Investment Board Meeting Agenda

Wednesday, September 24, 2025
IPERS Board Room
Conference Telephone #: 301-715-8592
Meeting ID: 871 5424 1166
1:00 p.m. – 3:45 p.m.

1:00 p.m. **Call to Order**

1:05 p.m. **Actuarial Education Session**
Pat Beckham and Bryan Hoge, *CavMac Actuarial Consulting Services*

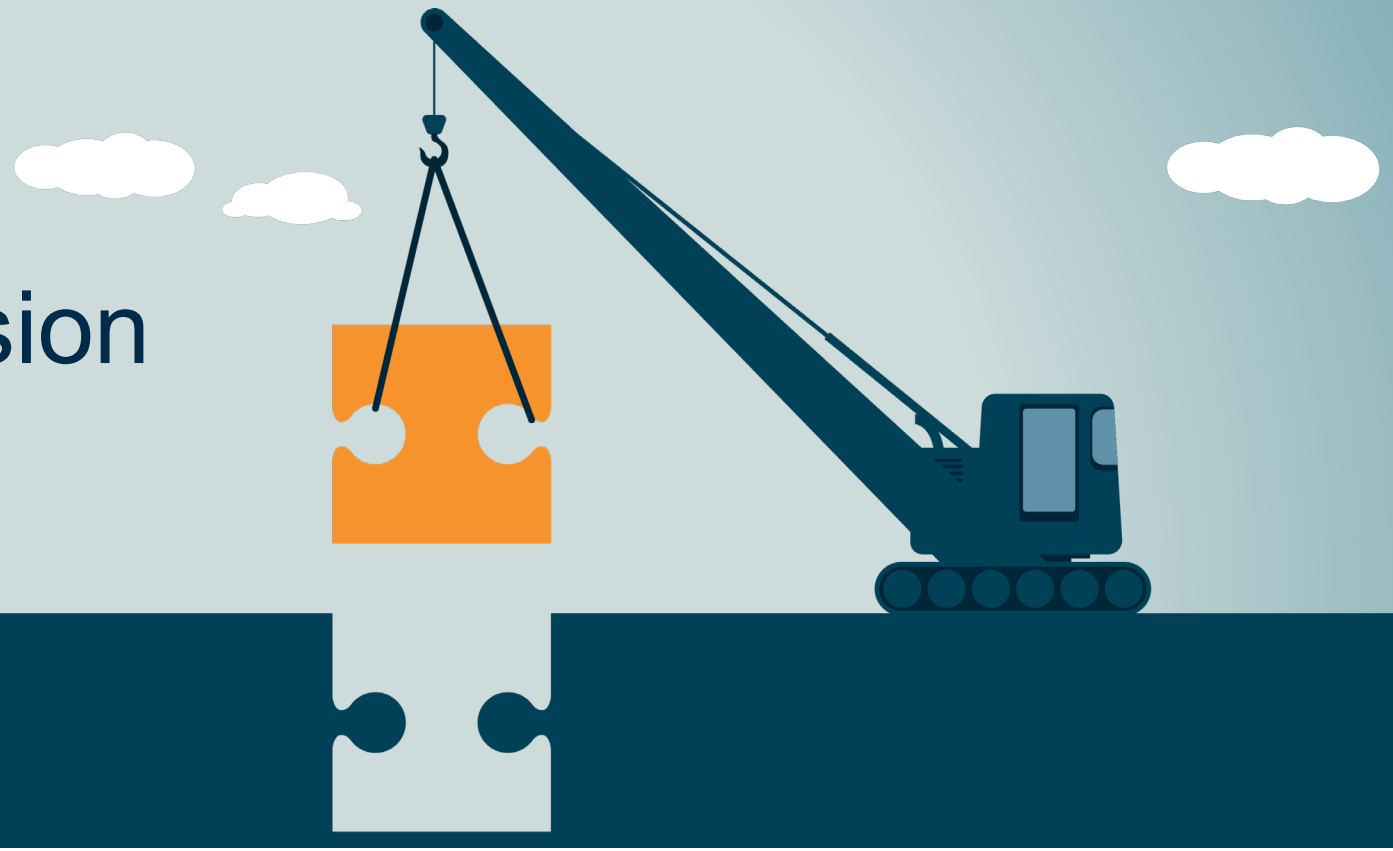
2:30 p.m. **Break**

2:45 p.m. **Capital Market Update and Benchmark Education**
Thomas Toth and Ali Kazemi, W*ilshire*

3:15 p.m. **Active Risk @ IPERS**
Sriram Lakshminarayanan, *IPERS*

3:45 p.m. **Adjourn**

Iowa Public Employees' Retirement System



Board Education Session

IPERS®

Working Today for Your Tomorrow

September 24, 2025

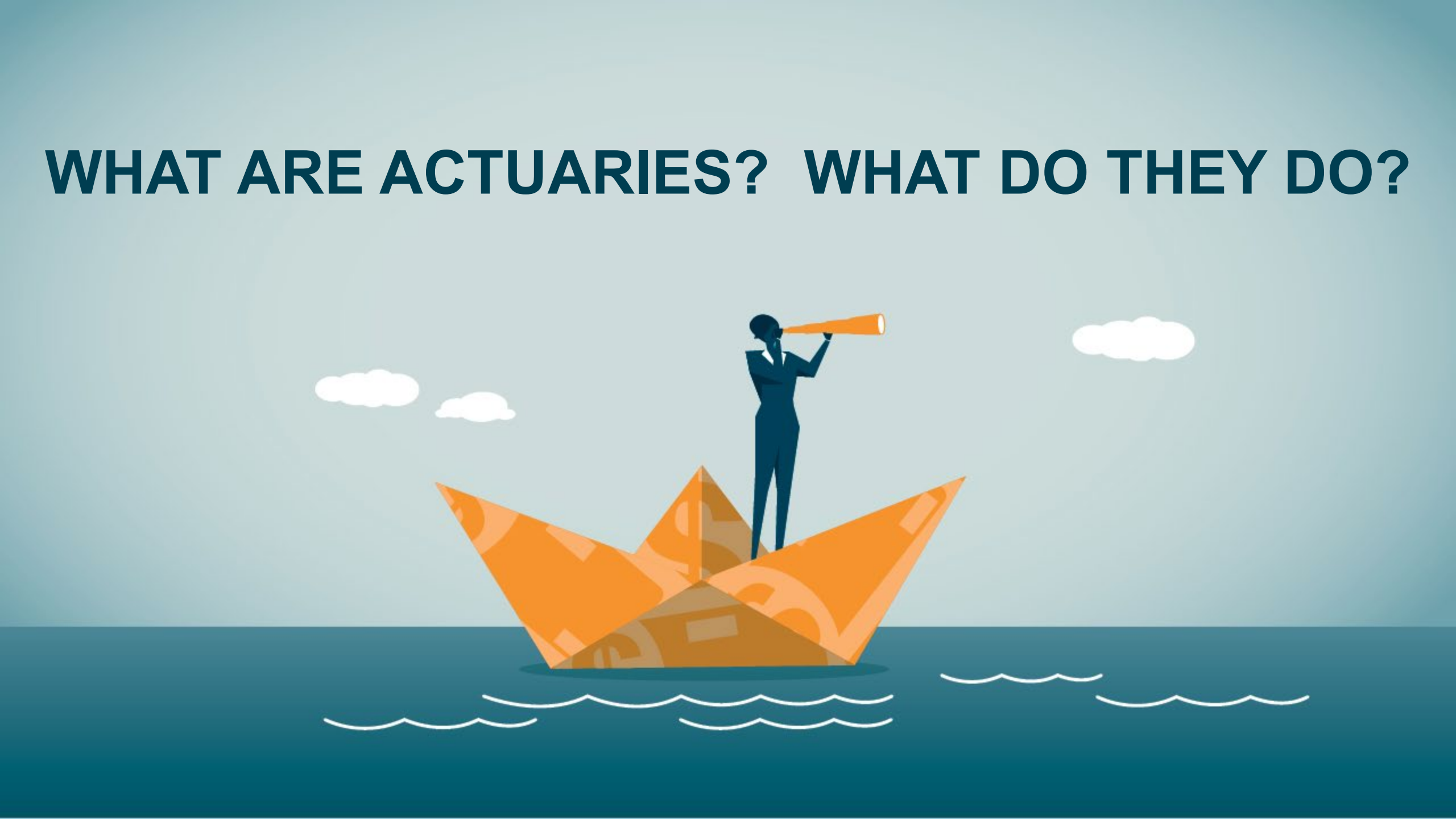
CavMac

Actuarial Consulting Services

Topics of Discussion

- What are Actuaries? What do they do?
- The Actuarial Valuation
- Understanding the Valuation Results
- Analysis of Risk with Alternate Portfolios

WHAT ARE ACTUARIES? WHAT DO THEY DO?



What Are Actuaries?

What Are They Trained In?

- Mathematics of Risk and Finance
- Demographic Analysis
- Investment and Funding Interaction
- Communication

How Are They Trained?

- University Background
- Rigorous Credentialing Process through Exams
- On-the-Job Experience
- Continuing education

What do Actuaries do?

- Work on problems in business and finance involving:
  - Payment of money in the future that is contingent upon occurrence of future events (retirement, death, injury, loss of property, etc.)
  - Risk management
- Work for:
  - Insurance companies
  - Consulting firms
  - Retirement Systems and Boards

Actuaries provide independent, objective analysis to support fiduciary responsibilities

What Does CavMac Do for IPERS?

Annual Actuarial Valuation for Funding Purposes	Financial Reporting Information under GASB 67 and 68	Annual Comprehensive Financial Report Assistance	Periodic Experience Study	
Projection Modeling for Future Valuation Results	Trusted Advisor to Investment Board and Staff on Actuarial Issues	Risk Analysis Study	Legislative Analysis on Proposed Plan Design and Funding Changes	Benefit Administration Support

THE ACTUARIAL VALUATION

IPERS is a Defined Benefit Plan

Benefit payments are defined by plan provisions (in statute)

- (Benefit Multiplier) x (Credited Service) x (Final Average Salary)
- Benefit payments commence under plan-specified conditions
- Benefit is typically paid for the life of the member

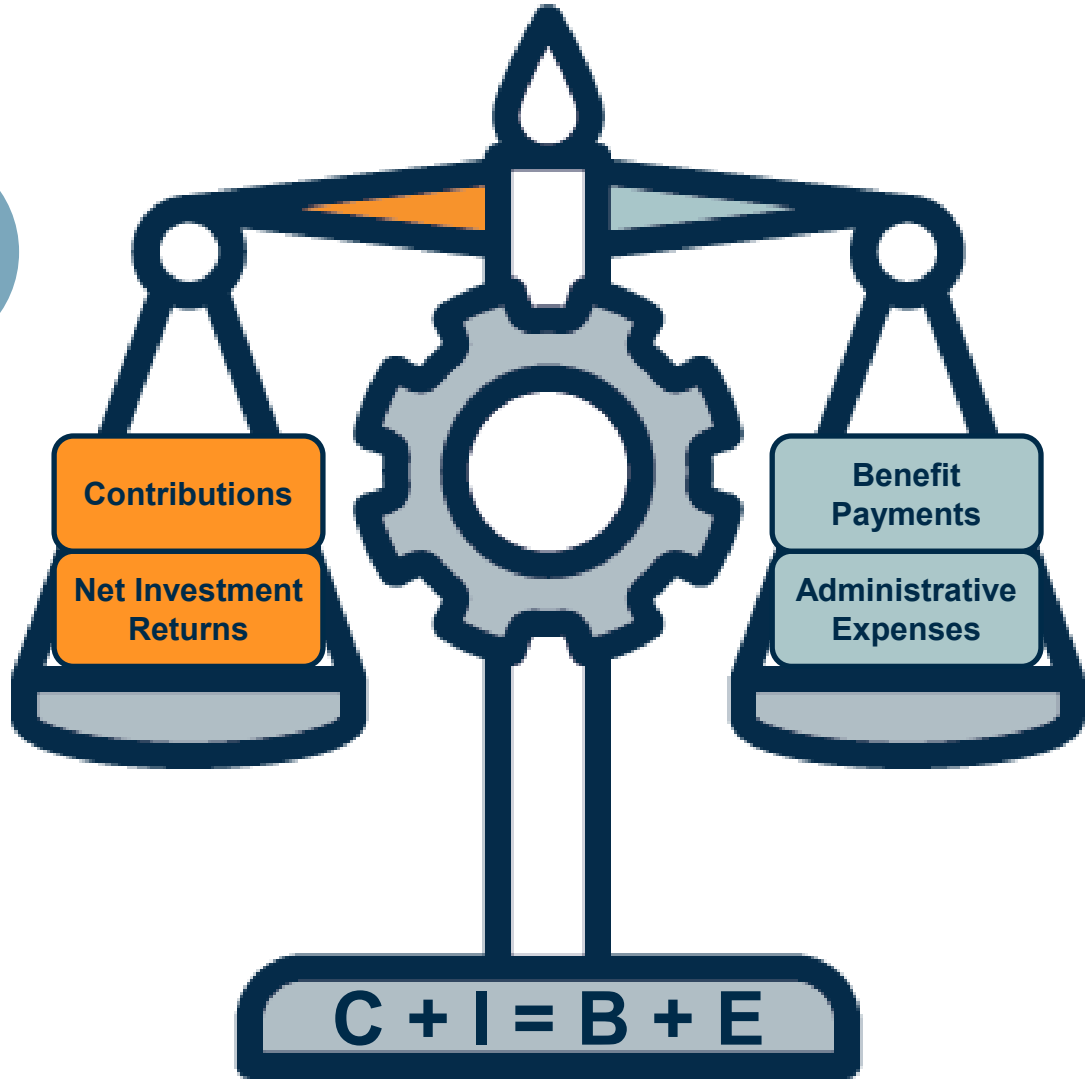
Amount, timing and duration of those future benefit payments are unknown, so assumptions are used to bridge the gap between what we know and what will happen in the future.

Most defined benefit plans are “advance funded”, i.e., contributions are paid while members are working which will accumulate with investment earnings and be sufficient to pay the benefits, as due. This process of assigning cost to years of service to fund future benefits requires actuarial expertise.

Basic Long-Term Retirement Funding Formula

C + I = B + E

- C = Contributions
- I = Investment Income
- B = Benefits paid
- E = Expenses



C and I are the only two sources of revenue that will ultimately be used to pay for benefits

Approaches to Funding Retirement Systems

- Actuarial Contribution Rates
  - Actual contributions are based on actuarial contribution rates developed in the annual actuarial valuation
  - Contribution rates change from year to year based on the valuation results which capture the actual vs expected experience
  - Employee contribution rate may be fixed or vary like the employer contribution rate
  - Output smoothing methods can be used where some restriction on the amount of increase or decrease on the contribution rate is applied (like IPERS)

- Fixed Contribution Rates
  - The employer and employee contribution rates are fixed and do not change from year to year
  - There is more funding risk because actual contributions do not change (up or down) in response to actual versus expected experience (primarily investment experience). Funded ratios and projected funding results can vary dramatically with actual experience, especially investment returns.
  - Less common in public plans
  - IPERS' prior funding policy used fixed contribution rates which was a major contributor to the current unfunded actuarial liability

Actuarial Valuation

- Primary functions of valuation
  - Determine funded status (assets/liabilities)
  - Evaluate funding progress
  - Determine the contribution rate needed to fund the benefits promised, based on current membership, actuarial assumptions and funding policy
  - Measure changes from the prior year
  - Determine certain financial reporting requirements for plan

- Actuarial valuation does NOT predict:
  - Future financial soundness of the system
  - Future investment performance
  - Impact of future members
  - Impact of future plan changes
  - Future impact of other experience (gains/losses)

The Actuarial Model

Inputs

- Membership Data
- Benefit Provisions
- Asset Data
- Actuarial Assumptions
- Actuarial Methods

Actuarial Model

- Employer Contribution
- UAL
- Funded Ratio
- Actuarial Gain or Loss
- Projections

Results

Membership Data

- Snapshot at valuation date
  - In pay group (retirees/beneficiaries)
  - Active members
  - Inactive vested members
  - Inactive non-vested members (due a refund)
- Basic demographic data
  - Birthdate, Gender, Service, Salary
  - Unique items needed for benefit structure
- Generally, the valuation doesn't include future members (closed group)

Actuarial Assumptions

- Experience Study is performed every 4 years to review all actuarial assumptions and actuarial methods

- Actuary's role is to make recommendations for each method and assumption
  - As fiduciaries, the Board is responsible for the selection of actuarial assumptions

- Assumptions and methods do not affect the true cost of the plan, which is the actual benefit payments paid from the trust
  - Assumptions and methods will influence the incidence of costs (timing and amount of contributions)

Selection of Assumptions

What Are They?

Economic

- Price Inflation
- Investment Return
- General Wage Increase
- Payroll Growth
- Individual Salary Increases
- Cost-of-Living Adjustments

Demographic

- Retirement
- Disability
- Termination
- Mortality

Who Selects Them?

Economic

- Board
- Actuary
- Other Advisors

Demographic

- Board Approves
- Mostly Actuary Since Data Driven

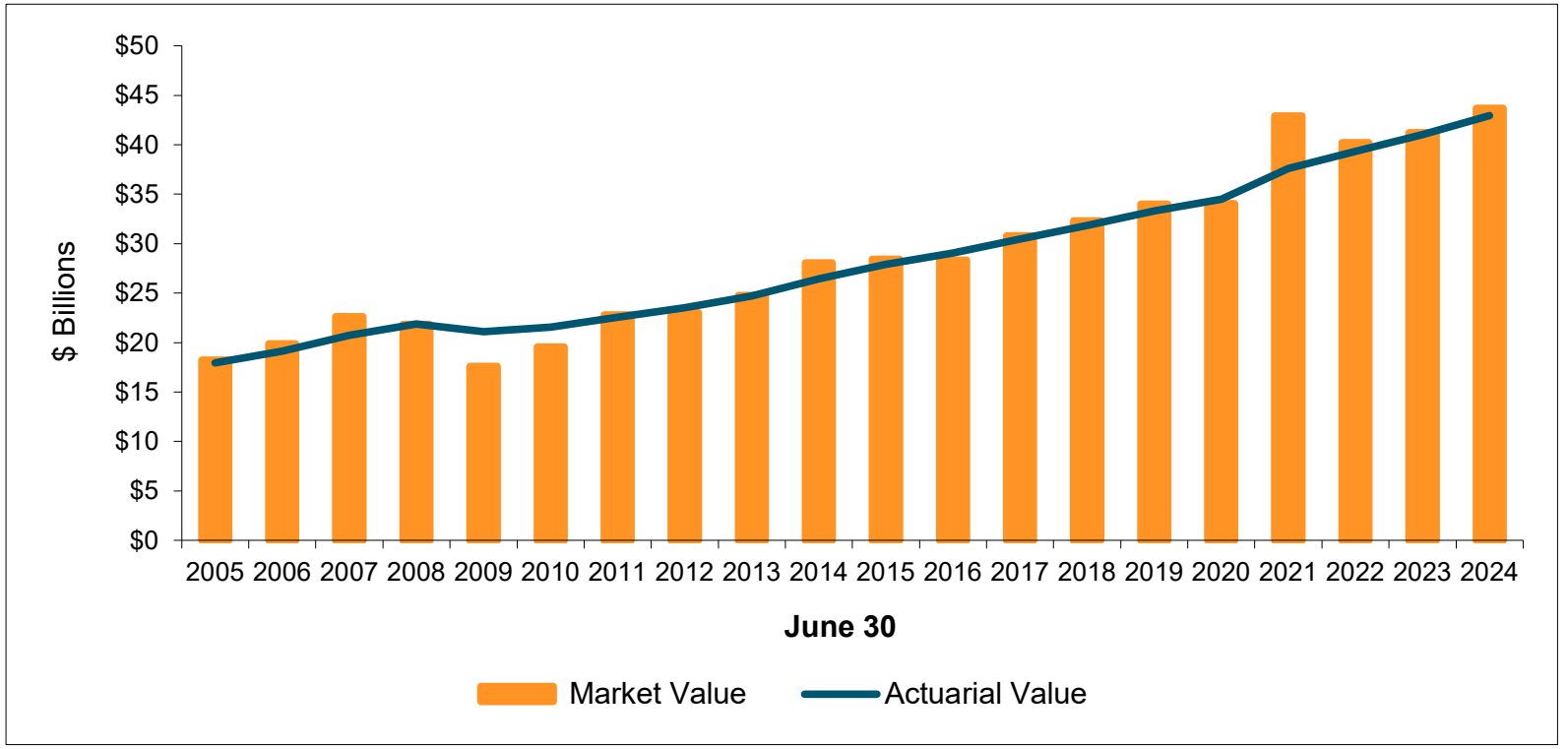
- Actuaries are not investment experts, so we rely on investment professionals and other advisors to aid in recommending economic assumptions.
  - Asset allocation drives the investment return assumption
  - As fiduciaries, the Board is responsible for the selection of all actuarial assumptions including the investment return assumption

Assets

- Market value of assets
  - Not used directly in actuarial valuation
  - Pure market value reflects the extreme volatility inherent in the market which impacts the funded ration and actuarial contribution rate

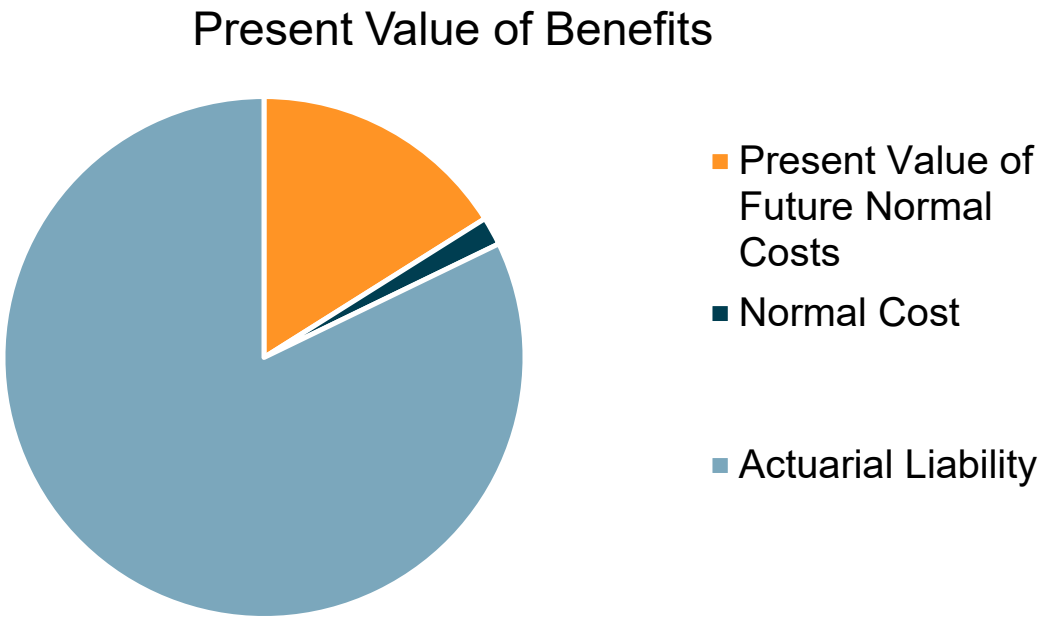
- Most public retirements systems use a “smoothed” market value, called the *actuarial value of assets* (AVA)
  - Goal is to provide more stability in the contribution rates
  - Used in all measurements in the actuarial funding valuation

