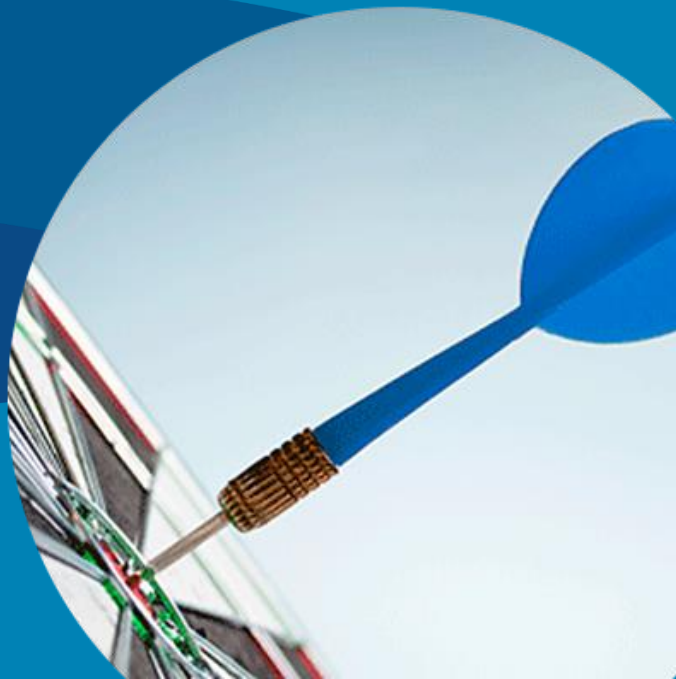
Actuarial Valuation as of July 1, 2023

November 16, 2023

Paul Wood, ASA
Dana Woolfrey, FSA



Officially, Hello!

- We are Gabriel, Roeder, Smith and Company
- Denver office –

Dana

Paul

Krysti

Karli

- Successful transition, thank you to staff!

Today

- Recent observations in public pensions
- Educational Intro: Key Actuarial Concepts and Terms and the NDTFFR Dynamic
- FY 2023 Experience and Key July 1, 2023 Results
- Looking Forward

RECENT OBSERVATIONS IN PUBLIC PENSIONS

Inflation!

- How it affects typical pension plans
  - COLAs
    - If inflation-related COLA provision, creates liability losses (new unfunded liability)
    - If no inflation-related COLA, increases demand for ad hoc and 13th check
- Salaries
  - Plans with significant portions of continuing actives receiving 20/25% increases
  - Over the long-term, impact to fixed rate plan is often minimal
    - More benefits/liabilities
    - More contributions

Plan Design Trends – Variable Benefits

- Respond to plan experience
- Transfer some risk back to member
  - Defined benefit less defined
- Lessens volatility of unfunded liability
  - If assets are down, so are liabilities and vice versa

Plan Design Trends – Variable Benefits

- Variable Pre- and Post-Retirement
  - **Texas Employees Retirement System**
    - Cash balance
  - Tennessee Consolidated
    - “Waterfall” system
  - Utah Retirement System
    - Stacked Hybrid
- Variable COLA
  - Wisconsin Retirement System
  - **Colorado Fire and Police Pension Association**
  - South Dakota Retirement System

Plan Design Trends – Variable Benefits
Texas Employees Cash Balance Plan

- 2021 legislative session
- Introduced cash balance plan for new hires
  - SAME *expected* employer cost
  - Still intended to produce meaningful retirement benefits
  - Slightly lower employee contributions
    - Intended to increase hiring competitiveness in tight labor market
  - Variable benefits
    - Investment related interest on cash balance accounts and investment related COLAs substantially reduce potential for *future* unfunded liabilities

Plan Design Trends – Variable Benefits
Texas Employees Cash Balance Plan

- Variable benefits
  - Investment related interest on cash balance accounts
    - 4% interest guaranteed
    - "Gain Sharing Interest Adjustment"
      - 0 – 3%
      - 50% of excess return over 4%
      - Expected = 1.5%
      - Expected total interest = 5.5%
  - Investment related COLAs
    - Same as gain sharing interest adjustment
    - Expected 1.5%

Plan Design Trends – Variable Benefits
Colorado FPPA "Breakeven COLA"

- Fixed contribution rate plan
- Following recent pressures (investment returns, changing assumptions) found that little to no COLA was prefunded
- Recent generations pay significantly higher contribution rate to change that
- Developed "Breakeven COLA"
  - What COLA is 100% funded?
  - Determined by actuarial valuation each year (responsive to experience)
  - Ensures that future generations are *expected* to get at least as much
  - Expected to grow over time

Plan Design Trends
Lifetime COLA for Purchase

- Texas ERS - 2023 legislation that retirees be able to take actuarial reduction to buy 2% escalating benefit
  - No expected cost to plan
  - At typical retirement ages, take 80% of normal form, but get 2% automatic increase each year
  - Helps retirement planning
- Wyoming Retirement System has had in place for many years now

EDUCATIONAL INTRO: KEY ACTUARIAL CONCEPTS AND TERMS AND THE NDTFFR DYNAMIC

Traditional Defined Benefit (DB) Plans

1	Final lifetime benefit ‘defined’ by a formula
2	Component: Years of Credited Service
3	Component: Final Average Compensation (FAC)
4	Component: Benefit multiplier such as 2.0%

Example
Formula: Service *x* FAC *x* Multiplier
25 years x 2% x $50,000 = $25,000 per year

Traditional Defined Benefit Plan

Will demonstrate that the TFFR benefit promise/employer risk is the primary component of the employer provided value to current members

Risk Characteristics

1. Investment Risk (Poor performance)
2. Mortality Risk (Long lives)
3. Inflation Risk (Pay increases, COLAs)
4. EMPLOYER bears the risks
5. Benefits are predictable (Defined)

The Actuarial Terms

- Present Value of Benefits (PVB)
- Actuarial Accrued Liability (AAL)
- Actuarial Value of Assets (AVA)
- Unfunded Actuarial Accrued Liability (UAAL)
- Funded Ratio
- Actuarially Determined Contribution (ADeC)

Definition Through Example

- An employer hires an employee and agrees to pay the employee $100,000 the day he or she retires in 20 years
- The employer would like to save up for this payment throughout the 20 years instead of having to come up with the whole $100,000 at the time of retirement
- Assume no investments are available
  - (earnings = $0)
- Assume works full 20 years (no pre-retirement death, disability or termination)

