

San Bernardino County Employees' Retirement Association

**Actuarial Issues for 2020
Board Offsite
March 13, 2020**

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| Topics for Today

What Goes into an Actuarial Valuation?

- **Focus on Assumptions and Funding Methods**

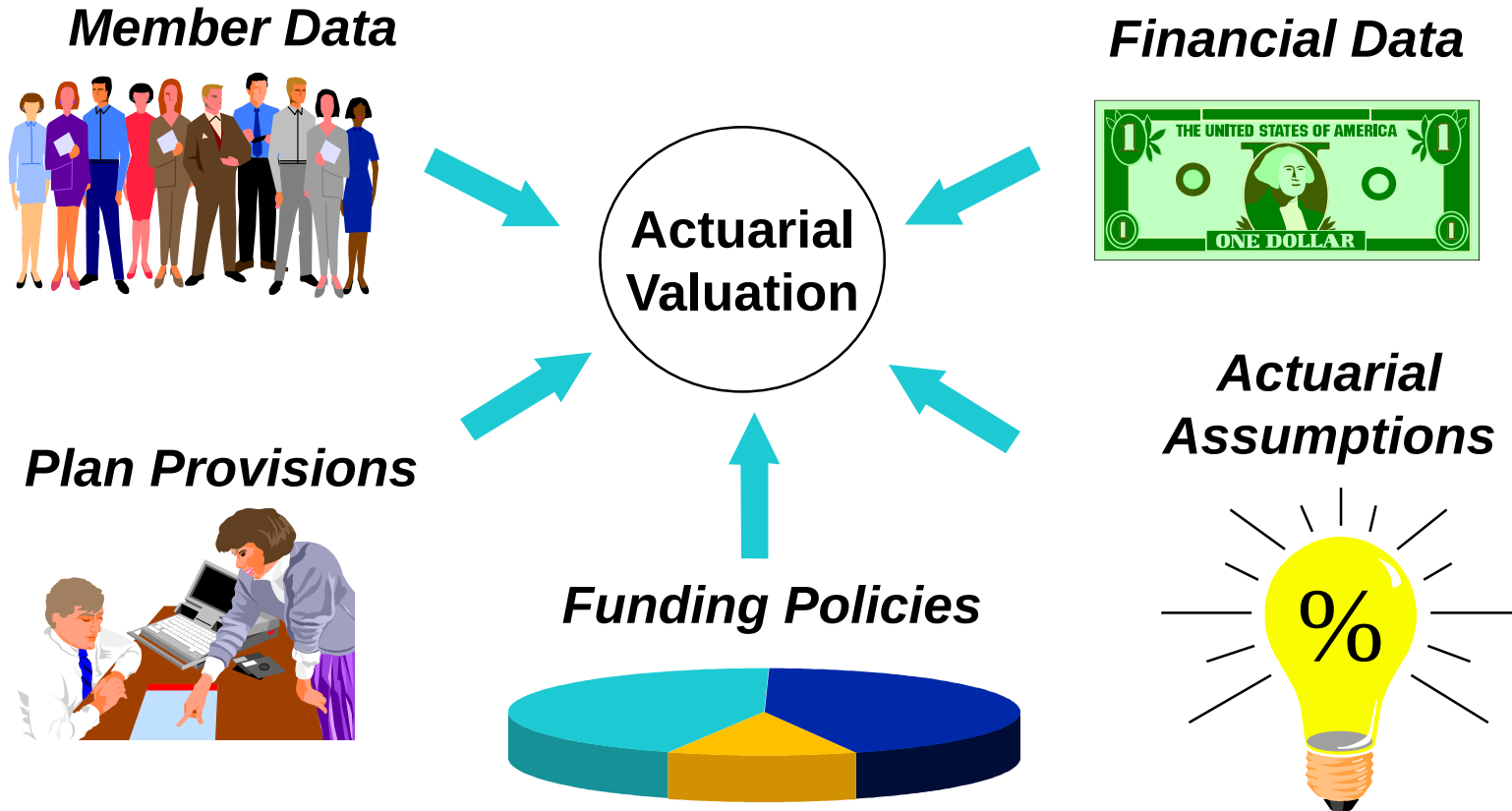
Preview of the 2020 Experience Analysis

- **Focus on Mortality and Expected Return**

SBCERA's UAAL Amortization

- **Proposal to Manage Short-term “Tail Volatility”**

What Goes Into an Actuarial Valuation



Valuation Input

Member Data



	Then – 6/30/2002 (Segal's 1st Valuation)	Now – 6/30/2019 (Most Recent Valuation)
Actives	17,952	21,823
Average Annual Salary	\$48,201	\$70,682
Retirees and Beneficiaries	5,984	13,244
Average Annual Benefit	\$19,400	\$44,146
Vested Terminated	1,547	6,726
Other Member Data	See Summary Provided in Above Reports	

Valuation Input

Financial Data



	Then – 6/30/2002	Now – 6/30/2019
Market Value	\$3,138 m	\$10,588 m
Valuation Value (Smoothed)	\$3,511 m	\$10,658 m
Last Year's Contributions	\$87 m	\$610 m
Last Year's Benefits	\$123 m	\$579 m
Net Investment Income	-\$177 m	\$503 m
Other Financial Data	See Summary Provided in Above Reports	

Valuation Input

Plan Provisions



	Then – 6/30/2002	Now – 6/30/2019
Benefit Formulas Offered	2	4
Formula for New General Ees	2.0% of Final 1-Yr Salary @ 55	2.5% of Final 3-Yr Salary @ 67
Formula for New Safety Ees	3.0% of Final 1-Yr Salary @ 50	2.7% of Final 3-Yr Salary @ 57
Other Plan Provisions	See Summary Provided in Above Reports	

Valuation Inputs – Two Actuarial Policy/Decision Areas

- Actuarial Assumptions
 - Assign a value to the benefits promised
 - Economic assumptions
 - Including the expected investment return
 - Demographic assumptions
 - Including mortality/longevity – Generational and “benefit weighted” mortality
 - Reviewed every 3 years, in the Experience Analysis
- Actuarial Funding Policy
 - Determines current year employer contributions
 - Actuarial Cost Method (never changes)
 - Asset Smoothing Method (rarely changes)
 - UAAL* Amortization Policy (reviewed occasionally)

* UAAL = Unfunded Actuarial Accrued Liability

Role of Assumptions and Methods

$$\mathbf{C + I = B + E}$$

Contributions + Investment Income
equals

Benefit Payments + Expenses

- Actuarial valuation determines the current or “measured” cost, not the ultimate cost
- Assumptions and funding methods affect only the timing of costs (unless benefits are affected!)

Valuation Input

- Actuarial Assumptions
 - Two types
- Demographic assumptions
 - When benefits will be payable
 - Amount of benefits
- Economic assumptions
 - How assets grow
 - How salaries increase
- Reviewed every three years in the Experience Study
 - For SBCERA in 2020

Valuation Input

Actuarial Assumptions (Demographic)



	Then – 6/30/2002	Now – 6/30/2019
Termination & Disability Assumptions	Based on Actual Experience	Based on Actual Experience
Retirement Assumptions	3 Sets	4 Sets
Mortality Assumptions	1994 Group Annuity Mortality / 1981 Disability Mortality Tables	Retirement Plan (RP) 2014 Mortality Tables w/ Generational Projection
Other Demographic Actuarial Assumptions	See Summary Provided in Actuarial Reports	

Valuation Input

Actuarial Assumptions (Economic)



	Then – 6/30/2002	Now – 6/30/2019
Inflation	4.25%	3.00%
Real Return	3.91%	4.25%
Investment Return	8.16%	7.25%
Salary Increase	4.25% + Merit/Promotion Increase	3.50% + Merit/Promotion Increase
Other Economic Actuarial Assumptions	See Summary Provided in Actuarial Reports	