Value of Assets: Actuarial Value vs. Market Value



- There should be no bias in the actuarial value of assets. However, Actuarial Value is generally expected to be:
  - Below Market when market is doing well
  - Above Market when market is doing poorly

Actuarial Funding Definitions



- Normal Cost is the current year ongoing active member costs added to the Actuarial Liability ($1B for IPERS)
- Present Value of Future Normal Costs is the present value of future liability to be added for active members
- Actuarial Liability is the liability attributable to past service

Unfunded Actuarial Liability

- Unfunded Actuarial Liability (UAL) is the Actuarial Liability (AL) minus the Actuarial Value of Assets (AVA)
- UAL is a natural part of retirement system funding give the number of variables used to model the future
- Must be financed in addition to ongoing cost for actives (normal cost)
- The existence of an UAL does not automatically mean the system has been “underfunded”
- Conceptually similar to a home mortgage: a debt to be systematically paid off over time

Contribution Rates

- Contribution Rates generally contain 2 components
  - Normal Cost Rate (ongoing cost for active members)
  - Amortization Payment Rate on UAL

- Administrative Expenses are sometimes included as an explicit 3rd part of the contribution rate

- Most systems determine contributions as a percent of covered payroll

Actuarial or Experience Gains and Losses

- Actuarial gains/(losses) result from actual experience that is better/(worse) than assumed
  - Actuarial gains increase the funded ratio, decrease the unfunded actuarial accrued liability and decrease the actuarial contribution rate
  - Opposite is true for actuarial losses
- Events that typically result in actuarial gains:
  - Lower salary increases
  - Higher investment return
  - Fewer and/or later retirements
  - More retiree deaths
- Because some members have higher liability than others, actuarial experience depends not just upon how many members, but also which members, change status

Summary Comments

- Actuarial work is highly technical and based on a very specialized skill set

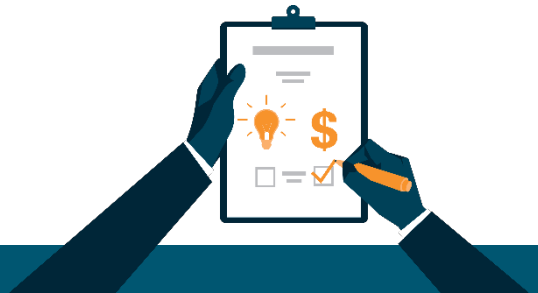
- Our work focuses on the liabilities of the system (value of future benefit payments) and developing a systematic plan to fund the promised benefits over a reasonable timeframe

- The actuary is an important part of the IPERS team

UNDERSTANDING THE JUNE 30, 2024 IPERS VALUATION RESULTS

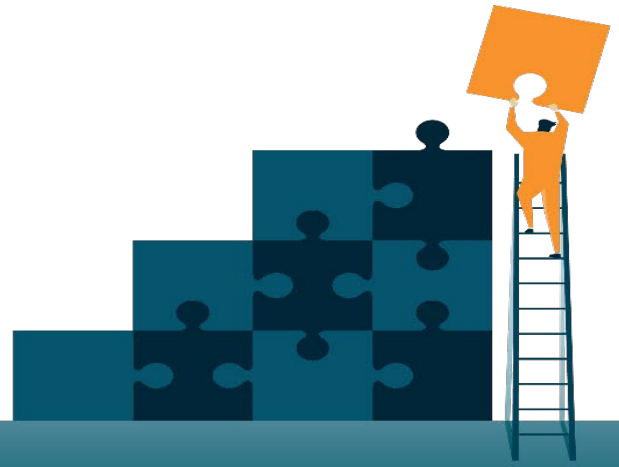
Purpose of the Actuarial Valuation

- Develop a strategy to systematically fund the benefits of the system
- Measure assets and liabilities (future benefit payments)
- Determine actuarial contribution rates (6/30/24 valuation results are used to set the FY 2026 contribution rates)
- Analyze experience (actual vs. expected) in past year
- Report on trends and analyze actuarial risks

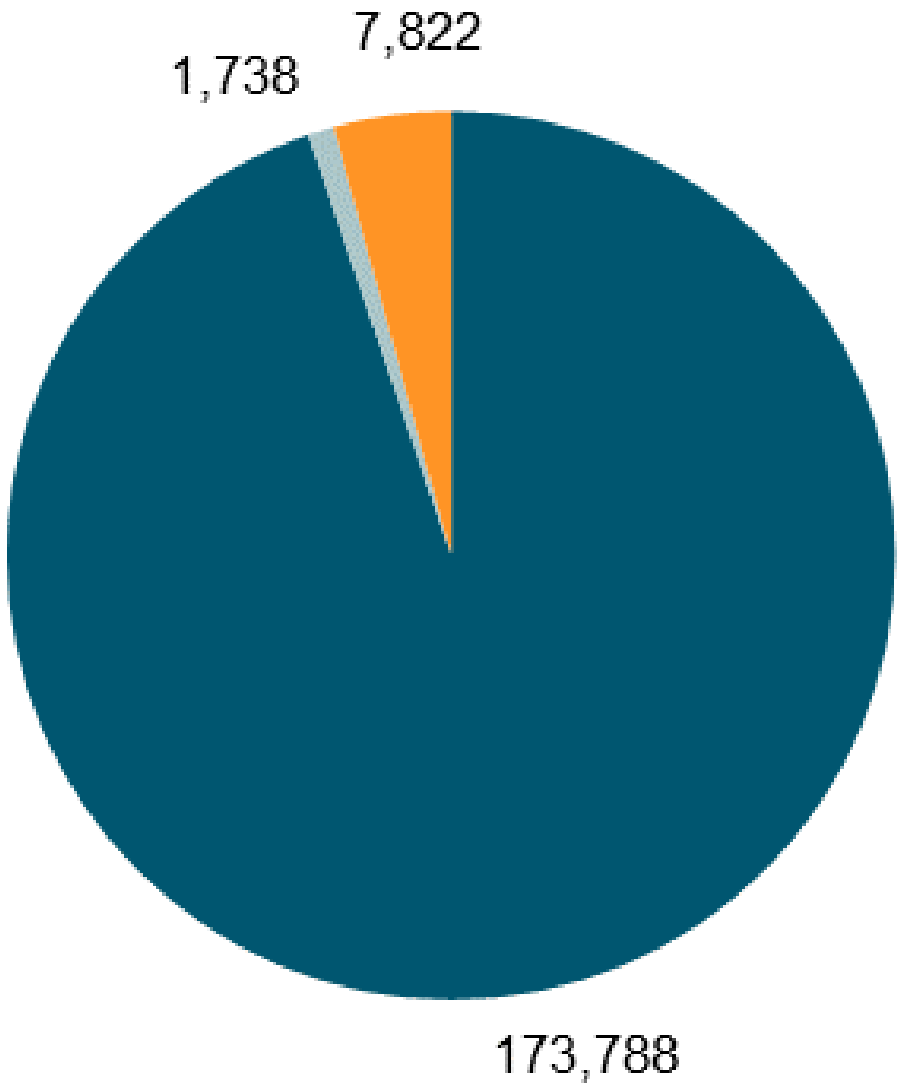


Impacts on the June 30, 2024 Valuation

- HF 2661 passed which provided the Sheriffs and Deputies with benefit enhancements
  - Increased the Unfunded Actuarial Liability by $109 million
  - Increased the contribution rate by 7.16% for Sheriffs and Deputies
- Actuarial experience: actual versus assumed
  - Return of 9.07% on the market value of assets for FY 2024
  - Due to asset smoothing method, the return on actuarial assets was 7.61% which resulted in an actuarial gain of $245 million
  - Liability loss of $23 million
- June 30, 2024 Valuation Results
  - Total system Unfunded Actuarial Liability decreased
  - Funded ratio increased
  - Required contribution rate remained the same for Regular members and Protection Occupation, but increased for Sheriffs and Deputies due to HF 2661



Active Membership By Group



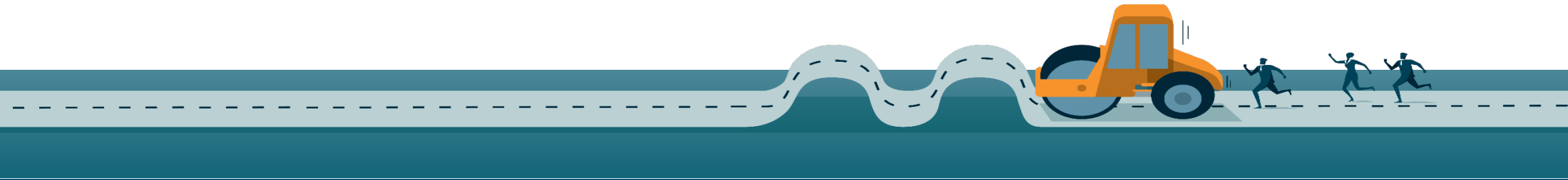
Regular members represent 95% of total active membership.

IPERS Key Assumptions

- Rate of Investment Return: 7.00%
- Rate of Inflation: 2.60%
- Payroll Growth Assumption: 3.25%
- Individual Salary Increases: 3.25% - 16.25%
  - Varies based on group and years of service
- Mortality: Public Plan Mortality Tables
  - General tables for Regular members and Safety tables for S/D and P/O
  - Table adjustments vary by group
- Retirement, Termination, Disability
  - Vary by group, age and service

Actuarial Value of Assets

- Market value not used directly in funding valuation
- Asset valuation method used to smooth the effect of market fluctuations
- Actuarial value is expected value (based on the expected return of 7.0% and contributions and benefit payments) plus 25% of difference between actual and expected values
- Resulting value of actuarial assets must be within a corridor of 80-120% of pure market value (corridor did not apply this year)



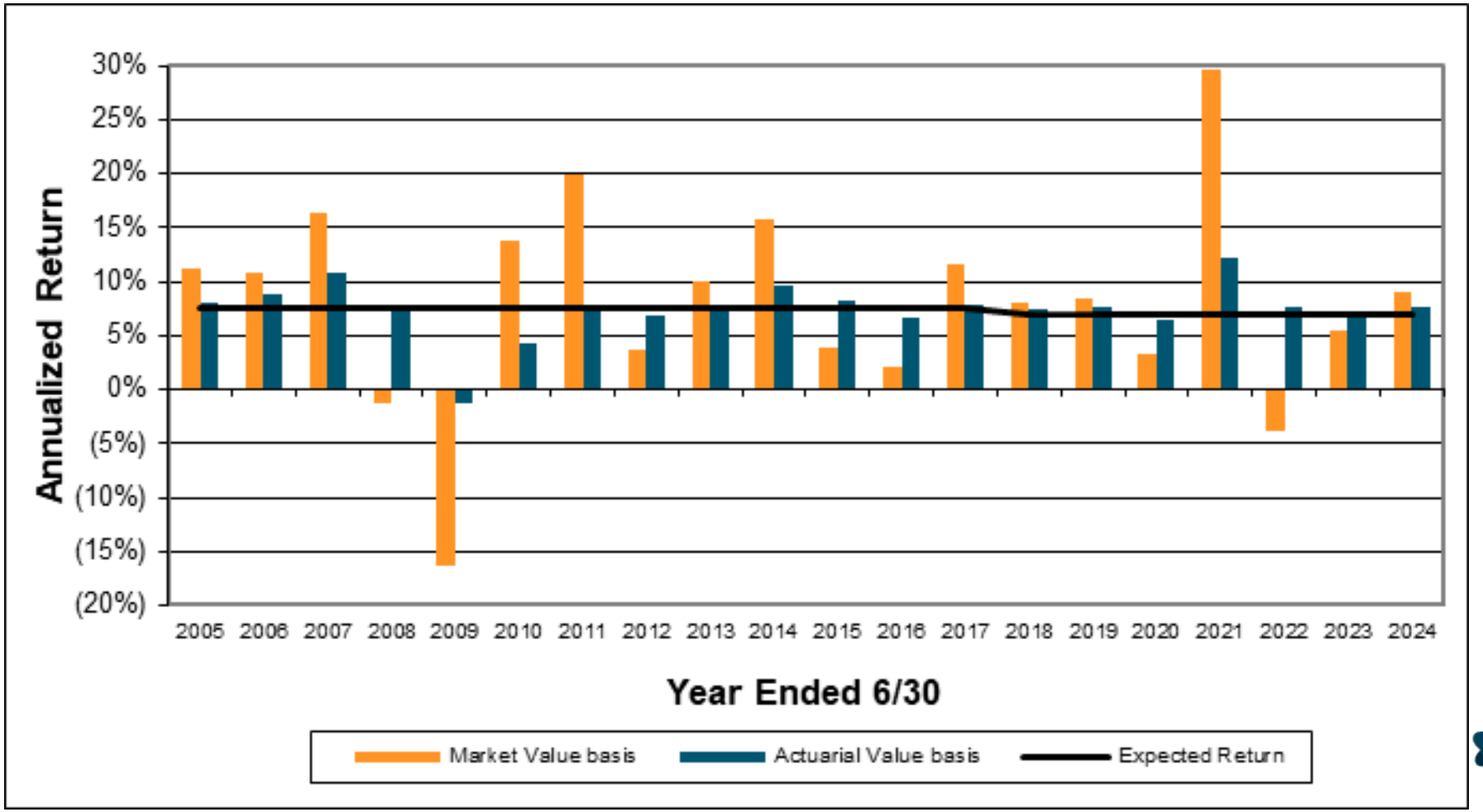
Asset Values ($M) Total System

	Market Value	Actuarial Value
Assets, June 30, 2023	$ 41,206	$ 41,013
▪ Contributions	1,578	1,578
▪ Benefit Payments	(2,739)	(2,739)
▪ Investment Income	3,616	3,075
▪ FED Transfer	0	0
Assets, June 30, 2024	$ 43,661	$ 42,927
Estimated Rate of Return	9.07%*	7.61%

* As reported by IPERS

The 7.61% return on actuarial value of assets resulted in a $245 million actuarial gain. Due to unrecognized investment gains, the market value of assets is currently 102% of actuarial value.

Historical Asset Returns

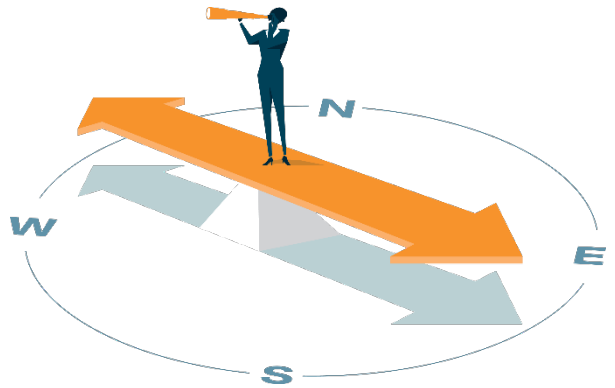


Expected return is 7.5% for all years through 2017 and 7.0% thereafter.

UAL by Group ($ in Millions as of 6/30/24)

	Regular	Sheriffs & Deputies	Protection Occupation	Total
Actuarial Liability	$43,969	$1,072	$2,262	$47,303
Actuarial Value of Assets	39,599	984	2,344	42,927
Unfunded Actuarial Liability (UAL)	$4,370	$88	$(82)	$4,375
Funded Ratio	90.1%	91.8%	103.6%	90.8%

Note: Numbers may not add due to rounding.

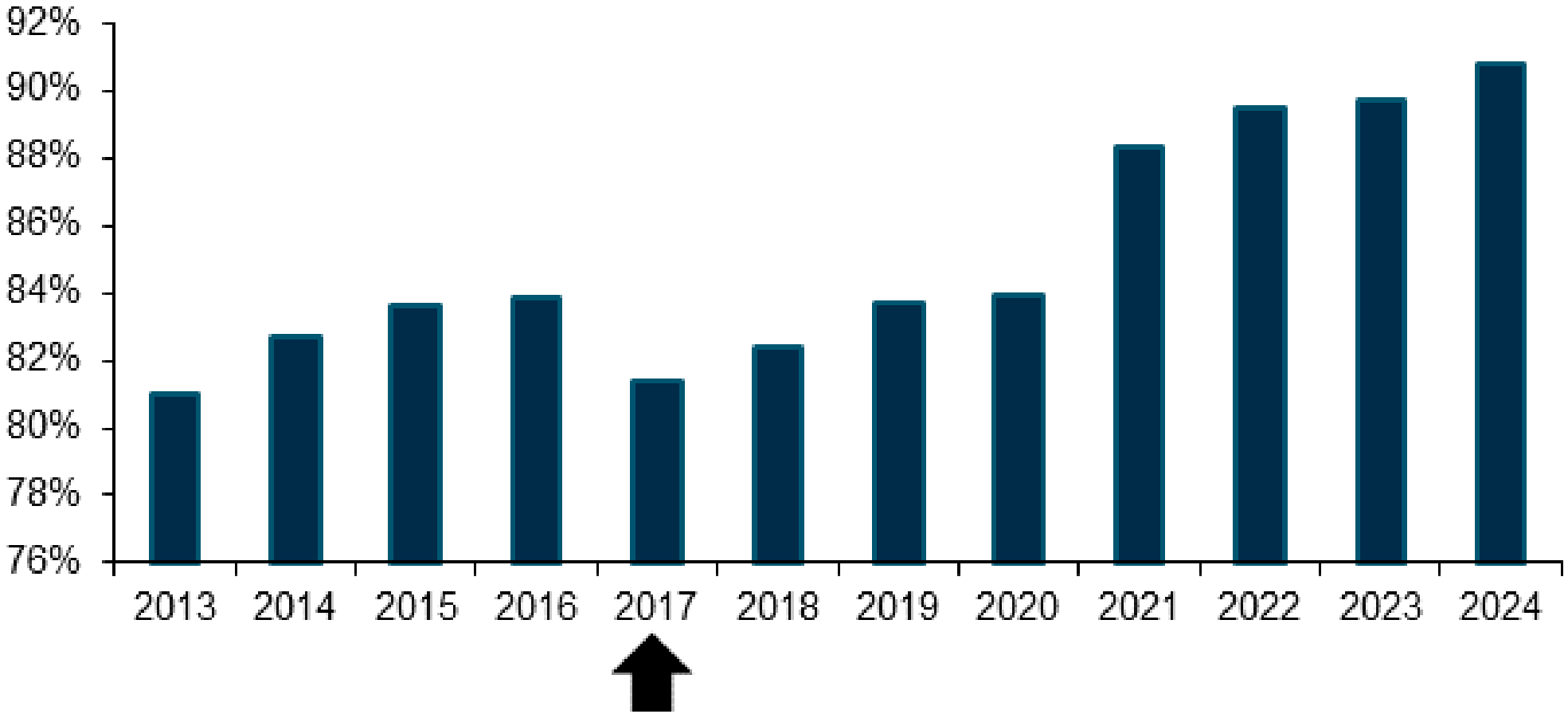


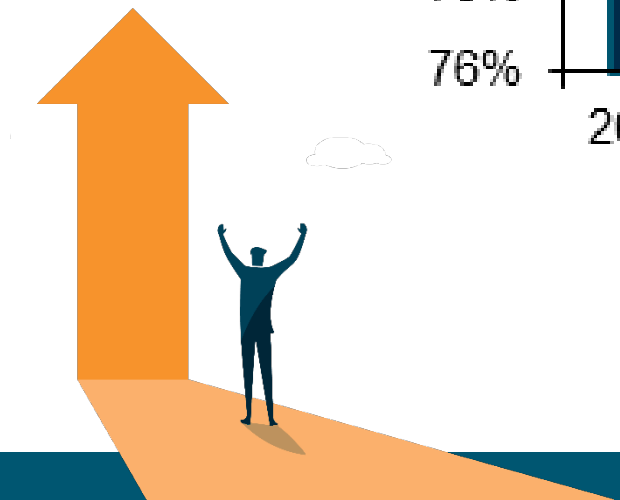
Change in Unfunded Actuarial Liability ($M)

	Regular Members	Sheriffs & Deputies	Protection Occupation	Total
UAL June 30, 2023	$4,795	$(24)	$(64)	$4,707
Contributions above actuarial rate	(172)	0	(1)	(174)
Expected increase	11	(2)	(4)	5
Investment experience	(226)	(4)	(15)	(245)
Liability experience	12	8	3	23
Benefit changes	0	109	0	109
Other	(50)	1	(1)	(50)
UAL June 30, 2024	$4,370	$88	$(82)	$4,375

Note: Numbers may not add due to rounding.

Historical Funded Ratio (All Groups)





Contribution Rates

- Components:
  - Normal Cost (ongoing cost for actives)
  - Amortization payment on Unfunded Actuarial Liability (UAL)

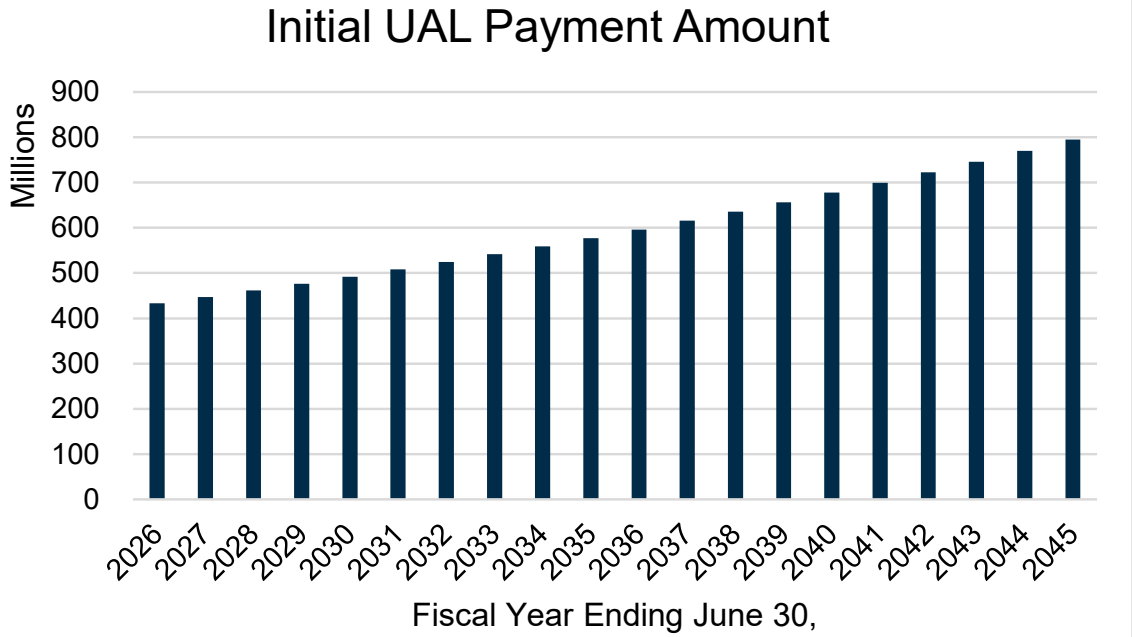
- UAL Amortization Policy (Layered Amortization)
  - June 30, 2014 base (legacy base) is amortized over a closed 30-year period (20 years remaining).
  - In subsequent years, changes in the expected vs. actual UAL are established as a new closed 20-year base.
  - Changes in UAL due to revised assumptions (2017, 2018 and 2022) were amortized over separate closed 20-year periods.
  - Once a group becomes 100% funded, all outstanding bases are eliminated, and the surplus (actuarial assets over actuarial liability) is amortized over an open 30-year period.