Present Value of Future Benefits (PVFB/PVB)

- Present value of all benefits expected to be paid to current plan members, including future service
  - On day 1 member can have large Present Value of Future Benefits
- In our example, the present value of benefits is $100,000
  - Both at hire and at retirement

– TFFR PVB = $5.7 Billion

Normal Cost

- The employer will need to save $5,000 per year to accumulate the $100,000
  - $100,000 / 20 years => $5,000 per year
  - The $5,000 can be defined as the Normal Cost
- The Normal Cost can be defined as:
  - The cost of accruing that year's benefit
  - The cost of providing benefits to a new employee

– TFFR Normal Cost ~ 12% of pay + Admin Costs

Actuarial Accrued Liability (AAL)

- So, 10 years into the arrangement the employer should have saved $50,000
  - $5,000 each year for 10 years
  - The $50,000 can be defined as the Actuarial Accrued Liability (AAL)
- Represents the *target value of assets* at the valuation date based on the funding objectives
  - AAL at Year 5 = $25,000
  - AAL at Year 20 = $100,000

– TFFR = $4.6 billion

Unfunded Actuarial Accrued Liability (UAAL)

- What if the employer had only saved $40,000 by year 10?
  - AAL (target assets): $50,000
  - Actual asset level: 40,000
  - UAAL $10,000

  - The $10,000 is the Unfunded Actuarial Accrued Liability (UAAL)

- TFFR = $4.6 billion - $3.3 billion = $1.3 billion

Funded Ratio

- The Funded Ratio is the actual asset value as a percentage of the target asset value
  - $40,000 / $50,000 = 80%

- TFFR = $3.3 billion / $4.6 billion = 71%

Amortization of the UAAL

- Additional contributions will be made so that the UAAL will be amortized over a desired period of time
  - Let's assume 10 years
  - Amortization payment = $10,000 / 10 = $1,000

- TFFR uses 20 years (this year), level % of pay
- Assumes payments will grow 3.25% per year
- 11.61% of pay
  - Similar in size to normal cost

Actuarially Determined Contribution (ADC)

- It is the sum of:
  1. The normal cost for the year and
  2. The amortization payment of the UAAL
  3. Sometimes expenses
- Another way to look at it:
  - The contribution for the current year

    plus

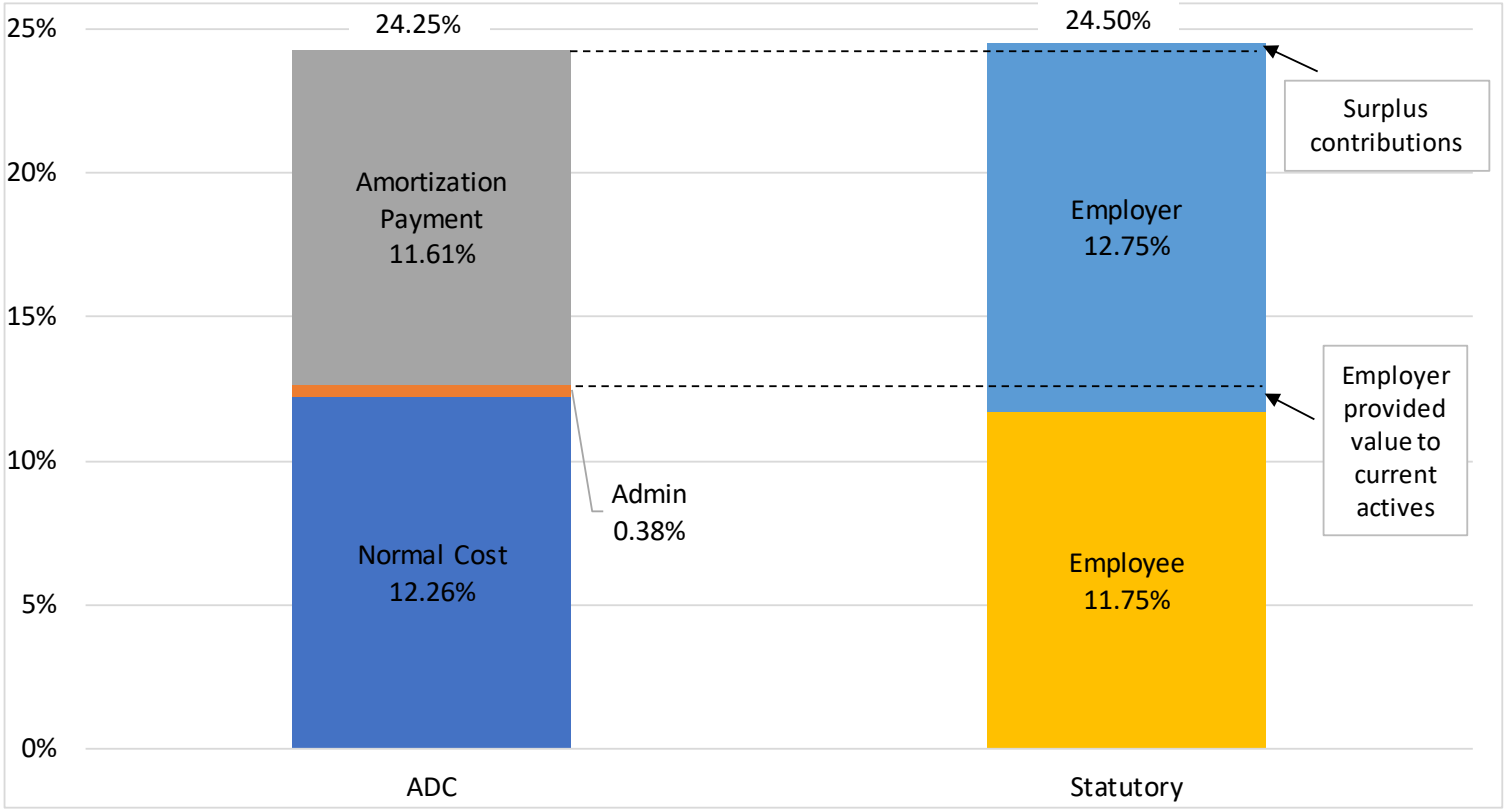
  - The contribution to make up any shortfall that may have occurred due to past experience or plan changes

Actuarially Determined Contribution (ADC)

- It is the sum of:
  1. The normal cost for the year and
  2. The amortization payment of the UAAL
  3. Sometimes expenses

