

State Board of Administration

FRS Pension Plan Review

Actuarial Assumptions Estimating Conference

October, 2025



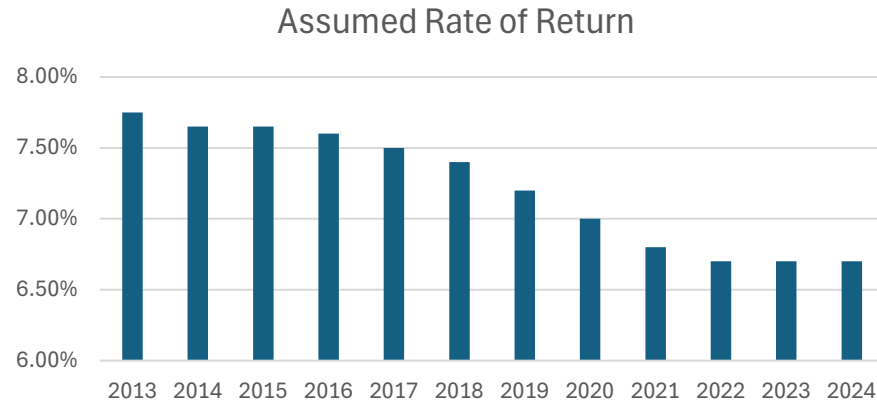
Executive Summary

- Current performance remains strong, and markets remain resilient
 - Public markets continue to generally outperform private markets
 - Geopolitical risk has amplified presenting significant uncertainties for markets
 - Near-term economic condition is stable, but labor market is showing signs of weakness
 - Anticipated Fed rate cuts
- Longer term – we remain at the dividing line between two secular regimes
 - The future is not likely to look like the past
 - “Higher for longer” is the new normal
 - Higher average inflation
 - Higher interest rates
 - Higher geopolitical risk
 - Higher volatility
- SBA supports keeping current Assumed Rate of Return at 6.70% until more clarity regarding markets
- Additionally Consider: Increasing contributions, reducing UAL amortization period, and level dollar amortization



Previous Changes to Enhance Fund Strength

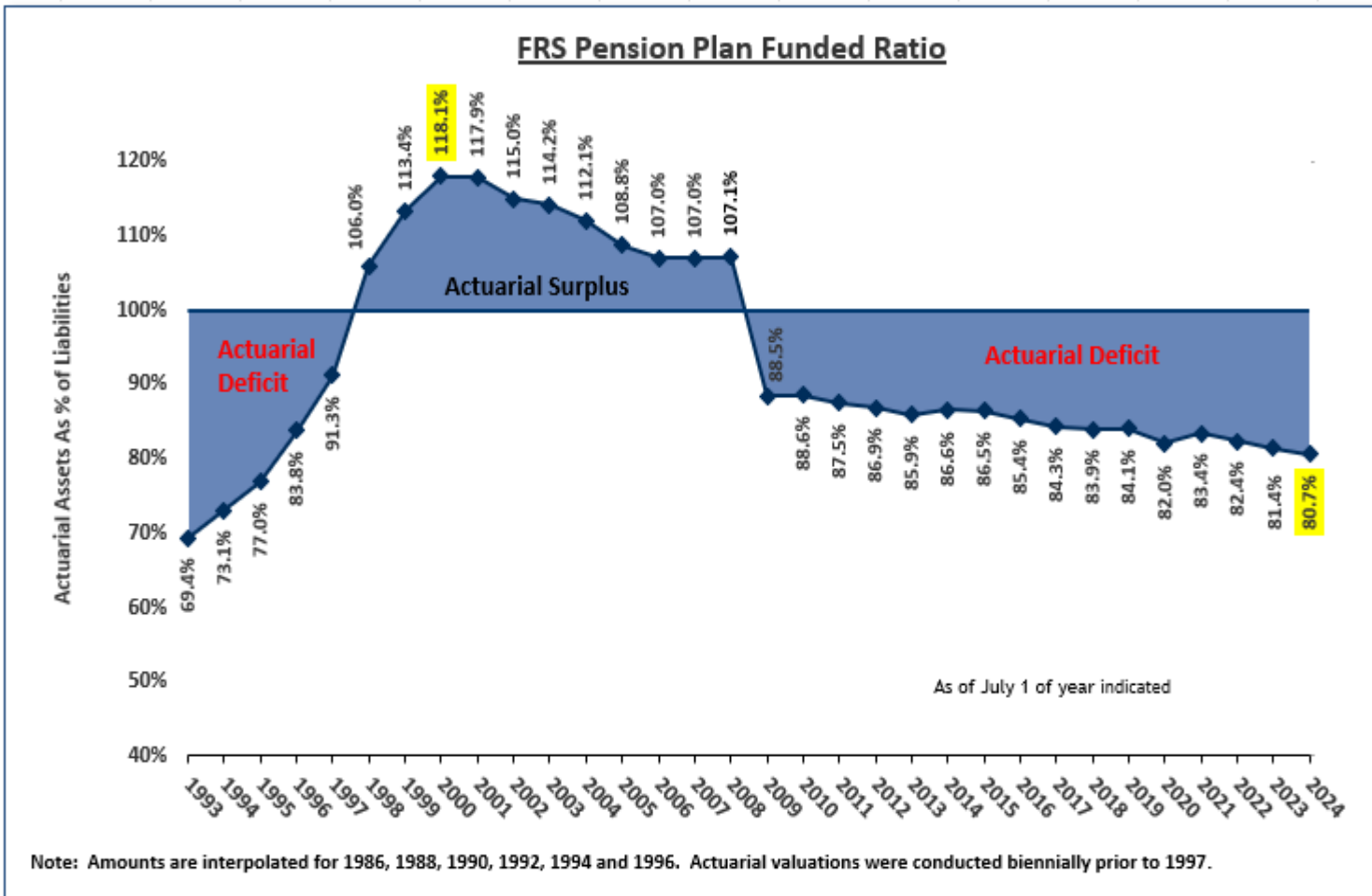
- Lowered assumed rate of return from 7.75% in 2013 to 6.7% in 2024



- Shorter Amortization Periods
 - 2020 - Reduced amortization period from 30 years to 25 years for new changes to the UAL
 - 2021 – Reduced amortization period to 20 years for all prior UAL amounts with amortization periods greater than 20 years and for all new changes to the UAL
- Adoption of updated mortality projections and DROP entry rates – 2024
 - Changes to reflect likely reality and observed experience
 - Increased life expectancy, especially for Special Risk Class
 - Increased DROP entry rates for all ages



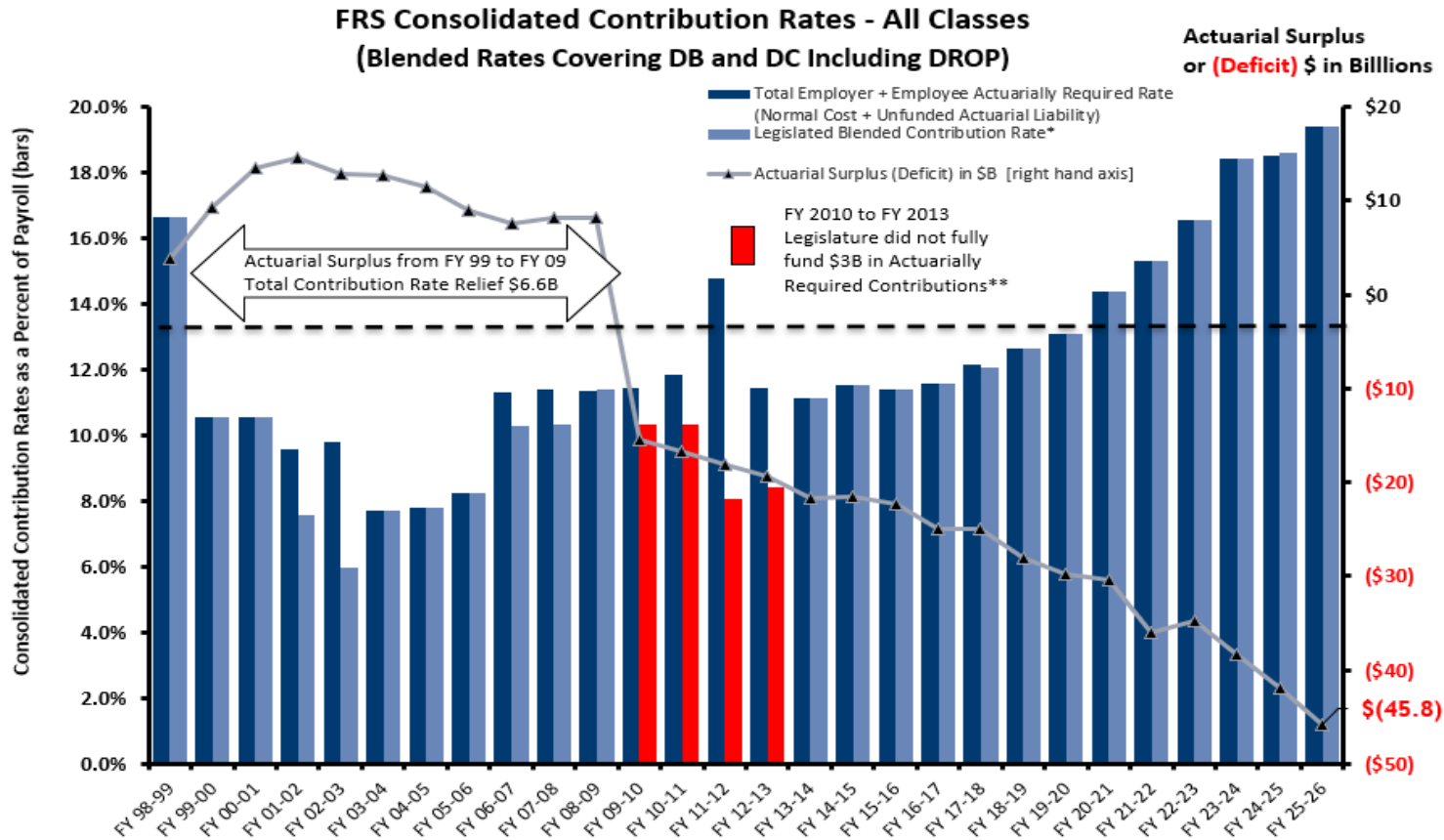
FRS Pension Plan Funded Status Over Time



- FRS Pension Plan became fully funded in 1998
- Between 1999 and 2008, employer contributions were cumulatively reduced approximately \$6.6 billion
- Current Funded Ratio of over 80% is healthy
- FRS continues to timely pay all benefits



FRS Consolidated Contribution Rates and Funded Status



*Weighted average blended rates for employer and employee contributions using total payroll.

