



Investment Committee

Agenda Item 5a

November 17, 2025

Item Name: Asset Liability Management: First Reading of Public Employees' Retirement Fund Recommendations

Program: Total Fund

Item Type: Action

Recommendations:

1. Adopt the capital market assumptions (CMAs) that are the basis for the expected return projections.
2. Adopt a new investment governance model of Total Portfolio Approach and a new Formal Total Fund Risk consisting of a Reference Portfolio and Active Risk Limit, replacing the current investment governance model of a Strategic Asset Allocation.
3. Adopt a Reference Portfolio with a 75/25 mix of equities and bonds, respectively.
4. Adopt an Active Risk Limit of 400 bps for management's non-reference portfolio investments.
5. No change to the current Discount Rate of 6.8% if adopting the recommended 75/25 Reference Portfolio.

Executive Summary

This asset liability management (ALM) cycle brings a newly proposed investment governance model, Total Portfolio Approach (TPA), that evolves and builds on the Public Employees' Retirement Fund's (PERF) existing Strategic Asset Allocation (SAA) model. Fundamentally, Total Portfolio Approach enshrines the belief that the portfolio is best managed as a whole, that every investment strategy and decision is made for its potential contribution to the overall, or total portfolio, and will lead to better investment performance and system funding.

There are a variety of ways to implement a Total Portfolio Approach. We think the most suitable form for CalPERS is to establish a new Formal Total Fund Risk for the PERF. There will be two components to it.

First, an equity-bonds Reference Portfolio that sets the market risk exposure, captures passive returns, and becomes the singular total fund performance benchmark. Here, we are recommending an equities-bonds Reference Portfolio mix of 75/25, respectively.

The second is to set an Active Risk Limit, so management is provided the ability to make non-Reference Portfolio active management investments. Here, we are recommending a 400 basis points (bps) Active Risk Limit.

Lastly, we recommend no change to the current Discount Rate of 6.8% if the 75/25 Reference Portfolio is adopted.

Strategic Plan

This agenda item supports the CalPERS Strategic Plan goal of strengthening the long-term sustainability of the pension fund. As defined in CalPERS ALM policy, ALM is the process of balancing the expected cost of future pension payments with the expected future investment returns. The periodic review and evaluation of investment and actuarial assumptions are intended to strengthen the sustainability of the pension fund.

This agenda item additionally supports the Strategic Plan goal of Stakeholder Engagement by promoting collaboration, support, and transparency, as stakeholder input is a critical component to the ALM process.

Investment Beliefs

- Investment Belief 2: a long-term investment horizon is a responsibility and an advantage.
- Investment Belief 7: CalPERS will take risk only where we have a strong belief we will be rewarded for it.
- Investment Belief 8: costs matter and need to be effectively managed.

Background

ALM is governed by the CalPERS ALM Policy, and the ALM process is a collaborative effort between the Actuarial Office (ACTO), the Financial Office (FINO), and the Investment Office (INVO), with stakeholder engagement a critical input. ALM operates on a four-year cycle with a mid-cycle review and is the primary process by which investment portfolio and actuarial assumptions evolve to reflect the investment risks and framework, the market opportunity set, demographic assumptions and experience, and plan status. The ALM decision frequency is supported by ACTO's annual actuarial valuation process that determines subsequent employer and employee contribution levels. This process establishes an amortization of each fiscal year's actual experience versus the assumptions underlying the ALM decisions, thus correcting annually for forecast and estimation uncertainty.

This is the first reading of the following PERF ALM Recommendations:

Analysis

Investment Governance Model Change

The recommendation to adopt Total Portfolio Approach poses a meaningful change to the investment governance model, however, there are no other changes to the Board of Administration's (Board) oversight role or authority, nor would the ALM process change.

Currently, the Board adopts a Strategic Asset Allocation that sets asset class allocation targets and provides management a range of discretion around those targets. Under Total Portfolio Approach, the Board will adopt a Formal Total Fund Risk that sets the PERF's risk profile and be periodically reviewed within the normal ALM cycle. The Formal Total Fund Risk will consist of two components, (1) Reference Portfolio and (2) Active Risk Limits.

Reference Portfolio

The Reference Portfolio will set PERF's market risk exposure and capture passive returns through its specific mix of equities and bonds. Equity risk is the predominant risk and return driver, so the more equity in a Reference Portfolio, the higher potential returns, and critically, the more volatility and investment risk. As the Reference Portfolio captures the passive returns the market provides, it further serves as the singular total fund benchmark for evaluating the Investment Office's performance of non-reference portfolio investment decisions.

The below table shows the expected returns and volatilities by the candidate Reference Portfolios.

Table 1: Expected returns by Reference Portfolio

Equity / Bonds Asset Mix	*Current SAA Portfolio 72/28	70/30	Recommended 75/25	80/20
Total Return – Survey Median	6.8%	6.8%	6.9%	7.0%
Total Return – Survey Range	5.4% - 8.4%	5.0% - 8.1%	5.0% - 8.3%	5.1% - 8.4%
Total Portfolio Volatility	12.0%	11.9%	12.7%	13.5%
Expected Tail Risk (95%)	-25.0%	-23.3%	-25.8%	-28.4%
Max Drawdown Great Financial Crisis 2007-09	-41%	-40%	-43%	-45%
Loss for Hypothetical \$500 bn Portfolio	-204 bn	-\$199 bn	-\$213 bn	-\$226 bn

*Note: All return estimates are net of fees. Total returns include Reference Portfolio passive returns plus the use of 300 bps of active risk (midpoint of expected active risk operating range of 250-350 bps). *Current portfolio risk is estimated based on a preliminary TPA risk model applied to fiscal year 2024-25 interim SAA targets.*

Active Risk Limit

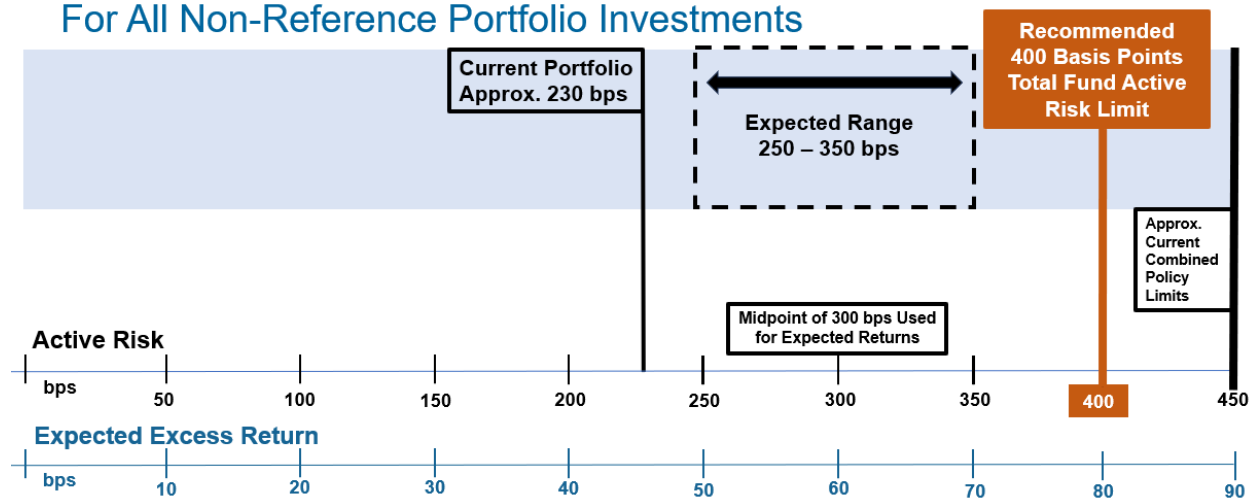
Like SAA's asset class ranges and discretion, Total Portfolio Approach will provide management the needed flexibility to diversify and add value to the portfolio by making active management investments, or simply, non-reference portfolio investments. Use of active risk will be easily distinguishable from the Reference Portfolio, meaning that management's decisions will be clear and transparent. Total Portfolio Approach does not require more flexibility or discretion to management than currently exists.

