10/21 & 10/22/2025 SWIB Board of Trustees Workshop

Table of Contents

SWIB STATE OF WISCONSIN INVESTMENT BOARD

Name of Meeting: **Regular Meeting of the Board of Trustees**
Date/Time: Tuesday, October 21, 2025 12:30 pm
Room: Great Room
Address: Lake Lawn Resort, 2400 East Geneva Street, Delavan, WI 53115

	OPEN SESSION
12:30 pm	Workshop Welcome & Kickoff
	CLOSED SESSION*
	RECONVENE IN OPEN SESSION
	Announcement of Matters Taken Up in Closed Session
3:05 pm	WRS Actuarial Overview and Projections
4:20 pm	2026 Asset Allocation Preview

Motion to Recess

* The motion to go into closed session at this meeting is made pursuant to: (i) Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies and/or for any comments or discussion on prior closed session minutes that discuss the same; and (ii) Section 19.85(1)(c) of the Wisconsin Statutes to discuss performance evaluation data of specific SWIB employees, including SWIB's executive director/chief investment officer and SWIB's board of trustees, and/or for any comments or discussion on prior closed session minutes that discuss the same. The Board may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General's Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the Board will subsequently reconvene in open session to cover remaining agenda items.

Name of Meeting: **Regular Meeting of the Board of Trustees**
Date/Time: Wednesday, October 22, 2025 9:00 am
Room: Great Room
Address: Lake Lawn Resort, 2400 East Geneva Street, Delavan, WI 53115

	OPEN SESSION
9:00 am	Workshop Welcome
	CLOSED SESSION*
	RECONVENE IN OPEN SESSION
12:05 pm	WRS Investment Policy
	CLOSED SESSION*
	RECONVENE IN OPEN SESSION
1:35 pm	Announcement of Matters Taken Up in Closed Session

Motion to Adjourn

* The motion to go into closed session at this meeting is made pursuant to: (i) Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies and/or for any comments or discussion on prior closed session minutes that discuss the same; and (ii) Section 19.85(1)(c) of the Wisconsin Statutes to discuss performance evaluation data of specific SWIB employees, including SWIB's executive director/chief investment officer and SWIB's board of trustees, and/or for any comments or discussion on prior closed session minutes that discuss the same. The Board may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General's Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the Board will subsequently reconvene in open session to cover remaining agenda items.

State of Wisconsin Investment Board (SWIB)

Wisconsin Retirement System
Actuarial Overview and Stress Testing Scenarios

October 2025

Topics

SECTION 1

WRS – The Big Picture

Objectives of this Presentation

- Provide an overview of the WRS
  - Relationship of Investment Return to Success Measures
  - Effects of bad outcomes
- Evaluate several points along the asset allocation spectrum against the measures of success
  - Deterministic stress tests
  - Stochastic simulations
- Find the “Sweet Spot” if it exists

All Participants at December 31, 2024

Active Lives Valuation

Valuation Group	Number	Average Annual Earnings/Benefits[1]
Actives	268,245	$68,483
Inactives	190,051	$22,901
Retirees & Beneficiaries	242,226	$30,993
Total Participants	**700,522**	

Retired Lives Valuation

[1] *For inactives, average money purchase balance.*

WRS Benefits

- Defined Benefit Plan:
  - 1.6% x Final Average Compensation x Service (most participants)
  - Different benefits for protective occupations
  - Provides benefits in the case of death or disability prior to retirement

WRS Investments

- Core Fund (Most Assets)
  - Diversified portfolio with results smoothed for WRS purposes via the Market Recognition Account (MRA)
- Variable Fund (Some Assets)
  - 100% Common Stock -- no smoothing of results
  - Participants can choose to invest up to half of their own contributions in this fund
    - They bear the risks and reap the rewards of this choice

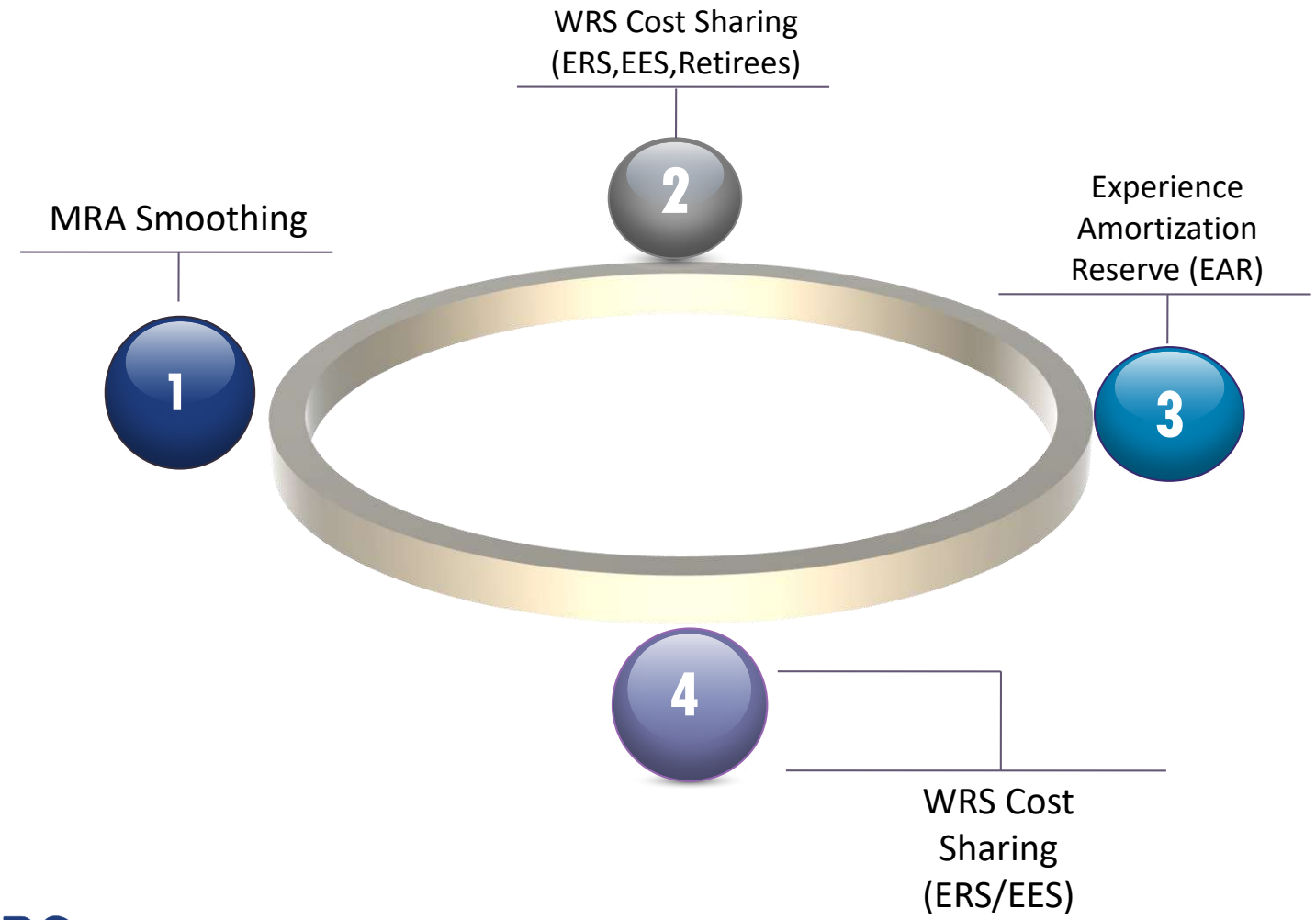
WRS Actuarial Assumptions

- Non-Retired Assets: 6.8%
- Retired Assets: 5%
  - A statutory assumption that is really a benefit condition
- Other assumptions relate to active participants salary, rates of turnover, disability, mortality, etc.
- Investment return assumption (6.8%) is the most important

WRS Risk Sharing

- Investment earnings increase (or decrease) active and inactive member account balances
  - Potentially affects their benefits when they retire via the operation of the Money Purchase Minimum benefit (MPM)
- Investment earnings (smoothed) above or below 5% affect dividends paid to retirees
- Active members and employers share in contribution rate changes

The “Magic” of WRS Financing



SECTION 2

Stress Testing Results - Deterministic

Deterministic Stress Testing

- Stress testing provides insight into how the System would respond to severely unfavorable markets
- For WRS, stress testing can answer questions:
  - What would it take to deplete the dividend liability?
  - What would it take to increase contribution rates 25%?

Dividend Liability and Retiree Funded Status

- Definitions
  - Dividend Liability (17.2B) = Total Retiree Liability (w/div.) less Base Benefit Liability (w/o div.)
  - Retiree Funded Status (128%) = Total Retiree Liability (w/div.) / Base Benefit Liability (w/o div.)

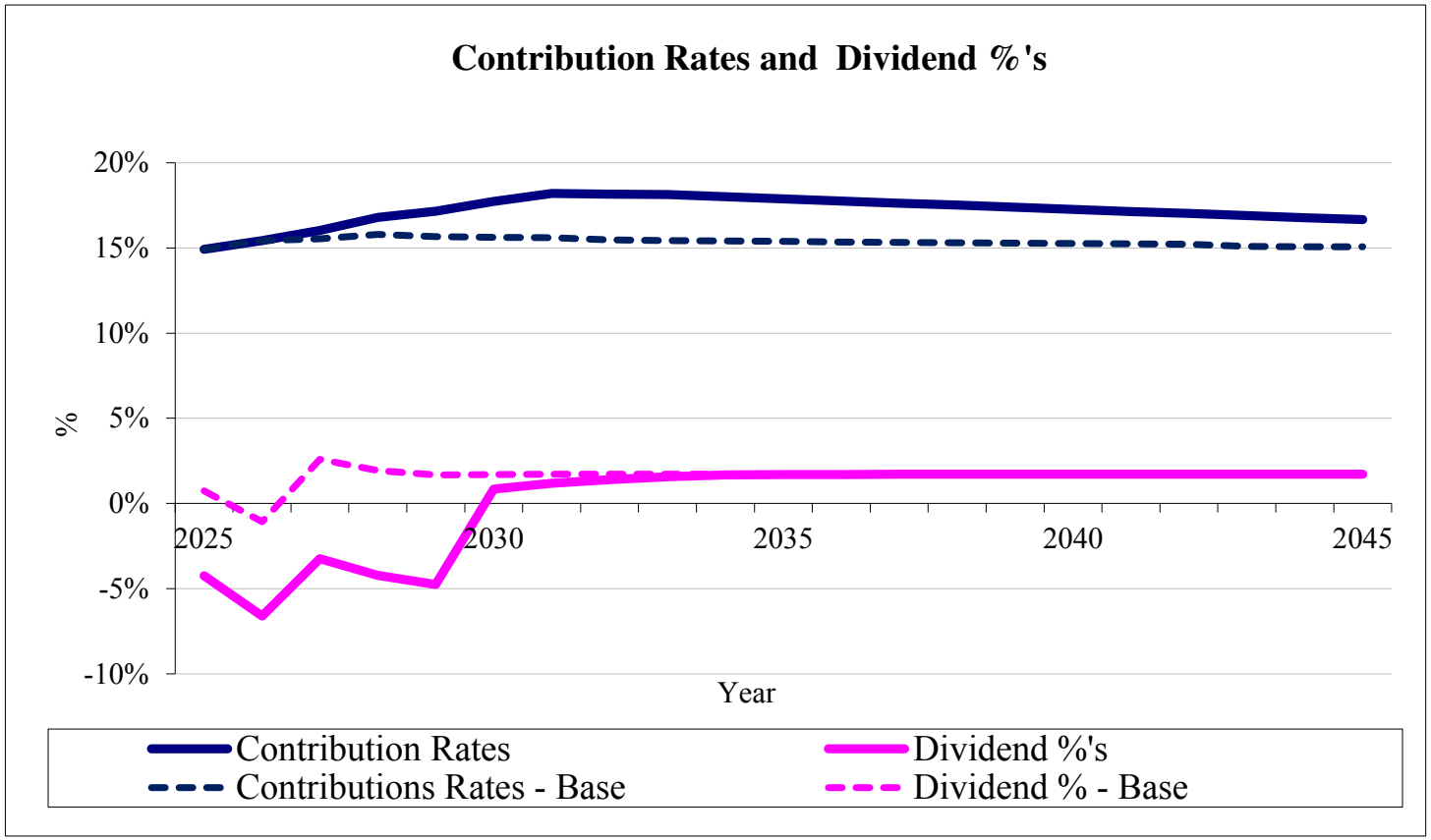
Deterministic Stress Testing

- Deterministic stress tests studied herein:

Stress Test	Asset Return Year 1	Asset Return Year 2	Asset Return Thereafter
1	-20%	6.8%	6.8%
2	-25%	6.8%	6.8%
3 Bounce Back	-25%	25%	6.8%
4	-30%	6.8%	6.8%

Underlying valuation assumptions held constant, including 6.8% investment return and 3.0% wage inflation assumptions

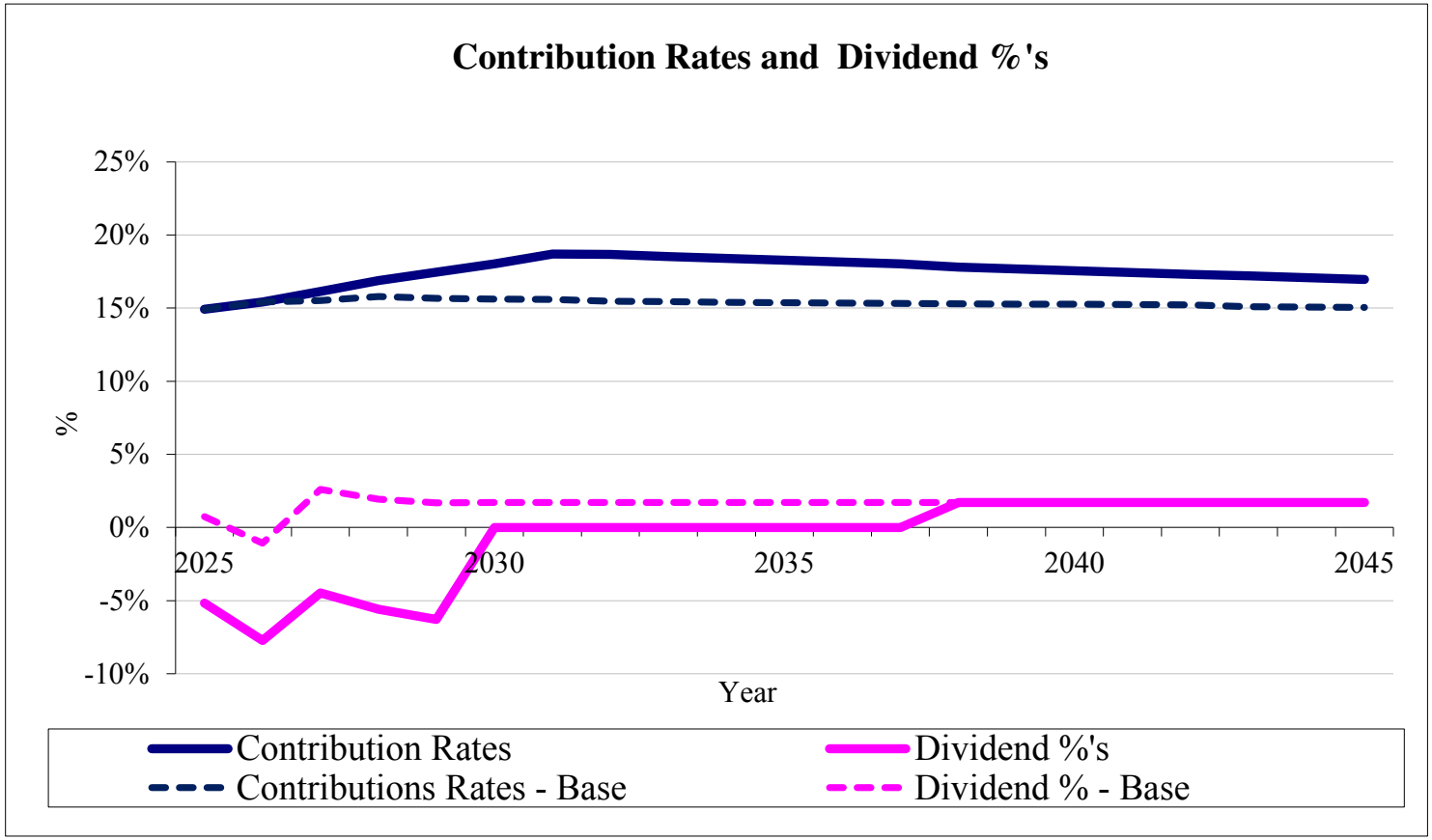
Stress Test 1 – Negative 20% Return in 2025 Followed by 6.8% Thereafter



Stress Test 1 – Negative 20% Return in 2025 Followed by 6.8% Thereafter

- Dividend Liability is depleted by 2029
- There will be a series of negative dividends, until most people are at the floor
- Positive dividends would resume in 2030
- Contribution Rate gradually increases by about 2.8% of payroll in year 5 and slowly declines thereafter

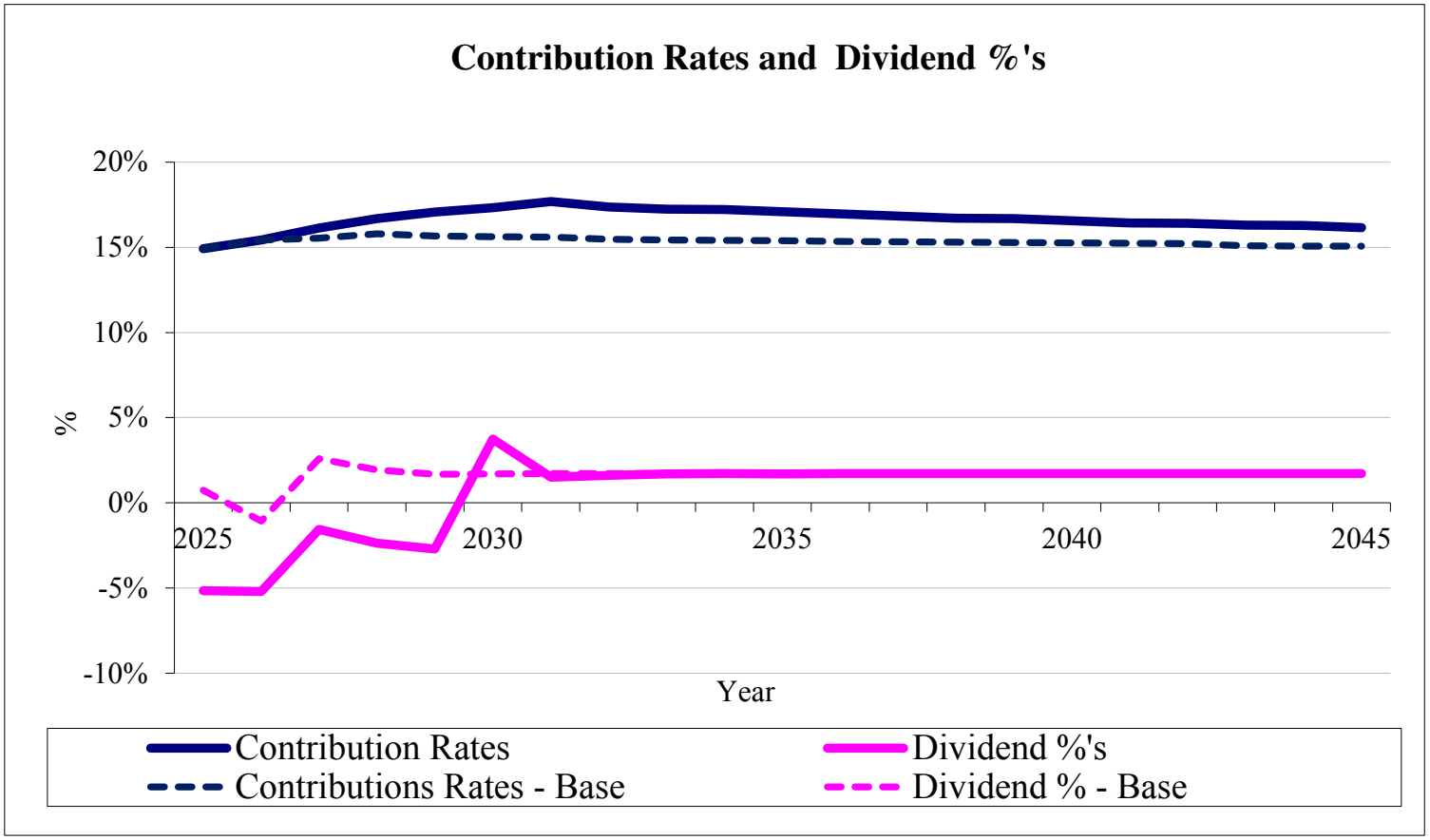
Stress Test 2 – Negative 25% Return in 2025 Followed by 6.8% Thereafter



Stress Test 2 – Negative 25% Return in 2025 Followed by 6.8% Thereafter

- Dividend Liability is depleted by 2029
- Retiree Liability becomes underfunded
- There will be a series of negative dividends, until all retirees are at the floor, followed by an extended period of no dividends
- Dividends could resume in 2038
- Contribution Rate gradually increases by about 3.3% of payroll in year 5 and slowly declines thereafter

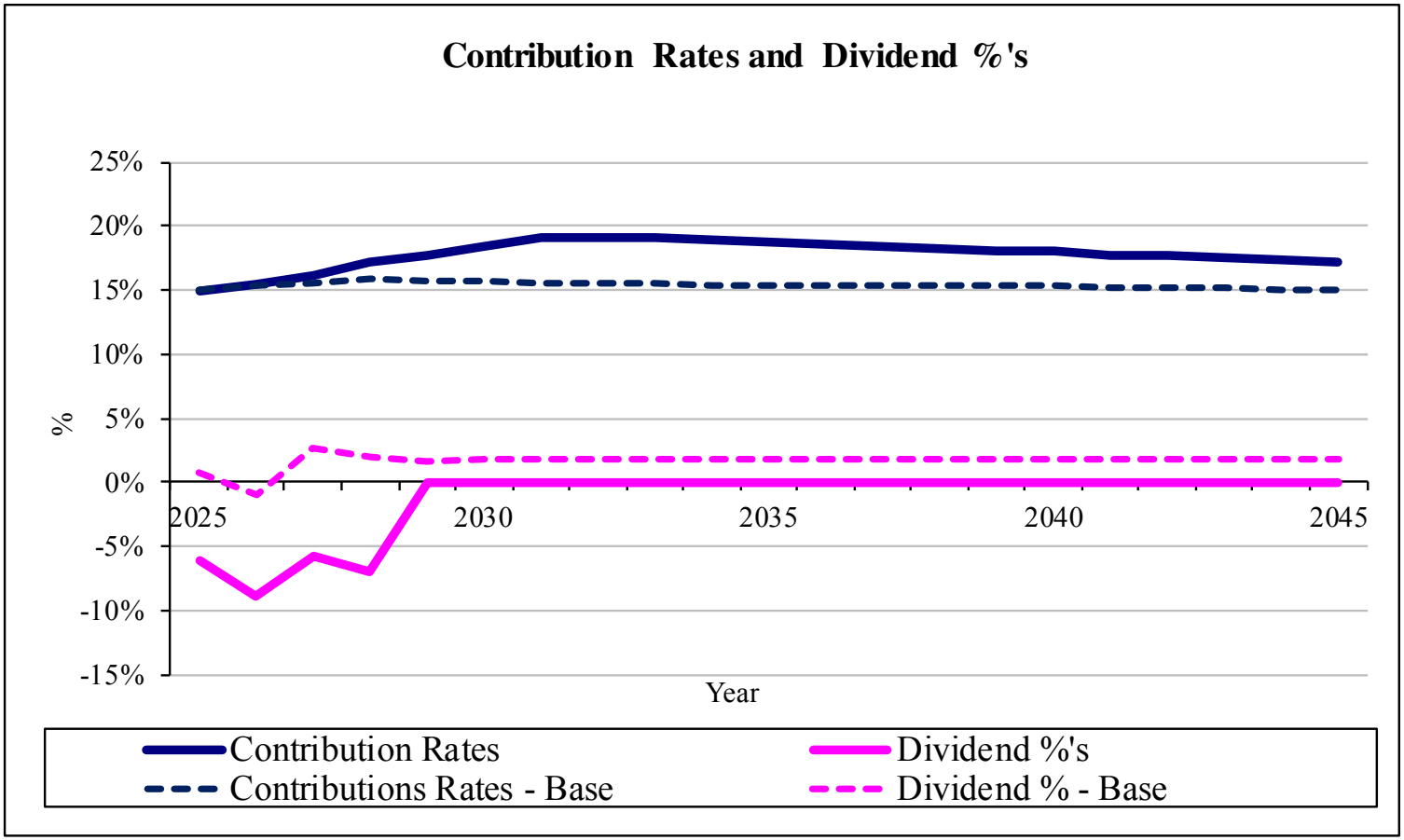
Stress Test 3 – Negative 25% Return in 2025, Positive 25% in 2026 and 6.8% Thereafter



Stress Test 3 – Negative 25% Return in 2025, Positive 25% in 2026 and 6.8% Thereafter

- Dividend Liability is not depleted, but Dividend Liability "cushion" falls to 6% in 2029
- There will be a series of negative dividends, pushing some retirees to the floor, followed by a rebuild of dividends for all retirees
- Contribution Rate gradually increases by about 1.5% of payroll in year 5 and slowly declines thereafter

Stress Test 4 – Negative 30% Return in 2025 Followed by 6.8% Thereafter



Stress Test 4 – Negative 30% Return in 2025 Followed by 6.8% Thereafter

- Dividend Liability is depleted by 2028
- Retiree Liability becomes underfunded
- There will be a series of negative dividends, until all people are at the floor, followed by a long period of no dividends
- Dividends could resume in 2046
- Contribution Rate gradually increases by about 4% of payroll in year 6 and slowly declines thereafter

Deterministic Stress Test Summary

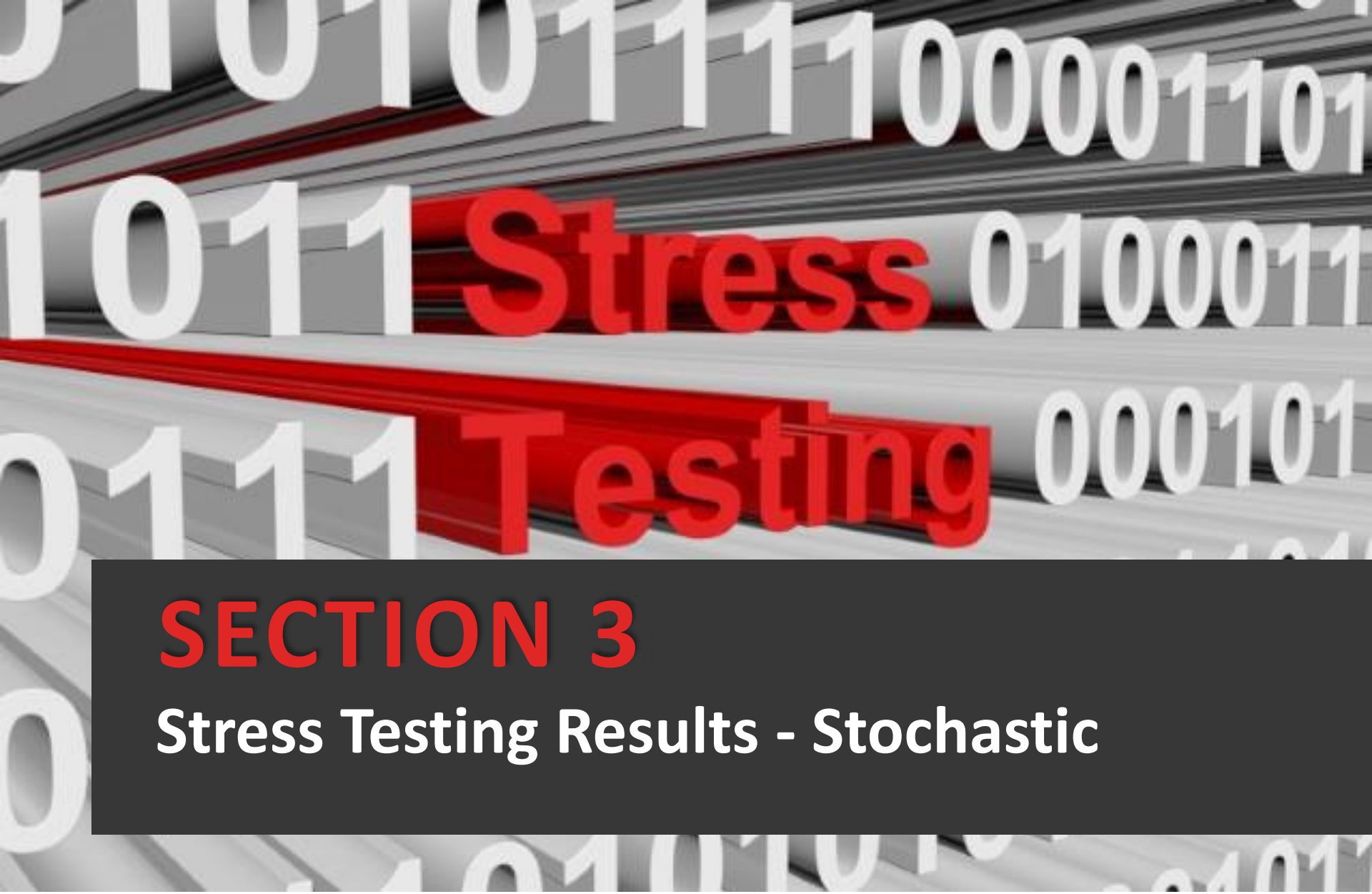
All tests show a 4-year negative dividend period

Stress Test/MVA Return	Year Dividend Liability Depleted	Year Positive Dividends Resume	Retiree Liability Underfunded	Year 5 Projected Contribution Rate Increase
1/-20%	2029	2030	No	2.8% of Payroll
2/-25%	2029	2038	Yes	3.3% of Payroll
3/-25% +25%	N/A	2028	No	1.5% of Payroll
4/-30%	2028	2046	Yes	4.2% of Payroll

Given all assumptions are met, including 6.8% return after shocks and bounceback

Stress Test Observations

- Contribution rates are generally more stable than dividend rates
- A large negative return would be detrimental to retirees (dividends are depleted)
- Retiree assets are 61% of total assets
- Proportions allocated to retiree reserve, money purchase minimum and EAR evolve over time



SECTION 3

Stress Testing Results - Stochastic

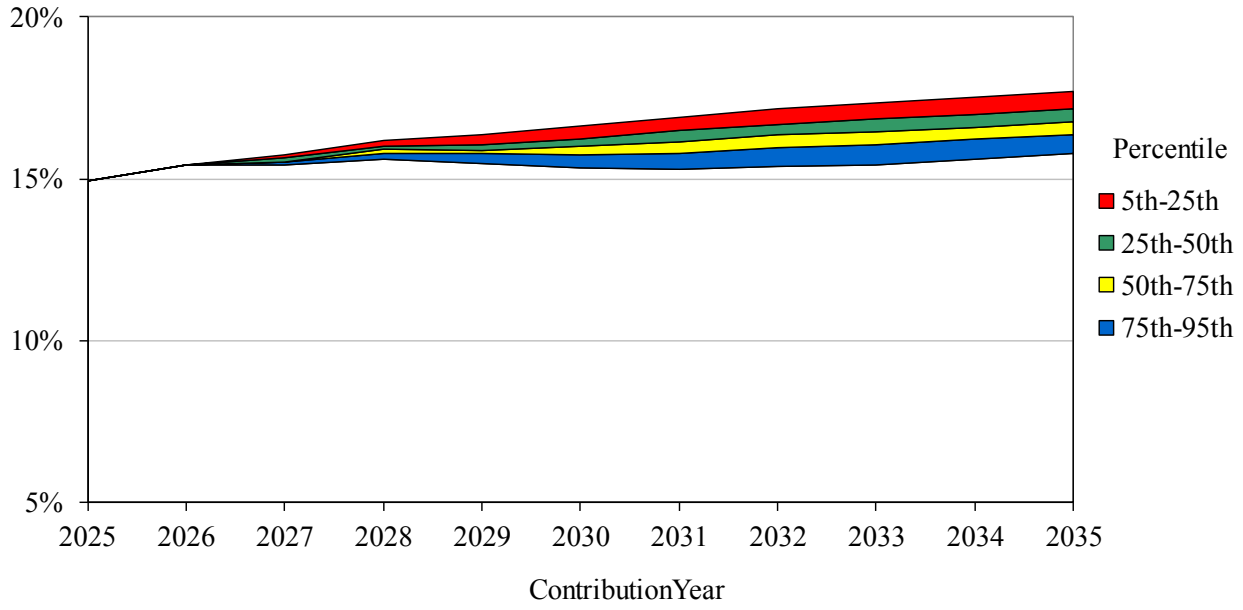
Monte Carlo Simulations

- Based on 10,000 random trials (normal distribution)
- Valuation Assumptions held constant
- Assumes nine sets of expected return/standard deviations (provided by NEPC)

