Investment Board Meeting Agenda

Wednesday, September 27, 2023
IPERS Board Room
Conference Telephone #: 309-205-3325
Meeting ID: 885 7144 9145
1:00 p.m. – 4:00 p.m.

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

1:05 p.m. **Actuarial Education – Part 1 Valuation Basics**
Brent Banister, *Cavanaugh Macdonald*
Bryan Hoge, *Cavanaugh Macdonald*

2:00 p.m. **Break**

2:10 p.m. **Actuarial Education – Part 2 Understanding the IPERS Valuation Results**
Brent Banister, *Cavanaugh Macdonald*
Bryan Hoge, *Cavanaugh Macdonald*

3:00 p.m. **Break**

3:10 p.m. **Actuarial Presentation – Part 3 Analysis of Risk with Alternate Portfolios**
Brent Banister, *Cavanaugh Macdonald*
Bryan Hoge, *Cavanaugh Macdonald*

4:00 p.m. **Adjourn**

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IPERS - Board Education Session

September 27, 2023

Cavanaugh Macdonald Consulting, LLC

Topics for Discussion

- Your Cavanaugh Macdonald Actuarial Team
- Part 1: Valuation Basics
- Part 2: Understanding the IPERS Valuation Results
- Part 3: Analysis of Risk with Alternate Portfolios

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Your Cavanaugh Macdonald Actuarial Team

Cavanaugh Macdonald Consulting

- Started in 2005 by two seasoned public sector consultants looking to better serve their clients
  - Now led by the 7 Principals of the firm
  - Total of 37 employees

- Provides actuarial services solely for public retirement and health systems and boards
  - Company policies are developed with our core business in mind
  - No competing priorities or differences of opinion on clients' best interests

- Recognized nationally as one of the top-tier public sector actuarial firms, particularly for state-wide systems

Depth of Experience

Our Retainer Clients

IPERS Team

Pat Beckham, Co-Lead Actuary

- FSA, FCA, EA, MAAA
- 40 years of actuarial experience, primarily in the public sector

Brent Banister, Co-Lead Actuary

- PhD, FSA, FCA, EA, MAAA
- 29 years of actuarial experience, primarily in the public sector

Bryan Hoge, Support Actuary

- FSA, FCA, EA, MAAA
- 18 years of actuarial experience, 9 years in the public sector

Aaron Chochon, Production

- ASA, FCA, EA, MAAA
- 12 years of actuarial experience, all in the public sector

Megan Skiles, Production

- Pursuing credentials
- 6 years of actuarial experience, all in the public sector

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

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Part 1: Valuation Basics

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.

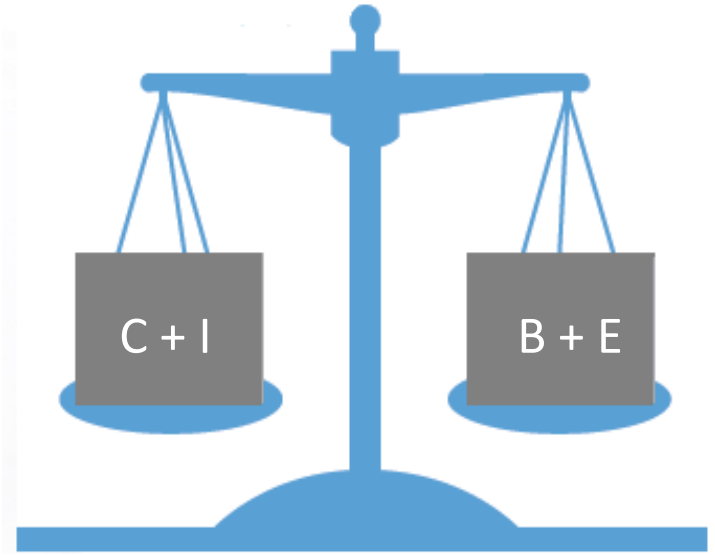
Funding for Benefits

- Pay as you go
  - Social Security
- Terminal Funding
  - Pay lump sum value at time of retirement
- Pre-Funding
  - Pay lump sum at date of hire
- Advanced Funding
  - Make contributions over a period of time to allow accumulated assets to grow with investment income to help pay the benefits
  - 60-70% of benefit payments comes from investment income

Basic Long-Term Retirement Funding Formula

C + I = B + E

C = contributions
I = investment income
B = benefits paid
E = expenses



"Money In = Money Out"

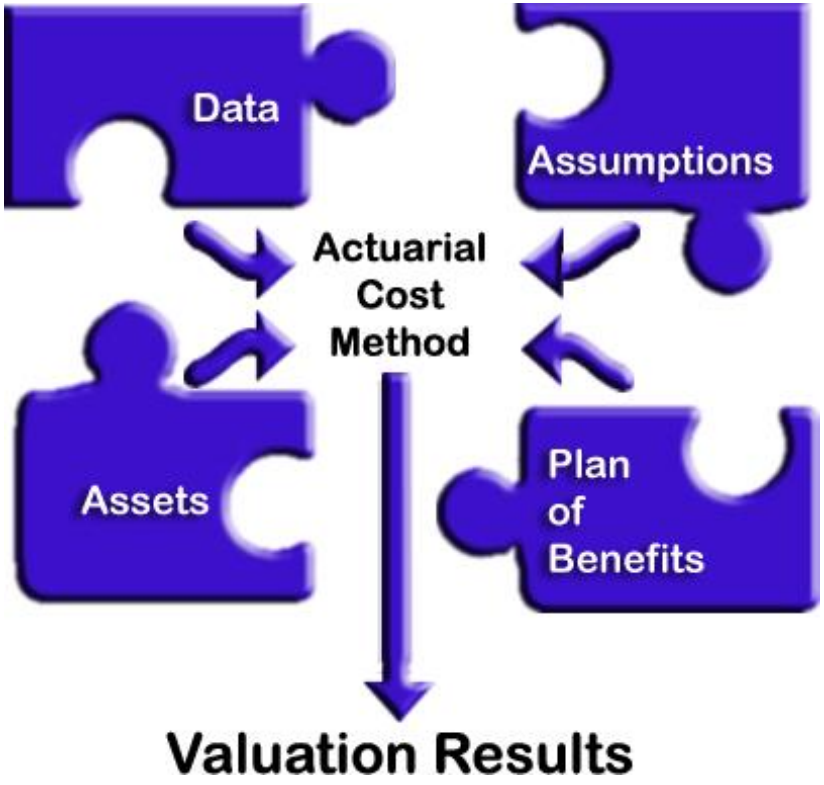
Approaches to Funding Retirement Systems

- 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 Elements of an Actuarial Valuation



Plan Benefits

- Plan Benefits are Defined
  - (Benefit Multiplier) x (Credited Service) x (Final Average Pay)
  - Primarily retirement benefits, with some systems offering ancillary benefits for death or disability

- Benefit payments commence based on plan-specific conditions
  - Payments are generally paid for the lifetime of the member

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 4-5 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
- Wage Growth
- COLA
- Payroll Growth

Demographic

- Retirement Rates
- Promotional/Step Pay Increases
- Disability
- Turnover
- Mortality

Who Selects Them?

Economic

- Board
- Actuary
- Other Advisors

Demographic

- Mostly Actuary
- Board Approves

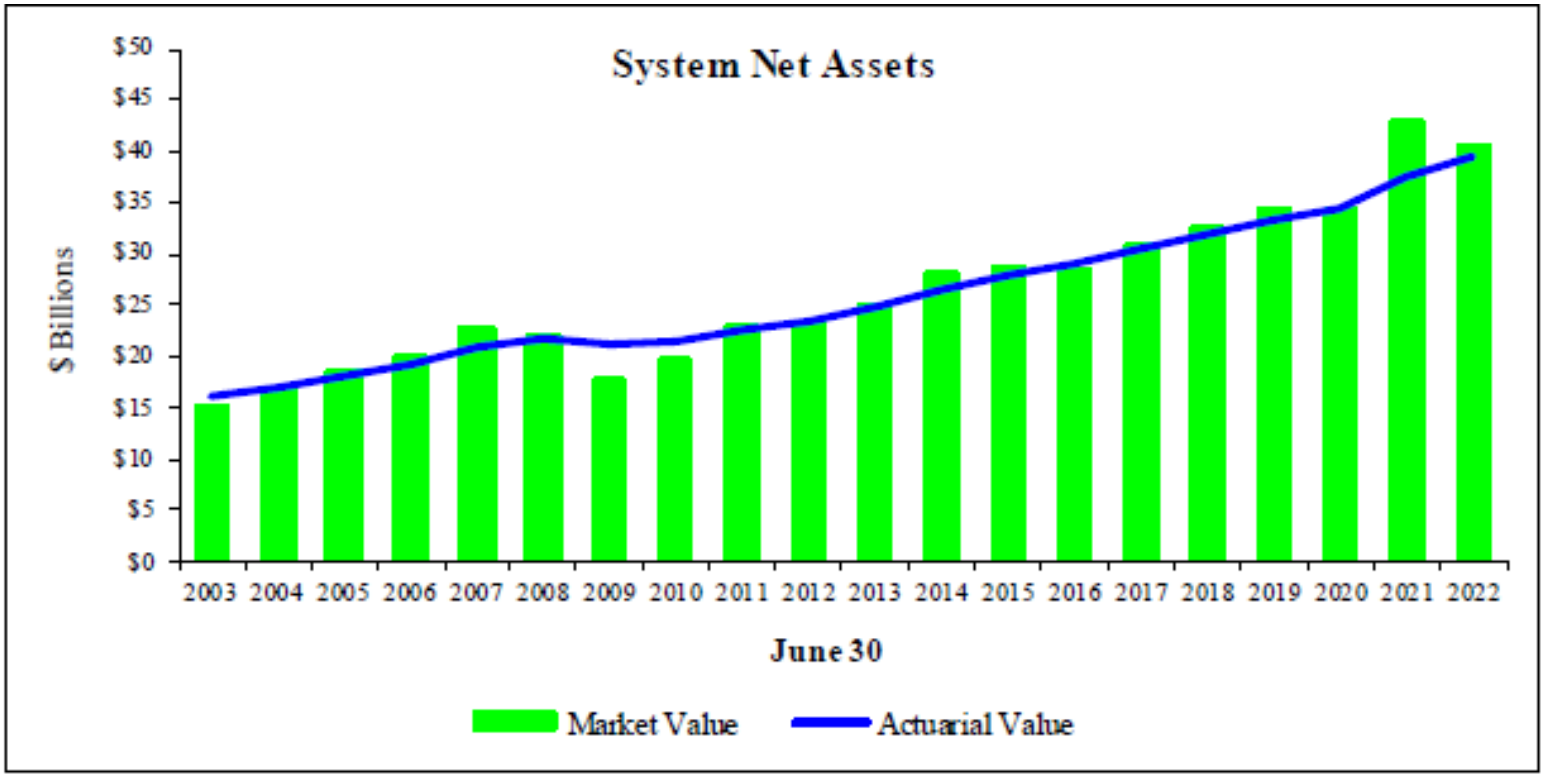
- Actuaries are not investment experts, so we rely on investment professionals and other advisors to aide in recommending economic assumptions
  - Asset allocation drives the investment return assumption
  - As fiduciaries, the Board is responsible for the selection of all actuarial assumptions including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

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

Funding 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

Present Value of Benefits

(PVB)

- Value of benefits expected to be paid to all current participants (active and retired)
  - Includes past service and expected future service
  - Based on projected salary

Actuarial Funding Definitions

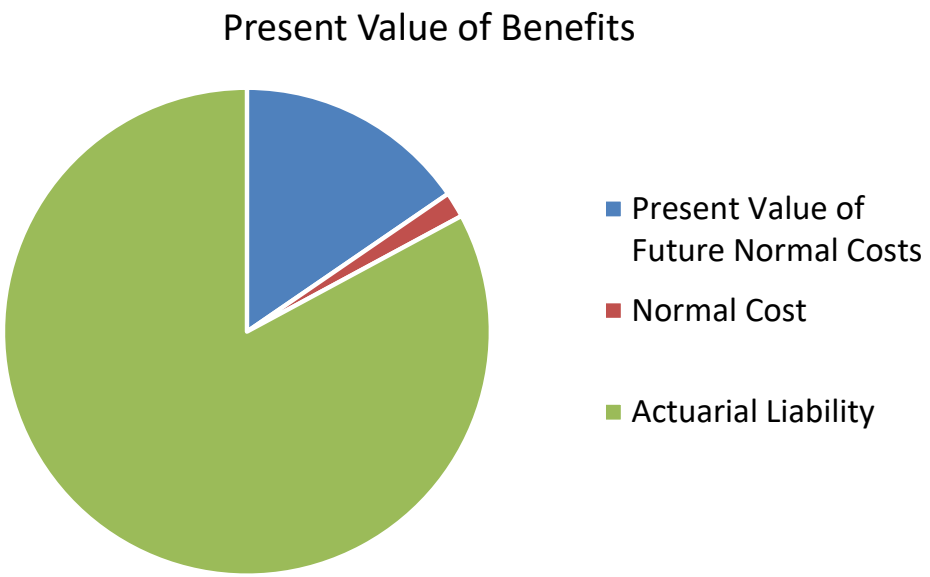
Actuarial Cost Method

- A method used to allocate the Present Value of Benefits between past service (Actuarial Accrued Liability) and future service (Present Value of Future Normal Costs)
- Most common method is Entry Age Normal cost
- All cost methods maintain the following relationship:

Actuarial Funding Definitions

Actuarial Cost Method

- Normal Cost is the liability added the current year for ongoing active member costs ($0.9B 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



Application to Pensions

Events to Consider in Present Value of Benefits

- Expected Investment return
- Mortality
- Retirement
- Termination of employment
- Disability
- Salary Increases
- Cost of Living Adjustments

Key Concept: Present Value

- Actuarial calculations typically involve determining a *"present value"*
- Present value: equivalent value, in today's dollars, of a stream of future payments
- In other words, how much money would you need today (based on your assumptions) to make the expected payments in the future?
  - Time value of money is dependent on the assumed investment return (also called interest rate)
  - Inverse relationship: higher interest rate = lower present value
  - Expected payments involve probability of certain events occurring

Present Value

Example: You owe $1,000 to 100 people one year from now. Each person is 70 years old. You expect a 7% return and the chance each person will be alive in one year is 98%. What is the present value of the debt?

$$100 \times \frac{\$1{,}000}{1.07} \times 98\% = \$91{,}589$$

Observation: Under what circumstances will you have exactly enough money to pay the debt?