To establish a proposed Active Risk Limit, current SAA asset class ranges and policy discretion were consolidated and converted into a single total fund active risk metric, totaling approximately 450 bps.

The current portfolio has approximately 230 bps of active risk.

Under Total Portfolio Approach, the expected operating range is 250 bps to 350 bps. We think 400 bps is a reasonable limit based on where the portfolio is today and our long run risk tolerance.

Figure 1: Visualization of Active Risk Limit Recommendation
For All Non-Reference Portfolio Investments



Note: Current policy max limit includes ranges across asset classes, liquidity, and leverage.

Notably, current SAA policy requires Board notification when asset class ranges and policy discretion may be or is exceeded. This will not change under Total Portfolio Approach.

The Formal Total Fund Risk Recommendation

Management is recommending the 75/25 Reference Portfolio with a 400 bps Active Risk Limit because it best balances the following:

- The Board's expressed tolerance for more risk when we have high conviction.
- The desire to offset future required employer contributions through higher investment returns.
- The increased volatility and drawdown risk that comes with higher equity exposure.
- Minimizing employer cost volatility and maximizing the likelihood of improved system funding.

The 75/25 Portfolio and associated Active Risk recommendation represents a moderate increase in investment risk from the current SAA. This increased risk is expected to result in moderately higher investment returns which would lower employer costs. Based on extensive analysis of projected actuarial results, this increase in investment risk does not significantly increase the risk of contribution spikes or severe funded status declines.

The 70/30 Portfolio option and associated Active Risk Limit would result in a slight reduction in investment risk and an increase in near-term employer and member contributions due to the recommended 6.7% discount rate. While this is prudent option, the benefits of this slight reduction in investment risk do not appear to adequately compensate for the required contribution increases.

The 80/20 Portfolio and associated Active Risk Limit is also a prudent option. However, the increase in investment volatility would increase from 0.7% (12.7% - 12.0%) under the 75/25 option to 1.5% (13.5% - 12.0%). While this option offers higher expected long-term returns,

near-term contributions are not expected to decrease materially nor is the funded status expected to improve materially faster than under the 75/25 Portfolio.

Performance Reporting

Overall, there will be minor changes to performance reporting under Total Portfolio Approach that will simplify and be additive to current reporting. The Board will receive the same reports at the same frequency it does now, such as the quarterly and annual Trust Level Reviews, Annual Program Reviews, ad hoc reports, and closed session strategy reviews. The Chief Investment Officer will lead a discussion with the Board about potential opportunities to streamline the reporting.

Standards based reports like the Annual Comprehensive Financial Report, and others, will have minor formatting updates with additional disclosures and commentary about the shift to Total Portfolio Approach, but otherwise will not change.

The most noticeable change will be simplifying from 11 asset class benchmarks to one singular total fund benchmark, the Reference Portfolio. Active management decisions will be reported independently and easily distinguished from the Reference Portfolio. This feature simplifies the evaluation of management's performance by making it more transparent, which in turn will drive greater accountability throughout the Investment Office.

Discount Rate Selection

The Chief Actuary considers many factors to arrive at a Discount Rate recommendation. Among these are expectations regarding the future allocation of PERF assets among asset classes, prevailing capital market assumptions for the next ten to twenty years, and current actuarial metrics of the system's individual plans such as funded status and the current level of required employer contributions.

Under the proposed Total Portfolio Approach, the Board will not be adopting a specific Strategic Asset Allocation as in past years. However, based on the recommended Reference Portfolio and associated active risk level, the near-term allocation of PERF assets is expected to have a long-term investment return of 6.8% or slightly higher. Therefore, a 6.8% Discount Rate is recommended for the 75/25 Reference Portfolio and assumed 300 bps of active risk.

Table 2: Candidate Reference Portfolios and Associated Discount Rates

Candidate Reference Portfolio	Associated Discount Rate
70/30	6.7%
75/25*	6.8%*
80/20	6.8%

*Note: 300 bps active risk is assumed across all candidate Reference Portfolios. *ALM Recommendation.*

Given the risks associated with increasing the Discount Rate assumption, and explained below under Benefits and Risks, a 6.8% Discount Rate is also recommended for the 80/20 Reference Portfolio. Should the board select the 70/30 Reference Portfolio, which reflects a lower level of investment risk than the current allocation, we recommend the Discount Rate be lowered to 6.7%.

Internal Transition Workstreams

Anticipating a transition to a Total Portfolio Approach, the Investment Office has identified and began planning across eight internally focused workstreams. They are as follows:

1. **Board Action:** The Board adopts a Formal Total Fund Risk via a Reference Portfolio and Active Risk Limit.
2. **Governance:** Develop a comprehensive governance and investment decision framework to allocate, measure, monitor, and manage active risk.
3. **Portfolio Construction:** Develop a portfolio construction approach that synthesizes strategies, risk factors, cost of liquidity, and investment horizons into a cohesive active risk budgeting framework.
4. **Treasury Management:** Develop a framework to manage liquidity and leverage under Total Portfolio Approach and ensure goals align with the Data and Technology Modernization Initiative.
5. **Policy and Controls:** update policies, procedures, and controls underpinning the successful transition to Total Portfolio Approach.
6. **Communication and Engagement:** Develop a strategy to guide and support team members through the transition to Total Portfolio Approach by fostering understanding, alignment, and engagement.
7. **Reporting:** Implement transparent and consistent reporting mechanisms to ensure clear and accurate communication under Total Portfolio Approach.
8. **Implementation:** Operationalize the processes, systems, and frameworks necessary to transition to Total Portfolio Approach.

Budget and Fiscal Impacts

There are no expected budgetary or fiscal impacts in changing to a Total Portfolio Approach.

Benefits and Risks

The ALM cycle always brings important Board decisions with systemwide implications, and this cycle is no different with a proposed new investment governance model and Discount Rate selection. The Board has a decision whether to keep PERF's current investment governance model of a Strategic Asset Allocation, with asset class policy targets, ranges, and discretion, or adopt a Total Portfolio Approach model that establishes a Formal Total Fund Risk consisting of a Reference Portfolio and Active Risk Limits. In addition to the investment governance model, the Board will adopt a Discount Rate that impacts employer and member contributions.

Governance Change

Maintaining the current SAA governance and framework would provide continuity to CalPERS and our stakeholders. The Board's ALM decisions would remain status quo, specifically its role in adopting asset allocation targets. Maintaining the SAA means investment decisions remain at the asset class level rather than the total portfolio level, leading to potential overdiversification and no Board adopted formal total fund risk standard.

Changing to Total Portfolio Approach creates new Board ALM decisions but otherwise has no impact on Board authority, oversight, and the ALM process. Under Total Portfolio Approach, the Board forgoes adopting asset class allocation targets to instead set the overall Formal Total

Fund Risk, consisting of two new Board decisions on a Reference Portfolio and Active Risk Limit. To the organization, there would be operational and cultural changes to implement and manage, the most significant being to how investment decisions are made. Otherwise, the benefits of Total Portfolio Approach can be found in the above Analysis section.

Discount Rate Selection

There is not a single correct selection of a Discount Rate for the PERF as actual future investment returns are extremely difficult to predict. Setting the Discount Rate higher than actual future returns, generally results in a lack of desirable funded status improvement and higher overall costs to employers. In addition, when it is realized that the Discount Rate is too high, it is very difficult to lower it since that immediately increases employer and member contributions. If future returns turn out higher than the Discount Rate, it could be argued that employers and members paid higher than necessary contributions during that period. However, the funded status would likely be higher, and subsequent required contributions can be lowered if the board elects to increase the Discount Rate after years of over performance. In such a scenario, employers will generally pay lower overall contributions due to the acceleration of funding.

