Florida Retirement System

2021 FRS Actuarial Assumption Estimating Conference
Including Preliminary July 1, 2021 Actuarial Funding Valuation Results

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Executive Summary

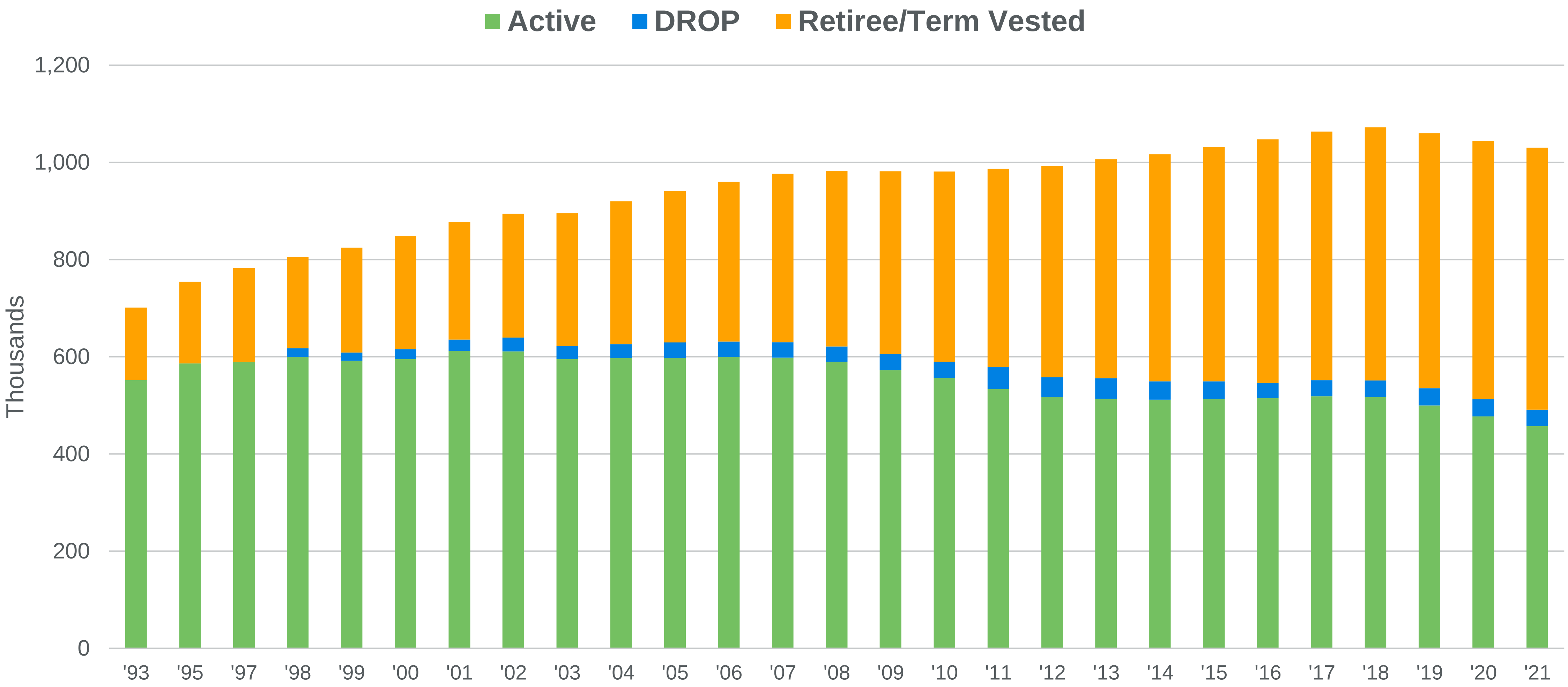
- Preliminary 2021 valuation results at a 7.0% investment return assumption:
  - Due to a +30.4% return on a market value basis, the fair market value of assets is now $27.2 billion above the smoothed asset measure used to calculate contribution rates and funded status based on the market value asset measure increased by 15.9% to 98.6%
  - Funded status based on the smoothed asset measure increased by 3.3% to 85.3%
  - The blended Pension Plan/Investment Plan composite employer contribution rate decreased by 1.01% of payroll to 11.32%, and projected 2022-2023 employer contributions decreased by $325 million to $4.25 billion
- The 2022-2023 contribution rate increase for a 0.10% decrease in the investment return assumption is 0.55% of payroll (estimated as a $210 million contribution cost increase for 2022-2023)
  - Aon's "SBA approach" nominal return outlook decreased 0.36% to 6.13%, with a 3.95% outlook for real return
  - Milliman's 4.17% real return outlook combined with a 2.4% inflation assumption gives a 6.67% nominal return outlook
- Current policy amortizes newly arising unfunded actuarial liability (UAL) charge and credit bases over 25 years as a level percent of projected system payroll
  - Effect of shortening the amortization period varies depending on the period selected and the bases affected