UAL Amortization Bases (Regular Members)

Amortization Bases	Original Amount	Remaining Payments*	Projected July 1, 2025 Balance	Annual Payment**
2014 Initial UAL	$ 5,592,056,086	20	$ 6,092,176,781	$ 432,986,190
2015 Experience	(193,648,198)	11	(166,389,565)	(18,583,765)
2016 Experience	21,763,596	12	19,311,774	2,010,295
2017 Experience	(158,062,524)	13	(143,850,814)	(14,052,736)
2017 Assumption Changes	1,435,708,789	13	1,306,621,409	127,643,390
2018 Experience	(310,129,854)	14	(289,597,092)	(26,704,564)
2018 Assumption Changes	75,130,979	14	70,156,783	6,469,355
2019 Experience	(384,733,612)	15	(366,776,918)	(32,085,734)
2020 Experience	67,832,112	16	65,732,382	5,478,947
2021 Experience	(1,670,503,783)	17	(1,639,227,290)	(130,683,029)
2022 Experience	(351,647,258)	18	(348,246,299)	(26,643,355)
2022 Assumption Changes	9,926,473	18	9,830,469	752,102
2023 Experience	19,791,982	19	19,722,355	1,452,382
2024 Experience	(471,153,951)	20	(471,153,951)	(33,486,086)
Total			**$ 4,158,310,024**	**$ 294,553,392**

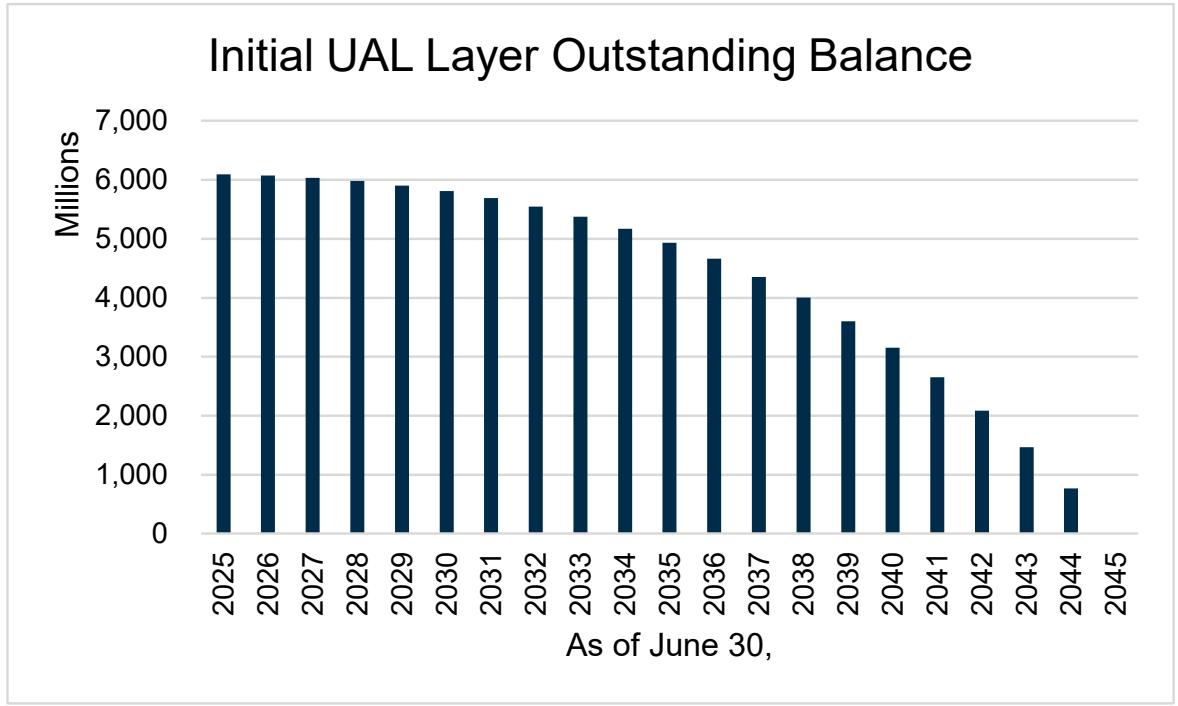
* Payment amounts reflect mid-year timing and increase 3.25% with the assumed increase in payroll growth.

Level Percent of Payroll Amortization

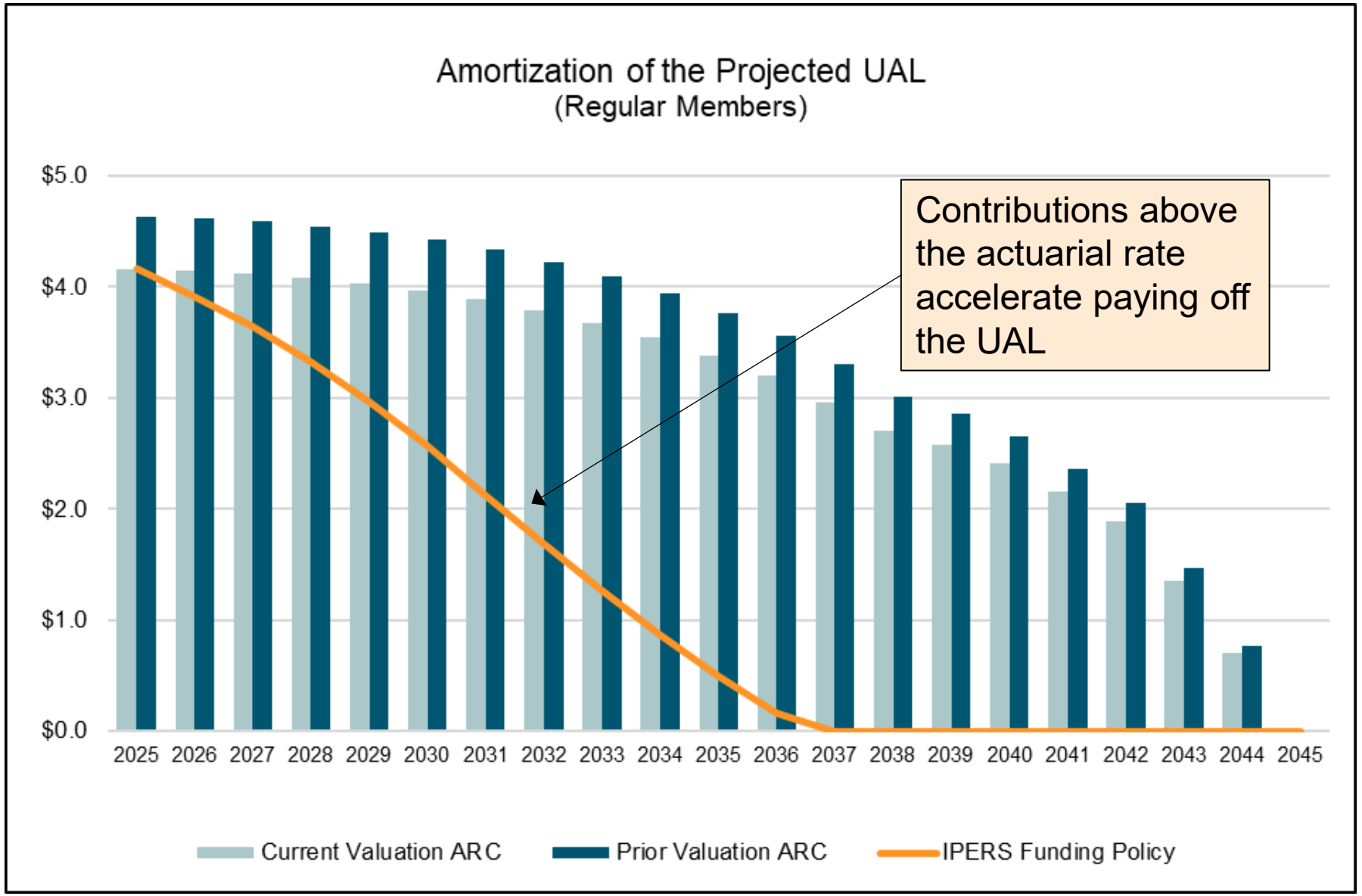


Under level percent of payroll amortization, the payment amounts increase while the payment rates as a percent of pay are expected to remain level.

Under level percent of payroll amortization, the outstanding UAL balance is expected to slowly decline in the early period before decreasing rapidly at the end of the period.



UAL Balance Under Amortization Schedule



Contribution Rates

- Contribution Rate Funding Policy
  - Compares Required Contribution Rate (RCR) from prior year to Actuarial Contribution Rate (ACR) in current year
  - If ACR < previous RCR, then:
    - If difference is <0.50%, RCR is unchanged
    - If difference is >= 0.50%, RCR is lowered by 0.50% provided funded ratio is 95% or higher
  - If ACR > previous RCR, then current RCR shall be:
    - Regular member: increased to ACR or 1% more than previous RCR, whichever is smaller
    - Sheriffs/Deputies: increased to ACR
    - Protection Occupation: increased to ACR

Contribution Rate (Regular Members)

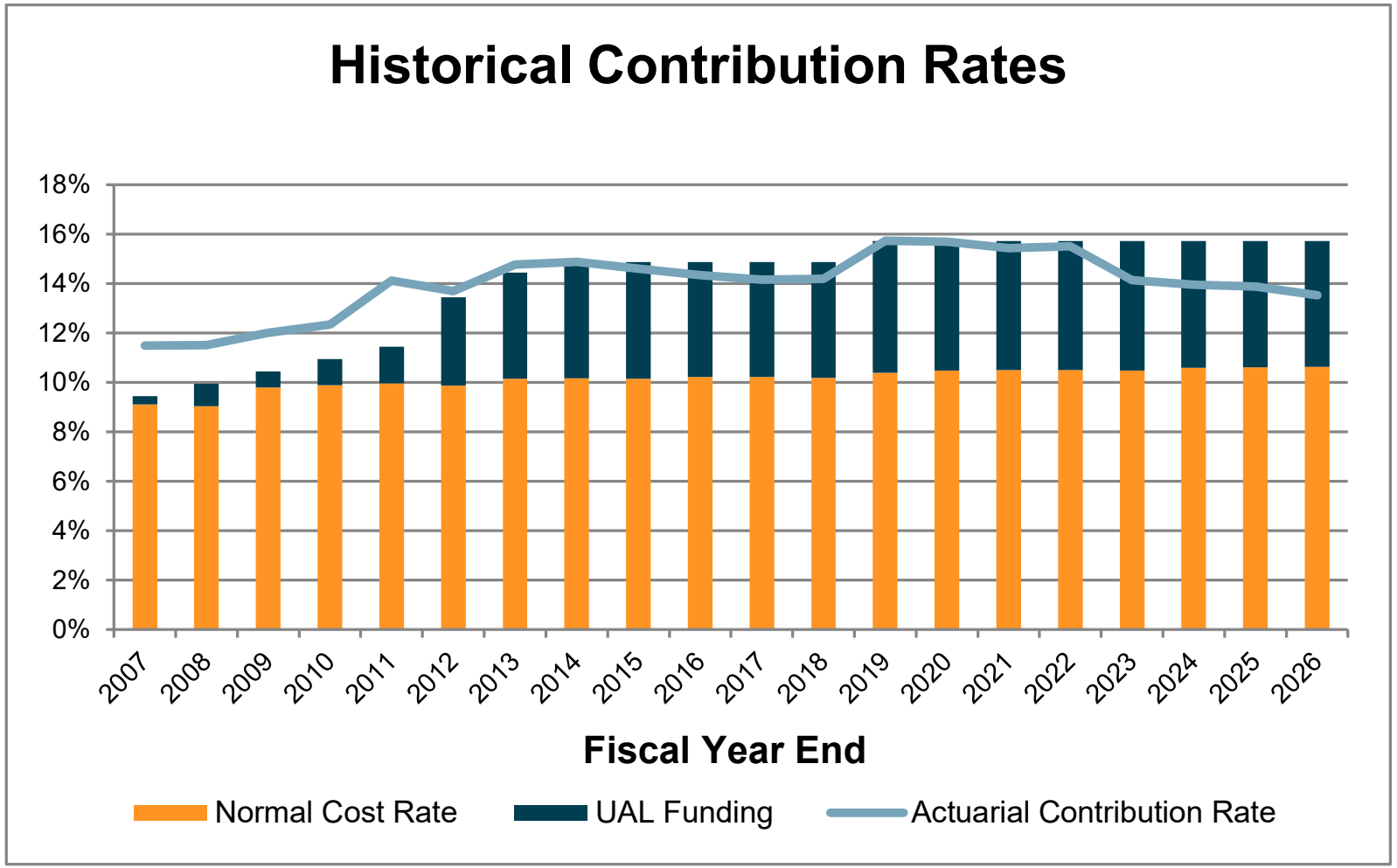
Valuation Date

(Contribution Rates for FY 2026/FY 2025)

	June 30, 2024	June 30, 2023
Normal Cost	10.63%	10.62%
UAL Payment	2.91%	3.27%
Total Actuarial Rate	13.54%	13.89%
Required Contribution*	15.73%	15.73%
Shortfall/(Margin)	**(2.19%)**	**(1.84%)**
*Employee Rate	6.29%	6.29%
*Employer Rate	9.44%	9.44%

Note: The Regular membership group is less than 95% funded so the Required Contribution Rate does not change despite the reduction in the Actuarial Contribution Rate.

Regular Membership



In the first part of this period, the contribution rates were fixed in statute.

The ability for the IPERS Board to set the contribution rate beginning in 2013, within certain parameters, has resulted in an actual contribution rate equal to or above the actuarial contribution rate for the last eleven years.

Impact of Different Investment Return Assumptions

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Regular Membership

Investment Return Assumption	6.50%	6.75%	7.00%	7.25%	7.50%
Contributions for FY 2026					
Total Normal Cost	11.94%	11.26%	10.63%	10.04%	9.50%
Unfunded Actuarial Liability	4.72%	3.81%	2.91%	2.01%	1.11%
Actuarial Contribution Rate	16.66%	15.07%	13.54%	12.05%	10.61%
Required Contribution Rate	16.66%	15.73%	15.73%	15.73%	15.23%
Employer Contribution Rate	10.00%	9.44%	9.44%	9.44%	9.14%
Employee Contribution Rate	6.66%	6.29%	6.29%	6.29%	6.09%
Contribution Shortfall/(Margin)	0.00%	(0.66%)	(2.19%)	(3.68%)	(4.62%)
Actuarial Liability	$46,532.4	$45,222.0	$43,968.9	$42,770.2	$41,622.9
Actuarial Value of Assets	39,598.9	39,598.9	39,598.9	39,598.9	39,598.9
Unfunded Actuarial Liability	$6,933.5	$5,623.1	$4,370.0	$3,171.3	$2,024.0
Funded Ratio	85.10%	87.57%	90.06%	92.59%	95.14%

Summary and Comments

- Favorable actuarial experience (actual vs expected) for FY 2024
  - Return of 9.1% on market value of assets produced a return of 7.6% on actuarial assets, resulting in an actuarial gain of $245 million.
  - Market value of asset now exceeds actuarial value by $734 million, up from $194 million last year.
  - Net actuarial loss on liabilities of $23 million.
  - Unfunded actuarial liability for entire System decreased from $4.71 billion last year to $4.38 billion in the 2024 valuation.

- Contribution Rate Funding Policy
  - Required Contribution Rate is unchanged for Regular members and Protection Occupation and remains greater than Actuarial Contribution Rate for FY 2026.
  - Required Contribution Rate increased for Sheriffs & Deputies due to benefit changes and is now equal to the Actuarial Contribution Rate (no contribution margin exists).

Analysis of Risk with Alternate Portfolios

Purpose of Study

- The Investment Board has responsibility for (among other things):
  - Selecting and monitoring the asset allocation policy.
  - Approving the assumed investment return for funding calculations.

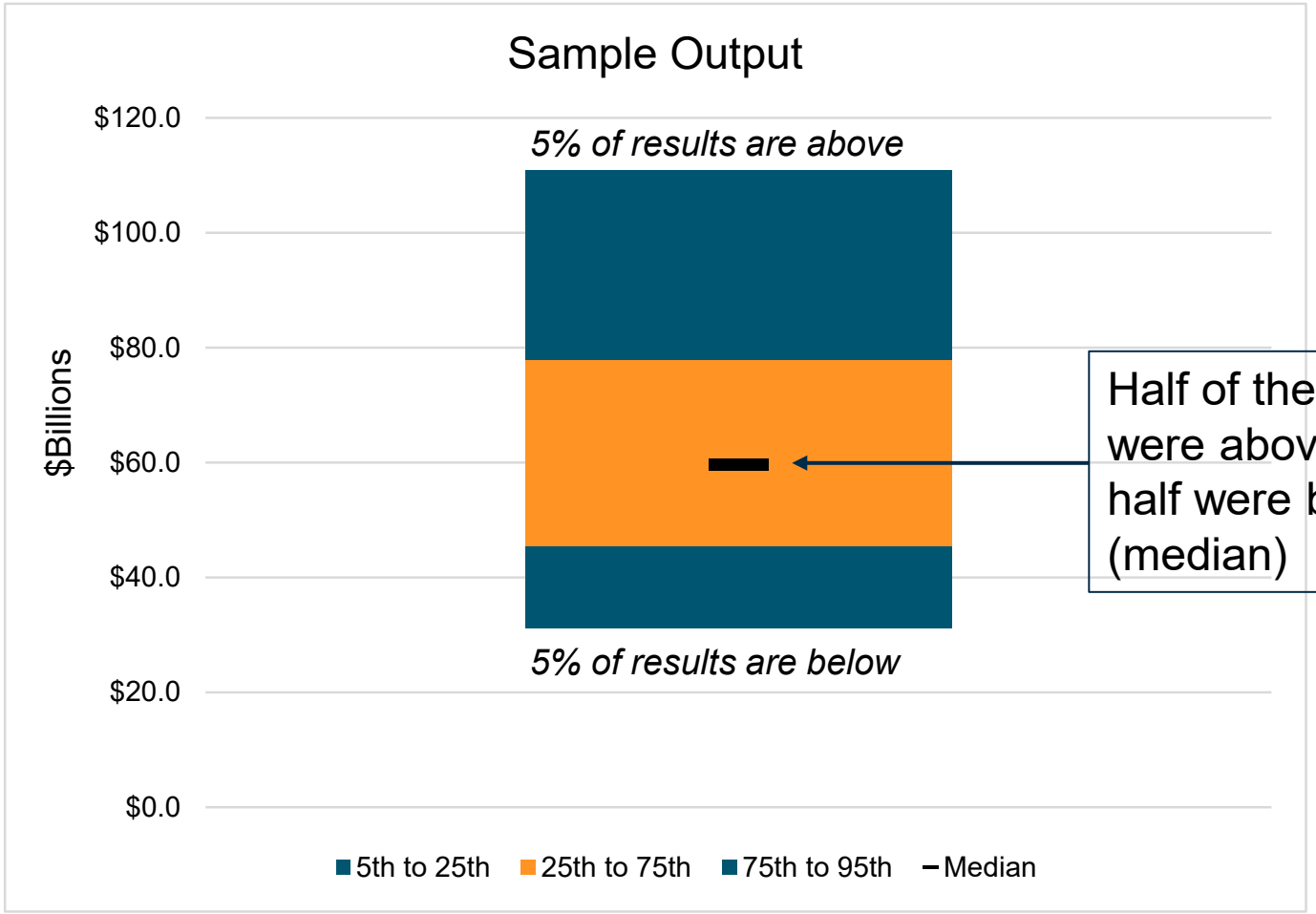
- Asset allocation options typically have a risk-reward trade-off. Portfolios with higher expected returns are also expected to have more variability in those returns.

- Understanding the expected impact of the return variability on funding requirements can help the Investment Board in determining the asset allocation targets.