Attachments

Attachment 1 – Asset Liability Management: First Reading of Recommendations Presentation

Attachment 2 – Wilshire Letter

Michele Nix
Chief Financial Officer

Scott Terando
Chief Actuary

On behalf of Stephen Gilmore
Stephen Gilmore
Chief Investment Officer

Asset Liability Management: First Reading of Public Employees' Retirement Fund Recommendations

Stephen Gilmore
Chief Investment
Officer

Michele Nix
Chief Financial
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Investment Committee

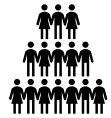
November 17, 2025

Today's Presentation

- The Proposed 2025 Public Employees' Retirement Fund (PERF) Asset Liability Management (ALM) Recommendations
- Appendix

ALM Review: November 2024 to Now

Our ALM Process is Working as Designed



Teamwork and Collaboration By the Financial, Investment, and Actuarial Offices



To Date: Nine Board Education Sessions, Two Stakeholder Webinars and a Variety of Stakeholder Engagements



Introduced a New Investment Framework: Total Portfolio Approach - A Global Evolution of Strategic Asset Allocation

ALM 2025 Recommendations

Adopt a Total Portfolio Approach (TPA) With:

- Capital Market Assumptions (CMAs)
- Formal Total Fund Risk:
 - 75/25 Equity-Bonds Reference Portfolio (RP)
 - Active Risk Limit of 400 Basis Points

No Change to the Current 6.8% Discount Rate

ALM Recommendation

Adopting a Total Portfolio Approach Means...

No Changes To:

Board authority for setting investment risk and governance model

ALM process:

- 4-year cycle, mid-point review
- Board deliverables of capital market assumptions and expected returns analysis
- Actuarial assumptions and deliverables

Changes Under TPA:

The Board would adopt a new investment governance model that sets formal Total Fund Risk via:

- **A Reference Portfolio**
- **Active Risk Limit**

This replaces adopting a target strategic asset allocation (SAA) and policy ranges for management discretion

In ALM years, the Board would review its formal Total Fund Risk

Why Change to Total Portfolio Approach?

TPA Evolves and Builds on SAA For Better Outcomes

Improved Internal Governance

Adds New Formal Overall Total Fund Risk

Reference Portfolio (RP)

Passive Market Risk Exposure Using Equities & Bonds, Gives Passive Returns

Simplicity

From 11 benchmarks to One Total Fund Benchmark, the Reference Portfolio, For Evaluating Management's Decisions

Better Transparency

Management Decisions are Reported Relative to the Reference Portfolio

Greater Accountability

Management's Decisions and Performance Will Be Clear, More Transparent, Drive Accountability

Investment Decisions For the Whole

Investments Made Based on the Best Value to the Total Portfolio

Taken Together, TPA Leads to Better Performance and System Funding

Investment Reporting

Investment Reporting	Current	Under TPA
1 Annual Fiscal Year End Trust Level Review (TLR)	X	X
7 Stand Alone Annual Program Reviews (APRs)	X	X
New Performance Dashboard into All TLRs		X
Forward Looking In-Depth Business Strategy Reviews (closed session)	X	X
3 Quarterly TLRs	X	X
1 Annual Board Consultant TLR Report	X	X
Ad Hoc Investment Strategy Reports	X	X
Annual Comprehensive Financial Report (ACFR)*	X	X
Annual Investment Performance (AIR) Report*	X	X
Annual Global Investment Performance Standards (GIPS) Report*	X	X

Reference Portfolio Recommendation

75/25 Equity-Bonds Reference Portfolio

- A component of the Board's Formal Total Fund Risk that:
 - Sets the market risk exposure to earn the passive returns the market gives
 - Becomes the total fund performance benchmark to measure management against
- The 75/25 reference portfolio balances:
 - Our starting point of an approximately 72/28 portfolio with our long run risk tolerance
 - The Board's expressed tolerance for more risk when we have high conviction
 - The increased volatility and drawdown risk that comes with higher equity exposure
 - Minimizing employer cost volatility and maximizing likelihood of improved system funding

Reference Portfolio Index Types

Accessible, Investible, and Operationally Simple

	<u>Proposed</u>	<u>Reasons Why</u>
	Cap Weighted Global Equities	<ul style="list-style-type: none"> • Commonly Used • Market Efficient • Minimizes Turnover/Cost • Continuity: Largest Current PERF Asset Class
	US Treasury Bonds (1+ year Maturity)	<ul style="list-style-type: none"> • Adds Term Premium & Diversifies From Equities • Industry Standard Interest Rate Exposure • Continuity: Similar Overall Interest Rate Exposure as Current PERF SAA

Capital Market Assumptions

Asset Class	Medium-Term Return (5-year)		Long-Term Return (20-year)		Volatility (20-year)	
	Midpoint	Range	Midpoint	Range	Midpoint	Range
Global Equity – Cap Weighted	6.2%	4.7% - 7.3%	6.7%	4.7% - 8.5%	16.5%	14.2% - 17.3%
Global Equity – Non-Cap Weighted	6.7%	5.4% - 7.3%	6.6%	6.3% - 7.6%	12.0%	10.3% - 13.7%
Private Equity	8.1%	5.5% - 9.9%	7.6%	4.7% - 11.2%	22.0%	11.0% - 32.1%
U.S. Treasuries	4.4%	3.8% - 4.6%	4.2%	3.0% - 5.0%	4.5%	1.5% - 5.2%
Long U.S. Treasuries	4.8%	4.1% - 5.3%	4.8%	3.9% - 6.1%	10.2%	5.1% - 12.7%
Mortgage-Backed Securities	5.1%	4.7% - 5.4%	4.6%	3.0% - 5.5%	4.3%	3.4% - 6.5%
Investment Grade Corporates	5.6%	4.9% - 6.3%	5.8%	4.4% - 6.9%	9.0%	5.4% - 12.3%
Emerging Market Debt	6.2%	5.6% - 6.9%	6.2%	4.9% - 7.1%	9.9%	8.4% - 12.0%
High Yield	5.7%	5.1% - 6.1%	6.2%	5.3% - 6.7%	8.9%	6.6% - 10.3%
Private Debt	7.9%	6.6% - 9.0%	6.6%	6.2% - 8.2%	11.9%	9.5% - 15.0%
Real Estate	5.9%	1.0% - 8.1%	5.9%	3.5% - 7.8%	12.7%	10.9% - 19.9%
Infrastructure	6.5%	6.2% - 10.0%	6.9%	6.2% - 9.0%	15.0%	9.8% - 25.0%
Liquidity	3.4%	2.8% - 4.0%	3.3%	2.7% - 4.0%	0.7%	0.0% - 5.9%



CMA's are developed from the 3/31/2025 survey of 15 institutional providers and internally reviewed.
CMA correlations in Appendix

Expected Returns By Reference Portfolio

Recommendation

Total Returns Include Reference Portfolio & Use of 300 bps* of Active Risk

Equity / Bonds Asset Mix	Current SAA Portfolio 72/28	70/30	75/25	80/20
Total Projected Return – Survey Median	6.8%	6.8%	6.9%	7.0%
Total Projected Return – Survey Range	5.4%-8.4%	5.0%-8.1%	5.0%-8.3%	5.1%-8.4%
Total Portfolio Volatility	12.0%	11.9%	12.7%	13.5%
Expected Tail Risk (95%)	-25.0%	-23.3%	-25.8%	-28.4%
Max Drawdown – Global Financial Crisis 2007-09	-41%	-40%	-43%	-45%
Loss for Hypothetical \$500 bn Portfolio	-\$204 bn	-\$199 bn	-\$213 bn	-\$226 bn