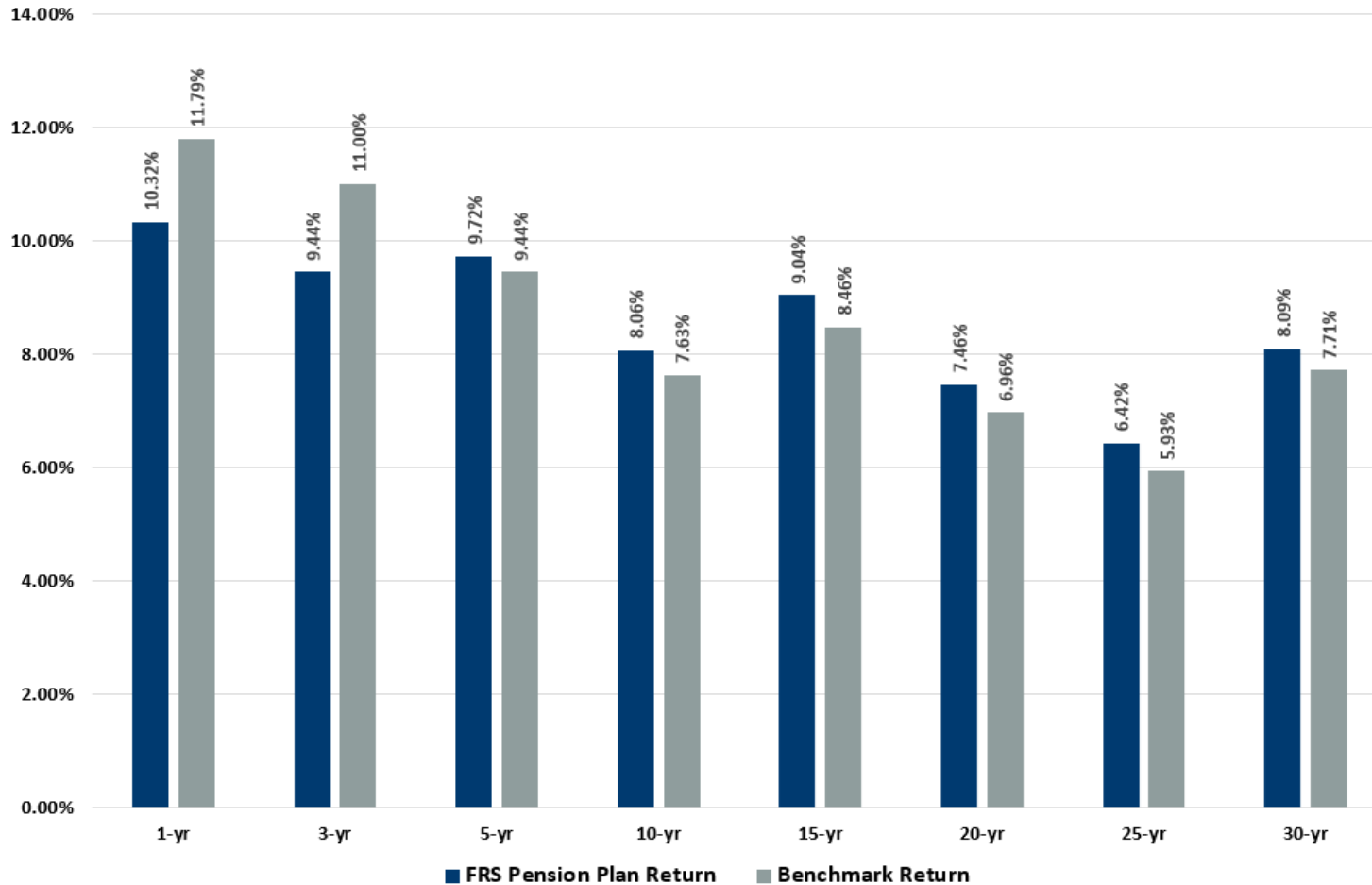
** In fiscal years 2009-10 through 2012-13, the Legislature failed to make actuarially required contributions, exacerbating the system deficit caused by diminished asset valuations during the Global Financial Crisis.

- Due to budgetary impact of financial crisis, approximately \$3 billion in actuarially required contributions were not funded from 2010 - 2013.
- This resulted in an opportunity cost of approximately \$6.6 billion in investment gains and a total of \$9.6 billion less in overall funding of the FRS



FRS Pension Plan Return vs. Performance Benchmark 2025

FRS Pension Plan Return vs. Performance Benchmark as of June 2025

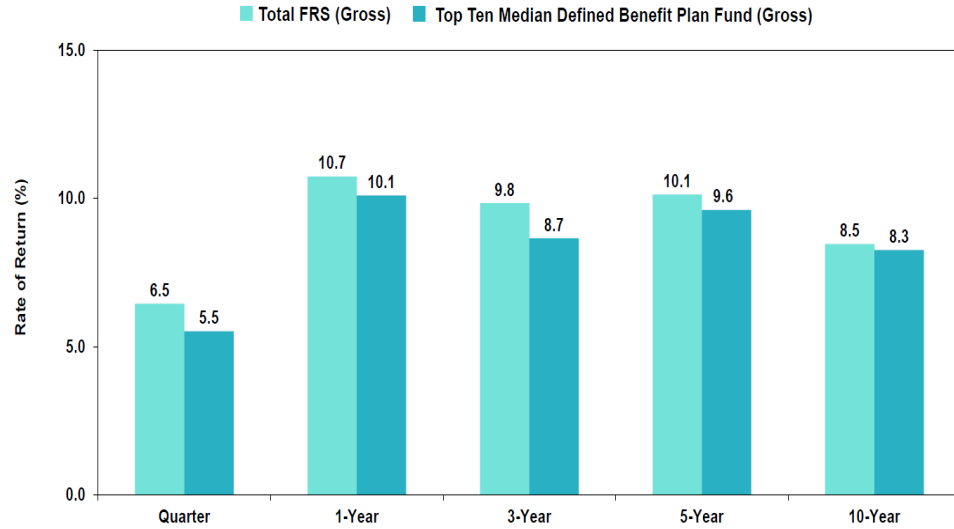


- The FRS Pension Plan has outperformed its performance benchmark over all but the 1 and 3-year time periods
- Recent underperformance driven by lags in private market valuations in the face of significant public equity gains during the past three years



Plan Performance Relative to Peers

FRS Results Relative to TUCS Top Ten Defined Benefit Plans Periods Ending June 30, 2025



Note: The data set includes \$2,302 billion in total assets. The median fund size was \$211 billion, and the average fund size was \$230 billion.
Note: Due to rounding, percentage totals displayed may not sum perfectly.



Investment advice and consulting services provided by Aon Investments USA Inc.

Top Ten Defined Benefit Plans FRS Universe Comparison (TUCS) Periods Ending June 30, 2025



Note: The data set includes \$2,302 billion in total assets. The median fund size was \$211 billion, and the average fund size was \$230 billion.
Note: Due to rounding, percentage totals displayed may not sum perfectly.