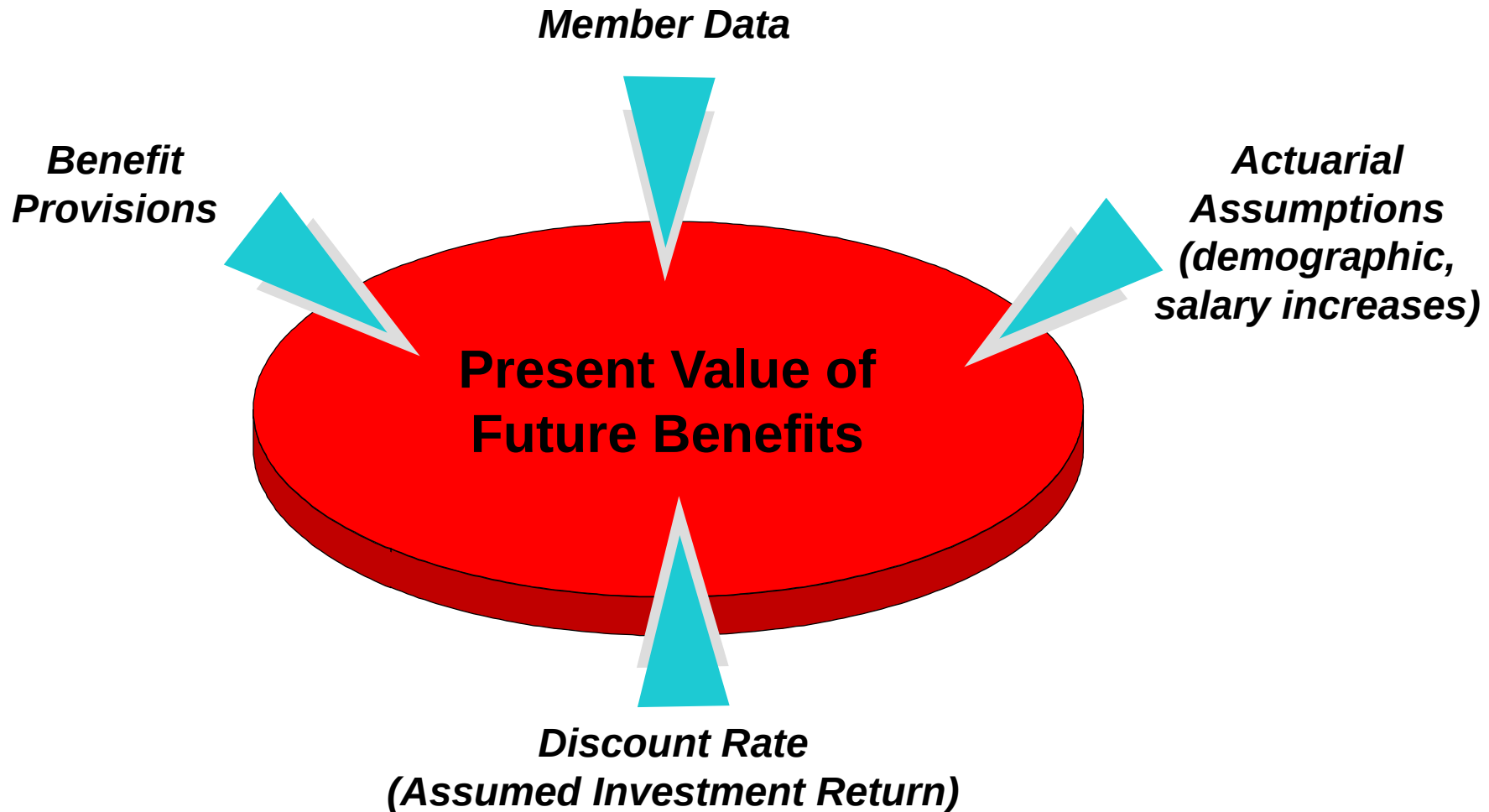
Valuation Input

Funding Policies – Three components



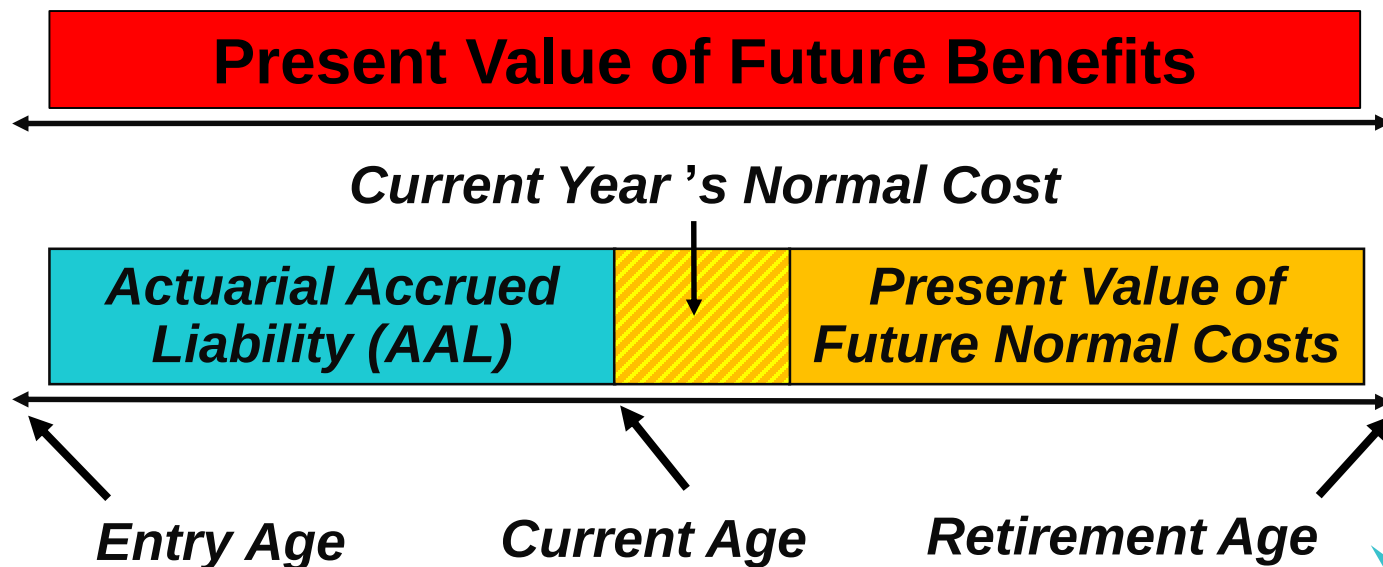
- **Actuarial Cost (or Funding) Method** – allocates present value of member's projected benefits to years of service: past, current and future
 - Defines Normal Cost and Actuarial Accrued Liability (AAL)
- **Asset Smoothing Method** – assigns a value to assets that manages short term volatility while tracking market value
 - Defines the Unfunded Actuarial Accrued Liability (UAAL)
- **UAAL Amortization Policy** – sets contributions to systematically pay off any UAAL
 - Includes structure, periods and pattern of payments

