Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

Montana Teachers' Retirement System

Valuation Results
July 1, 2022

Presented October 7, 2022

Benefit Financing

- Basic Retirement Funding Equation

$$C + I = B + E$$

C = Contributions
I = Investment Income
B = Benefits Paid
E = Expenses (administration)

Benefit Financing

$$C + I = B + E$$

B depends on

- Plan Provisions
- Experience

C depends on

- Short Term: Actuarial Assumptions
  Actuarial Cost Method
- Long Term: I, B, E

Results

Changes Since Prior Valuation

- Updated assumptions and methods in accordance with the Experience Study for the Five-Year Period ended June 30, 2021
  - Increased unfunded actuarial accrued liabilities by $78.2 million
  - Reduced funded ratio by 0.85%
  - Increased amortization period three years
  - Key assumption changes
    - Lowered the investment return assumption from 7.50% to 7.30%
    - Increased the inflation assumption from 2.50% to 2.75%
    - Updated mortality, retirement, termination and salary merit scales to better reflect recent experience

Comments on Valuation

- Asset returns
  - Market asset return -4.13% vs. 7.50% expected (11.63% less than expected).
  - Actuarial asset return 8.14% vs. 7.50% expected (0.64% more than expected).
- Market value of assets are $75,147,197 less than the actuarial value of assets. Unrecognized investment gains/losses will be recognized over the next three years
  - 2023 Investment Gain of $10.7 million
  - 2024 Investment Gain of $60.2 million
  - 2025 Investment Loss of $146.1 million

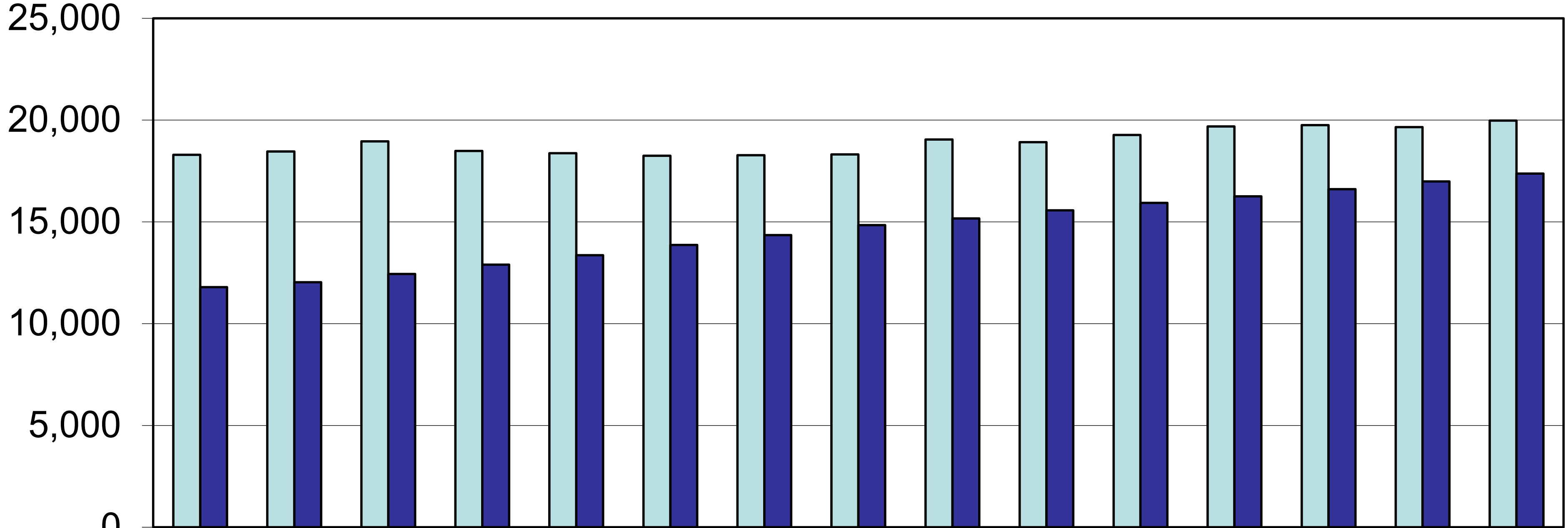
Comments on Valuation

- Funded Ratio
  - Funding increased from 71.43% to 71.73%
- Amortization Period
  - Amortization period increased from 24 years to 25 years