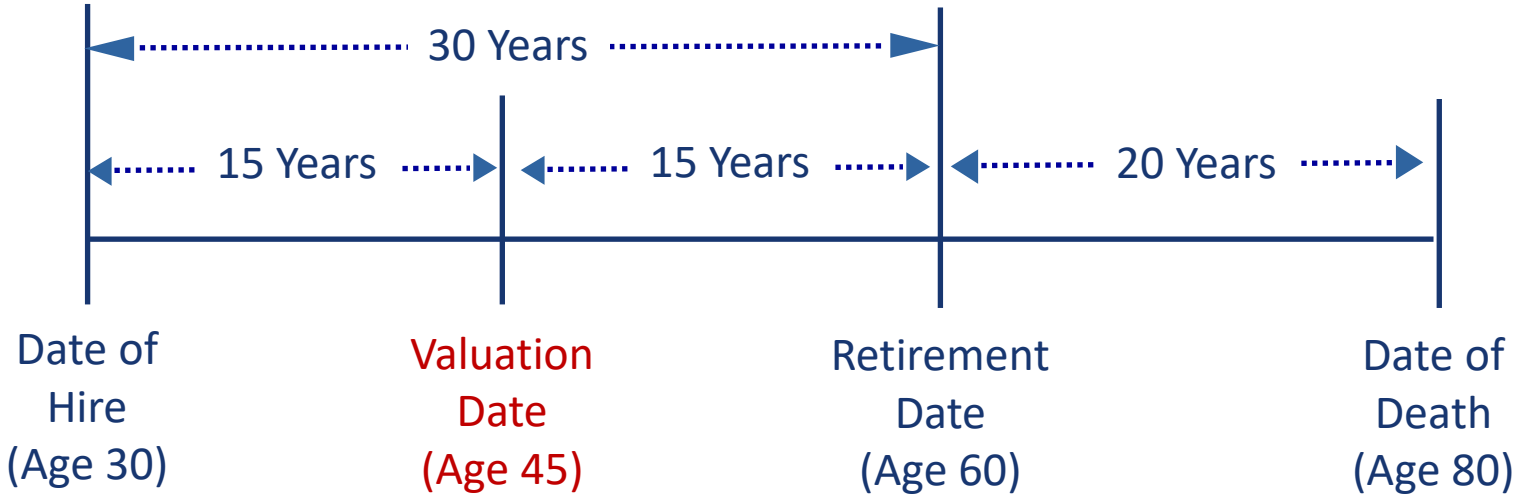
Actuarial Valuation

KNOWN at valuation date:

1. Age
2. Salary
3. Gender
4. Service to date
5. Membership group

ASSUMED at valuation date:

1. Future salary increases
2. Retirement date(s)
3. Death rates before and after retirement
4. Disability rates
5. Other termination rates



Unfunded Actuarial Accrued Liability

- Unfunded actuarial accrued liability (UAAL) is the Actuarial Accrued Liability (AAL) minus the Actuarial Value of Assets (AVA)
- UAAL is a natural part of retirement system funding given 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 UAAL 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

Unfunded Actuarial Liability (UAL) Changes

- Prior Year Unfunded Actuarial Liability
  - Interest on unfunded actuarial liability
  - Normal Cost
  - (Contributions)
  - Actuarial (gains)/losses
  - Benefit Changes, if applicable
  - Assumption Changes, if applicable
- Current Year Unfunded Actuarial Liability

- Increases in UAL results in higher actuarial contribution rates

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

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Part 2:
Understanding the IPERS 6/30/2022 Valuation Resu

Purpose of an Actuarial Valuation

- Develop a strategy to systematically fund the benefits of the system
- Measure assets and liabilities (future benefit payments)
- Determine actuarial contribution rates (6/30/22 valuation results are used to set the FY 2024 contribution rates)
- Analyze experience (actual vs. expected) in last year
- Report on trends and analyze actuarial risks

Actuarial Valuation

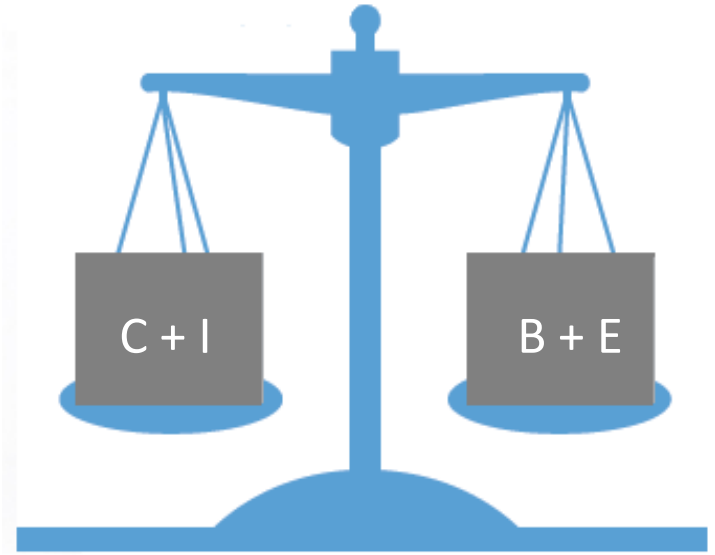
- Snapshot picture of the System as of a single date (June 30, 2022)
- Statistical projection of amount/timing of future benefits to be paid
  - Uses one set (best estimate) of assumptions out of many possible scenarios
  - Other reasonable sets of assumptions exist
  - Different assumptions would produce different results, potentially significant
- Actual experience determines the true costs of the System (actual benefit payments paid to members)
- Contribution rates are adjusted each year as actual vs expected experience unfolds.

Basic Retirement Funding Formula using IPERS

IPERS	$1.4B	$2.8B	$2.5B (current) $1.7B (future)	$14M

C + I = B + E

C = contributions
I = investment income
B = benefits paid
E = expenses



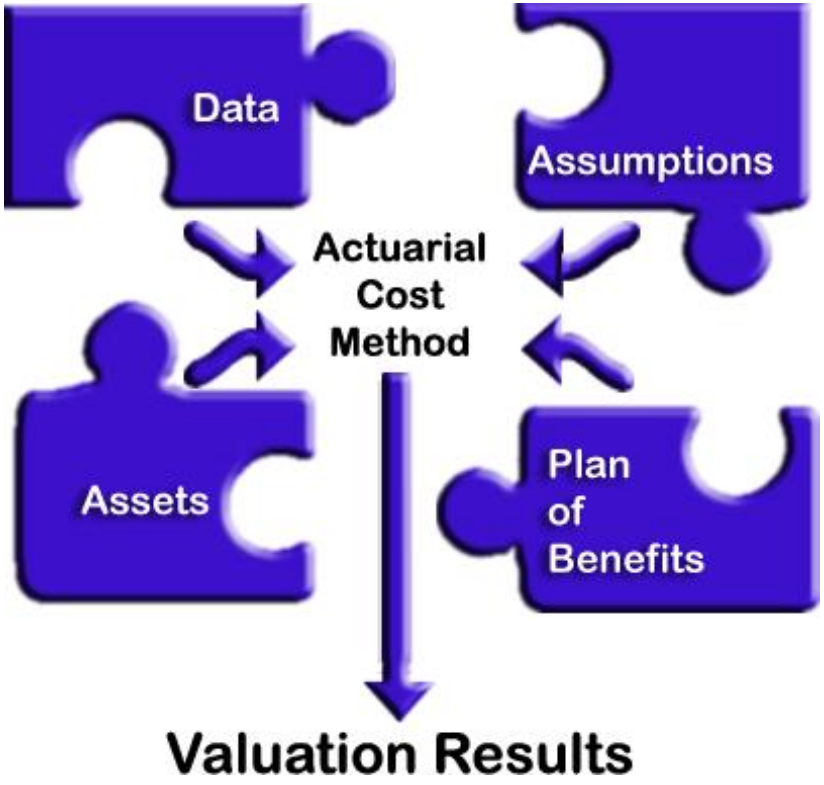
"Money In = Money Out"

Benefits Paid includes current year benefits and future years of benefits

Impacts on the June 30, 2022 Valuation

- Actuarial experience: actual versus assumed
  - Return of -3.90% on the market value of assets for FY 2022. Due to asset smoothing method, the return on actuarial assets was 7.75% which resulted in actuarial gain of $277 million (decreases UAL)
    - As of June 30, 2021, IPERS had $5.3B in deferred asset gains
    - As of June 30, 2022, IPERS has $0.8B in deferred asset gains
  - Liability loss of $142 million, largely due to retirement and mortality experience (increases UAL)
- June 30, 2022 Valuation Results:
  - Total system UAL decreased
  - Funded ratio increased
  - Required contribution rate decreased 0.50% for Sheriffs & Deputies and remained the same for Regular and Protection Occupation groups.
  - All three groups continue to have a contribution margin