Study Methodology

- We build a model each year that projects the IPERS membership for the next 50 years.
  - Assumes all demographic assumptions are met and the active membership stays constant.
- We then consider 1,000 random investment return scenarios based on the capital market assumptions for the asset portfolio.
- Various output measures are collected and then analyzed to see the expected pattern of results.
- For this study, considered three portfolios provided by IPERS, derived from data provided by Wilshire and other investment managers:
  - 7.25% return (13.50% standard deviation)
  - 7.00% return (12.10% standard deviation)
  - 6.75% return (11.25% standard deviation)

Study Output Example

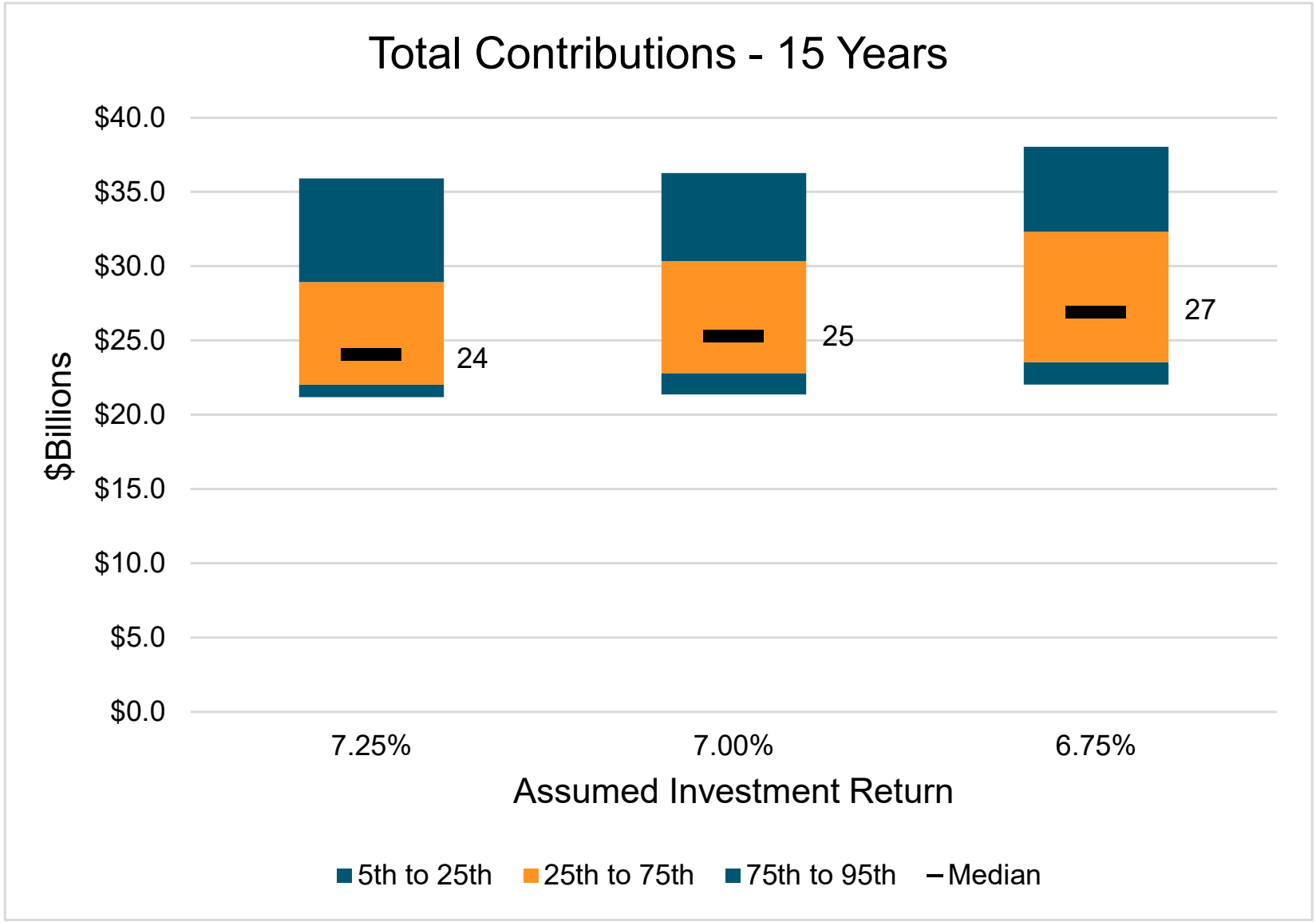


Each blue area has 20% of the results

Study Measures

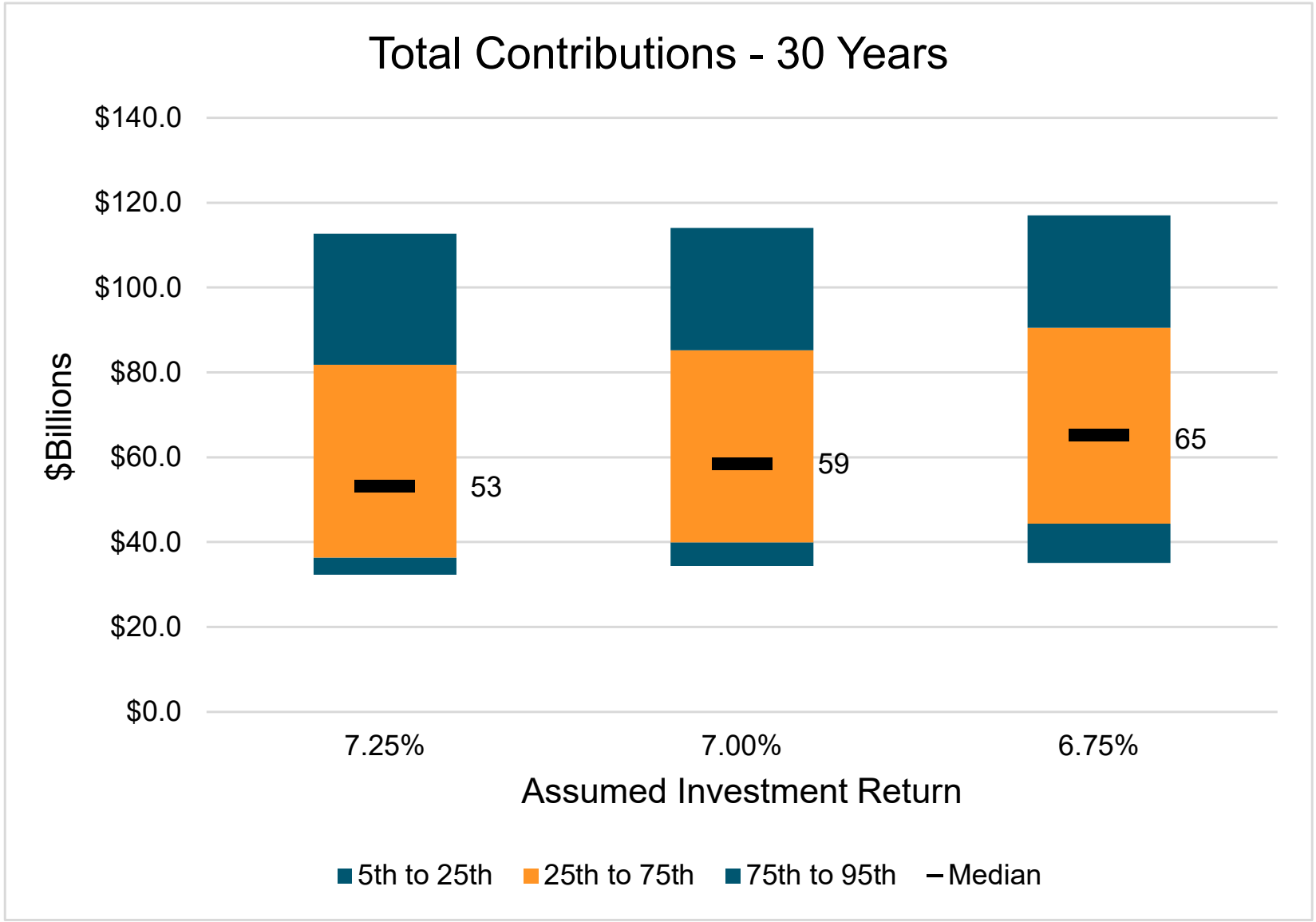
- What are the total contributions?
- What happens to the funded ratio?
- How do the assets grow?
- What happens to the contribution requirements?

Study Output



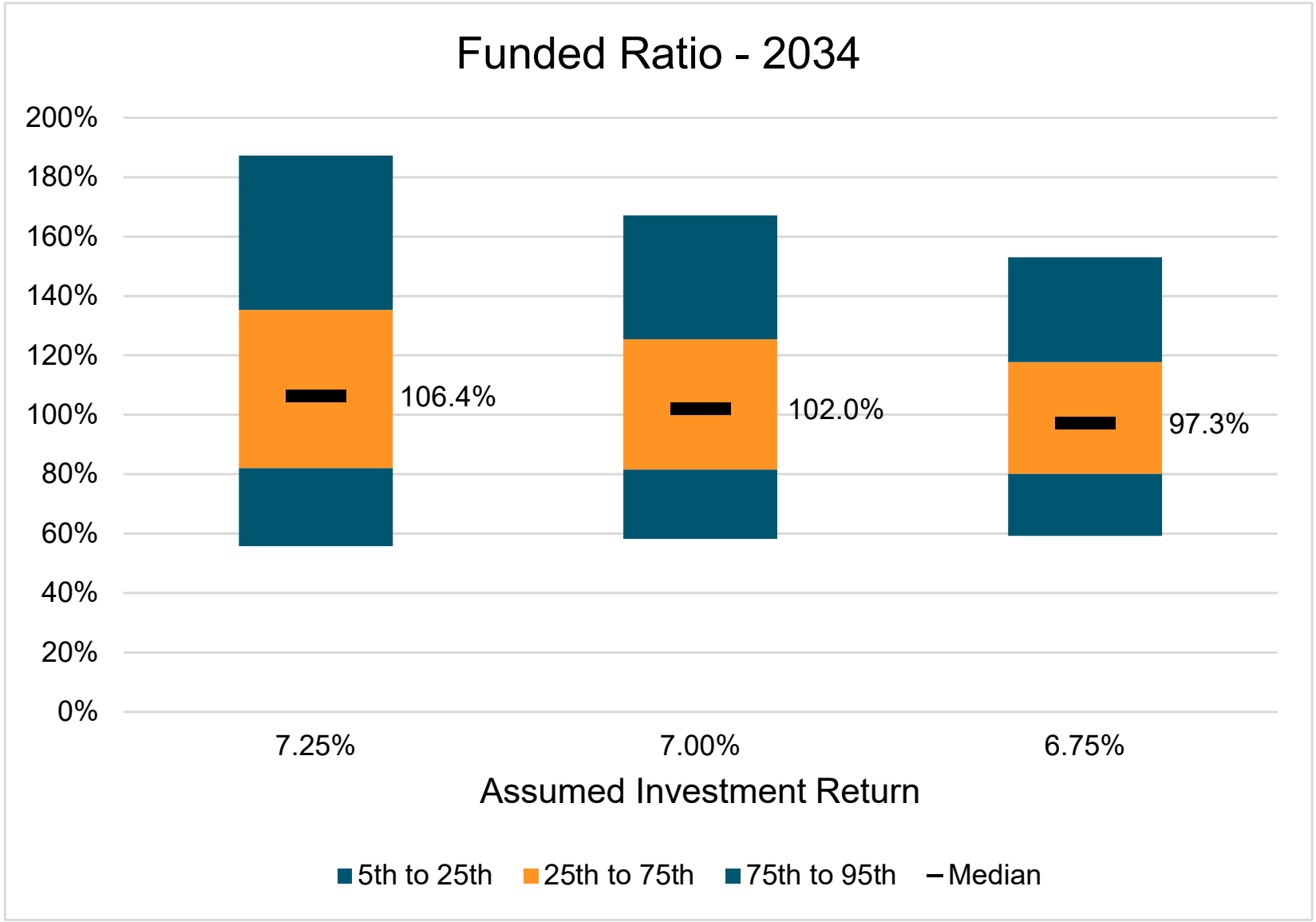
Lower expected returns require additional funding

Study Output



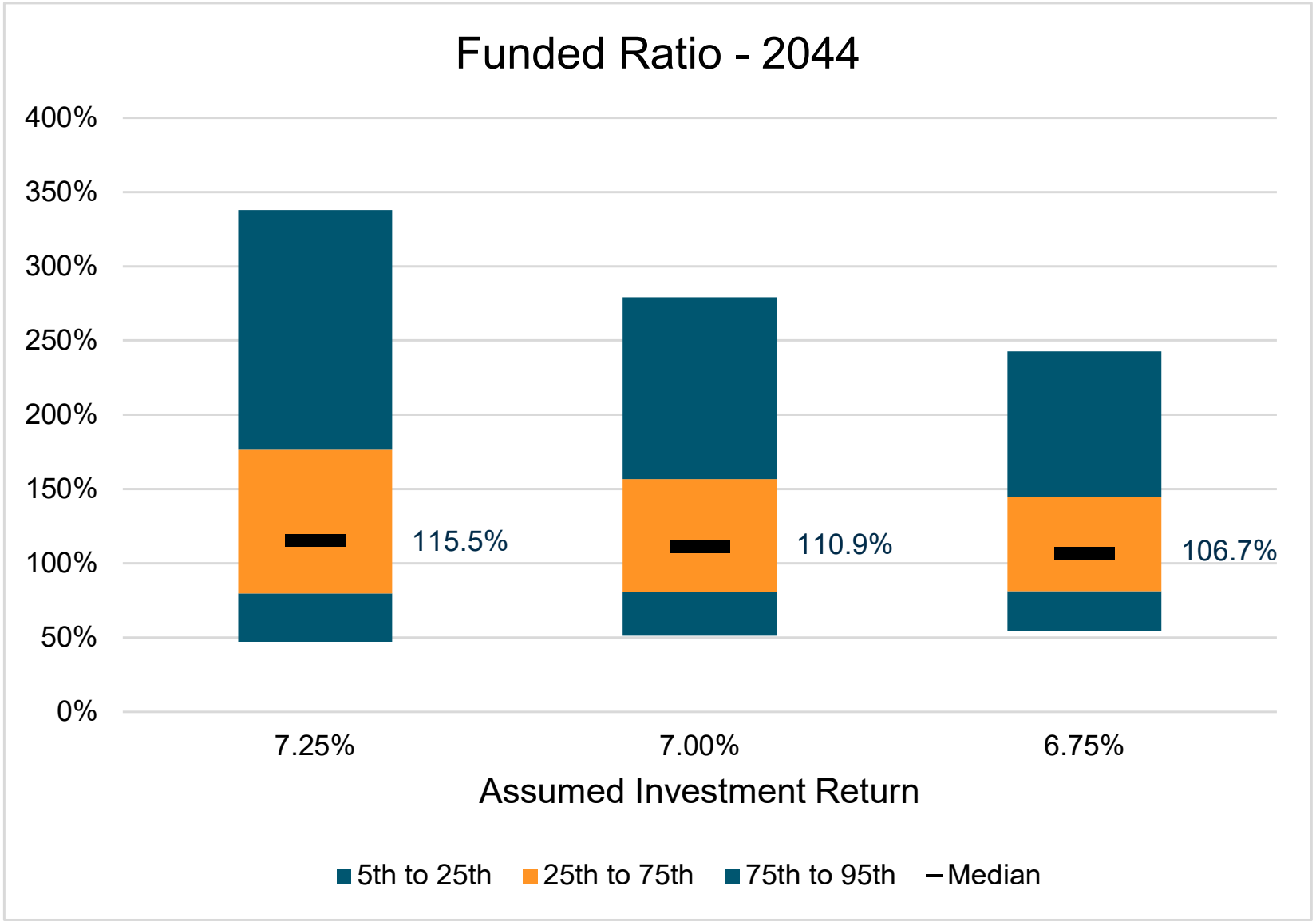
Over time, the market return variability will have more impact on contributions than the asset allocation of the portfolio

Study Output



The funding policy keeps the median and lower percentile results similar across the portfolios

Study Output



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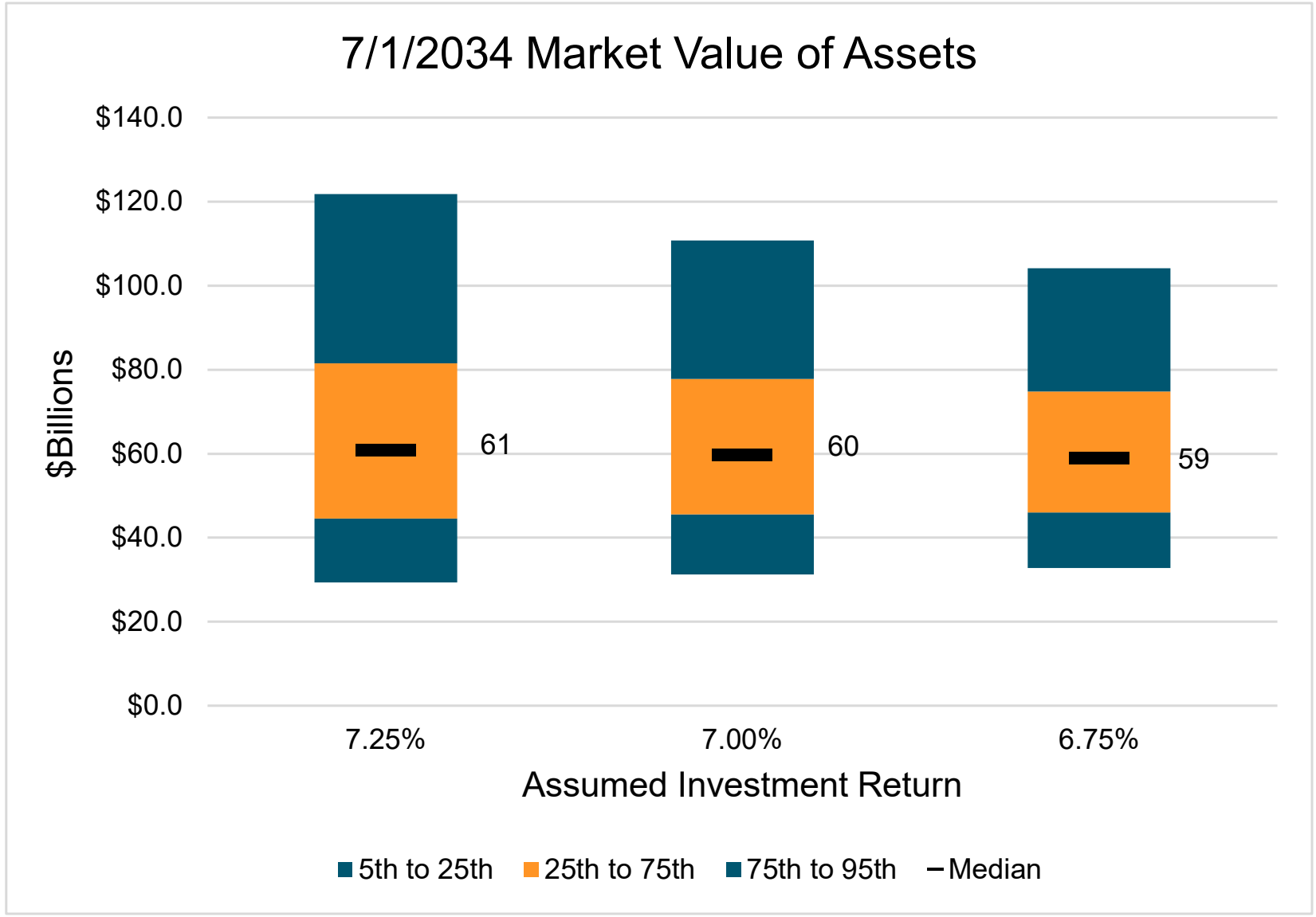
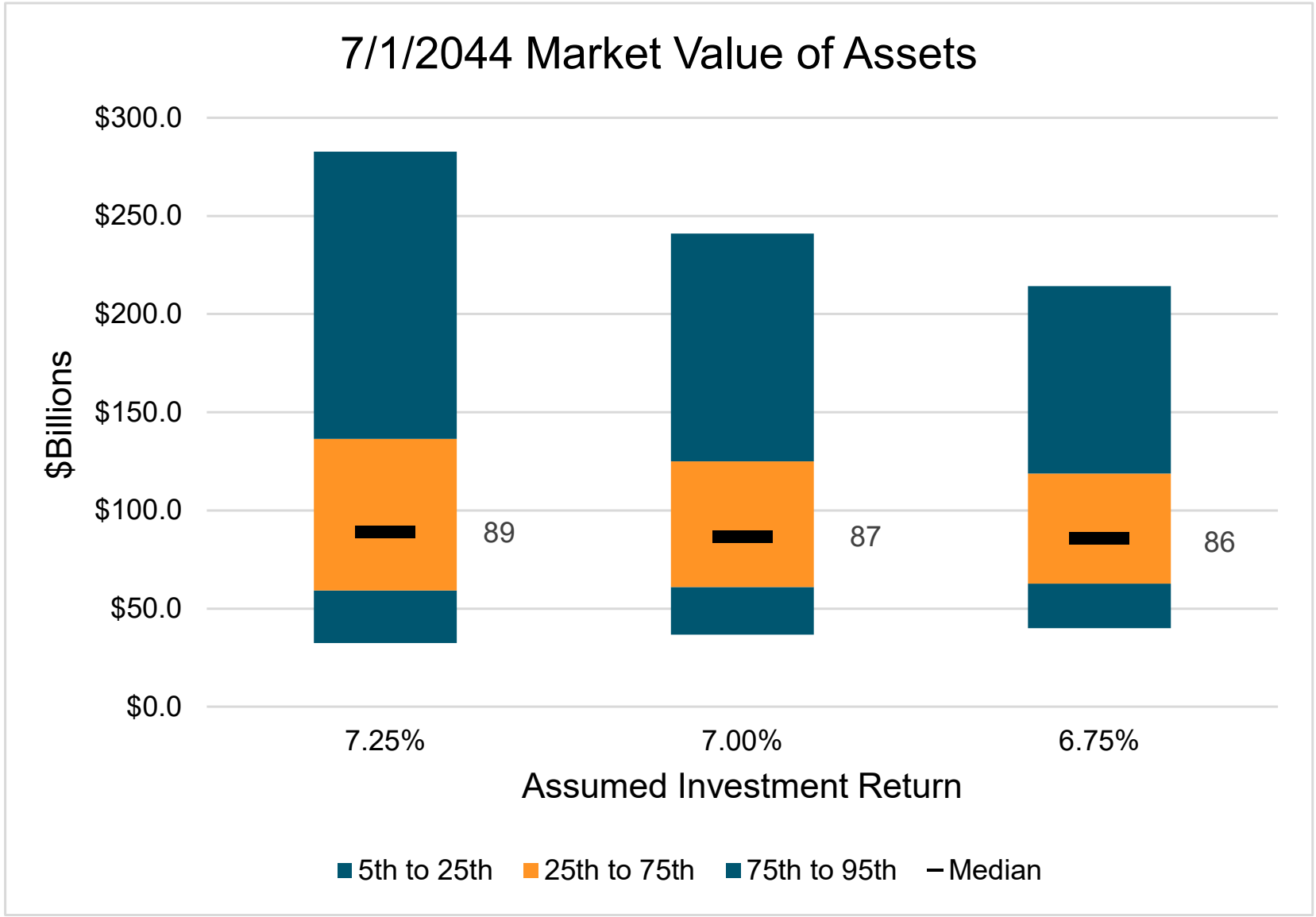