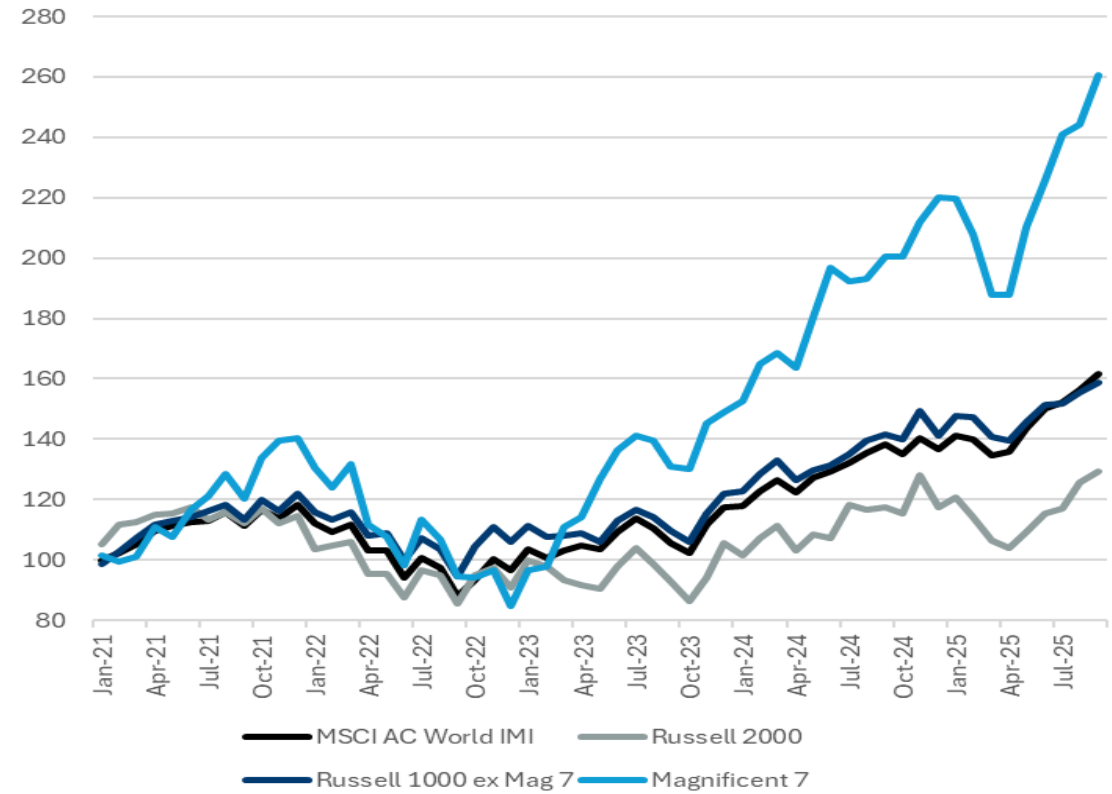


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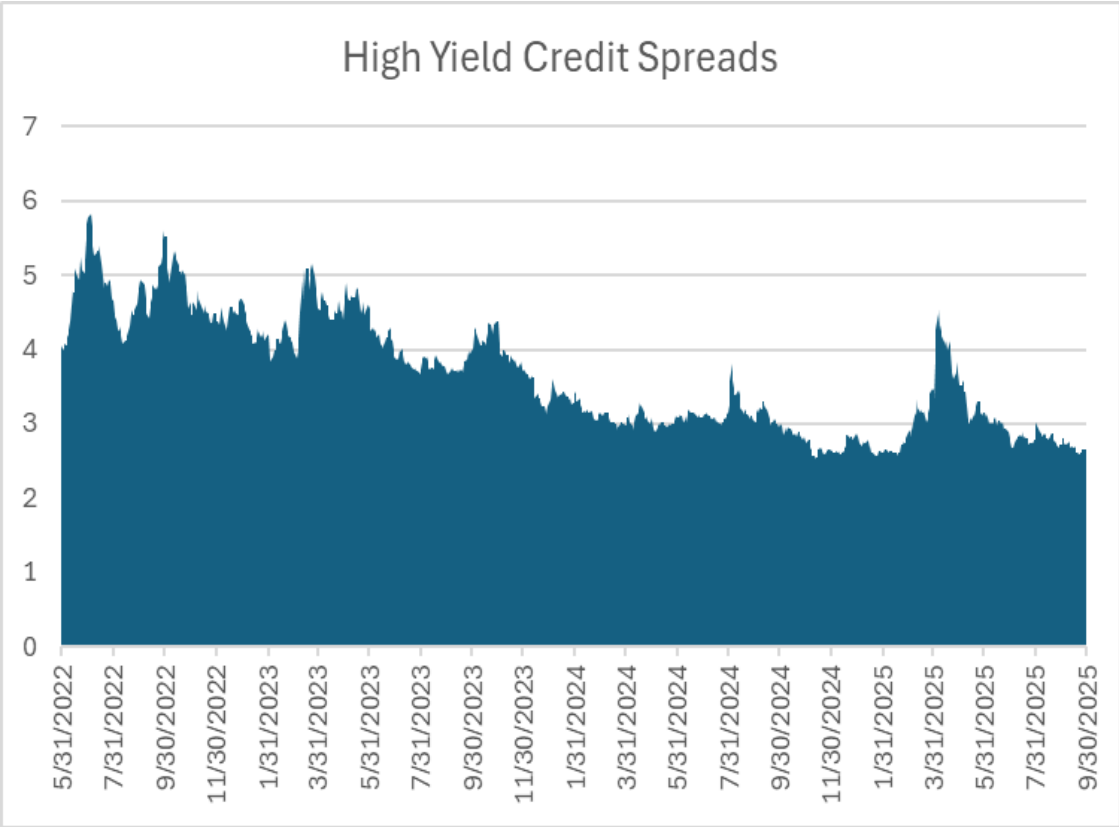


Financial Markets Are Bullish

Returns	2021	2022	2023	2024	YTD 2025
Magnificent 7	40%	-40%	76%	48%	18%
Russell 1000 ex Mag 7	22%	-13%	15%	16%	12%
MSCI ACWI IMI	18%	-18%	22%	16%	18%
Russell 2000	15%	-21%	16%	11%	10%



Source: FactSet



Source: Bloomberg US Corporate High Yield Average OAS Index

Current High Yield Spreads at approximately 2.67% compared to historical average of 4.87% going back to 1994



Economic Outlook Moderating

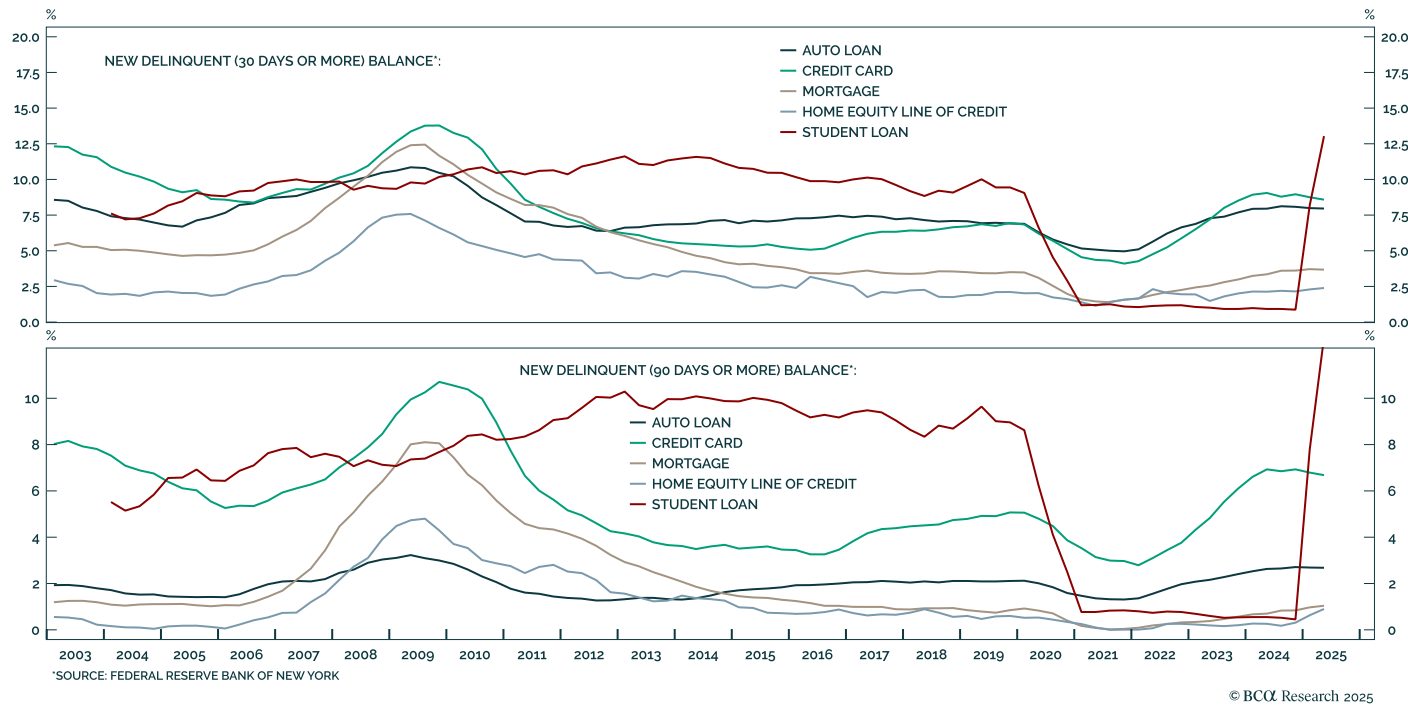
Generally Stable – But There are Signs of Moderation

- Inflation slightly elevated
 - As of August 31, CPI up 2.9% seasonally adjusted year over year and 0.4% seasonally adjusted for the month
- Employment gains slower; Unemployment slightly up at 4.3%
 - Long term unemployed up 385,000 for the year
 - Labor force participation down .4% for the year
- Ratio of 1.0 job per job seeker as of July
- Average hourly earnings up 3.7% for the past 12 months
- Delinquency rates on all consumer loans at 2.76%, slightly higher than last year
- Federal Reserve has started to reduce rates