Actuarial Rate 6.8%

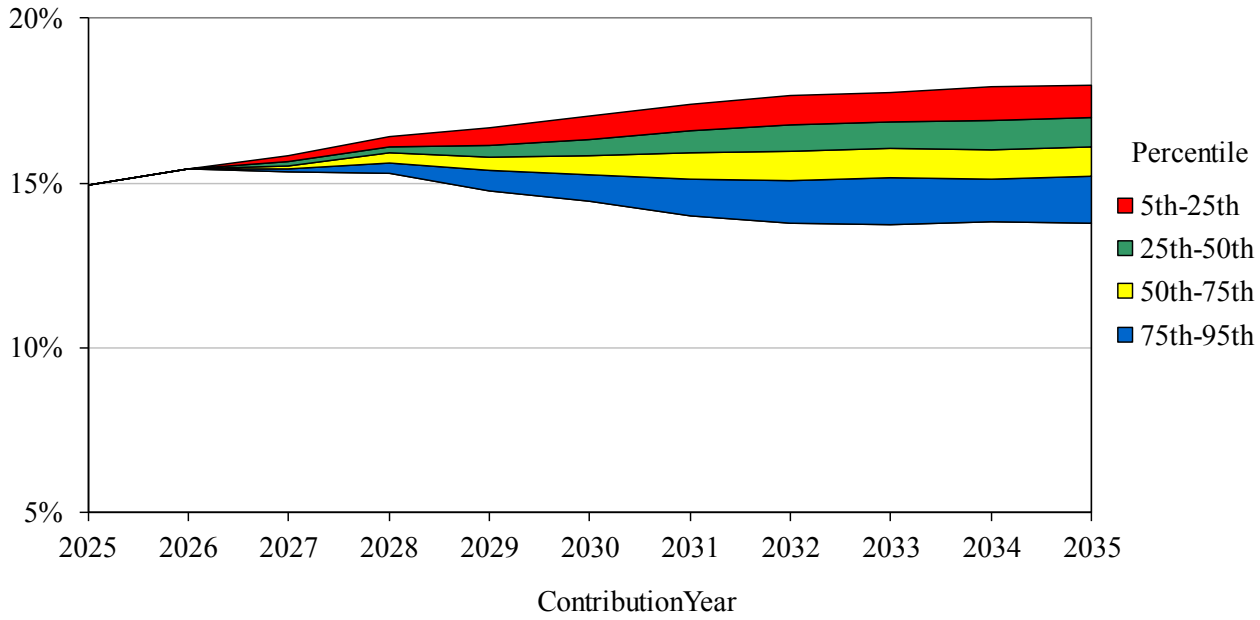
	Expected Return		Standard Deviation	
	Geometric	Arithmetic	2025	2023
Scenario 1	4.5%	4.5%	2.2%	N/A
Scenario 2	5.0%	5.1%	4.1%	4.6%
Scenario 3	5.5%	5.7%	6.2%	5.5%
Scenario 4	6.0%	6.3%	8.2%	9.4%
Scenario 5	6.5%	7.0%	10.7%	12.9%
Scenario 6	7.0%	7.9%	14.0%	13.6%
Scenario 7	7.5%	8.7%	16.9%	17.1%
Scenario 8	8.0%	10.1%	22.3%	22.4%
Scenario 9	8.5%	11.8%	28.3%	N/A

Contribution as a % of Payroll
Scenario 2 – 5.0% Return, 4.1% Volatility



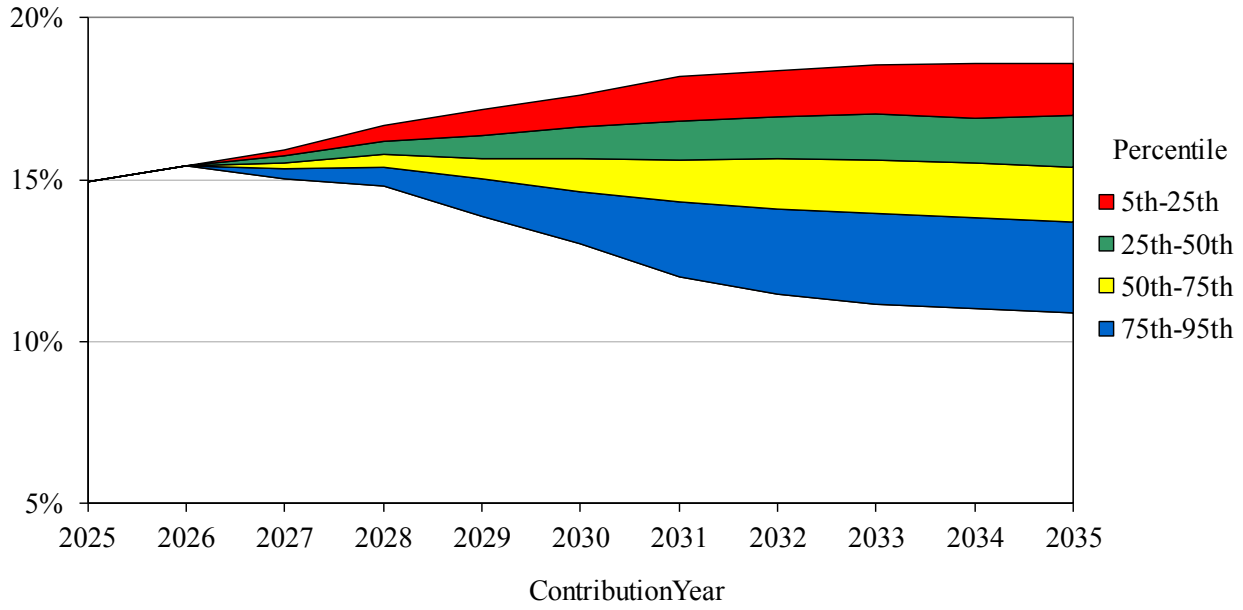
5th Percentile	14.9%	15.4%	15.7%	16.2%	16.4%	16.6%	16.9%	17.2%	17.3%	17.5%	17.7%
25th Percentile	14.9%	15.4%	15.6%	16.0%	16.1%	16.2%	16.5%	16.7%	16.8%	17.0%	17.2%
Median	14.9%	15.4%	15.5%	15.9%	15.9%	16.0%	16.1%	16.4%	16.4%	16.6%	16.8%
75th Percentile	14.9%	15.4%	15.5%	15.8%	15.8%	15.7%	15.8%	15.9%	16.0%	16.2%	16.4%
95th Percentile	14.9%	15.4%	15.4%	15.6%	15.5%	15.3%	15.3%	15.4%	15.4%	15.6%	15.8%

Contribution as a % of Payroll
Scenario 4 – 6.0% Return, 8.2% Volatility



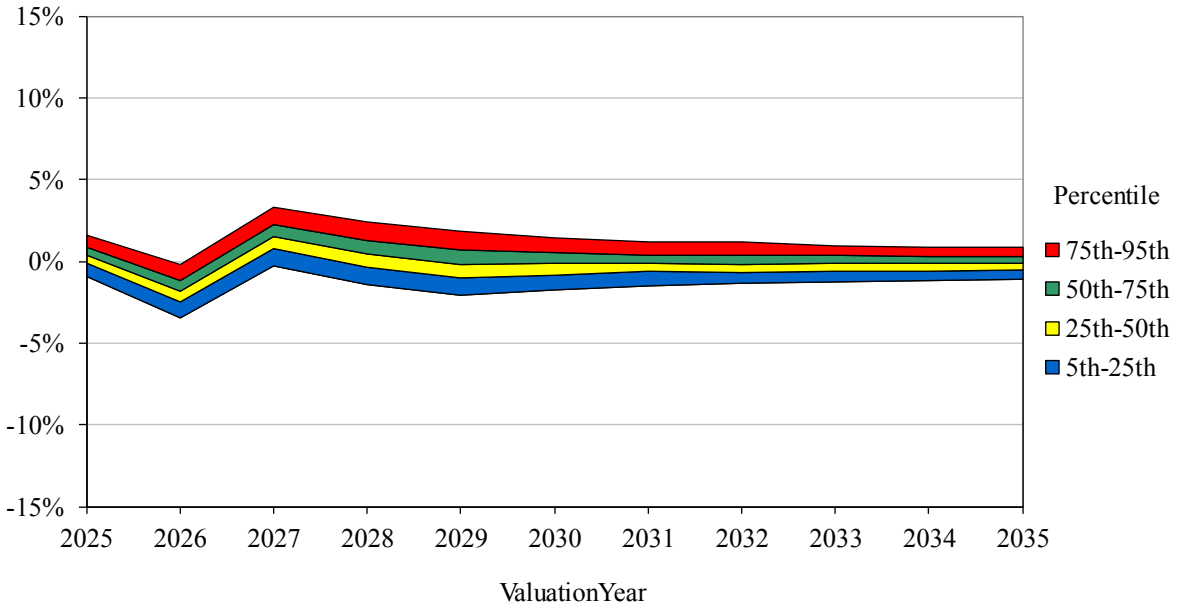
5th Percentile	14.9%	15.4%	15.8%	16.4%	16.7%	17.0%	17.4%	17.7%	17.7%	17.9%	18.0%
25th Percentile	14.9%	15.4%	15.6%	16.1%	16.2%	16.3%	16.6%	16.8%	16.8%	16.9%	17.0%
Median	14.9%	15.4%	15.5%	15.9%	15.8%	15.8%	15.9%	16.0%	16.0%	16.0%	16.1%
75th Percentile	14.9%	15.4%	15.4%	15.6%	15.4%	15.2%	15.1%	15.1%	15.1%	15.1%	15.2%
95th Percentile	14.9%	15.4%	15.3%	15.3%	14.8%	14.4%	14.0%	13.8%	13.7%	13.8%	13.8%

Contribution as a % of Payroll
Scenario 6 – 7.0% Return, 14.0% Volatility



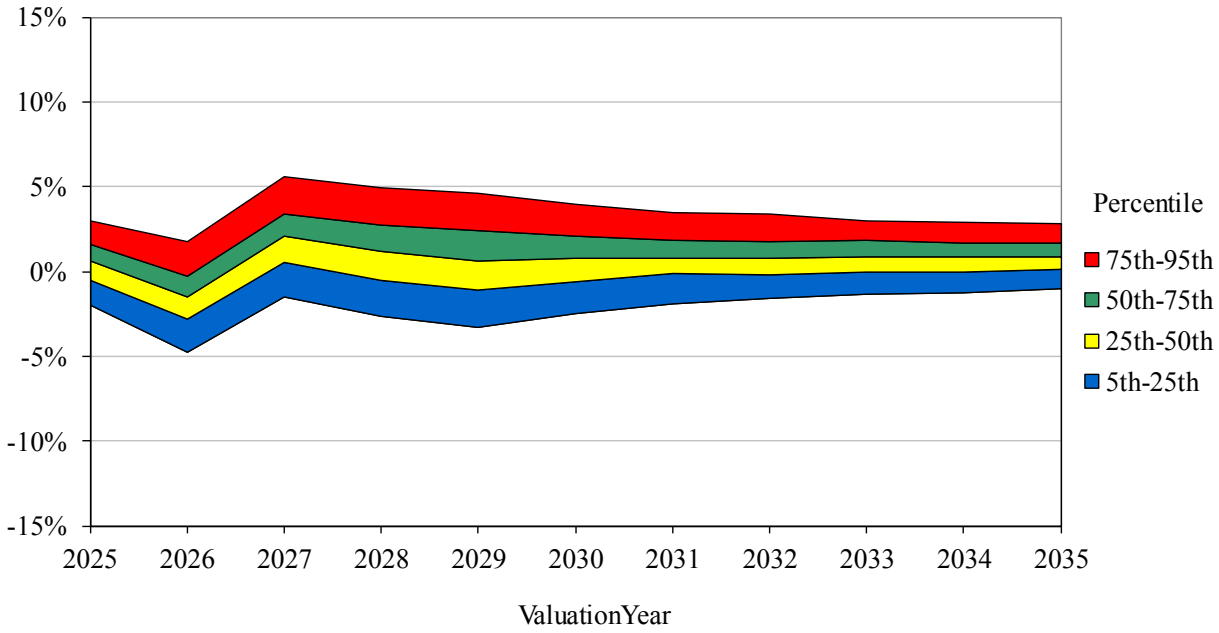
5th Percentile	14.9%	15.4%	15.9%	16.7%	17.2%	17.6%	18.2%	18.4%	18.5%	18.6%	18.6%
25th Percentile	14.9%	15.4%	15.7%	16.2%	16.4%	16.6%	16.8%	17.0%	17.0%	16.9%	17.0%
Median	14.9%	15.4%	15.5%	15.8%	15.7%	15.6%	15.6%	15.7%	15.6%	15.5%	15.4%
75th Percentile	14.9%	15.4%	15.3%	15.4%	15.0%	14.6%	14.3%	14.1%	13.9%	13.8%	13.7%
95th Percentile	14.9%	15.4%	15.0%	14.8%	13.9%	13.0%	12.0%	11.5%	11.1%	11.0%	10.9%

Dividend Rates
Scenario 2 – 5.0% Return, 4.1% Volatility



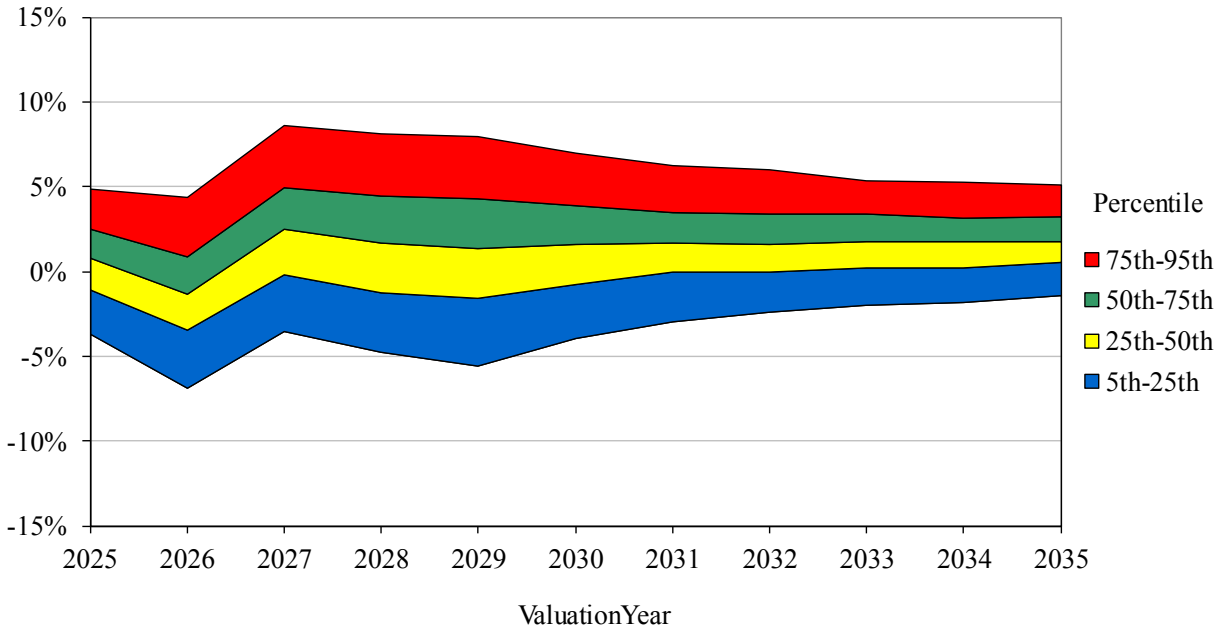
5th Percentile	-0.9%	-3.4%	-0.2%	-1.4%	-2.1%	-1.7%	-1.5%	-1.3%	-1.2%	-1.2%	-1.1%
25th Percentile	-0.1%	-2.4%	0.8%	-0.4%	-1.0%	-0.8%	-0.6%	-0.7%	-0.6%	-0.6%	-0.5%
Median	0.4%	-1.8%	1.5%	0.5%	-0.2%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%
75th Percentile	0.9%	-1.2%	2.2%	1.3%	0.7%	0.5%	0.4%	0.4%	0.3%	0.3%	0.3%
95th Percentile	1.6%	-0.2%	3.3%	2.4%	1.9%	1.5%	1.2%	1.2%	0.9%	0.9%	0.8%

Dividend Rates
Scenario 4 – 6.0% Return, 8.2% Volatility



5th Percentile	-2.0%	-4.8%	-1.5%	-2.6%	-3.3%	-2.4%	-1.9%	-1.6%	-1.3%	-1.2%	-1.0%
25th Percentile	-0.5%	-2.8%	0.5%	-0.5%	-1.0%	-0.6%	-0.1%	-0.2%	0.0%	0.0%	0.1%
Median	0.6%	-1.5%	2.1%	1.2%	0.7%	0.8%	0.8%	0.8%	0.9%	0.8%	0.8%
75th Percentile	1.6%	-0.3%	3.4%	2.8%	2.4%	2.1%	1.9%	1.8%	1.8%	1.7%	1.7%
95th Percentile	3.0%	1.7%	5.6%	5.0%	4.6%	4.0%	3.5%	3.4%	3.0%	2.9%	2.8%

Dividend Rates
Scenario 6 – 7.0% Return, 14.0% Volatility



5th Percentile	-3.7%	-6.8%	-3.5%	-4.8%	-5.5%	-4.0%	-3.0%	-2.4%	-2.0%	-1.8%	-1.4%
25th Percentile	-1.1%	-3.4%	-0.2%	-1.2%	-1.6%	-0.7%	0.0%	-0.1%	0.2%	0.3%	0.6%
Median	0.8%	-1.3%	2.5%	1.7%	1.3%	1.6%	1.7%	1.6%	1.8%	1.8%	1.8%
75th Percentile	2.5%	0.8%	4.9%	4.5%	4.3%	3.9%	3.5%	3.4%	3.4%	3.2%	3.3%
95th Percentile	4.9%	4.4%	8.7%	8.2%	8.0%	7.0%	6.2%	6.0%	5.4%	5.3%	5.1%

Stress Testing Dividend Depletion and Retiree Funded Status

- Definitions
  - Dividend Liability (17.2B) = Total Retiree Liability (w/div.) less Base Benefit Liability (w/o div.)
  - Retiree Funded Status (128%) = Total Retiree Liability (w/div.) / Base Benefit Liability (w/o div.)
- Dividend Stress Test studied
  - Probability that dividend liability will be depleted
  - Number of paths leading to Dividend Depletion
  - Worst case scenario of Retiree Funded Status
  - Depletion Severity measure

Stress Testing Dividend Depletion and Retiree Funded Status

Probability {Dividend Depletion in Year i}

Represents the number of times the Retiree Funded Status is less than 1 in year i divided by 10,000 (allows for recovery in future years)

Dividend Stress Test

Probability That Dividend Liability Will Be Depleted in Year (Allows for Recovery in Future Year)

Scenario	Expected RoR	Standard Deviation	Year				
			1	5	10	20	50
1	4.5%	2.2%	0%	0%	0%	6%	100%
2	5.0%	4.1%	0%	0%	0%	3%	49%
3	5.5%	6.2%	0%	0%	1%	2%	7%
4	6.0%	8.2%	0%	1%	2%	2%	2%
5	6.5%	10.7%	0%	3%	4%	3%	1%
6	7.0%	14.0%	0%	6%	7%	4%	1%
7	7.5%	16.9%	0%	9%	10%	5%	1%
8	8.0%	22.3%	0%	16%	15%	9%	2%
9	8.5%	28.3%	0%	22%	22%	13%	3%

Actuarial Rate 6.8%

Stress Testing Dividend Depletion and Retiree Funded Status

Percentage of Paths Leading to Dividend Depletion on or before i

Counts the number of times on or before year i the Retiree Funded Status is less than 1 (does not allow for recovery in future years)

Dividend Stress Test

Percentage of Paths Leading to Dividend Depletion on or before Year i

Scenario	Expected RoR	Standard Deviation	Year				
			1	5	10	20	50
1	4.5%	2.2%	0%	0%	0%	6%	100%
2	5.0%	4.1%	0%	0%	0%	3%	50%
3	5.5%	6.2%	0%	0%	1%	3%	10%
4	6.0%	8.2%	0%	1%	3%	4%	5%
5	6.5%	10.7%	0%	3%	5%	6%	6%
6	7.0%	14.0%	0%	6%	9%	11%	11%
7	7.5%	16.9%	0%	9%	14%	15%	15%
8	8.0%	22.3%	0%	16%	21%	23%	24%
9	8.5%	28.3%	0%	22%	28%	29%	30%

Actuarial Rate 6.8%

Stress Testing Dividend Depletion and Retiree Funded Status

Worst Case Scenario of Retiree Funded Status

Finds the 5th percentile of retiree funded status for any given year in any given scenario (very unlikely scenario)

Dividend Stress Test

Worst Case Scenario of Retiree Funded Status (% of Floor Benefit That is Funded)

Scenario	Expected RoR	Standard Deviation	Year				
			1	5	10	20	50
1	4.5%	2.2%	127%	120%	112%	100%	72%
2	5.0%	4.1%	127%	116%	110%	103%	86%
3	5.5%	6.2%	126%	113%	108%	104%	98%
4	6.0%	8.2%	125%	110%	106%	107%	113%
5	6.5%	10.7%	124%	105%	103%	106%	129%
6	7.0%	14.0%	123%	100%	96%	103%	137%
7	7.5%	16.9%	122%	94%	91%	101%	153%
8	8.0%	22.3%	120%	82%	79%	88%	141%
9	8.5%	28.3%	118%	70%	66%	72%	121%

Actuarial Rate 6.8% →

Worst Case Scenario based on 5th percentile (i.e., 5% probability)

Stress Testing Dividend
Depletion and Retiree Funded Status

Depletion Severity Measure

Of the stress test simulations that result in a Retiree Funded Status of less than 1, finds the average Retiree Funded Status (or degree of depletion)

Dividend Stress Test
Depletion Severity Measure

Average Retiree Funded Status for Depletion Scenarios

Scenario	Expected RoR	Standard Deviation	Year				
			1	5	10	20	50
1	4.5%	2.2%	N/A	N/A	N/A	98%	79%
2	5.0%	4.1%	N/A	N/A	N/A	97%	93%
3	5.5%	6.2%	N/A	97%	97%	96%	93%
4	6.0%	8.2%	N/A	96%	94%	95%	95%
5	6.5%	10.7%	N/A	94%	92%	93%	94%
6	7.0%	14.0%	N/A	90%	89%	88%	92%
7	7.5%	16.9%	N/A	89%	87%	85%	90%
8	8.0%	22.3%	N/A	85%	81%	81%	81%
9	8.5%	28.3%	N/A	80%	75%	75%	70%

Actuarial Rate 6.8% →

Dividend Stress Test Observations

- The low risk scenarios are actually risky in the sense that, for example, 4.5% and 5% expected return has a much higher chance of dividend depletion in later years than higher risk scenarios
- Must balance short and long term volatility
- Consider probability of dividend depletion
- Consider level of worst case scenario that is acceptable

Combination of All Scenarios

2035 Results by Percentile of Investment Return Outcomes										
Scenario	Expected RoR	Standard Deviation	Contribution Rates			Dividend Rates			Highest Div. Dep. PRB	Worst Retiree Funded %
			95th	50th	5th	95th	50th	5th		
1	4.5%	2.2%	16.6%	17.1%	17.6%	-0.1%	-0.6%	-1.1%	100%/Year50	72%/Year50
2	5.0%	4.1%	15.8%	16.8%	17.7%	0.8%	-0.1%	-1.1%	50%/Year50	86%/Year50
3	5.5%	6.2%	14.8%	16.4%	17.9%	1.8%	0.4%	-1.1%	10%/Year50	98%/Year50
4	6.0%	8.2%	13.8%	16.1%	18.0%	2.8%	0.8%	-1.0%	5%/Year50	106%/Year10
5	6.5%	10.7%	12.5%	15.8%	18.2%	3.9%	1.3%	-1.1%	6%/Year50	103%/Year10
6	7.0%	14.0%	10.9%	15.4%	18.6%	5.1%	1.8%	-1.4%	11%/Year50	96%/Year10
7	7.5%	16.9%	9.1%	15.1%	19.0%	6.3%	2.3%	-1.6%	15%/Year50	91%/Year10
8	8.0%	22.3%	6.1%	14.8%	19.8%	8.0%	2.7%	-2.5%	24%/Year50	79%/Year10
9	8.5%	28.3%	2.4%	14.7%	20.7%	9.8%	3.0%	-3.5%	30%/Year50	66%/Year10

Actuarial Rate 6.8% →

- Portfolios with lower expected return result in higher expected contributions and lower expected dividends
- Higher assumed rates of return are associated with higher standard deviation (i.e., risk) and 5th percentile scenario for retiree dividend pool falling below 75% (Worst Retiree Funded %)
- Scenarios 4 through 7 represent potential 'Goldilocks Zone'

Goldilocks Zone Guideposts[1]

- Prefer narrow range of potential employer contributions (difference between 95th and 5th percentiles below 10%)
- Prefer some level of meaningful dividends (close to or greater than 1% for 50th percentile)
- Prefer probability of dividend depletion below 20%
- Prefer worst case funded status greater than 80%

[1] Guideposts are not mathematically absolute

2025 Observations

- Changes from 2023 Study
  - Returns over 2023 and 2024 were 11.40% and 8.55%
    - MRA returns of 9.1% and 7.5%
    - 2023 – $7.0B in unrecognized losses, 2025 – $3.4B in unrecognized losses
  - Similar Standard Deviation to 2023 Study
  - Changes in assumptions (primarily salary increases, retirement, turnover)

2025 Observations

- Overall results are similar to 2023 study
  - Probability of depleting dividend liability is somewhat lower due to factors on previous slide
  - Similar range of dividend/contribution results
- 'Goldilocks zone' remains at 6.0% to 7.5%
  - Provides for positive return with appropriate downside protection
  - Potential refinement of 6.5% to 7.5% in future years

Questions

SECTION 4

Appendix 1

Understanding Dividend Liability

- Retirees share in investment gains, but also share in investment losses
  - Prior dividends can be reduced if less than 5% is credited to the Core Annuity Division
- Only dividends can be reduced, the original core benefit is protected
- The present value of the excess of total core benefits over original benefits is called the "Dividend Liability"

Liability Attributable to Dividends – "Dividend Liability"

Valuation	Liability for Dividend Remaining (billions)	Liability for Dividend Adjustment (billions)	Liability after Dividend Adjustment (billions)
12/31/2015	$5.5	$0.2	$5.7
12/31/2016	5.4	1.0	6.4
12/31/2017	6.1	1.3	7.4
12/31/2018	6.9	0.0	6.9
12/31/2019	6.5	1.0	7.5
12/31/2020	7.0	3.1	10.1
12/31/2021	9.4	4.8	14.2
12/31/2022	13.4	1.1	14.5
12/31/2023	13.7	2.7	16.4
12/31/2024	15.4	1.8	17.2

- "Liability for dividend remaining" = value of all previously granted dividends
  - ($9.2 Billion at 12/31/2008 decreasing to $3.0 Billion at 12/31/2013)
- 2025 "liability for dividend remaining" is >2008, BUT as a percentage of total liabilities, it is smaller
- Substantial asset losses could decrease the "liability for dividend remaining" to low levels

Dividend Risk Measure – MRA Basis

- Dividend Liability (after Dividend adjustment in April) / Total Core Retiree Assets
- Example (2024)
  - Dividend Liability = $17.2 billion
  - Total Retiree Assets (Core) = $77.9 billion
  - Dividend Risk Measure = 17.2/77.9 = 22.0%
- In other words, Retiree Assets (after MRA smoothing) would need to decrease by 22.0% to deplete the existing Dividend Liability by year end
- Dividend Risk Measure was 20.1% last study

Dividend Risk Measure – MVA Basis

- However, this is on an MRA (smoothed) basis
- Dividend Liability (MVA basis)
  - Total Retiree Assets (Core MVA) ~ $75.8 billion
  - Dividend Liability (MVA) ~ $15.1 billion
  - Dividend Risk Measure (MVA) % ~ 15.1B/75.8B = 19.9%
- Given all assumptions are met, over time, on a market value basis the cushion will decrease to 19.9% with phase-in of unrecognized losses
- Dividend Risk Measure on a MVA basis was 18.0% last study

Dividend Risk Measure

- On MRA basis, 2025 dividend liability results look better than 2023, however:
  - At 12/31/2022 there were $7.0B in deferred asset losses – looking forward things are worse than they appear
  - At 12/31/2024 there are $3.4B in deferred asset losses – looking forward things are worse than they appear but not as bad as last study

Dividend Risk Measure	2023	2025
MRA basis	20.1%	22.0%
MVA basis	15.3%	19.9%

- The ultimate dividend liability 'cushion' increased from 15.3% to 19.9%

SECTION 5

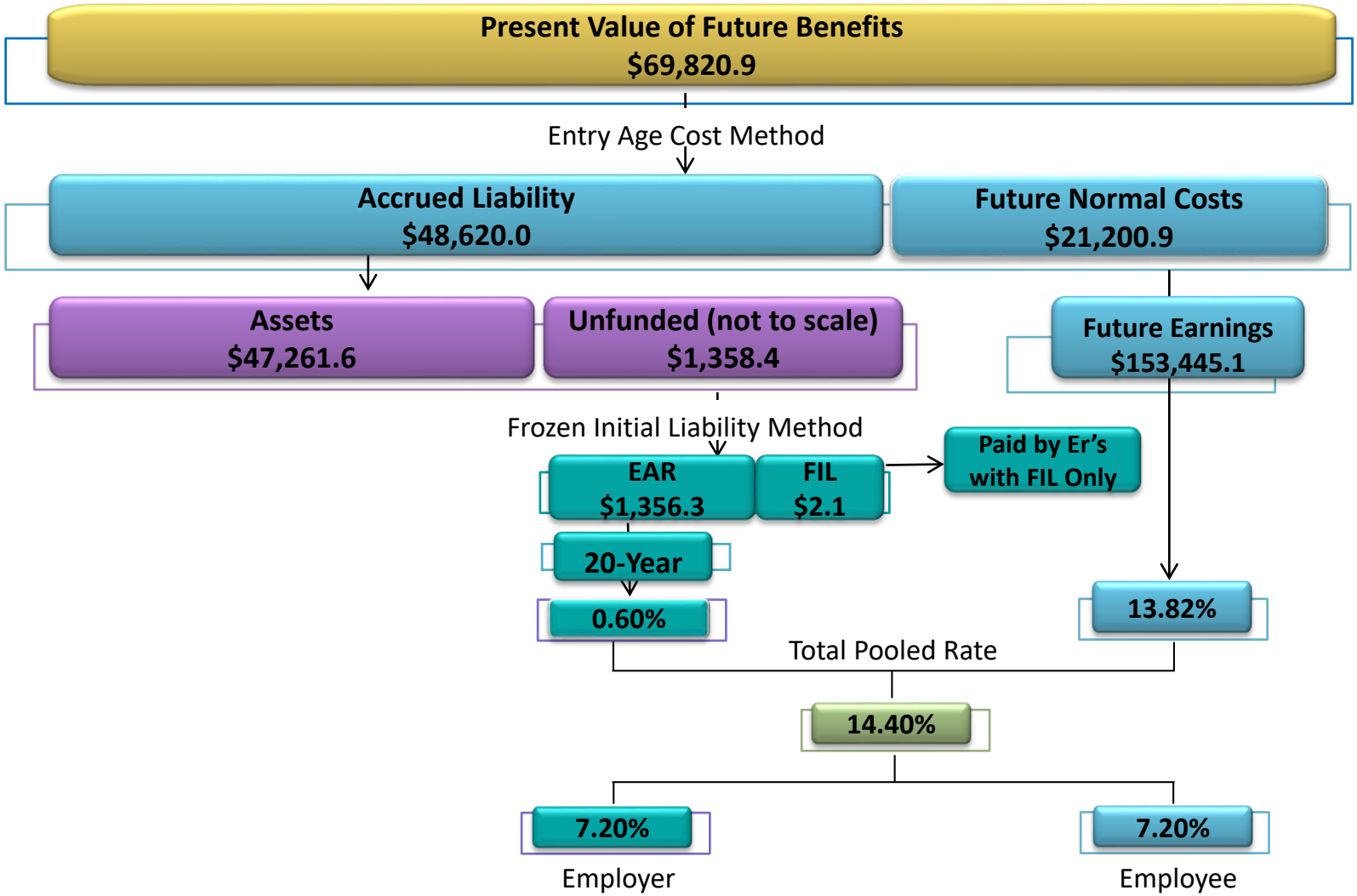
Appendix 2

Operation of Market Recognition Account (MRA) – $ Millions 2024 Valuation

	2024	2025	2026	2027	2028
Actual Investment Return	$ 10,311				
Assumed Investment Return	8,477				
Gain/(Loss) to be phased-in	1,834				
Phased-in recognition					
• Current year	$ 367	?	?	?	?
• First prior year	928	$ 367	?	?	?
• Second prior year	(5,068)	928	$ 367	?	?
• Third prior year	2,495	(5,068)	928	$ 367	?
• Fourth prior year	1,773	2,495	(5,068)	928	$ 367
Total recognized gain (loss)	$ 495	$(1,278)	$ (3,773)	$ 1,295	$ 367

2025-2028: Expect $3.4 billion in deferred asset *LOSSES*
-- Shared by annuitants, actives and employers

Actuarial Valuation Process
Illustration for General/Elected Group ($ Millions)



Comparative Statement of Total Average Contribution Rates

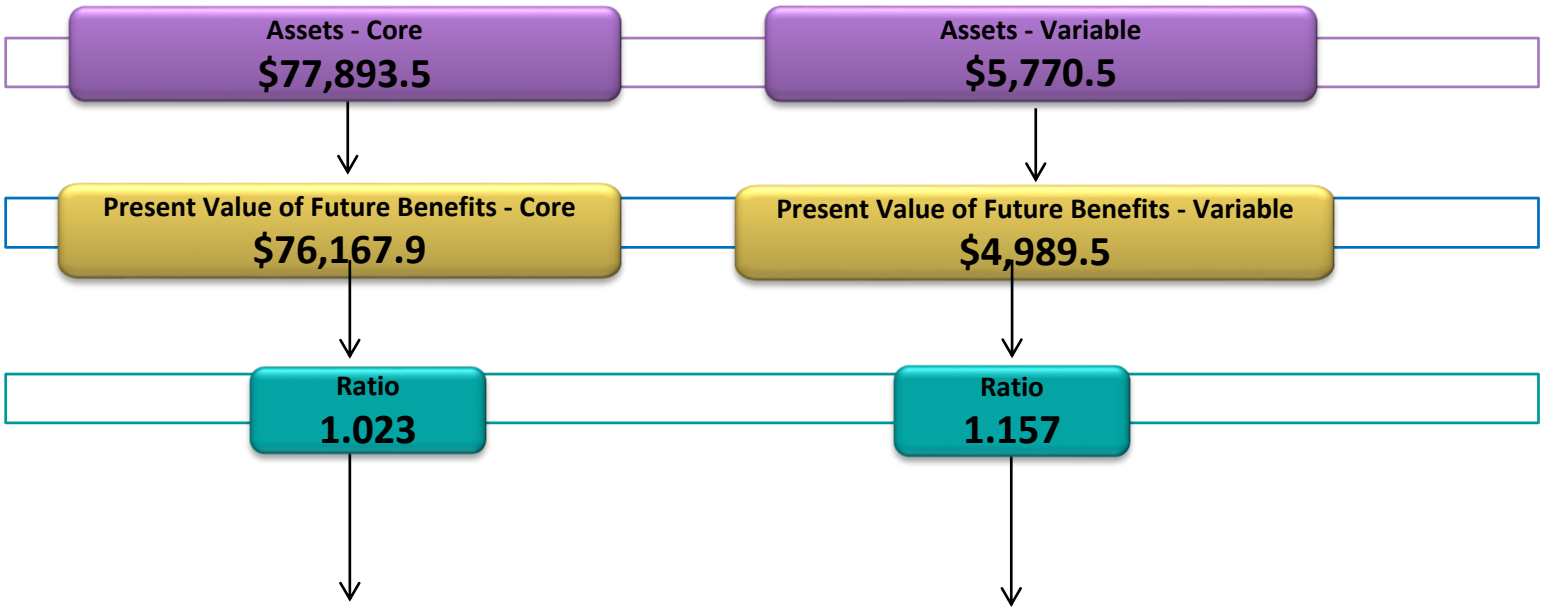
Valuation 12/31	General	Executive & Elected	Protective with Soc. Sec.	Protective without Soc. Sec.
2008	11.15%	11.95%	14.14%	15.46%
2013	13.60%	15.40%	16.30%	20.20%
2018	13.54%	13.54%	18.41%	23.02%
2019	13.53%	13.53%	18.51%	23.11%
2020	13.00%	13.00%	18.52%	23.86%
2021	13.60%	13.60%	20.03%	24.90%
2022	13.81%	13.81%	21.20%	26.00%
2023	13.90%	13.90%	21.90%	25.90%
2024	14.41%	14.41%	21.93%	25.70%

Executive and Elected employee and employer rates for CY 2016 and beyond are made in accordance with the combined General/Exec & Elected results.