  $5,000 + $1,000 = $6,000

TFFR ADC and Funding Dynamic



- Employer provided value = 12.26% + 0.38% - 11.75%
- < 1% of pay *+ benefit promise*

TFFR Dynamic vs. PERS

- PERS employer normal cost was over 5%
  - Easier to implement similar cost/ less employer risk option because providing significantly more than just the risk protection
- TFFR employer provided normal cost < 1% of pay
- TFFR primary benefit to members from employer is guaranteeing 7.25% return on employee contributions
- If implement DC plan, any employer match > 1% of pay would increase cost over current plan
  - Without even considering asset allocation implications for this plan
- If don't want the risk of DB, have to provide more contributions to provide value to member

FY 2023 EXPERIENCE AND KEY JULY 1, 2023 RESULTS

Key Results – Static
$ in millions

	7/1/2023	7/1/2022
Actuarial Accrued Liability	$ 4.58	$ 4.48
Actuarial Value of Assets (AVA)	3.26	3.13
Unfunded Liability (AVA-basis)	1.32	1.35
Funded Ratio (AVA-basis)	71.2%	69.9%
Actuarial Accrued Liability	$ 4.58	$ 4.48
Fair Value of Assets (FVA)	3.17	3.02
Unfunded Liability (FVA-basis)	1.40	1.46
Funded Ratio (FVA-basis)	69.3%	67.5%

Key results – Forward Looking
% of pay

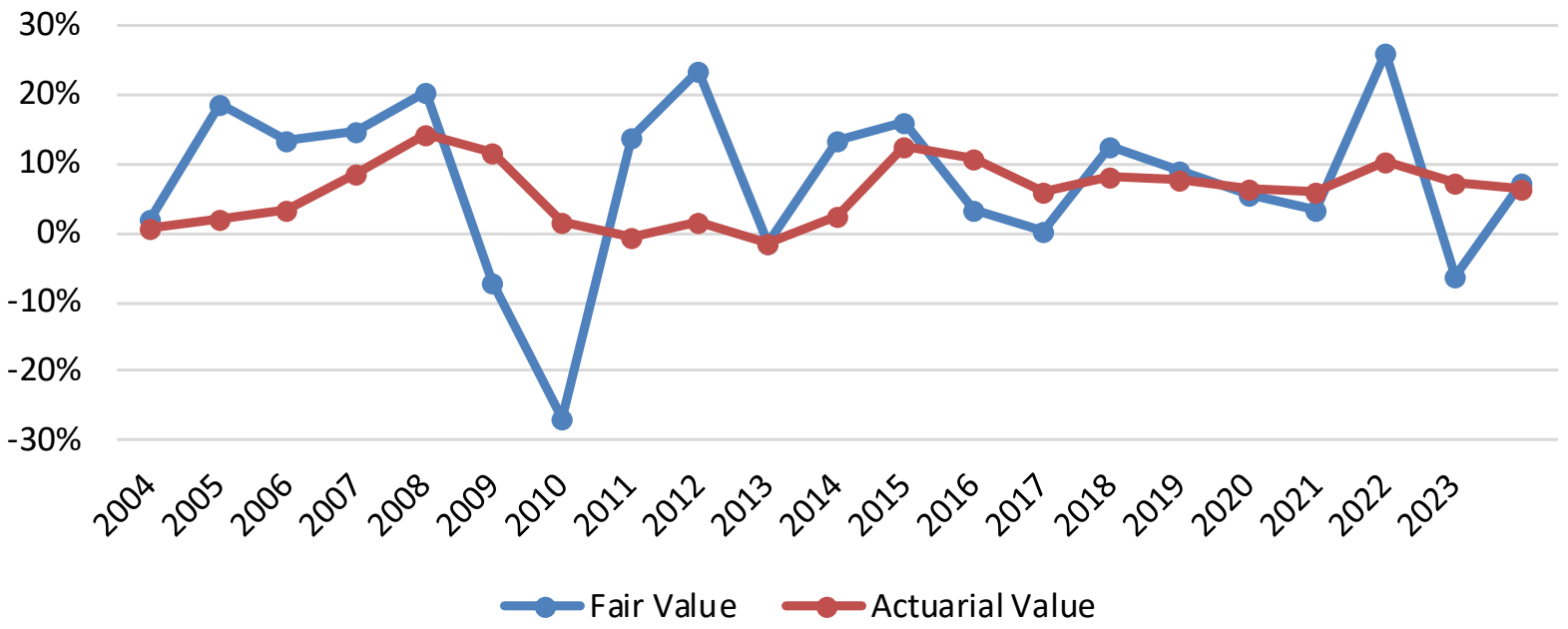
	7/1/2023	7/1/2022
Actuarially Determined Contribution (ADC)	24.25%	23.87%
Employee Contribution Rate	11.75%	11.75%
Net Employer ADC	12.50%	12.12%
Actual Employer Contribution Rate	12.75%	12.75%
Contribution Shortfall/(Surplus)	-0.25%	-0.63%
Funding Period	20 years	19 years

Key factors in FY 2023 experience

- Asset experience
  - Slightly adverse experience
  - Biggest impact item
  - Negatively impacts funded ratio, UAAL, ADC, funding period
    - Basically everything
- Salary experience
  - increased less than expected
    - both individual salary and total payroll
  - Impacts different key metrics differently