The Elements of an Actuarial Valuation

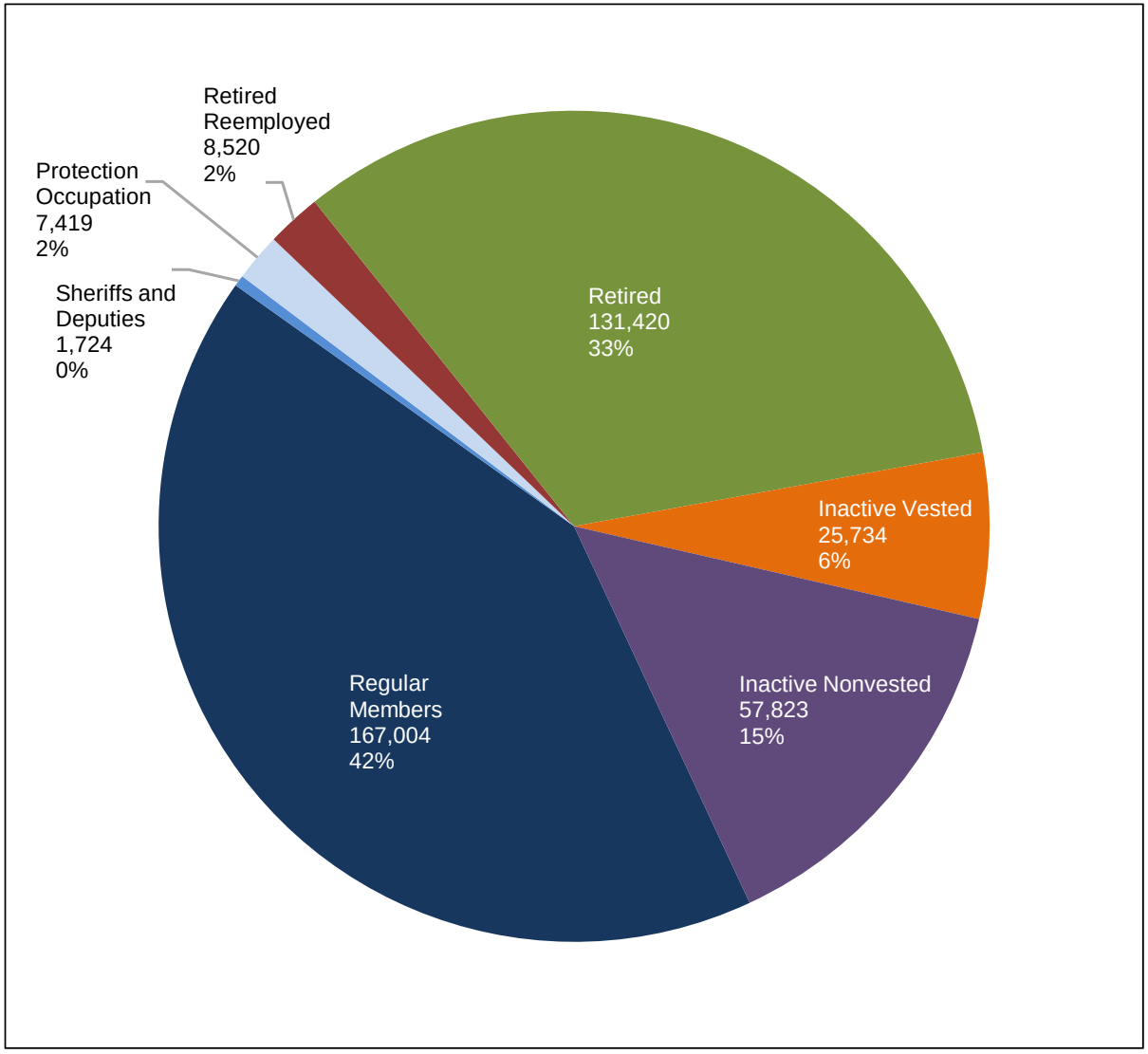


IPERS Plan Benefits

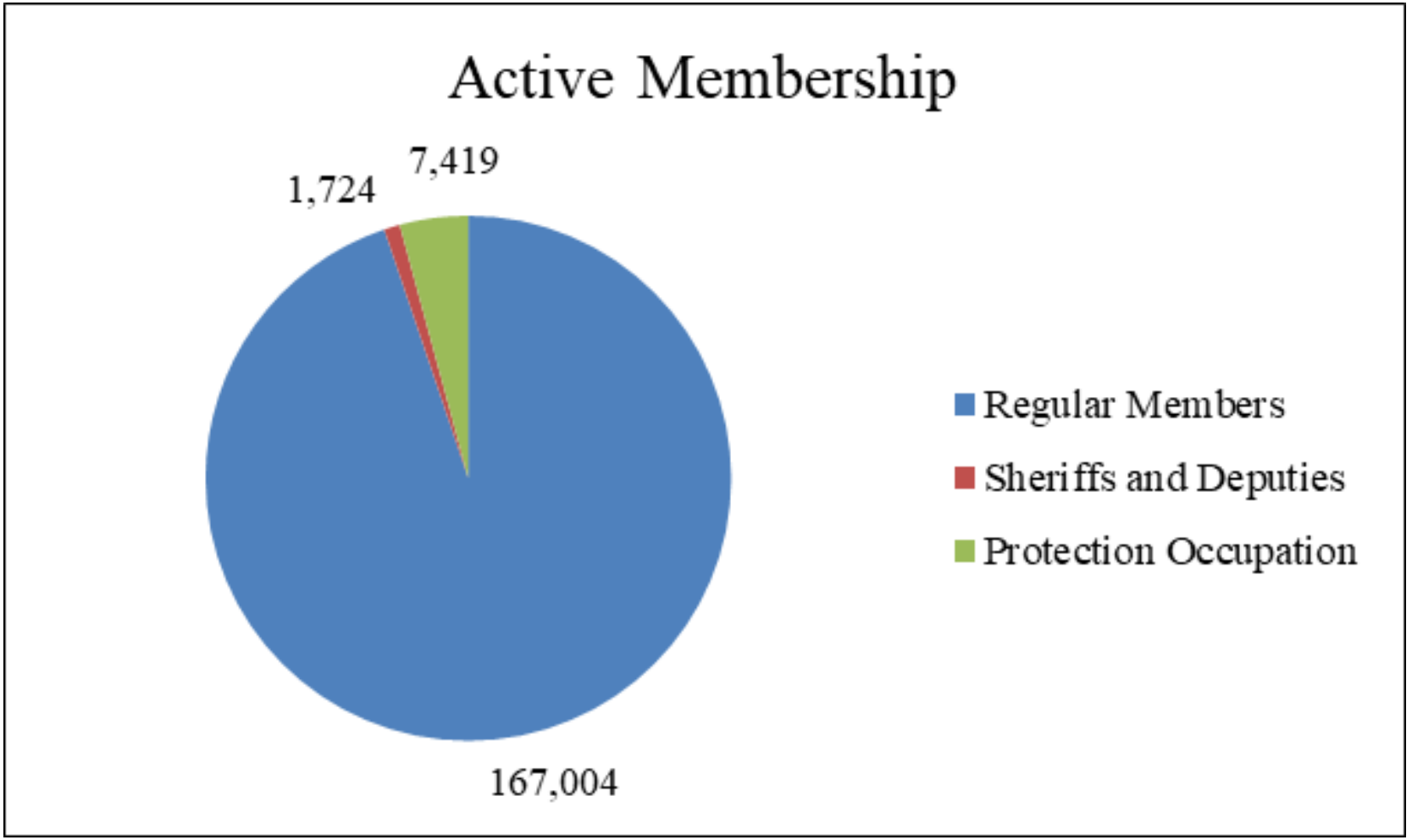
- Regular Members
  - 2% x Average Salary x Service (<=30)
    - 1% x Average Salary x Service (30+)
  - Eligible for unreduced benefits at 65, 62/20 or Rule of 88 (age 55)
  - Eligible for reduced benefits at age 55

- Sheriffs/Deputies and Protection Occupation
  - 60% x Average Salary (after 22 YOS)
    - 1.5% x Average Salary x Service (22+)
    - Maximum benefit of 72% x Average Salary (30 YOS)
  - Eligible for unreduced benefits at 55
    - Sheriffs and Deputy Sheriffs may retire at age 50 and 22 YOS

Membership by Status



Active Membership by Group



IPERS Key Assumptions

- Rate of Investment Return: 7.00%
- Rate of Inflation: 2.60%
- Cost of Living Adjustments Assumption: 2.60%
- Payroll Growth Assumption: 3.25%
- Individual Salary Increases: 3.25% - 16.25%
  - Varies based on plan 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 plan
- Retirement, Termination, Disability
  - Vary by plan, age and service

Actuarial Value of Assets

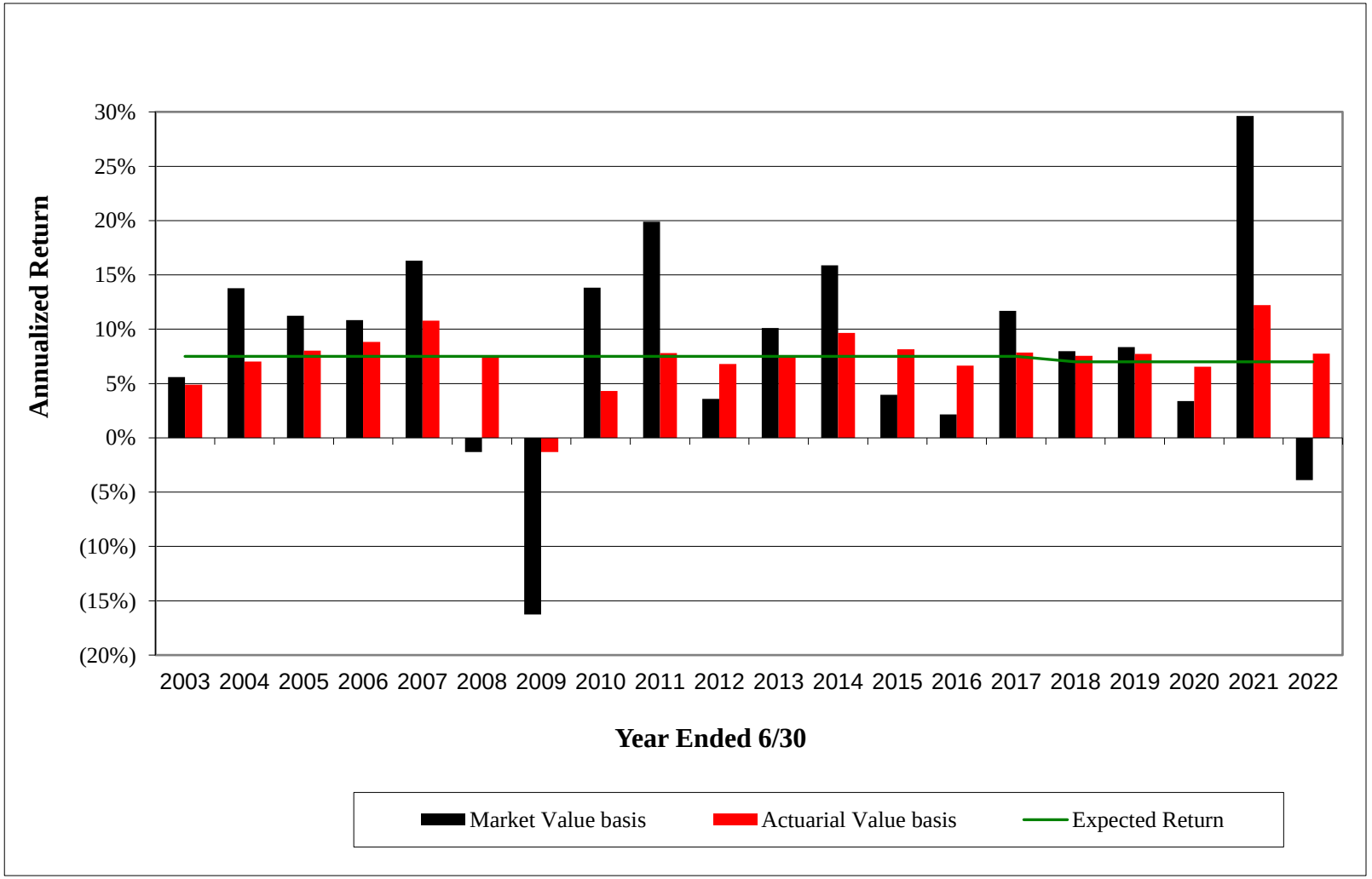
- Market value not used directly in funding valuation
- Asset valuation method used to smooth the effect of market fluctuations
- Actuarial value is expected value (based on the expected return of 7.0% and contributions and benefit payments) plus 25% of difference between actual and expected values
- 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, 2021	$ 42,890	$ 37,585
▪ Contributions	1,431	1,431
▪ Benefit Payments	(2,532)	(2,532)
▪ Investment Income	(1,603)	2,870
▪ FED Transfer	0	0
Assets, June 30, 2022	$ 40,186	$ 39,354
Estimated Rate of Return	-3.90%*	7.75%

* The 7.75% return on actuarial value of assets resulted in a $277 million actuarial gain. The 7.75% return partially reflects the -3.90% return for 2022 as well as deferred gains from years prior to 2022. Due to unrecognized investment gains, the market value of assets is currently 102% of actuarial value.

Asset Values ($M) Total System



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

UAL by Group ($ in Millions as of 6/30/22)

	Regular	Sheriffs & Deputies	Protection Occupation	Total
Actuarial Liability	$41,091	$850	$2,029	$43,970
Actuarial Value of Assets	36,346	890	2,119	39,354
Unfunded Actuarial Liability (UAL)	$4,745	$(40)	$(89)	$4,615
Funded Ratio	88.5%	104.7%	104.4%	89.5%

Note: Numbers may not add due to rounding.