GRS

Pages B-5 & B-6

Actuarial Valuation Process – 2024 Retired Lives Valuation
Illustration ($ Millions)



Core effective earnings rate = 7.5%, dividend adjustment = 2.3%.
Variable effective earnings rate = 20.0%, and the variable adjustment = 15.0%.

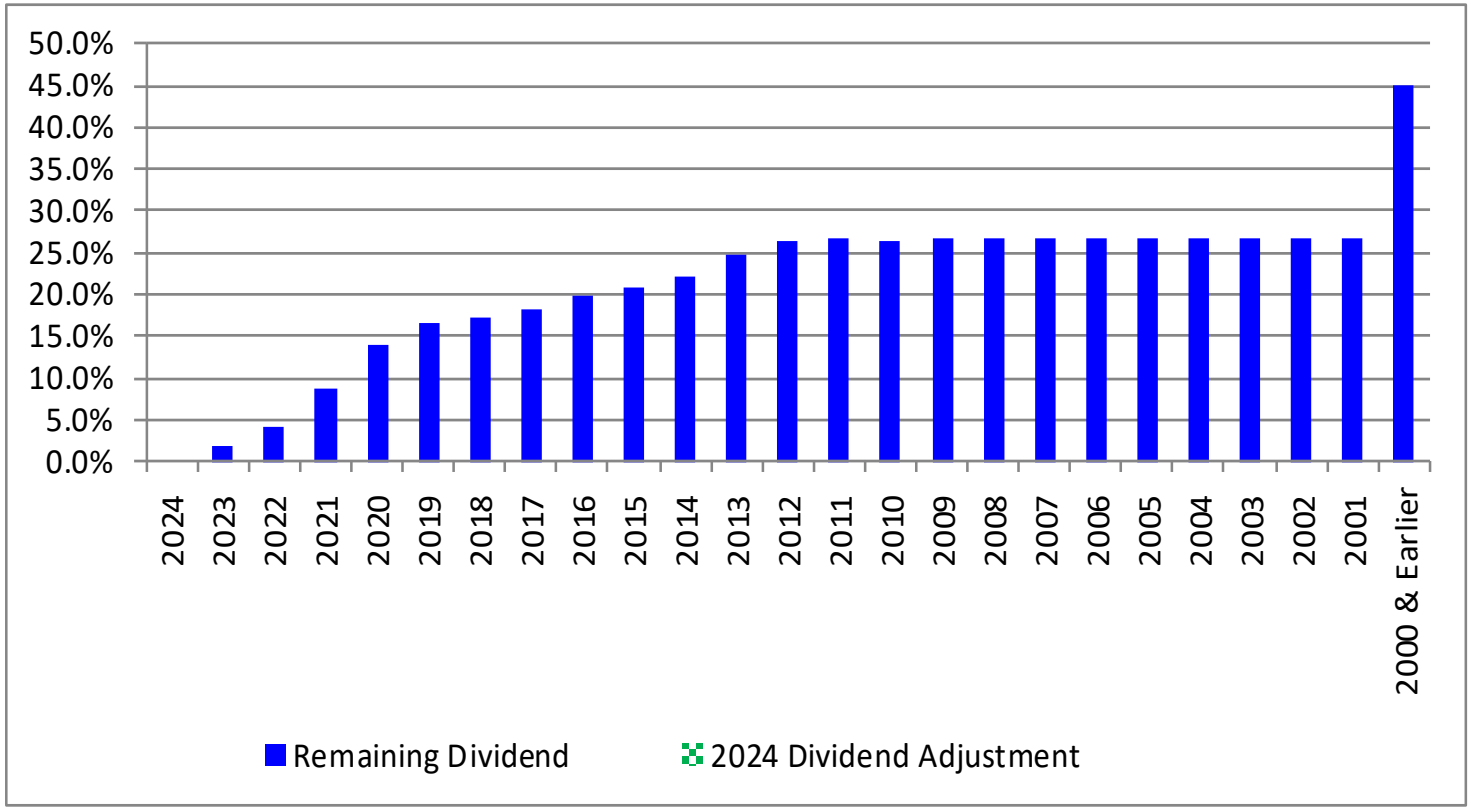
Primary Sources of Core Dividend

	% of APV[(1)]
1. SWIB net of fee investment return	8.55%
2. MRA adjustment	(1.05)%
3. Published effective earnings rate	7.50%
4. Adjustment to relate earnings to average core annuity fund balance	(0.35)%
5. Earnings rate based on average balance	7.15%
6. Expected dividend before adjustments: 1.0715/1.05-1	2.05%
7. Adjustment to relate average asset to ending liability	0.05%
8. Carryover from last year due to timing of dividend, accounting adjustments and rounding	0.16%
9. Experience study adjustment	0.00%
10. Experience and other effects	0.01%
11. Statutory adjustment to round to nearest one-tenth percent	0.03%
12. **Computed average dividend rate: (6)+(7)+(8)+(9)+(10)+(11)**	**2.3%**
13. Adjustment for members at or near the statutory floor	0.0%
14. **Final computed dividend rate: (12)+(13), if greater than 0.5% (or less than -0.5%) of core annuities, otherwise 0%**	**2.3%**

(1) *Actuarial Present Value*

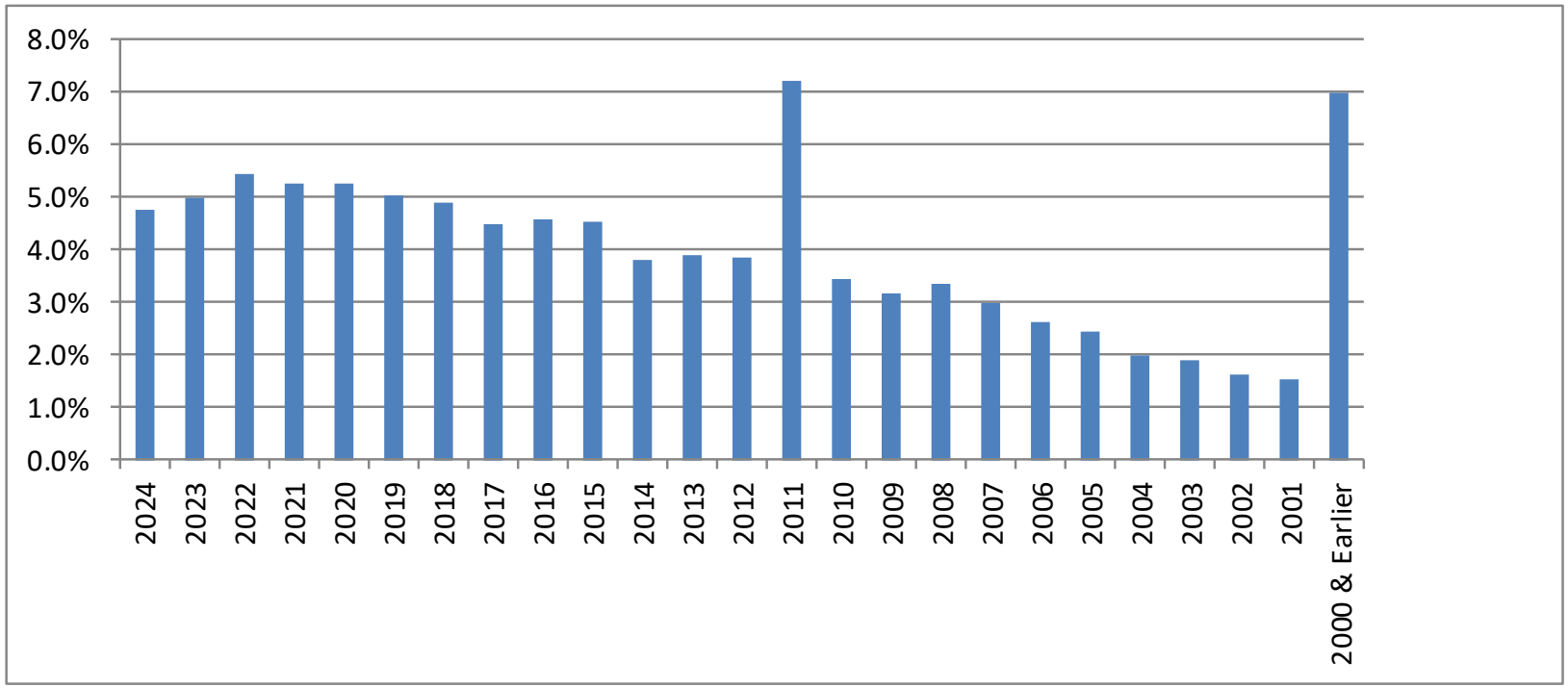
(Report-6)

Dividend Remaining (as a Percentage of Total Benefit) by Year of Retirement



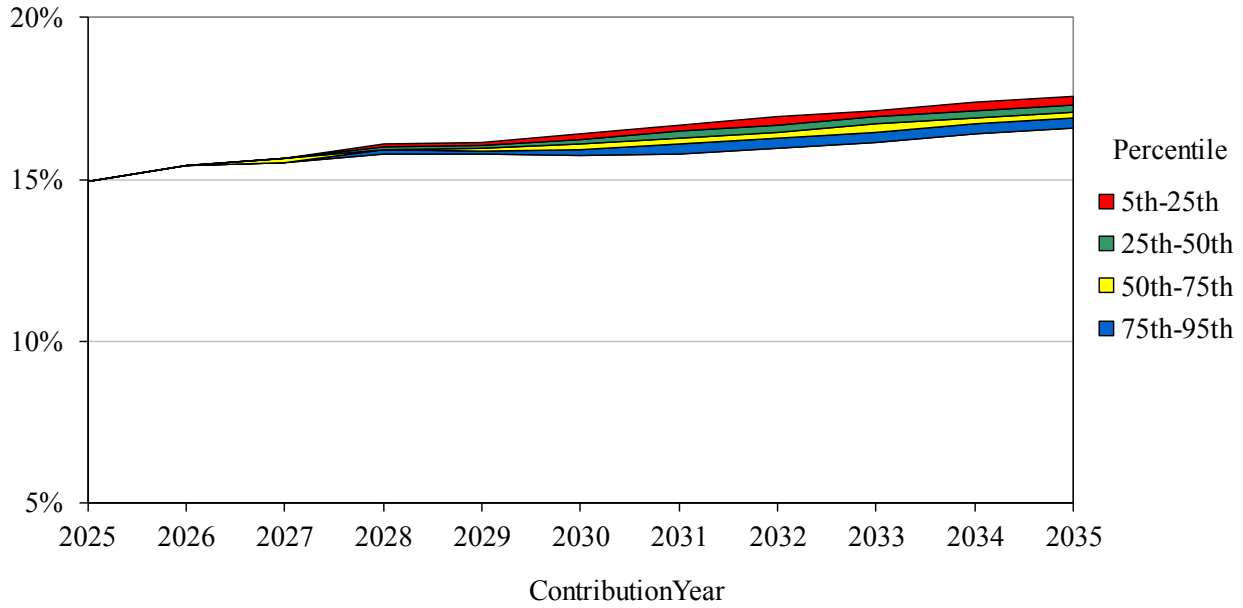
(Report-7)

Liabilities (as a Percentage of Total) by Year of Retirement



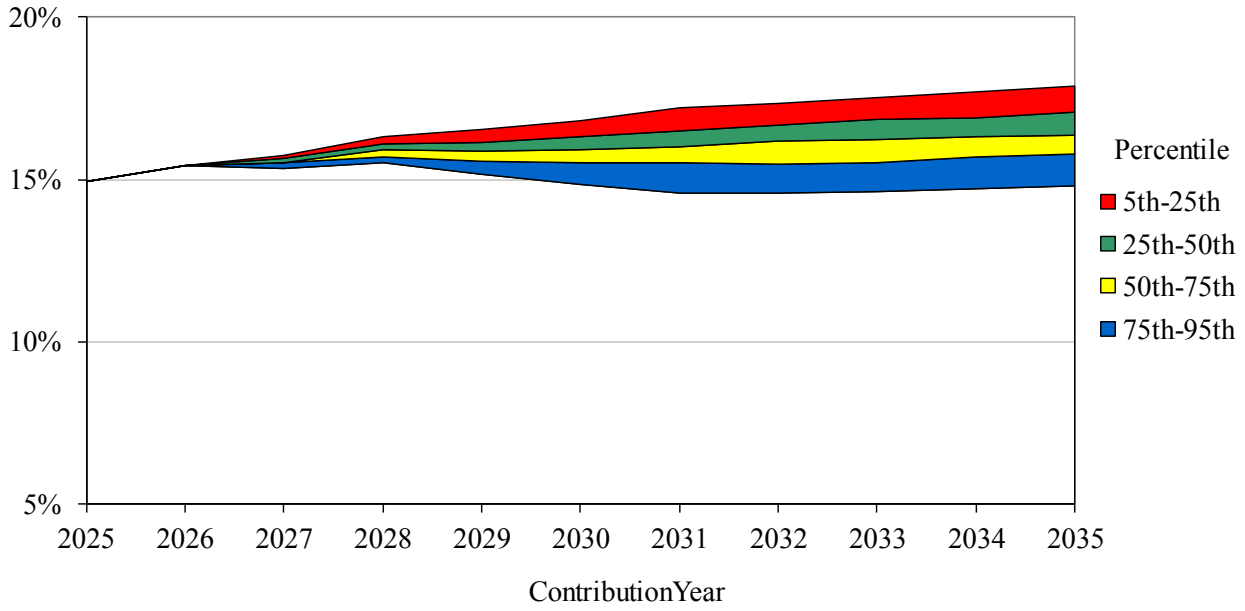
(Report-7)

Contribution as a % of Payroll
Scenario 1 – 4.5% Return, 2.2% Volatility



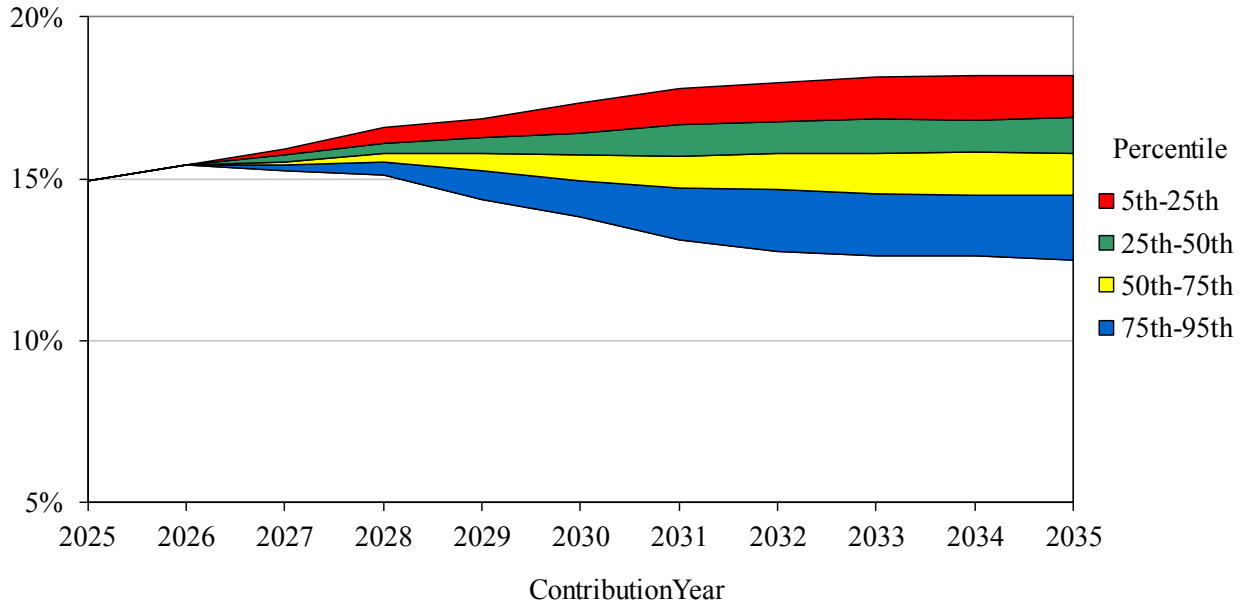
5th Percentile	14.9%	15.4%	15.6%	16.1%	16.2%	16.4%	16.7%	17.0%	17.1%	17.4%	17.6%
25th Percentile	14.9%	15.4%	15.6%	16.0%	16.1%	16.2%	16.5%	16.7%	16.9%	17.1%	17.3%
Median	14.9%	15.4%	15.6%	15.9%	16.0%	16.1%	16.3%	16.5%	16.7%	16.9%	17.1%
75th Percentile	14.9%	15.4%	15.5%	15.9%	15.9%	15.9%	16.1%	16.3%	16.4%	16.7%	16.9%
95th Percentile	14.9%	15.4%	15.5%	15.8%	15.8%	15.7%	15.8%	16.0%	16.1%	16.4%	16.6%

Contribution as a % of Payroll
Scenario 3 – 5.5% Return, 6.2% Volatility



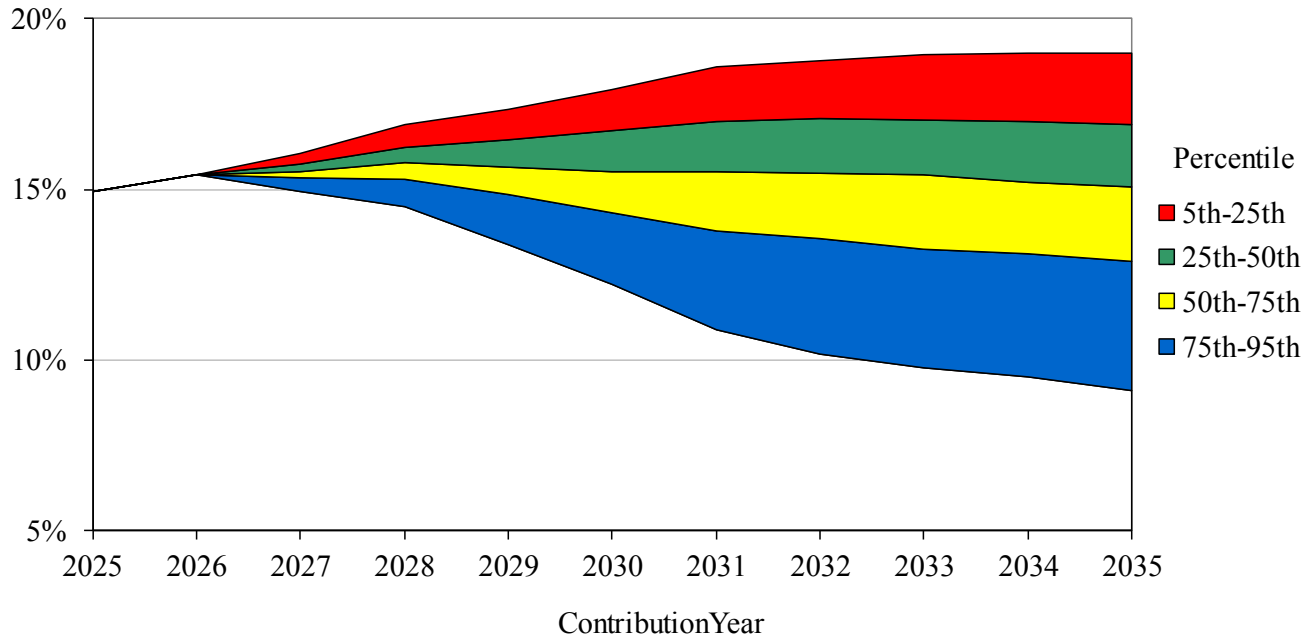
5th Percentile	14.9%	15.4%	15.7%	16.3%	16.6%	16.8%	17.2%	17.4%	17.5%	17.7%	17.9%
25th Percentile	14.9%	15.4%	15.6%	16.1%	16.2%	16.3%	16.5%	16.7%	16.8%	16.9%	17.1%
Median	14.9%	15.4%	15.5%	15.9%	15.9%	15.9%	16.0%	16.2%	16.2%	16.3%	16.4%
75th Percentile	14.9%	15.4%	15.5%	15.7%	15.6%	15.5%	15.5%	15.5%	15.5%	15.7%	15.8%
95th Percentile	14.9%	15.4%	15.3%	15.5%	15.2%	14.8%	14.6%	14.6%	14.6%	14.7%	14.8%

Contribution as a % of Payroll
Scenario 5 – 6.5% Return, 10.7% Volatility



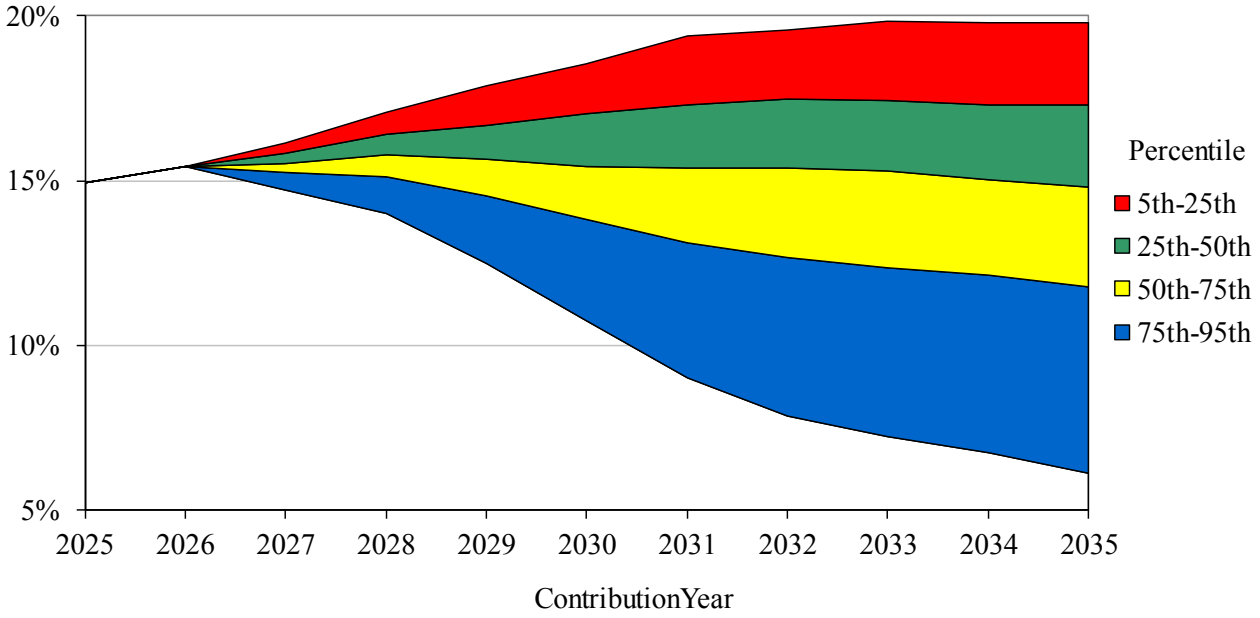
5th Percentile	14.9%	15.4%	15.9%	16.6%	16.9%	17.3%	17.8%	18.0%	18.1%	18.2%	18.2%
25th Percentile	14.9%	15.4%	15.7%	16.1%	16.3%	16.4%	16.7%	16.8%	16.8%	16.8%	16.9%
Median	14.9%	15.4%	15.5%	15.8%	15.8%	15.7%	15.7%	15.8%	15.8%	15.8%	15.8%
75th Percentile	14.9%	15.4%	15.4%	15.5%	15.3%	14.9%	14.7%	14.7%	14.5%	14.5%	14.5%
95th Percentile	14.9%	15.4%	15.2%	15.1%	14.4%	13.8%	13.1%	12.8%	12.6%	12.6%	12.5%

Contribution as a % of Payroll
Scenario 7 – 7.5% Return, 16.9% Volatility



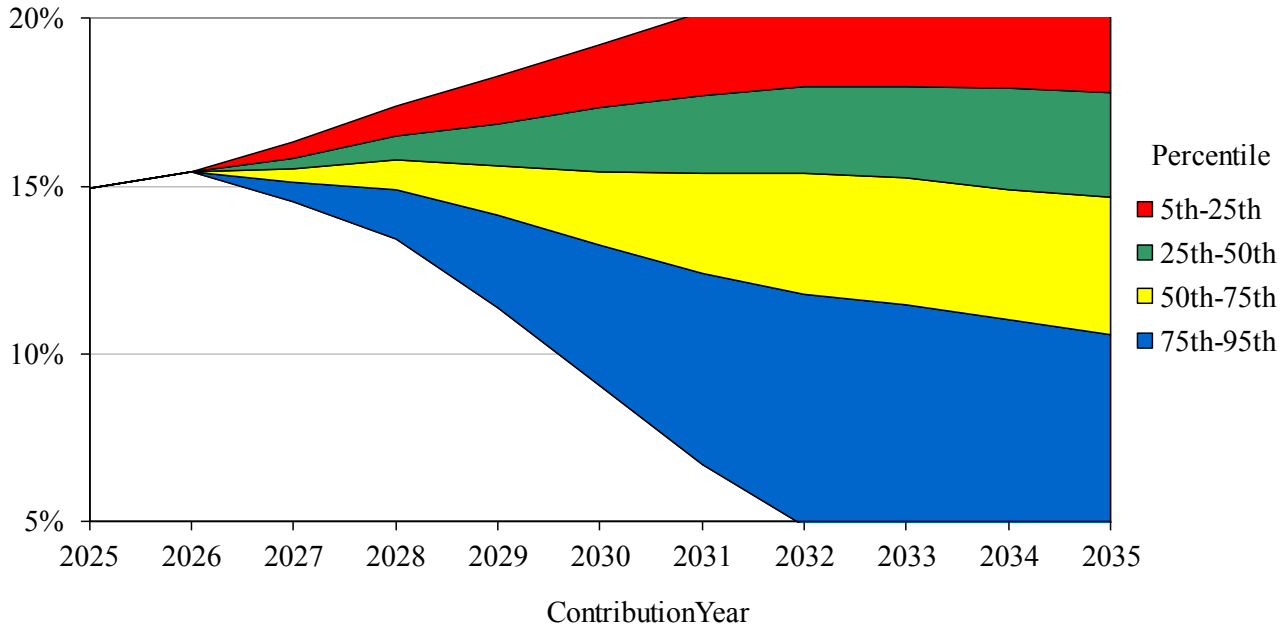
5th Percentile	14.9%	15.4%	16.0%	16.9%	17.4%	17.9%	18.6%	18.8%	18.9%	19.0%	19.0%
25th Percentile	14.9%	15.4%	15.7%	16.2%	16.5%	16.7%	17.0%	17.1%	17.0%	17.0%	16.9%
Median	14.9%	15.4%	15.5%	15.8%	15.7%	15.5%	15.5%	15.5%	15.4%	15.2%	15.1%
75th Percentile	14.9%	15.4%	15.3%	15.3%	14.8%	14.3%	13.8%	13.5%	13.2%	13.1%	12.9%
95th Percentile	14.9%	15.4%	14.9%	14.5%	13.4%	12.2%	10.9%	10.2%	9.7%	9.5%	9.1%

Contribution as a % of Payroll
Scenario 8 – 8.0% Return, 22.3% Volatility



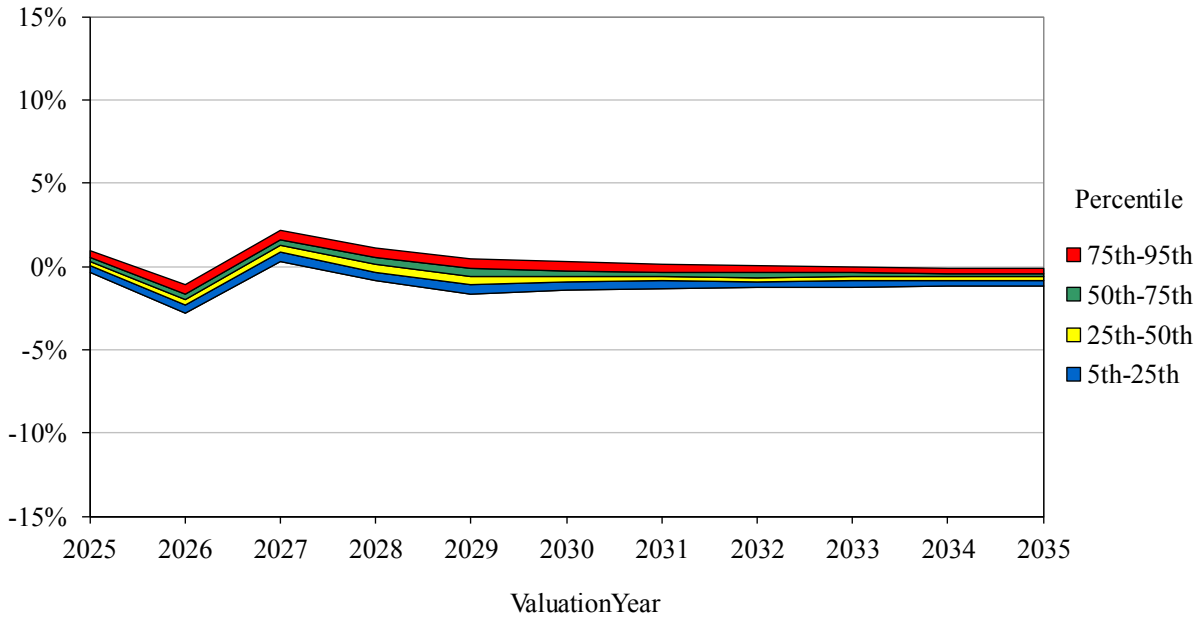
5th Percentile	14.9%	15.4%	16.1%	17.1%	17.9%	18.5%	19.4%	19.6%	19.8%	19.8%	19.8%
25th Percentile	14.9%	15.4%	15.8%	16.4%	16.7%	17.0%	17.3%	17.5%	17.4%	17.3%	17.3%
Median	14.9%	15.4%	15.5%	15.8%	15.7%	15.4%	15.4%	15.4%	15.3%	15.0%	14.8%
75th Percentile	14.9%	15.4%	15.2%	15.1%	14.5%	13.8%	13.1%	12.7%	12.3%	12.1%	11.8%
95th Percentile	14.9%	15.4%	14.7%	14.0%	12.5%	10.7%	9.0%	7.9%	7.2%	6.7%	6.1%