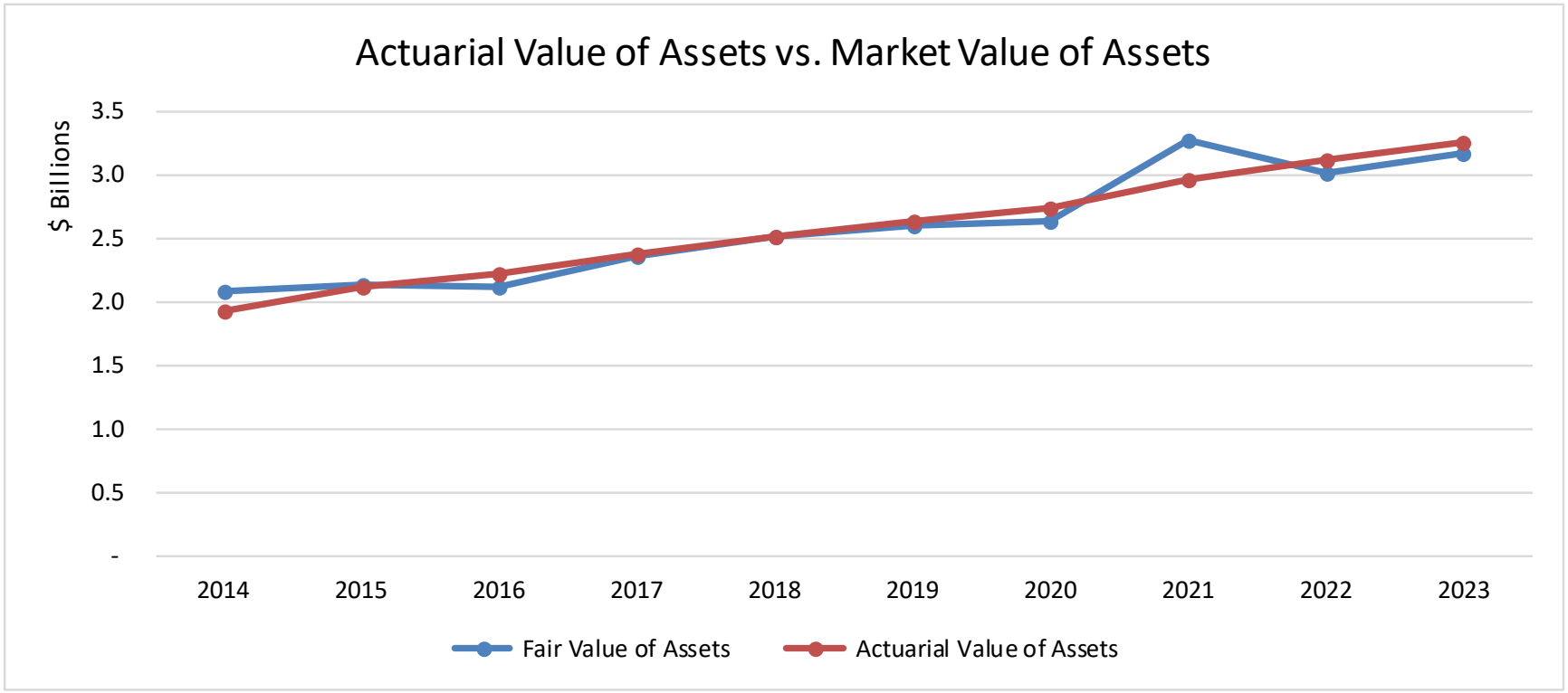
Historical returns and impact of smoothing

Exhibit C.5
Fair Value and Actuarial Value Rates of Return

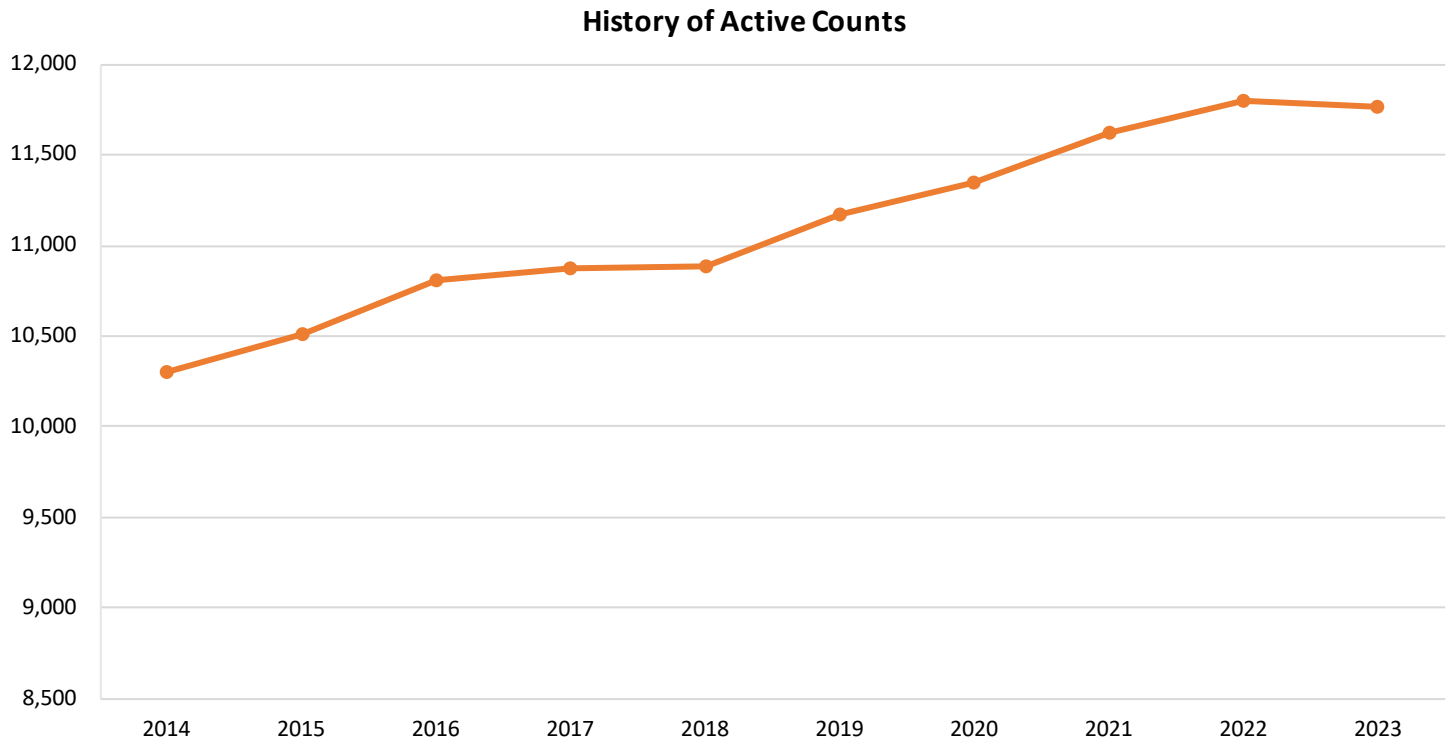


- Market value 7.3% (on target)
- Actuarial value 6.3% (actuarial loss, due to recognition of prior year outstanding losses)