300 bps of active risk is used because it is the midpoint of the expected operational range as seen on slide 15

Stochastic Analysis – State Miscellaneous Plan

State Miscellaneous Plan (6/30/2024 valuation results)

Current Employer Rate (% payroll) 31.3%
 Current Funded Status 74.5%

Reference Portfolio	70/30	75/25	80/20
Discount Rate	6.7%	6.8%	6.8%
Employer Contribution Rates Over Next 10 Years			
Average employer contribution rate	23.2%	22.1%	21.7%
Probability of exceeding 40% in any year	22.1%	22.4%	23.9%
Probability of single year increase > 5%	14.0%	18.2%	21.4%
Funded Status After 10 Years			
Median funded status	96.9%	97.0%	97.8%
Probability of 50% or lower	3.1%	4.1%	5.0%
Probability of 100% or higher	46.3%	46.8%	48.0%

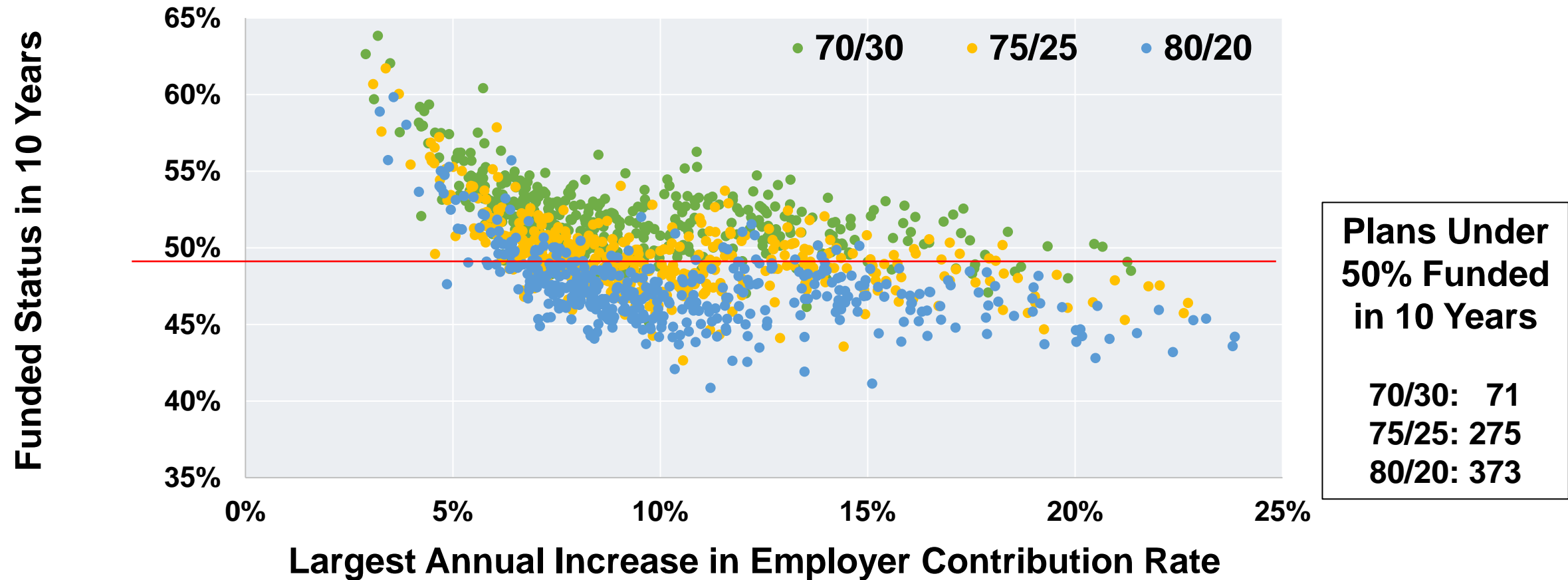
Public Agency Plans | 10 Year Projections

Stochastic Analysis of Largest 420 Public Agency Plans

Median Results						
	Miscellaneous			Safety		
Portfolio	70/30	75/25	80/20	70/30	75/25	80/20
Discount Rate	6.7%	6.8%	6.8%	6.7%	6.8%	6.8%
Funded Status in 10 Years	96.9%	97.1%	97.7%	95.0%	95.0%	95.8%
Cumulative Employer Contributions Over 10 Years (Relative to 75/25 Portfolio)	5.3%	N/A	-1.2%	5.3%	N/A	-1.5%

Public Agency Plans | 10 Year Projections

Stochastic Analysis of Largest 420 Public Agency Plans



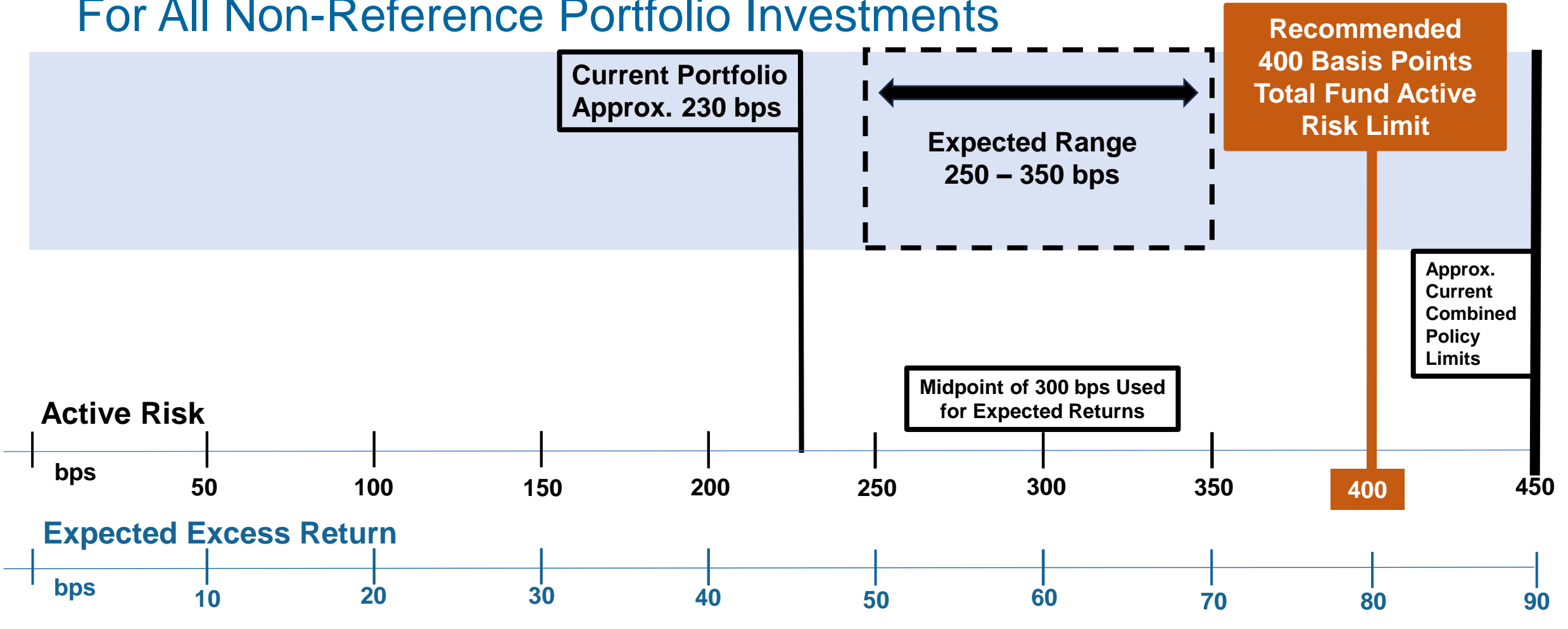
Active Risk Limit Recommendation

➤ 400 Basis Points Total Fund Active Risk Limit

- Active risk applies to every non-Reference Portfolio investment
- Consolidates existing SAA ranges and policy discretion into a single overall total fund Active Risk Limit
- Simple and transparent reporting of management decisions
- Recommendation is lower than current SAA policy's combined ranges of approximately 450 basis points
- Expected operating range is 250-350 basis points