Present Value Of Future Benefits



Actuarial Cost Method -- Terminology

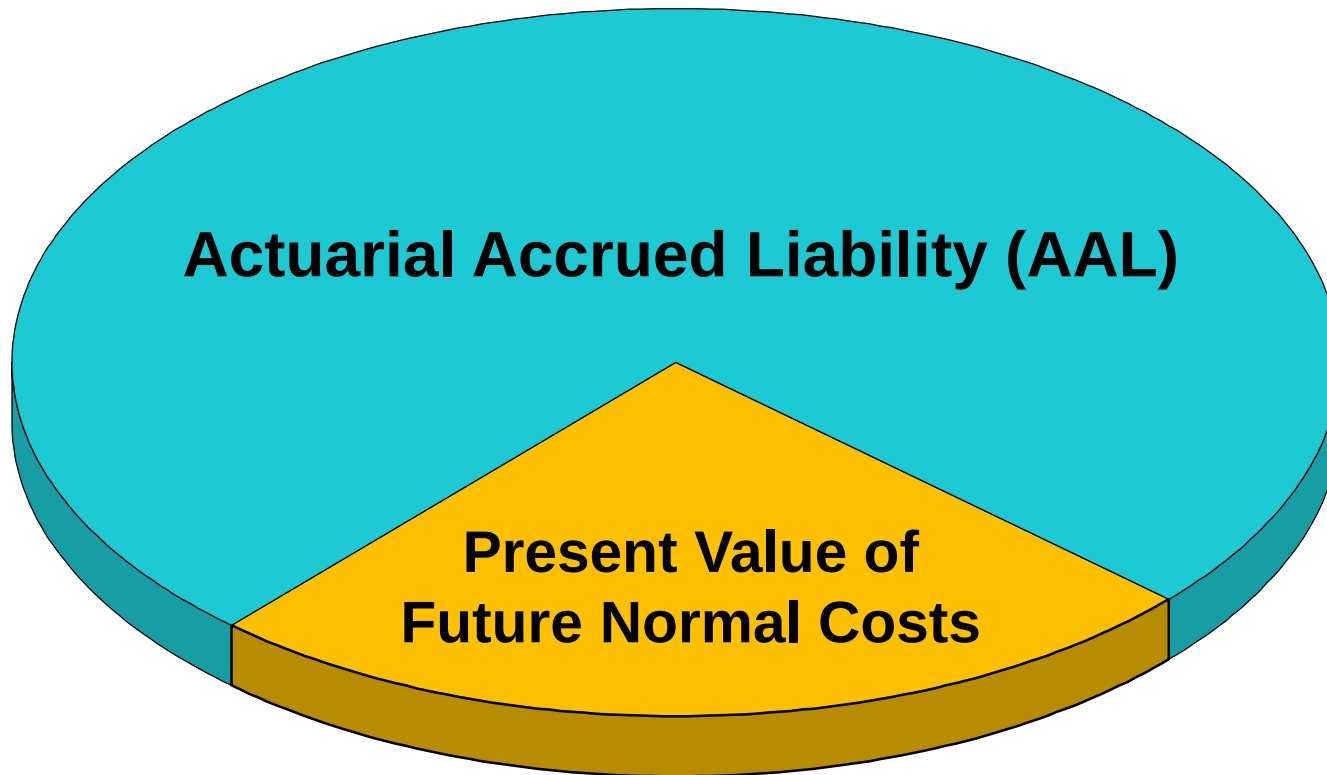
- **The Normal Cost** is the portion of the value of projected benefits for active members that is allocated to each plan year.
 - Normal Cost is shared between employees and employers
- **The Actuarial Accrued Liability (AAL)** measures the Normal Costs from past years — for retired members, the AAL is the entire value of their benefit.
 - Any unfunded AAL (UAAL) is almost always funded by the employers



Accrued Liability and Future Normal Costs

**Present Value of
Future Benefits**

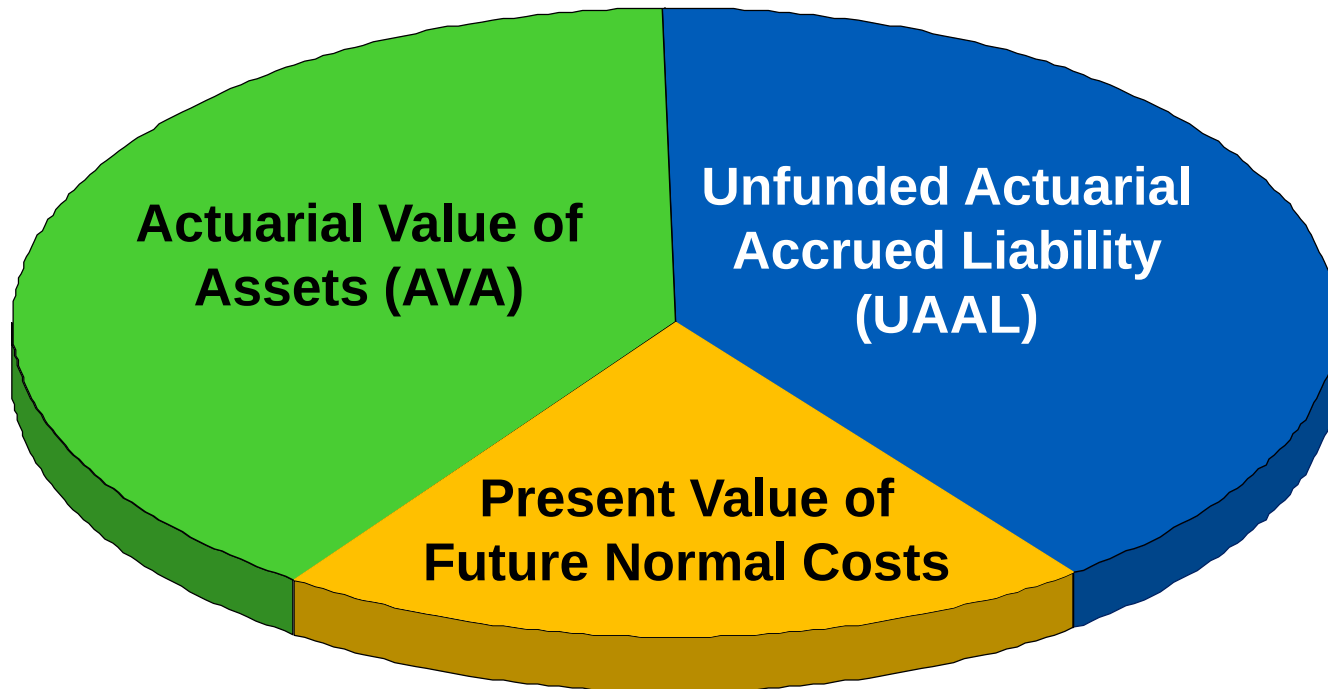
**Actuarial Accrued Liability
+ Present Value of Future Normal Costs
= Present Value of Future Benefits**



Actuarial Value of Assets and the UAAL

Present Value of
Future Benefits

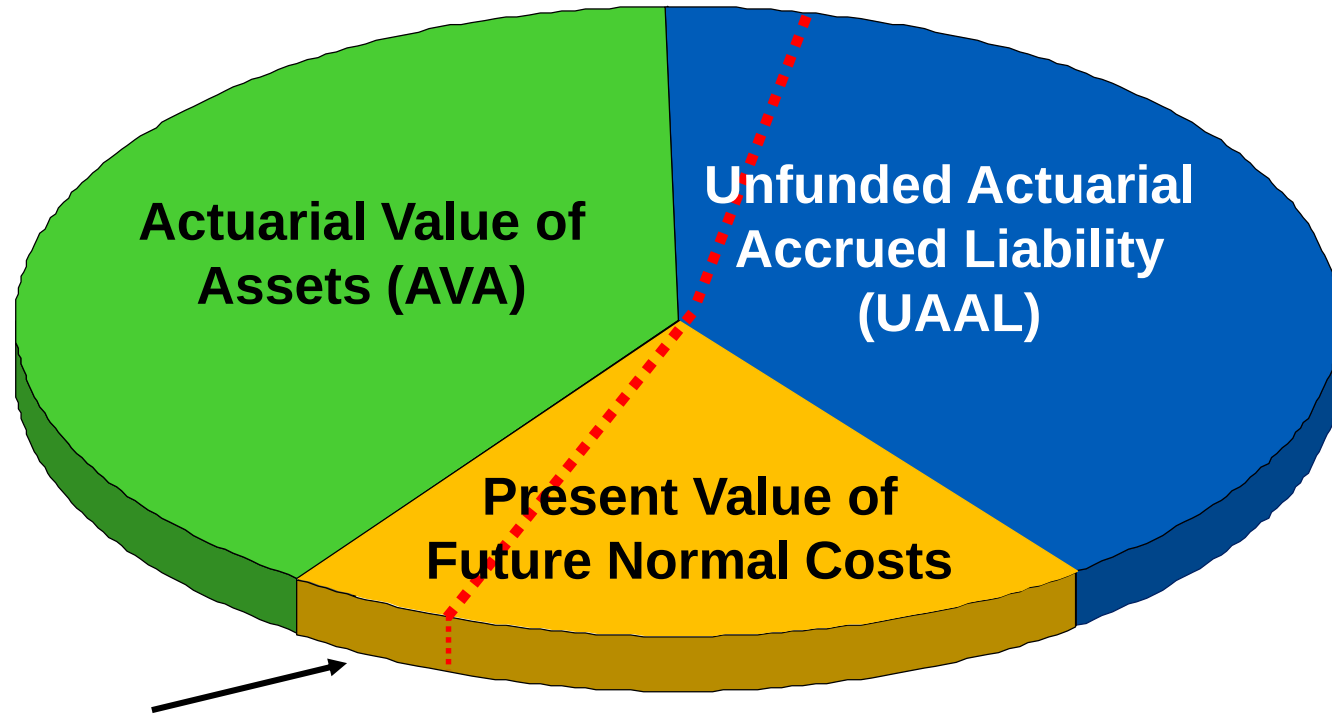
Actuarial Accrued Liability
– Actuarial Value of Assets
= **Unfunded Actuarial Accrued Liability**