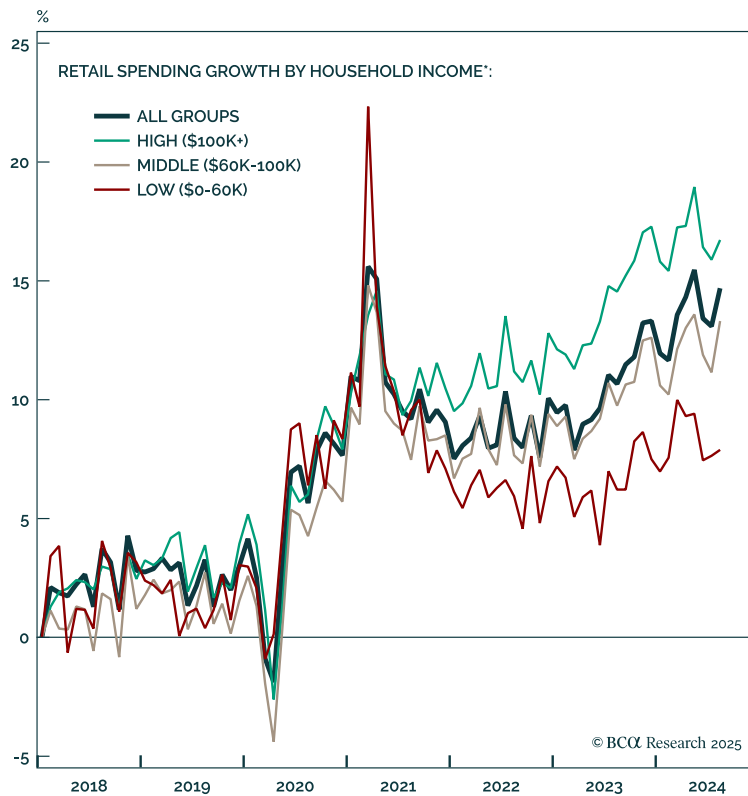
Economic Outlook Moderating

Consumer delinquencies by category of debts



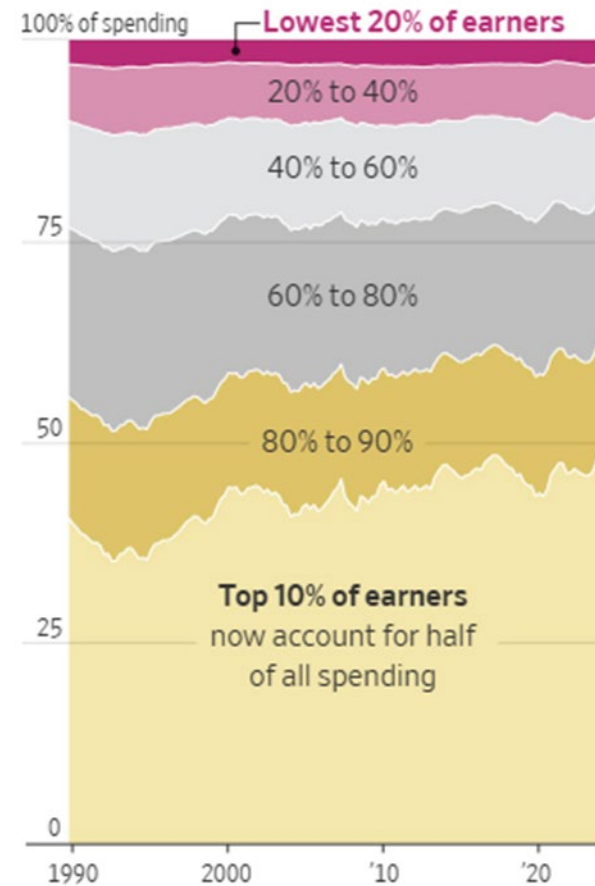
Economic Outlook Moderating

Consumer spending by income group



*NOTE: SEASONALLY-ADJUSTED AND INFLATION-ADJUSTED INDEXED TO 2018.
SOURCE: FEDERAL RESERVE.

Share of spending, by income group



Source: Moody's Analytics



Current Valuations Pose Risk to Forward Returns

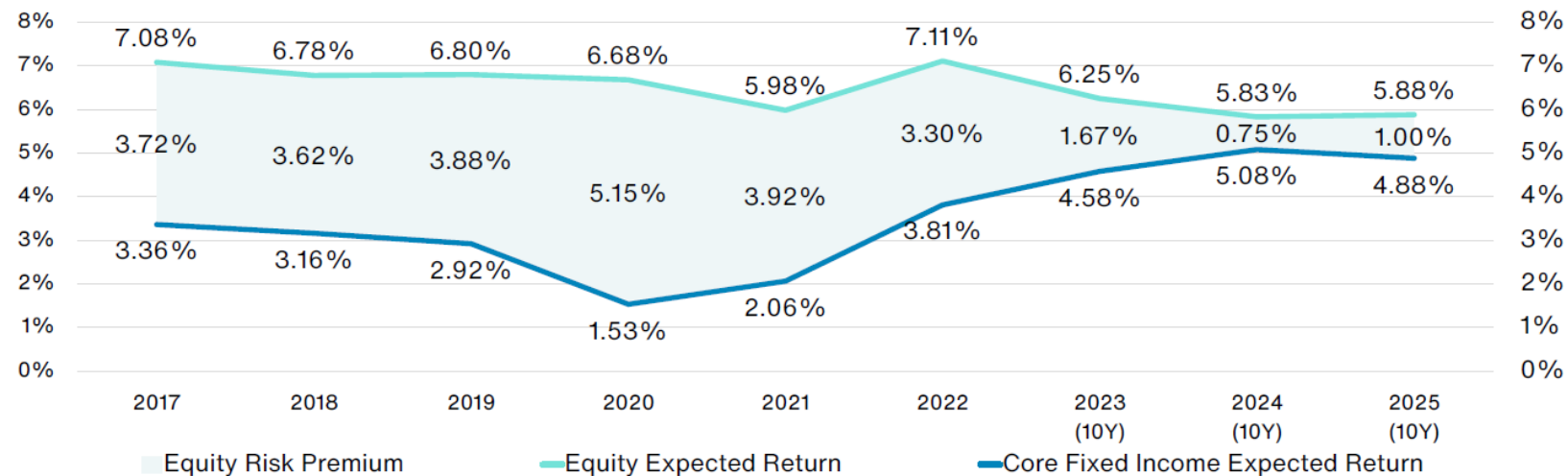
SBA Approach to Assumption Development

Breakdown of equity risk premium assumption

The increase in the 2025 equity risk premium¹ was driven by the combination of a decreases in projected fixed income returns and slightly increasing projected equity returns

- Below is a 9-year historical look at the breakdown of the global equity risk premium

Breakdown of Global Equity Risk Premium

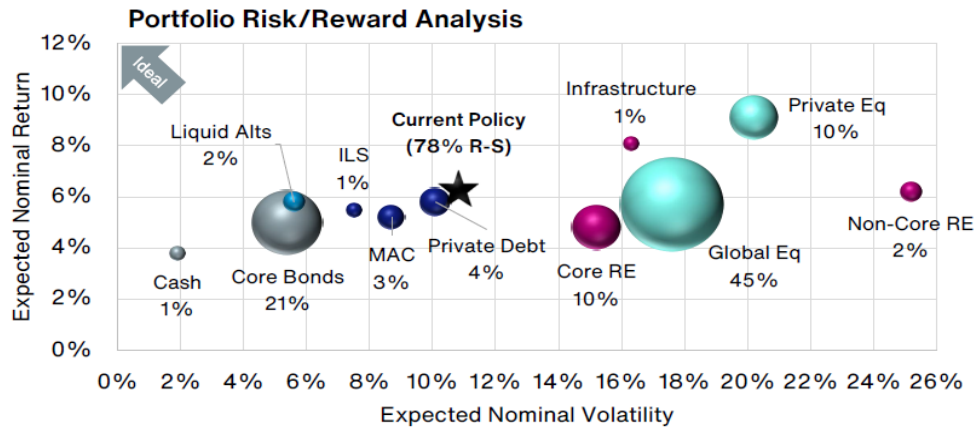


¹Equity Risk Premium is defined as the excess return earned over bonds that compensates investors for taking on higher risk; all returns are 15-year (Pre-2023) / 10-year (Post-2023) geometric average (compounded) expected returns Pre-2019 averaging based on Aon, Callan, Mercer, and Wilshire capital market assumptions; 2019 and beyond based on Aon, Mercer, and Wilshire capital market assumptions

SBA Expected Returns

Portfolio Analysis

Current diversification results in an expected return of 6.32%¹



Legend:

Bubble size proportional to current asset allocation (i.e., larger bubbles = larger allocations); Asset classes are color coded:

- Equities (teal), Liquid Alternatives (blue), Return-Seeking Fixed Income (navy blue), Real Assets (purple), Safety (gray)