Contribution as a % of Payroll
Scenario 9 – 8.5% Return, 28.3% Volatility



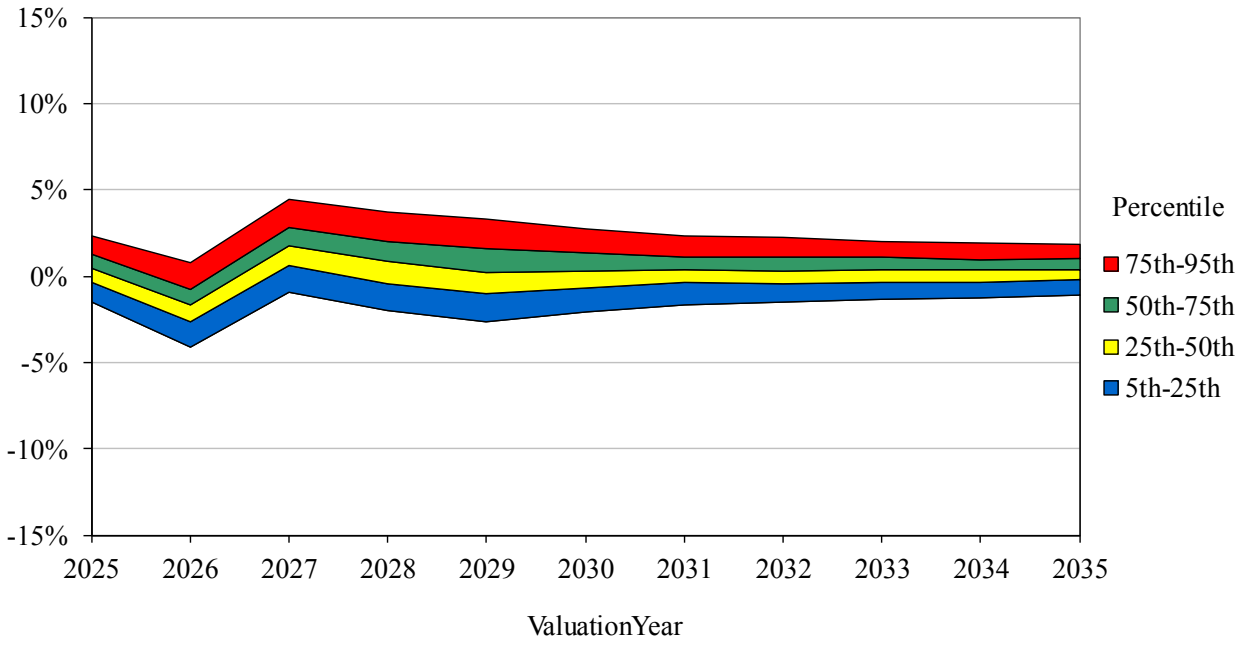
5th Percentile	14.9%	15.4%	16.3%	17.4%	18.3%	19.2%	20.2%	20.5%	20.6%	20.6%	20.7%
25th Percentile	14.9%	15.4%	15.8%	16.5%	16.9%	17.3%	17.7%	18.0%	18.0%	17.9%	17.8%
Median	14.9%	15.4%	15.5%	15.8%	15.6%	15.4%	15.4%	15.4%	15.2%	14.9%	14.7%
75th Percentile	14.9%	15.4%	15.1%	14.9%	14.1%	13.2%	12.4%	11.8%	11.4%	11.0%	10.6%
95th Percentile	14.9%	15.4%	14.5%	13.4%	11.4%	9.0%	6.7%	4.9%	4.0%	3.2%	2.4%

Dividend Rates
Scenario 1 – 4.5% Return, 2.2% Volatility



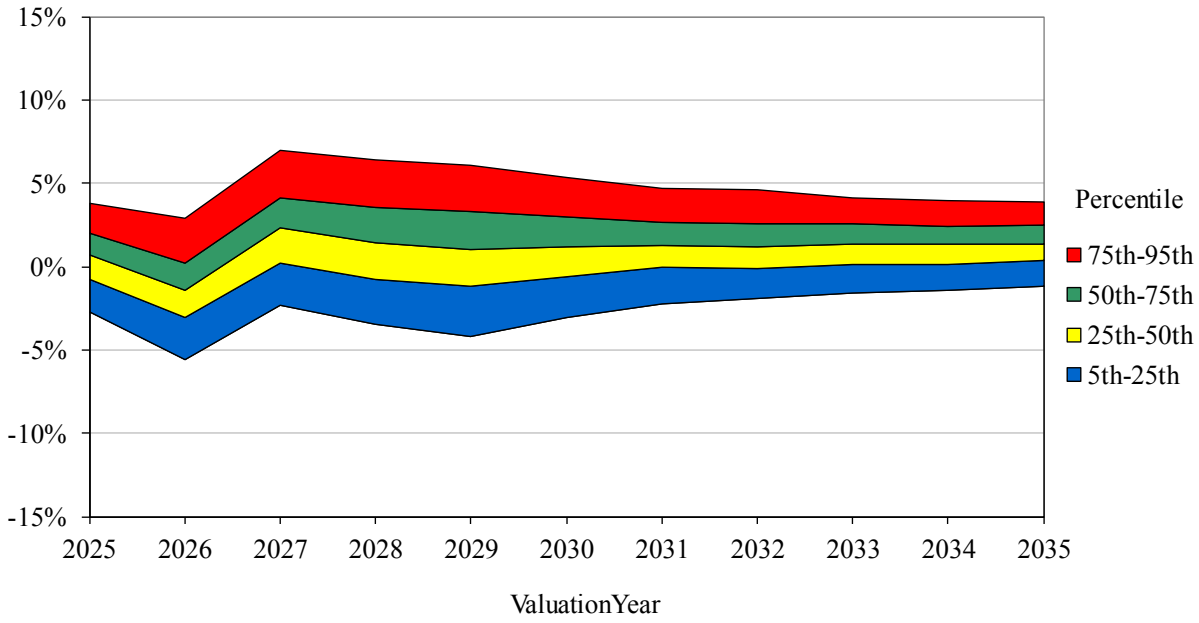
5th Percentile	-0.4%	-2.8%	0.3%	-0.8%	-1.6%	-1.4%	-1.3%	-1.3%	-1.2%	-1.2%	-1.1%
25th Percentile	0.0%	-2.3%	0.9%	-0.3%	-1.0%	-1.0%	-0.9%	-0.9%	-0.9%	-0.9%	-0.8%
Median	0.3%	-2.0%	1.3%	0.1%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%
75th Percentile	0.6%	-1.6%	1.6%	0.6%	-0.1%	-0.2%	-0.3%	-0.4%	-0.4%	-0.4%	-0.4%
95th Percentile	1.0%	-1.1%	2.2%	1.2%	0.5%	0.3%	0.1%	0.1%	-0.1%	-0.1%	-0.1%

Dividend Rates
Scenario 3 – 5.5% Return, 6.2% Volatility



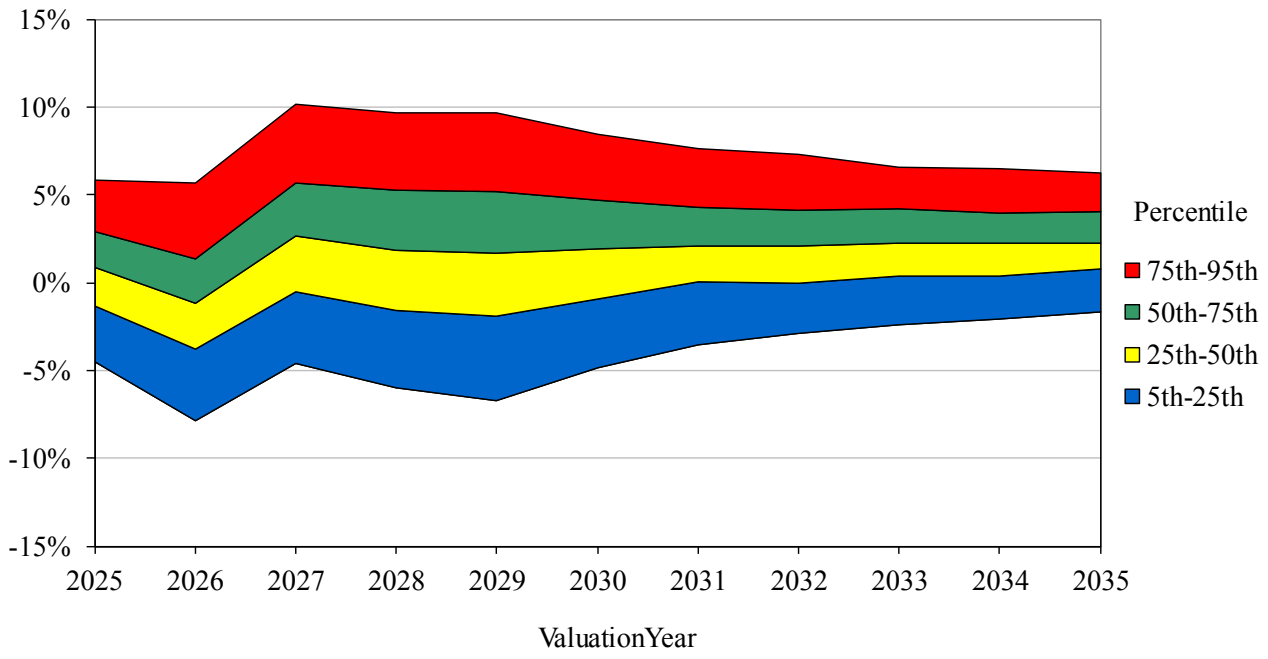
5th Percentile	-1.5%	-4.1%	-0.9%	-2.0%	-2.7%	-2.1%	-1.7%	-1.5%	-1.3%	-1.2%	-1.1%
25th Percentile	-0.3%	-2.6%	0.6%	-0.5%	-1.0%	-0.7%	-0.4%	-0.4%	-0.3%	-0.3%	-0.2%
Median	0.5%	-1.7%	1.8%	0.8%	0.3%	0.3%	0.4%	0.3%	0.4%	0.4%	0.4%
75th Percentile	1.3%	-0.7%	2.9%	2.0%	1.6%	1.3%	1.2%	1.1%	1.1%	1.0%	1.0%
95th Percentile	2.3%	0.8%	4.5%	3.7%	3.3%	2.7%	2.4%	2.3%	2.0%	1.9%	1.8%

Dividend Rates
Scenario 5 – 6.5% Return, 10.7% Volatility



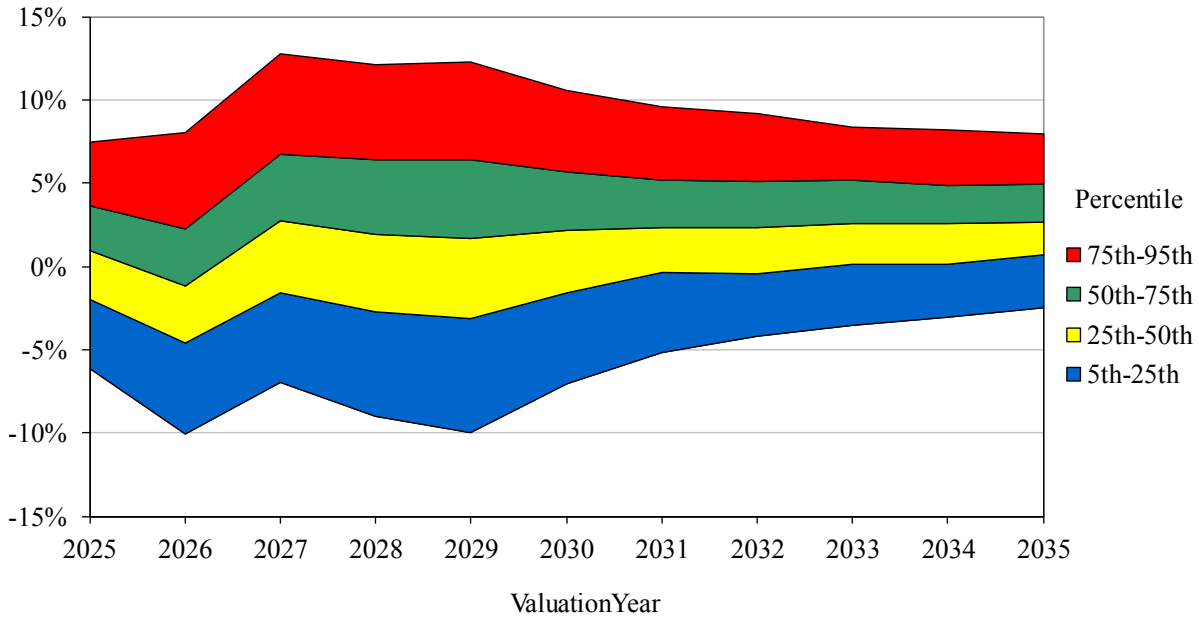
5th Percentile	-2.7%	-5.6%	-2.3%	-3.5%	-4.2%	-3.0%	-2.3%	-1.9%	-1.5%	-1.4%	-1.1%
25th Percentile	-0.7%	-3.0%	0.3%	-0.8%	-1.2%	-0.6%	0.0%	-0.1%	0.2%	0.2%	0.4%
Median	0.7%	-1.4%	2.3%	1.4%	1.0%	1.2%	1.3%	1.2%	1.3%	1.3%	1.3%
75th Percentile	2.0%	0.3%	4.1%	3.6%	3.3%	3.0%	2.7%	2.6%	2.6%	2.4%	2.5%
95th Percentile	3.8%	2.9%	7.0%	6.4%	6.1%	5.4%	4.7%	4.6%	4.1%	4.0%	3.9%

Dividend Rates
Scenario 7 – 7.5% Return, 16.9% Volatility



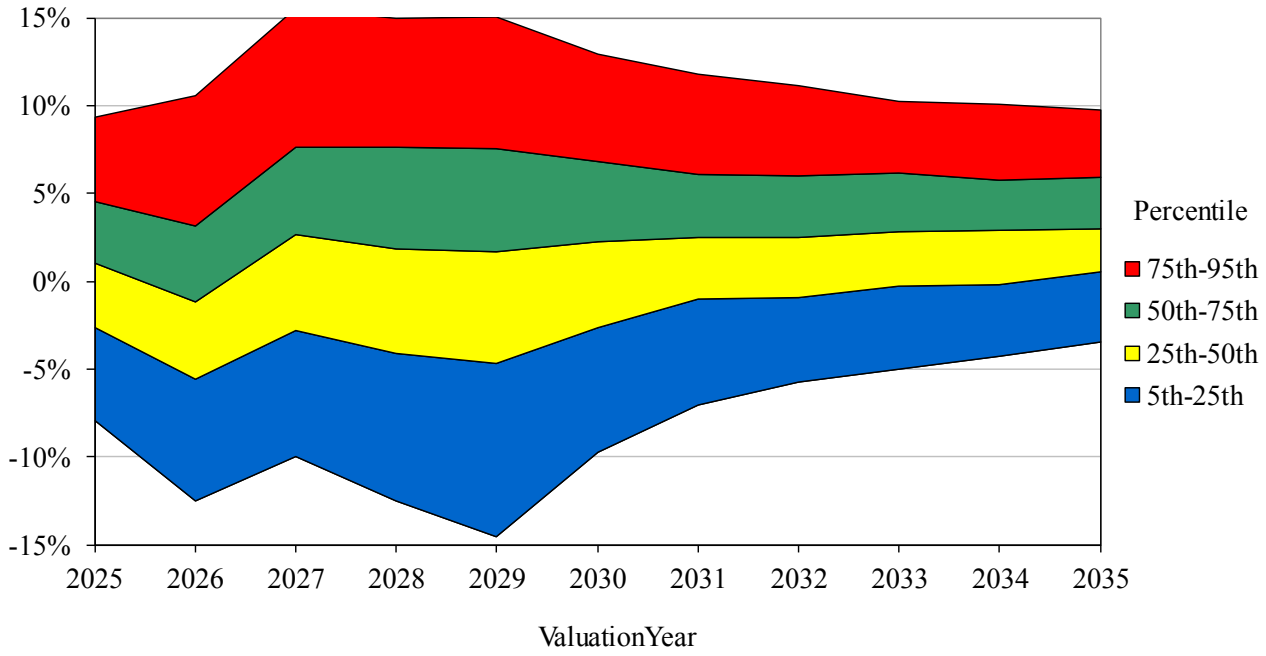
5th Percentile	-4.5%	-7.9%	-4.6%	-5.9%	-6.7%	-4.8%	-3.5%	-2.9%	-2.4%	-2.1%	-1.6%
25th Percentile	-1.3%	-3.7%	-0.6%	-1.6%	-1.9%	-0.9%	0.1%	0.0%	0.4%	0.4%	0.8%
Median	0.9%	-1.2%	2.7%	1.9%	1.7%	2.0%	2.1%	2.1%	2.2%	2.2%	2.3%
75th Percentile	2.9%	1.4%	5.7%	5.3%	5.2%	4.7%	4.3%	4.1%	4.2%	3.9%	4.0%
95th Percentile	5.8%	5.7%	10.2%	9.7%	9.7%	8.5%	7.6%	7.3%	6.6%	6.5%	6.3%

Dividend Rates
Scenario 8 – 8.0% Return, 22.3% Volatility



5th Percentile	-6.1%	-10.1%	-6.9%	-9.0%	-10.0%	-7.0%	-5.2%	-4.2%	-3.6%	-3.1%	-2.5%
25th Percentile	-2.0%	-4.6%	-1.5%	-2.7%	-3.1%	-1.5%	-0.4%	-0.4%	0.1%	0.1%	0.7%
Median	1.0%	-1.2%	2.8%	1.9%	1.7%	2.2%	2.3%	2.3%	2.6%	2.6%	2.7%
75th Percentile	3.7%	2.2%	6.7%	6.4%	6.4%	5.7%	5.2%	5.1%	5.2%	4.9%	5.0%
95th Percentile	7.5%	8.1%	12.8%	12.2%	12.3%	10.5%	9.6%	9.2%	8.4%	8.2%	8.0%

Dividend Rates
Scenario 9 – 8.5% Return, 28.3% Volatility



5th Percentile	-7.9%	-12.5%	-10.0%	-12.5%	-14.6%	-9.8%	-7.1%	-5.7%	-5.0%	-4.3%	-3.5%
25th Percentile	-2.7%	-5.5%	-2.8%	-4.1%	-4.7%	-2.6%	-1.0%	-1.0%	-0.3%	-0.2%	0.5%
Median	1.1%	-1.2%	2.7%	1.8%	1.7%	2.3%	2.5%	2.5%	2.9%	2.9%	3.0%
75th Percentile	4.5%	3.1%	7.7%	7.7%	7.5%	6.8%	6.1%	6.0%	6.2%	5.8%	5.9%
95th Percentile	9.3%	10.6%	15.6%	15.0%	15.0%	12.9%	11.8%	11.1%	10.3%	10.1%	9.8%

WRS Stress Testing (Limitations and Simplifications)

- Goal is to understand the potential effect of various levels of stress on the System (not calculate exact predictions)
- Simplifying assumptions
  - Retiree funded status allowed to become negative and recover over time
  - Typical dividend adjustments (mortality improvements, carryover, timing, etc.) assumed to average to zero
  - Iterative impact between Money Purchase Minimum and contribution rates assumed to average to zero
  - Modified Normal Distribution in future years (standard deviation gradually declines in future years)

Combination of All Scenarios

2045 Results by Percentile of Investment Return Outcomes										
			Contribution Rates			Dividend Rates			Highest	Worst Retiree
Scenario	Expected RoR	Standard Deviation	95th	50th	5th	95th	50th	5th	Div. Dep. PRB	Funded %
1	4.5%	2.2%	18.5%	18.9%	19.4%	0.0%	-0.5%	-1.1%	100%/Year50	72%/Year50
2	5.0%	4.1%	17.2%	18.2%	19.1%	0.9%	0.0%	-1.0%	50%/Year50	86%/Year50
3	5.5%	6.2%	15.8%	17.5%	18.8%	1.9%	0.5%	-1.0%	10%/Year50	98%/Year50
4	6.0%	8.2%	14.3%	16.6%	18.5%	2.9%	1.0%	-1.0%	5%/Year50	106%/Year10
5	6.5%	10.7%	12.3%	15.8%	18.3%	4.0%	1.5%	-1.0%	6%/Year50	103%/Year10
6	7.0%	14.0%	9.8%	14.9%	18.3%	5.3%	2.0%	-1.3%	11%/Year50	96%/Year10
7	7.5%	16.9%	7.2%	14.0%	18.3%	6.5%	2.6%	-1.5%	15%/Year50	91%/Year10
8	8.0%	22.3%	2.7%	13.1%	18.8%	8.3%	3.1%	-2.3%	24%/Year50	79%/Year10
9	8.5%	28.3%	0.0%	12.2%	19.4%	10.3%	3.5%	-3.4%	30%/Year50	66%/Year10

Actuarial Rate 6.8% →

- Portfolios with lower expected return result in higher expected contributions and lower expected dividends
- Higher assumed rates of return are associated with higher standard deviation (i.e., risk) and 5th percentile scenario for retiree dividend pool falling below 75% (Worst Retiree Funded %)
- Scenarios 4 through 7 represent potential 'Goldilocks Zone'

Disclaimers

- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- Mark Buis, James Anderson and Rich Koch are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.
- This is one of multiple documents comprising the actuarial report. Additional information regarding actuarial assumptions and methods, and important additional disclosures are provided in the full report entitled "Forty-Fourth Annual Actuarial Valuation and Gain Loss Analysis."
- If you need additional information to make an informed decision about the contents of this presentation or the contents of the full report, or if anything appears to be missing or incomplete, please contact us before making use of the information.

SWIB STATE OF WISCONSIN INVESTMENT BOARD

ASSET ALLOCATION REVIEW

OCTOBER WORKSHOP

OCTOBER 2025

Joseph Nankof, Partner
Todd Mattina, Head Economist and ARA, CIO

NEPC

AGENDA

- Introduction
- Summary
- Background & Assumptions
- Scenario Analysis
- Recommendations
- Appendix

SUMMARY

SUMMARY

- **Significant changes in financial markets**
  - Volatility as uncertainty builds around fiscal, monetary, and trade policy
  - Labor market weakness
  - Elevated equity market valuations
  - Current credit spreads don't offer much upside
- **Themes of asset allocation analysis**
  - On-Year with GRS stress testing results
  - Evaluate policy leverage, private investment pacing plan, and the strategic allocation across fixed income
- **Preliminary recommendations**
  - A decrease of 2% in Public Equities and a decrease in Policy Leverage by 2%.
  - Eliminate Long Treasury allocation and replace with US Treasury in Public Fixed Income.
  - Implementation of an active risk range of zero to 90 bps for VTF.

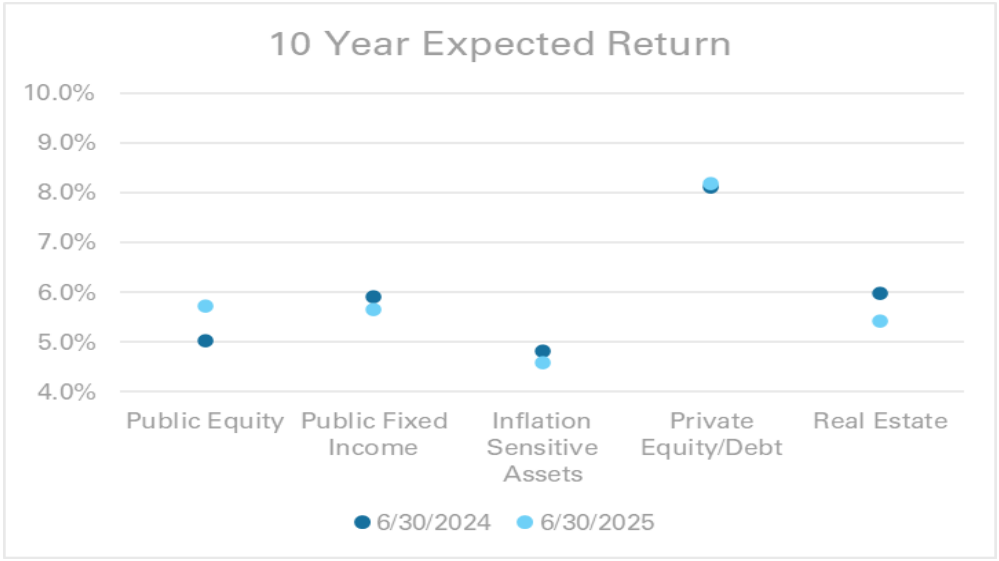
CURRENT POLICY AND RECOMMENDATION

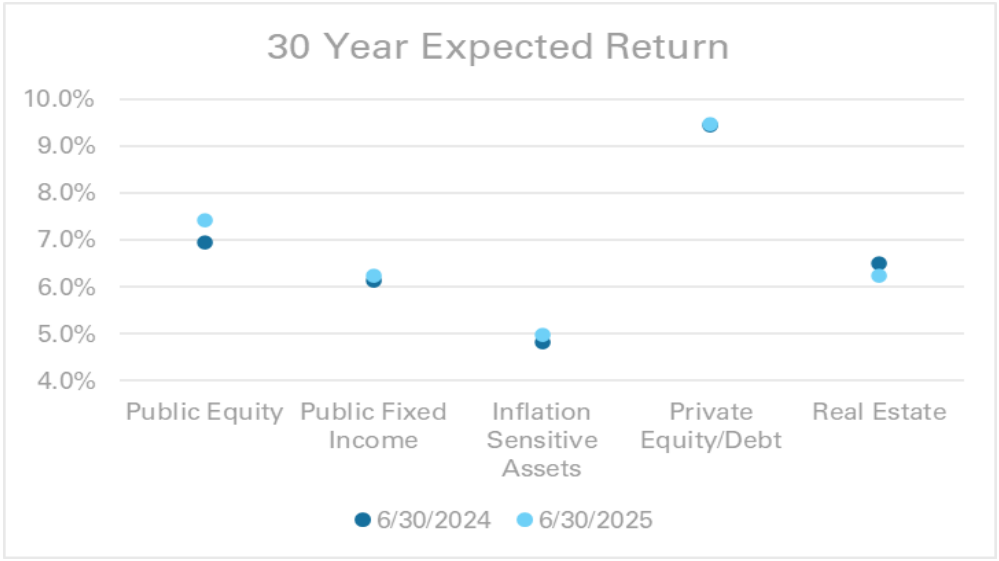
The biennial asset/liability review is an opportunity to review the asset allocation relative to the liabilities and consider adjustments to long-term investment policy. This exercise is intended to evaluate the long-term strategic decisions outlined in the table below.

Decision	Current Policy Targets	Preliminary Recommended Targets
Public Markets Allocation	38% Equity/27% Fixed Income/19% TIPS	36% Equity/27% Fixed Income/19% TIPS
Private Markets Allocation	20% Private Equity & Debt / 8% Real Estate	No Change
Leverage Level	-12%	-10%
Public Equity Structure	Global Market Capitalization (China Half Weight)	No Change
Public Fixed Income Structure	60% Investment-Grade / 40% Below Investment-Grade and Emerging Markets Debt	Eliminate Long Treasury allocation and increase US Treasury to 28% of Public Fixed Income allocation

BACKGROUND & ASSUMPTIONS

2024 & 2025 ASSUMPTIONS





Sources: S&P, FactSet

ASSET CLASS ASSUMPTIONS

OVERVIEW

- **NEPC's capital market assumptions are updated quarterly with this release reflecting market data as of June 30, 2025**
- **U.S. equity markets fully recovered from the early April selloff – hitting new highs to end the quarter**
- **Despite recent valuation expansion, Non-U.S. developed market equity return assumptions improved, reflecting a modest increase in long-term earnings expectations**
- **Fixed income assumptions are lower as market rate expectations shifted modestly lower, pulling down interest rate forecasts**
- **Credit spreads remain tight and are below long-term medians, limiting the upside return potential within risk-seeking credit**

CAPITAL MARKET ASSUMPTION PRINCIPLES

HOW SHOULD RETURN ASSUMPTIONS BE INTERPRETED

- **NEPC return assumptions are meant to reflect a nominal return expectation, net of fees, over a 10-year and 30-year investment horizon**
- **With this in mind, NEPC asset class return assumptions look to include all sources of return that flow to an asset class over time**
  - Each major contributing source of return is a building block in our models
- **NEPC's asset class models are designed to be forward-looking and not to replicate the past, which requires both model scrutiny and iteration**
- **Forecasting asset class returns, requires forward-looking assumptions about building block contributors and how they evolve over time**
- **Developing market trends require scrutiny and time to analyze data and research market shifts to understand whether they are cyclical or structural inputs contributing to an asset class's building blocks**

ASSET CLASS ASSUMPTIONS

DEVELOPMENT

- **Capital market assumptions are published for over 70 core asset classes and over 30 composites**
- **Market data as of 06/30/2025**
- **NEPC proprietary models used to develop return forecasts based on a building block approach**
- **The 10-year return outlook is intended to support strategic asset allocation analysis**
- **30-year return assumptions are used for actuarial inputs and long-term planning**

Asset Allocation Process

1. Finalize list of new asset classes
2. Calculate asset class volatility and correlation assumptions
3. Set model terminal values, growth, and inflation inputs
4. Model data updated at quarter-end
5. Review model outputs and produce asset class return assumptions
6. Assumptions released on the 15th calendar day after quarter-end

ASSET CLASS BUILDING BLOCKS

METHODOLOGY

- **Asset models reflect current and forecasted market data to inform expected returns**
- **Systematic inputs are paired with a long-term trend to terminal values**
- **Model inputs are aggregated to capture key return drivers for each asset class**
- **Building block inputs will differ across asset class categories**

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	6/30/2025 10-Year Return	6/30/2024 10-Year Return	Delta
	Cash	3.8%	4.2%	-0.4%
	U.S. Inflation	2.6%	2.6%	-
Equity	U.S. Large-Cap Equity	5.3%	4.0%	+1.3%
	Non-U.S. Developed Equity	5.3%	4.5%	+0.8%
	Emerging Market Equity	6.6%	7.8%	-1.2%
	Global Equity*	5.7%	5.0%	+0.7%
	Private Equity*	8.6%	8.7%	-0.1%
Fixed Income	U.S. Treasury Bond	4.4%	4.6%	-0.2%
	U.S. Municipal Bond	4.3%	3.8%	+0.5%
	U.S. Aggregate Bond*	4.8%	5.0%	-0.2%
	U.S. TIPS	4.6%	4.8%	-0.2%
	U.S. High Yield Corporate Bond	6.1%	6.3%	-0.2%
	Private Debt*	8.3%	8.3%	-
Real Assets	Commodity Futures	4.8%	4.4%	+0.4%
	REIT	5.5%	6.3%	-0.8%
	Gold	4.0%	5.0%	-1.0%
	Real Estate - Core	5.4%	6.0%	-0.6%
	Private Real Assets - Infrastructure	5.7%	6.6%	-0.9%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	5.4%	4.7%	+0.7%
	60% MSCI ACWI & 40% U.S. Agg.	5.7%	5.3%	+0.4%
	Hedge Fund*	6.2%	6.2%	-

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time.

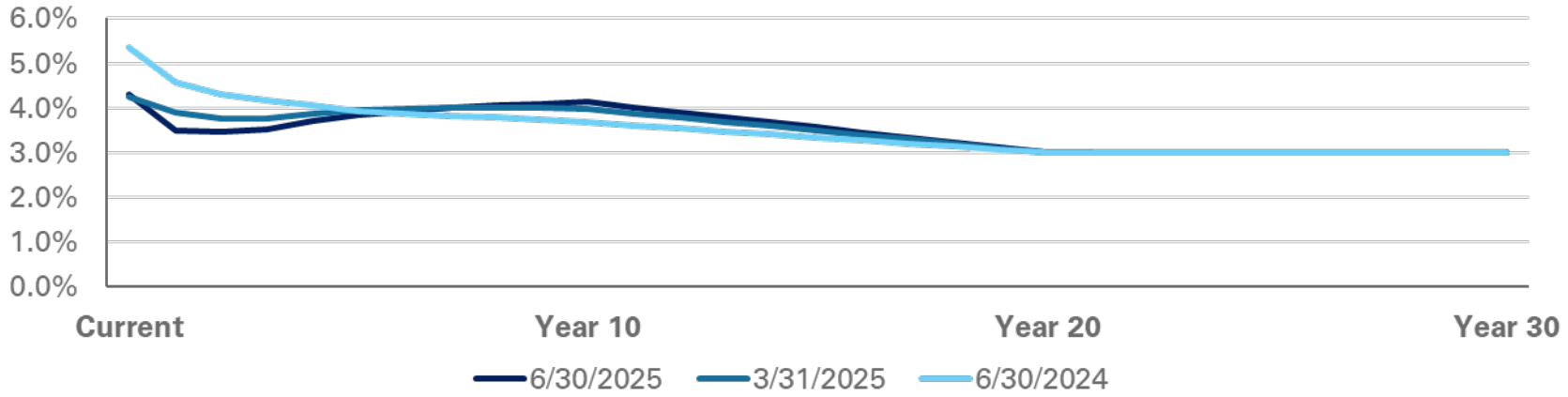
U.S. INFLATION ASSUMPTIONS

OVERVIEW

- **Inflation is a key building block to develop asset class assumptions**
- **Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets**
- **NEPC's inflation assumption forecasts near-term paths for major Consumer Price Index (CPI) components including food, energy, core services, and shelter costs**
  - CPI is expected to converge with breakeven inflation forecast over the long-term
- **The composite inflation assumption reflects a blend of NEPC's inflation forecast and market-implied breakeven inflation rates**

U.S. Inflation Assumption		
Time Horizon	**Current**	**12-Month Change**
10-Year	2.6%	—
30-Year	2.7%	+0.1%

U.S. CASH
EXPECTATIONS



- **Cash is a foundational input for all asset class return expectations that reflects forward expectations of inflation and real interest rates**
  - Cash + risk premia is an input for long-term asset class return projections

- **The composite cash assumption is built from a blend of NEPC's cash forecast and market forward pricing of short-term interest rates**

Time Horizon	Current	12-Month Change
10-Year	3.8%	-0.4%
30-Year	3.5%	—

Sources: Bloomberg, FactSet, NEPC

RECOMMENDATIONS

POLICY ALLOCATION APPROACH

Summary

- Liability-aware strategy balances target returns with downside risks, limiting the chance of higher contributions, underfunding, or lower dividends.
- GRS analysis supports a 10-year target return between 6% and 7.5%, exceeding the 5% dividend adjustment hurdle while promoting stable contributions, lower funding shortfall risk, and sustainable dividend increases.
- Weak 2022 capital market returns continue to flow through the 5-year Market Recognition Account, pressuring dividend adjustment rates in 2025 and 2026.
- Dividend liability has risen to 22% of the total actuarial liability—the highest since 2008—providing a strong buffer in funding status against future adverse returns.
- The private investments allocation continues to progress in line with the updated pacing plan. Updates to the 2024 pacing plan of private investments indicate that the actual allocation is expected to be well within policy ranges this year.
- The Policy Leverage framework points to a lower target allocation, driven by the reduced expected excess return and higher volatility based on 30-year expectations.