Funding Policy and “Actuarially Determined Contribution”

Present Value of
Future Benefits

*Amortization of Unfunded
Actuarial Accrued Liability
(paid by employers)*



*Normal Cost (includes
member contributions)*

Funding Policy – SBCERA Current Funding Policy

- Actuarial Cost Method
 - Entry Age – level percent of pay normal cost
- Asset Smoothing Method
 - 5-year smoothing period with no market value corridor
 - Reaffirmed by the Board in 2009

Funding Policy – SBCERA Current Funding Policy (continued)

- Amortization Policy

- Approved by the Board effective with the 6/30/2002 valuation
- 6/30/2002 UAAL amortized over fixed 20-year period
- Layered approach for new UAAL identified after 6/30/2002
 - 20-year periods for all changes in UAAL due to:
 - Actuarial experience gains/losses
 - Actuarial assumption changes

- Formal Funding Policy adopted by the Board in 2012

- Reaffirmed in 2014

Questions?



Setting Actuarial Assumptions

- Selection of Actuarial Assumptions
 - Objective, long term
 - Experience analysis
 - Recent experience or future expectations
 - Demographic: recent experience
 - Economic: not necessarily!
 - Client specific or not
 - Consistency among assumptions
 - Desired pattern of cost incidence
 - Beware “results based” assumptions!

Setting Actuarial Assumptions – Economic Assumptions

- Price Inflation (CPI)
 - Investment Return, Salary Increases, COLA
- Investment Return
 - Components include price inflation, real return, expenses (investment)
 - Generally based on passive returns
- Salary Increases
 - “Across the board” increases
 - Includes price inflation plus real wage growth
 - Merit & Promotion: based on experience
 - More like a “demographic” assumption

Setting Actuarial Assumptions – Sample Economic Assumptions: 2014 vs 2017

Exhibit A: Page 23

	2014 Study		2017 Study	
	Return	Pay*	Return	Pay*
Price Inflation	3.25%	3.25%	3.00%	3.00%
Real Wages	n/a	0.50%	n/a	0.50%
Net Real Return	4.25%**	n/a	4.25%**	n/a
Total	7.50%	3.75%	7.25%	3.50%

* Excludes merit and promotion component of assumed individual salary increases

** Recommended return is net of investment expenses

Setting Actuarial Assumptions –

Salary Increase Assumption: Three components

- Price Inflation: Trend is lower assumptions
 - Sample: Reduced from 3.25% (2014) to 3.00% (2017)
 - Market based forecasts are even lower
 - **Segal has been recommending 2.75% since 2018**
- Real Increases (“Across the Board”)
 - Average wage growth above average price increases
 - Historically: 0.6%-0.9% for state and local governments
 - Social Security projects 1.2% (median assumptions)
- Promotion and Merit Increases
 - Varies by age and/or years of service

Setting Actuarial Assumptions – Payroll Growth Assumption

- Used to project total payroll for UAAL amortization
- Active member payroll growth based on wage inflation
 - Assumes constant active head count
- Includes price inflation and real wage increases
 - Price inflation: 3.25% (2014) vs. 3.00% (2017)
 - Real wage increases: 0.50% (2014) vs. 0.50% (2017)
 - Total payroll growth: 3.75% (2014) vs. 3.50% (2017)

Setting Actuarial Assumptions – Investment Earnings (Return) Assumption

- Used to set the discount rate for measuring costs
 - Sometimes called the assumed interest rate
 - Used for contribution requirements
 - Also for financial reporting (GASB 67 and 68)
 - Affects timing of Plan cost
 - Lower assumed rate means higher current cost
 - Ultimately, actual earnings determine cost
- $C + I = B + E$**
- “Can’t pay benefits with assumed earnings!”

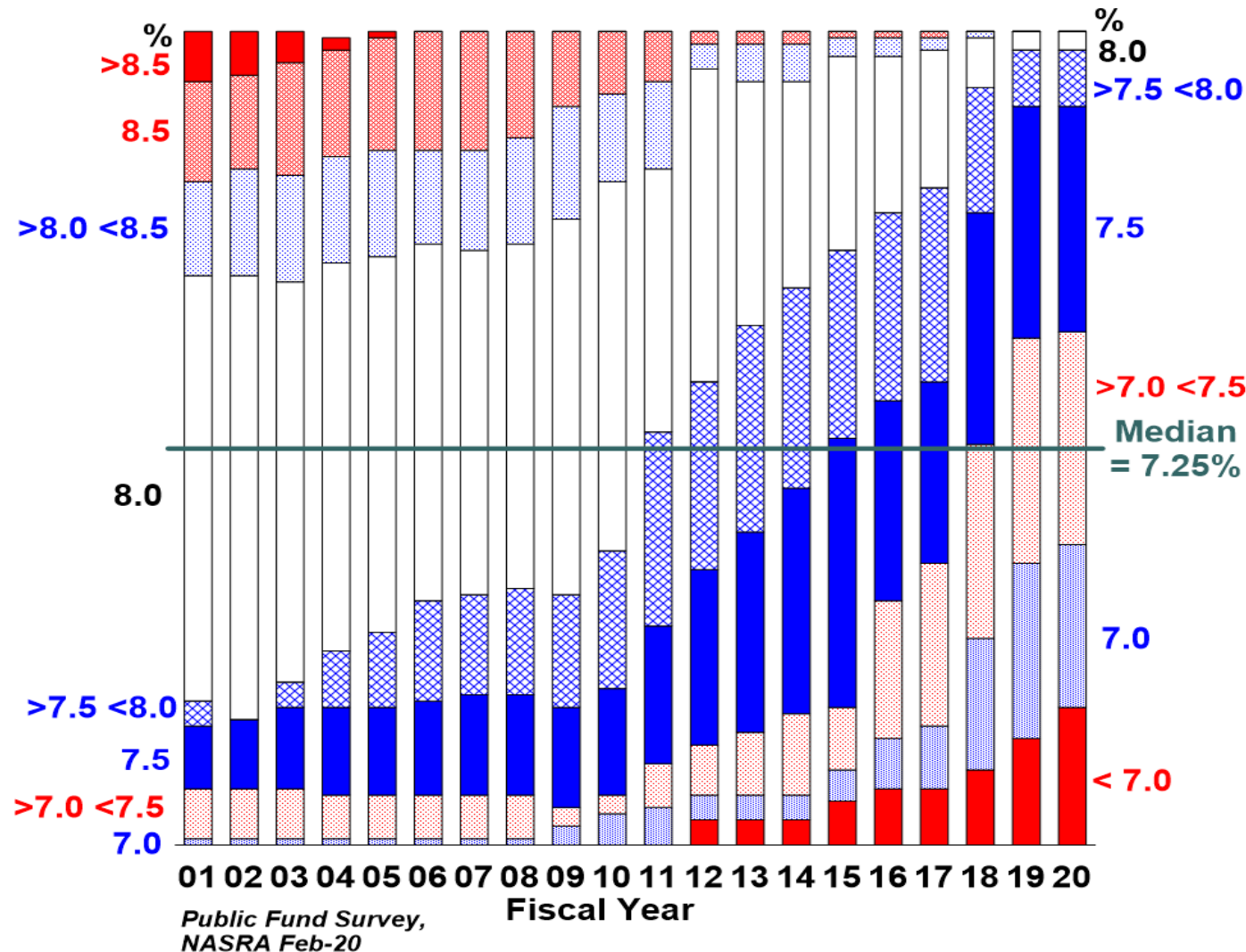
Setting Actuarial Assumptions – Setting the Earnings Assumption

