.40	0.44
Currency Beta	MSCI Currency Factor Index	2.2%	2.3%	3.3%	-0.48	-0.45	-0.30	-0.28
Inflation		2.4%	-	-	-	-	-	-
60/40 Portfolio	MSCI ACWI / Bbg U.S. Agg	5.5%	6.0%	10.9%	0.16	0.20	0.50	0.53

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

**To represent hedge fund styles, we use a combination of HFRI benchmarks: Equity Style = 33% HFRI Fundamental Growth, 33% HFRI Fundamental Value, 33% HFRI Activist. Credit Style = 20% HFRI Distressed/Restructuring, 20% HFRI Credit Arbitrage, 20% HFRI Fixed Income-Corporate, 20% HFRI Fixed Income-Convertible Arbitrage, 20% HFRI Fixed Income-Asset Backed. Asymmetric Style = 50% HFRI Relative Value, 50% HFRI Macro*

***The Risk Parity forecast shown here assumes a 10% target volatility strategy. We recommend customizing this forecast to the target volatility specifications of the risk parity strategy that an investor wishes to model. Please speak with your Verus consultants for customization needs.*

Correlation assumptions

	Cash	US Large	US Small	Intl Large	Intl Small	EM	Global Equity	PE	US TIPS	US Treasury	Global Sovereign ex-US	US Core	Core Plus	Short-Term Gov't/Credit	Short-Term Credit	Long-Term Credit	US HY	Bank Loans	Global Credit	EM Debt USD	EM Debt Local	Commodities	Hedge Funds	Real Estate	REITs	Infrastructure	Currency Beta	Risk Parity
Cash	1.0																											
US Large	0.0	1.0																										
US Small	-0.1	0.9	1.0																									
Intl Large	0.0	0.9	0.8	1.0																								
Intl Small	0.0	0.9	0.8	1.0	1.0																							
EM	0.0	0.7	0.6	0.8	0.8	1.0																						
Global Equity	0.0	1.0	0.9	0.9	0.9	0.8	1.0																					
PE	-0.1	0.7	0.7	0.6	0.6	0.6	0.7	1.0																				
US TIPS	0.0	0.5	0.4	0.5	0.5	0.4	0.5	0.2	1.0																			
US Treasury	0.1	0.1	0.0	0.1	0.1	0.1	0.1	-0.1	0.8	1.0																		
Global Sovereign ex-US	0.2	0.4	0.3	0.5	0.5	0.5	0.5	0.1	0.7	0.6	1.0																	
US Core	0.1	0.4	0.3	0.4	0.4	0.4	0.4	0.0	0.8	0.9	0.8	1.0																
Core Plus	0.2	0.5	0.4	0.5	0.5	0.5	0.5	0.1	0.8	0.9	0.8	1.0	1.0															
Short-Term Gov't/Credit	0.3	0.2	0.1	0.3	0.3	0.3	0.3	0.0	0.7	0.8	0.6	0.8	0.8	1.0														
Short-Term Credit	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.2	0.7	0.5	0.7	0.7	0.8	0.7	1.0													
Long-Term Credit	0.1	0.6	0.5	0.6	0.6	0.6	0.6	0.2	0.8	0.7	0.8	0.9	0.9	0.7	0.8	1.0												
US HY	0.0	0.8	0.8	0.8	0.8	0.7	0.8	0.5	0.6	0.2	0.5	0.5	0.6	0.4	0.6	0.7	1.0											
Bank Loans	0.0	0.6	0.6	0.6	0.7	0.6	0.6	0.5	0.3	-0.1	0.2	0.2	0.3	0.1	0.5	0.4	0.8	1.0										
Global Credit	0.1	0.7	0.6	0.7	0.8	0.7	0.7	0.3	0.8	0.6	0.8	0.8	0.9	0.7	0.8	0.9	0.8	0.6	1.0									
EMD USD	0.1	0.7	0.6	0.7	0.7	0.7	0.7	0.4	0.6	0.4	0.7	0.6	0.7	0.5	0.7	0.8	0.8	0.7	0.9	1.0								
EMD Local	0.1	0.5	0.4	0.7	0.7	0.8	0.7	0.4	0.5	0.3	0.7	0.5	0.6	0.4	0.5	0.6	0.7	0.5	0.8	0.8	1.0							
Commodities	-0.1	0.4	0.4	0.4	0.4	0.5	0.5	0.3	0.2	-0.2	0.2	-0.1	0.0	-0.1	0.1	0.1	0.5	0.5	0.3	0.3	0.4	1.0						
Hedge Funds	0.0	0.8	0.9	0.8	0.9	0.8	0.9	0.6	0.4	-0.1	0.3	0.2	0.4	0.1	0.5	0.5	0.8	0.8	0.7	0.7	0.6	0.5	1.0					
Real Estate	-0.2	0.6	0.5	0.5	0.5	0.4	0.6	0.4	0.2	0.0	-0.1	0.1	0.1	0.0	-0.1	0.2	0.4	0.4	0.3	0.4	0.3	0.2	0.5	1.0				
REITs	-0.1	0.8	0.7	0.7	0.7	0.5	0.7	0.6	0.6	0.4	0.4	0.5	0.6	0.3	0.4	0.7	0.7	0.5	0.7	0.7	0.5	0.3	0.7	0.6	1.0			
Infrastructure	0.0	0.8	0.7	0.8	0.8	0.7	0.8	0.6	0.5	0.2	0.5	0.4	0.5	0.3	0.5	0.6	0.8	0.7	0.8	0.8	0.7	0.5	0.8	0.5	0.7	1.0		
Currency Beta	-0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	0.1	-0.2	-0.1	-0.3	-0.2	-0.2	-0.2	-0.3	-0.2	-0.2	-0.1	-0.3	-0.2	-0.3	-0.1	-0.1	0.1	0.0	-0.1	1.0	
Risk Parity	0.1	0.7	0.7	0.8	0.7	0.6	0.8	0.4	0.7	0.4	0.7	0.6	0.7	0.4	0.7	0.7	0.8	0.5	0.8	0.7	0.6	0.5	0.7	0.1	0.7	0.7	-0.2	1.0

Note: as of 9/30/24 - Correlation assumptions are based on the last ten years. Private Equity and Real Estate correlations are especially difficult to model due to appraisal-based pricing and lag problems that exist in the data – we have therefore used BarraOne correlation data to strengthen these correlation estimates.

Range of likely 10-year outcomes

10-YEAR RETURN 90% CONFIDENCE INTERVAL

Source: Verus 2025 Capital Market Assumptions, MPI

Notices & disclosures

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