Active Risk Limit Recommendation

For All Non-Reference Portfolio Investments



Discount Rate Recommendation

➤ No Change to the Current 6.8% Discount Rate

- 6.8% is appropriate for the recommended 75/25 Reference Portfolio and 400 basis points Active Risk Limit
- Fund experience and investment return expectations are monitored regularly to reassess the appropriateness of the Discount Rate

Other Discount Rate Considerations

- Increasing the discount rate results in immediate reductions to contributions before the higher expected returns are realized
- Actual returns lower than the discount rate jeopardize funded status improvement and increase overall costs to employers

Probability of Achieving Various Average Investment Returns

Discount Rate	70/30		75/25		80/20	
	10-Years	20-Years	10-Years	20-Years	10-Years	20-Years
6.7%	52.1%	53.6%	52.5%	54.8%	53.0%	55.6%
6.8%	51.3%	52.6%	51.7%	53.6%	51.9%	54.5%

The Path to Total Portfolio Approach

Eight Project Workstreams (1-4)

#1 Board Action

Board adopts (1) a simple and investible Reference Portfolio aligned with the long-term return objectives of the plan; and (2) an Active Risk Limit providing management discretion to invest away from the Reference Portfolio.

#2 Internal Governance

Develop comprehensive internal governance and investment decision framework to allocate, measure, monitor, and manage active risk.

#3 Portfolio Construction

Develop a portfolio construction approach that synthesizes strategies, risk factors, cost of liquidity, and investment horizons into a cohesive active risk budgeting framework.

#4 Treasury Management

Develop a framework to manage liquidity and leverage under a TPA and ensure TPA goals align with the Data and Tech Modernization Initiative.

The Path to Total Portfolio Approach

Eight Project Workstreams (5-8)

#5 Policy & Controls

Update policies, procedures, and controls underpinning the successful transition to TPA.

#6 Communication & Engagement

Develop a strategy to guide and support team members through the transition to a TPA by fostering understanding, alignment, and engagement.

#7 Reporting

Implement transparent and consistent reporting mechanisms to ensure clear and accurate communication under a TPA.

#8 Implementation

Operationalize the processes, systems, and frameworks necessary to transition to a TPA.

2025-26 ALM Timeline

← Stakeholder Engagement Throughout Cycle →

September 2025		October 2025		November 2025			
<p>First Read: PERF Recommended Reference Portfolio, Active Risk Limits, Expected Rate of Return, Experience Study, Actuarial Assumptions, Discount Rate</p> <p><i>ALM Strategy Closed Session</i></p>		<p>Ed Forum State of the System Session</p>		<p>Board Vote: PERF Recommended Reference Portfolio, Active Risk Limits, Expected Rate of Return, Experience Study, Actuarial Assumptions, Discount Rate</p>			
December 2025		March 2026		June 2026		July 1, 2026	
<p>Stakeholder Webinar December 4</p>		<p>Affiliate Funds ALM</p> <p>First Read: PERF Policy Updates</p> <p>Closed Session: PERF Implementation Strategy</p>		<p>Affiliate Funds ALM</p> <p>Board Vote: PERF Policy Updates</p> <p>Closed Session: PERF Implementation Strategy</p>		<p>PERF ALM Effective Date</p>	