- Building-Block Method
 - Expected inflation: consistent with salary increases
 - Real return for each asset class
 - Weighted by asset allocation
 - Less assumed expenses (investment)
 - Less risk adjustment (“margin for adverse deviation”)
- Note: generally no add-on for superior managers
 - “Indexed” returns, no “alpha”
- Sources of real return data:
 - Investment consultants (your Fund and industry)

Setting Actuarial Assumptions for SBCERA– Components of Investment Return Assumption

	2014 Study	2017 Study
Assumed Inflation	3.25%	3.00%
Portfolio Real Rate of Return	5.59%	5.55%
Assumed Expenses	(1.08%)	(1.25%)
Risk Adjustment	(0.26%)	(0.05%)
Total	7.50%	7.25%
Confidence Level	53%	51%

Setting Actuarial Assumptions – Change in Distribution of Public Pension Investment Return Assumptions, FY 01 to FY 20



Setting Actuarial Assumptions – Expected Return Assumptions for California Systems

Exhibit A: Page 30

System(s)	Assumption	Count
CalPERS	7.00%	
CalSTRS	7.00%	
University of California	6.75%	
1937 CERL Systems	7.25%	9
	7.00%	10
	6.50%	1
City Systems		
San Francisco	7.40%	
LACERS, LAFPP	7.25%	
LADWP	7.00%	
Fresno	7.00%	
San Jose	6.75%	
San Diego	6.50%	

Setting Actuarial Assumptions –

Impact of assuming lower earnings or longer lifetimes

- Increases UAAL, decreases funded ratio
- Increases current contribution rates (especially employer)
- Reduced risk of increasing future employer contributions
- Conflicting policy goals?
 - Everyone wants to lower UAAL, increase funded ratio
 - But more conservative assumptions will increase UAAL
 - Even though assumption changes are fully justified
- “No good deed goes unpunished!”
 - But you still need to “Do the right thing!”

Questions?



Setting Actuarial Assumptions – Mortality Assumptions for SBCERA

- Current mortality assumptions for SBCERA members
 - Assumptions adopted with last experience study and used for 6/30/2017, 6/30/2018 and 6/30/2019 valuations
 - Generational projection of future mortality improvement
 - Separate headcount weighted mortality tables for General and Safety members
 - Both using RP-2014 as base table
 - RP-2014 table developed using private sector pension experience
 - Adjusted based on 6 years of SBCERA mortality experience
 - General retirees expected to live about as long as base table
 - Safety retirees expected to live about 1 year longer than base table

Setting Actuarial Assumptions – Mortality Assumptions for SBCERA (continued)

- 2017 study noted upcoming change from headcount weighted basis to benefit weighted basis
 - Headcount weighted basis looks only at number of members who die or survive
 - Benefit weighted basis reflects how income affects mortality
 - Important because pension liability is greater for members with higher benefits
 - Consistent with recommendation made by SBCERA actuarial auditor in 2018
 - SBCERA’s actuarial auditor: “the default should be to use the benefit-weighted table when a choice between such tables is available”

Setting Actuarial Assumptions – New Public Sector Mortality Tables

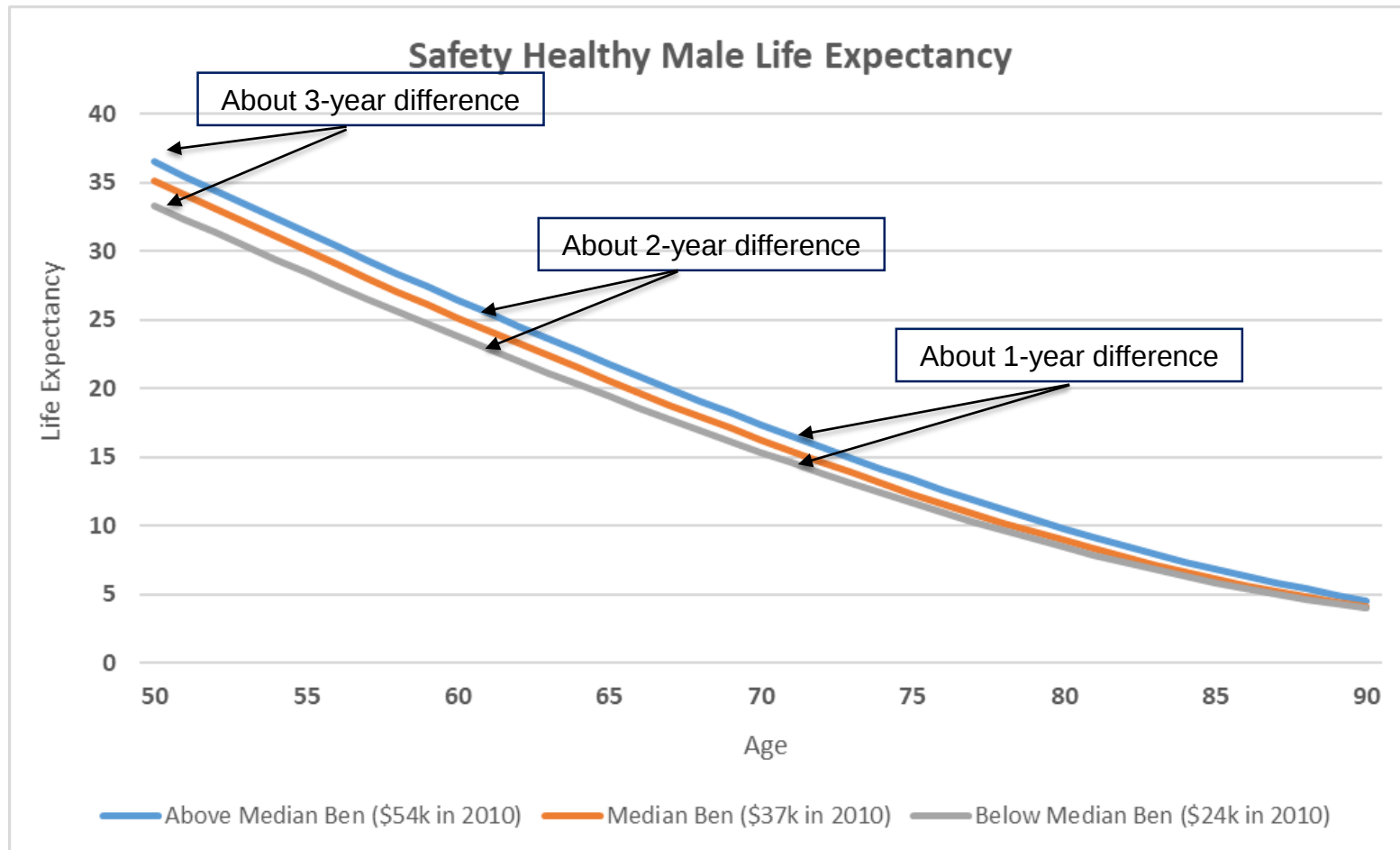
- Switch to benefit weighted basis was deferred, pending new mortality tables based on public sector experience
 - Pub-2010 tables developed based on public sector experience
 - Published by the Retirement Plans Experience Committee (RPEC) of the Society of Actuaries (SOA) in 2019
 - Separate tables for
 - Job category (i.e., General, Safety and Teacher)
 - Pre and post retirement
 - Healthy annuitant, disabled annuitant and survivor
 - Benefit weighted and headcount weighted