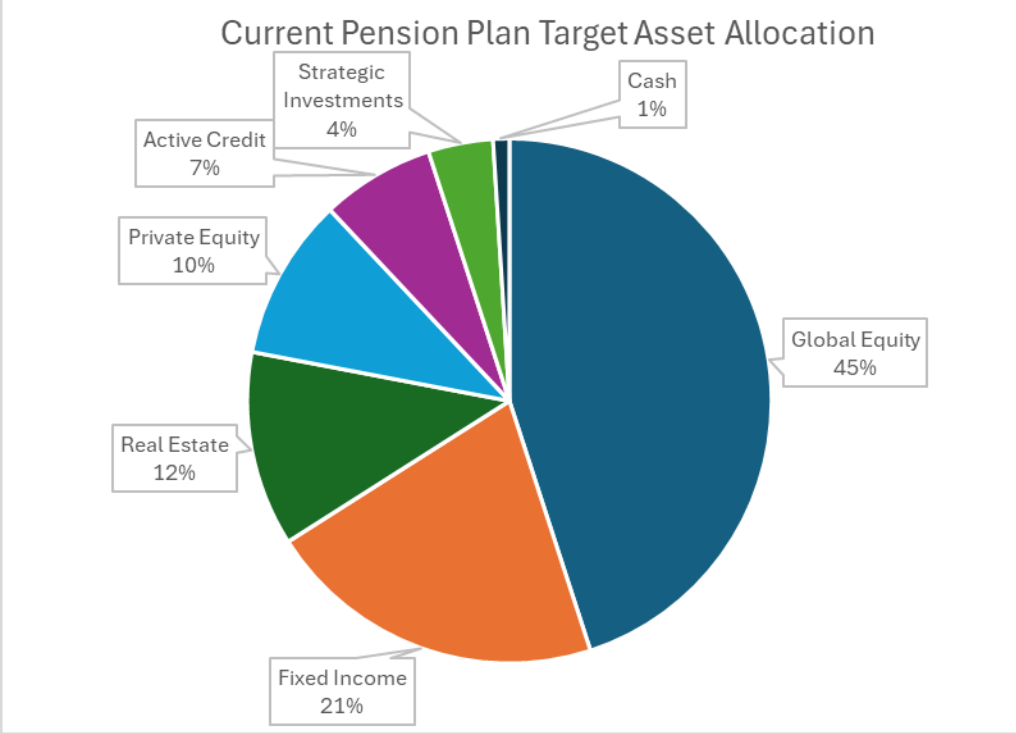
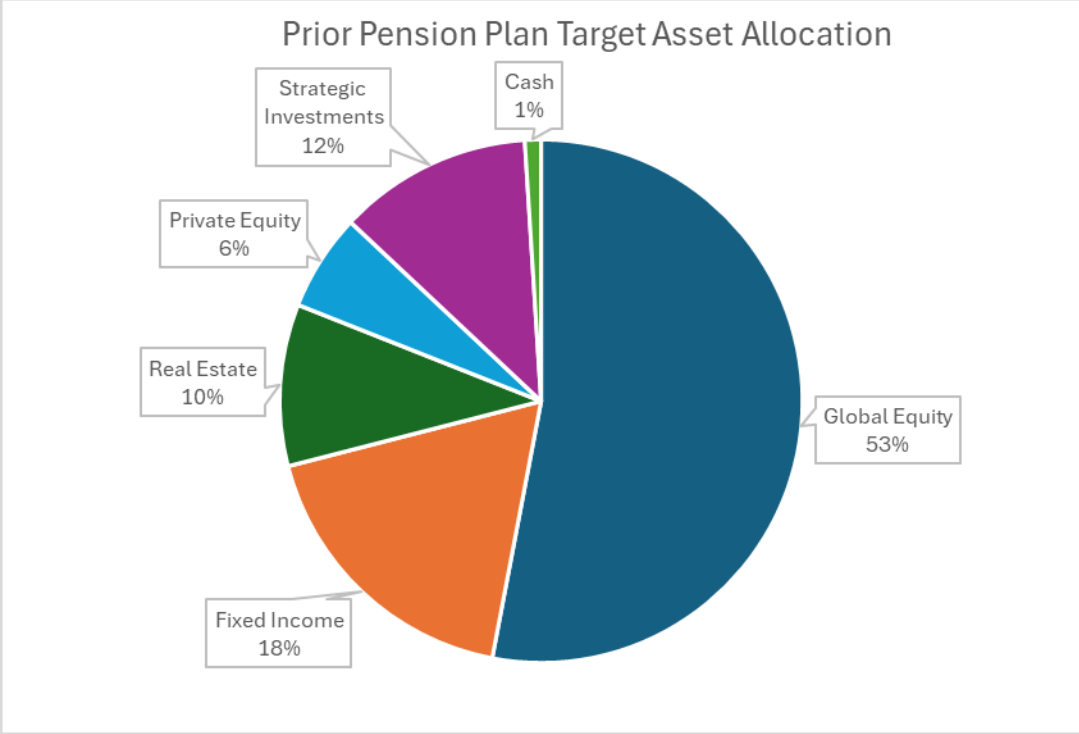
¹ Expected returns are using Aon's Q3 2025 30-Year Capital Market Assumptions (CMAs) as of June 30, 2025 adjusted for the delta in average Global Equity Risk Premium (ERP) among three investment advisors: Aon, Mercer, and Wilshire (-100bps adjustment), which are projections about the future returns of asset classes. Our CMA projections are designed to reflect the typical cost of implementing an investment program. Expected returns are calculated using weighted allocations of the underlying CMAs. Expected returns are geometric (long-term compounded; rounded to the nearest decimal) assuming portfolio weights are rebalanced annually. Expected returns presented are models and do not represent the returns of an actual client account. Your actual returns will be reduced by your advisory fees and other expenses you may incur as a client. Aon's advisory fees are described in Part 2A of Aon's Form ADV. Not a guarantee of future results. See appendix for capital market assumptions disclosure pages.

² The portfolio's expected return of 6.32% is based upon current policy target weights for each asset class and the asset classes' expected returns and correlations. The portfolio's expected return is subject to change should the current policy targets change and/or the investment objective of an asset class change.

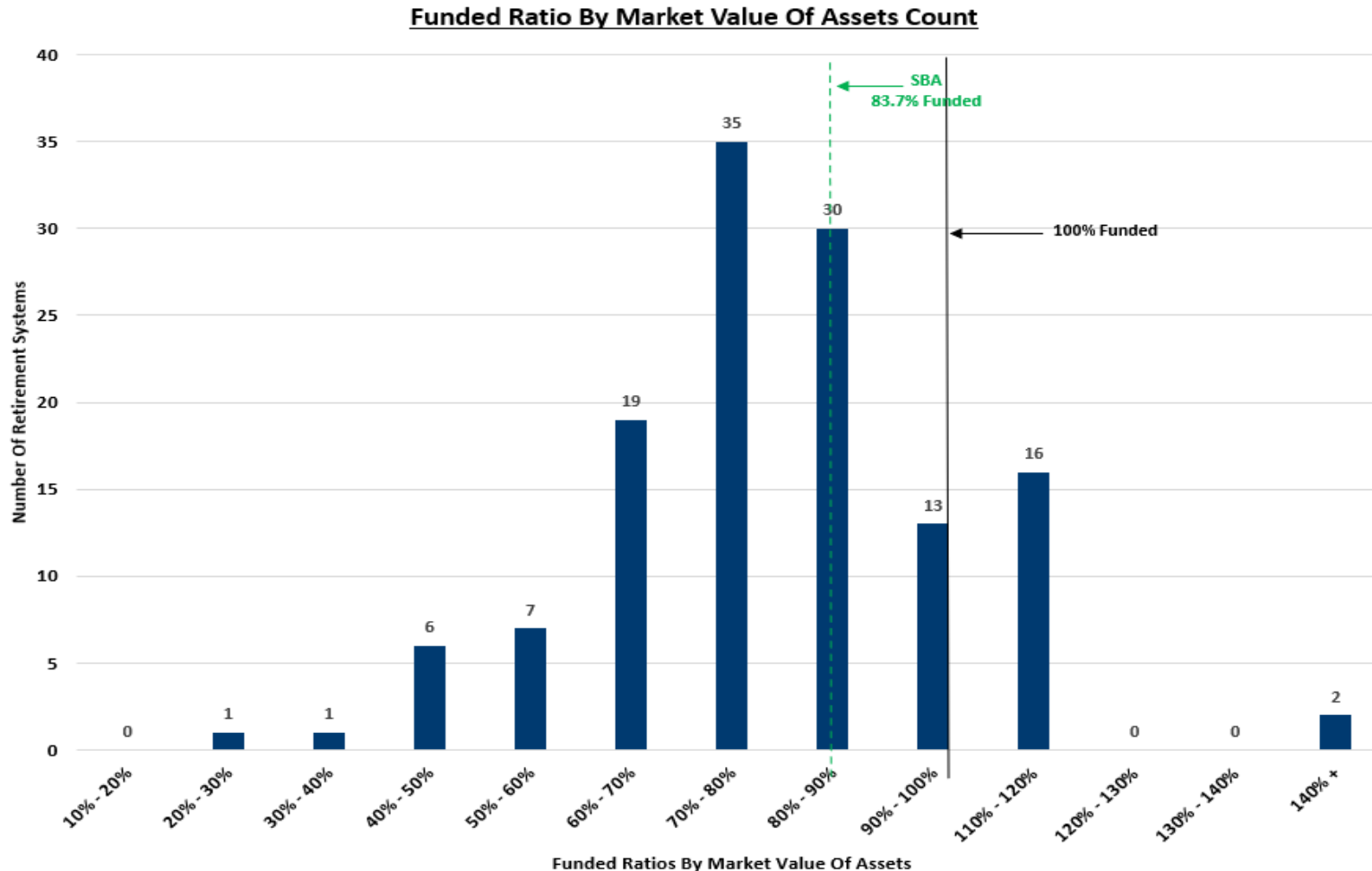
Percentages may not sum to 100% due to rounding.

Asset Class – Target %	Expected Real Return ¹	Expected Nominal Return ¹	Expected Nominal Volatility
Equity			
Global Equity IMI – 45%	3.3%	5.7%	17.6%
Fixed Income			
Cash (Gov't) – 1%	1.5%	3.8%	1.9%
Core Fixed Income – 21%	2.6%	5.0%	5.4%
Multi-Asset Credit – 3%	2.8%	5.2%	8.7%
Alternatives			
Direct Hedge Funds – 2%	3.4%	5.8%	5.6%
Core Real Estate – 10%	2.4%	4.8%	15.2%
Non-Core Real Estate – 2%	3.8%	6.2%	25.2%
Private Equity – 10%	6.6%	9.1%	20.2%
Infrastructure - 1%	5.7%	8.1%	16.3%
Private Debt – 4%	3.4%	5.8%	10.1%
Insurance Linked Securities – 1%	3.1%	5.5%	7.5%
Portfolio Metrics (30-Year Assumptions)			
Total Fund^{1,2}	3.95%	6.32%	10.83%