Comments on Valuation

- MUS Retirement Program Supplemental Contribution Rate
  - Unfunded liability as of July 1, 2022
    - $318.7 million
  - Unfunded liability as of July 1, 2020
    - $353.1 million
  - Current statutory rate – 4.72%
  - Calculated rate determined as of July 1, 2022 – 13.53% (8.81% shortfall)
  - Lump sum necessary to maintain current statutory rate - $207.6 million

Active and Retired Membership



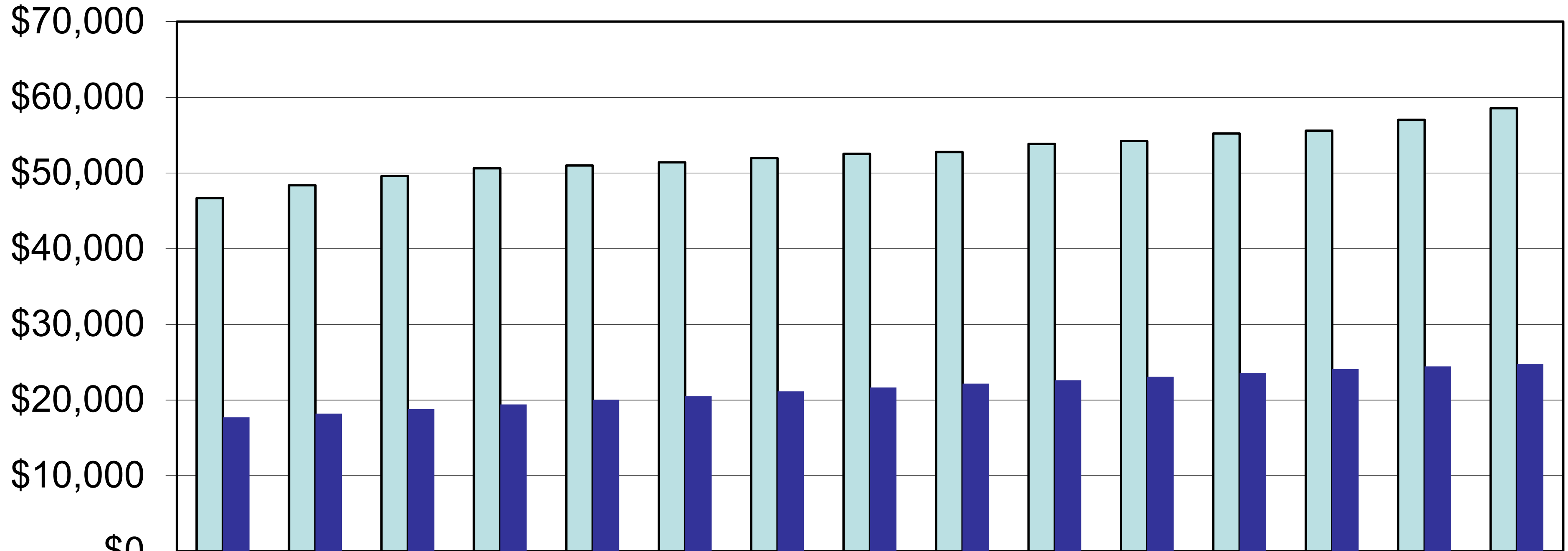
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Actives	18,292	18,456	18,953	18,484	18,372	18,249	18,272	18,316	19,048	18,917	19,267	19,686	19,751	19,658	19,975
Retirees	11,788	12,036	12,440	12,899	13,363	13,868	14,349	14,839	15,164	15,566	15,933	16,256	16,605	16,985	17,369

0.6% annual increase for active members since 2008; 1.6% increase for 2022.