Setting Actuarial Assumptions – New Public Sector Mortality Tables (continued)

- Anticipated discussions at triennial experience study before 6/30/2020 valuation
 - Base tables: Pub-2010 General and Pub-2010 Safety
 - Benefit weighted tables consistent with prior discussions and SOA research
 - Pub-2010 study continues to show benefit (or salary for active employees) is a significant predictor of mortality differences: “consistent with a number of earlier studies..., higher benefits amounts were correlated with lower levels of mortality”

Setting Actuarial Assumptions – Sample New Public Sector Safety Mortality Tables

- Pub-2010 Safety life expectancies based on 3 levels of annual benefit



Setting Actuarial Assumptions – Mortality Assumptions for SBCERA

- Greater focus on “credibility” of SBCERA specific data
 - About 1,000 deaths needed for full credibility for headcount-weighted mortality
 - Where full credibility means 90% confidence that the actual experience will be within 5% of the expected value
 - Requires more than 1,000 deaths under benefit weighted basis
 - Because dispersion of retirees’ benefit amounts is taken into account
 - With full credibility, can adjust standard tables to match observed experience
 - Otherwise must weight observed experience and standard table
 - Can mean more stable assumptions (especially for smaller groups such as Safety)

Setting Actuarial Assumptions – Mortality Assumptions for SBCERA (continued)

- Credibility of SBCERA specific data
 - SBCERA's General mortality experience over a 9-year period for 2020 study is fully credible with over 1,000 deaths
 - SBCERA's Safety mortality experience over a 9-year period for 2020 study is not fully credible
 - Partially adjust the Pub-2010 Safety mortality tables to fit SBCERA experience
- Potential impact on valuation results
 - Some increase in liabilities and contribution rates due to effect of new benefit weighted mortality assumptions

Questions?



SBCERA's UAAL Amortization Structure

- Effective in 2002, Board adopted layered UAAL amortization
 - Then current (6/30/2002) UAAL amortized over 20 years
 - In subsequent valuations, each new change in UAAL is amortized over separate, fixed periods
 - 20 years for gains/losses and assumptions changes
 - 15 years for plan amendments
 - Up to 5 years for temporary retirement incentive
 - Amortization payments structured as a level percentage of projected total payroll

SBCERA's UAAL Amortization Structure (continued)

- For each amortization layer, the amortization schedule shows
 - Source and amount of each change in UAAL since 2002
 - Outstanding balance remaining
 - Years remaining before being fully amortized
 - Current amortization payment
- Sum of outstanding balances by layer equals total UAAL
 - Separate schedules for each cost group

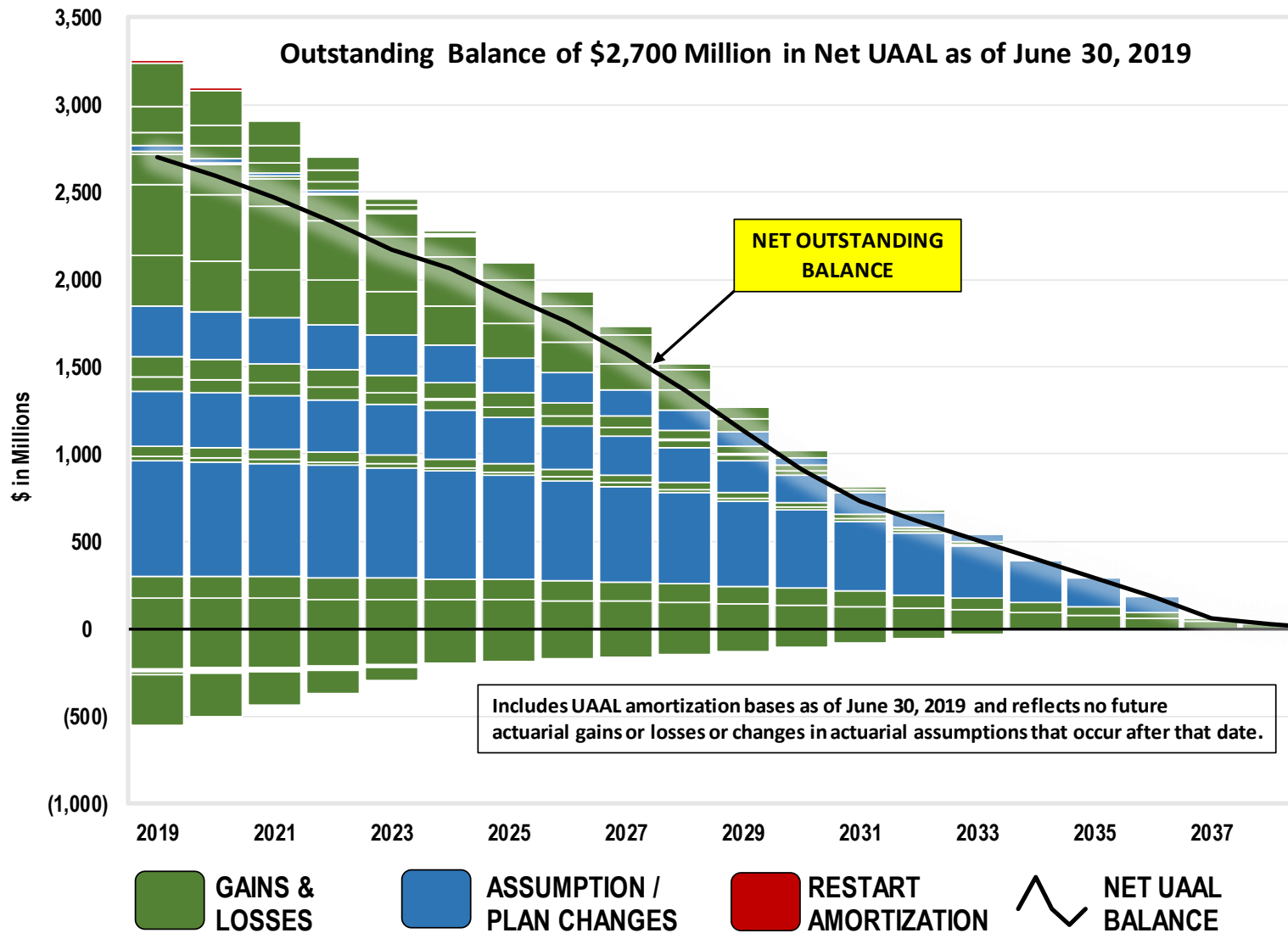
SBCERA June 30, 2019 Amortization Schedule