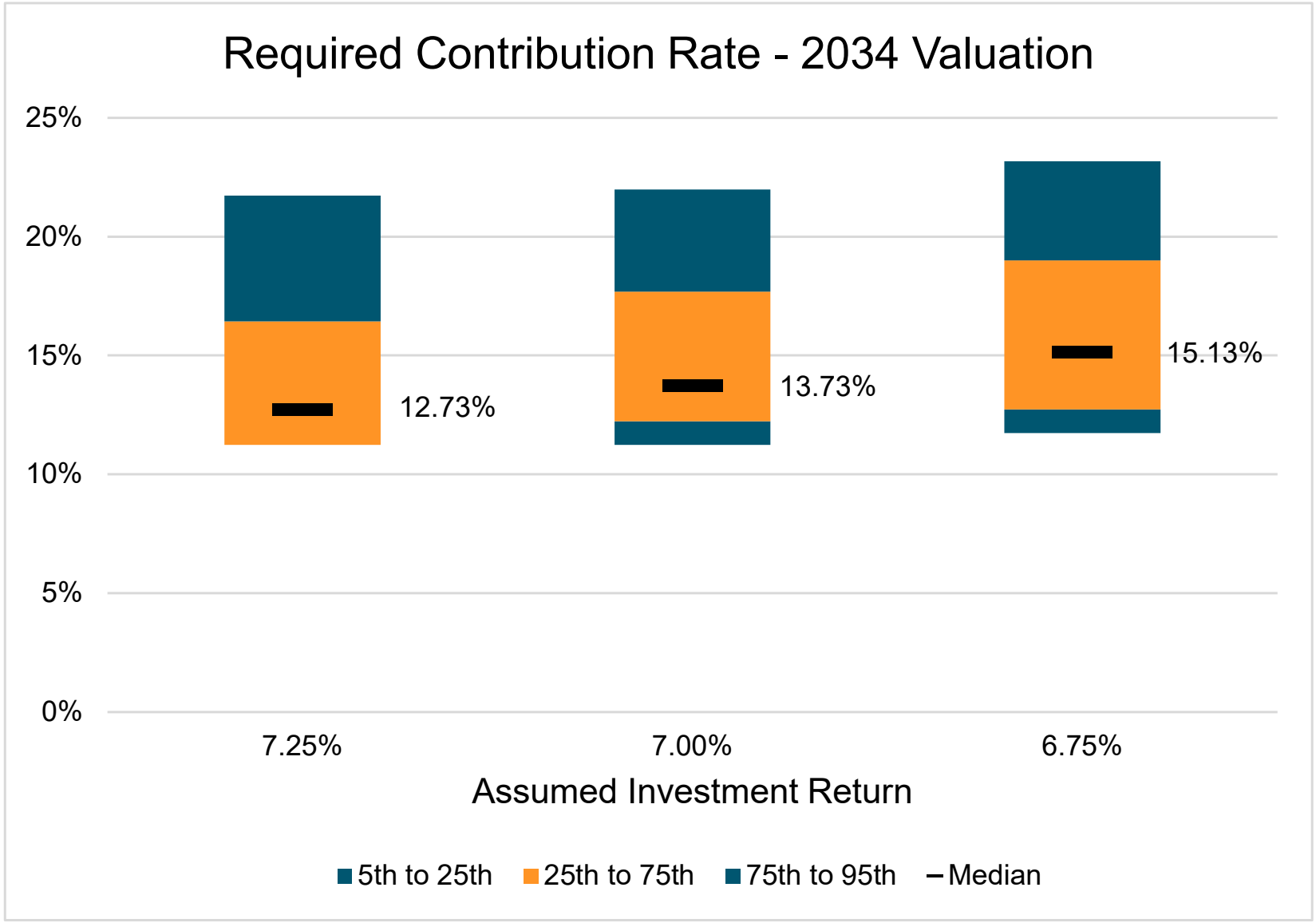
Similar to the funded ratio, the funding policy results in a consistent market value for the 50th percentile and below

Study Output



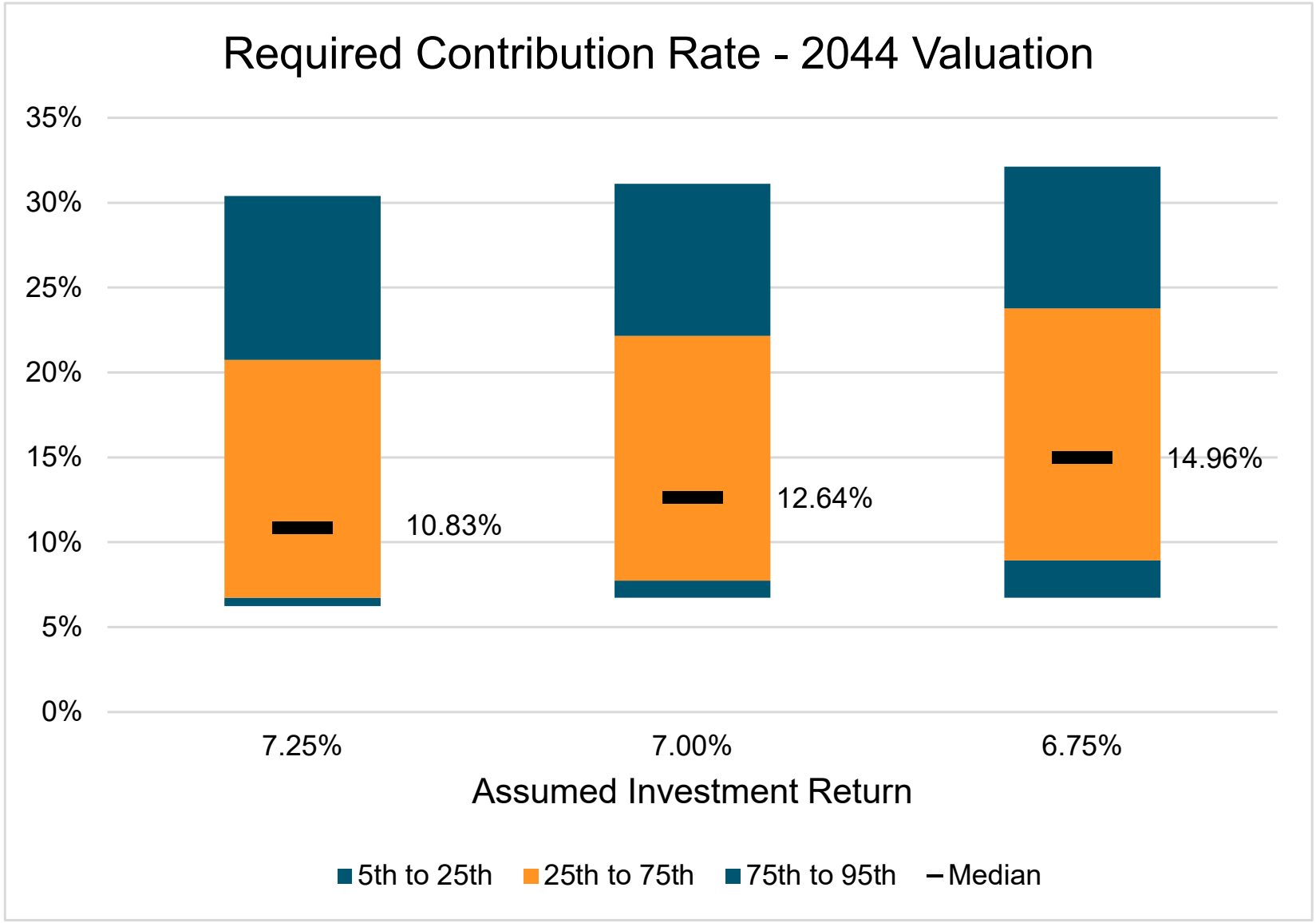
Over long periods, the assets could grow quite large without changes, however, unlikely to occur.

Study Output



The funding policy limits the reduction in the required contribution rate to 50bp/year.

Study Output



Over long periods of time, the expectations are somewhat similar

Study Output

Contributions over the next 20 years	**7.25%**	**7.00%**	**6.75%**
Scenarios above 18% (10-year period)	19.06%	23.47%	32.10%
Scenarios above 18% (20-year period)	36.01%	41.02%	47.24%
Proportion of years above current 15.73% rate (20-year period)	24.45%	29.44%	39.55%
Average number of contribution rate increases (20-year period)	4.65	5.11	6.27

Conclusions

Higher expected returns lead to generally lower contributions

Higher expected returns have more volatility which can lead to more assets than needed (favorable returns) or contribution increases (unfavorable returns)

The IPERS funding policy minimizes the probability of IPERS being unable to pay benefits and increases benefit security

Actuarial Certification

We, Patrice A. Beckham, FSA, Brent A. Banister, FSA, and Bryan K. Hoge, FSA, are consulting actuaries with Cavanaugh Macdonald Consulting, LLC. We are members of the American Academy of Actuaries, Fellows of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. We are available to answer any questions or provide additional information as needed.

Sincerely,

Patrice A. Beckham, FSA, EA, FCA, MAAA
Senior Consulting Actuary

Brent A. Banister, Ph.D., FSA, EA, FCA, MAAA
Chief Actuary

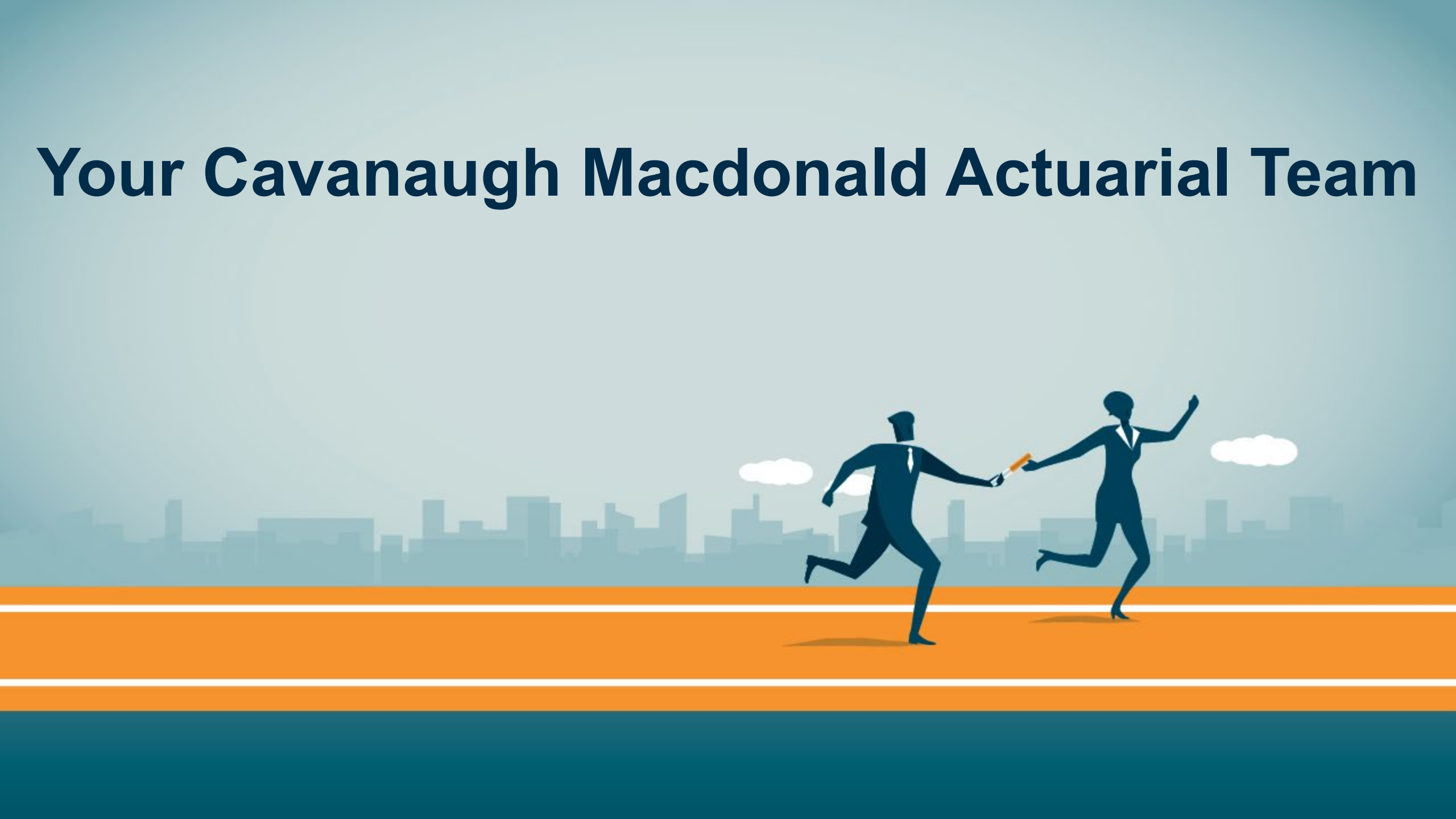
Bryan K. Hoge, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

As credentialed actuaries, we are bound by Actuarial Standards of Practice, which includes communications and disclosures.

Thank You!!

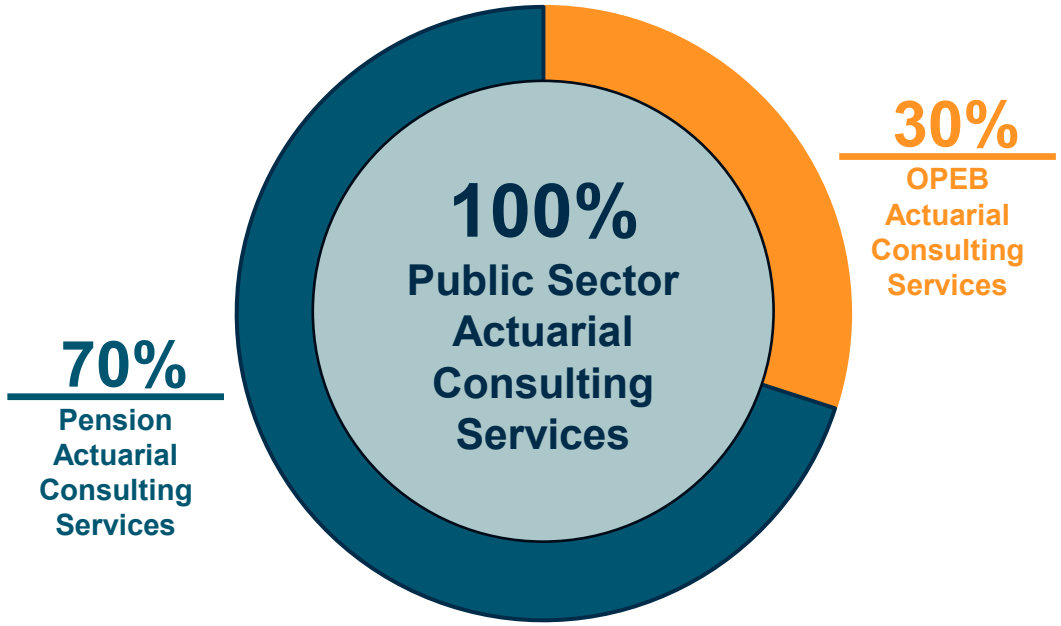
CavMac
Actuarial Consulting Services

Your Cavanaugh Macdonald Actuarial Team



Our Mission

CavMac is a professional actuarial service firm incorporated in 2005 and is qualified to provide actuarial valuations, experience investigations, and OPEB consulting services. CavMac was created specifically to provide actuarial consulting services to public sector retirement plans. One hundred percent of our revenue is from public sector actuarial consulting services, a rare feature amongst our competitors.



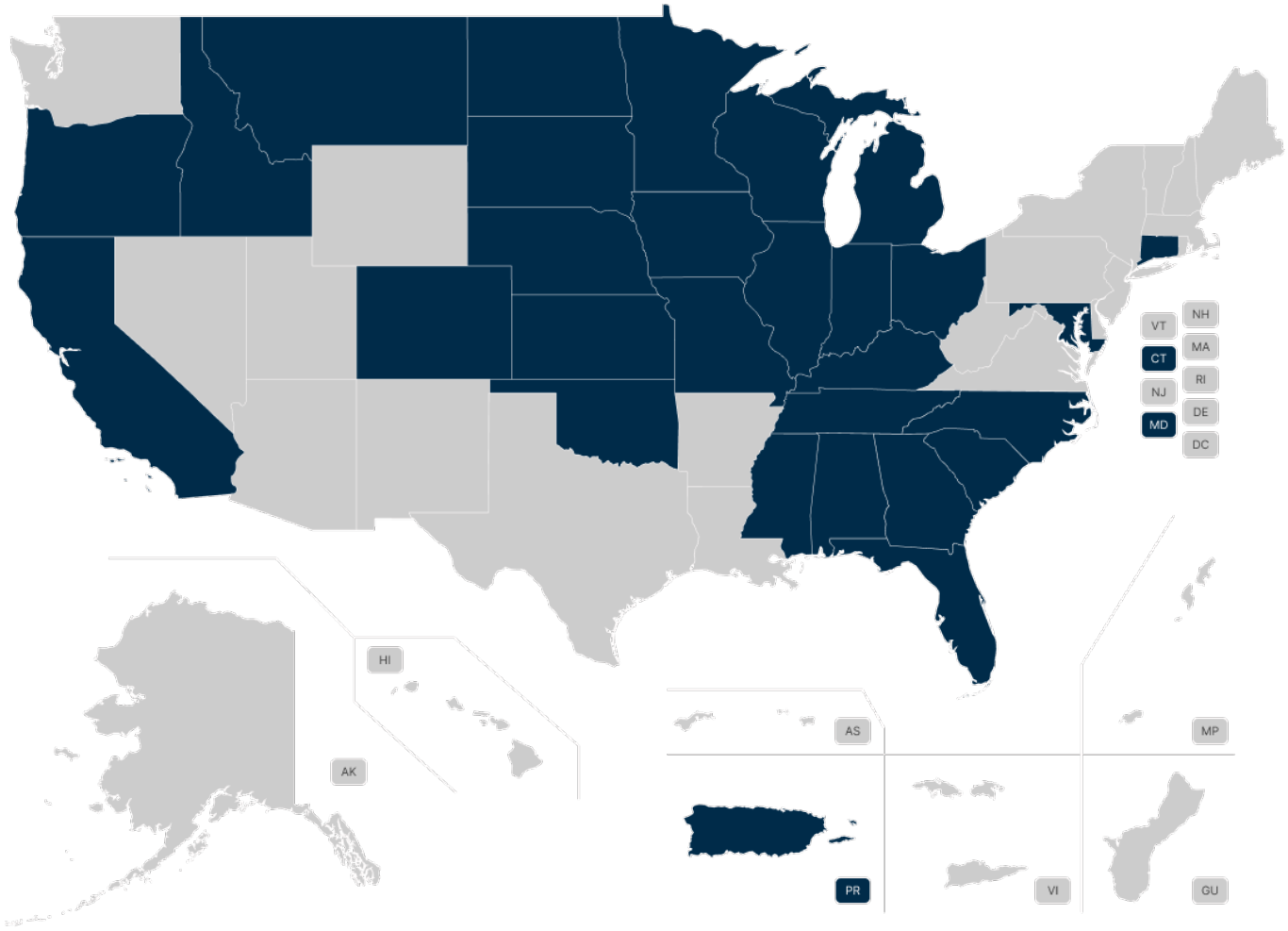
CavMac is a wholly independent, privately held firm. Nineteen years ago, Tom Cavanaugh and Ed Macdonald founded CavMac and helped build our firm into one of the leading public sector actuarial consulting firms in the country today. CavMac currently has 39 employees, of which 36 are either credentialed actuaries or actuarial analysts most of whom are working toward their actuarial certifications. While this employee count may seem small compared to our competitors, all but three from our firm are working full-time on the public retirement actuarial consulting services presented here.

Firm Background and Experience

CavMac is considered one of the leading actuarial consulting firms in the country, providing actuarial services to public sector employers across the United States, Puerto Rico, and some Pacific Island nations.

We serve anywhere from large statewide retirement systems down to small municipal and local plans, ranging from California to Maryland and from northern Michigan to southern Florida.

In aggregate, CavMac provides actuarial services to 76 Pension clients and 53 OPEB clients, some of which include hundreds of individual plans.



The IPERS CavMac Team

Pat Beckham
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Aaron Chochon
ASA, EA, FCA, MAAA
Senior Actuary

Megan Skiles
ASA, FCA, MAAA
Actuary

The Role of the Actuary

- Typically, retirement systems do not have an actuary on staff, so they hire a “consulting actuary” to provide required services to the system
- Responsibilities include:
  - Actuarial Valuations – annually
    - Funding
    - Accounting/Financial Reporting
  - Experience Study – periodically, usually every 4-5 years
  - Cost Studies (change to benefit structure or funding) – as needed
  - Actuarial factors and calculations – as needed
  - Consulting - ongoing

Full Array of Actuarial Services

- Preparation of Annual Financial Statements and Disclosure Requirements in accordance with GASB 67/68, GASB 73 and GASB 74/75
- Development of Plan Factors used to Prepare Retirement Calculations at Retirement
- Attendance at Board Meetings
- Consultation Services Regarding Benefit and Assumption Changes
- Annual Employee Benefit Statements

- Periodic Experience Investigations on Economic and Demographic Assumptions and Actuarial Methods
- Risk Analysis and Stress Testing for Pension and Retiree Healthcare Plans
- Medicare Part D Attestation
- Preparation of Actuarial Impact Statements on Proposed Legislation
- Premium Rate Setting for Self-Funded Health Plans

- Projection Modeling on Employer Contributions and Funded Status for Pension and Retiree Healthcare Plans
- Plan Design Consulting Services
- Legislative Testimony
- Individual Benefit Calculations
- Knowledge of National Public Sector Trends
- Pension and OPEB Plan Audits

- Telephone or Video-Conferencing Consultation on Plan Matters (at no charge)
- Asset/Liability Forecasting
- Educational Training for both Staff and Board of Trustees
- Detailed Gain and Loss Analysis
- Review of DROP, PLOP and Retirement Incentive Plans
- Impact of Re-Employment of Retirees

Services

ACTUARIAL FUNDING VALUATION

CONSULTING SERVICES

DEVELOP ACTUARIAL FACTORS FOR PLAN ADMINISTRATION

COST STUDIES FOR PROPOSED LEGISLATION

EXPERIENCE STUDY

PROJECTIONS

ACCOUNTING REPORTS UNDER GASB

Support of Organizations which Support Public Plans

- Ed Koebel, CEO, is the pension educator for “Actuarial Principles” through the Certificate of Achievement in Public Plan Policy (CAPPP) program of the International Foundation of Employee Benefit Plans.
- Alisa Bennett, President, is on the Corporate Advisory Committee of the Public Healthcare Roundtable, is a CAPPP educator and recently presented at the NCPERS Public Safety Conference.
- Todd Green, President, serves on the Corporate Advisory Board of the National Council of Teachers Retirement (NCTR).
- Larry Langer, Principal, serves on the Associate Advisory Committee of National Association of State Retirement Administrators (NASRA).
- Brent Banister, Chief Actuary, serves on various committees with three major actuarial organizations as well as the joint committee which produced the LDROM Toolkit.
- Wendy Ludbrook, Consulting Actuary, is a member of the committee that recently released the 2nd edition of the Issue Brief entitled “Actuarial Funding Policies and Practices for Public Pension Plans”.