Appendix

Capital Market Assumptions Correlations

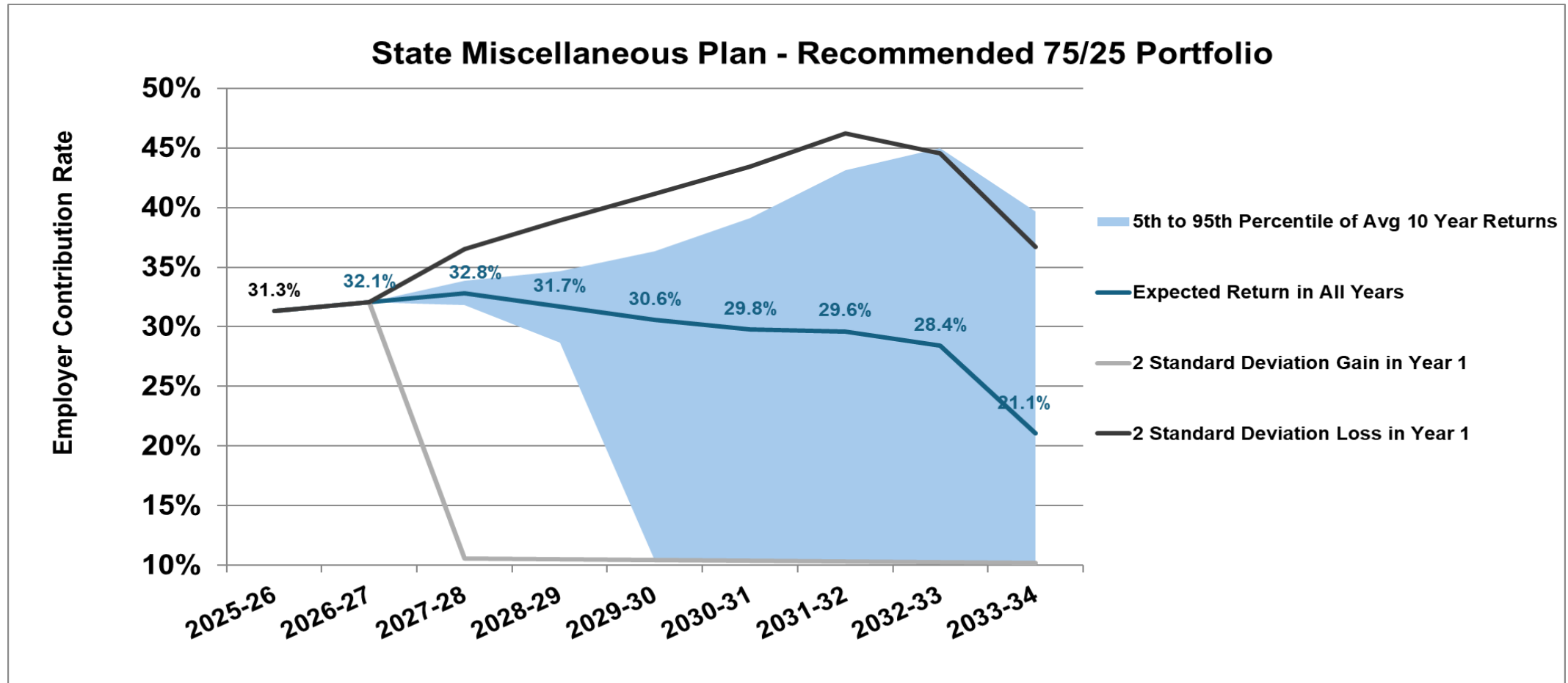
Asset Class Comparisons

Asset Class	Global Equity Cap Weighted	Global Equity Non-Cap Weighted	Private Equity	U.S. Treasuries	Long U.S. Treasuries	Mortgage-Backed Securities	Investment Grade Corporates	Emerging Market Debt	High Yield	Private Debt	Real Estate	Infrastructure	Liquidity
Global Equity – Cap Weighted	100%	88%	84%	-8%	-10%	23%	43%	68%	74%	61%	70%	73%	-1%
Global Equity – Non-Cap Weighted	88%	100%	72%	-1%	12%	21%	47%	62%	71%	52%	74%	72%	-4%
Private Equity	84%	72%	100%	-9%	-12%	-1%	35%	58%	66%	63%	63%	62%	0%
U.S. Treasuries	-8%	-1%	-9%	100%	95%	86%	51%	29%	0%	-15%	9%	-3%	16%
Long U.S. Treasuries	-10%	12%	-12%	95%	100%	83%	71%	20%	4%	-18%	9%	-11%	5%
Mortgage-Backed Securities	23%	21%	-1%	86%	83%	100%	72%	50%	26%	2%	16%	4%	15%
Investment Grade Corporates	43%	47%	35%	51%	71%	72%	100%	73%	62%	16%	27%	21%	1%
Emerging Market Debt	68%	62%	58%	29%	20%	50%	73%	100%	76%	51%	55%	50%	2%
High Yield	74%	71%	66%	0%	4%	26%	62%	76%	100%	67%	57%	58%	-4%
Private Debt	61%	52%	63%	-15%	-18%	2%	16%	51%	67%	100%	55%	55%	-3%
Real Estate	70%	74%	63%	9%	9%	16%	27%	55%	57%	55%	100%	57%	0%
Infrastructure	73%	72%	62%	-3%	-11%	4%	21%	50%	58%	55%	57%	100%	-3%
Liquidity	-1%	-4%	0%	16%	5%	15%	1%	2%	-4%	-3%	0%	-3%	100%

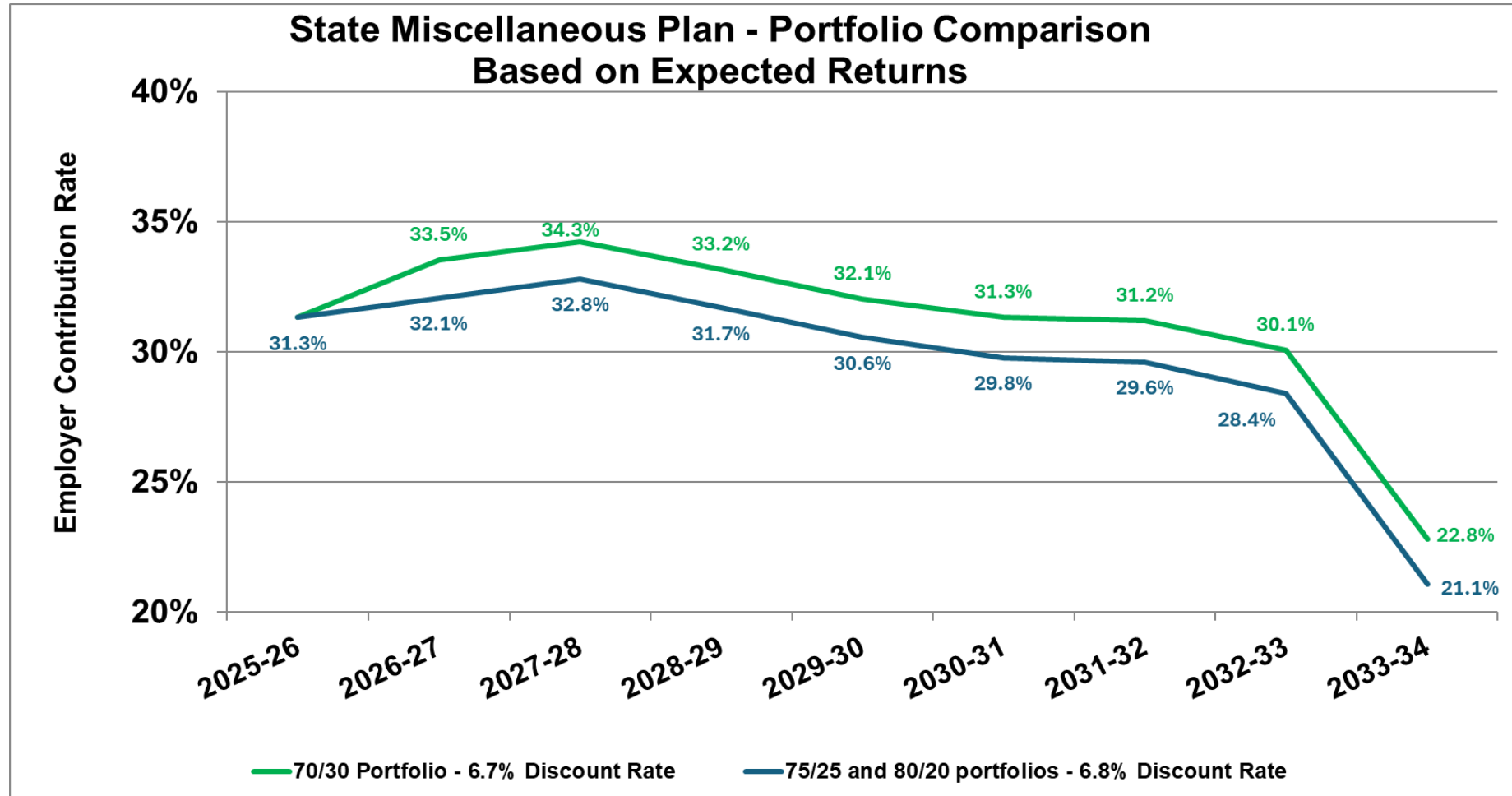
Stochastic Analysis – Schools Pool

School's Pool (6/30/2024 valuation results)			
Current Employer Rate (% payroll)	26.8%		
Current Funded Status	69.6%		
Portfolio	70/30	75/25	80/20
Discount Rate	6.7%	6.8%	6.8%
Employer Contribution Rates Over Next 10 Years			
Average employer contribution rate	20.5%	19.6%	19.3%
Probability of exceeding 40% in any year	8.1%	9.0%	10.5%
Probability of single year increase > 4%	14.4%	17.9%	21.1%
Funded Status After 10 Years			
Median funded status	96.1%	96.3%	96.9%
Probability of 50% or lower	2.5%	3.5%	4.4%
Probability of 100% or higher	45.3%	45.7%	46.6%

Projected Employer Contribution Rates Under Alternate Investment Return Scenarios – Recommended Portfolio



Illustrative Employer Contribution Rate Projections

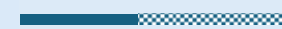
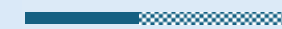


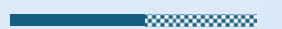



Possible Impact of 70/30 Portfolio on PEPRA Member Contributions

Estimated Number of Plans and Members to Receive an Increase to PEPRA Member Rates Due to Reducing the Discount Rate to 6.7% *		
	Miscellaneous	Safety
% of Plans	6.9%	18.5%
% of Members	10.7%	25.4%

* These rate increases would be in addition to those caused by the additional assumption changes from the current Experience Study.