Historical asset values and impact of smoothing

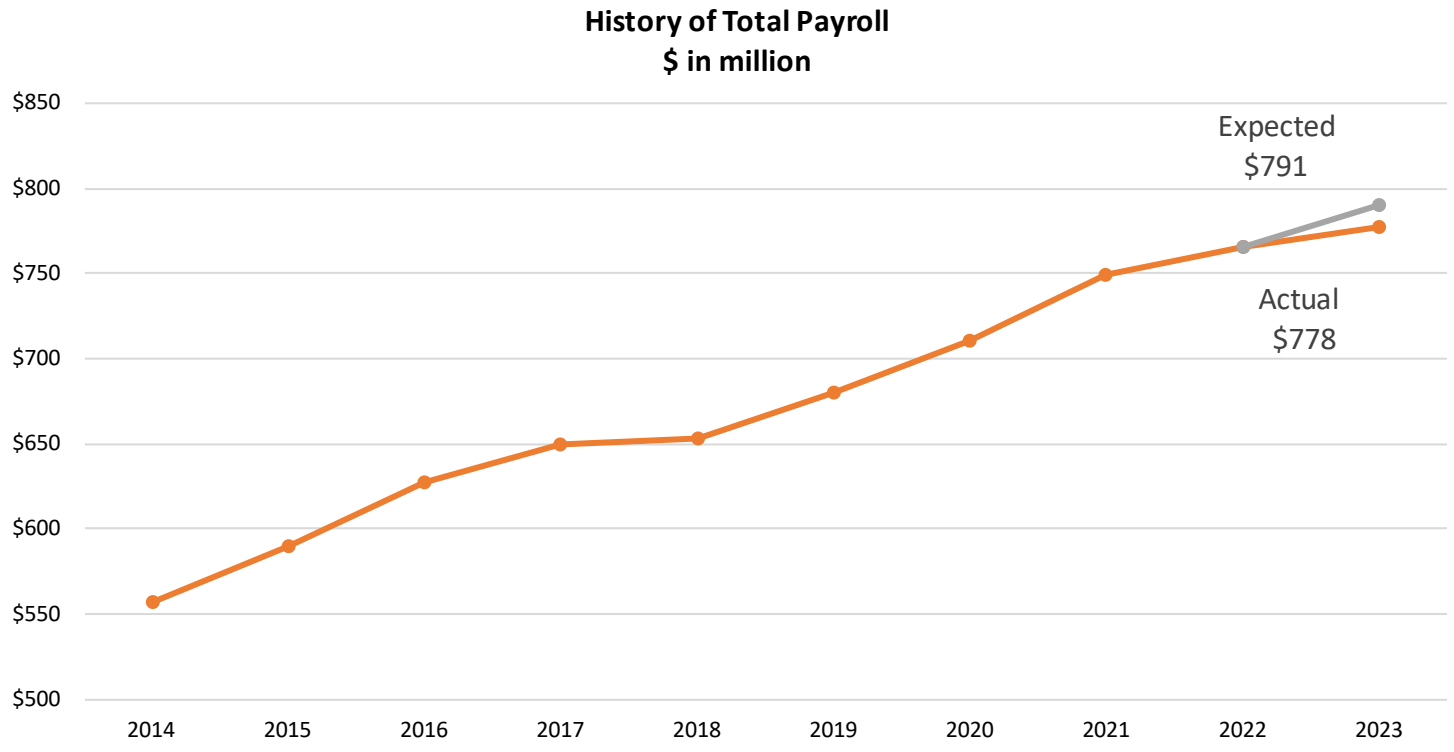


Slight Population Contraction



Total Payroll Growth Less Than Expected

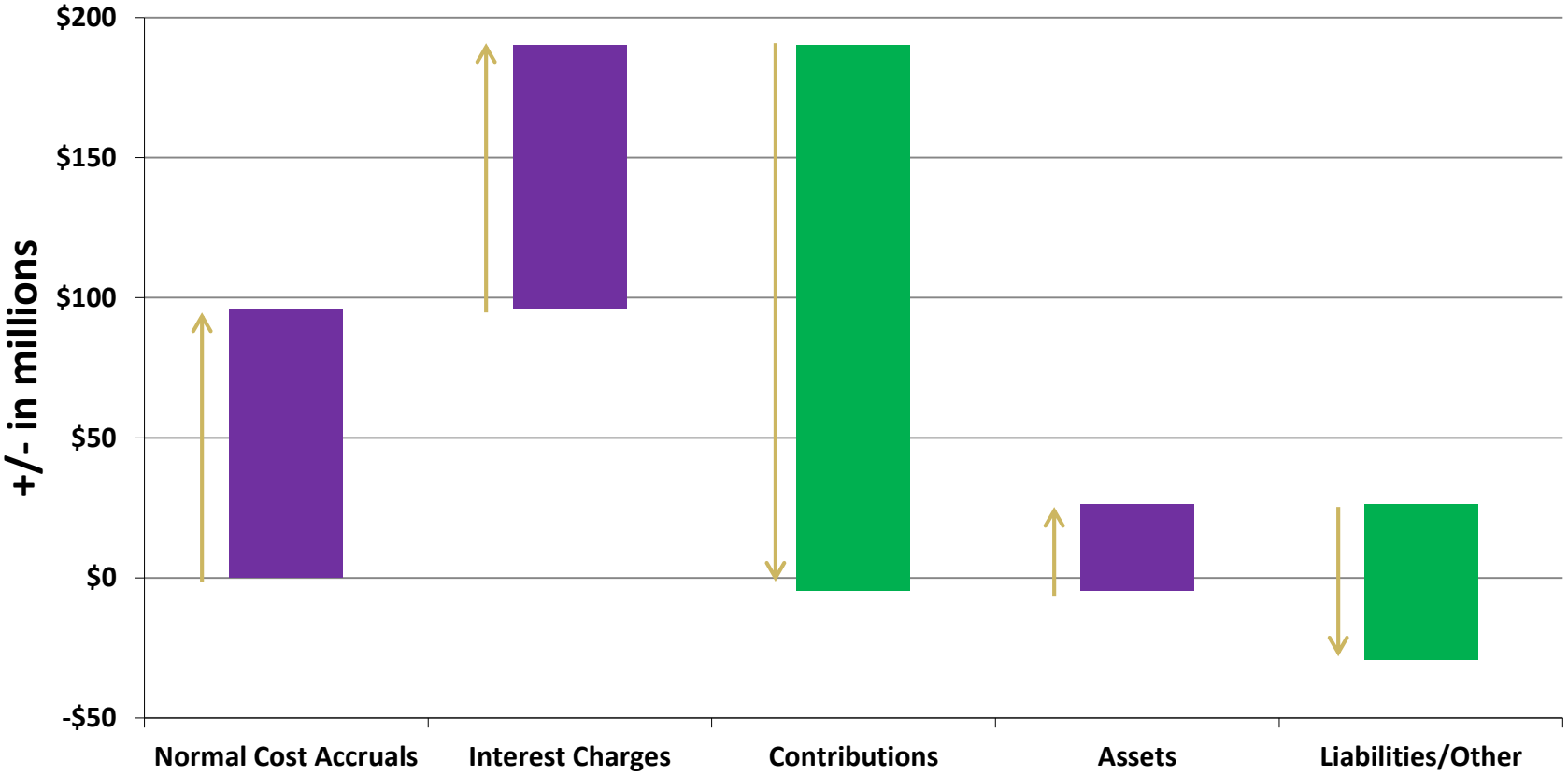
- Total payroll expected to grow 3.25%
  - *As are calculated amortization payments*
- Actually grew 1.5%