Wilshire

Iowa Public Employees Retirement System

Capital Market Update and Benchmark Education

September 2025

Agenda

- Capital Market Refresh
- Benchmarking Private Assets
- Actionable Tracking Error

Capital Market Assumptions Refresh

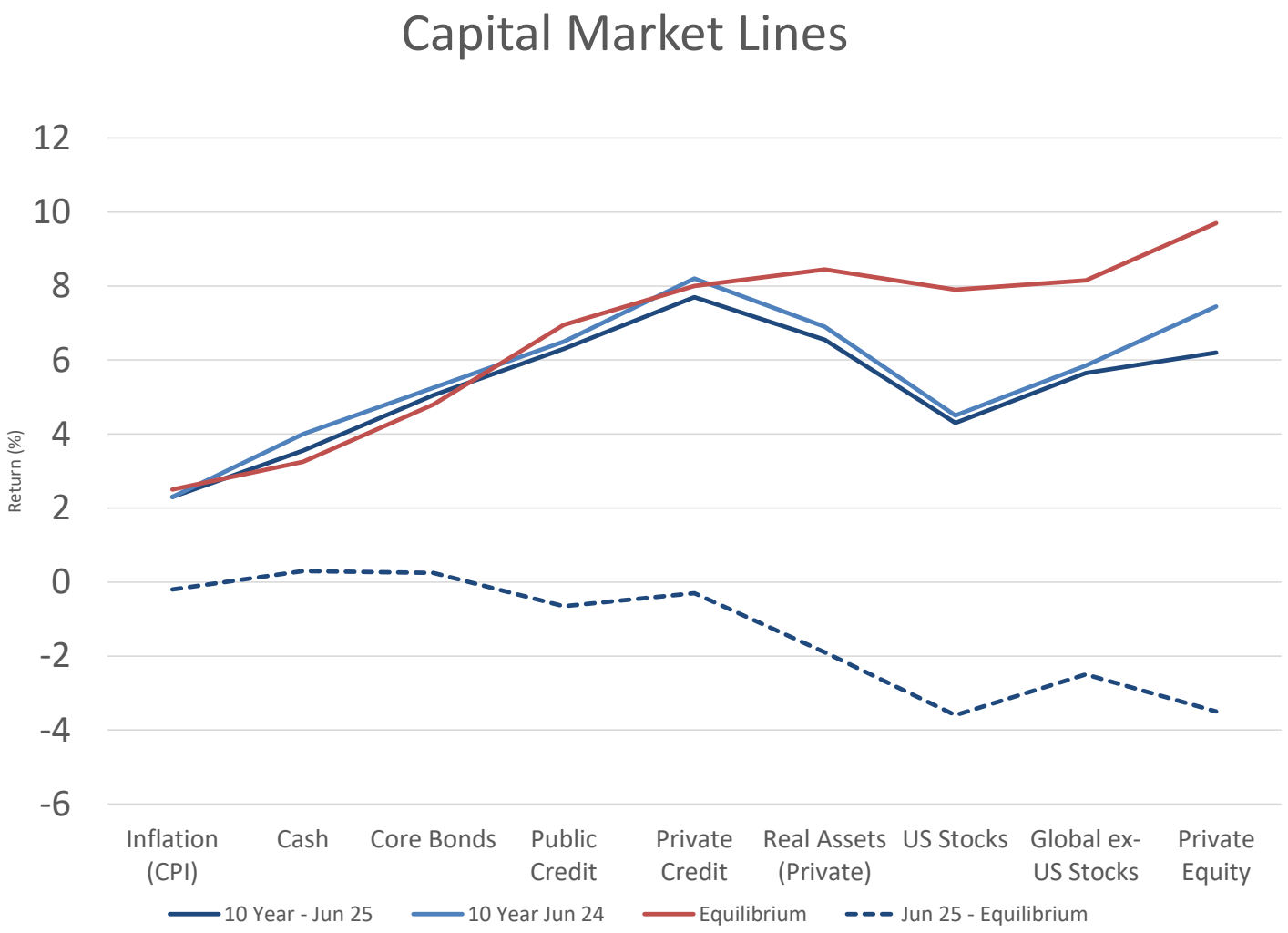
Capital Market Assumptions

- Wilshire's Capital Market Assumptions as of **June 30, 2025**
- Wilshire's asset class return, risk and correlation assumptions are developed on multi-year forward looking expected rates of return and historical risk and correlation, adjusted to incorporate recent trends
- Public market return expectations represent a passive investment in the asset class (beta). They do not reflect value added from active management (alpha).

Asset Classes	Expected Return 30 Years	Risk	Cash Yield	Factor Exposure Growth	Factor Exposure Inflation	Liquidity Market Level	Liquidity Stressed Metric
U.S. Equity	6.10	17.00	1.25	8.00	-3.00	100	0
International Equity	6.90	19.05	2.80	8.00	0.15	90	0
Private Equity	7.95	29.65	0.00	14.00	-4.25	0	0
Global Smart Beta	6.45	17.00	1.75	8.00	-1.95	95	0
Public Credit	6.00	8.95	9.05	3.00	1.00	80	25
Private Credit	7.90	13.25	4.90	4.50	-1.50	0	0
Core (Plus) Fixed Income	4.90	4.75	5.75	-0.95	-2.60	100	80
Cash	3.40	0.75	3.55	0.00	0.00	100	100
Private Real Assets	6.85	13.45	3.60	4.80	2.10	0	0

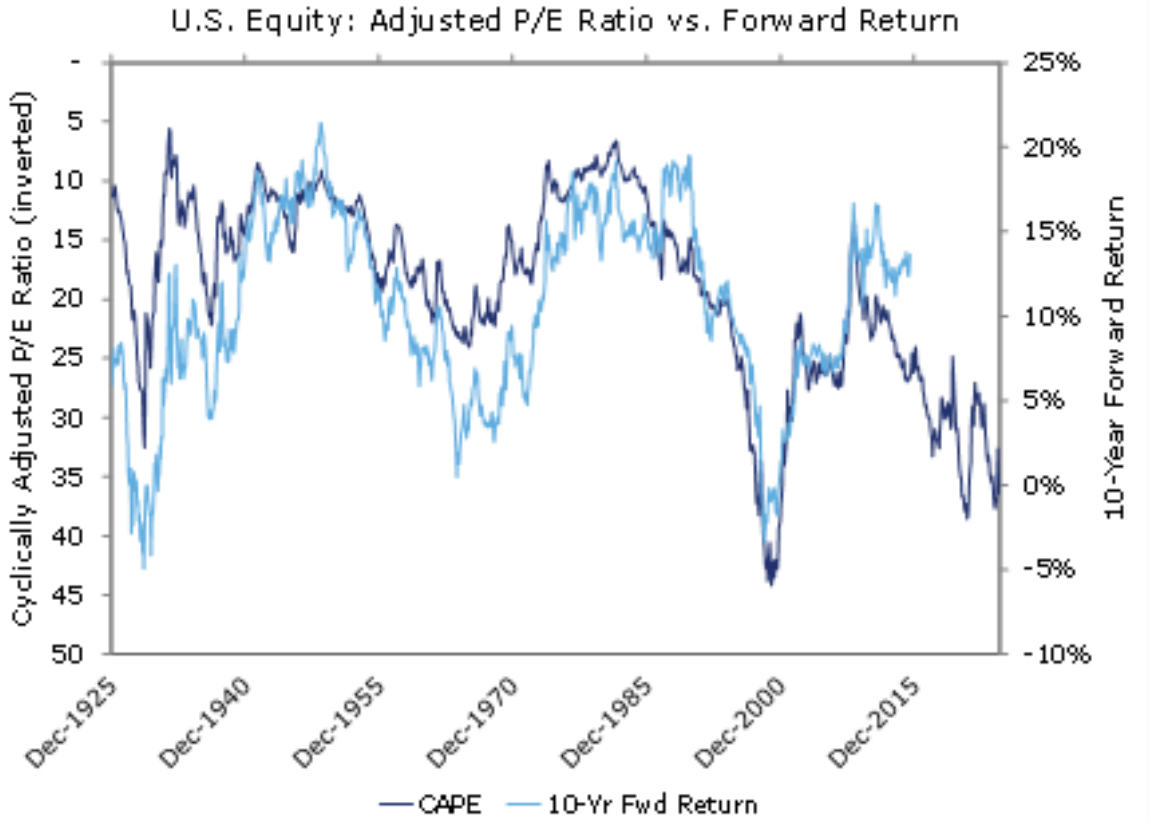
- Growth – Assets with significant growth factor exposure, high expected returns and high risk
- Defensive Growth – Assets with positive growth factor exposure with moderate risk
- Defensive/Rate Sensitive – Assets whose value/return is sensitive to changes in interest rates
- Real Assets/Inflation Sensitive – Assets whose value/return is sensitive to inflation

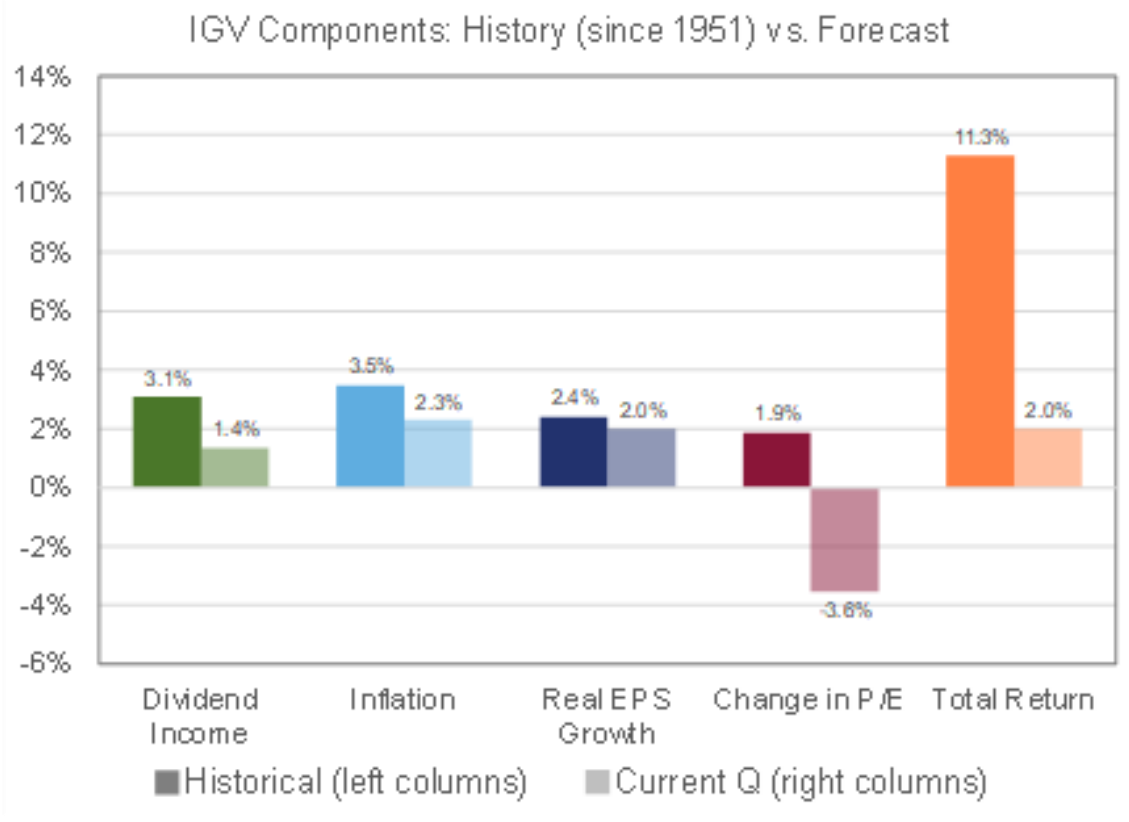
Capital Market Assumptions



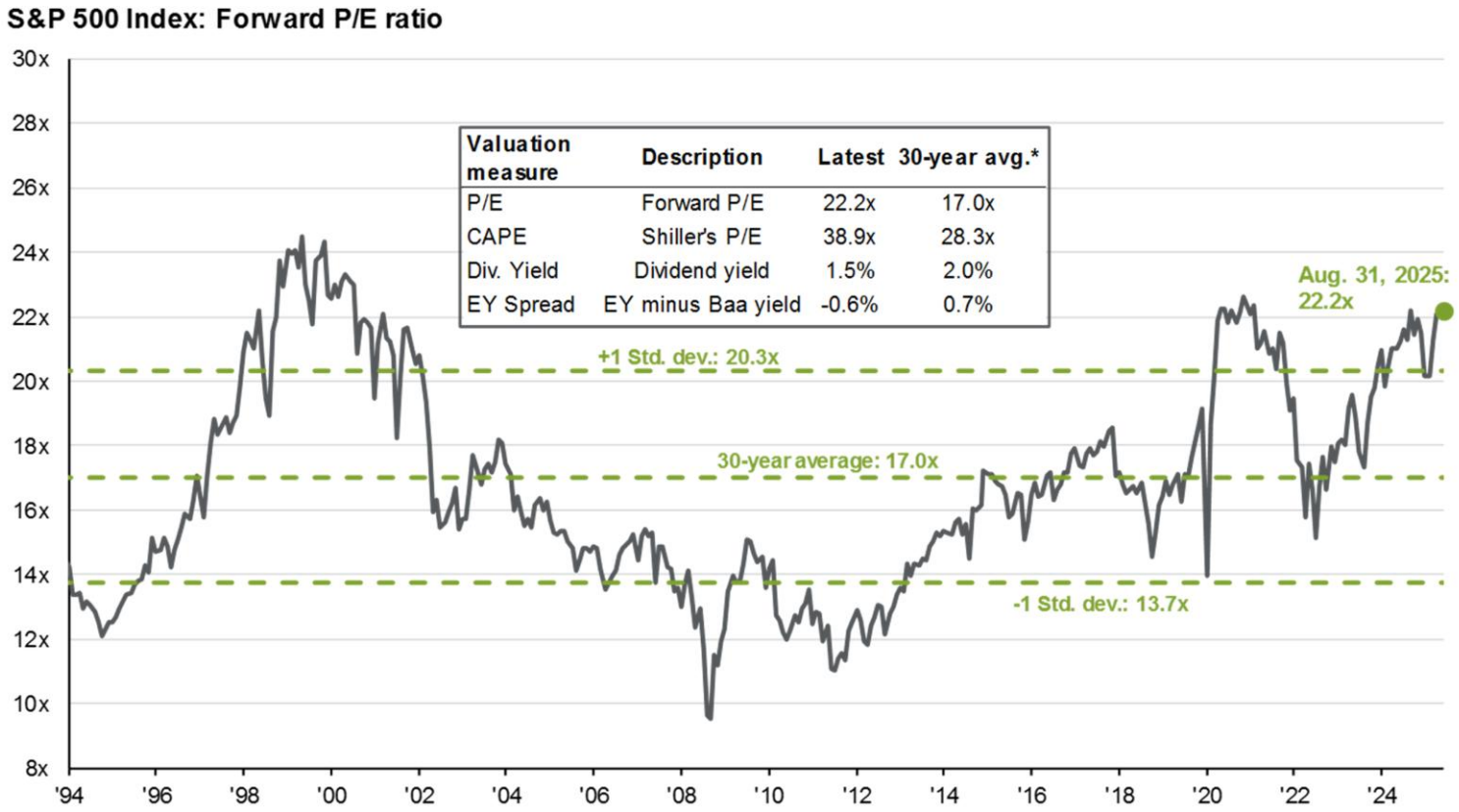
- Asset allocation portfolio modeling utilize 30-year horizon assumptions
  - Derived by combining 10-year horizon assumptions with Equilibrium assumptions
  - Longer term assumptions are less influenced by current market valuations
- Shorter term return expectations are close to long term return expectations for low and moderate risk assets
- Higher risk asset return expectations are lower

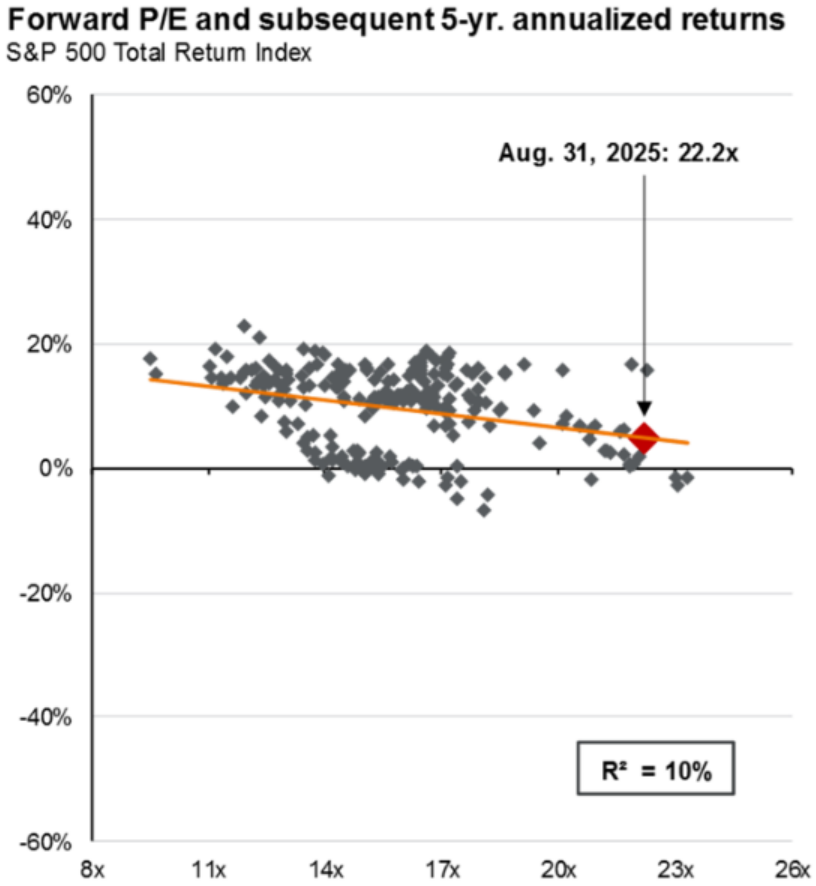
Capital Market Assumptions – Equity Valuations





Capital Market Assumptions – Equity Valuations





Source: J.P. Morgan

Benchmarking Private Assets

Benchmark Purpose

- Serves as a clear and objective means of evaluating performance.
- Benchmarks provide investors a realistic and achievable starting point – i.e., the passive portfolio held in the absence of a view on any given security
- The purpose of benchmarking can be summarized as follows:

Performance Attribution	Decomposition of sources of return, such as asset allocation, active vs. passive management, manager skill, etc.
Insight on Risk/Returns	Insight into level of risk being taken to generate return and the volatility of return over time
Manager Evaluation	Measure against which manager performance can be evaluated to assist in retention / termination decisions

General Issues with Alternative & Illiquid Asset Benchmarks

Unambiguous	Private Market benchmarks tend to be ambiguous by nature.
Investable	Private Market assets tend to have no passive alternatives.
Measurable	Private Market assets are measured relatively infrequently.
Appropriate	Private Markets assets are not universally defined.
Reflective of current investment options	Unlike traditional asset classes, Private Market assets do not have a predefined definition of the opportunity set.
Pre-specified	A benchmark can be pre-specified; however, there are different views on how to benchmark Private Markets.

The Impact of the Investment Environment

Alternative benchmarks offer an imperfect proxy, which can be pronounced in different investment environments.

- Performance can be significantly impacted when private assets are benchmarked against public assets.
  - Private markets often lag public markets, be it on the upside or downside.
  - Private markets benefit from this mismatch when public markets are falling, but the reverse is also true with private markets having a higher hurdle in strong equity markets.

Source: CFA Institute

The Denominator Effect

Another issue investors face when holding Private Equity within their portfolio is the so-called denominator effect, whereby private asset allocations exceed the percentage threshold established in an allocation policy.

The effect comes into play after extraordinary performance, such as in 2021, where Private Equity valuations significantly outpace public equities and bonds, leading investors to be over-allocated to Private Equity.

Common Benchmark Options: Private Equity

Public Index (+ Premium)

- Description: The investor benchmarks the private equity fund against a public equity index, with or without a premium.
- Considerations: Misalignment between benchmark and private equity assets, especially following a change in market environment due to a tendency for private markets to lag public markets.

Private Equity Index

- Description: Several providers offer private equity indexes and include various fund types such as buyout, growth equity, and venture capital.
- Considerations: Most are U.S. focused introducing potential currency and regional differences, often lags in data reporting, the indices typically rely on self reporting, potential misalignment from different weights in vintage years, and potential misalignment regarding fund types.

Custom Benchmark

- Description: A custom benchmark may blend indices or specific criteria tailed to the portfolio's strategy.
- Considerations: Lack of comparability, subjectivity within the creation of the benchmark, and complexity.

Public Market Equivalent

- Description: A collection of performance measures developed to evaluate private equity funds, while seeking to overcome the limitations of common performance measures such as the internal rate of return and multiple on invested capital.
- Considerations: Different methods have different considerations. Please see the following slide for more details.

Public Index + Premium Overview

The most common method used to benchmark private equity assets.

- Examples of public market indexes used by investors include Russell 2000 Growth, S&P 500, MSCI World, Wilshire 5000, Russell 3000, and MSCI ACWI ex-US.
- Investors can choose to use public markets indexes as-is or may opt to adjust the benchmark by lagging it or adding a premium to it.
- The appropriate public market index to use depends on the regional composition and the fund type (i.e., buyout, growth equity, venture capital) of the Private Equity strategy.
- Premiums have come down over time
  - 200-300 bps for Private Equity
  - 100 bps for Private Credit

Main Considerations

Pros:

- Available on a timely basis
- Reflects objective of private investment

Cons:

- Misalignment between benchmark and underlying assets
- Not investible
- Market volatility can lead to periods of exaggerated over/underperformance

Wilshire

Actionable Tracking Error

- October 2024

What is Tracking Error?