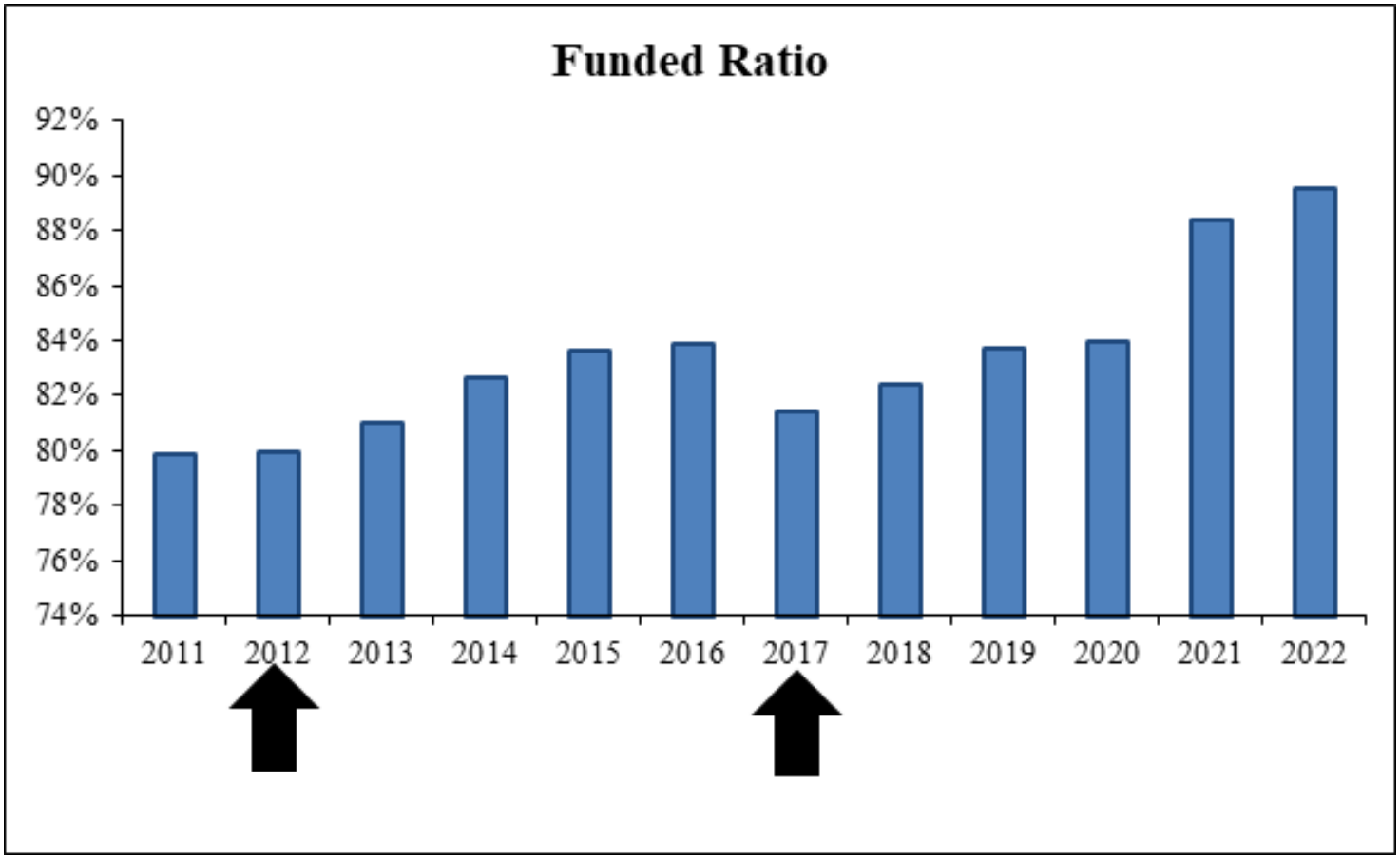
Change in Unfunded Actuarial Liability (UAL $M)

	Regular Members	Sheriffs & Deputies	Protection Occupation	Total
UAL June 30, 2021	$5,043	$(22)	$(61)	$4,960
Contributions above actuarial rate	(18)	(1)	0	(20)
Expected decrease	(89)	(2)	(5)	(95)
Investment experience	(257)	(6)	(15)	(277)
Liability experience	115	2	24	142
Assumption changes	0	(10)	(32)	(43)
Other	(45)	(2)	(3)	(50)
UAL June 30, 2022	$4,745	$(40)	$(89)	$4,615

Negative numbers reflect a reduction of the UAL.

Note: Numbers may not add due to rounding.

Historical Funded Ratio (Total System)



Pension Reform

Investment Return
Lowered to 7.0%

Contribution Rates

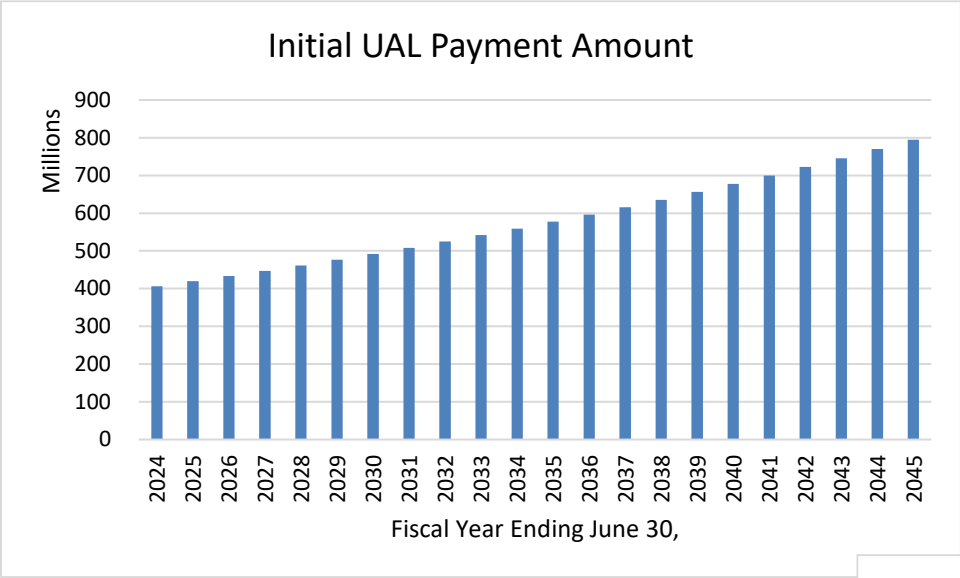
- Components:
  - Normal Cost (ongoing cost for actives)
  - Amortization payment on Unfunded Actuarial Liability (UAL)
- UAL Amortization Policy (Layered Amortization)
  - June 30, 2014 base (legacy base) is amortized over a closed 30-year period (22 years remaining) as a level percent of payroll.
  - In subsequent years, differences in the expected and actual UAL are established as a new base and amortized over a closed 20-year period.
  - Changes in UAL due to assumption changes in 2017, 2018 and 2022 valuations were amortized over separate closed 20-year periods.
  - Once a group becomes 100% funded, all outstanding bases are eliminated, and surplus is amortized over an open 30-year period.

Layered UAL Amortization (Regular Members)

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2023 Balance	Annual Payment*
2014 Initial UAL	$ 5,592,056,086	22	$ 6,092,675,707	$ 406,156,983
2015 Experience	(193,648,198)	13	(178,445,264)	(17,432,256)
2016 Experience	21,763,596	14	20,449,770	1,885,731
2017 Experience	(158,062,524)	15	(150,685,262)	(13,181,983)
2017 Assumption Changes	1,435,708,789	15	1,368,699,870	119,734,198
2018 Experience	(310,129,854)	16	(300,529,837)	(25,049,864)
2018 Assumption Changes	75,130,979	16	72,805,312	6,068,493
2019 Experience	(384,733,612)	17	(377,530,325)	(30,097,600)
2020 Experience	67,832,112	18	67,176,074	5,139,454
2021 Experience	(1,670,503,783)	19	(1,664,627,021)	(122,585,491)
2022 Experience	(351,647,258)	20	(351,647,258)	(24,992,447)
2022 Assumption Changes	9,926,473	20	9,926,473	705,499
Total			**$ 4,608,268,239**	**$ 306,350,717**

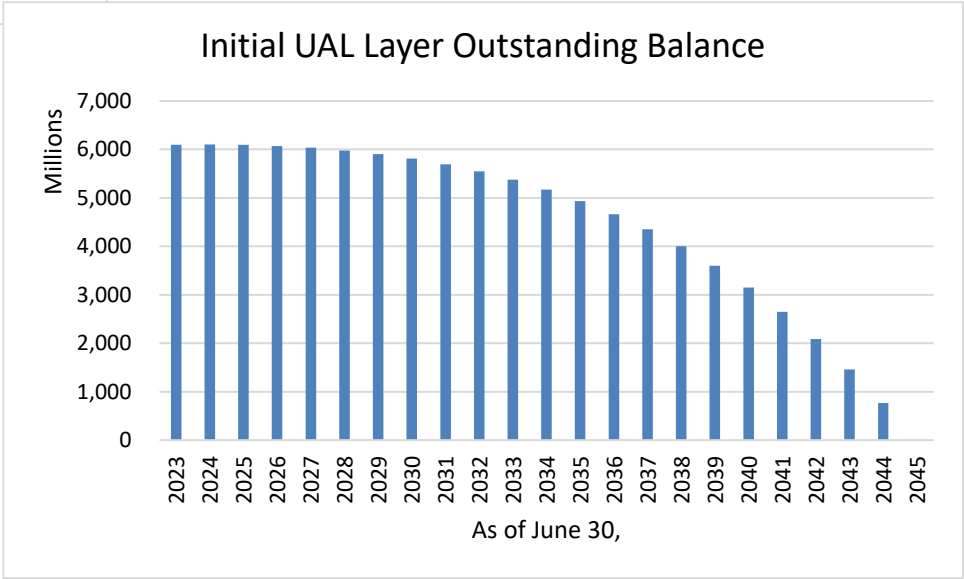
* Payment amounts reflect mid-year timing and increase 3.25% with the assumed increase in payroll growth.

Level Percent of Payroll Amortization

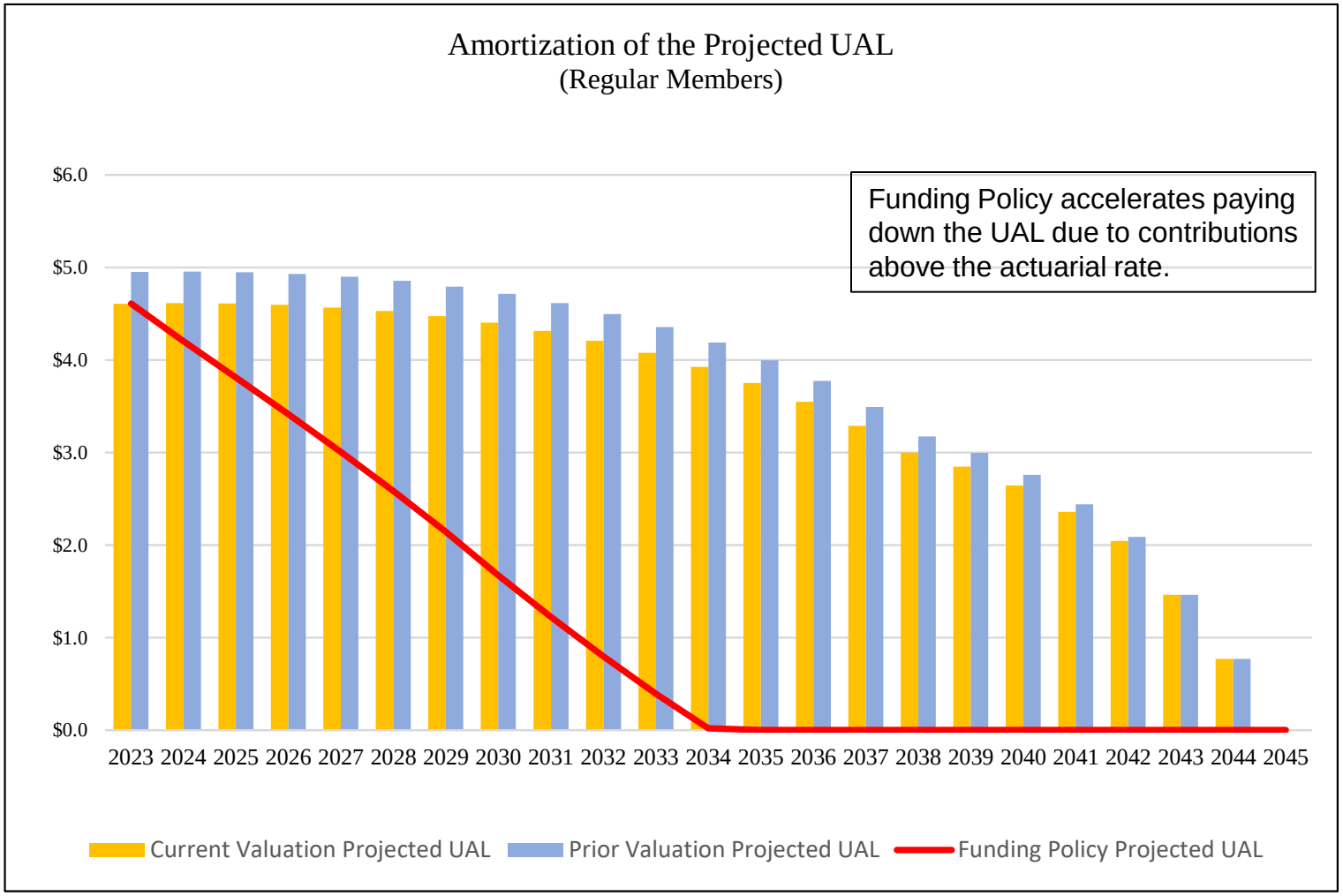


Under level percent of payroll amortization, the payment amounts increase while the payment rates as a percent of pay are expected to remain level.

Under level percent of payroll amortization, the outstanding UAL balance is expected to remain level for many years before decreasing rapidly at the end of the period.



UAL Balance Under Amortization Schedule



Current and prior valuation assumes the actuarial contribution rate is contributed each year, not the required contribution rate.