GRS STRESS-TESTING SUPPORTS A POLICY PORTFOLIO WITH TARGET RETURNS OF 6% TO 7.5%

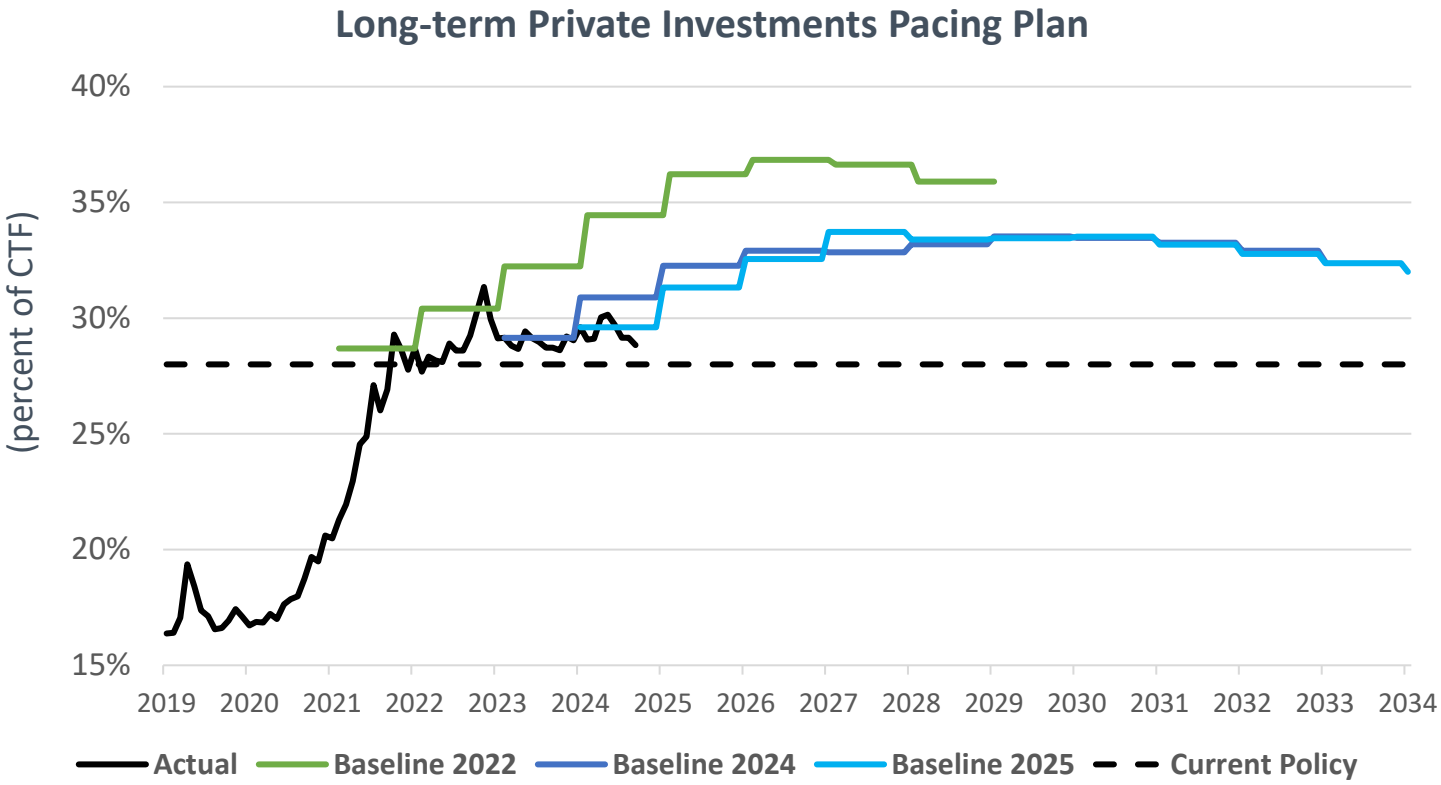
GRS Stress-Testing Results – October 2025

2035 Results by Percentile of Investment Return Outcomes										
			Contribution Rates			Dividend Rates			Highest	Worst Retiree
Scenario	Expected RoR	Standard Deviation	95th	50th	5th	95th	50th	5th	Div. Dep. PRB	Funded %
1	4.5%	2.2%	16.6%	17.1%	17.6%	-0.1%	-0.6%	-1.1%	100%/Year50	72%/Year50
2	5.0%	4.1%	15.8%	16.8%	17.7%	0.8%	-0.1%	-1.1%	50%/Year50	86%/Year50
3	5.5%	6.2%	14.8%	16.4%	17.9%	1.8%	0.4%	-1.1%	10%/Year50	98%/Year50
4	6.0%	8.2%	13.8%	16.1%	18.0%	2.8%	0.8%	-1.0%	5%/Year50	106%/Year10
5	6.5%	10.7%	12.5%	15.8%	18.2%	3.9%	1.3%	-1.1%	6%/Year50	103%/Year10
6	7.0%	14.0%	10.9%	15.4%	18.6%	5.1%	1.8%	-1.4%	11%/Year50	96%/Year10
7	7.5%	16.9%	9.1%	15.1%	19.0%	6.3%	2.3%	-1.6%	15%/Year50	91%/Year10
8	8.0%	22.3%	6.1%	14.8%	19.8%	8.0%	2.7%	-2.5%	24%/Year50	79%/Year10
9	8.5%	28.3%	2.4%	14.7%	20.7%	9.8%	3.0%	-3.5%	30%/Year50	66%/Year10

Actuarial Rate 6.8% →

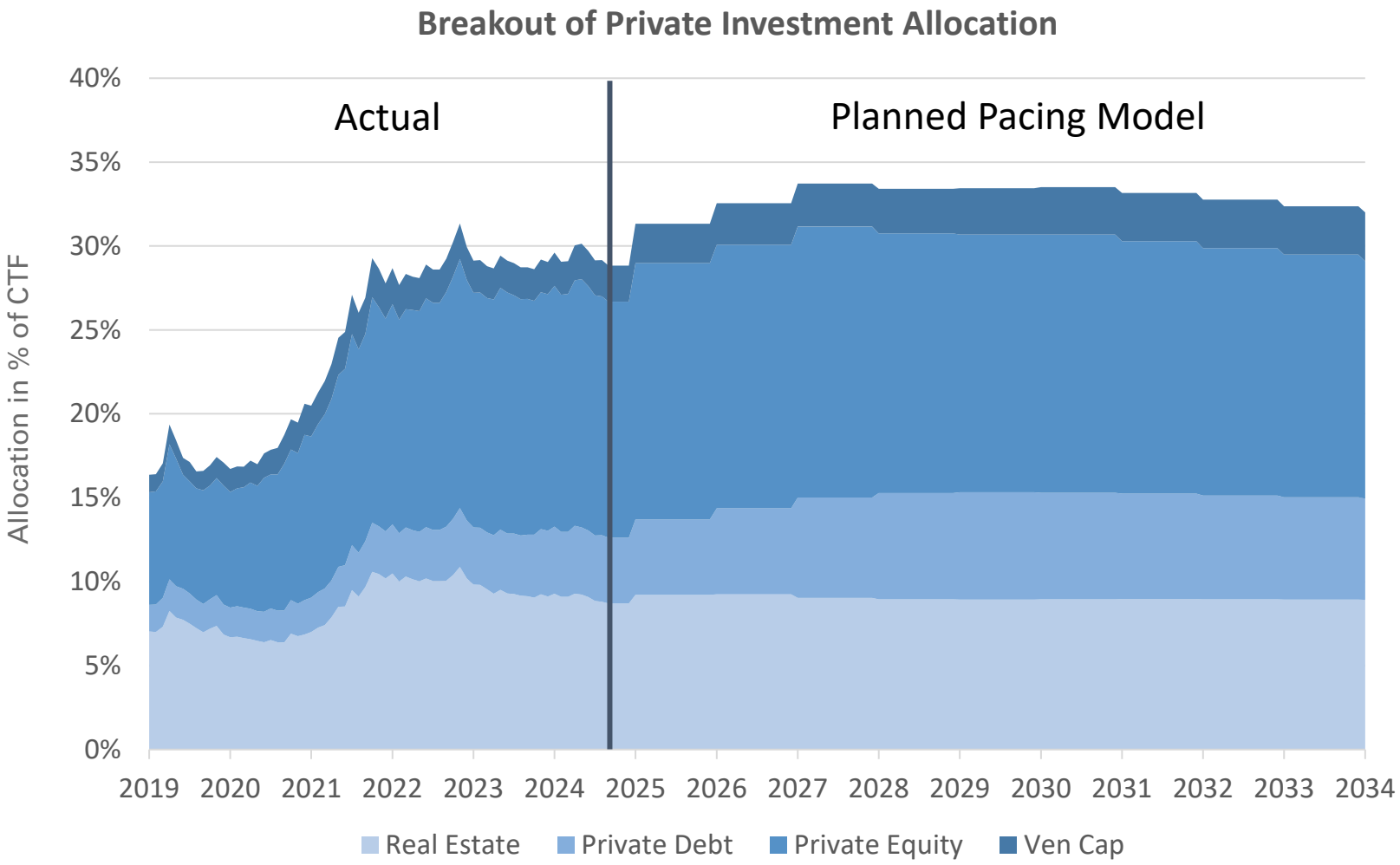
- GRS stress-testing helps select portfolios with target returns that balance upside potential against risks like higher contributions, plan under-funding, or lower dividend increases.
- Scenarios 4 to 7 with target returns of 6% and 7.5%, respectively, balance downside risks with sufficient return to keep the plan financially stable over time.
- Target returns above 7.5% sharply increase CTF volatility and the likelihood of adverse outcomes (higher contributions, underfunding, negative dividends).

LONG-TERM PRIVATE INVESTMENTS PACING PLAN SUGGESTS NO CHANGE IN TARGET ALLOCATIONS



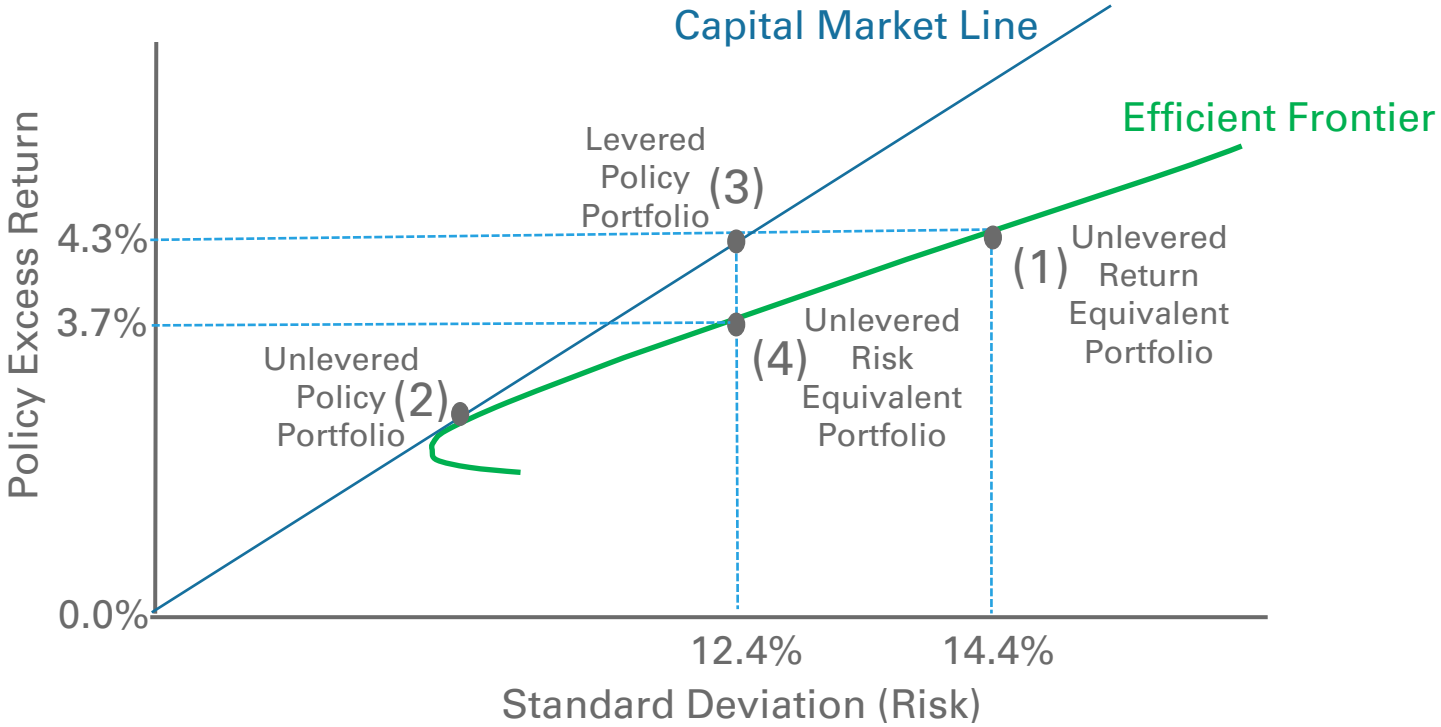
- Private investments allocation continues to evolve in line with the updated pacing plan of cash flow projections.
- Projected allocations are expected to remain within policy ranges this year.

COMPOSITION OF PRIVATE INVESTMENTS PACING PLAN BY SUB-ASSET CLASS



POLICY LEVERAGE FRAMEWORK - REVIEW

(HISTORICAL LEVERAGE PREFERENCE)



Steps:

1. Determine long term average return and risk for Policy Portfolio and cash
2. Determine long term average return of Unlevered Risk Equivalent Portfolio
3. Implied leverage preference over long term has averaged 1.16x.
4. Leverage changes over time:
   - Sharpe Ratio near term > Sharpe Ratio long term, Leverage ratio > 1.16x
   - Sharpe Ratio near term < Sharpe Ratio long term, Leverage ratio < 1.16x

TRENDS IN IMPLIED POLICY LEVERAGE PREFERENCE

	Policy Portfolio Characteristics			Implied Policy Leverage Preference			
	Excess Return (%)	Vol. (%)	Sharpe Ratio	Excess Return [1]	Volatility Approach [2]	Average of [1] and [2] [3]	Refined Vol. Approach [4]
15yr Avg	**4.26**	**12.37**	**0.340**	**16%**	**16%**	**16%**	**16%**
2022	4.45	12.70	0.350	21%	13%	17%	17%
2023	4.01	12.37	0.324	9%	16%	13%	13%
2024	4.01	12.40	0.323	9%	16%	12%	11%
2025*	4.01	12.55	0.320	9%	14%	12%	10%

[1]: When excess return is higher than the 15yr average of 4.26%, implied Policy Leverage goes up.

[2]: When volatility is higher than the 15 yr average of 12.37%, implied Policy Leverage falls.

[3]: The 2023 Policy Leverage framework took an average of approaches [1] and [2].

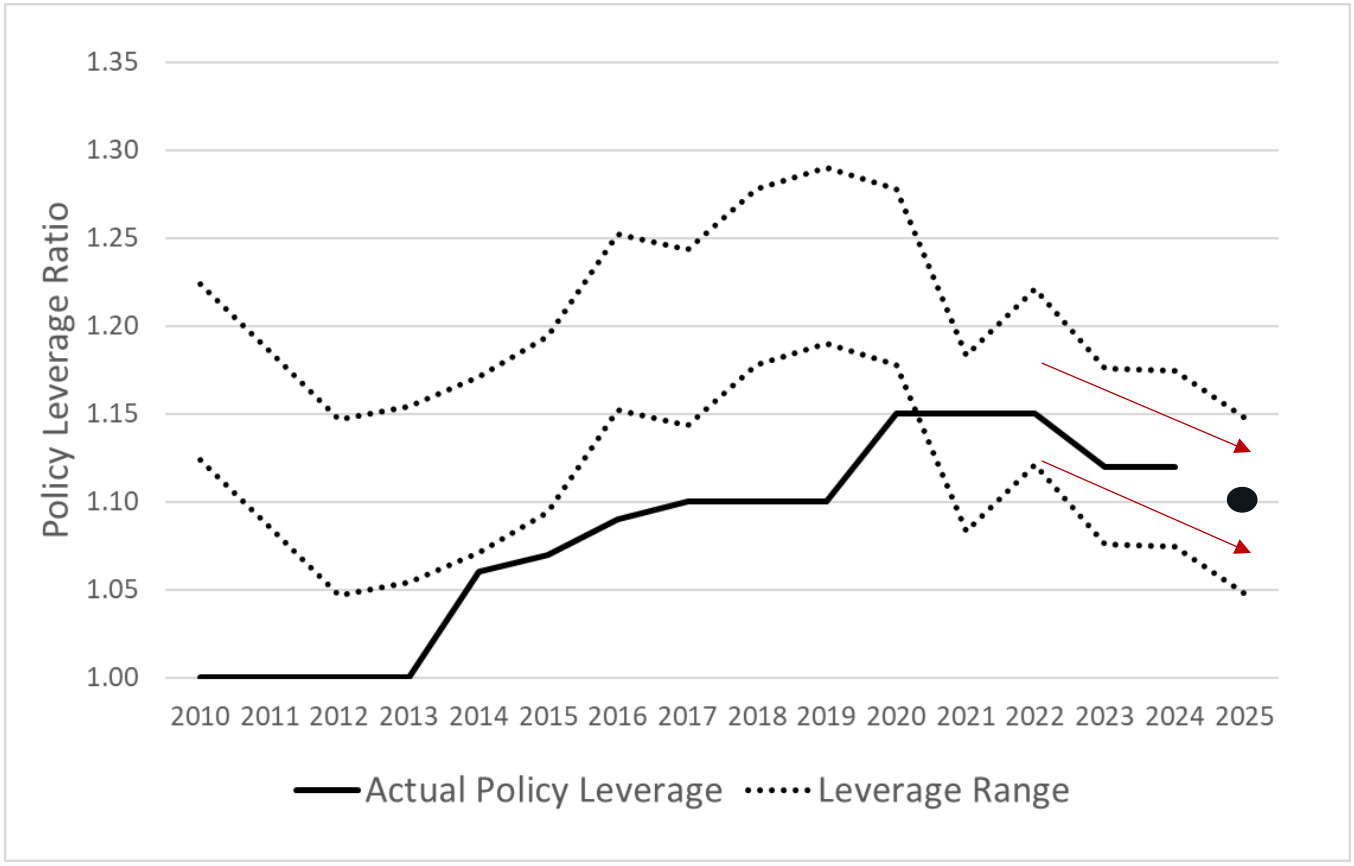
[4]: The refined Volatility Approach evaluates how the updated capital market assumptions impact the Sharpe Ratio of the current policy portfolio.

*ARA carried over the 2024 excess return into 2025 to control for a methodological change in the capital market assumptions.

POLICY LEVERAGE FRAMEWORK SUGGESTS A DECLINE

(ACTUAL POLICY LEVERAGE COMPARED TO MODEL-BASED LEVERAGE RANGE)

Model-Based Range in Policy Leverage
Compared to Actual Target Policy Leverage



The declining model-based range in implied Policy Leverage preference reflects higher cash rates after 2022 and lower excess returns in recent years.

Volatility has also increased in recent years, which has reduced the expected Sharpe ratio.

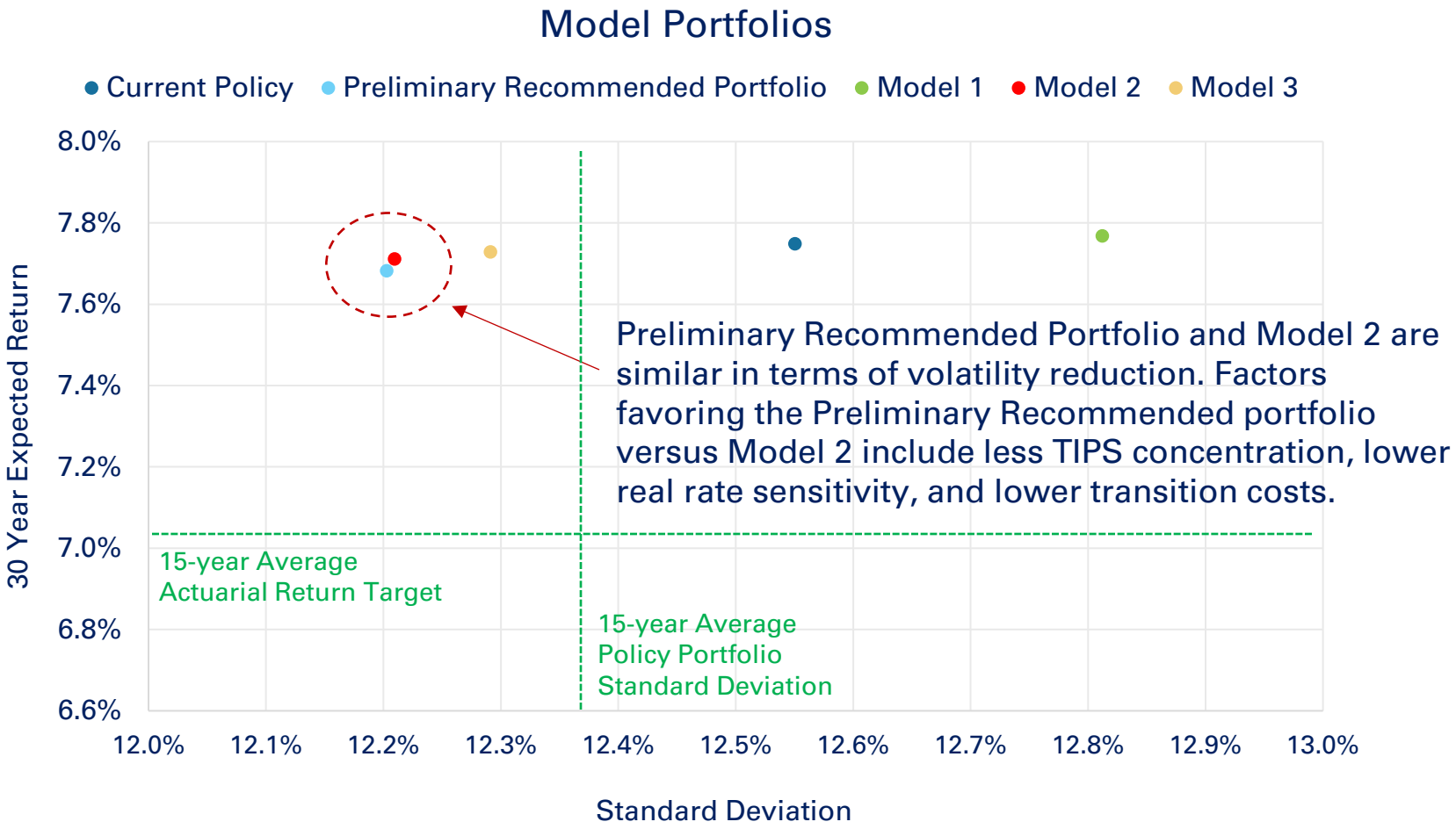
Dot in 2025 represents the preliminary recommendation for the Policy Leverage Target.

CURRENT AND RECOMMENDED ALLOCATIONS

SUMMARY

Asset Class	10 Year Return Geometric Return	10 Year Sharpe Ratio	30 Year Return Geometric Return	30 Year Sharpe Ratio	Standard Deviation	Current Policy	Preliminary Recommended Portfolio	Model 1	Model 2	Model 3
Public Equity	5.7%	0.105	7.4%	0.217	18.1%	38%	36%	40%	36%	36%
Public Fixed Income	5.7%	0.291	6.2%	0.441	6.3%	27%	27%	25%	27%	29%
TIPS	4.6%	0.124	5.0%	0.248	6.0%	19%	19%	19%	21%	19%
Private Equity/Debt	8.2%	0.204	9.5%	0.281	21.3%	20%	20%	20%	20%	20%
Real Estate	5.4%	0.108	6.2%	0.188	14.7%	8%	8%	8%	8%	8%
Policy Leverage	4.0%	N/A	3.7%	N/A	0.7%	-12%	-10%	-12%	-12%	-12%
10 Year Compound Return						6.5%	6.5%	6.5%	6.5%	6.5%
10 Year Sharpe Ratio						0.211	0.215	0.206	0.216	0.216
30 Year Compound Return						7.7%	7.7%	7.8%	7.7%	7.7%
30 Year Sharpe Ratio						0.340	0.343	0.334	0.346	0.344
Standard Deviation						12.6%	12.2%	12.8%	12.2%	12.3%
Duration:										
- CTF Fund Level (years)						2.64	2.54	2.45	2.68	2.64
- Public Fixed Income (years)						5.74	5.53	5.56	5.57	5.5
Implementation Shortfall ($M)							-4.7	-8.7	-8.8	-9.0
VaR 95% CL 1-Yr Horizon ($B)						-18.3	-17.6	-18.8	-17.6	-17.7
T-Cost ($M)						N/A	-3.7	-8.0	-7.8	-8.0

CURRENT POLICY AND MODEL PORTFOLIOS



PUBLIC EQUITY STRUCTURE

	Current Equity Allocation*	% of Total Portfolio	Preliminary Recommended Public Equity Allocation*	% of Total Portfolio
Global Equities	79.1%	30.1%	79.1%	28.5%
US Small Cap Equities	7.5%	2.8%	7.5%	2.7%
Int'l Small Cap Equities	3.7%	1.4%	3.7%	1.3%
Emerging Market Large Cap				
China	1.3%	0.5%	1.3%	0.5%
x-China	6.9%	2.6%	6.9%	2.5%
Emerging Market Small Cap	1.6%	0.6%	1.6%	0.6%
Total		**38%**		**36%**
10-Year Compound Return	5.7%		5.7%	
30-Year Compound Return	7.4%		7.4%	
Standard Deviation	18.1%		18.1%	
10-Year Sharpe Ratio	0.105		0.105	
30-Year Sharpe Ratio	0.217		0.217	

* Market capitalization weights as of June 30, 2025; Actual market capitalization weights will float with market moves over time. Provided for informational purposes.

PUBLIC FIXED INCOME STRUCTURE

	Current Fixed Income Allocation	% of Total Portfolio	Preliminary Recommended Fixed Income Allocation	% of Total Portfolio
US Treasuries	24.0%	6.5%	28.0%	7.6%
US Investment Grade Credit	24.0%	6.5%	24.0%	6.5%
Mortgage-Backed	8.0%	2.2%	8.0%	2.2%
Long Treasuries	4.0%	1.1%	0.0%	0.0%
High Yield Bonds	20.0%	5.4%	20.0%	5.4%
Leveraged Loans	10.0%	2.7%	10.0%	2.7%
Emerging Market Debt*	10.0%	2.7%	10.0%	2.7%
Total		**27%**		**27%**
10-Year Compound Return	5.7%		5.6%	
30-Year Compound Return	6.3%		6.2%	
Standard Deviation	6.3%		6.1%	
10-Year Sharpe Ratio	0.291		0.290	
30-Year Sharpe Ratio	0.440		0.450	
Duration (years)	5.74		5.53	

REFERENCE PORTFOLIO ATTRIBUTION

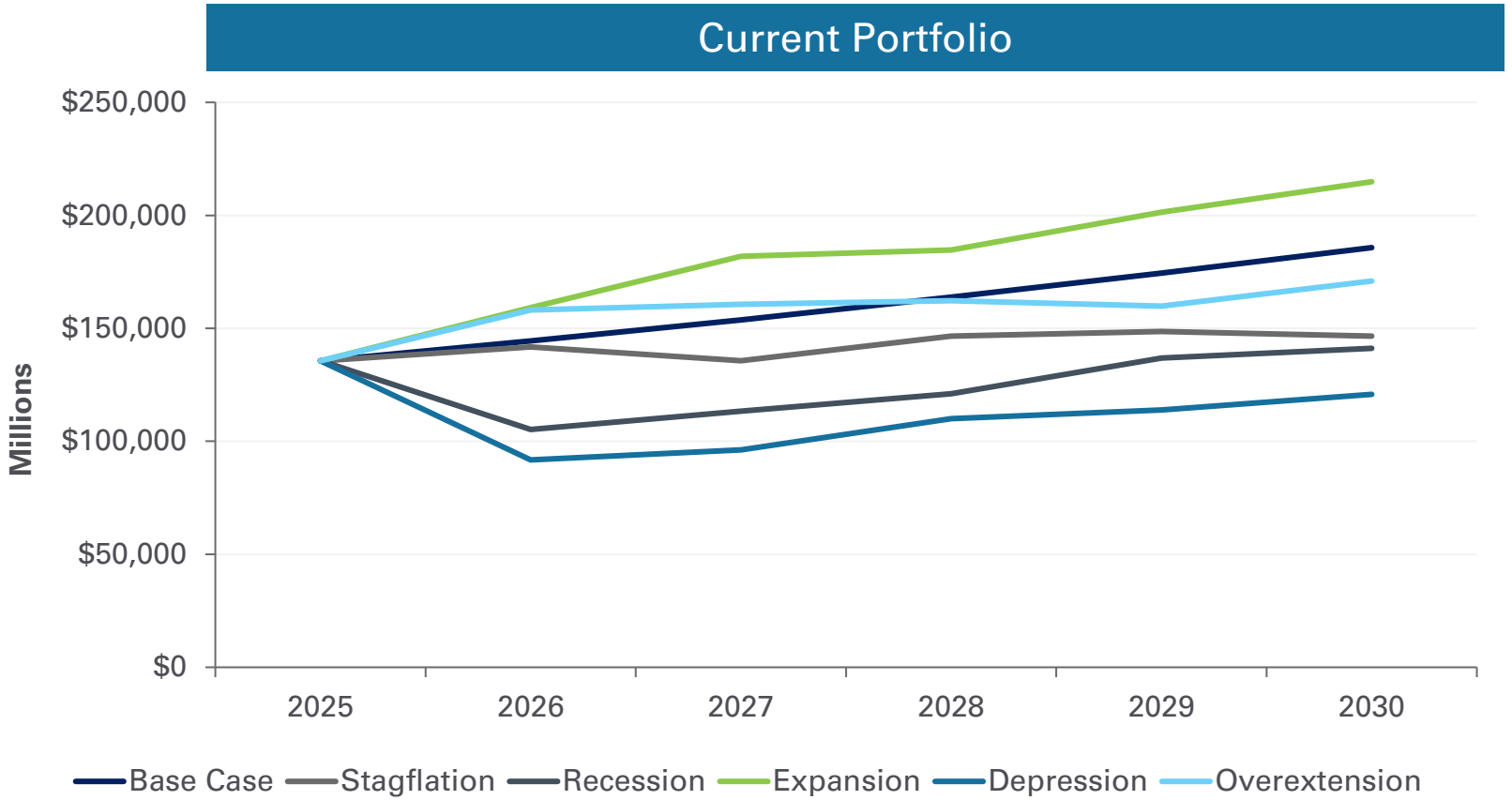
	10-Year Expected Return	Standard Deviation	30-Year Expected Return
Reference Portfolio	5.69%	11.46%	6.91%
Private Markets	0.55%	0.18%	0.45%
Portfolio Structure	0.12%	0.34%	0.12%
Leverage	0.10%	0.23%	0.19%
Prelim. Recommended Portfolio	6.46%	12.20%	7.67%

VARIABLE RETIREMENT TRUST ALLOCATION

	Current Policy Portfolio	Recommended Policy Portfolio	Rebalancing Range
US Equities	70%	70%	65 - 75%
Int'l Equities incl. Emerging	30%	30%	25 - 35%
10-Year Compound Return	5.73%	5.73%	
30-Year Compound Return	7.41%	7.41%	
Standard Deviation	17.24%	17.24%	
10-Year Sharpe Ratio	0.086	0.086	
30-Year Sharpe Ratio	0.218	0.218	
Target Active Risk	0.3 - 0.9%	0.0 - 0.9%	

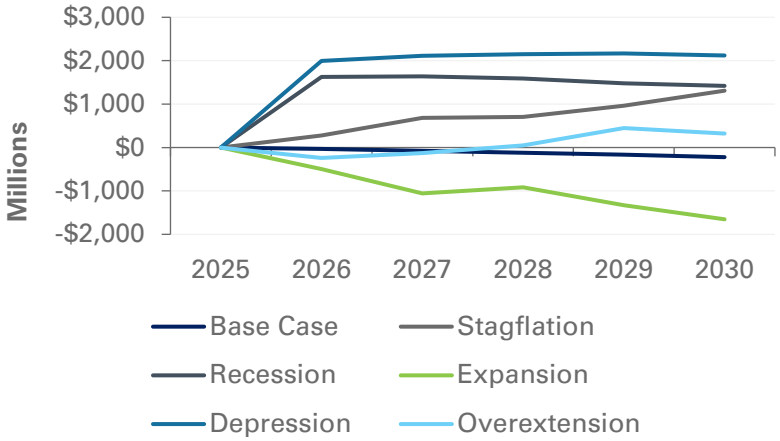
SCENARIO ANALYSIS

MACRO SCENARIOS: CURRENT PORTFOLIO

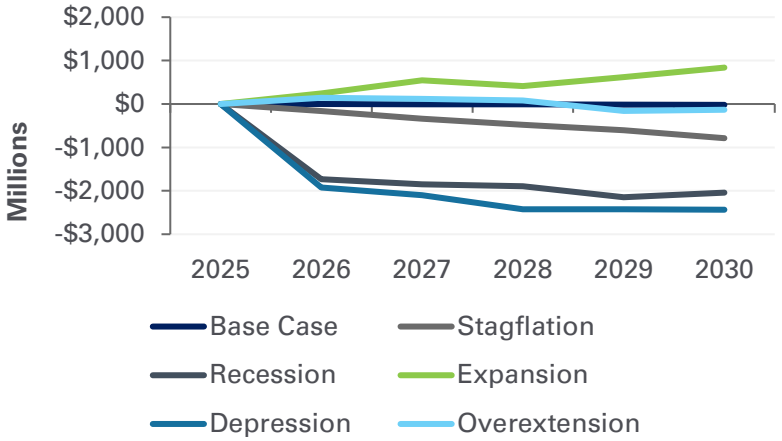


MACRO SCENARIOS: MODEL PORTFOLIOS RELATIVE TO CURRENT POLICY

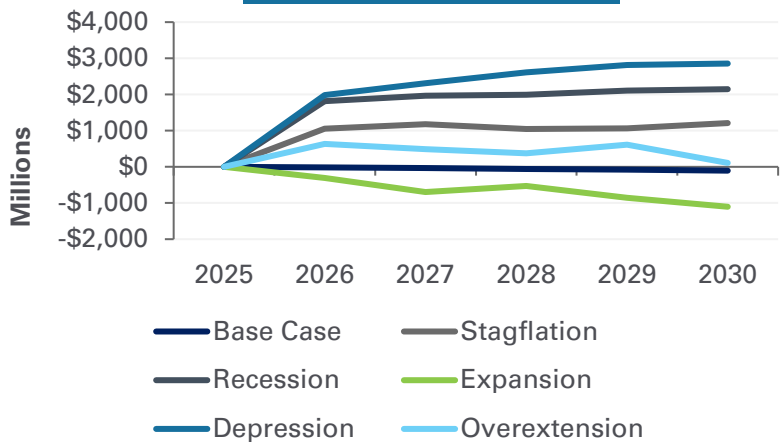
Prel. Recommend.