- Strategic policy portfolios can not be implemented passively for a combination of reasons
  - Rebalancing is costly and transaction costs should always be considered
  - Private markets are not directly investable in a passive vehicle and benchmarking remains a challenge
- The result of this implementation hurdle is that portfolio returns can deviate from policy returns – these are excess returns

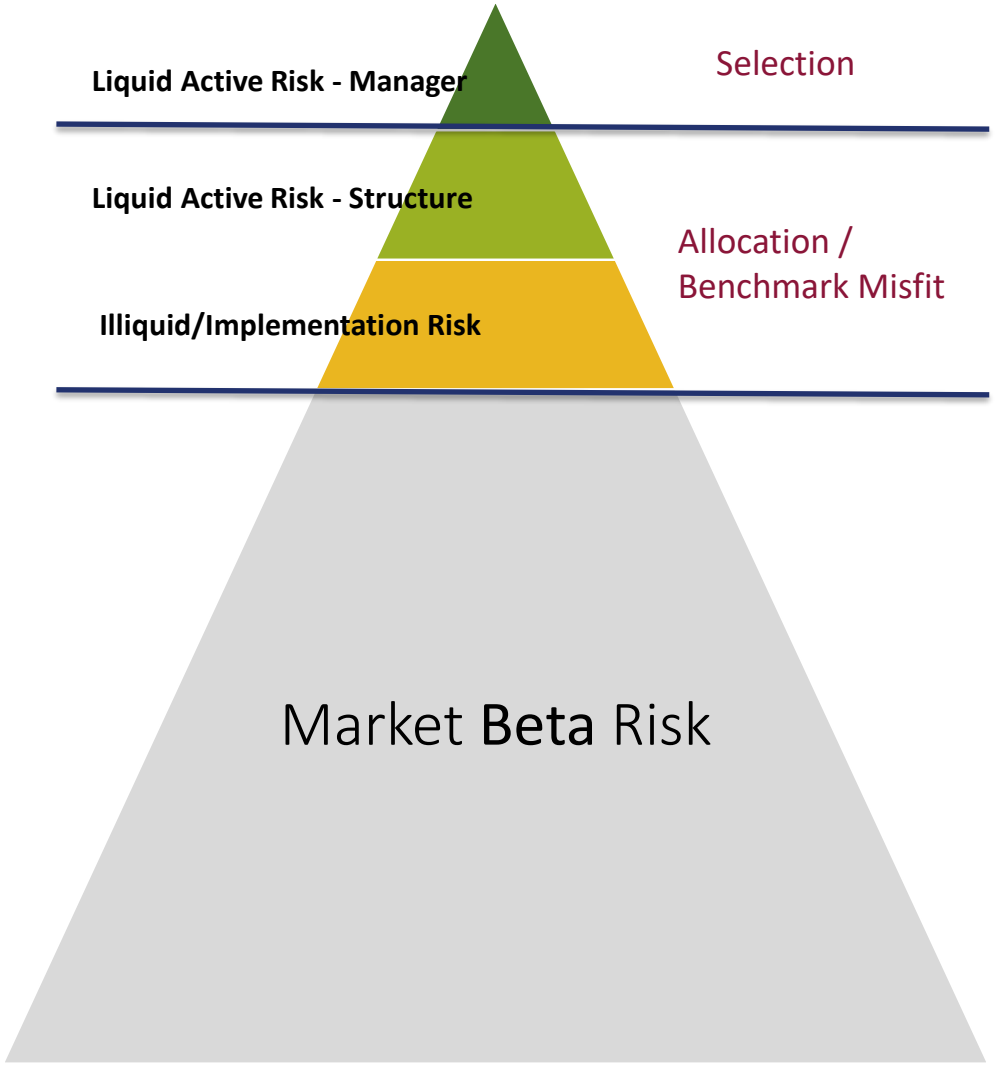
Tracking error is equal to either the realized or expected volatility of the excess returns

- A plan should only accept tracking error if they:
  - Expect to get compensated for that risk by generating additional return
  - If that risk is unavoidable in order to access the underlying beta (private markets)

Interpreting Active Risk: Sources of Tracking Error

Active manager risk is not the only source of tracking error for asset owners.

- **Total Fund TE** – aggregate active risk of all investments versus the strategic policy but can and should be split up amongst the various stakeholders
- **Allocation Deviation** – active risk from differences in actual weights vs policy weights
- **Benchmark Mismatch** – active risk from differences in style in the individual composites versus composite benchmarks (by staff)
- **Manager Risk**– active risk from asset managers (irrespective of style biases versus their benchmark or truly idiosyncratic risk)



Challenges Associated with Private Markets Active Risk

- Private investment performance measured against public market benchmark
- Private markets investments performance reported on a lagged basis
- Cannot readily rebalance or manage cash flow
- Hard to isolate “alpha” given benchmark challenges

- ✗ Benchmark mismatch cannot be eliminated (no pre-determined, investable, passive benchmark)
- ✗ Can use lagged public market benchmark but does not allow any action to be taken to manage active risk in a timely manner)
- ✗ Cannot actively rebalance (cash flow is not in staff control after commitment)
- ✓ Dissect actual manager risk vs. benchmark misfit, then determine course of appropriate action (adjust pacing, secondary market transactions)

Private markets investments will exhibit a large tracking error and the sources of tracking error is confounded between actual investment risk and measurement mismatch

IPERS Current Policy Benchmark vs SAA

SAA - Long Term Target

Asset Class	Current Target
U.S. Equity	21.00%
International Equity	13.00%
Private Equity	17.00%
Global Smart Beta	5.00%
Total Growth Assets	**56.00%**
Public Credit	3.00%
Private Credit	8.00%
Total Defensive Growth Assets	**11.00%**
Core (Plus) Fixed Income	22.50%
Cash	1.00%
Total Defensive / Rate Sensitive Assets	**23.50%**
Private Real Assets	9.50%
Total RA / Inflation Sensitive Assets	**9.50%**
Total Assets	**100.0%**

Interim (Short Term)Target

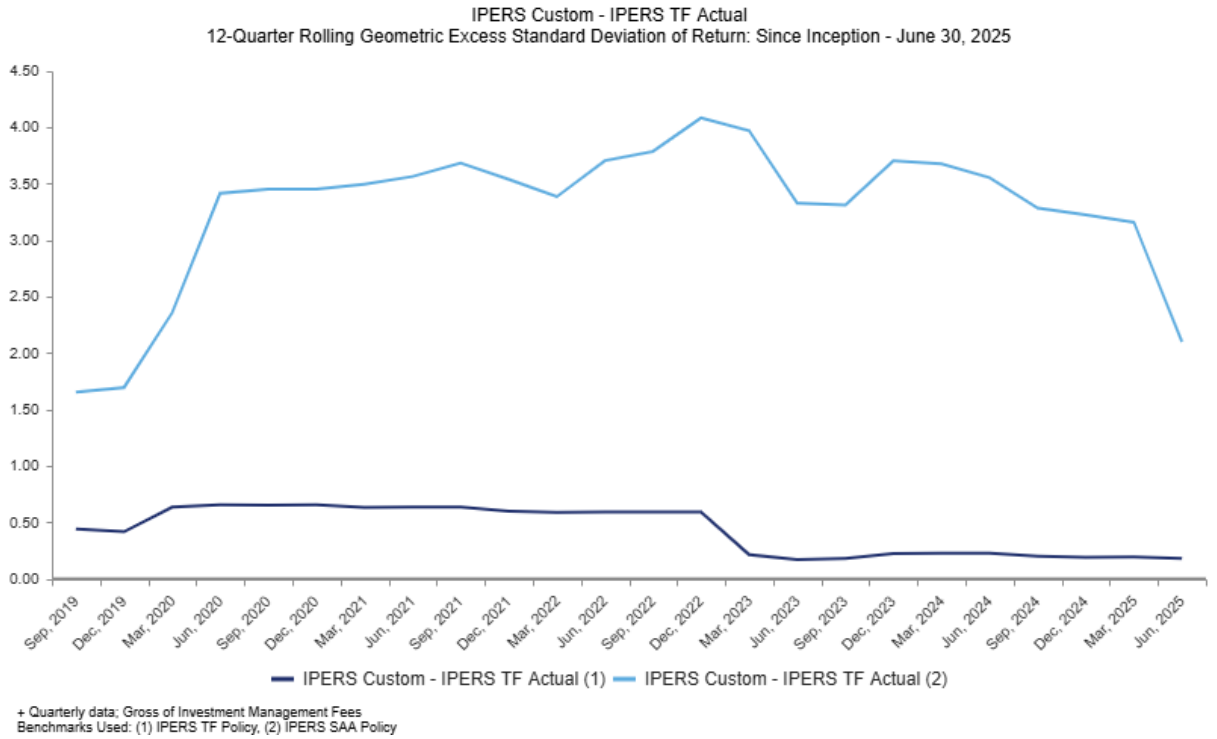
I. Asset Allocation Policy[1]

Asset Class	Asset Class Ranges	Policy Benchmark Weights	Policy Benchmark Index
Equities		**39%**	
Domestic Equities	+/- 3%	21%	Russell 3000
International Equities	+/- 3%	13%	MSCI ACWI ex-U.S. (Net)
Global Smart Beta Equities	+/- 3%	5%	Custom Index[2]
Fixed Income		**29%**	
Core Fixed Income	+/- 3%	25%	Bloomberg U.S. Aggregate
Public Credit	+/- 3%	3%	Custom Index[3]
Cash	+/- 3%	**1%**	Merrill Lynch 91-Day T-Bill
TOTAL PUBLIC MARKETS		**68.5%**	
	Asset Class Targets	**Policy Benchmark Weights**	**Policy Benchmark Index**
Private Equity	17%	Actual[4]	Portfolio[5]
Private Credit	6%	Actual[4]	Portfolio[5]
Private Real Assets	9%	Actual[4]	Portfolio[5]
TOTAL PRIVATE MARKETS		**32%**	

[1]On September 17, 2020, September 22, 2022, and September 28, 2023, the Investment Board revised the Asset Allocation Policy, as reflected in the table below. However, the Board stipulated that core fixed income assets should be reduced as needed to fund new allocations to the private markets. Therefore, beginning October 1, 2020 and revised as of October 1, 2022, and October 1, 2023, the target weight for private equity will be increased to 17 percent and core fixed income will be lowered to 22.5 percent, with target weights being adjusted quarterly in the future to reflect the progress in funding the increased allocations to private credit and private real assets.

Asset Class	Current Weight	Target Weight
Core Fixed Income	25%	22.5%
Private Credit	6%	8%
Private Real Assets	9%	9.5%

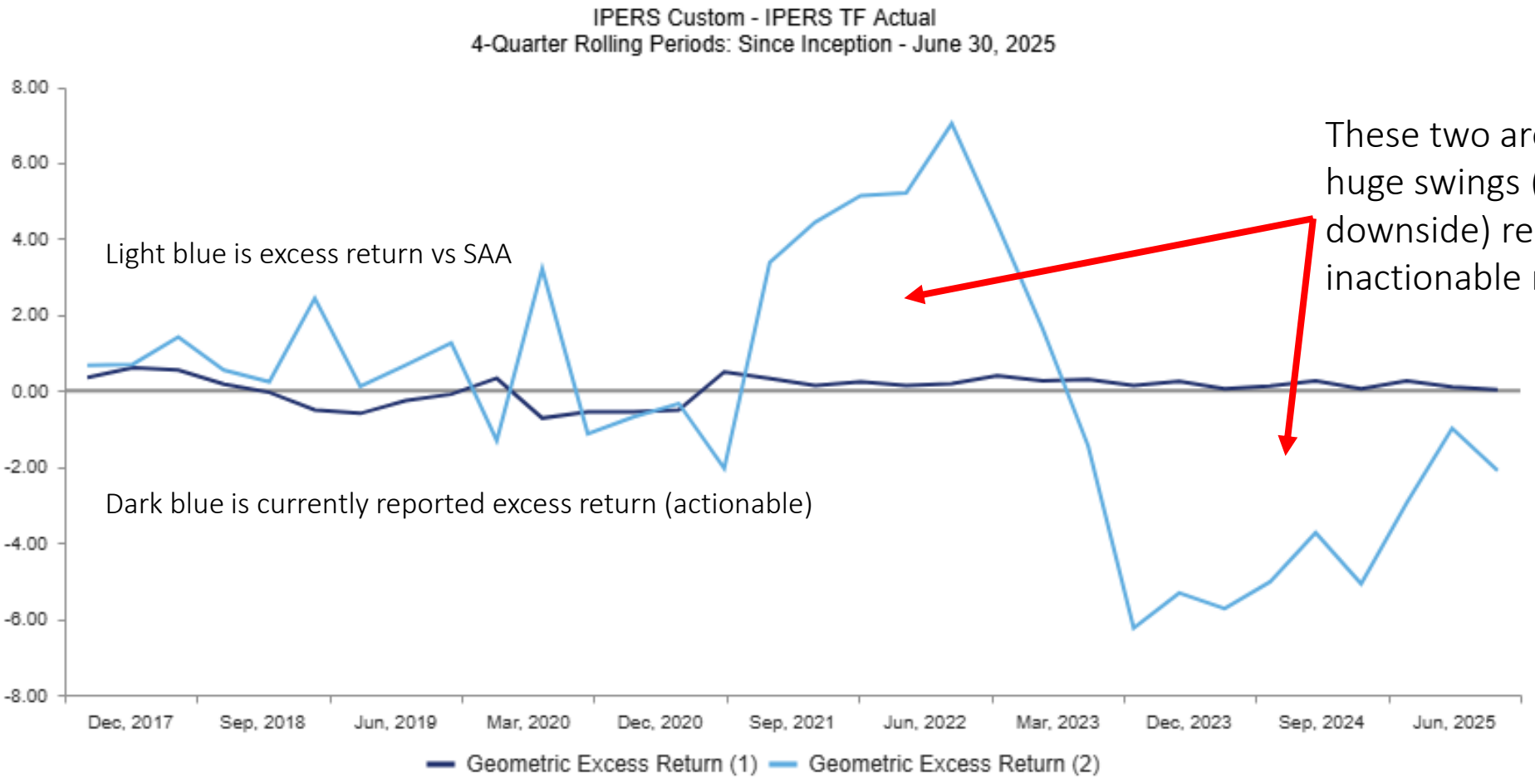
Actionable vs In-Actionable Tracking Error



+ Quarterly data; Gross of Investment Management Fees
Benchmarks Used: (1) IPERS TF Policy, (2) IPERS SAA Policy

- The difference between the lines on this chart are related to the challenges of managing private market TE
- Actionable (dark blue) is TE that staff has control over in the short term
- The light blue line is what many plan sponsors report
- The differential between these two lines is inactionable tracking error
  - Staff can't instantly get to Private Market target weights
  - Staff can't invest passively in Private Markets to capture the Public Equity + Premium return

Comparison of IPERS Excess Return Using Different Policy Measurements



Light blue is excess return vs SAA

Dark blue is currently reported excess return (actionable)

These two areas reflect huge swings (upside and downside) related to inactionable risk

+ Quarterly data; Gross of Investment Management Fees
Benchmarks Used: (1) IPERS TF Policy, (2) IPERS SAA Policy

Conclusion

Benchmarking non-traditional assets comes with trade-offs, nuances, and complexities.

- There is no one perfect benchmark that can be utilized to evaluate the overall portfolio and its underlying components without sacrificing the ability to understand the impact of the portfolio construction decisions.
- A combination of the benchmarking tools will help investors both measure the performance of the existing portfolio and assist with the planning of future allocations.
  - IPERS' Annual review of private market portfolio with a long-term focus is consistent with best practices
- IPERS current use of measuring the policy benchmark using an actionable concept is consistent with good practice
- Periodic education and review on the topic of benchmarking is also recommended

Wilshire believes the "best practices" in evaluating non-traditional assets are through a multi-pronged approach.

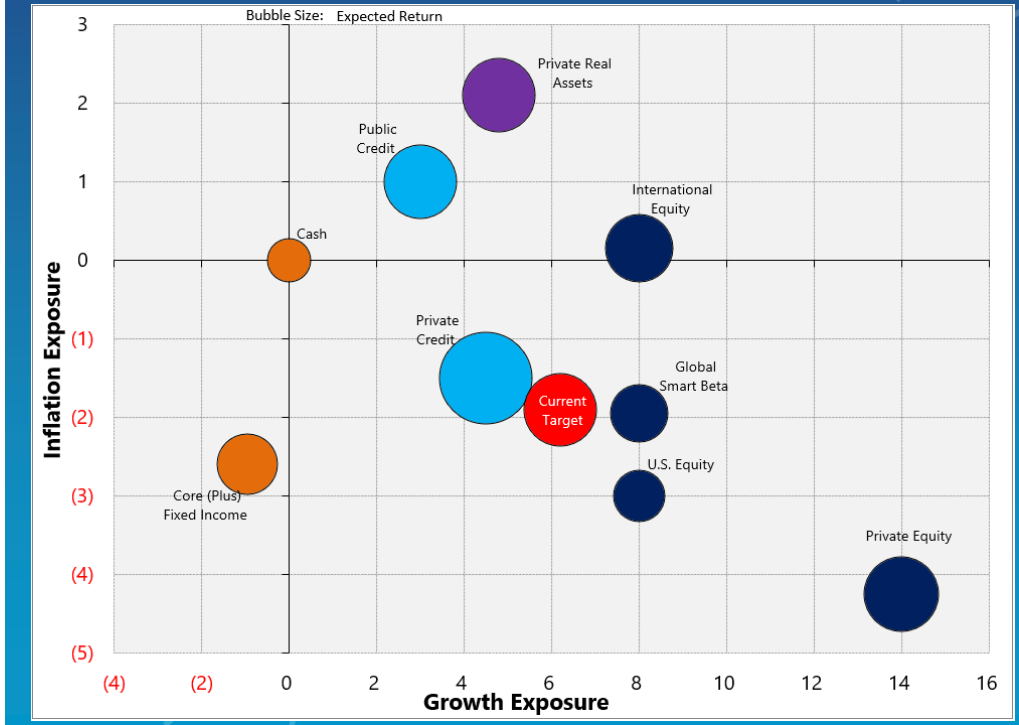
- Widely accepted market indices or market proxy that represent the investment opportunities
- Peer universe analysis
- Portfolio objectives (i.e., absolute and/or relative to inflation)
- Opportunity cost (i.e., available relative investable universe)

Appendix

Understanding the Total Portfolio Approach

- Integrates all asset classes into a unified investment strategy
- Explicitly manages overall portfolio risk based on Board approved target
- Focus on maximizing risk-adjusted returns for the entire portfolio at that risk level
- Considers correlations and interactions among different investments opportunities
- Allows dynamic allocation adjustments in response to market changes

Factor Risk



Benchmark Purpose

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Performance Attribution	Decomposition of sources of return, such as asset allocation, active vs. passive management, manager skill, etc.
Insight on Risk/Returns	Insight into level of risk being taken to generate return and the volatility of return over time
Manager Evaluation	Measure against which manager performance can be evaluated to assist in retention / termination decisions

Ideal Benchmark Characteristics

Unambiguous	Benchmark components and construction methodology are clearly identifiable.
Investable	It is possible to replicate and simply hold the benchmark.
Measurable	The benchmark's return is readily calculable on an on-going basis.
Appropriate	The benchmark is consistent with the composite's objective or manager's investment style.
Reflective of current investment options	The manager is knowledgeable of the securities or factor exposures within the benchmark.
Pre-specified	The benchmark is agreed upon prior to the start of the monitoring period.

Source: CFA Institute

General Benchmark Considerations

There are several items investors should consider for both traditional and non-traditional assets:

- **Time Horizon**
  - Examine results over various time horizons for a more holistic understanding of performance.
  - Calculate rolling returns to smooth out short-term volatility and show performance across a market cycle.
- **Risk Factors**
  - Evaluate risk-adjusted performance using metrics such as Sharpe ratio, Sortino ratio, etc.
- **Impact of Fees**
  - Compare both net and gross returns relative to the benchmark to account for the impact of fees.
- **Benchmark Construction**
  - Understand how the benchmark is constructed and if there are any notable limitations / assumptions.
- **Review Benchmarks**
  - Regularly review the benchmark and make updates, as applicable, to maintain relevance and appropriateness.

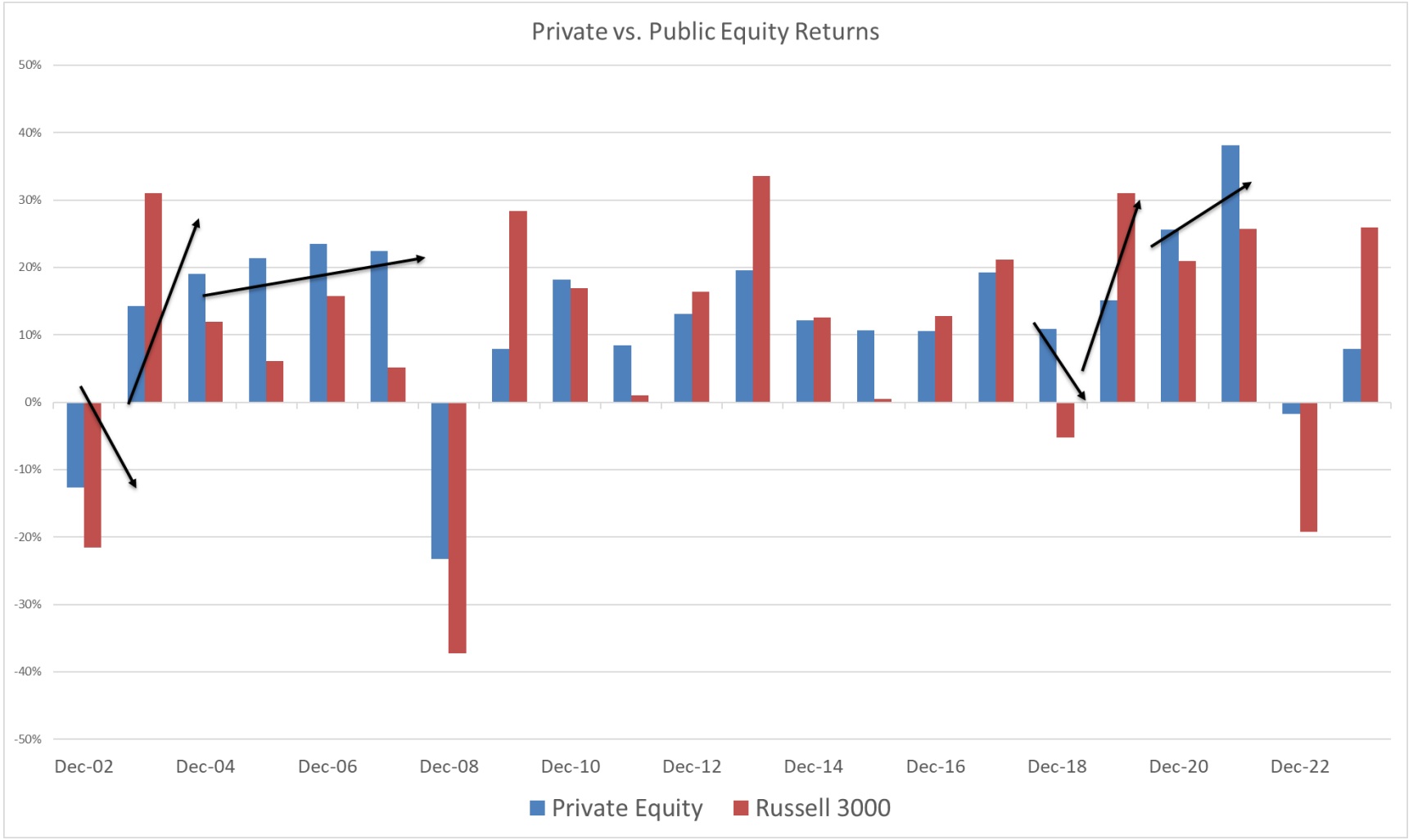
Alternative Benchmark Considerations

Non-traditional assets present unique challenges due to the lack of regular market prices, varying liquidity, and complex risk profiles. Investors must consider many factors when selecting a benchmark:

- **Reporting**
  - Understand the implications of any reporting lags.
  - Acknowledge the impact of market environment when using public market equivalent benchmarks.
- **Additional Risk Factors**
  - Account for the illiquidity premium and / or the use of leverage within the underlying assets.
  - Understand the liquidity of the underlying assets and any mismatch between those and the benchmark.
  - Ensure that the benchmark accounts for sensitivities to periods of stress.
- **Time Horizon**
  - Confirm that the benchmark reflects the appropriate time frame and aligns with the anticipated holding period.
  - Reassess the appropriateness of the benchmark over time as market standards can evolve.