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% <u>provided funded ratio is 95% or higher</u>
- If ACR > previous RCR, then current RCR shall be:
  - ✓ Regular members: increased to ACR or 1% more than previous RCR, whichever is smaller
  - ✓ Sheriffs/Deputies: increased to ACR
  - ✓ Protection Occupation: increased to ACR

Change in Actuarial Contribution Rate

	Regular Members
Actuarial Contribution Rate, June 30, 2021	14.14%
- Contributions above actuarial rate	(0.11%)
- Payroll increase (more)/less than expected	(0.02%)
- Investment experience	(0.20%)
- Liability experience	0.09%
- Assumption changes	0.01%
- Change in normal cost rate	0.11%
- Other experience	(0.06%)
Actuarial Contribution Rate, June 30, 2022	13.96%

Contribution Rate (Regular Members)

	Valuation Date (Contribution Rates for FY 2024/FY 2023)	
	June 30, 2022	June 30, 2021
Normal Cost	10.60%	10.49%
UAL Payment	3.36%	3.65%
Total Actuarial Rate	13.96%	14.14%
Required Contribution*	15.73%	15.73%
Shortfall/(Margin)	(1.77%)	(1.59%)
*Employee Rate	6.29%	6.29%
*Employer Rate	9.44%	9.44%

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

Contribution Rate (Sheriffs & Deputies)

	Valuation Date (Contribution Rates for FY 2024/FY 2023)	
	June 30, 2022	June 30, 2021
UAL Payment	(1.66%)	(1.03%)
Funded Ratio	104.7%	102.7%
Normal Cost	16.78%	16.93%
Applicable UAL Rate*	0.00%	0.00%
Total Actuarial Contribution Rate	16.78%	16.93%
Employee Rate	8.51%	8.76%
Employer Rate	8.51%	8.76%
Required Contribution Rate	17.02%	17.52%
Shortfall/(Margin)	(0.24%)	(0.59%)

*The UAL Rate is allowed to be negative only if the funded ratio was at least 110% for the last three years.

Note: The ACR is less than the prior year's RCR by more than 0.50% and the funded ratio exceeds 95% so the RCR was decreased by 0.50%.

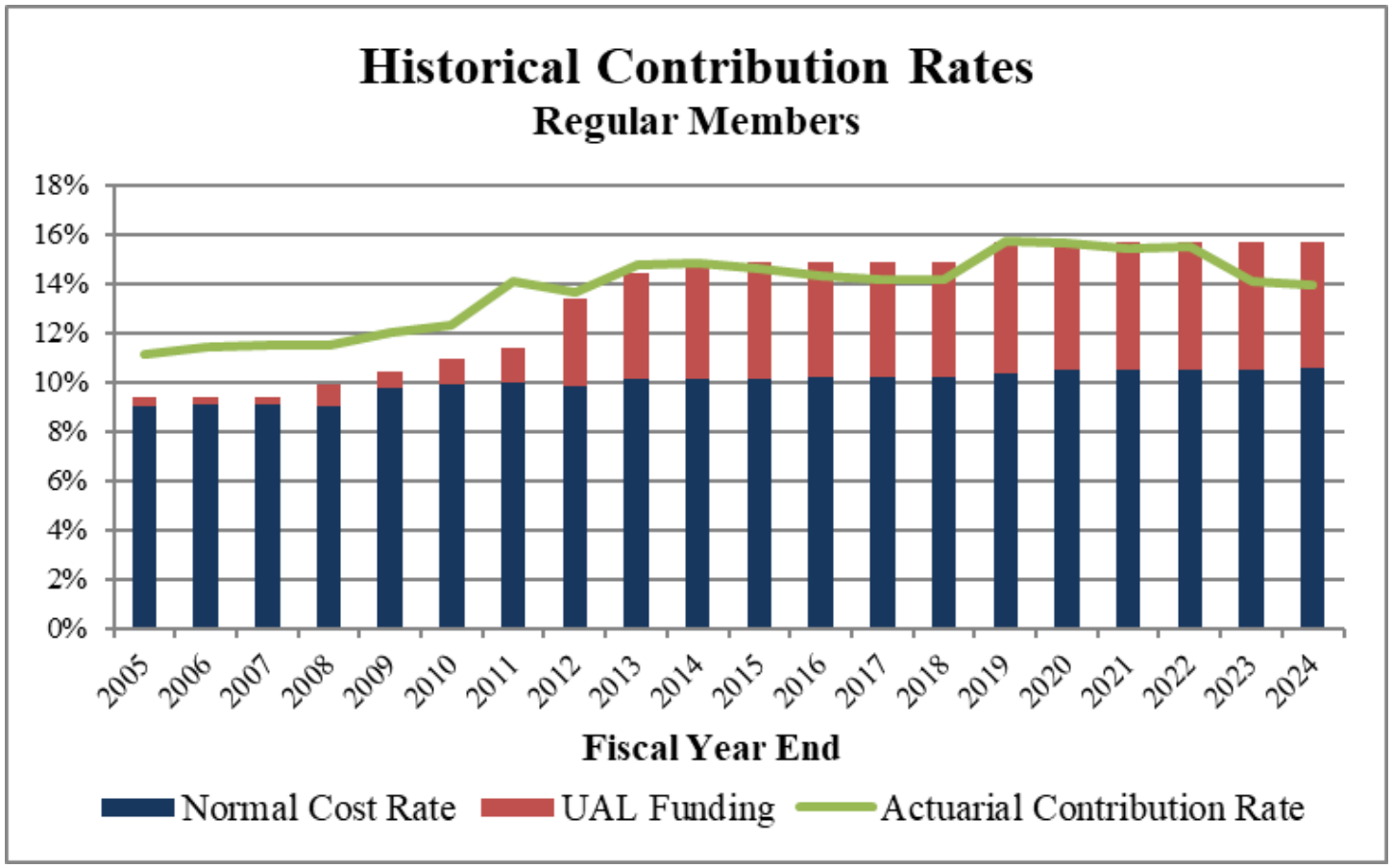
Contribution Rate (Protection Occupation)

	Valuation Date (Contribution Rates for FY 2024/FY 2023)	
	June 30, 2022	June 30, 2021
UAL Payment	(1.18%)	(0.84%)
Funded Ratio	104.4%	103.1%
Normal Cost	15.31%	15.30%
Applicable UAL Rate*	0.00%	0.00%
Total Actuarial Contribution Rate	15.31%	15.30%
Employee Rate	6.21%	6.21%
Employer Rate	9.31%	9.31%
Required Contribution Rate	15.52%	15.52%
Shortfall/(Margin)	(0.21%)	(0.22%)

*The UAL Rate is allowed to be negative only if the funded ratio was at least 110% for the last three years.

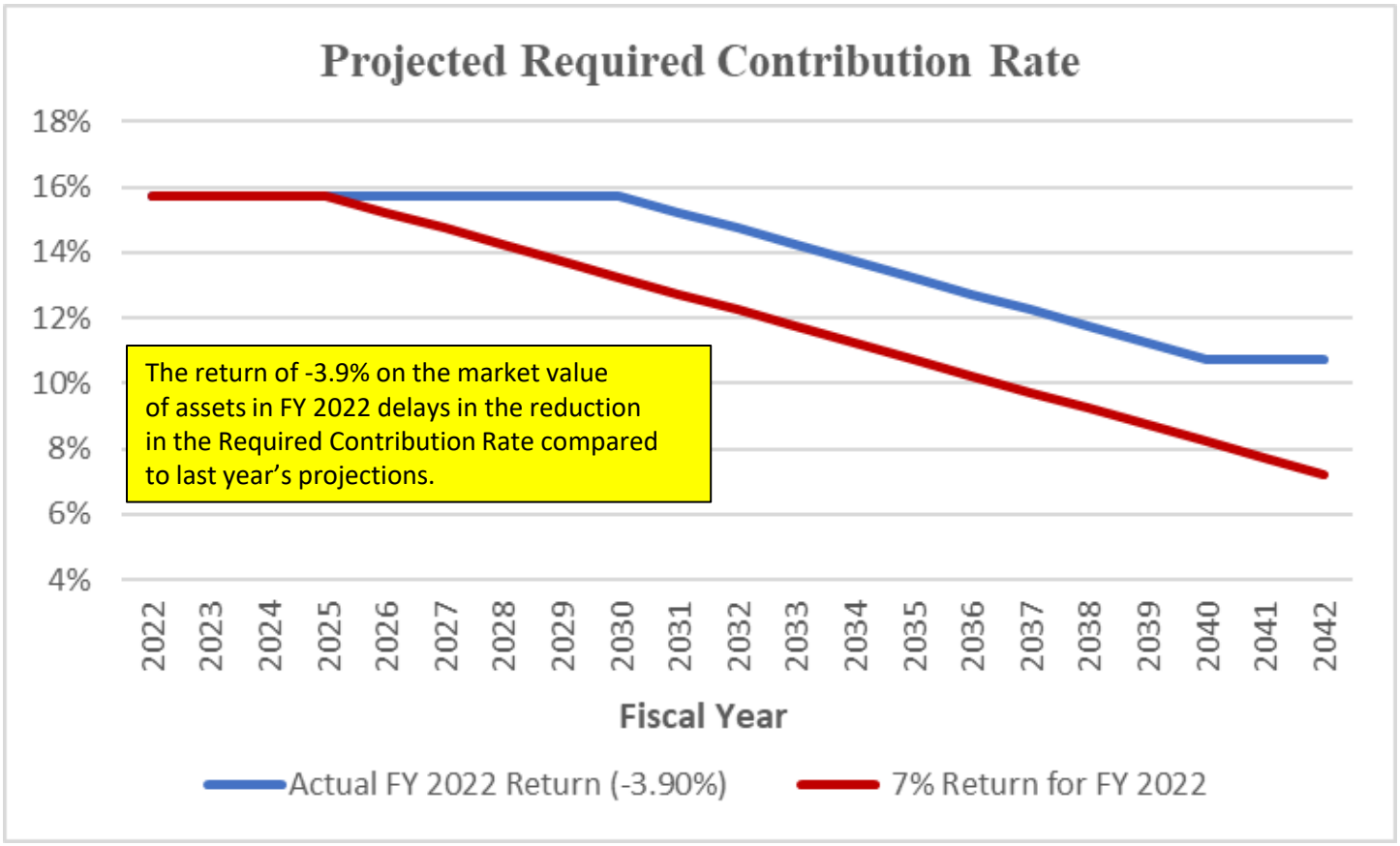
Note: The ACR is not less than the prior year's RCR by more than 0.50% so the RCR was not decreased by 0.50%.

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 nine years.

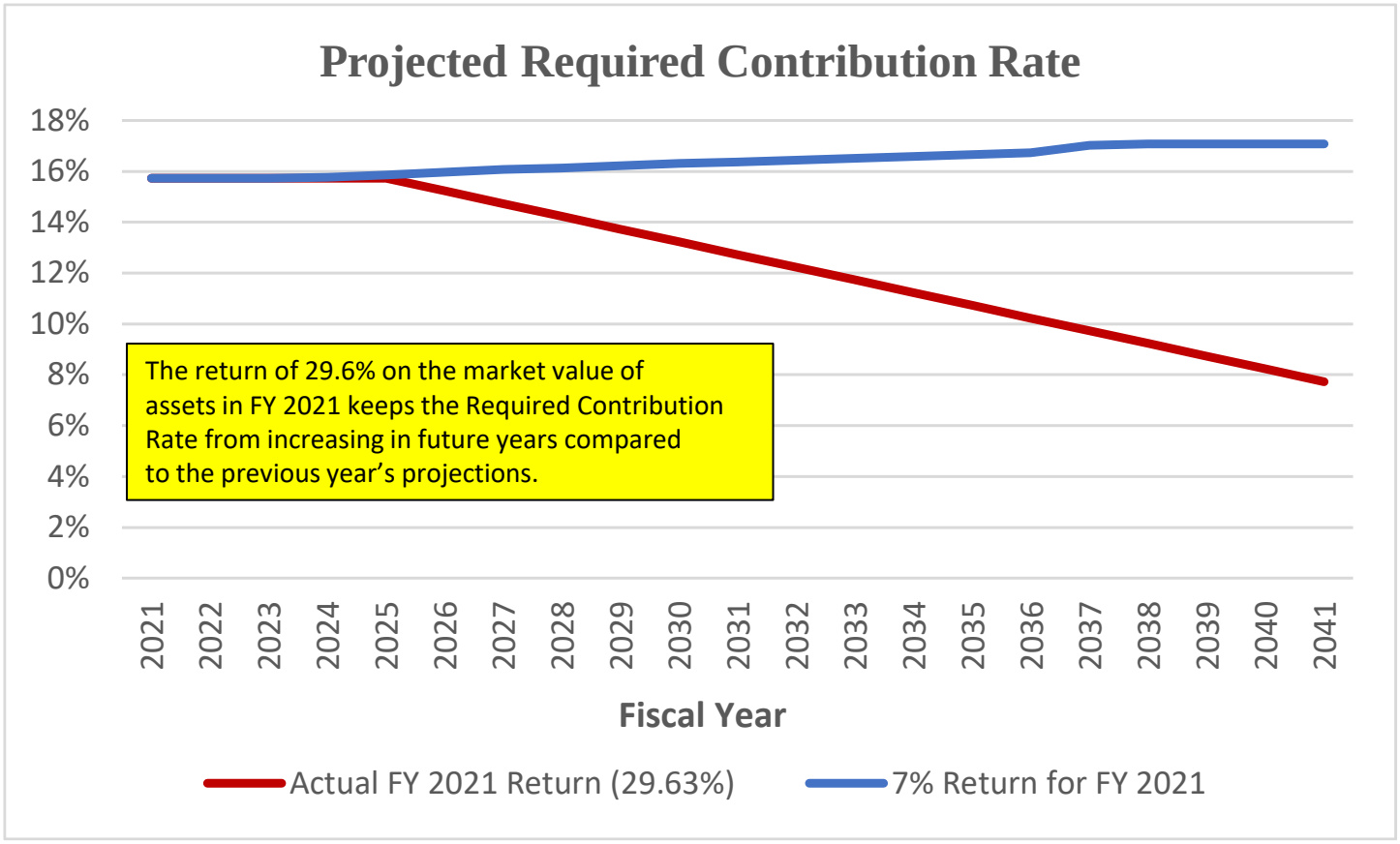
Regular Membership



The return of -3.9% on the market value of assets in FY 2022 delays in the reduction in the Required Contribution Rate compared to last year's projections.