2.8% annual increase for retired members since 2008; 2.3% increase for 2022.

1.6 actives per retiree 14 years ago; 1.2 actives per retiree now.

Average Salary and Benefits

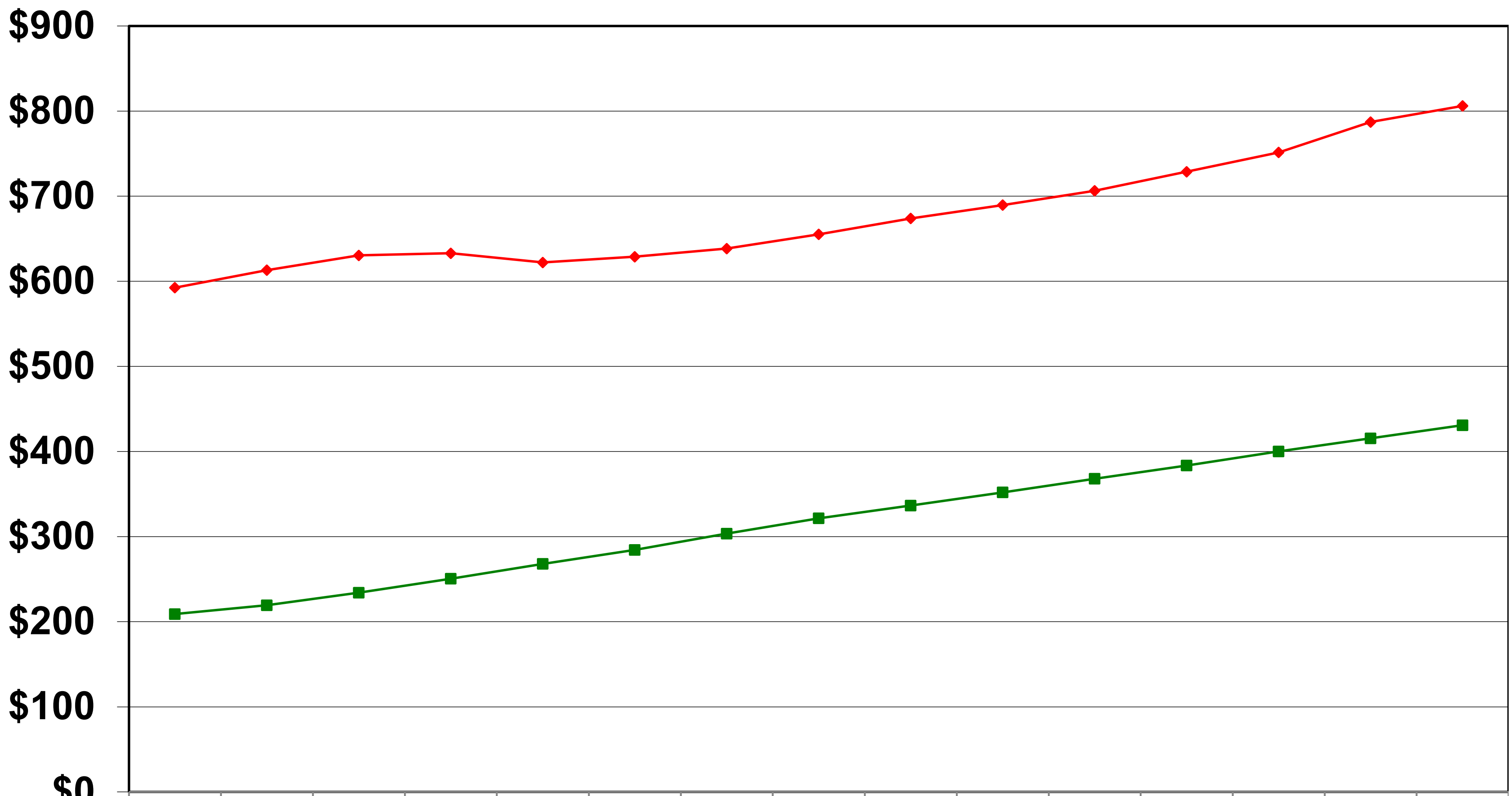


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Full-Time Salary	46,677	48,377	49,598	50,616	50,987	51,421	51,967	52,551	52,776	53,844	54,222	55,231	55,603	57,028	58,560
Retirees Benefits	17,729	18,218	18,814	19,420	20,044	20,503	21,153	21,667	22,188	22,614	23,096	23,591	24,096	24,465	24,811