FRS Pension Plan Target Asset Allocation

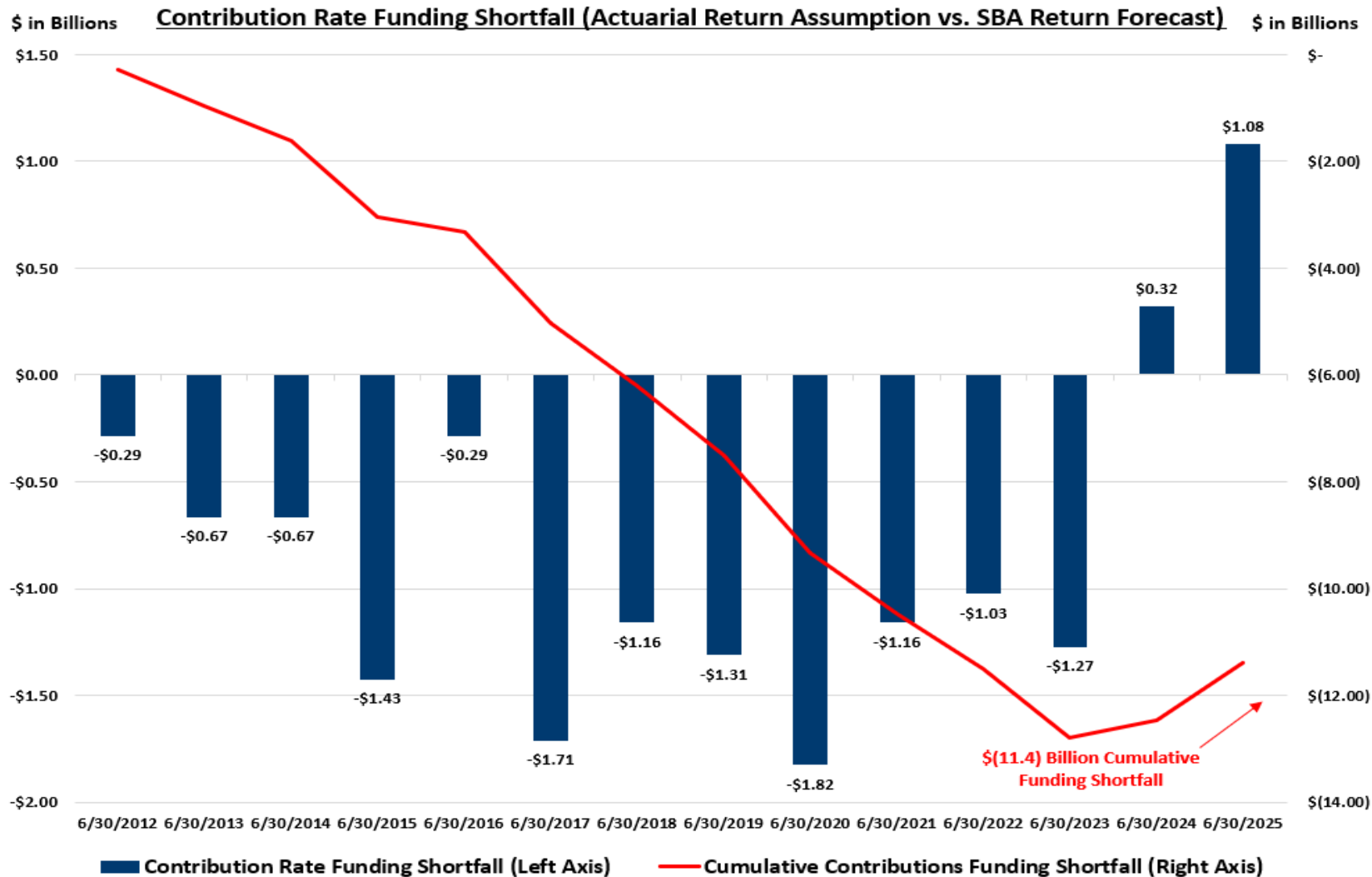


Distribution of Public Retirement System Funded Ratios



- This shows the funded ratios of 130 public retirement systems
- The FRS is near the middle of the distribution – not great, but still healthy

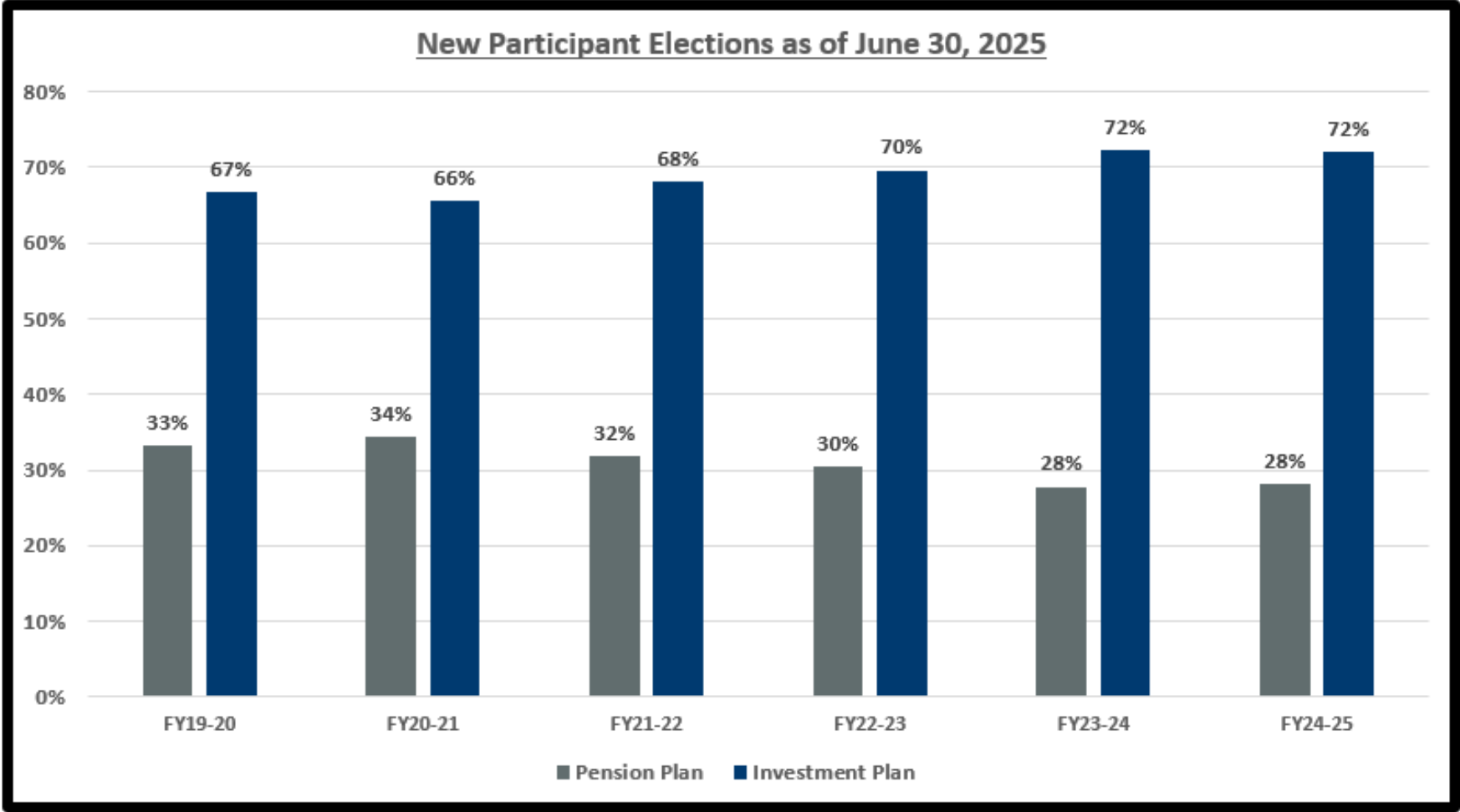
Contribution Rate Funding Shortfall



- Between 2011 and 2023, contributions were calculated based on investment returns higher than the SBA's annual asset liability study
- These higher assumptions resulted in approximately \$11.4 billion in cumulative reduced contributions
- This resulted in an opportunity cost of \$10.4 billion in investment gains and a total of \$21.8 billion of funding for the FRS



Plan Choice Statistics



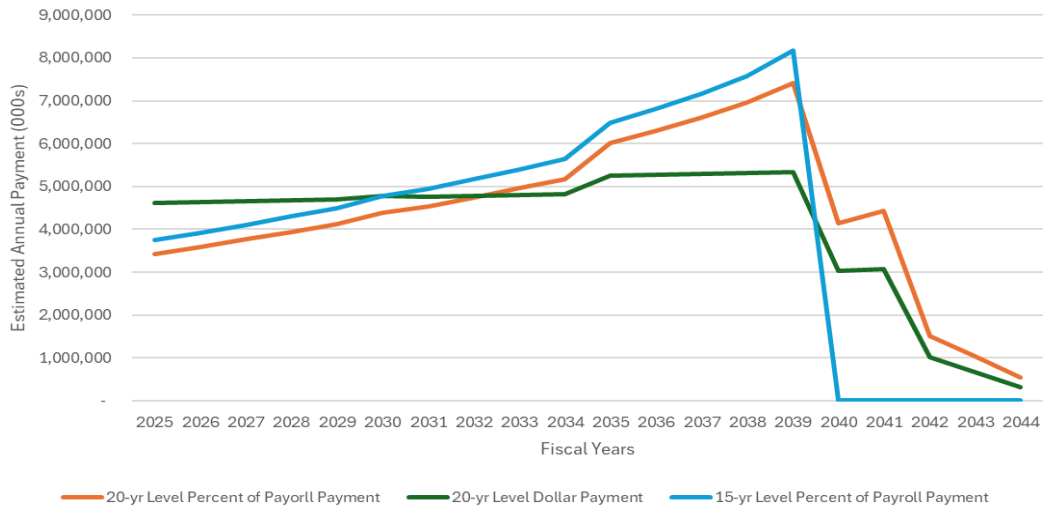
Recommendations

- **Keep assumed rate of return constant at 6.70%**
- Increase funding to the Plan
 - Switch amortizing unfunded liabilities (UAL) from level percentage of payroll to level dollar method. Reduces underfunding risk if actual payroll is less than projected payroll.
 - Reduce further the amortization period for UAL. The professional staff of the SBA recommend a reduction of the amortization period of the UAL to not greater than 15 years.
 - Increase employer and employee contribution rates.