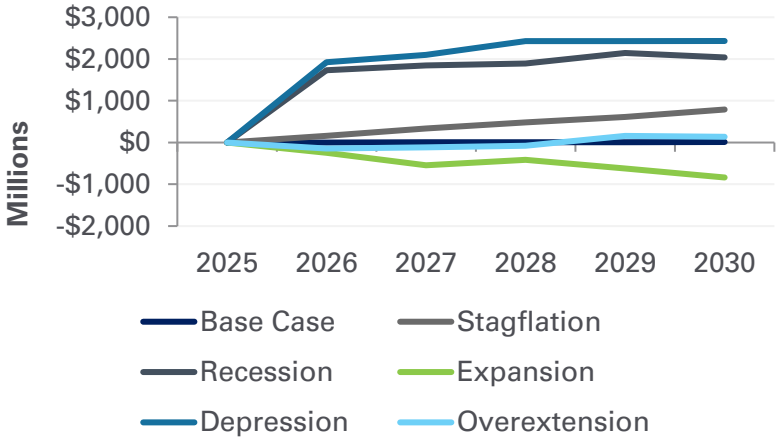
Model 1



Model 2



Model 3



SUMMARY

- **Update of NEPC capital market assumptions:**
  - Key changes compared to 2024 include higher Public Equity returns and lower Real Estate returns
- **On-year for GRS stress-testing analysis:**
  - Simulations support a Policy Portfolio with a target return between 6% and 7.5% to balance expected return, investment volatility, and downside risks
- **Updated Policy Leverage framework and private investments pacing plan:**
  - Policy Leverage framework indicates a lower range, mainly due to higher volatility
  - Private investments continue to evolve in line with updated pacing plan
- **Preview of recommendations:**
  - Decrease Public Equities by 2% and reduce Policy Leverage by 2%
  - Eliminate Long Treasury allocation and increase US Treasury allocation to 28% of Public Fixed Income
  - Implement an active risk range in the VTF of zero to 90 basis points

APPENDIX

JULY 2025 MARKETS UPDATE

NEPC MARKET OUTLOOK

Labor market weakness is beginning to build as July payrolls posted subpar results along with large downward revisions to May and June

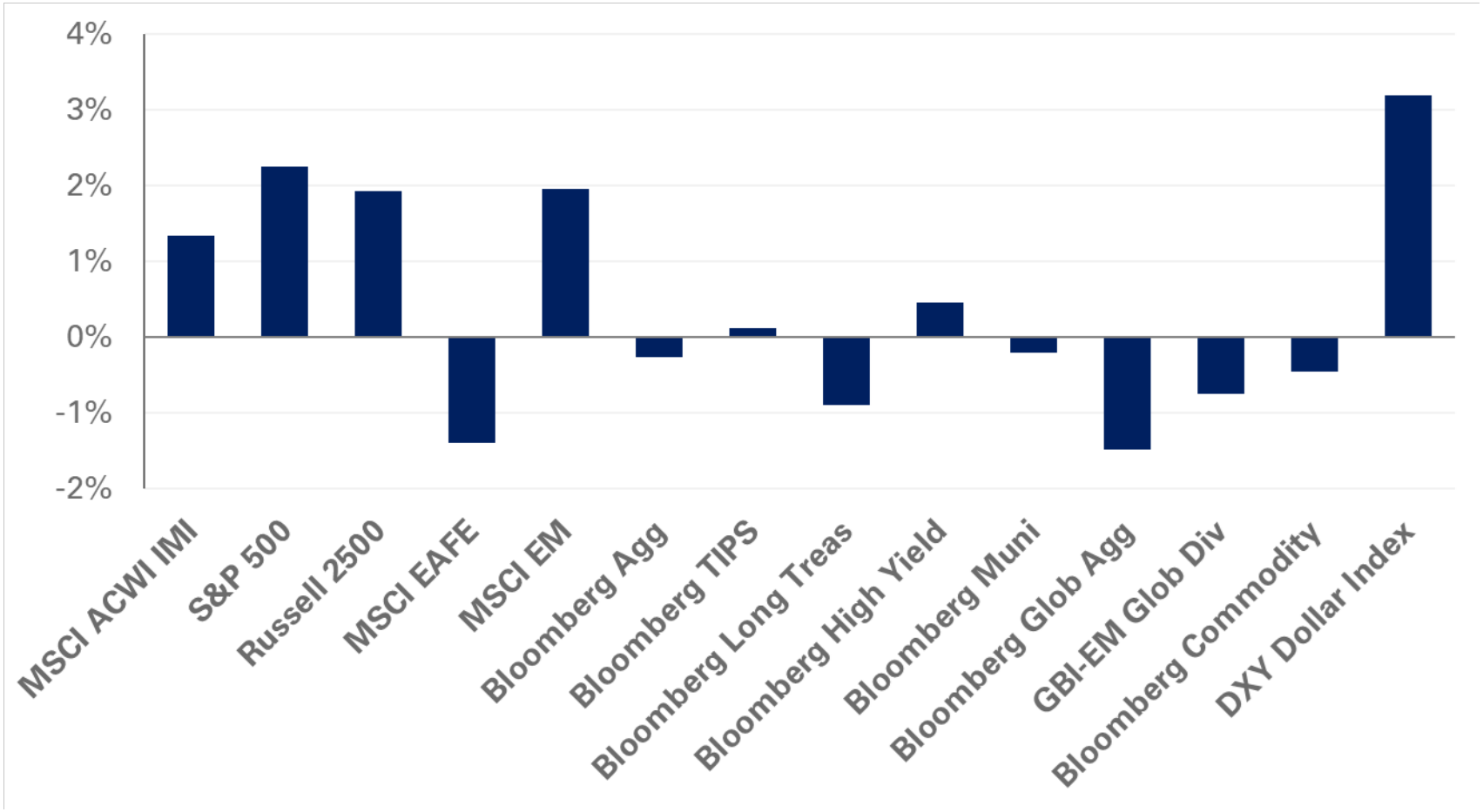
Brace for volatility as uncertainty builds surrounding tariff policy, labor market dynamics, and changes to Fed posture in response

With equity markets posting strong returns, look to rebalance to maintain exposures in line with strategic policy targets

We recommend investors to ensure they have appropriate safe-haven fixed-income exposure and sufficient liquidity for cash flow needs

STRONG EARNINGS SEASON DRIVING US RETURNS

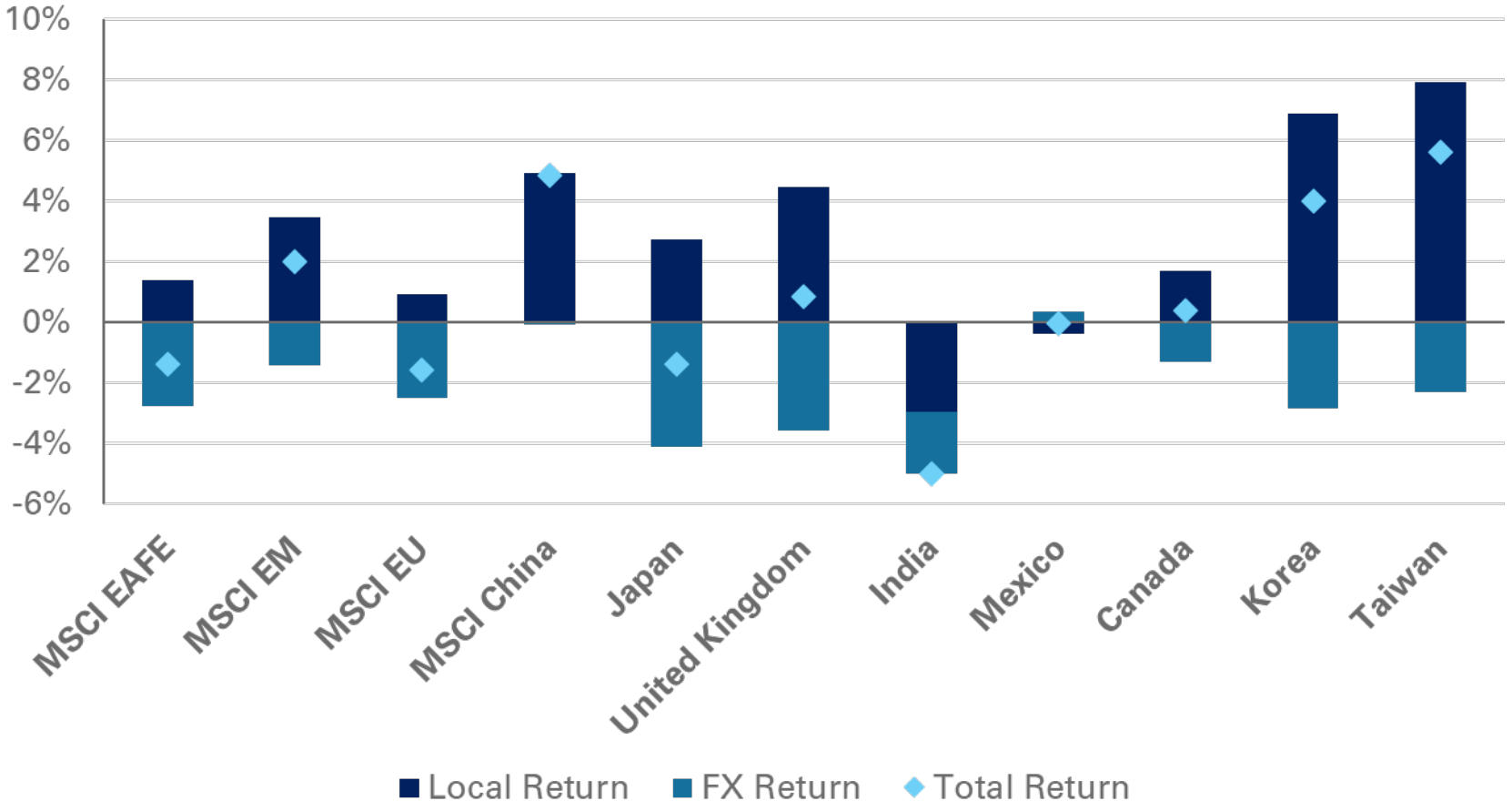
MONTHLY TOTAL RETURNS



Sources: S&P, Russell, MSCI, Bloomberg, JPM, FactSet

DOLLAR REBOUND WEIGHED ON NON-US EQUITY

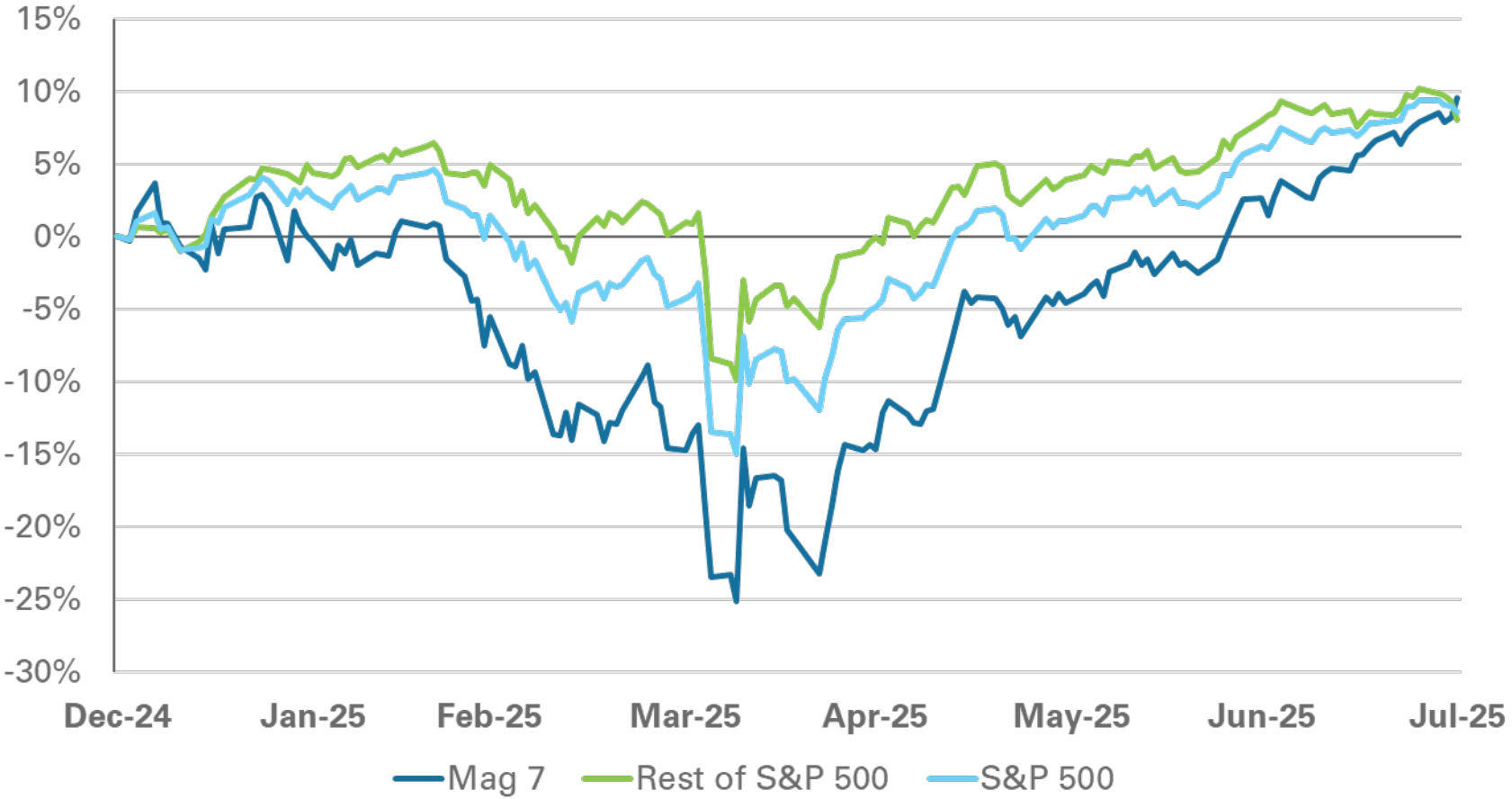
MONTHLY TOTAL RETURNS



Sources: MSCI, FactSet

MAG 7: FROM LAGGARD TO LEADER

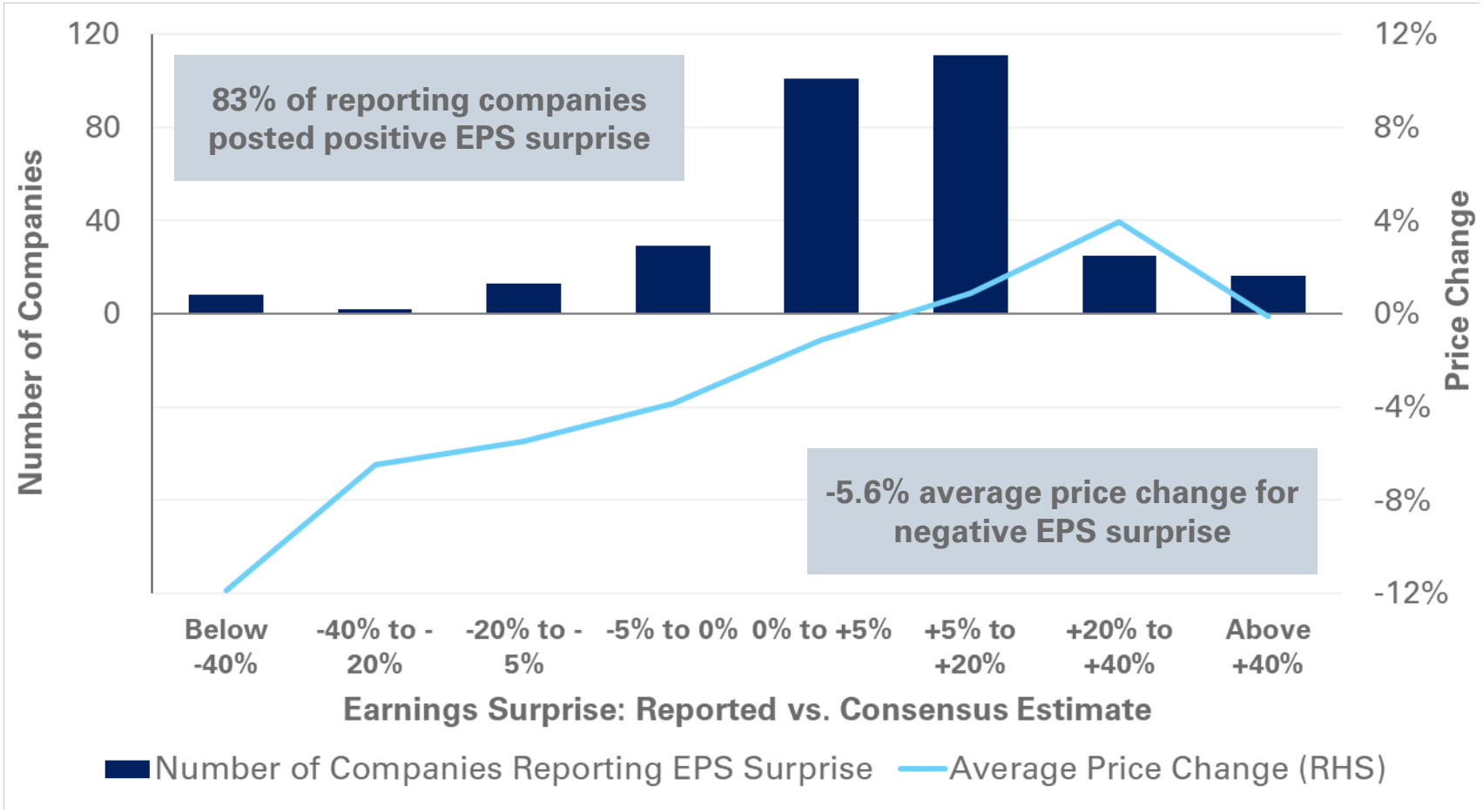
YEAR-TO-DATE TOTAL MARGINAL RETURN



Sources: FactSet, NEPC

EARNINGS LOSERS GETTING PUNISHED

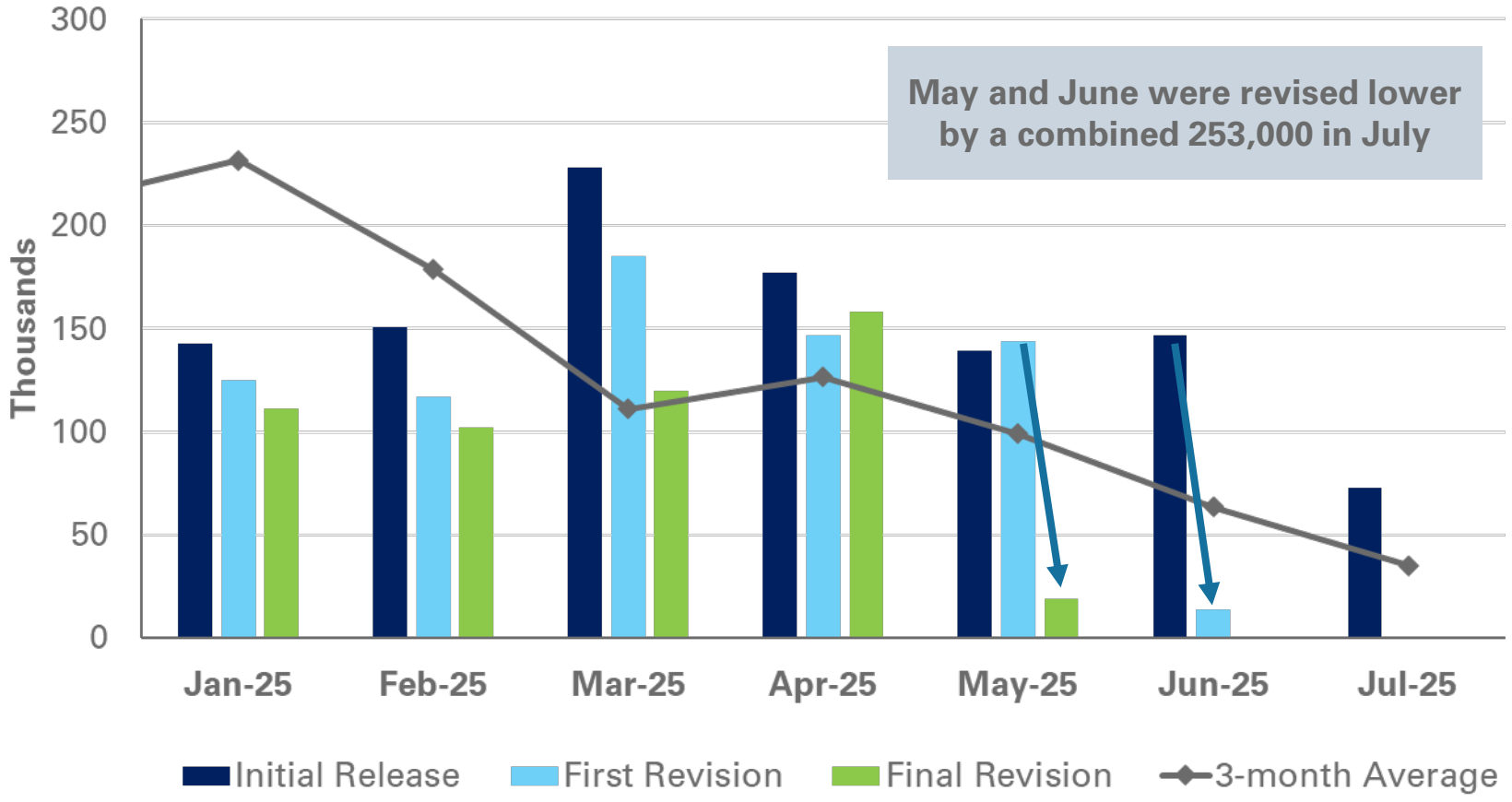
S&P 500 EARNINGS SURPRISE VERSUS PRICE CHANGE



Note: Q2 2025 reported earnings versus consensus estimate as of 7/31/2025. Price change is from 2 days prior to 2 days after respective release date.
Sources: FactSet, NEPC

RECENT LABOR MARKET NOT AS ADVERTISED

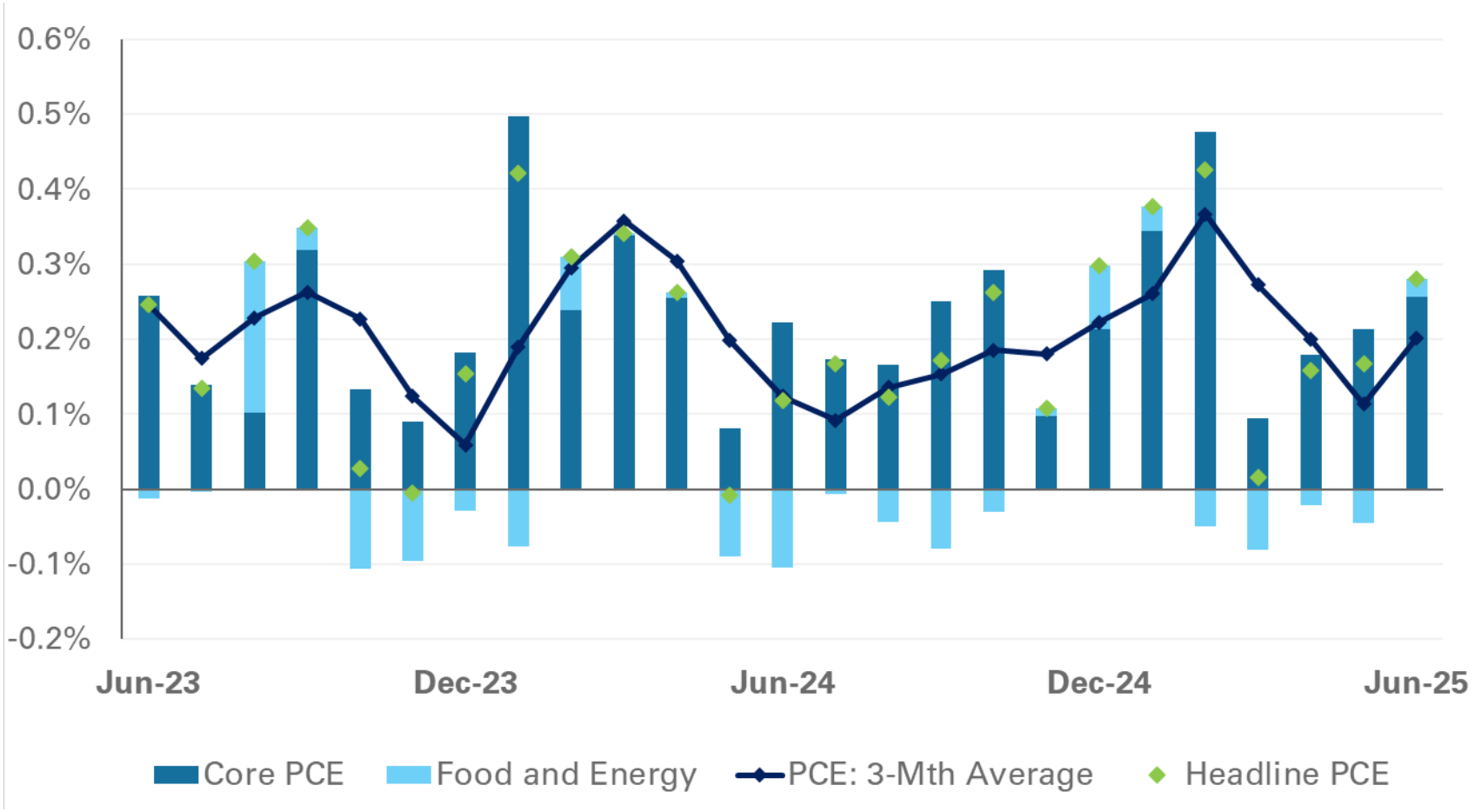
NONFARM PAYROLLS: MONTHLY JOBS ADDED



Notes: 3-month average reflects most recently revised number
Sources: U.S. Bureau of Labor Statistics, FactSet

TARIFFS, SEASONALITY BUOYING INFLATION

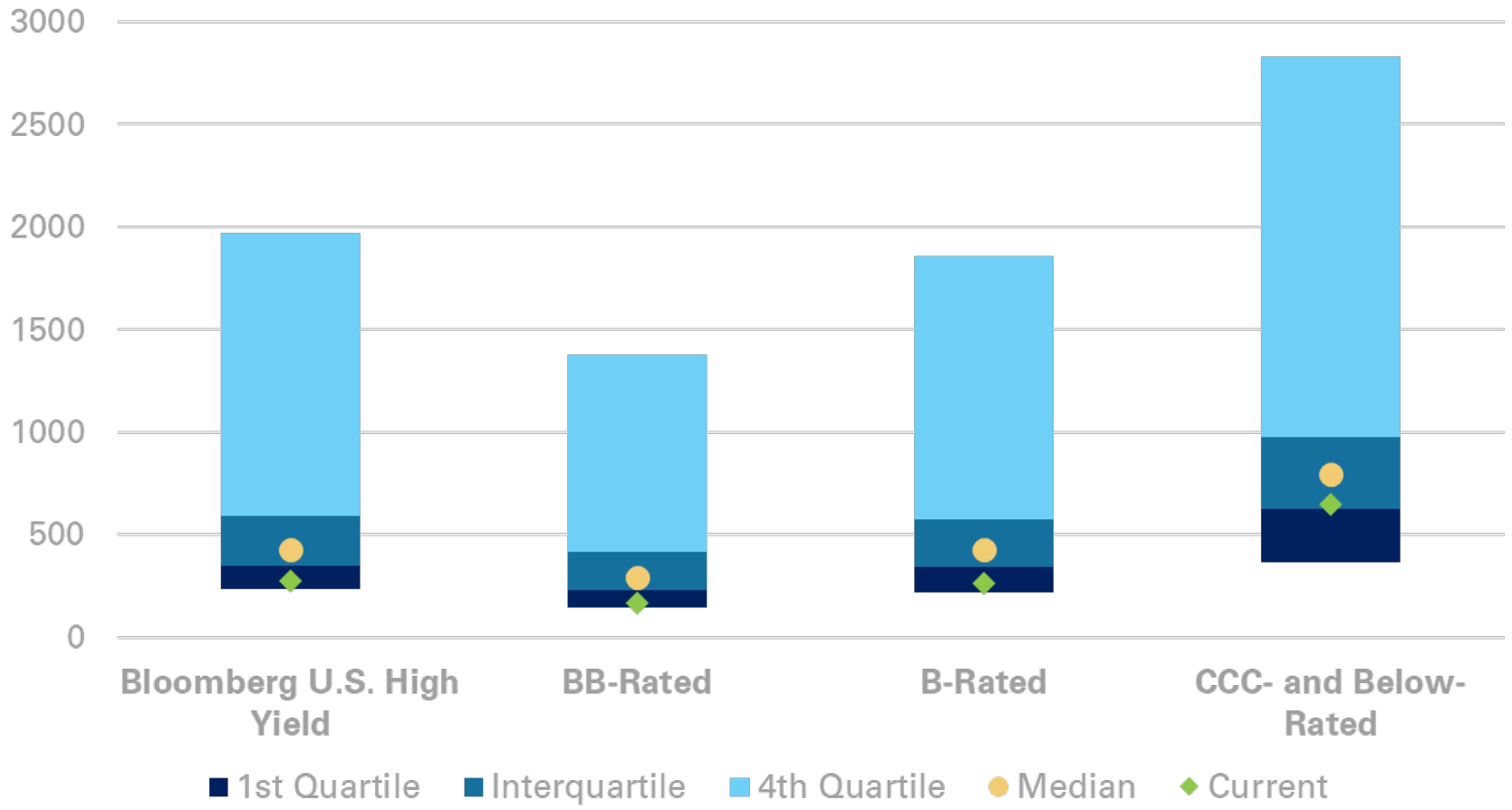
PERSONAL CONSUMPTION EXPENDITURE INDEX



Sources: US Bureau of Economic Analysis, FactSet

CURRENT SPREADS DON'T OFFER MUCH UPSIDE

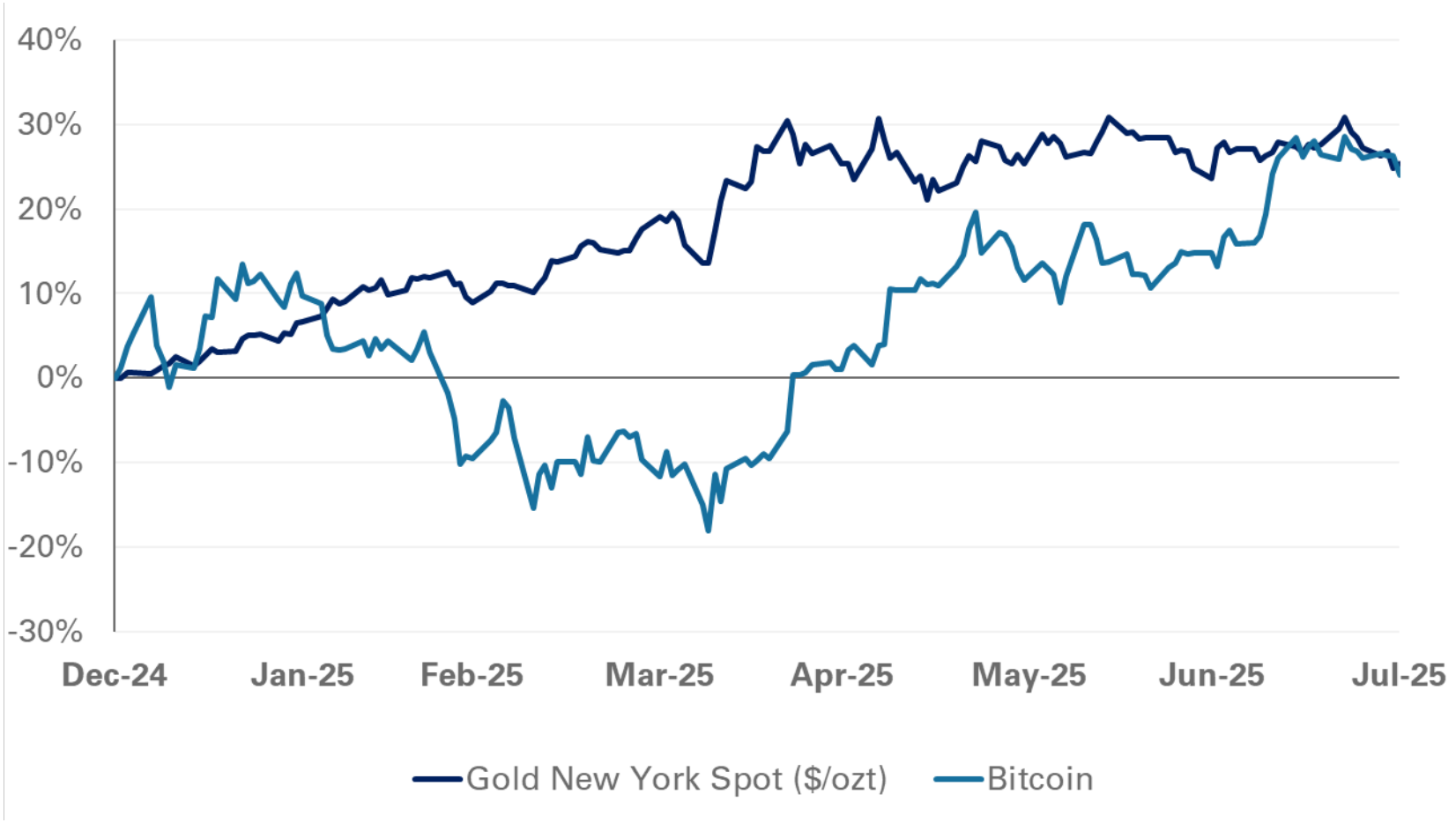
BLOOMBERG U.S. HIGH YIELD OPTION-ADJUSTED SPREADS