1.6% annual increase for average salary since 2008; 2.7% increase for 2022.

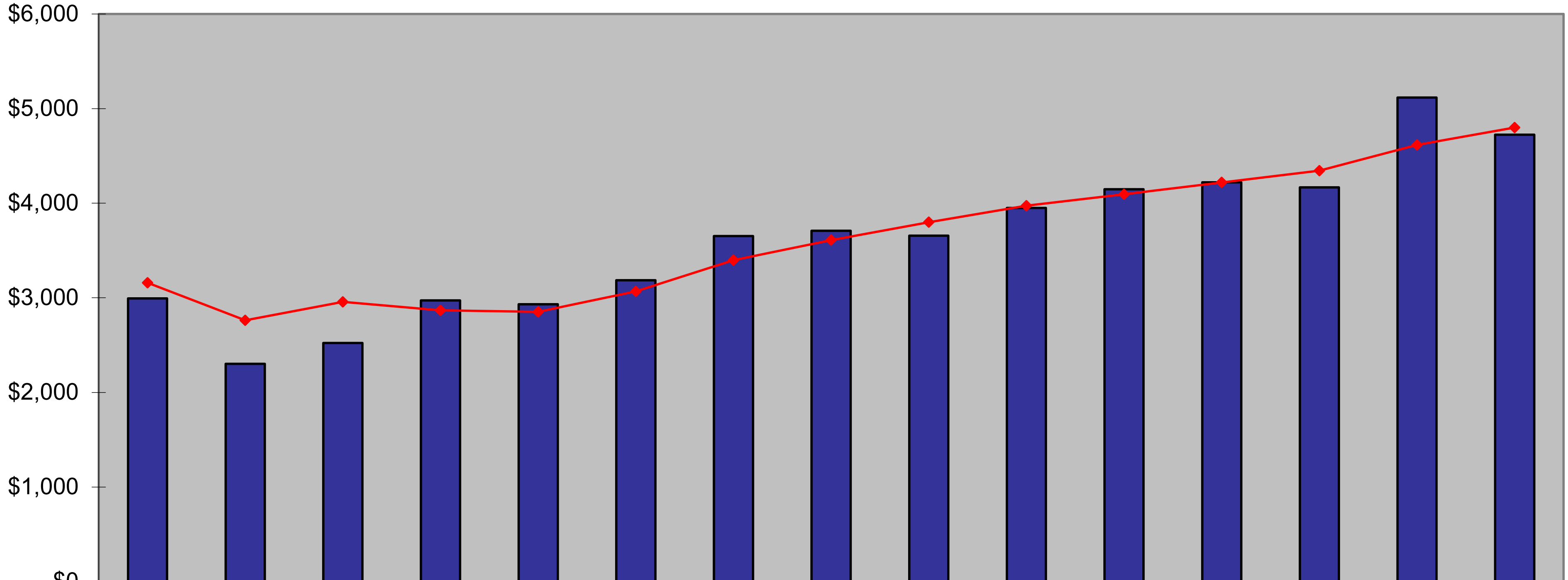
2.4% annual increase for average benefits since 2008; 1.4% increase for 2022.