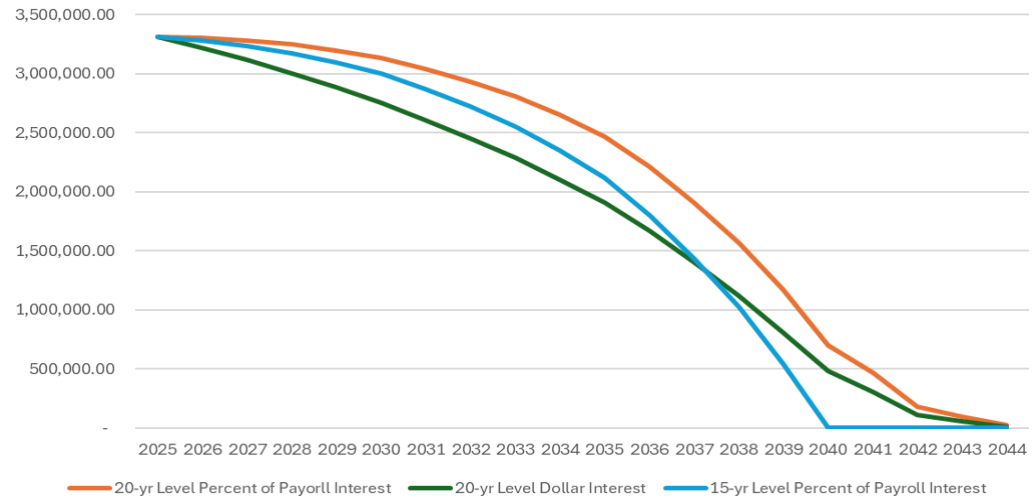


Effect of Implementing Amortization Changes

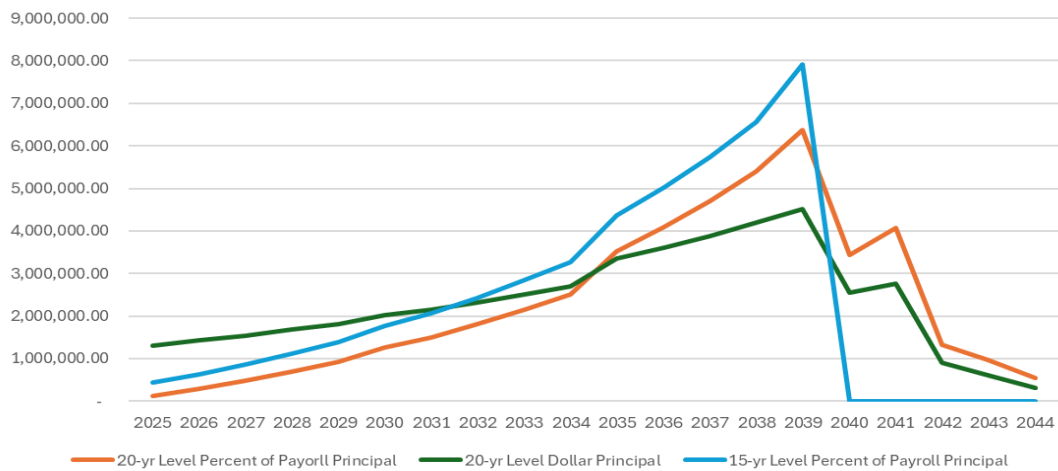
Estimated Annual Payment Comparison



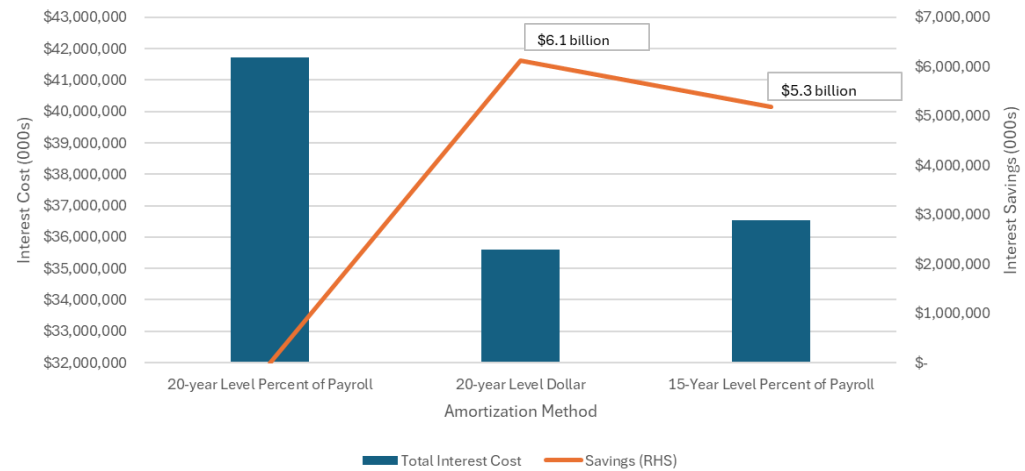
Estimated Interest Payment Comparison



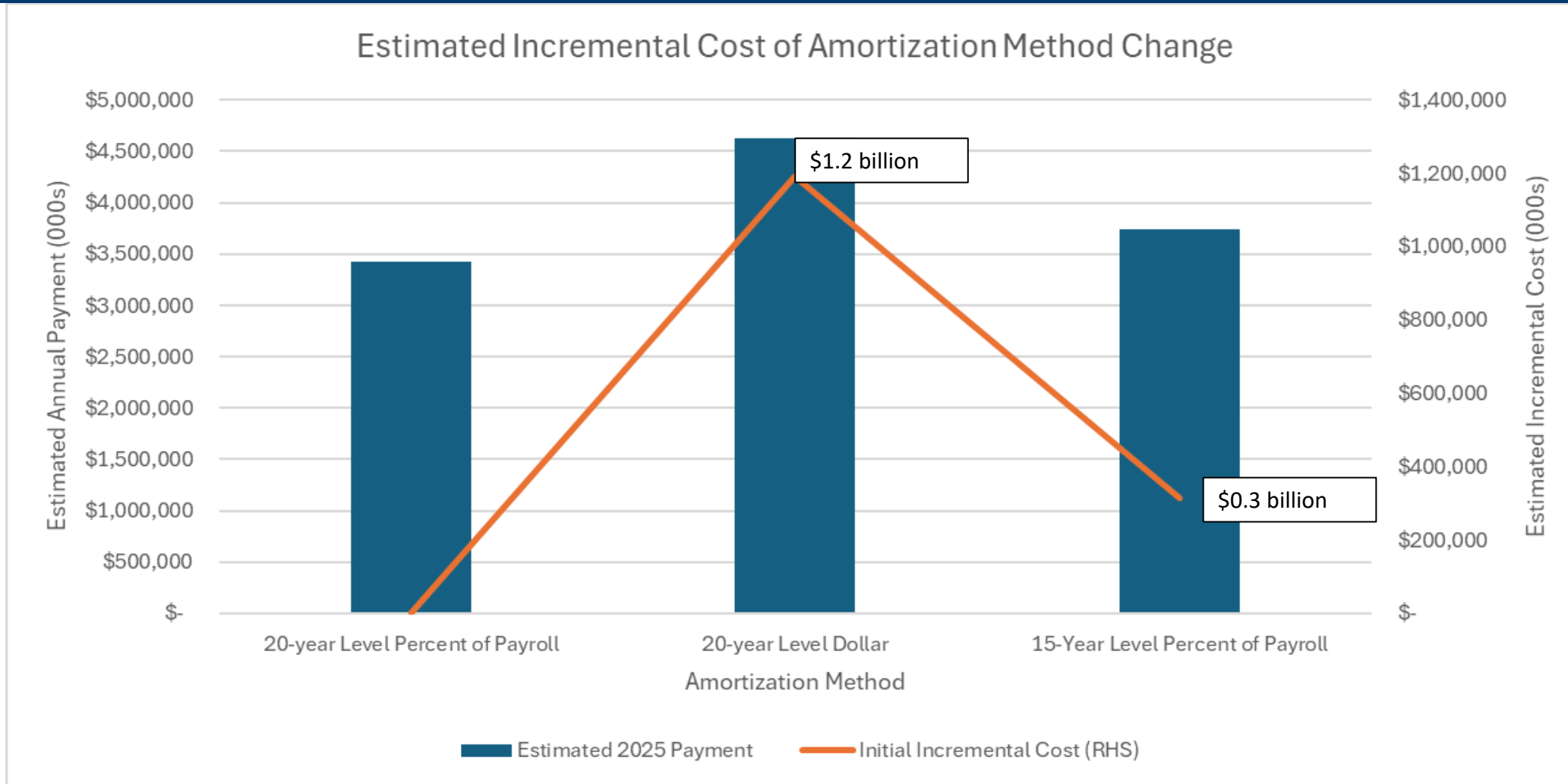
Estimated Principal Payment Comparison



Estimated Gross Savings Comparing Amortization Methods



Effect of Implementing Amortization Changes



Sources: Public Plans Data (publicplansdata.org) as of July 2022

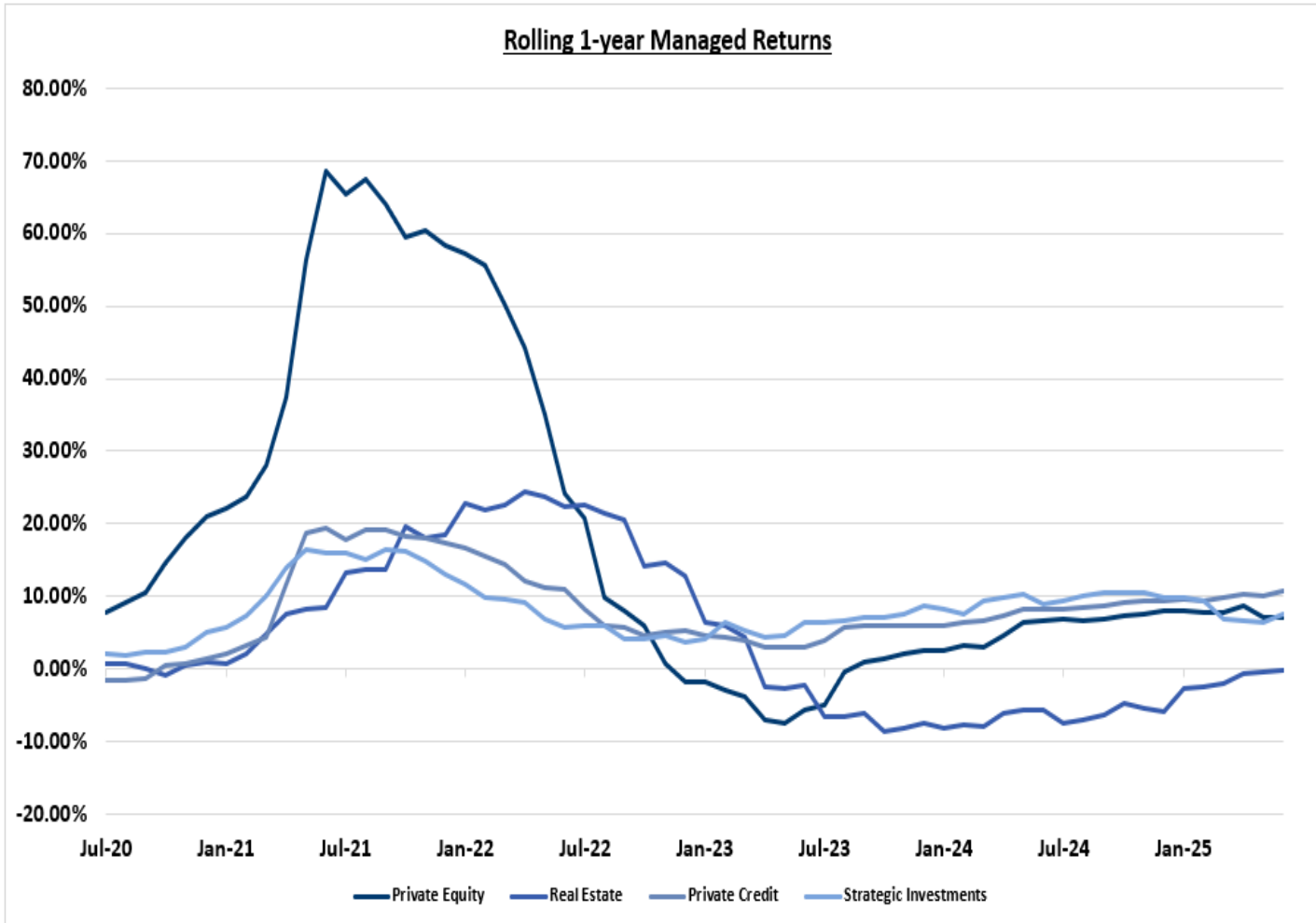
¹Peers defined as public funds published within publicplansdata.org as of July 2022; Number of plans per year are shown in parentheses

State Board of Administration

Appendix



Private Market Asset Classes Rolling 1 Year Returns



- Private market asset classes had significant outperformance between 2020 and 2022 (reaching almost 70% return for Private Equity)
- Returns have normalized in the last 3 years, and trail public markets that have experienced outperformance
- Diversification and asset allocation are key to achieving the required real returns for the FRS

Private Equity – Cash Flow Positive and Strong Long-Term Absolute and Relative Performance

- SBA Private Equity performs well in relation to peers

All eyes on manager selection amid lackluster returns

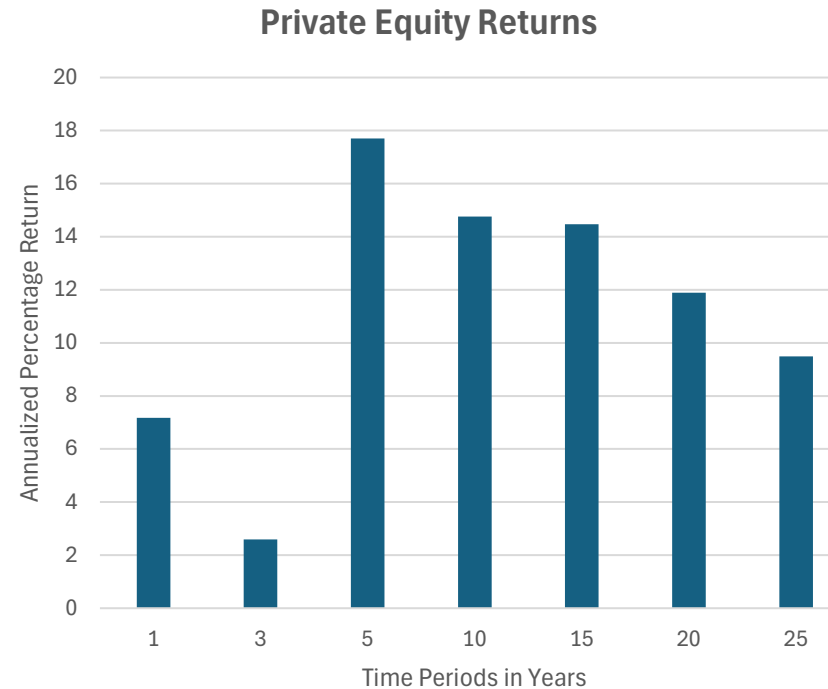
LPs increasingly look to PE co-investments

Investor	AuM	5-year return	5-year benchmark	Difference (pts)	10-year return	10-year benchmark	Difference (pts)
CalPERS	\$548bn	12.8	11.9	0.9	11.3	11.8	-0.5
CalSTRS	\$358bn	14.9	13.1	1.8	12.9	11.4	1.5
TRS Texas	\$201bn	13.0	13.7	-0.7	12.2	12.3	-0.1
SWIB	\$165bn	14.1	15.2	-1.1	13.3	12.5	0.8
NY State Teachers	\$151bn	13.6	19.5	-5.9	13.9	18.2	-4.3
Virginia Retirement System	\$115bn	14.6	12.5	2.1	14.2	12.0	2.2
Michigan SIB	\$110bn	13.9	19.4	-5.5	13.3	16.8	-3.5
NYC Teachers	\$109bn	14.4	18.7	-4.3	13.8	16.2	-2.4
Univ. of California (Retirement Plan)	\$102bn	12.0	21.2	-9.2	12.3	14.3	-2.0
Oregon PERF	\$96bn	12.5	17.1	-4.6	12.5	15.8	-3.3
Ohio STRS	\$99bn	13.9	14.3	-0.4	13.9	13.4	0.5
NYC Employees	\$90bn	14.3	18.7	-4.4	13.6	16.2	-2.6
Florida SBA	\$275bn	15.8	15.1	0.7	15.2	11.7	3.5
Ohio PERS	\$104bn	13.4	13.9	-0.5	12.8	12.0	0.8

Source: With Intelligence
Shows latest returns for each investor, no earlier than Q4 2024.
MassPRIM and NY Common not included as latest returns are Q3/2 2024.

- 12 out of the 14 largest investors (86%) underperformed their 5 or 10-year benchmark – or both.
- Underperformance is widespread despite large variations in benchmarks.