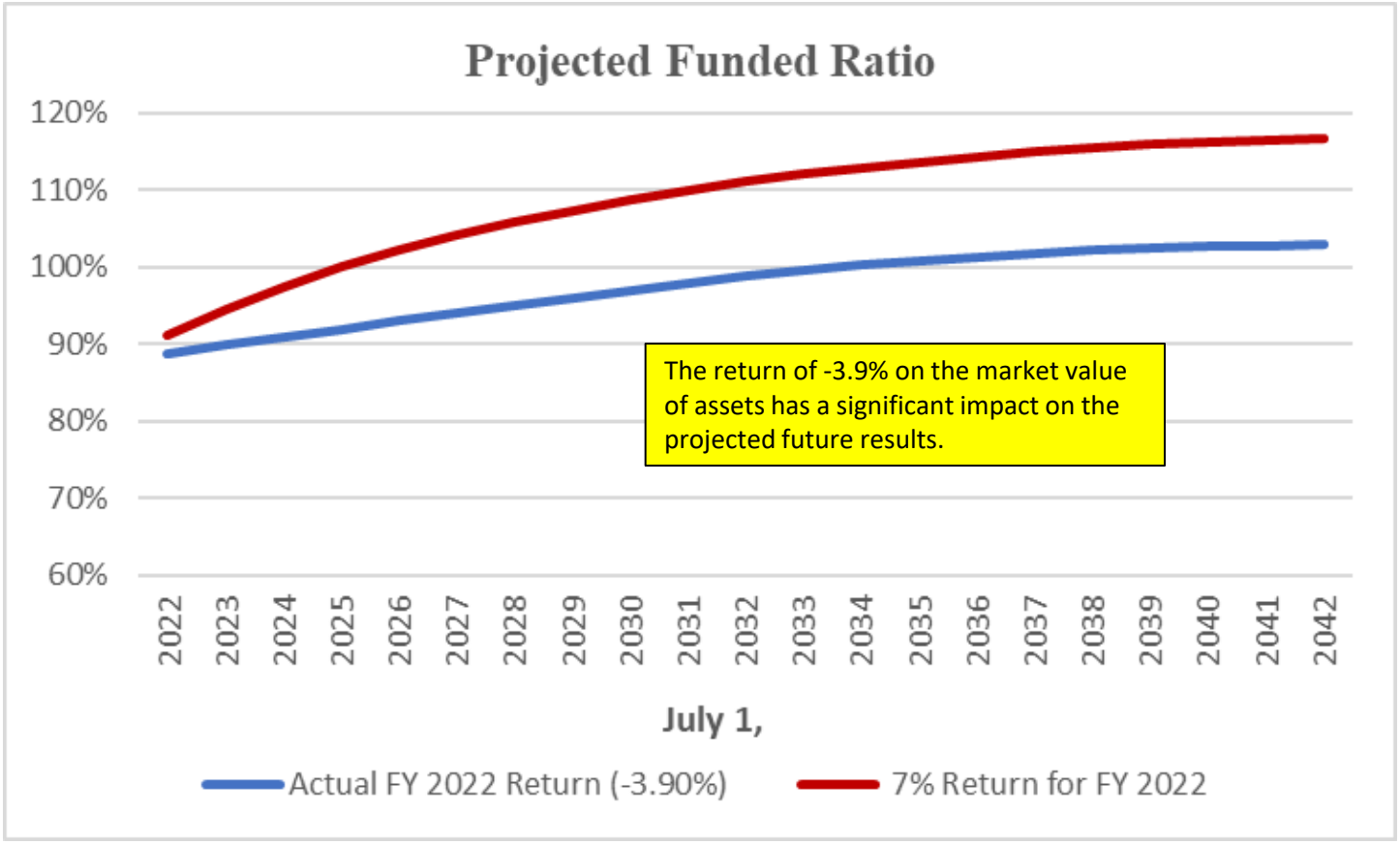
Projections are based on the 6/30/2021 valuation model.

Regular Membership



Projections are based on the 6/30/2020 valuation model.

Regular Membership



Projections are based on the 6/30/2021 valuation model.

Impact of Different Investment Return Assumptions

Investment Return Assumption	6.75%	7.00%	7.25%
Contributions for FY 2024			
Total Normal Cost	11.24%	10.60%	10.01%
Unfunded Actuarial Liability	4.28%	3.36%	2.44%
Actuarial Contribution Rate	15.52%	13.96%	12.45%
Required Contribution Rate	15.73%	15.73%	15.73%
Employer Contribution Rate	9.44%	9.44%	9.44%
Employee Contribution Rate	6.29%	6.29%	6.29%
Contribution Shortfall/(Margin)	(0.21%)	(1.77%)	(3.28%)
Actuarial Liability	$42,256.2	$41,090.8	$39,975.5
Actuarial Value of Assets	36,345.9	36,345.9	36,345.9
Unfunded Actuarial Liability	$5,910.3	$4,744.9	$3,629.6
Funded Ratio	86.01%	88.45%	90.92%

Summary and Comments

- Favorable actuarial experience (actual vs expected) for FY 2022
  - Despite a return of -3.9% on market value of assets, there was a gain on actuarial value of assets of $277 million
  - Market value of asset now exceeds actuarial value by $832 million, down from $5.3 billion last year
  - Net actuarial loss on liabilities of $142 million
  - Unfunded actuarial liability for entire System decreased from $4.96 billion last year to $4.62 billion in the 2022 valuation

- Contribution Rate Funding Policy
  - Required Contribution Rate decreased for Sheriffs and Deputies. Other groups are unchanged.
  - Required Contribution Rate for FY 2024 is greater than Actuarial Contribution Rate for all three groups

Actuarial Certification

We, Patrice A. Beckham, FSA, Brent A. Banister, FSA, and Bryan K Hoge 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
Principal and Consulting Actuary

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

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

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

Cavanaugh Macdonald
CONSULTING, LLC
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Part 3:
Analysis of Risk with Alternate Portfolios

Purpose of Study

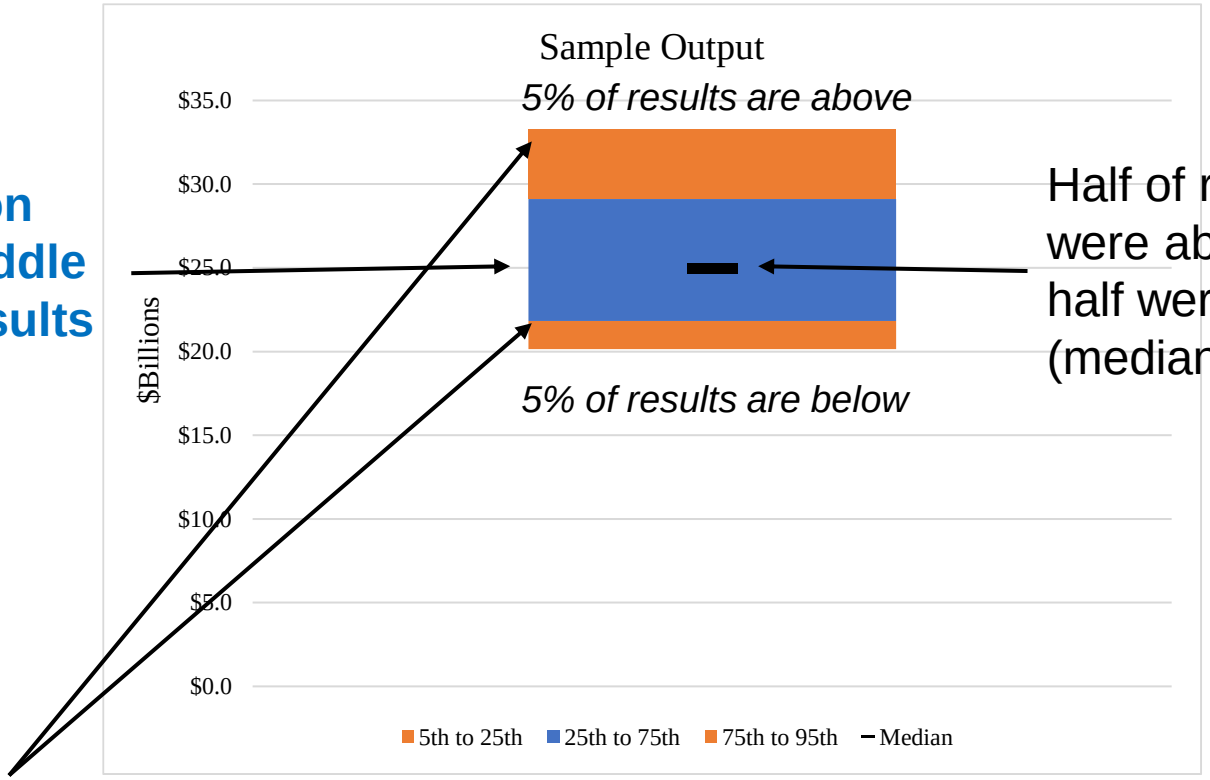
- The Investment Board has responsibility for (among other things):
  - Selecting and monitoring the asset allocation policy.
  - Approving the assumed investment return for funding calculations.
- Asset allocation options typically have a risk-reward trade-off. Portfolios that are expected to return more will also be 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 four portfolios provided by IPERS, derived from data provided by Wilshire and other investment managers:
  - 7.25% return (13.50% standard deviation)
  - 7.00% return (12.50% standard deviation)
  - 6.75% return (11.25% standard deviation)
  - 6.50% return (10.70% standard deviation)