Payroll & Benefits (Millions)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Full-time Payroll	$592.5	$613.1	$630.4	$633.0	$622.1	$628.8	$638.5	$655.2	$673.9	$689.6	$706.4	$728.8	$751.5	$787.2	$806.1
Benefits	$209.0	$219.3	$234.0	$250.5	$267.9	$284.3	$303.5	$321.5	$336.5	$352.0	$368.0	$383.5	$400.1	$415.5	$430.9

Assets ($ Millions)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Market Value	$2,993	$2,302	$2,521	$2,972	$2,932	$3,185	$3,652	$3,708	$3,657	$3,951	$4,148	$4,220	$4,168	$5,117	$4,724
Actuarial Value	$3,159	$2,762	$2,957	$2,867	$2,852	$3,068	$3,397	$3,610	$3,799	$3,974	$4,094	$4,220	$4,344	$4,616	$4,800

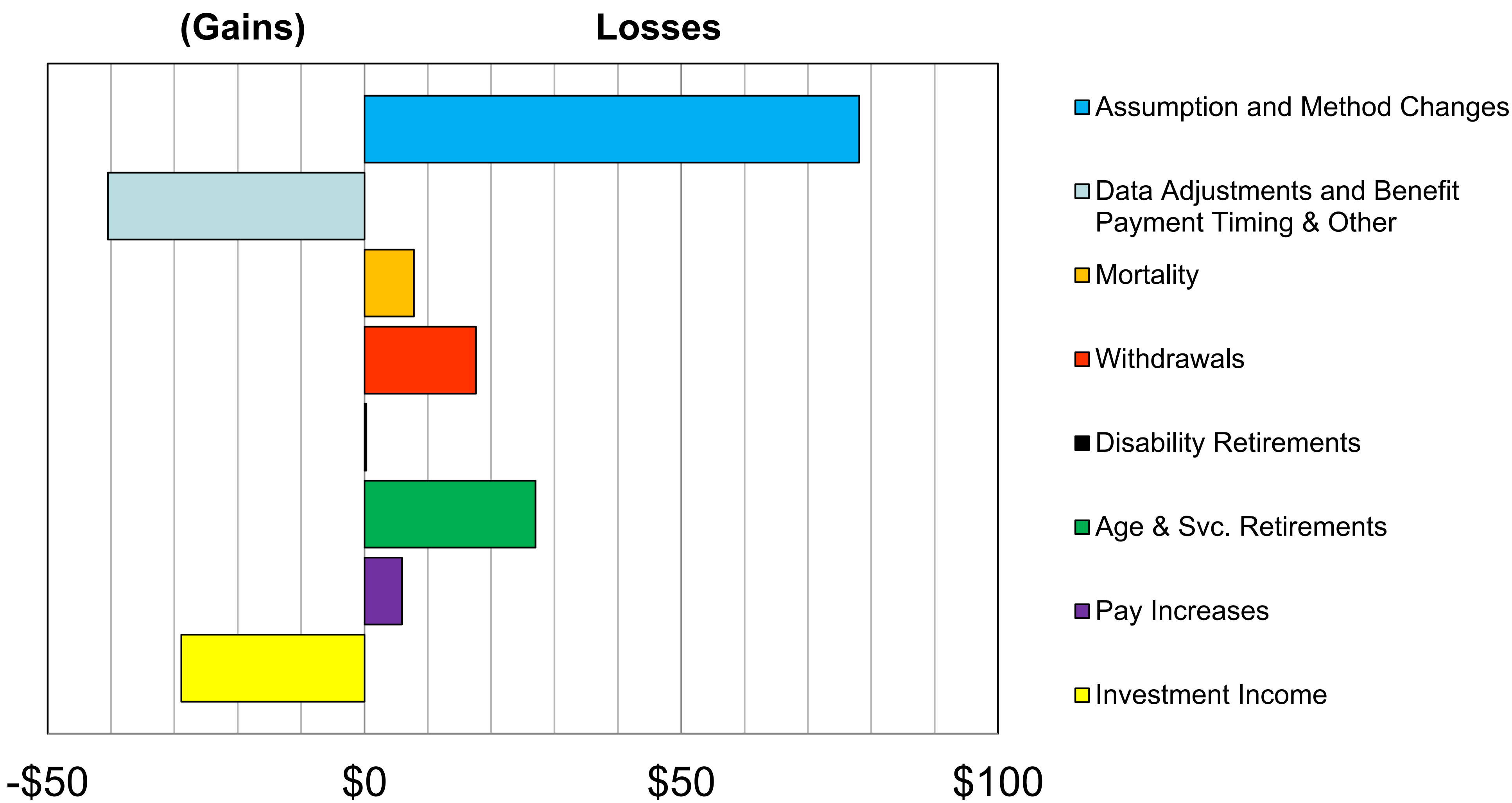
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Market Return	(4.9)%	(20.8)%	12.9%	21.7%	2.2%	12.9%	17.1%	4.6%	2.1%	11.9%	8.8%	5.7%	2.7%	27.7%	(4.1)%
Actuarial Return	7.2%	(10.3)%	9.8%	(0.1)%	3.2%	12.0%	13.2%	9.6%	8.8%	8.2%	6.9%	7.0%	7.0%	10.7%	8.1%