Sources: Bloomberg, FactSet

GOLD AND BITCOIN NOW NECK AND NECK

YEAR-TO-DATE PERFORMANCE



Source: FactSet

JUNE 30, 2025 CAPITAL MARKET ASSUMPTIONS DETAIL

PUBLIC EQUITY ASSUMPTIONS

OVERVIEW

- **Recent equity performance has been strong across all regions, weighing on forward-looking return expectations**
  - U.S. equity return assumptions remain subdued relative to history given the extended valuation environment
- **Non-U.S. developed market equity return assumptions improved, reflecting a modest increase in earnings expectations for the region**
- **Emerging market forecasts declined meaningfully, reflecting the impact of significant valuation expansion among countries with a higher beta to U.S. markets**

PUBLIC EQUITY ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	Represents P/E multiple contraction or expansion relative to long-term trend
Inflation	Market-specific inflation based on country-level revenue exposure
Real Earnings Growth	Market-specific real growth based on a weighted-average of country revenue exposure and GDP growth
Shareholder Yield	Income distributed to shareholders via dividend distributions and net share repurchases

Asset Class	6/30/25 10-Yr Return	12-Month Change
U.S. Large-Cap Equity	5.3%	+1.3%
U.S. Small/Mid-Cap Equity	5.7%	-0.5%
Non-U.S. Developed Equity	5.3%	+0.8%
Non-U.S. Developed Small-Cap Equity	6.0%	-0.7%
Emerging Market Equity	6.6%	-1.2%
Emerging Market Small-Cap Equity	6.6%	-0.5%
Hedge Fund - Equity	5.7%	+0.2%
Global Equity*	5.7%	+0.7%
Private Equity*	8.6%	-0.1%

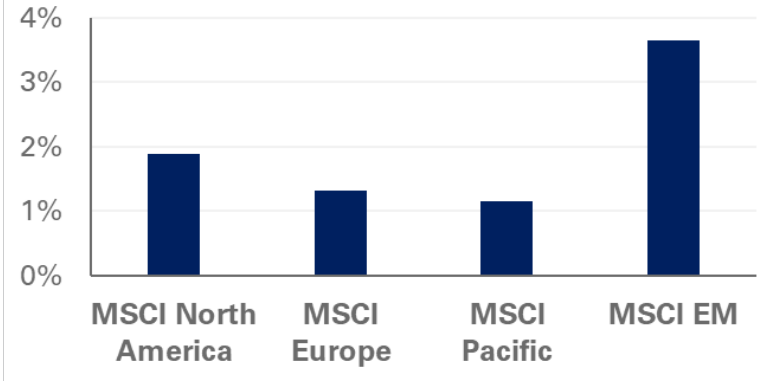
*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

PUBLIC EQUITY

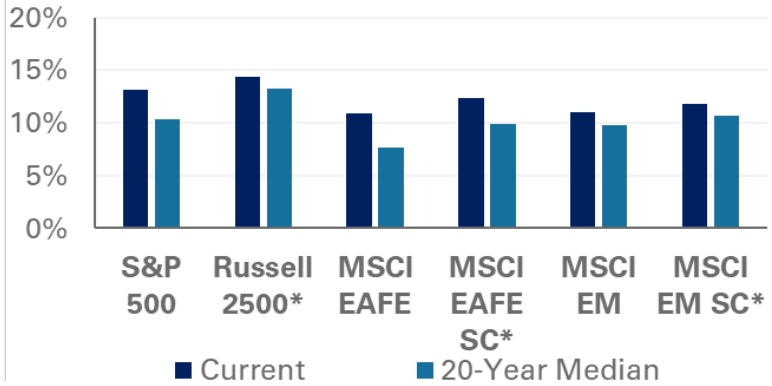
REAL EARNINGS GROWTH

- **U.S. equities benefit from higher sales growth forecasts, reflecting the impact of a resilient U.S. consumer**
  - U.S. large cap companies also have global revenue exposure that benefits from global growth rates
- **Cyclically-high profit margin levels temper real earnings growth forecasts given expectations for normalization**
  - Profit margin assumptions reflect a lower path towards long-term targets that consider the shift in index composition through time

Expected 5-Year Real Growth



Profit Margins Relative Median

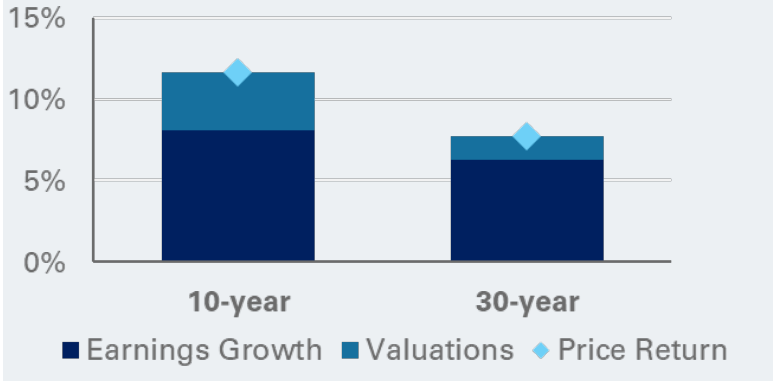


Note: *Small cap indices margins based on EBITDA margins
Sources: S&P, Russell, MSCI, FactSet, NEPC

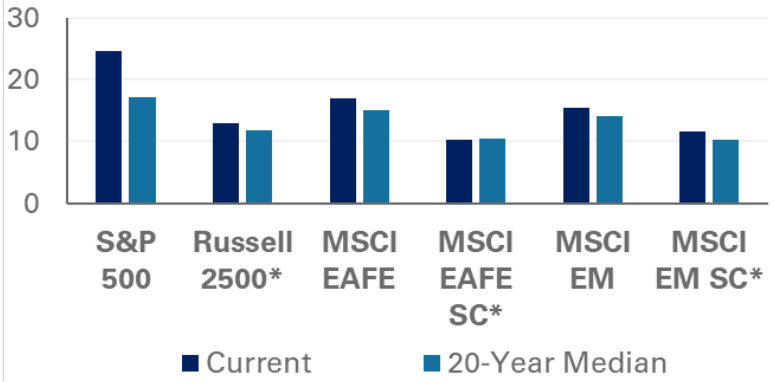
PUBLIC EQUITY
VALUATION

- **Valuations can heavily influence short- to medium-term returns, but earnings growth is the main driver of long-term equity returns**
- **Valuations across the equity spectrum are elevated relative to long-term target levels**
  - U.S. large-cap valuations represent the largest drag on returns across the equity complex
- **Non-U.S. developed market valuations have expanded after an extended period of perceived U.S. exceptionalism**

Historical S&P 500 Price Return



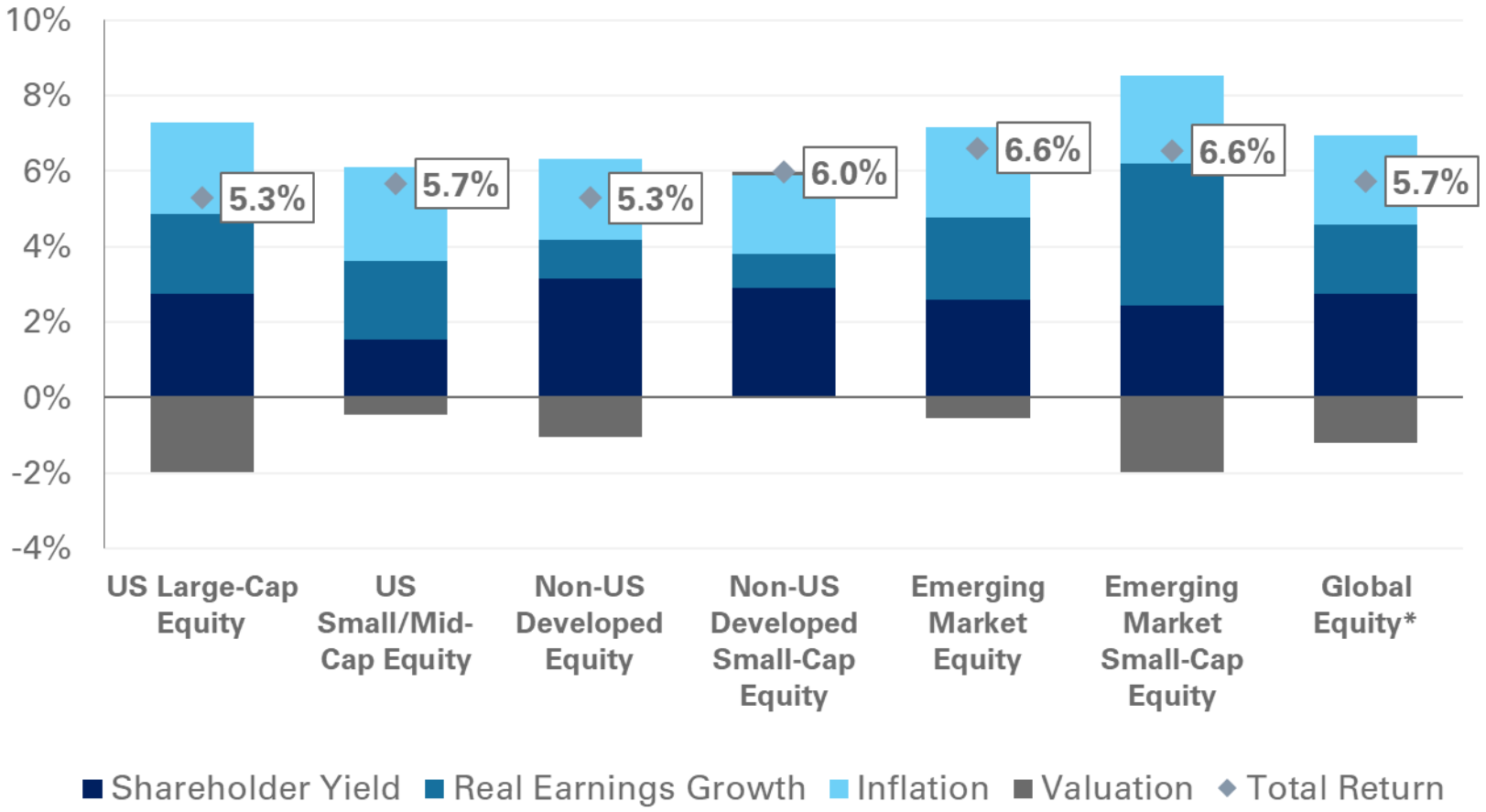
Trailing P/E Relative Median



Note: *Small cap indices valuations based on EV/EBITDA multiples
Sources: S&P, Shiller, Russell, MSCI, FactSet, NEPC; Shiller PE long-term average beginning in 1924

PUBLIC EQUITY

BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time.

Source: NEPC

FIXED INCOME ASSUMPTIONS

OVERVIEW

- **Expected returns across fixed income assets declined as markets react to ongoing uncertainty surrounding the path for economic growth and inflation**
- **Market interest rate expectations reflect an accelerated path for Fed easing – diverging from more hawkish short-term rate expectations expressed in the Fed's dot plot**
- **NEPC's internal interest rate forecast has remained consistent relative to changes in Fed expectations and market pricing**
- **Safe-haven fixed income exposure is a critical liquidity source for the portfolio and offers downside protection in periods of market stress**
  - Sizing of the safe-haven exposure is a strategic exercise and reflects investor return objectives, risk-tolerance, and private market pacing plan needs
- **High-quality fixed income is an asset class group designed to support lower volatility portfolios and larger strategic targets to fixed income**

FIXED INCOME ASSUMPTIONS

BUILDING BLOCKS

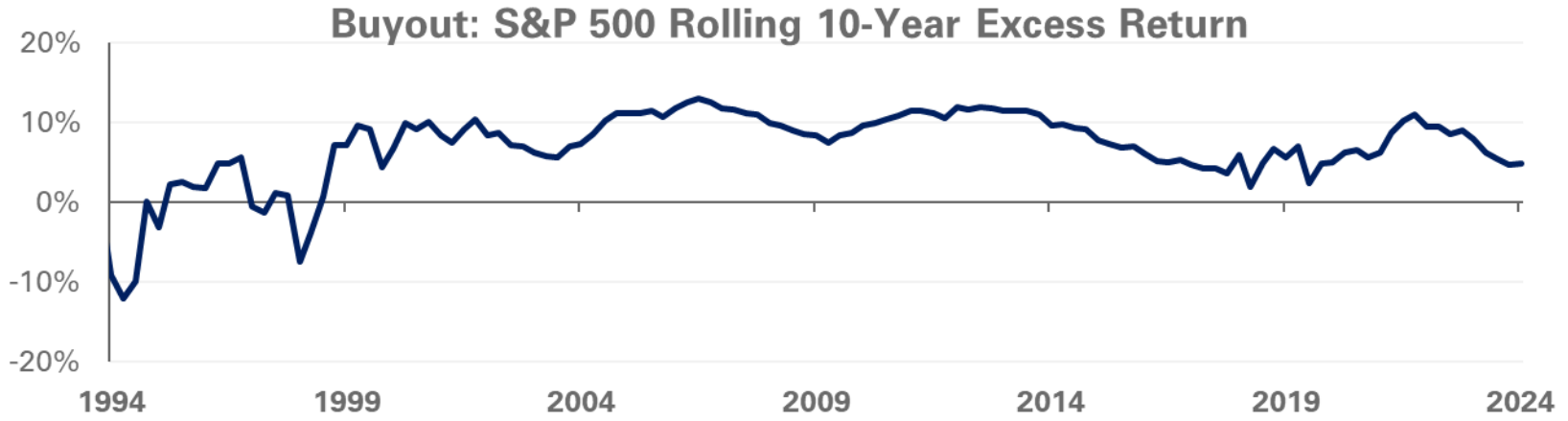
Illiquidity Premium	The return expected for assets with illiquidity risk
Government Rates Price Change	Change due to shifts in current yields relative to forecasted rates
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates
Spread Price Change	Valuation change due to changes in credit spreads relative to long-term targets
Credit Spread	Yield premium provided by securities with credit risk
Government Rates	The yield attributed to sovereign bonds that do not have credit risk

Asset Class	6/30/25 10-Yr Return	12-Month Change
U.S. TIPS	4.6%	-0.2%
U.S. Treasury Bond	4.4%	-0.2%
U.S. Corporate Bond	5.5%	-0.2%
U.S. MBS	4.7%	-0.1%
U.S. High Yield Corporate	6.1%	-0.2%
U.S. Leveraged Loan	7.0%	-0.4%
EMD External Debt*	6.6%	-1.1%
EMD Local Currency Debt	6.2%	-0.7%
Non-U.S. Govt. Bond	2.7%	-
U.S. Muni Bond (1-10 Year)	3.7%	+0.3%
U.S. High Yield Muni Bond	5.0%	+0.8%
Hedge Fund – Credit	6.6%	-0.1%
U.S. Aggregate Bond*	4.8%	-0.2%
Private Debt*	8.3%	-

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

ALTERNATIVE ASSETS

METHODOLOGY

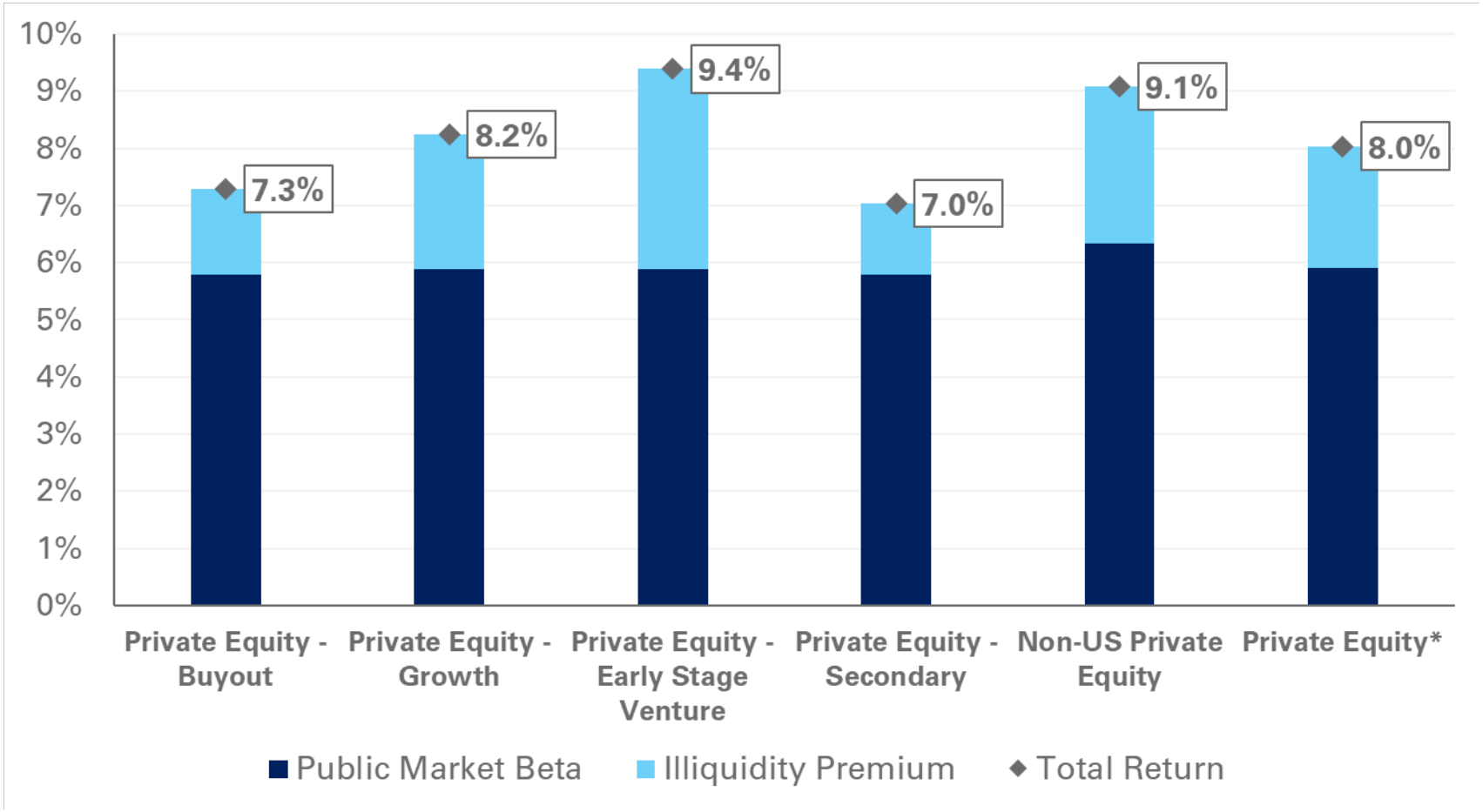


- **Private market assumptions are constructed from public market betas with an added illiquidity premia**
  - Historically, the observed illiquidity premium has been a significant component driving private market returns
- **Hedge fund assumptions are constructed from betas to public markets with an added alpha assumption**

Sources: Cambridge Associates, NEPC

PRIVATE EQUITY

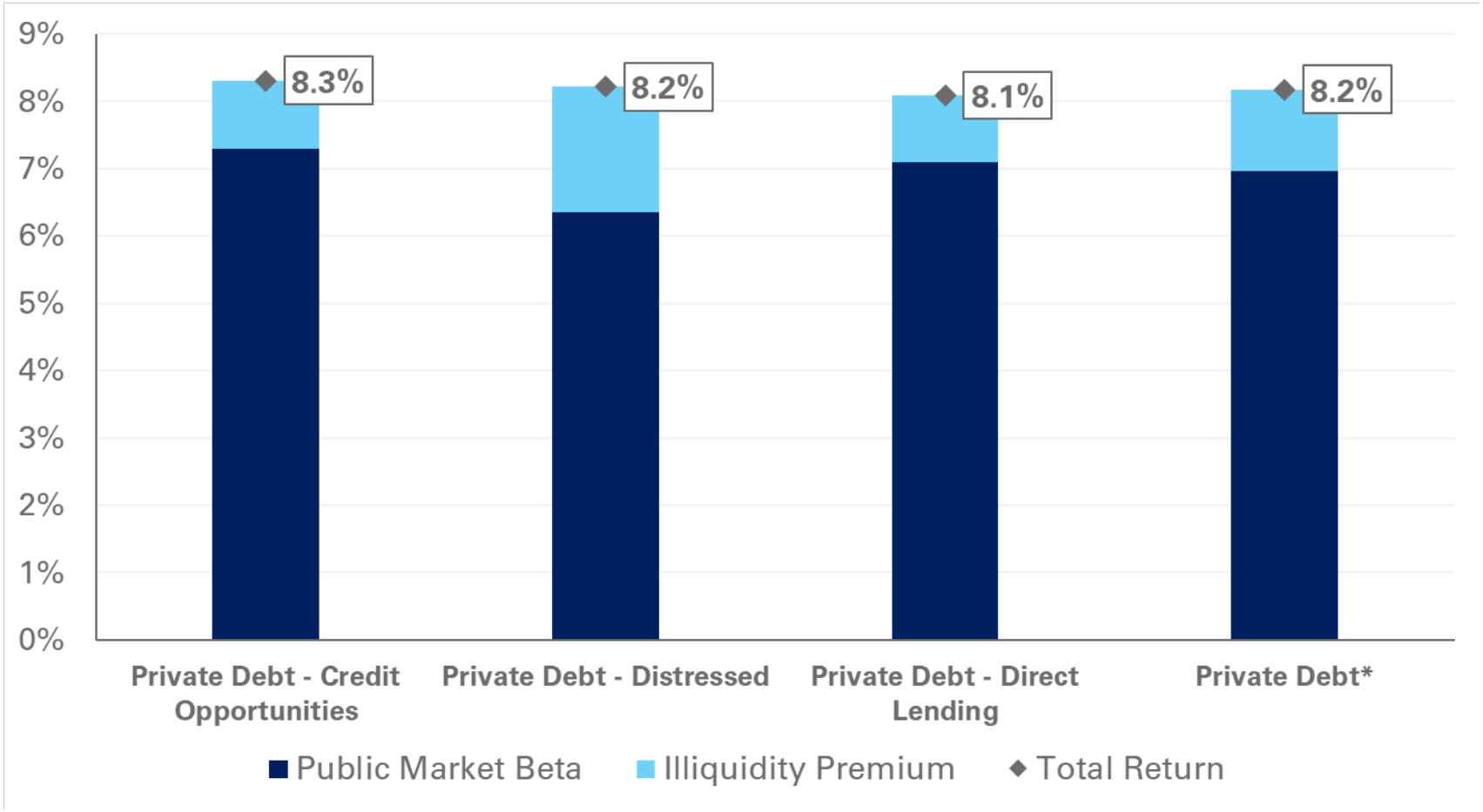
BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



*Private Equity is a derived composite of 34% U.S. Buyout, 34% U.S. Growth, 8.5% U.S. Secondary, 8.5% U.S. Venture, 15% Non-U.S. PE. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

PRIVATE DEBT

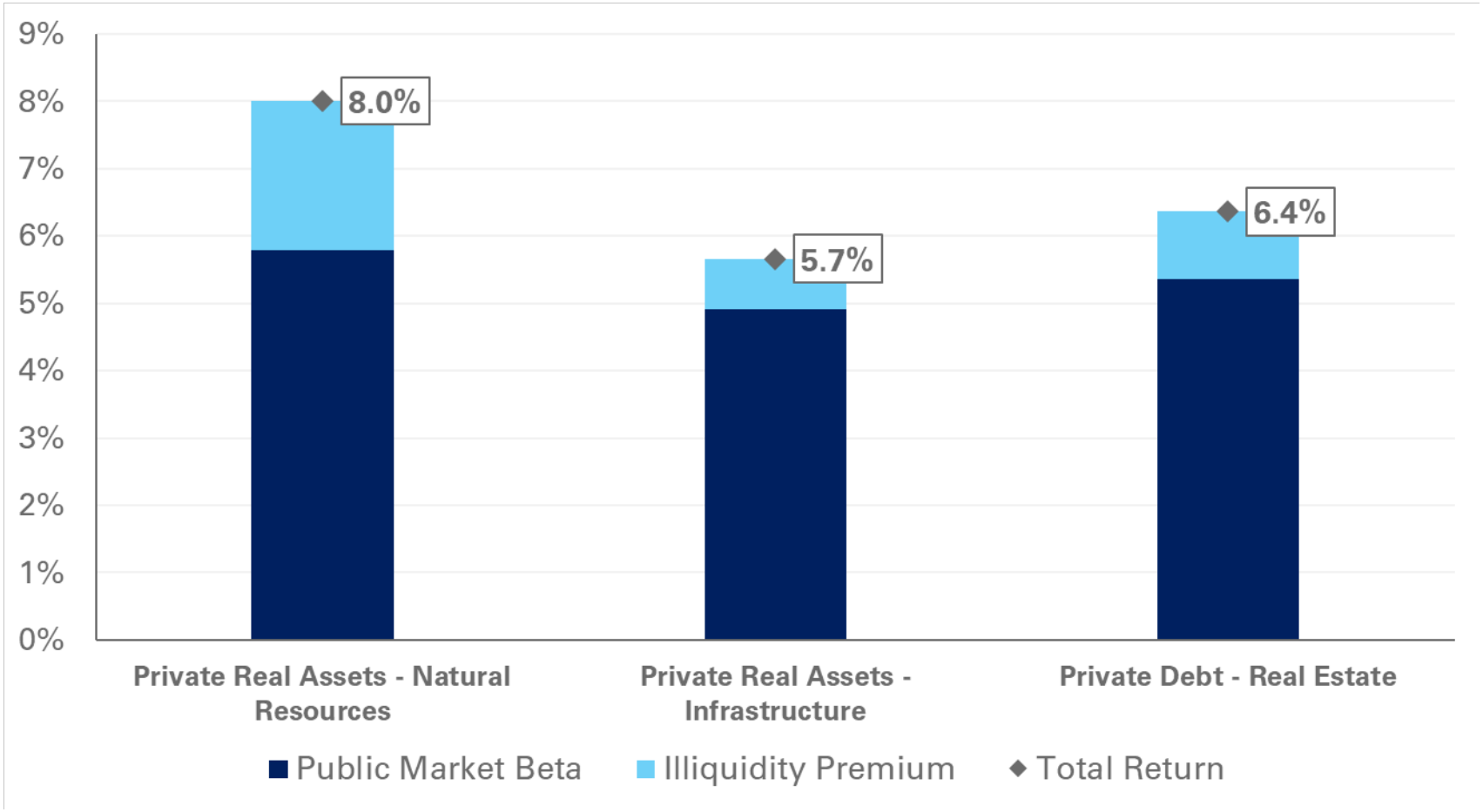
BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



*Private Debt is a derived composite of 25% Credit Opportunities, 25% Distressed, 50% Direct Lending. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

PRIVATE REAL ASSET

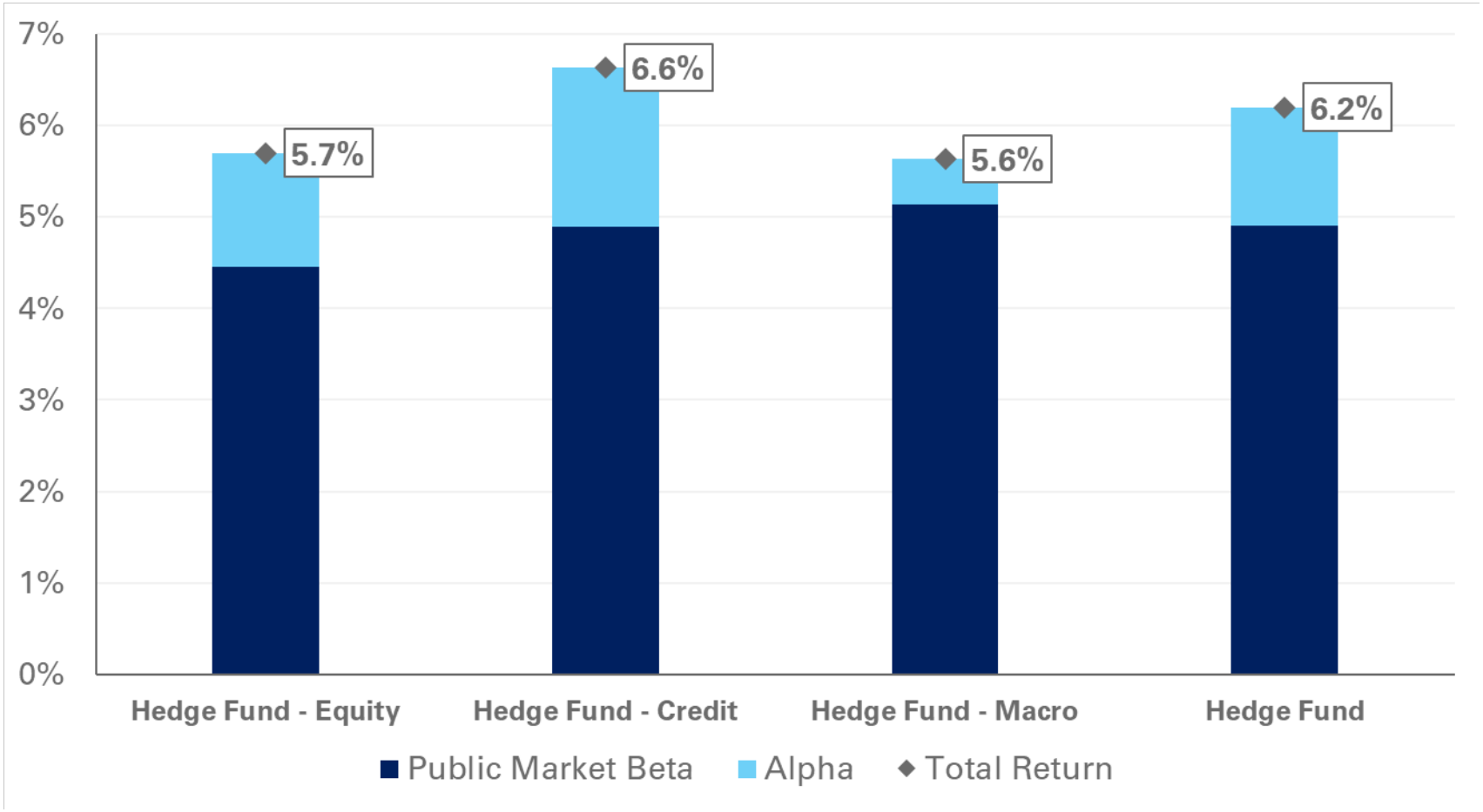
BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