Date Established	Source	Initial Amount (\$ in '000s)	Initial Period	Outstanding Balance (\$ in '000s)	Years Remaining	Amortization Amount (\$ in '000s)
Combined						
June 30, 2002	Restart Amortization	\$36,177	20	\$14,074	3	\$5,047
June 30, 2003	Actuarial Loss	515,947	20	252,244	4	69,032
June 30, 2004	Actuarial Loss	249,570	20	143,490	5	31,964
June 30, 2004	POB Credit	(505,187)	20	(290,396)	5	(64,688)
June 30, 2004	Plan Change	1,245	20	711	5	158
June 30, 2005	Actuarial Loss	120,808	20	78,730	6	14,869
June 30, 2005	Assumption Change	41,487	20	27,024	6	5,105
June 30, 2006	Actuarial Gain	(16,929)	20	(12,142)	7	(1,999)
December 31, 2006	UAAL Prepayment	(10,000)	20	(7,458)	7.5	(1,156)
June 30, 2007	Actuarial Gain	(6,662)	20	(5,126)	8	(751)
June 30, 2007	Plan Change	586	20	445	8	65
June 30, 2008	Actuarial Loss	19,453	20	15,943	9	2,112
June 30, 2008	Assumption Change	(10,692)	20	(8,765)	9	(1,162)
June 30, 2009	Actuarial Loss	206,143	20	177,197	10	21,488
June 30, 2010	Actuarial Loss	454,302	20	405,311	11	45,433
June 30, 2011	Actuarial Loss	320,873	20	294,633	12	30,782
June 30, 2011	Assumption Change	312,234	20	286,706	12	29,953
June 30, 2012	Actuarial Loss	122,009	20	114,807	13	11,256
June 30, 2012	Burial Allowance Method Change	3,010	20	2,777	13	271
June 30, 2013	Actuarial Loss	79,446	20	76,201	14	7,052
June 30, 2014	Actuarial Gain	(232,660)	20	(226,084)	15	(19,848)
June 30, 2014	Assumption Change	331,433	20	322,043	15	28,271
June 30, 2015	Actuarial Loss	59,042	20	58,010	16	4,852
June 30, 2016	Actuarial Loss	24,146	20	23,910	17	1,912
June 30, 2017	Actuarial Gain	(2,921)	20	(2,912)	18	(224)
June 30, 2017	Assumption Change	662,715	20	659,461	18	50,625
June 30, 2018	Actuarial Loss	127,034	20	\$126,893	19	9,376
June 30, 2019	Actuarial Loss	172,248	20	<u>172,248</u>	20	<u>12,283</u>
Grand Total				\$2,699,975		\$292,078

SBCERA's UAAL Amortization Structure (continued)

- 2019 valuation includes graphical representation of UAAL amortization layers
 - Projects UAAL amortization bases and payments
 - **Assuming no future actuarial gains/losses, assumption changes or plan amendments**
 - Use graphs in conjunction with amortization schedule

SBCERA Projection of UAAL Amortization Balances as of June 30, 2019



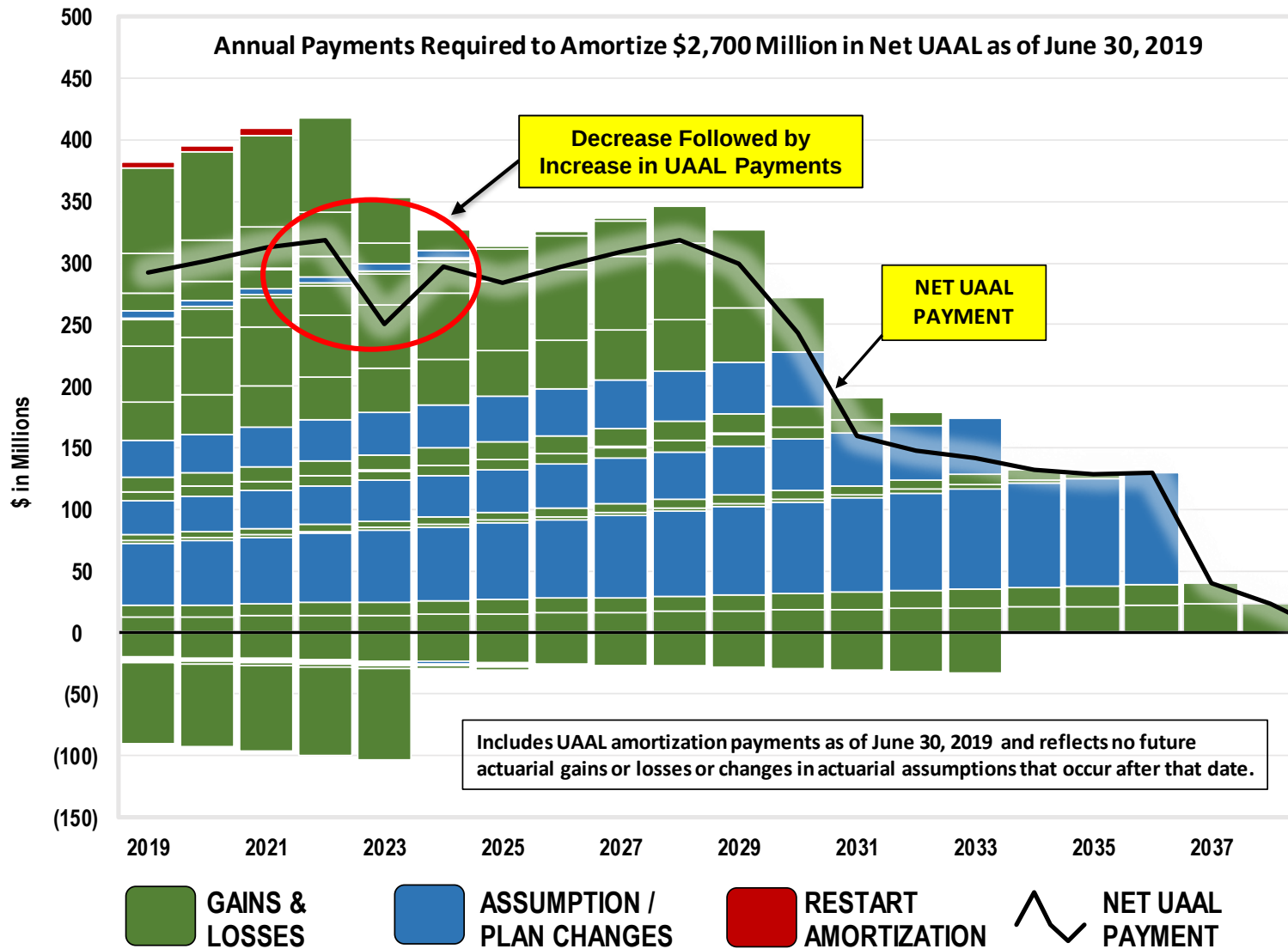
SBCERA's UAAL Amortization Structure – Managing “Tail Volatility”

- Layered amortization allows full transparency by tracking:
 - Where UAAL came from
 - When each portion of UAAL will be fully amortized
- Ability to track UAAL comes at a policy price: tail volatility
 - Most layers are “charge” layers, but gain layers are “credit” layers
 - When a charge layer is fully amortized, next year’s contribution decreases
 - When a credit layer is fully amortized, next year’s contribution increases