Total Payroll Growth Less Than Expected

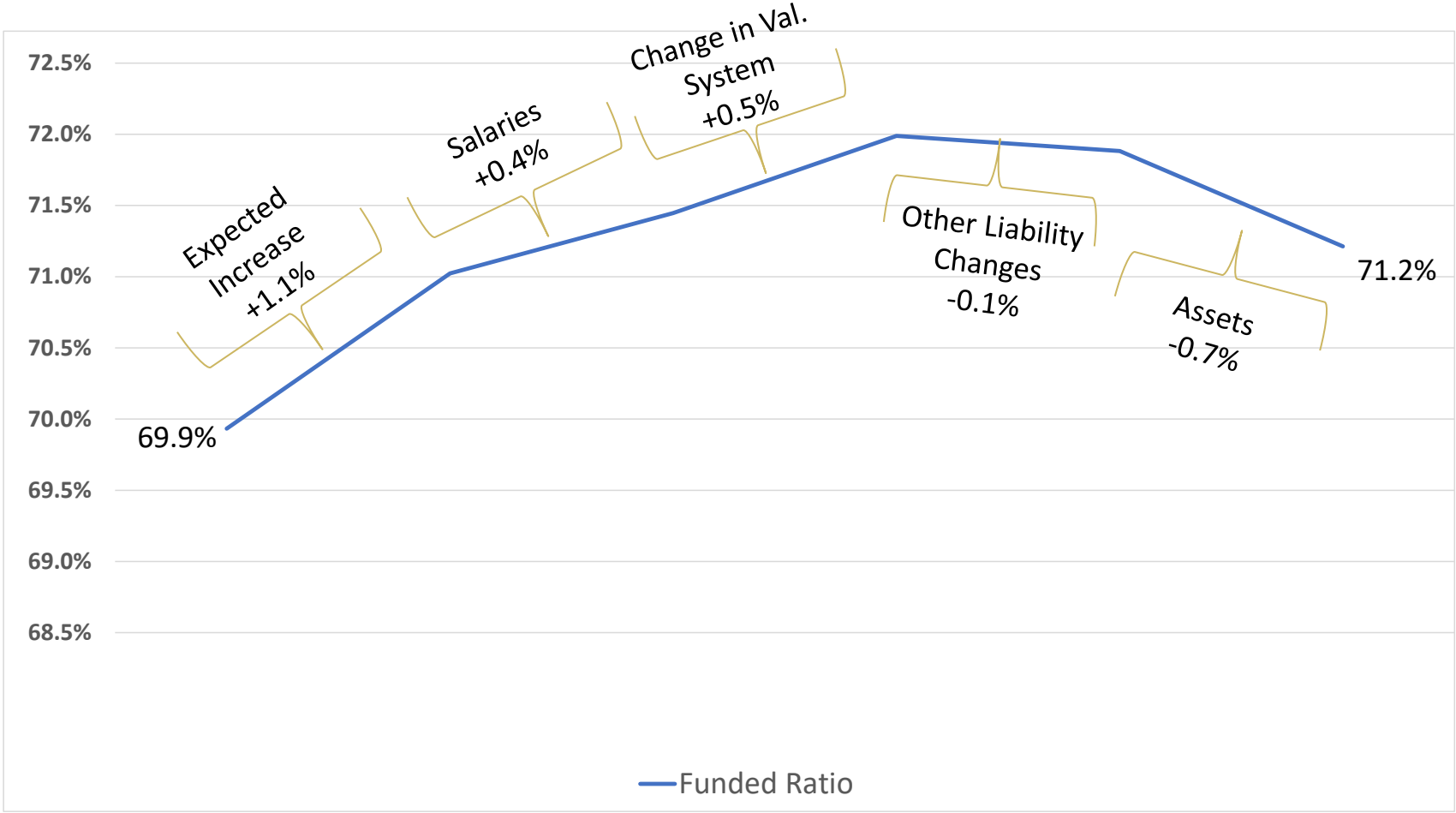
- Two sources
  - Pay increases less than expected for continuing actives
    - Primary source
    - Liability gains (projected benefits less) BUT
    - Less Contributory Payroll to spread Unfunded Liability
  - Lack of full new hire replacement increases ADC
    - Shared burden shared across less payroll
- Total combined impact
  - salary gains (*decrease*) + less contributory payroll (*increase*)
  - increase ADC by 0.18%