HEDGE FUND

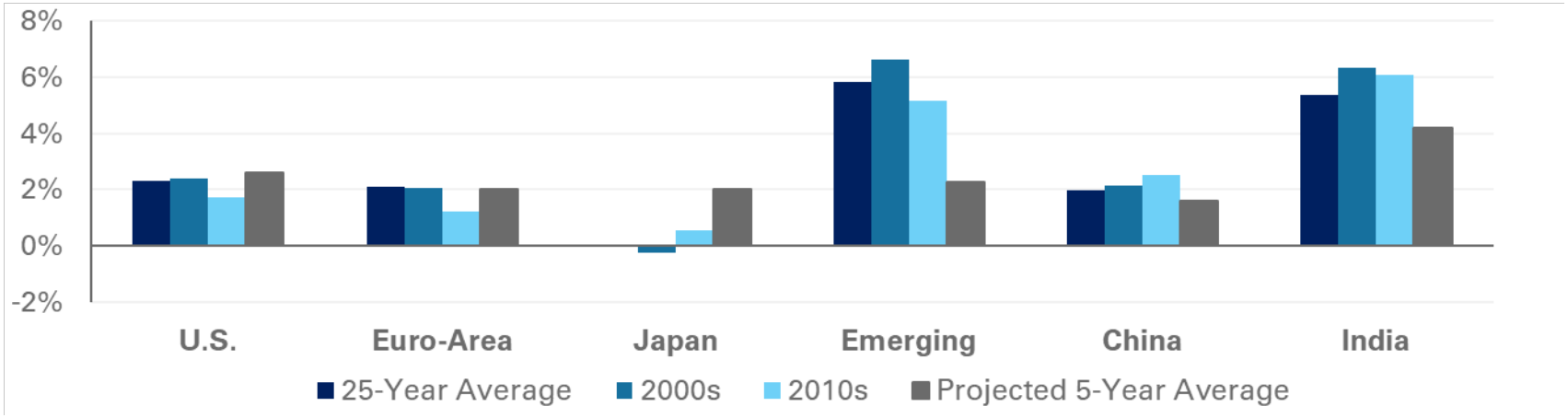
BUILDING BLOCKS: 10-YEAR EXPECTED RETURN



*Hedge Funds is a derived composite of 40% Long/Short, 40% Credit, 20% Macro. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

GLOBAL INFLATION

HISTORICAL INFLATION



- **Non-U.S. forecasts are guided by IMF forecasts, local consumer and producer price indices, and global interest rate curves**

- **Near-term inflation levels for developed markets are projected to be higher relative to history**
  - Long-term inflation assumptions reflect NEPC's path and central bank targets

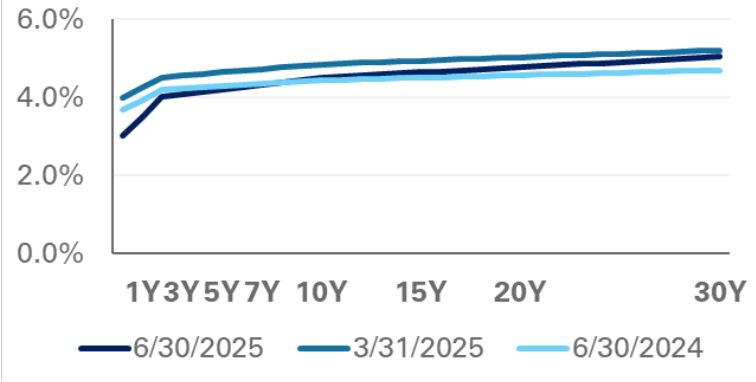
Sources: IMF, FactSet, NEPC

GLOBAL INTEREST RATES

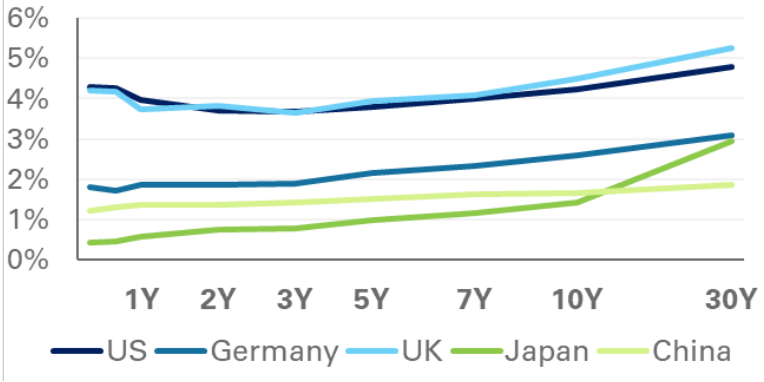
EXPECTATIONS

- **NEPC's outlook on U.S. interest rates has remained consistent over the past few years, generally above market expectations**
- **As interest rate expectations shift lower, the return outlook for base interest rates gradually declines**
- **The outlook is less attractive for non-U.S. developed markets due to the nominal yield differential relative to the U.S.**
  - Differing regional growth and inflation conditions have led to diverging central bank actions

NEPC 10-Year Forward U.S. Treasury Curve



Global Yield Curves



Sources: FactSet, NEPC

10-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
U.S. Large-Cap Equity	5.3%	4.0%	+1.3%
U.S. Small/Mid-Cap Equity	5.7%	6.2%	-0.5%
Non-U.S. Developed Equity	5.3%	4.5%	+0.8%
Non-U.S. Developed Equity (USD Hedge)	5.5%	4.7%	+0.8%
Non-U.S. Developed Small-Cap Equity	6.0%	6.7%	-0.7%
Emerging Market Equity	6.6%	7.8%	-1.2%
Emerging Market Small-Cap Equity	6.6%	7.1%	-0.5%
Hedge Fund - Equity	5.7%	5.5%	+0.2%
Private Equity - Buyout	7.3%	7.2%	+0.1%
Private Equity - Growth	8.2%	8.5%	-0.3%
Private Equity - Early Stage Venture	9.4%	9.7%	-0.3%
Private Equity - Secondary	7.0%	6.7%	+0.3%
Non-U.S. Private Equity	9.1%	9.7%	-0.6%
China Equity	7.0%	9.8%	-2.8%
Global Equity*	5.7%	5.0%	+0.7%
Private Equity*	8.6%	8.7%	-0.1%

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Cash	3.8%	4.2%	-0.4%
US TIPS	4.6%	4.8%	-0.2%
US Treasury Bond	4.4%	4.6%	-0.2%
US Corporate Bond	5.5%	5.7%	-0.2%
US Corporate Bond - AAA	4.9%	4.9%	-
US Corporate Bond - AA	5.0%	5.1%	-0.1%
US Corporate Bond - A	5.3%	5.5%	-0.2%
US Corporate Bond - BBB	5.8%	6.0%	-0.2%
US Mortgage-Backed Securities	4.7%	4.8%	-0.1%
US Securitized Bond	5.2%	5.4%	-0.2%
US Collateralized Loan Obligation	5.4%	5.7%	-0.3%
US Municipal Bond	4.3%	3.8%	+0.5%
US Municipal Bond (1-10 Year)	3.7%	3.4%	+0.3%
US Taxable Municipal Bond	5.6%	5.5%	+0.1%

NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Non-US Government Bond	2.7%	2.7%	-
Non-US Government Bond (USD Hedge)	2.9%	3.0%	-0.1%
Non-US Inflation-Linked Bond (USD Hedge)	3.9%	3.7%	+0.2%
US Short-Term TIPS (1-3 Year)	4.4%	4.8%	-0.4%
US Short-Term Treasury Bond (1-3 Year)	4.3%	4.7%	-0.4%
US Short-Term Corporate Bond (1-3 Year)	5.2%	5.6%	-0.4%
US Intermediate-Term TIPS (3-10 Year)	4.5%	4.8%	-0.3%
US Intermediate-Term Treasury Bond (3-10 Year)	4.3%	4.6%	-0.3%
US Intermediate-Term Corporate Bond (3-10 Year)	5.7%	6.0%	-0.3%
US Long-Term TIPS (10-30 Year)	5.2%	4.9%	+0.3%
US Long-Term Treasury Bond (10-30 Year)	4.7%	4.3%	+0.4%
US Long-Term Corporate Bond (10-30 Year)	5.4%	5.4%	-
20+ Year US Treasury STRIPS	4.5%	4.2%	+0.3%
10 Year US Treasury Bond	4.5%	4.7%	-0.2%
10 Year Non-US Government Bond (USD Hedge)	2.7%	2.6%	+0.1%
US Aggregate Bond*	4.8%	5.0%	-0.2%

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
US High Yield Corporate Bond	6.1%	6.3%	-0.2%
US Corporate Bond - BB	6.6%	6.9%	-0.3%
US Corporate Bond - B	6.3%	6.4%	-0.1%
US Corporate Bond - CCC/Below	0.0%	0.8%	-0.8%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.6%	5.8%	-0.2%
US Leveraged Loan	7.0%	7.4%	-0.4%
Emerging Market Investment Grade External Debt	5.5%	5.4%	+0.1%
Emerging Market High Yield External Debt	7.4%	9.7%	-2.3%
Emerging Market Local Currency Debt	6.2%	6.9%	-0.7%
US High Yield Securitized Bond	8.8%	9.3%	-0.5%
US High Yield Collateralized Loan Obligation	7.6%	8.0%	-0.4%
US High Yield Municipal Bond	5.0%	4.2%	+0.8%
Hedge Fund - Credit	6.6%	6.7%	-0.1%
Private Debt - Credit Opportunities	8.3%	7.7%	+0.6%
Private Debt - Distressed	8.2%	8.5%	-0.3%
Private Debt - Direct Lending	8.1%	8.3%	-0.2%
Private Debt*	8.3%	8.3%	-

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

10-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Commodity Futures	4.8%	4.4%	+0.4%
Midstream Energy	5.4%	5.0%	+0.4%
REIT	5.5%	6.3%	-0.8%
Global Infrastructure Equity	4.7%	6.2%	-1.5%
Global Natural Resources Equity	6.0%	6.4%	-0.4%
Gold	4.0%	5.0%	-1.0%
Real Estate - Core	5.4%	6.0%	-0.6%
Real Estate – Value-Add	6.5%	7.2%	-0.7%
Real Estate - Opportunistic	7.6%	8.3%	-0.7%
Private Debt - Real Estate	6.4%	6.6%	-0.2%
Private Real Assets - Natural Resources	8.0%	8.1%	-0.1%
Private Real Assets - Infrastructure	5.7%	6.6%	-0.9%

NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

30-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
U.S. Large-Cap Equity	7.0%	6.3%	+0.7%
U.S. Small/Mid-Cap Equity	7.2%	7.5%	-0.3%
Non-U.S. Developed Equity	6.8%	6.1%	+0.7%
Non-U.S. Developed Equity (USD Hedge)	7.1%	6.4%	+0.7%
Non-U.S. Developed Small-Cap Equity	7.6%	7.9%	-0.3%
Emerging Market Equity	8.6%	9.0%	-0.4%
Emerging Market Small-Cap Equity	8.3%	8.5%	-0.2%
Hedge Fund - Equity	6.2%	6.0%	+0.2%
Private Equity - Buyout	8.7%	8.7%	-
Private Equity - Growth	9.5%	9.7%	-0.2%
Private Equity - Early Stage Venture	10.4%	10.5%	-0.1%
Private Equity - Secondary	8.2%	8.2%	-
Non-U.S. Private Equity	10.4%	10.6%	-0.2%
China Equity	8.5%	9.5%	-1.0%
Global Equity*	7.4%	7.0%	+0.4%
Private Equity*	9.9%	10.0%	-0.1%

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Cash	3.5%	3.5%	-
US TIPS	5.0%	4.8%	+0.2%
US Treasury Bond	4.8%	4.6%	+0.2%
US Corporate Bond	6.3%	6.1%	+0.2%
US Corporate Bond - AAA	5.7%	5.4%	+0.3%
US Corporate Bond - AA	5.6%	5.4%	+0.2%
US Corporate Bond - A	6.0%	5.8%	+0.2%
US Corporate Bond - BBB	6.6%	6.4%	+0.2%
US Mortgage-Backed Securities	5.0%	4.8%	+0.2%
US Securitized Bond	5.6%	5.5%	+0.1%
US Collateralized Loan Obligation	5.0%	5.1%	-0.1%
US Municipal Bond	4.3%	4.0%	+0.3%
US Municipal Bond (1-10 Year)	4.0%	3.7%	+0.3%
US Taxable Municipal Bond	6.4%	6.2%	+0.2%

NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Non-US Government Bond	3.3%	3.2%	+0.1%
Non-US Government Bond (USD Hedge)	3.6%	3.4%	+0.2%
Non-US Inflation-Linked Bond (USD Hedge)	4.0%	3.7%	+0.3%
US Short-Term TIPS (1-3 Year)	4.5%	4.5%	-
US Short-Term Treasury Bond (1-3 Year)	4.4%	4.4%	-
US Short-Term Corporate Bond (1-3 Year)	5.4%	5.4%	-
US Intermediate-Term TIPS (3-10 Year)	4.9%	4.8%	+0.1%
US Intermediate-Term Treasury Bond (3-10 Year)	4.7%	4.6%	+0.1%
US Intermediate-Term Corporate Bond (3-10 Year)	6.4%	6.3%	+0.1%
US Long-Term TIPS (10-30 Year)	5.5%	5.1%	+0.4%
US Long-Term Treasury Bond (10-30 Year)	5.2%	4.7%	+0.5%
US Long-Term Corporate Bond (10-30 Year)	6.7%	6.3%	+0.4%
20+ Year US Treasury STRIPS	5.4%	4.7%	+0.7%
10 Year US Treasury Bond	5.4%	5.1%	+0.3%
10 Year Non-US Government Bond (USD Hedge)	3.6%	3.3%	+0.3%
US Aggregate Bond*	5.3%	5.1%	+0.2%

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
US High Yield Corporate Bond	7.5%	7.3%	+0.2%
US Corporate Bond - BB	7.7%	7.6%	+0.1%
US Corporate Bond - B	7.3%	7.1%	+0.2%
US Corporate Bond - CCC/Below	1.4%	1.5%	-0.1%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.9%	5.9%	-
US Leveraged Loan	6.6%	6.7%	-0.1%
Emerging Market Investment Grade External Debt	6.4%	5.4%	+1.0%
Emerging Market High Yield External Debt	8.2%	9.7%	-1.5%
Emerging Market Local Currency Debt	5.5%	5.9%	-0.4%
US High Yield Securitized Bond	8.8%	8.6%	+0.2%
US High Yield Collateralized Loan Obligation	7.4%	7.4%	-
US High Yield Municipal Bond	5.4%	4.9%	+0.5%
Hedge Fund - Credit	7.2%	7.1%	+0.1%
Private Debt - Credit Opportunities	8.9%	8.4%	+0.5%
Private Debt - Distressed	9.4%	9.4%	-
Private Debt - Direct Lending	8.9%	8.9%	-
Private Debt*	9.1%	9.0%	+0.1%

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

30-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Commodity Futures	4.3%	3.8%	+0.5%
Midstream Energy	6.1%	6.4%	-0.3%
REIT	7.1%	7.4%	-0.3%
Global Infrastructure Equity	6.3%	6.8%	-0.5%
Global Natural Resources Equity	7.1%	7.2%	-0.1%
Gold	4.8%	4.9%	-0.1%
Real Estate - Core	6.2%	6.5%	-0.3%
Real Estate – Value-Add	7.5%	7.8%	-0.3%
Real Estate - Opportunistic	8.4%	8.7%	-0.3%
Private Debt - Real Estate	6.8%	6.8%	-
Private Real Assets - Natural Resources	8.9%	8.9%	-
Private Real Assets - Infrastructure	6.8%	7.0%	-0.2%

NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

VOLATILITY FORECASTS

EQUITY

Volatility			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
U.S. Large-Cap Equity	17.4%	17.2%	+0.2%
U.S. Small/Mid-Cap Equity	21.4%	21.0%	+0.4%
Non-U.S. Developed Equity	19.6%	19.7%	-0.1%
Non-U.S. Developed Equity (USD Hedge)	17.4%	17.7%	-0.3%
Non-U.S. Developed Small-Cap Equity	23.3%	24.2%	-0.9%
Emerging Market Equity	27.4%	28.1%	-0.7%
Emerging Market Small-Cap Equity	30.6%	31.4%	-0.8%
Hedge Fund - Equity	10.9%	11.0%	-0.1%
Private Equity - Buyout	20.7%	20.0%	+0.7%
Private Equity - Growth	30.8%	31.5%	-0.7%
Private Equity - Early Stage Venture	48.0%	46.5%	+1.5%
Private Equity - Secondary	20.4%	20.4%	-
Non-U.S. Private Equity	29.0%	32.0%	-3.0%
China Equity	30.4%	30.6%	-0.2%
Global Equity*	18.2%	18.2%	-
Private Equity*	25.8%	25.9%	-0.1%

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Cash	0.6%	0.6%	-
US TIPS	6.0%	6.0%	-
US Treasury Bond	5.5%	5.4%	+0.1%
US Corporate Bond	7.9%	7.7%	+0.2%
US Corporate Bond - AAA	7.0%	6.8%	+0.2%
US Corporate Bond - AA	6.7%	6.6%	+0.1%
US Corporate Bond - A	7.7%	7.6%	+0.1%
US Corporate Bond - BBB	8.6%	8.4%	+0.2%
US Mortgage-Backed Securities	6.5%	6.5%	-
US Securitized Bond	7.9%	8.0%	-0.1%
US Collateralized Loan Obligation	6.5%	7.7%	-1.2%
US Municipal Bond	6.0%	6.0%	-
US Municipal Bond (1-10 Year)	4.5%	4.5%	-
US Taxable Municipal Bond	7.5%	7.5%	-

NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Non-US Government Bond	9.8%	9.5%	+0.3%
Non-US Government Bond (USD Hedge)	4.1%	4.1%	-
Non-US Inflation-Linked Bond (USD Hedge)	6.7%	6.7%	-
US Short-Term TIPS (1-3 Year)	3.3%	3.3%	-
US Short-Term Treasury Bond (1-3 Year)	2.3%	2.3%	-
US Short-Term Corporate Bond (1-3 Year)	2.8%	2.8%	-
US Intermediate-Term TIPS (3-10 Year)	5.8%	6.0%	-0.2%
US Intermediate-Term Treasury Bond (3-10 Year)	5.4%	5.9%	-0.5%
US Intermediate-Term Corporate Bond (3-10 Year)	7.4%	7.1%	+0.3%
US Long-Term TIPS (10-30 Year)	12.6%	12.4%	+0.2%
US Long-Term Treasury Bond (10-30 Year)	12.3%	11.8%	+0.5%
US Long-Term Corporate Bond (10-30 Year)	12.4%	11.9%	+0.5%
20+ Year US Treasury STRIPS	21.0%	20.7%	+0.3%
10 Year US Treasury Bond	7.6%	7.5%	+0.1%
10 Year Non-US Government Bond (USD Hedge)	4.9%	5.0%	-0.1%
US Aggregate Bond*	5.8%	5.8%	-

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
US High Yield Corporate Bond	11.3%	11.2%	+0.1%
US Corporate Bond - BB	9.7%	9.7%	-
US Corporate Bond - B	11.7%	11.6%	+0.1%
US Corporate Bond - CCC/Below	20.4%	20.3%	+0.1%
US Short-Term High Yield Corporate Bond (1-3 Year)	8.2%	8.2%	-
US Leveraged Loan	6.1%	9.1%	-3.0%
Emerging Market Investment Grade External Debt	8.7%	8.7%	-
Emerging Market High Yield External Debt	17.5%	17.5%	-
Emerging Market Local Currency Debt	12.6%	12.7%	-0.1%
US High Yield Securitized Bond	13.0%	11.2%	+1.8%
US High Yield Collateralized Loan Obligation	15.9%	10.4%	+5.5%
US High Yield Municipal Bond	12.0%	12.0%	-
Hedge Fund - Credit	9.7%	9.9%	-0.2%
Private Debt - Credit Opportunities	14.3%	14.5%	-0.2%
Private Debt - Distressed	13.9%	14.4%	-0.5%
Private Debt - Direct Lending	11.0%	11.0%	-
Private Debt*	11.8%	11.8%	-

*Calculated as a blend of other asset classes. NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

VOLATILITY FORECASTS

REAL ASSETS

Volatility			
Asset Class	**06/30/2025**	**06/30/2024**	**Delta**
Commodity Futures	18.5%	18.5%	-
Midstream Energy	27.7%	28.2%	-0.5%
REIT	22.4%	21.8%	+0.6%
Global Infrastructure Equity	19.3%	19.4%	-0.1%
Global Natural Resources Equity	22.9%	23.3%	-0.4%
Gold	16.6%	16.4%	+0.2%
Real Estate - Core	14.7%	15.0%	-0.3%
Real Estate – Value-Add	23.0%	23.4%	-0.4%
Real Estate - Opportunistic	27.3%	25.8%	+1.5%
Private Debt - Real Estate	11.9%	11.9%	-
Private Real Assets - Natural Resources	32.5%	32.3%	+0.2%
Private Real Assets - Infrastructure	10.6%	12.4%	-1.8%

NEPC's capital market assumptions reflect proprietary forecasts for expected returns, volatility, and correlations. Return expectations may differ from an investor's realized returns after accounting for fees, taxes, or other aspects that can influence actual returns. Return forecasts and methodology are reviewed on an ongoing basis and are subject to change over time. Source: NEPC

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for monitoring financial markets. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

This report is provided as a management aid for the client's internal use only. This report may contain confidential or proprietary information and may not be copied or redistributed to any party not legally entitled to receive it.

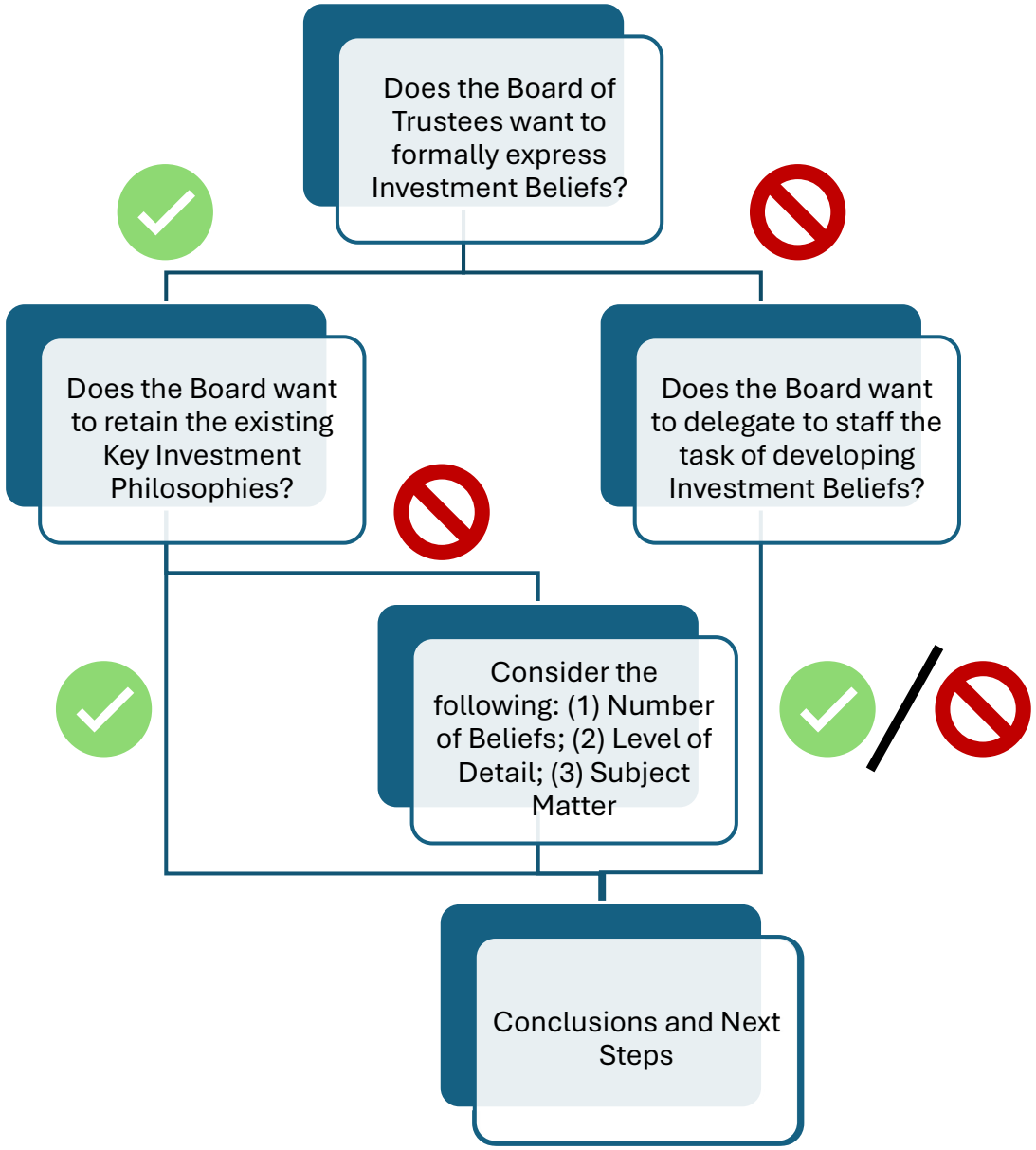
WRS Investment Policy: Investment Beliefs

October Workshop 2025

Edwin Denson, Executive Director/Chief Investment Officer
Sara Chandler, Chief of Staff & Strategy

STATE OF WISCONSIN
INVESTMENT BOARD

Agenda



SWIB
STATE OF WISCONSIN INVESTMENT BOARD

Does the Board of Trustees want to formally express Investment Beliefs?

Straw Poll (By Show of Hands):

- Trustees **should** formally express Investment Beliefs
- Trustees **should not** formally express Investment Beliefs
- I am **undecided** at this time

Does the Board of Trustees want to formally express Investment Beliefs?

DISCUSSION

- Current investment philosophies are documented in the Trustee-approved WRS Investment Policy
- Potential benefits
  - Transparency and accountability
  - Strategic clarity
  - Institutional identity and culture
  - Consistency
- Potential drawbacks
  - Political or public scrutiny/second-guessing
  - Weaponization
  - Constrain flexibility
  - Create unreasonable expectations

Decision

SWIB
STATE OF WISCONSIN INVESTMENT BOARD

Does the Board of Trustees want to delegate to staff the task of developing Investment Beliefs?

Straw Poll (By Show of Hands):

- Trustees **should** delegate to staff the task of developing Investment Beliefs
- Trustees **should not** delegate to staff the task of developing Investment Beliefs
- I am **undecided** at this time

Decision

SWIB
STATE OF WISCONSIN INVESTMENT BOARD

Does the Board of Trustees want to retain the existing Key Investment Philosophies as drafted in the WRS Investment Policy?

Straw Poll (By Show of Hands):

- Trustees **should** retain the existing Key Investment Philosophies
- Trustees **should not** retain the existing Key Investment Philosophies
- I am **undecided** at this time

DISCUSSION – Existing Philosophies

1. Investment returns are a function of risk; thus, losses are inevitable. The optimal SWIB strategic asset allocation policy should reflect a probability of losses that is consistent with SWIB's investment return expectations.

2. Asset classes and sub-asset classes are broadly defined to gain exposure to the entire investable opportunity set and capture the greatest depth of available investment opportunities to the extent they offer a risk-return trade-off commensurate with SWIB's return objectives and risk tolerance.

3. Through quantitative asset/liability modeling and qualitative evaluation, an appropriate strategic asset allocation mix can be selected. Application of a rebalancing regimen after allowing a predetermined amount of "drift" around targets effectively contains allocation risk and can add value by enforcing an efficient allocation at the asset class level.

4. A well-diversified asset mix in the Core Fund historically has been a favorable position for meeting long-term objectives, recognizing that strategies will not always appear to add value over shorter time frames. It is essential to hold to the investment program during difficult times, and the diversified asset mix should mitigate the impact of negative market environments.

5. Including an allocation to passive investments within major asset classes is a relatively efficient way to provide benchmark returns, adjust risk within the overall fund, provide a liquid and low-cost pool of assets, and facilitate timely fund rebalancing.

6. Positive returns can be gained from active management and supplement the returns earned from the allocation to passive investments. Over the long term, active management can add value beyond market-neutral benchmarks at the asset class, sector, and security levels by exploiting market inefficiencies and their resulting valuation opportunities.

7. Risk management and performance benchmarking are integral to the entire investment process. SWIB manages and monitors risk at multiple levels. The primary risk resulting from WRS drawdowns is lower dividend annuities and higher employee and employer contributions. Fund-level absolute and relative return volatility are other key risks that affect the WRS.

8. Ex-ante (forecasted) and ex-post (actual) total fund risk, and component contributions to risk, are assessed and considered in the structuring of the investment program and monitored by SWIB staff. Performance benchmarking compares actual investment results to expected results.

9. Fund and portfolio results are most appropriately measured against investable market indices, representing neutral, or passive, market positions. Peer comparisons are fraught with difficulties due to differences in liability structure, investment style, risk preferences, and inconsistencies over time and are generally used as secondary comparisons. Results are evaluated on the basis of investment return as well as return for the level of assumed risk.

10. Cost optimization is a component of investment results, and costs are optimized through lower-cost internal management, external fee negotiations, and a focus on net performance. Maintenance of an internal team of investment professionals is an appropriate strategy to optimize costs and retain better control of the assets compared to outsourcing asset management. When SWIB does use external managers, it negotiates competitive fee arrangements that are driven by pay for performance metrics.

WRS Investment Policy, Section III.B, pages 3-4

SWIB
STATE OF WISCONSIN INVESTMENT BOARD

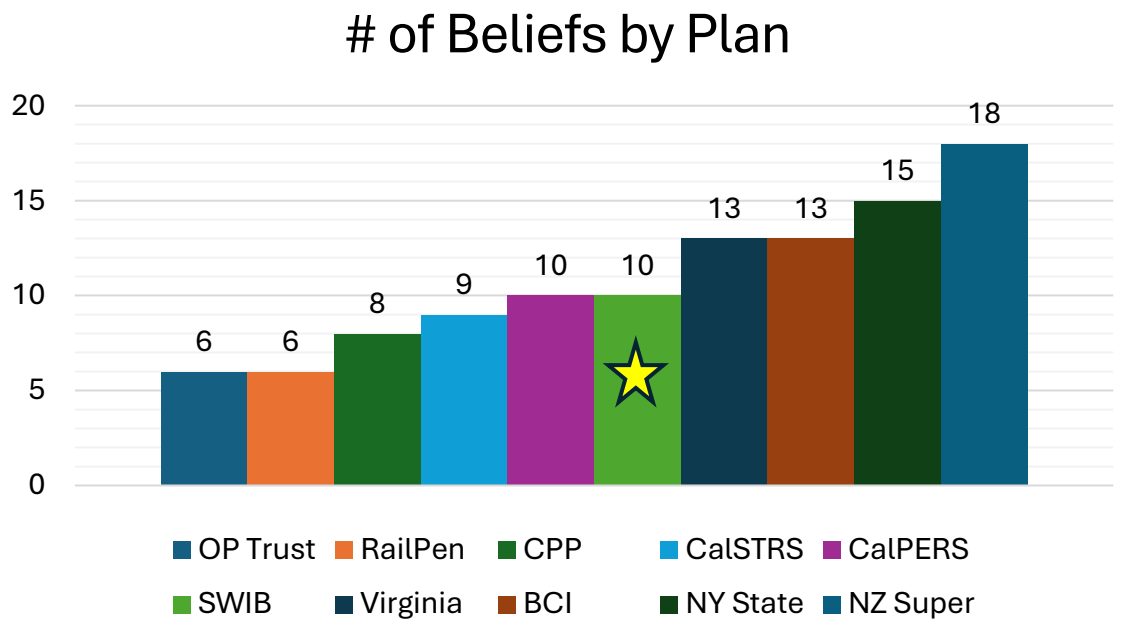
Decision

SWIB
STATE OF WISCONSIN INVESTMENT BOARD

New Investment Beliefs

DISCUSSION

- The number of Investment Beliefs
  - Peer examples range from 6 to 18, with SWIB currently at 10
- Level of detail provided for Investment Beliefs
- Subjects covered or omitted



Most Common Beliefs Among Peers

Tier 1

A long-term investment horizon provides an opportunity for improved returns

An investor should take risk where it will be compensated for doing so

Markets are generally efficient, but inefficiencies exist that active management can capitalize on

Long-term investors can capture an illiquidity risk premium

Diversification enhances returns at a target level of risk

Strategic asset allocation is the dominant driver of portfolio risk and return

It is important to manage costs effectively without compromising net returns

SWIB currently:
- addresses
- does not address
- partially addresses

SWIB
STATE OF WISCONSIN INVESTMENT BOARD

Most Common Beliefs Among Peers

Tier 2

Human capital is an important component of long-term investment success

Alignment of financial interests with partners is critical

Good governance contributes positively to investing outcomes

Internal management is a valuable option to improve net returns

The path of returns matters to stakeholder outcomes

Scale/size is a competitive advantage

Environmental, social and governance factors can influence risk and return

SWIB currently:
- addresses
- does not address
- partially addresses

SWIB
STATE OF WISCONSIN INVESTMENT BOARD

Conclusions and Next Steps

SWIB
STATE OF WISCONSIN INVESTMENT BOARD