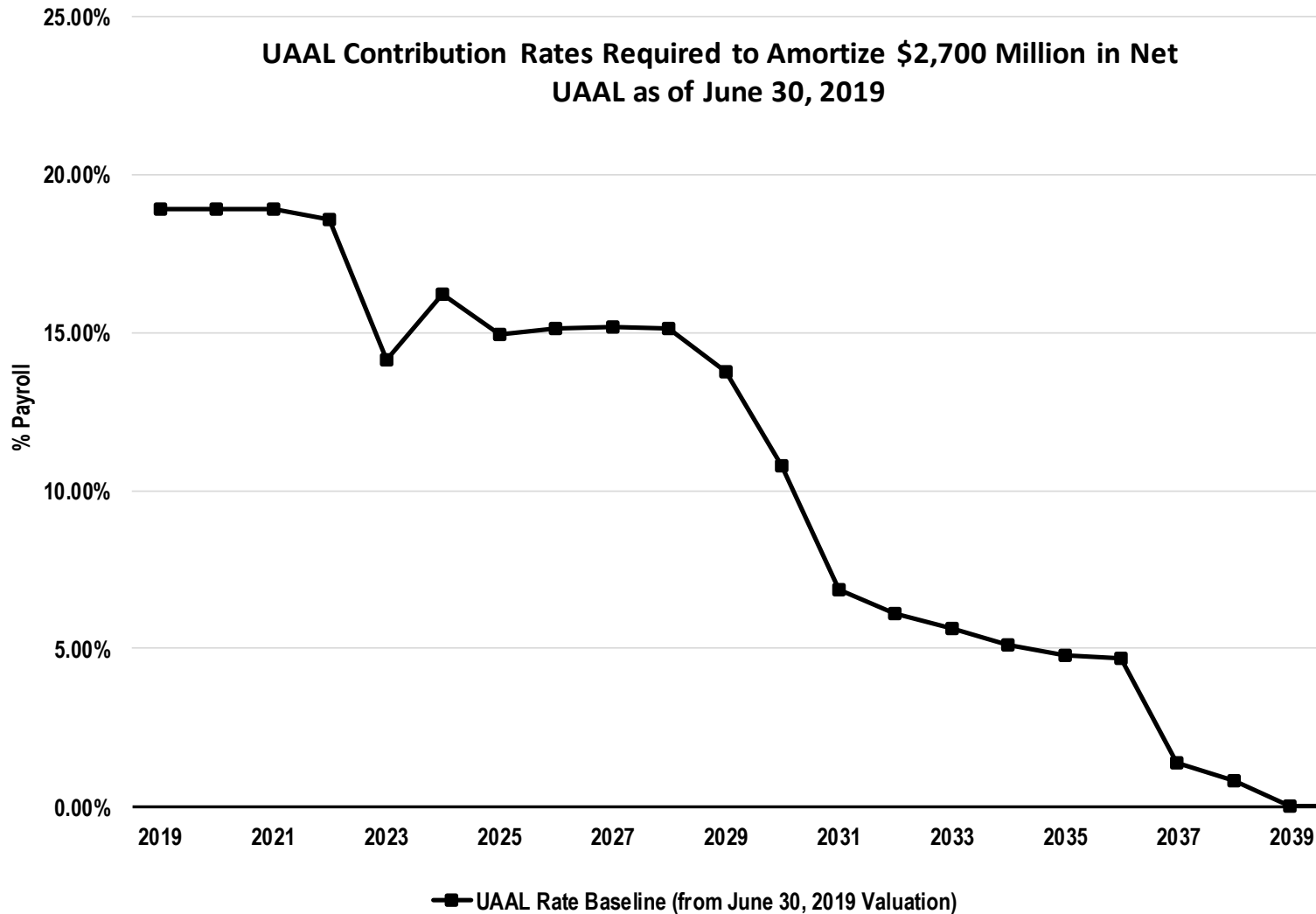
Managing Tail Volatility – UAAL Amortization Structure (continued)

- Solution: occasional active management of amortization periods
 - Only to manage tail volatility
 - Not intended to accelerate or decelerate UAAL funding
- For SBCERA, net UAAL payments decrease then increase between 2023 and 2024 valuations
 - Decreases in 2023 valuation due to full amortization of actuarial loss from 2003 valuation
 - Increases in 2024 due to full amortization of net gain from POB credit, actuarial loss and plan change from 2004 valuation

SBCERA Projection of UAAL Amortization Payments as of June 30, 2019



SBCERA Projection of UAAL Contribution Rates (% of Payroll)



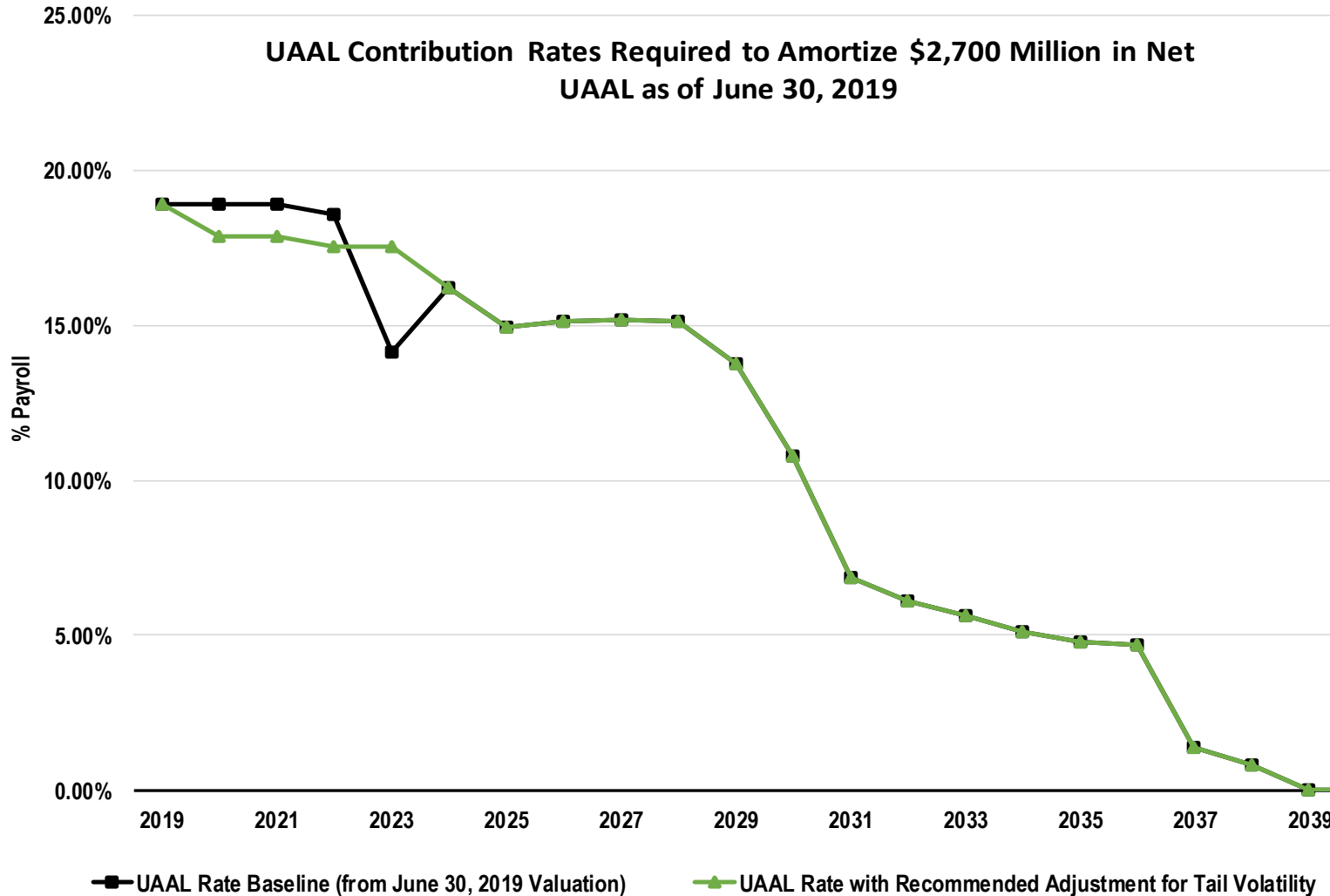
Managing Tail Volatility –

Proposed Adjustment to UAAL Amortization Periods

- To manage UAAL rate volatility in upcoming valuations
 - Proposed effective with the 6/30/2020 valuation
 - Action now reduces immediate impact on employer contributions
- Uses 4 year amortization for
 - 2003 charge layer: extended from 3 years to 4 years
 - 2004 credit layer: unchanged at 4 years
 - Note we adjust periods, not combine layers, to keep UAAL history
- UAAL rate impact
 - Extending amortization of 2003 layer results in small net amortization payment decrease of about 1% of pay through 2022
 - Instead of larger decrease in 2023 followed by increase in 2024

Managing Tail Volatility –

SBCERA Projection of UAAL Contribution Rates (% of Payroll) with Adjustment



Questions?