Change in UAAL Since Prior Valuation

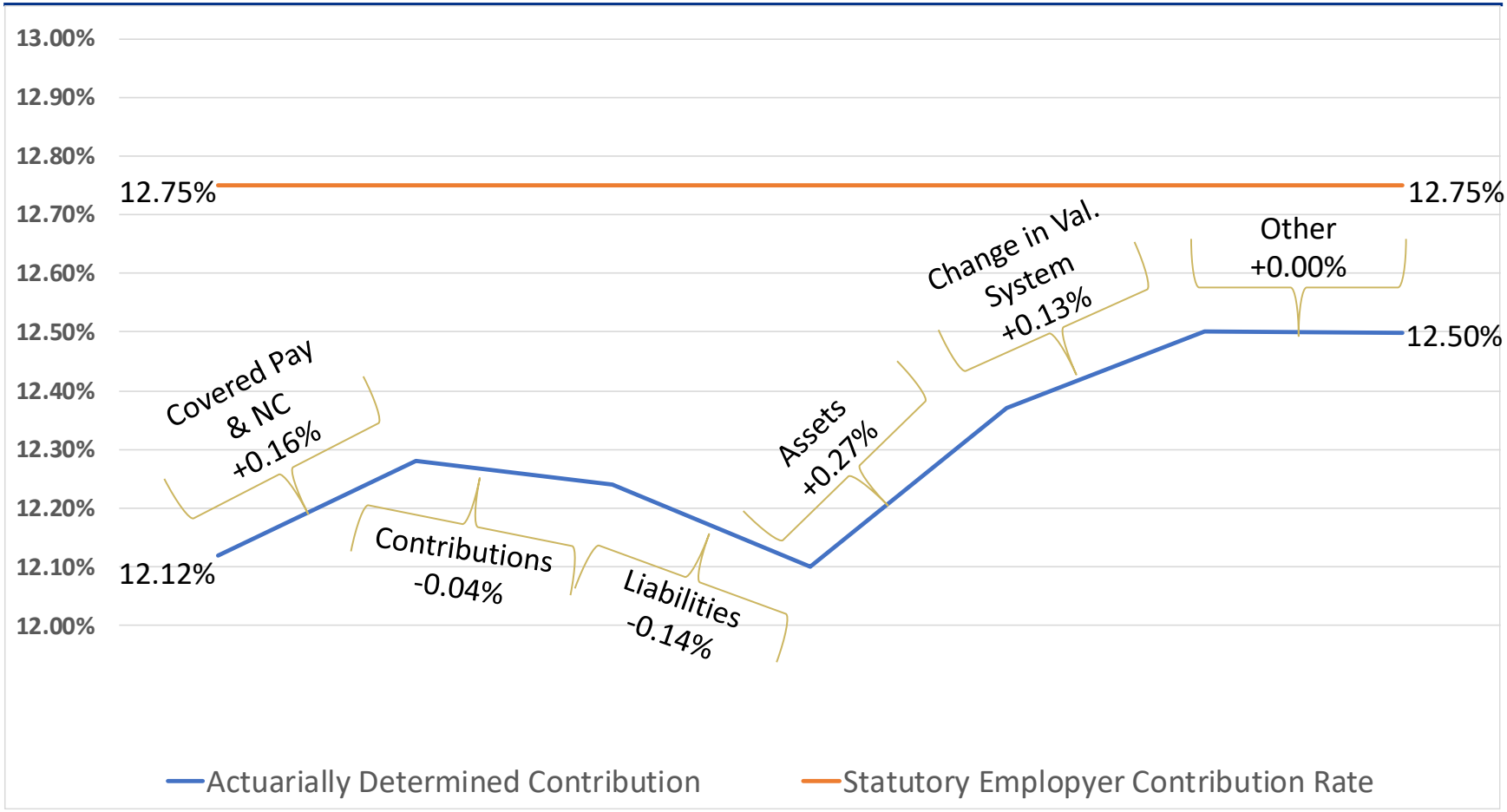


Liability Change Detail:
- Salary Increases: -$28 million
- Change in Valuation System: -$35 million
- New Members and Rehire: +$7 million
- Other: -$0.2 million

Change in Funded Ratio Since Prior Valuation



Change in ADC Since Prior Valuation



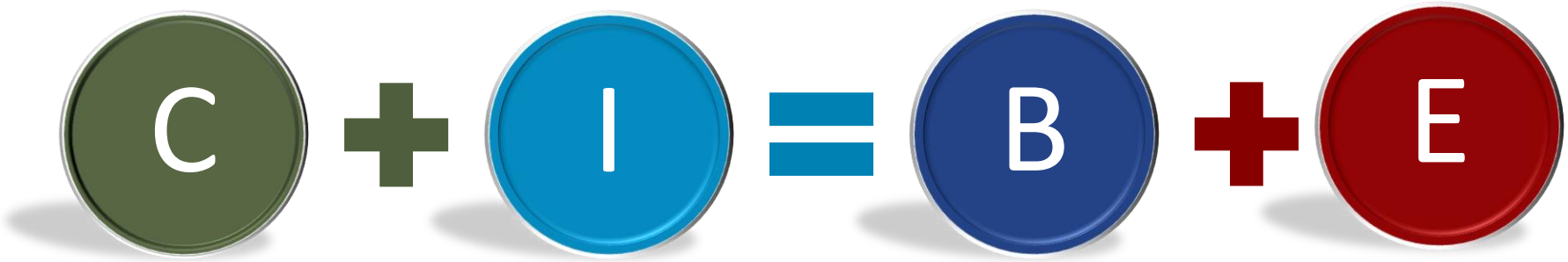
Actuarial Standards of Practice # 4

Low Default Risk Obligation Measure

- ASOPs = Actuarial Standard of Practices
  - Provide guidance to actuaries on appropriate practices
- New additions for ASOP 4 (Pensions) first effective for this valuation, including LDROM
  - LDROM = Low-Default-Risk Obligation Measure
  - By far most controversial
  - Actuaries must calculate and disclose a liability using a discount rate tied to a low-default-risk index
    - treasury yields, municipal bonds yields, or investment grade corporate bonds
  - Intended to show the liabilities for a plan without being exposed to investment risk

Actuarial Standards of Practice # 4

Low Default Risk Obligation Measure



Contributions	Investment Income	Benefits	Expenses
• Funding Policy	• Investment Strategy	• Plan Design	• Administrative Policy

"Net Money In = Money Out"

Actuarial Standards of Practice # 4

Low Default Risk Obligation Measure

- New Actuarial Standard of Practice Requirement
- Lump sum cost to a plan to purchase low-default-risk fixed income securities whose resulting cash flows essentially replicate in timing and amount the benefits
  - 4.90% discount rate
- Difference = Savings from diversified portfolio