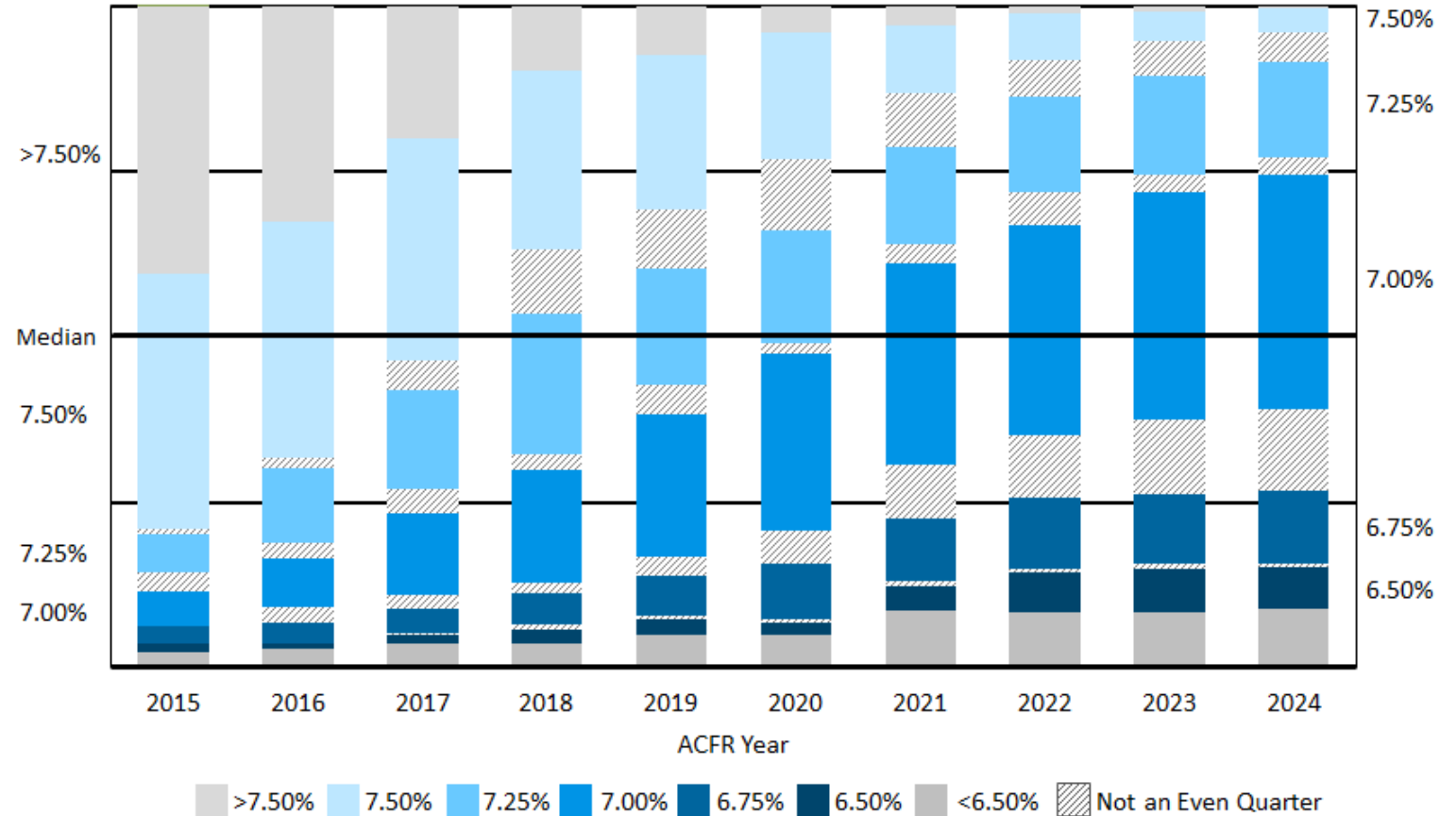
Why 6.8% Discount Rate for 80/20 Portfolio?

6.8% or 6.9% Discount Rate for 80/20 Portfolio		
State Miscellaneous Plan Results		
Portfolio	80/20	80/20
Discount Rate (6.8% versus 6.9%)	6.8%	6.9%
Funded Status in 10 Years (based on a consistent discount rate)		
Median	97.8%	96.1%
25% Percentile / 75% Percentile	 73.9% 130.1%	 72.5% 128.0%
Sum of Employer Contributions Over 10 Years		
Median (\$Bill)	\$49.3	\$47.5
25% Percentile / 75% Percentile	 \$35.8 \$67.9	 \$34.2 \$66.1
Total Employer Cost (Contributions + UAL)		
Median (\$Bill)	\$58.8	\$60.3
25% Percentile / 75% Percentile	 -\$11.1 \$116.0	 -\$9.5 \$116.8

Retaining the current 6.8% discount rate in connection with the 80/20 portfolio results in higher funded status and lower total employer cost in almost all investment return scenarios versus a 6.9% discount rate.

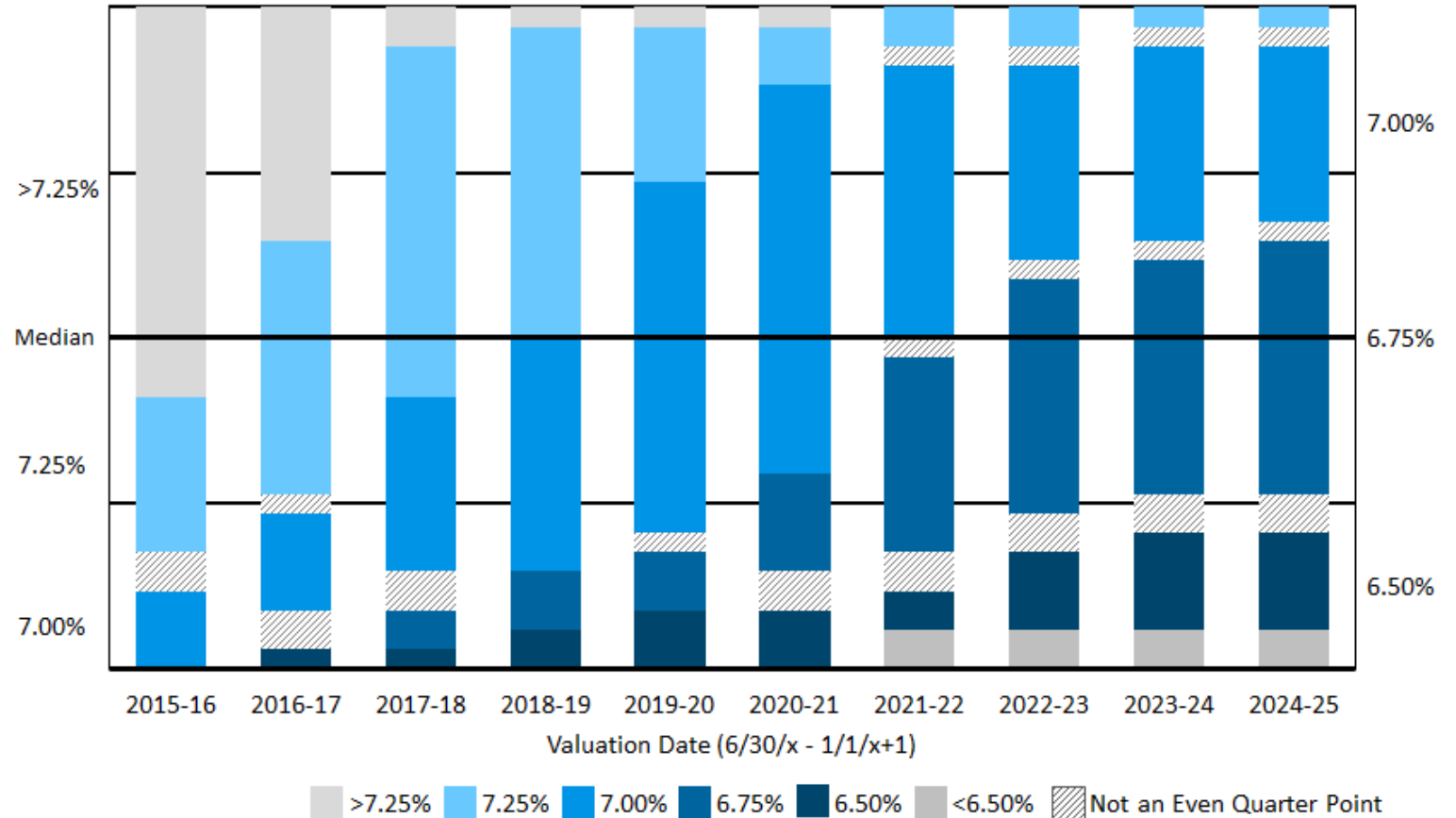
Survey of Public Pension Plan Discount Rates

- Most recent data from 2024 ACFR
- 248 public systems surveyed
- Mean is 6.9%
- Since prior year
 - 18 reductions
 - 3 increases
 - 16 not yet reported (no change assumed)



Survey of 34 California Public Retirement Systems

- Most recent data valuation reports 6/20/2024 to 1/1/2025
- Mean is 6.76%
- Since prior year 1 reduction (7% to 6.75%)



November 17th, 2025

Mr. David Miller
Chair of the Investment Committee
California Public Employees' Retirement System
400 P Street
Sacramento, CA 95814

Re: Item 5a: Asset Liability Management: First Reading of Public Employees' Retirement Fund
Recommendations

Dear Mr. Miller,

You requested Wilshire's opinion on Staff's recommendation to move forward with a Total Portfolio Approach. These recommendations encompass adoption of a Total Fund risk target based on approved capital market assumptions. The risk target is codified through establishment of a Reference Portfolio mix and an Active Risk Limit. Wilshire will touch on each of these recommendations in turn.