- Allocators increasingly seek specialist GPs over generalists as pressure on manager selection builds.

- Private equity has strong positive returns over time



FRS Capital Market Assumptions

Custom FRS Capital Market Assumptions

As of June 30, 2025

	10-Year CMAs				30-Year CMAs			
	Expected Real Return ¹	Expected Nominal Return ¹	Expected Nominal Volatility	Assumed Global Equity Beta	Expected Real Return ¹	Expected Nominal Return ¹	Expected Nominal Volatility	Assumed Global Equity Beta
Equity								
1 Global Equity IMI	3.4%	5.9%	17.3%	1.00	3.3%	5.7%	17.6%	1.00
Fixed Income								
2 Cash (Gov't)	1.3%	3.7%	1.2%	0.01	1.5%	3.8%	1.9%	0.01
3 Core Fixed Income	2.4%	4.9%	5.0%	0.01	2.6%	5.0%	5.4%	0.01
4 Multi-Asset Credit	2.5%	5.0%	8.4%	0.30	2.8%	5.2%	8.7%	0.30
Alternatives								
5 Direct Hedge Funds ^{2,3}	3.2%	5.7%	5.2%	0.22	3.4%	5.8%	5.6%	0.24
6 Core Real Estate	2.4%	4.9%	15.0%	0.30	2.4%	4.8%	15.2%	0.30
7 Non-Core Real Estate	4.1%	6.6%	24.9%	0.65	3.8%	6.2%	25.2%	0.65
8 Private Equity	6.6%	9.2%	20.0%	0.69	6.6%	9.1%	20.2%	0.69
9 Infrastructure	5.7%	8.2%	16.0%	0.31	5.7%	8.1%	16.3%	0.31
10 Private Debt	3.8%	6.3%	9.7%	0.23	3.4%	5.8%	10.1%	0.24
11 Insurance Linked Securities	3.3%	5.8%	5.5%	0.01	3.1%	5.5%	7.5%	0.01
Inflation								
12 Inflation	0.0%	2.4%	1.7%		0.0%	2.3%	1.7%	

¹ Expected returns are using Aon's Q3 2025 10/30-Year Capital Market Assumptions (CMAs) as of June 30, 2025 adjusted for the delta in average Global Equity Risk Premium (ERP) among three investment advisors: Aon, Mercer, and Wilshire (-100bps adjustment), which are projections about the future returns of asset classes. For asset classes that can be implemented passively, which includes most public assets, alpha and active management fees are not included in the return expectations. For asset classes that can only be implemented actively, such as hedge funds and private assets, we assume alpha and higher active manager fees. Expected returns are geometric (long-term compounded). Expected returns presented are models and do not represent the returns of an actual client account. Your actual returns may differ from the model expected returns presented based on your plan's individual fees/expenses. AIUSA's advisory fees are described in Part 2A of AIUSA's Form ADV. Not a guarantee of future results.

² Alpha incorporated in Expected Nominal Return

³ Represents diversified portfolio of Direct hedge fund investments.

- Aon's capital market assumptions continue to show the value of private market portfolios and the value of diversification
- Private Equity is expected to have the highest real return over the next 10 years