Study Output Example

Blue region shows middle 50% of results



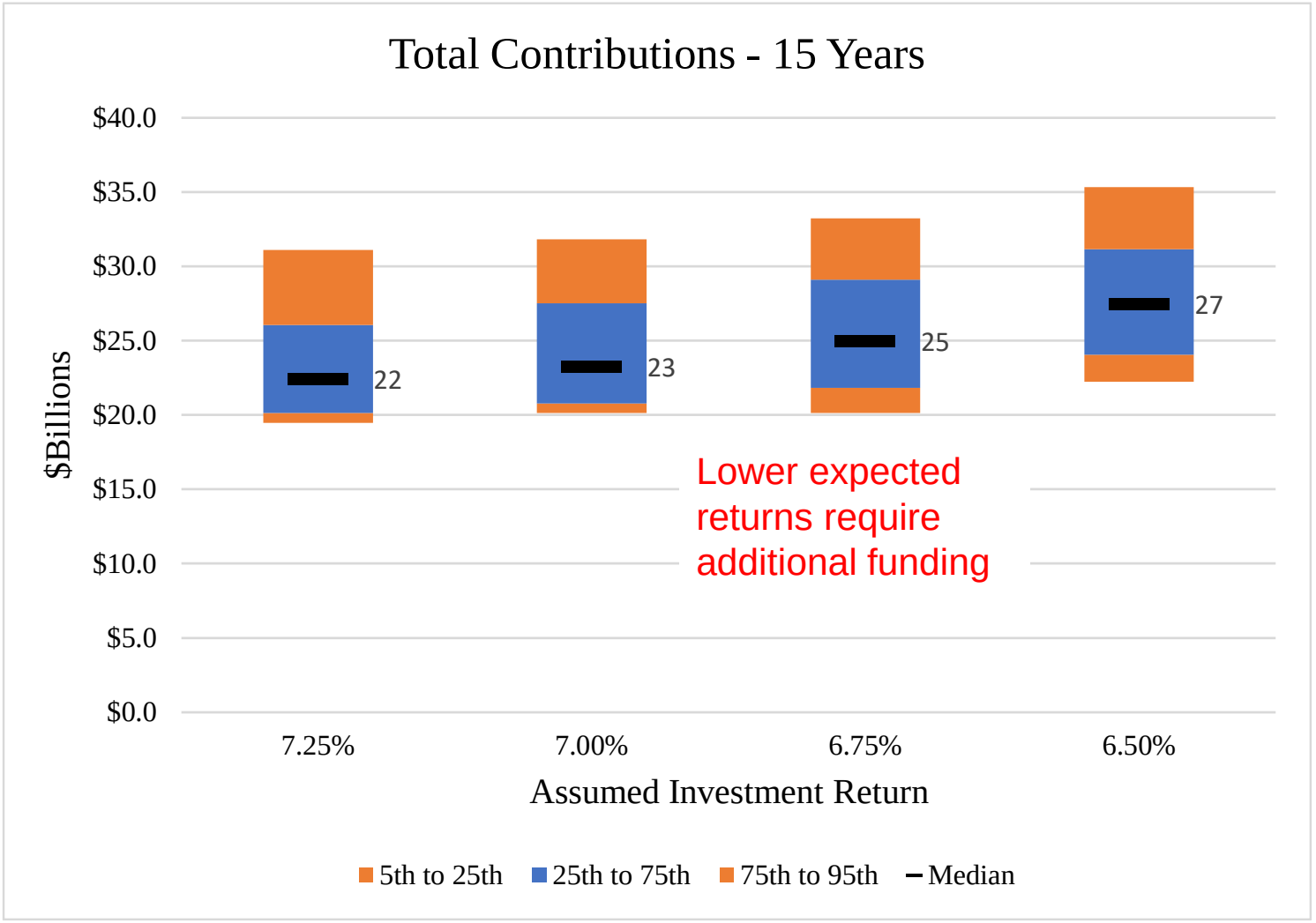
Half of results were above and half were below (median)