Valuation Accrued Liabilities	LDROM
$4,577,220,667	$6,063,057,159

LOOKING FORWARD

If All Goes As Planned

Exhibit D.1
Deterministic Projection of the Unfunded Liability
$ in Millions

As of July 1, (a)	Payroll For Next FY (b)	Contribution as % of Payroll (c)	Normal Cost and Admin as % of Payroll (d)	Net Amortization [c - d] * b (e)	UAAL BOY (f)	Interest (g)	Net Principal Contribution e - g (h)	Funding Period (i)
2023	$823	24.50%	12.64%	$98	$1,318	$92	$6	20
2024	850	24.50%	12.62%	101	1,312	92	9	19
2025	877	24.50%	12.61%	104	1,303	91	14	18
2026	906	24.50%	12.60%	108	1,289	90	18	17
2027	935	24.50%	12.59%	111	1,271	88	23	16
2028	966	24.50%	12.58%	115	1,248	86	29	15
2029	997	24.50%	12.57%	119	1,219	84	35	14
2030	1,030	24.50%	12.57%	123	1,184	81	41	13
2031	1,063	24.50%	12.56%	127	1,143	78	49	12
2032	1,098	24.50%	12.56%	131	1,094	75	56	11
2033	1,133	24.50%	12.55%	135	1,038	70	65	10
2034	1,170	24.50%	12.55%	140	973	66	74	9
2035	1,208	24.50%	12.54%	144	898	60	84	8
2036	1,247	24.50%	12.54%	149	814	54	96	7
2037	1,288	24.50%	12.53%	154	718	47	108	6
2038	1,330	24.50%	12.53%	159	611	39	121	5
2039	1,373	24.50%	12.52%	164	490	30	135	4
2040	1,418	24.50%	12.52%	170	356	20	150	3
2041	1,464	24.50%	12.52%	175	205	9	167	2
2042	1,511	24.50%	12.51%	181	39	(4)	185	1
2043	1,560	15.50%	12.51%	47	(146)	(12)	59	-

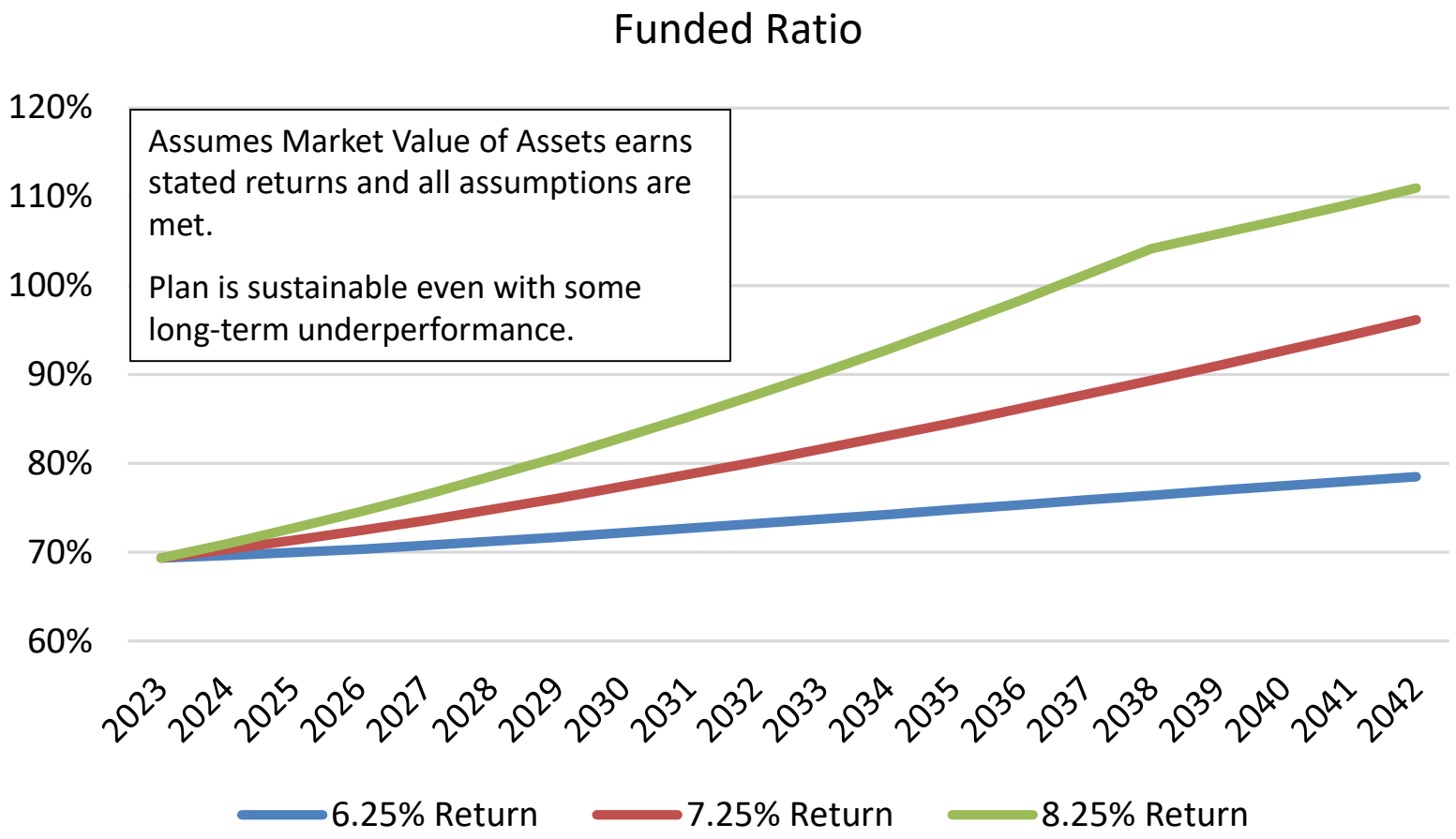
Assumes Actuarial Value of Assets earns 7.25% and all assumptions are met.

Short Term Sensitivity Analysis

FY 2024 Return	24%	16%	7.25%	0%	-7.25%	-16%	-24%
Employer ADC	11.69%	12.13%	12.62%	13.02%	13.42%	13.91%	14.35%

- There is an expectation that with a 7.25% return in FY 2024, the ADC would continue to be less than the current statutory contribution rate of 12.75%
- An approximate FY 2024 return lower than 5% may result in an ADC that is greater than the current statutory rate of 12.75%

Long Term Projections



Coming Soon…Other Actuarial Deliverables

- Plan Management Policy Score Update
- Experience Study
  - Start education next fall
  - Deliver spring 2025

Summary

- TFFR statutory contributions still meeting Board funding policy objectives
  - Full funding expected in 20 years
- Slim margins
- In addition to the usual (investment return), will be keeping close eye on active population (counts and payroll growth) to make sure reliance on future payroll remains reasonable
- May discuss plan design options to increase resiliency

Disclaimers

- This presentation is intended to be used in conjunction with the actuarial valuation report issued on October . This presentation should not be relied on for any purpose other than the purpose described in the valuation report.
- This presentation shall not be construed to provide tax advice, legal advice or investment advice.