Funding Results

	July 1, 2021 Valuation	July 1, 2022 Valuation (Prior to Exp. Study)	July 1, 2022 Valuation (Reflecting Experience Study)
Total Normal Cost Rate	9.67%	9.58%	10.87%
Less Member Rate	8.15%	8.15%	8.15%
Employer Normal Cost Rate	1.52%	1.43%	2.72%
Administrative Expense Load	0.46%	0.39%	0.00%
Rate to Amortize UAL	9.78%	10.04%	9.14%
Total Employer Statutory Rate	11.76%	11.86%	11.86%
Actuarial Accrued Liability	$6,463.2 million	$6,613.1 million	$6,691.3 million
Actuarial Value of Assets	$4,616.3 million	$4,799.6 million	$4,799.6 million
Unfunded Accrued Liability	$1,846.9 million	$1,813.5 million	$1,891.7 million
Funded Ratio	71.43%	72.58%	71.73%
Amortization Period*	24 Years	22 Years	25 Years

* Reflects anticipated increase in employer supplemental contribution rate

2021 (Gain)/Loss Analysis
($ Millions)



ASOP 4

- Effective for measurement dates on/after February 15, 2023 (July 1, 2023 valuation for TRS)
- Changes Impacting Public Plans
  - Disclose Low-Default Risk Obligation Measure (LDROM)
  - Disclose Reasonable Actuarially Determined Contribution (ADC)
    - New guidance on amortization of the unfunded actuarial accrued liability
  - Assess implications of Contribution Allocation Procedure (CAP) or Funding Policy
  - Other changes
    - Output Smoothing Methods
    - Addressing contribution lag
    - Gain/loss analysis

Low Default Risk Obligation Measure

- Liability measure that must use a discount rate that reflects low default risk fixed income securities whose cash flows are reasonably consistent with the benefits expected to be paid
- Can be interpreted that the difference in the LDROM and AAL measures the reduction in liability (savings) from investing in a diversified portfolio
- Only the liability measure must be disclosed, not the funded status, unfunded portion of the liability or amortization period
- Communication of the measure may prove challenging
  - Some may call the LDROM the "true cost" of the plan

Reasonable Actuarially Determined Contribution

- With any funding valuation, the actuary should calculate and disclose a reasonable actuarially determined contribution (ADC) except when assumptions/methods are set by law
- New guidance on UAAL amortization states that each individual base must be either:
  - Fully amortized in a reasonable period of time or
  - Reduces outstanding balance by reasonable amount <u>each year</u>
- Fixed contribution rate plans must determine if fixed rate is the ADC or a different ADC is determined
  - 30-year period may not meet criteria of reasonable
- **Actuarial profession CANNOT force systems to change their funding – these are just disclosures**

Actuarial Certifications & Disclosures

- Additional information regarding the assumptions and methods can be found in the July 1, 2022 actuarial valuation report.

- The actuaries who prepared these results, Todd B. Green, ASA, EA, FCA, MAAA, and Bryan Hoge, FSA, EA, FCA, MAAA, are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.