Each orange area has 20% of results

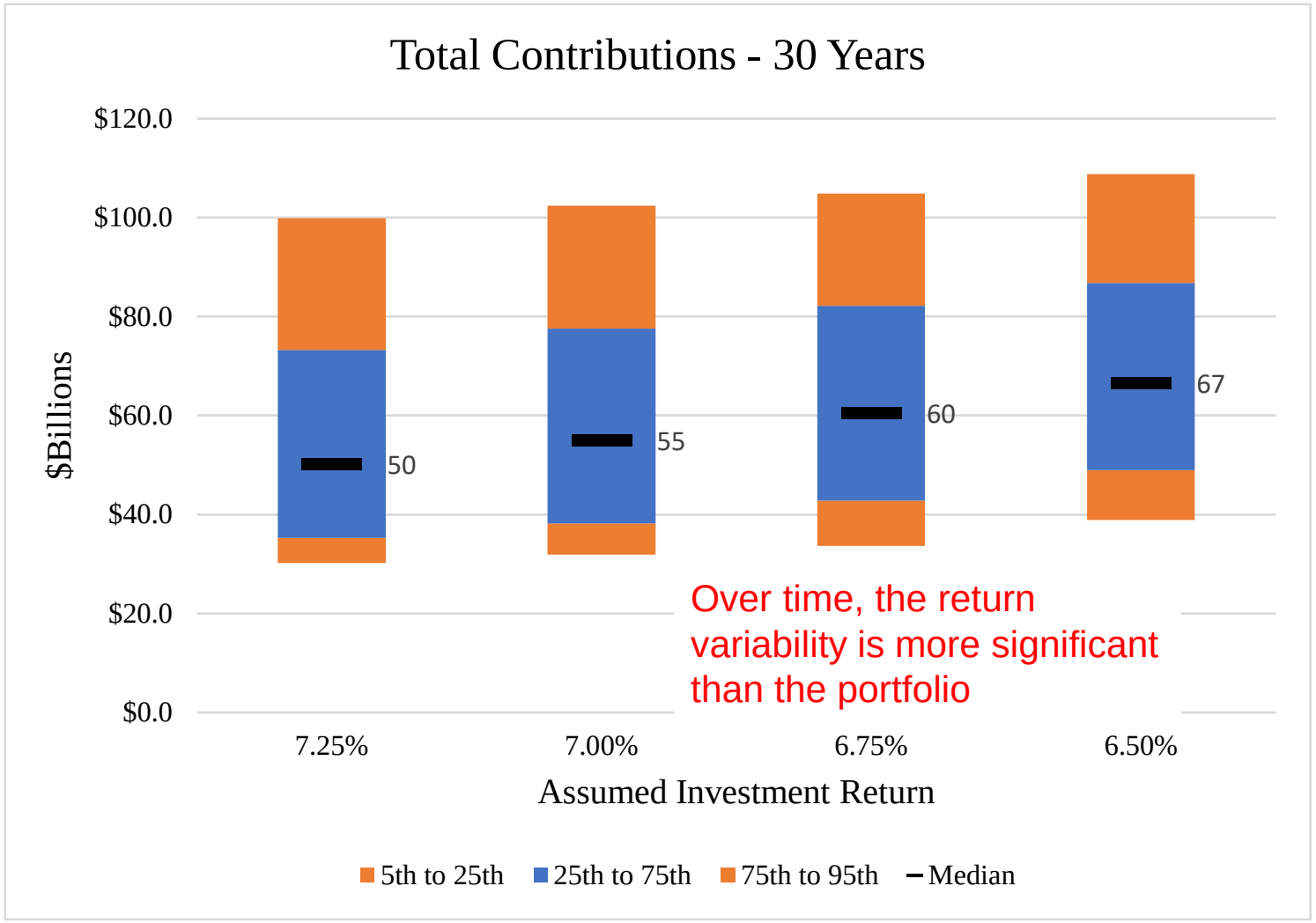
Study Measures

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

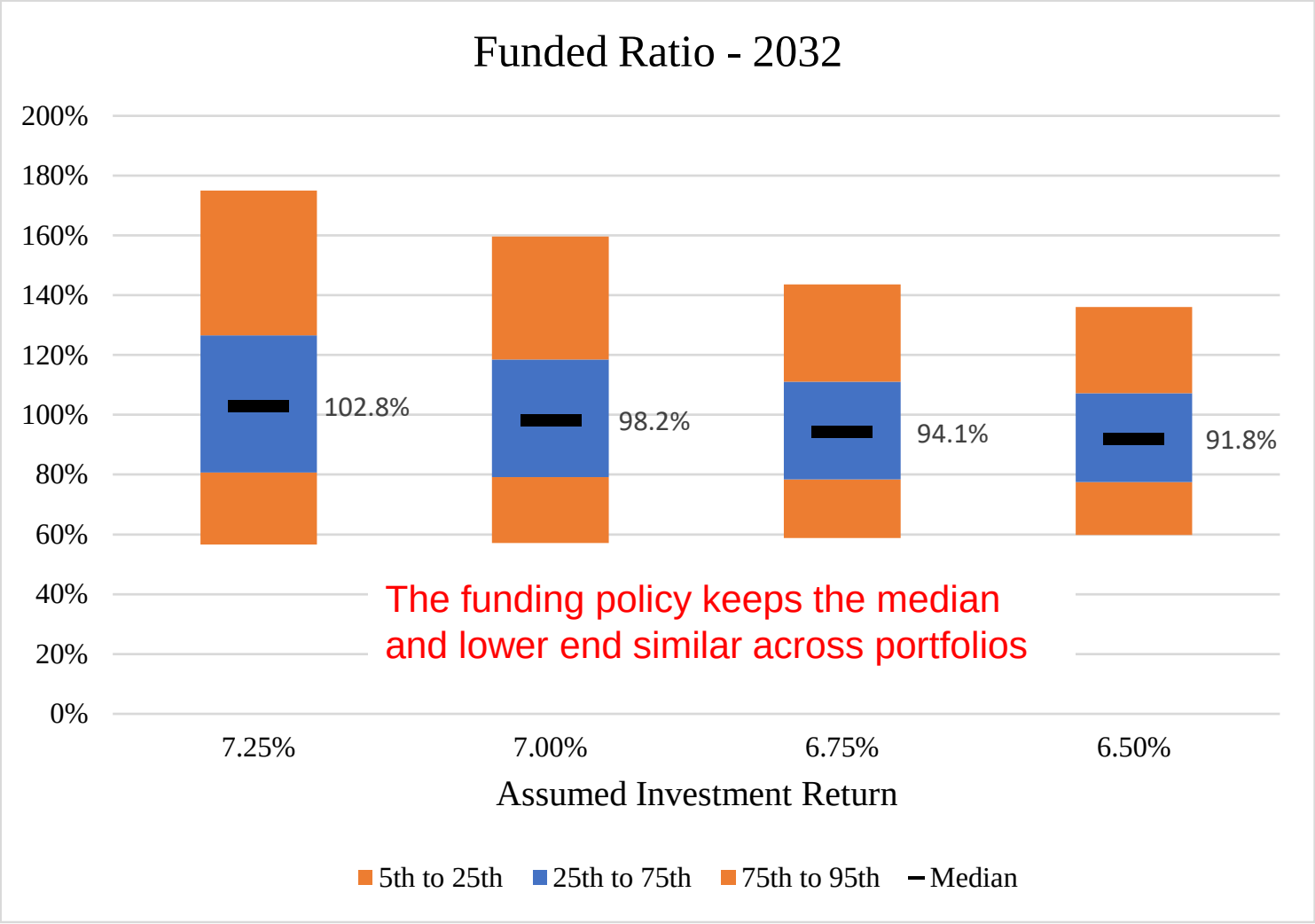
Study Output



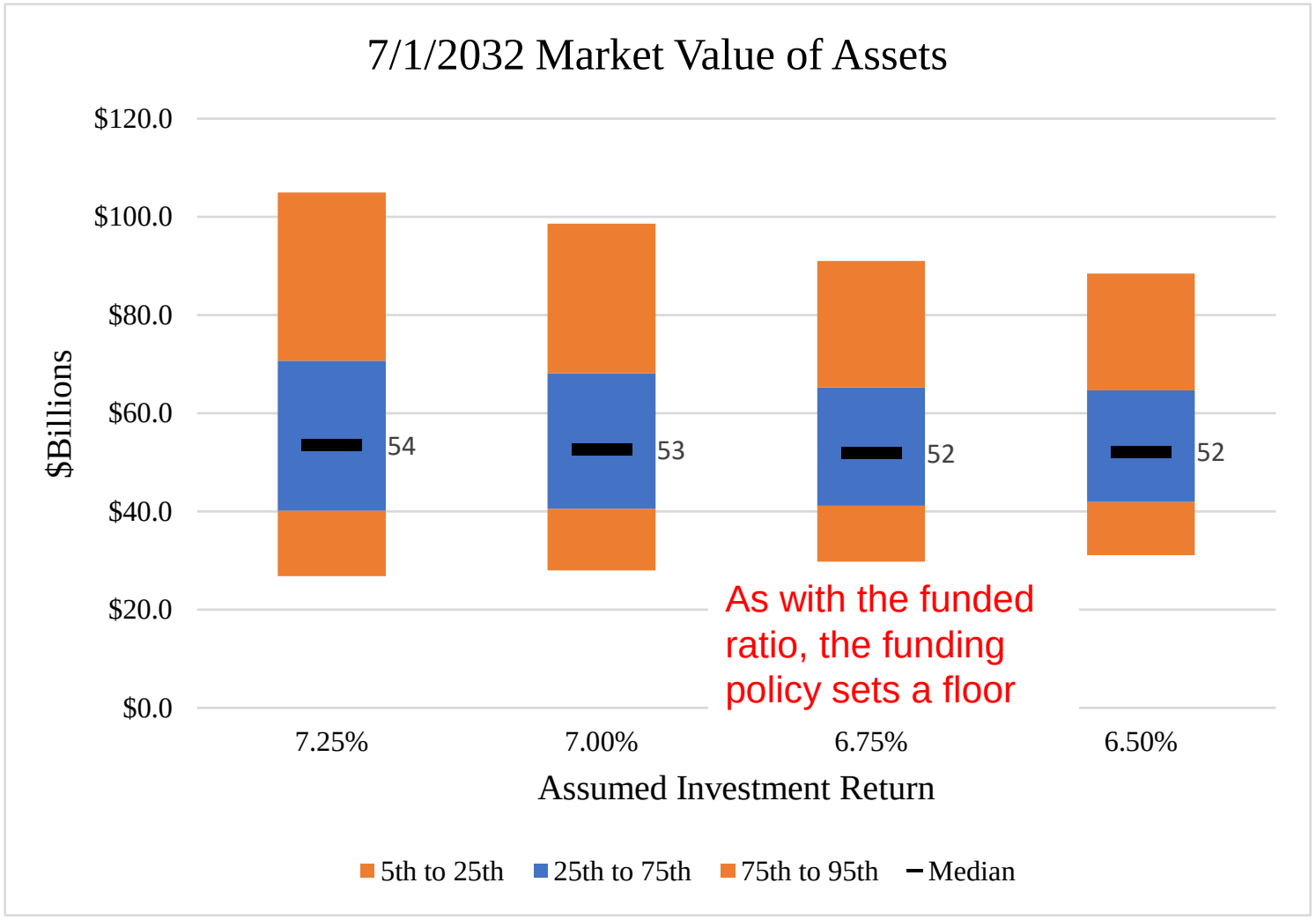
Study Output



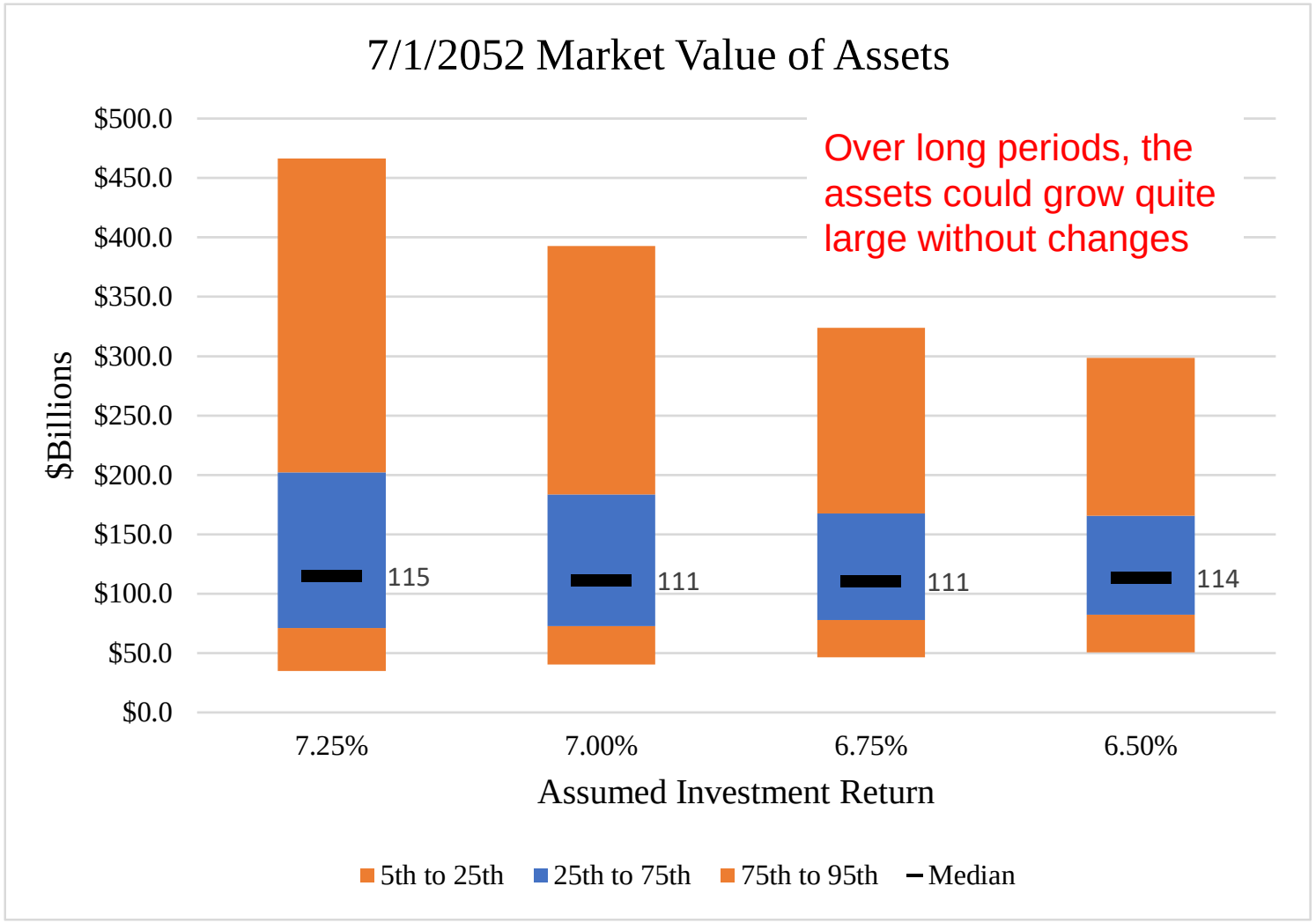
Study Output



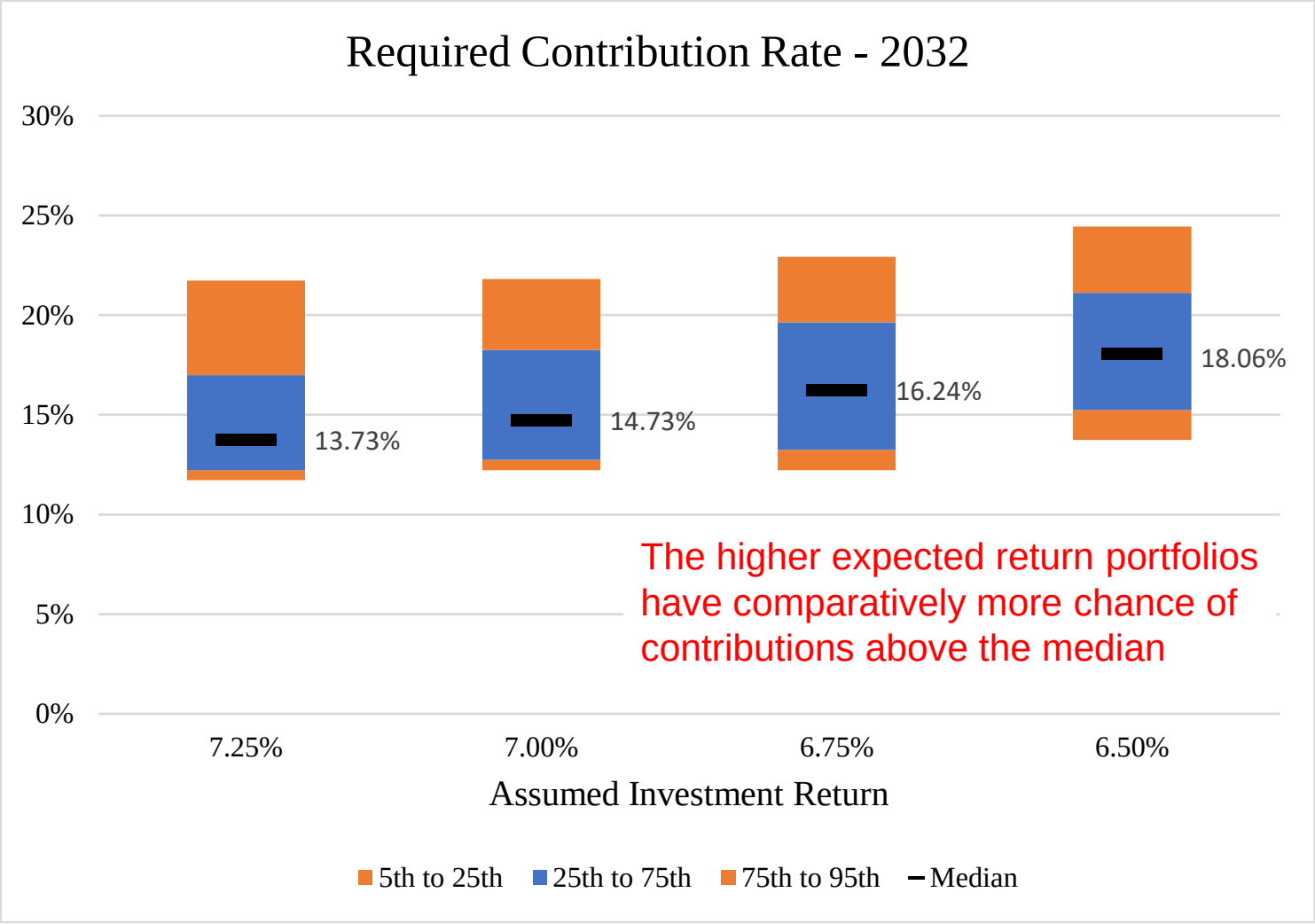
Study Output



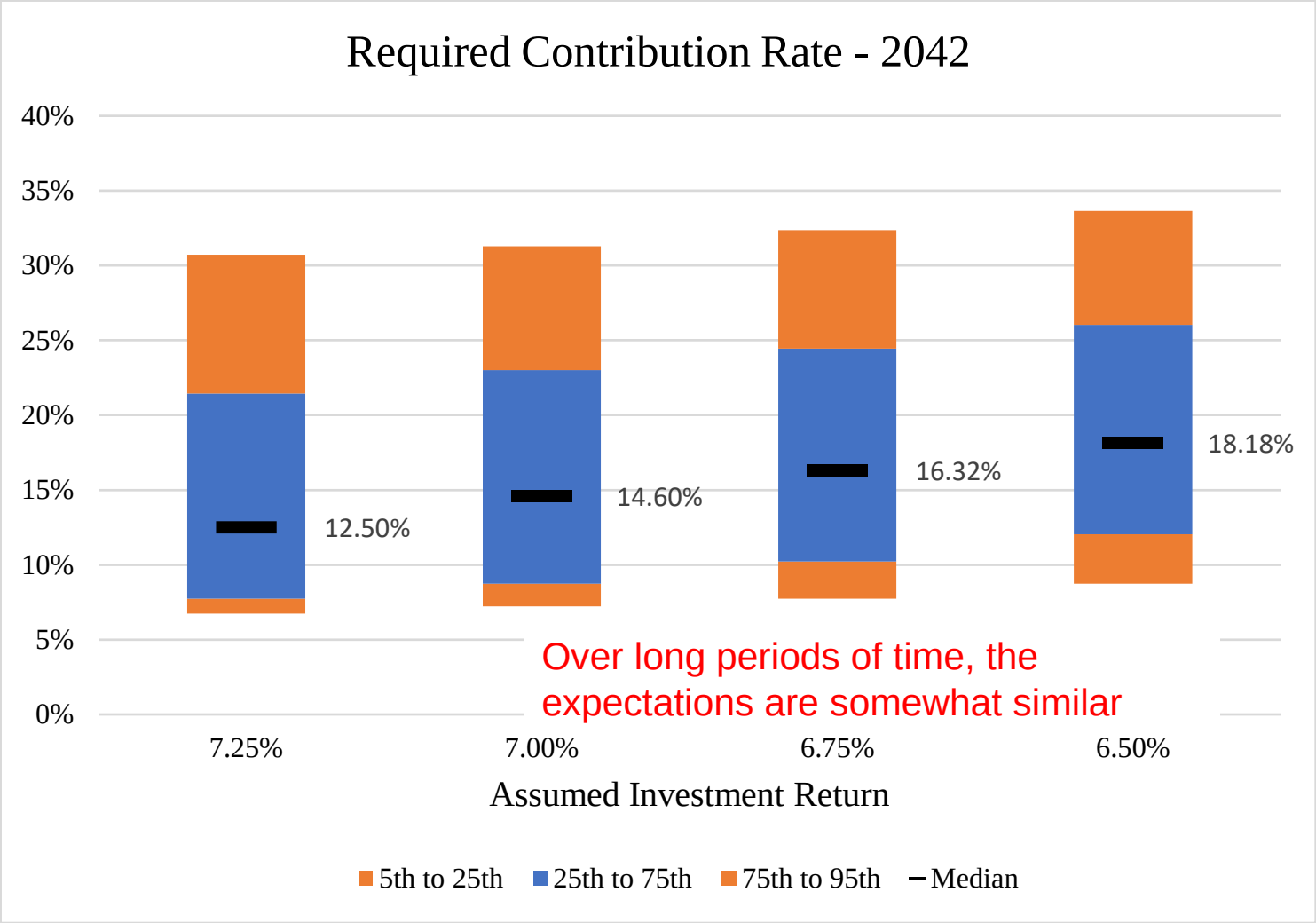
Study Output



Study Output



Study Output



Study Output

Contributions over the next 20 years	**7.25%**	**7.00%**	**6.75%**	**6.50%**
Scenarios above 18% (10-year period)	20.30%	26.80%	37.80%	54.00%
Scenarios above 18% (20-year period)	38.80%	44.50%	52.20%	64.50%
Proportion of years above current rate	25.90%	32.49%	45.53%	69.55%
Average number of increases	4.67	5.35	6.67	8.17

Conclusions

- Higher expected returns lead to generally lower contributions.
- Higher expected returns have more volatility which can lead to more assets than needed (good returns) or contribution increases (bad returns).
- The IPERS funding policy minimizes IPERS being unable to pay benefits and increases benefit security.