Past Trends in Public vs Private Equity Returns

- In 2002-2007 and 2018-2021 PE outperformed as public markets sold off, then lagged during the rebound before once again adding value
  - This trend played out after the GFC but PE trailed in 2012-2017 with the exception of 2015



Private Equity represented by the Preqin Quarterly Index (rebased to 12/31/2000)

Private Equity Index Overview

Typical Benchmark Construction

- Private Equity Indexes are constructed by aggregating quarterly performance from various Private Equity funds, typically focused on a particular fund type (i.e., buyouts), or a combination thereof.
- Market leading benchmark providers have robust processes in place to verify the accuracy of the returns, seek to eliminate selection bias, and tend to cover an extensive data set to provide depth and breadth of coverage for the fund type(s) included in the index.

Main Considerations

Pros:

- Reflects the broad opportunity Set

Cons:

- May not reflect the type of maturity of the program being evaluated
- Often reporting lags
- Potential misalignment regarding region, underlying fund type, vintage year, etc.

Private Equity Index Examples

There are many Private Equity indexes available to investors, including, but not limited to the following:

- Private Equity Quarterly Index (PREQIN)
  - **Offering:** Preqin PE Quarterly Index
  - **Regional Focus**: Global
  - **Strategy Breakdown**: Broad range of funds – buyouts, venture capital, etc.
  - **Funds Included**: 6,300+
- Cambridge
  - **Offering:** Cambridge Associates US Private Equity Index (Ex-US options also available)
  - **Regional Focus**: US-focused
  - **Strategy Breakdown**: Buyout, growth, and venture capital
  - **Funds Included**: 9,900+ funds, across 2,400 fund managers
- FTSE (formerly Refinitiv)
  - **Offering:** FTSE Private Equity Buyout Index
  - **Regional Focus**: US-focused
  - **Strategy Breakdown**: Equity buyout through both liquid and publicly traded assets
  - **Funds Included:** 8,000+
- MSCI (formerly Burgiss)
  - **Offering:** 70 PE indexes available
  - **Regional Focus**: Varies by benchmark but global and regional solutions available
  - **Strategy Breakdown**: Broad range of funds – buyouts, venture capital, distressed, etc.
  - **Funds Included:** 7,500+ across the various offerings
- State Street
  - **Offering:** State Street Private Equity Index (SSPEI)
  - **Regional Focus**: Global
  - **Strategy Breakdown**: Mix of buyout, venture capital, private debt, and energy/natural resources
  - **Funds Included:** 3,800

Custom Benchmarks Overview

Given the complexities associated with benchmarking Private Equity assets, clients may elect to create a custom benchmark to assess the performance of their Private Equity portfolios.

- Examples of custom benchmarks are limitless; however, a few are shown below:

  - Lagged: MSCI World (1 Quarter Lagged)
  - Lagged + Premium: Wilshire 5000 (1 Quarter Lagged) + 3%
  - Different Weights + Premium: Russell 3000 (75%) + MSCI ACWI ex-US (25%) + 3%
  - Different Weights + Lagged: S&P 500 (2.5%) + S&P 500 (1 Quarter Lagged, 97.5%)
  - Composite Performance: Benchmarking the portfolio against itself.

Custom Benchmarks Considerations

Pros

- Customization allows investors to create a solution that seeks to address the unique composition of the client's portfolio.
- Opting for benchmarking a portfolio against itself may also be an option investors take, which removes benchmark impact on attribution and reporting.

Cons

- Custom benchmarks make peer comparison more complicated.
- Custom benchmarks rely on subjectivity within the creation of the benchmark
- Customization is often complex.

Public Market Equivalent (PME) Examples

PME Methodology	Description	Main Pros	Main Cons
"Buy and Hold"	• Completely match contributions of underlying fund • Interim distributions are ignored • Sell all units at end of period to generate NAV	• Simple calculation • Never fails (i.e., avoids "negative NAV")	Does not account for any interim distributions. PME IRR can be materially impacted over long periods of time.
Long-Nickels	• Completely match contributions and distributions of underlying fund • Calculate remaining NAV	• Accounts for both contributions and distributions in PME calculation	Breaks down in certain instances where private equity fund significantly outperforms (e.g., "negative NAV")
PME+ (WPM recommended approach)	• Completely match contributions • Scale distributions of underlying fund so that the terminal benchmark NAV is equal to the underlying fund's NAV.	• Contributions matched perfectly • Distributions accounted for but scaled to avoid breakdown • Never fails	Methodology scales distributions by a factor instead of completely matching the distributions of the underlying fund
Kaplan-Schoar	• Completely match contributions and distributions of underlying fund • Calculate remaining NAV	• Simple calculation • Never fails (i.e., avoids "negative NAV")	Output is not an IRR benchmark and difficult to measure alpha. Less common methodology that will need some investor education.

Note: WPM stands for Wilshire Private Markets

PME Considerations & Recommendation

There is generally a tradeoff between accuracy and repeatability within PME calculation methodologies.

- Wilshire believes that there is merit in each of the methodologies.
- After studying all four PME methodologies, Wilshire considers PME+ to be the most attractive and consistent of the methodologies. PME+ benefits, include:
  1. It's relatively consistent and always provides a positive terminal NAV.
  2. It accounts for some level of interim distributions and matches the private equity fund reasonably well.
- Wilshire believes that the PME+ methodology is balanced medium between the "buy and hold" methodology and the Long-Nickels methodology.
- PME methods are useful for evaluating the success of a private equity program; however, they are limited in that they cannon by combined with index returns from other segments of the portfolio to produce Total Fund benchmarks, because they are cashflow weighted.
  - Time weighted returns (shown in total fund performance reports) strip out the impact of cash flows.

Managing Public Markets Active Risk

- **Allocation**
  - Deviation from the target allocation
  - Portfolio characteristic tilts vs. composite benchmark
- **Selection**
  - Active positioning by asset managers

- ✓ Rebalance if unintentional, if intentional, monitor and analyze alpha generation effectiveness
- ✓ Eliminate if unintentional, if intentional, monitor and analyze alpha generation effectiveness
- ✓ Allocate and analyze active risk contribution by manager and determine rebalancing ranges

Active Risk @ IPERS

Sri Lakshminarayanan, Chief Investment Officer

September 24, 2025

Roles - Board and Staff

- **The Investment Board communicates IPERS' risk tolerance by adopting an investment policy**
  - **Asset Allocation Policy**
    - How much growth, rates, credit, illiquidity, inflation etc.
    - Set a strategic asset allocation with a mix of these betas
  - **Active Risk Budget**
    - Don't be passive, go for excursions outside passive and add value
    - But don't go too far – limit, constraints etc.
- **Investment team - implements policy**
  - **Efficiency**
    - Minimize costs of beta and alpha
  - **Risk management**
    - Rebalancing; minimizing unintentional bets
  - **Seek to add value**
    - External/internal active management

The Active Risk Budget

- **This is the current active risk budget set by the Board:**

	Target	Upper Limit
Total Fund	**1.50%**	**3.00%**
External Managers	1.00%	2.50%
Investment Staff	1.00%	2.50%

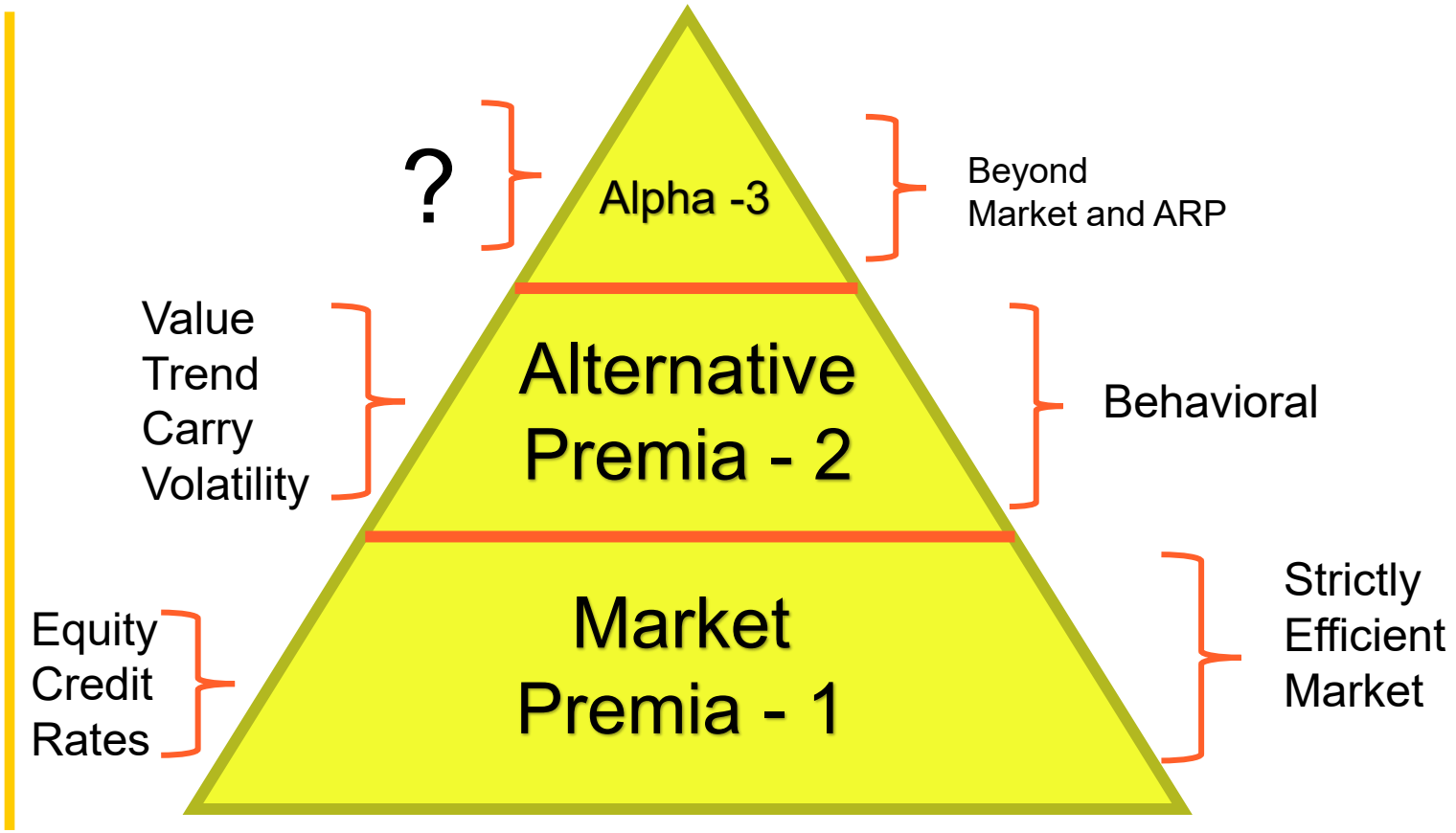
- **Note that IPERS policy views private markets as "beta only"**
  - **Private market returns and allocations doesn't impact active risk**
  - **Private market return variability affects total fund risk**

- **IPERS currently has low active risk and efficient conversion of returns to risk – (in staff opinion)**

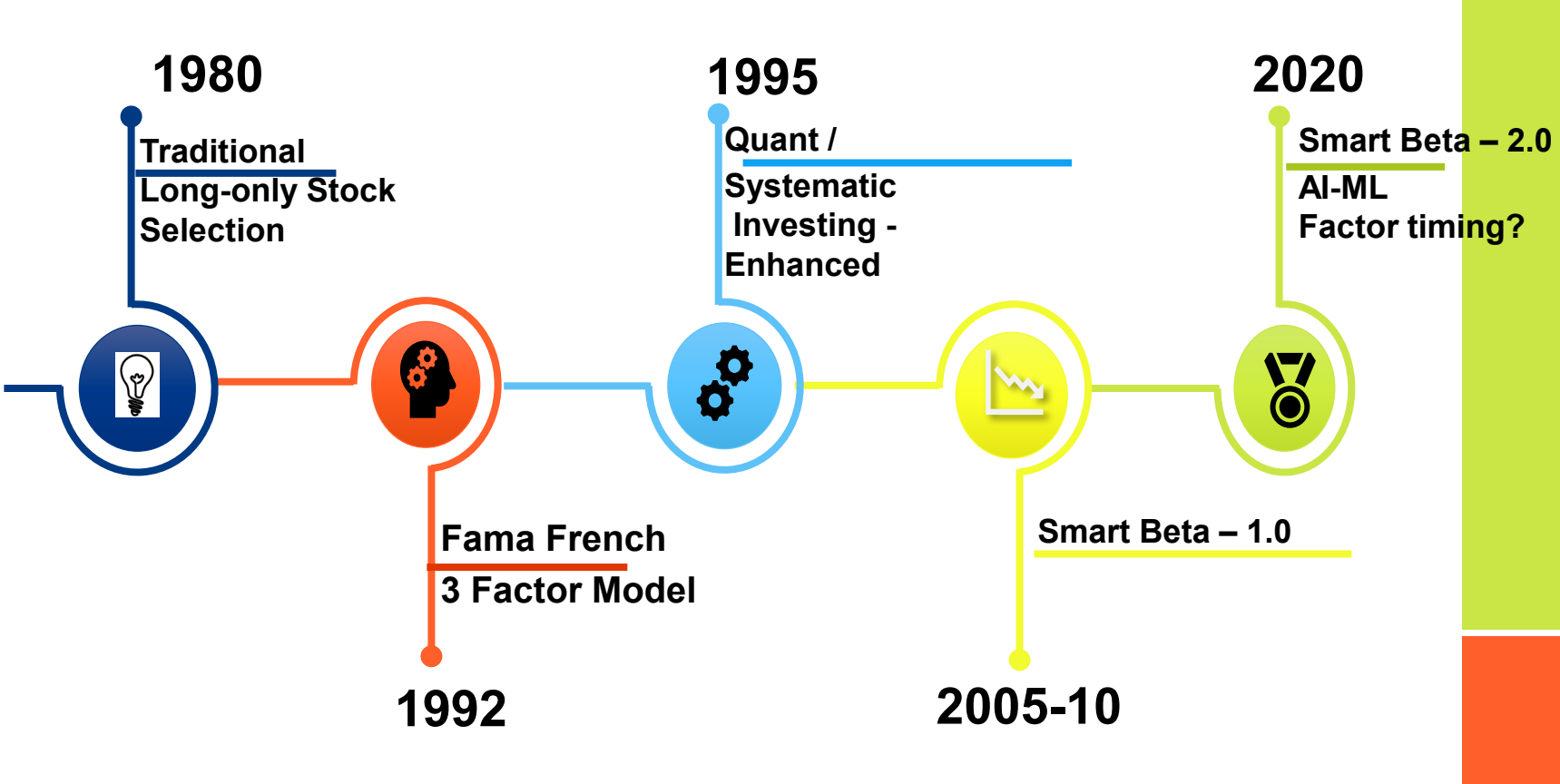
Ways to deploy active risk

- **Board selects a portfolio that earns 7% with Asset Allocation**
- **Let's lever it up by 10% and make an additional 0.70%**
  - **But ….. What if they are wrong in the short term?**
  - **Staff actions will make it feel worse**
- **Ok, lets lever it down by 10%**
  - **Guaranteed downside protection**
  - **But this guarantees a loss of 0.70% over long terms**
- **Staff needs to add value over long term, but the path needs to be different**
  - Ideally stay flat or add value when the passive portfolio is losing

Active strategies evaluation



Example – Smart Beta



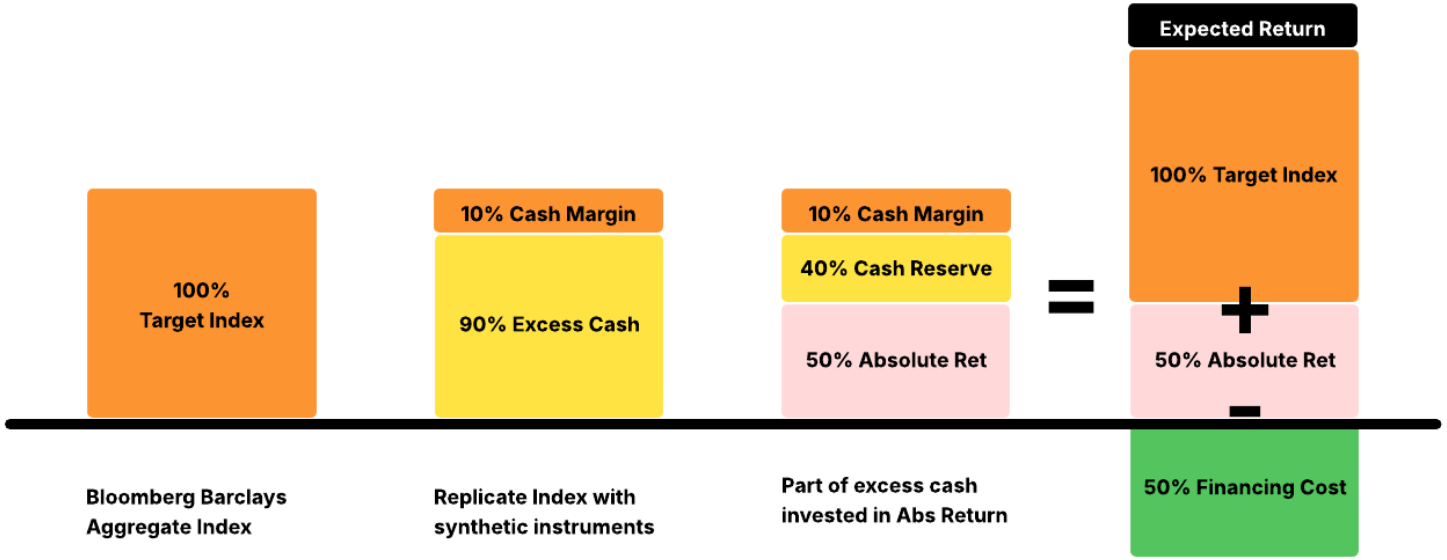
Smart Beta @ IPERS

- **Started investing in Q3-2017**
- **Rationale**
  - **Reduction of long-only active management in equities**
  - **Reduce costs by replacing active management with simple multi-factor index approach, focus on down capture**
  - **Make it a strategic decision and not an active decision subject to change**
- **Experience**
  - **Achieved down capture at the cost of bull upside**
  - **Naïve formulation failed to achieve "multi" factor exposure**
    - Quality and momentum under-represented
    - Index construction has inflexible/rigid implementation - by design
- **Revert to traditional cap-weighted beta for the SAA**
  - **Implement Smart Beta 2.0 as an overlay - as needed**

Pure Alpha (throwback to 2021)

- **Pure alpha in theory**
  - Cannot be explained by market premia or ARP
  - The result of skillful investment management
- **A strategy can produce pure alpha return while investing in markets and ARPs**
  - Alpha can come about from skillful timing and/or selection skill
- **ARP was difficult to obtain outside of hedge funds and were often considered alpha in the past**
  - ARP have become readily available to investors at costs well below what hedge funds charge
- **So, does pure alpha even exist today?**
  - We think it probably does
  - Most likely to be found in absolute return products (hedge funds) that have more breadth, resources and the ability to attract talent

Portable Alpha



Portable Alpha (throwback to 2021)

- **Alpha and beta decisions should be made separately!**
- **Portable alpha**
  - Allows investors to separate asset allocation from alpha generation
  - Investors choose the optimal manager who can generate their target beta exposure efficiently
  - Separately, high-quality alpha-seeking managers can be selected from a far wider universe of managers to generate excess returns. *(BlackRock, 2019)*
- **Porting is a form of leverage because beta exposure is obtained notionally through derivatives**
  - For example, $100 par of bonds are sold for cash; 50% of the cash proceeds are invested in a hedge fund, while the remaining 50% of cash is used to support derivatives that provide $100 of notional exposure to bonds
  - The more cash reserved for margin, less liquidity risk

Portable Alpha (throwback to 2021)

- **IPERS does not have an asset allocation to LARS, ARP or absolute return strategies - these sources of alpha are "ported" into the investment portfolio using "beta overlays"**
- **Beta overlays allow IPERS to invest in unique alpha sources without changing the Board's strategic asset allocation**
- **There is a cost for beta overlay - which must be factored into the expected return of portable alpha strategies**
- **The amount of portable alpha used in the IPERS portfolio is controlled by**
  - Total active risk budget – **decided by the Board**
  - Staff allocation decisions on where to spend active risk
  - Staff decisions on level of leverage utilization (liquidity risk)
  - Diversification

Where are we now in this journey?

IPERS	Capital	Tracking Error	$ at Risk
Domestic Equity			
BlackRock - Russell 1000 SAE	$ 2,045	1.53%	$ 31.29
BlackRock - Russell 2000 SAE	$ 214	2.14%	$ 4.58
International Equity			
BlackRock – EAFE SAE	$ 1,266	2.21%	$ 27.98
PanAgora - Dynamic EAFE	$ 395	1.80%	$ 7.10
Wellington - Emerging Markets	$ 257	4.26%	$ 10.96
BlackRock - Emerging Markets SAE	$ 408	4.51%	$ 18.41
Core Fixed Income			
BlackRock - Universal	$ 674	1.92%	$ 12.94
PGIM - Universal	$ 549	2.36%	$ 12.96
Man EM Global Macro	$ 148	11.69%	$ 17.32
Mesirow EM Currency	$ 233	13.16%	$ 30.73
Public Credit			
PGIM - High Yield	$ 475	1.86%	$ 8.84
Aegon USA - High Yield	$ 453	1.06%	$ 4.80
PGIM - Emerging Market Debt	$ 473	1.23%	$ 5.82
LARS			
Aspect Capital	$ 75	8.22%	$ 6.17
Graham Capital Management	$ 75	10.83%	$ 8.12
P/E Global	$ 100	11.63%	$ 11.63
PIMCO	$ 100	10.41%	$ 10.41
Welton Global	$ 75	9.62%	$ 7.22
ARP	$ 220	2.99%	$ 6.58
DCM	$ 50	5.88%	$ 2.94
IPERS	$46,682	0.19%	$246.81

Arithmetic Risk	0.53%

Type	$ at Risk
Long only	$119.79
Portable Alpha	$ 73.95
Cash Overlay	$ 53.06

Type	AUM
Long only	$ 5,987
Portable Alpha	$ 1,605
Cash Overlay	$ 192

As of June 30, 2025

IPERS

Where do we want to be in 3-5 years?

- Bring more balance to the "$ at Risk" distribution
- Continue to search for any strategy that adds a bit more than traditional premia
- IPERS' search process selective by design
- Can we double our current active risk?
  - Try and replicate risk premia synthetically
  - Only go external if it can't be done internally
  - Continue to focus on fees/structuring