Total Portfolio Approach Process

A Total Portfolio Approach (TPA) strives to manage the PERF portfolio in a holistic and agile manner, with a focus on total fund performance. Investments will be evaluated based on their expected contribution to the overall fund's objectives rather than in comparison to asset class benchmarks. This requires the establishment of a common framework for comparing investments across asset classes and significant collaboration across teams. Wilshire will provide oversight on behalf of the Board when evaluating the reasonableness of this framework and its key inputs over time.

TPA delegates portfolio construction authority that was historically handled through strategic asset allocation decisions to Staff. This allows a more opportunistic approach in investment underwriting. CalPERS Investment Belief 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return. Consistent with its importance to the organization, the asset allocation decision also touches upon a meaningful number of CalPERS' other core Investment Beliefs. Most notably, Investment Belief 1: Liabilities must influence the asset structure and Belief 2: a long-term investment horizon is a responsibility and an advantage. TPA does not change these investment beliefs. Rather, it establishes clear accountability for all active investment decisions that deviate from the Reference Portfolio.

Moving to a TPA framework is not without risk. Shifting to TPA requires significant changes in governance, reporting, and decision-making processes. These changes may pose implementation challenges and require substantial internal transition workstreams. A TPA Steering Committee of INVO Executives has been established to provide oversight and leadership of those workstreams. In addition, cultural changes could impact asset class teams that are used to working within their

area of expertise versus assessing investment opportunities more holistically for their total fund impact.

Wilshire is comfortable that the Board retains the authority to set the overall market risk for the portfolio as well as a limit on the amount of active risk taking. In tandem, the Board will continue to oversee the total portfolio risk profile, while delegating specific investment decision-making to INVO. This governance model is an evolution of the strategic asset allocation approach which CalPERS has historically utilized. Wilshire will work closely with Staff in updating the investment policies to comply with the TPA governance framework.

Recommended Reference Portfolio

The Reference Portfolio will serve as the primary point of comparison to assess whether or not active investment decisions are adding value. It reflects the Board's market risk tolerance necessary to achieve the portfolio's long-term objectives. Staff is recommending a Reference Portfolio (RP) composed of 75% Global Equity and 25% U.S. Treasuries. This portfolio, when combined with active risk taking, has a long-term expected return of 6.9% with portfolio volatility of 12.7%. For comparison, the current portfolio has an expected return of 6.8% with expected risk of 12.0%. The proposed portfolio increases the overall risk level in pursuit of higher returns.

In modeling the portfolios, Staff utilized updated capital market assumptions (CMAs) from its well-communicated survey process. As both a participant in CalPERS' survey process and in having the opportunity to compare the survey results to Wilshire's own in-house CMAs, we are comfortable that the result of using the survey's consensus views to drive these important inputs are reasonable and appropriate estimates of the capital market environment.

The recommended RP for the PERF is designed to meet the discount rate when combined with active risk taking. It aims to balance the variation in employer costs with the likelihood of improving the funded status of the PERF. Additionally, this approach aligns more fully with Investment Belief #7, which emphasizes that CalPERS should measure its investment performance relative to a reference portfolio of passively managed assets to ensure that active risk is being compensated at the Total Fund level over the long term. However, it is worth noting that the higher equity allocation increases total portfolio volatility to 12.7% from 12.0%, which in turn marginally raises expected tail risk and the potential for significant drawdowns.

At the appropriate time, Wilshire will provide a recommendation for the specific equity and bond indexes used to calculate the Reference Portfolio's return and risk for Board approval.

Recommended Active Risk Limit

The Active Risk Limit (ARL) is used to control the extent to which the actual PERF portfolio deviates from the Reference Portfolio benchmark, ensuring that the pursuit of excess returns stays within acceptable risk boundaries. That is, it restricts the ability of Staff to take excessive or unintended risks that could lead to significant underperformance. This enables the Board to control and monitor risk parameters effectively, ensuring that the portfolio's risk profile remains consistent

with their risk tolerance and mandate. The ARL offers a greater level of simplicity by consolidating all existing asset class policy ranges into a single overall risk limit. Further, the ARL promotes accountability, as INVO must justify their active investment decisions, such as for example adding to private equity or infrastructure, within the agreed-upon risk budget. It also fosters transparency by providing stakeholders with a clear metric (tracking error) to assess whether outperformance justifies the risks taken.

The ARL will capture the risk impact of all investment allocations outside of publicly traded global equities and U.S. Treasuries. This includes exposures to investment grade structured and corporate bonds, high yield, emerging market debt, private equity, real estate and infrastructure.

Importantly, the active risk level will be calculated based on a framework that incorporates strategy benchmarks, universe characteristics, and the estimated funding mix together with an external risk modeling platform. This structure is better able to capture the underlying economic risks of strategies that lack granular and timely valuations. Because the active risk calculation is model based, it will differ from the realized portfolio volatility figures which are impacted by the infrequent and smoothed valuations of private assets.

It should be noted that the levels of realized return variance from the RP are likely to be much higher than comparisons to the PERF's historical realized tracking error against its strategic asset allocation benchmark. Establishing reasonable expectations around these short-term measurements will position the Board to properly monitor and respond to future performance results. Since this is a somewhat nuanced point but one that is critical to understand, we would be happy to address any questions you may have in more detail during the Investment Committee meeting.

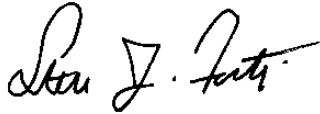
Wilshire would note that consolidating asset class ranges and discretion into a single active risk metric may oversimplify more complex risk factors. Investment Belief #9 captures that risk is multi-faceted and not fully captured by measures such as volatility or tracking error. Wilshire is comfortable that Staff understands the nuance of risk management to supplement the stated active risk limit. This includes an emphasis on liquidity management, sustainability factors, and strong oversight and governance. Wilshire is comfortable that the recommended active risk level provides Staff with the ability to allocate across capital market strategies in a judicious manner to extract additional strategic market premiums.

Conclusion

As the Board consultant, Wilshire is comfortable that moving forward with TPA is prudent, albeit not without risks. We regularly discuss these risks, and the steps being taken to mitigate them, with senior INVO staff. Approving the Reference Portfolio mix and Active Risk Limit as recommended by Staff is an appropriate step in formally adopting the TPA framework. We expect the TPA process to be one that is not set in place at a specified time in the future. Rather it is going to be a continual process of improvement to help drive positive performance results for the PERF.

Please do not hesitate to contact us if you have any questions or require anything further. We look forward to discussing this item with you during the November Investment Committee meeting.

Best Regards,



Steven J. Foresti - Senior Advisor, Investments
Wilshire Advisors LLC



Thomas Toth, CFA - Managing Director
Wilshire Advisors LLC