Agenda

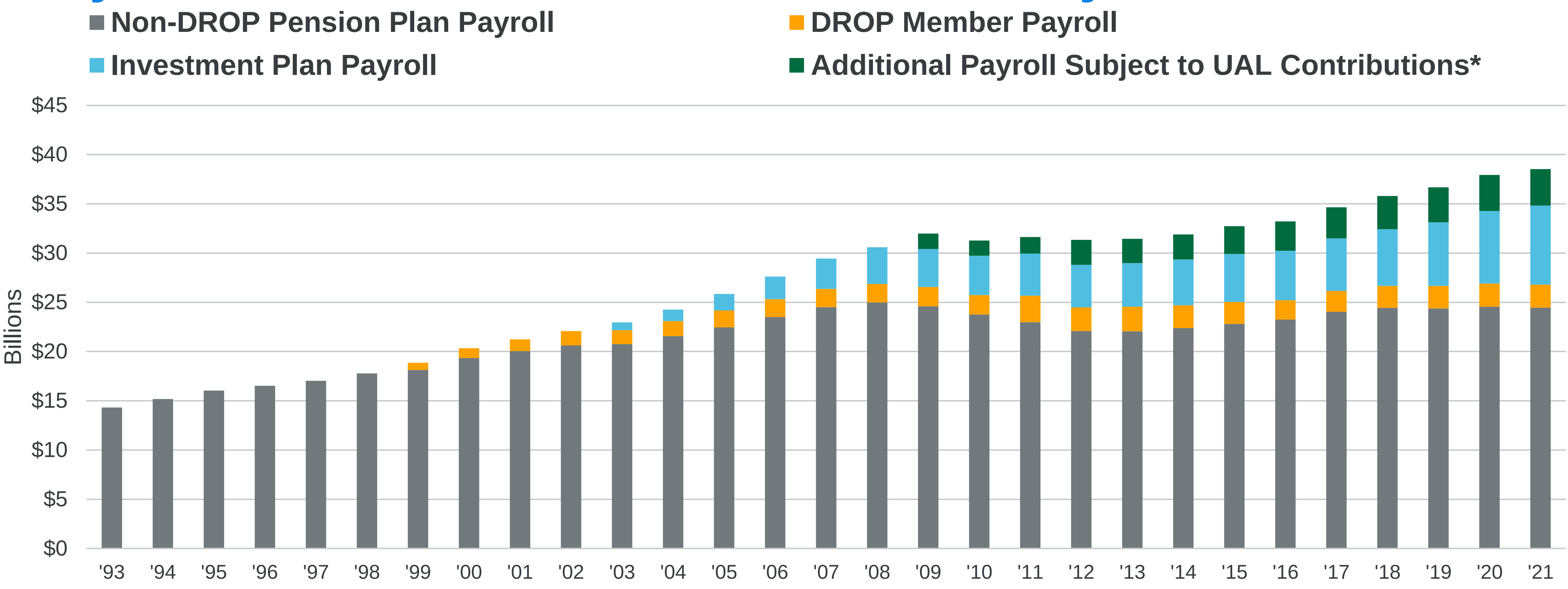
- Preliminary 2021 actuarial funding valuation results
- Investment return assumption for FRS Pension Plan funding actuarial valuation
- Amortization policy for unfunded actuarial liability
- Discount rate for Health Insurance Subsidy & Florida National Guard GASB actuarial valuations
- Needed guidance from Conference Principals

FRS Pension Plan Assets, Member Demographics

FRS Pension Plan Membership



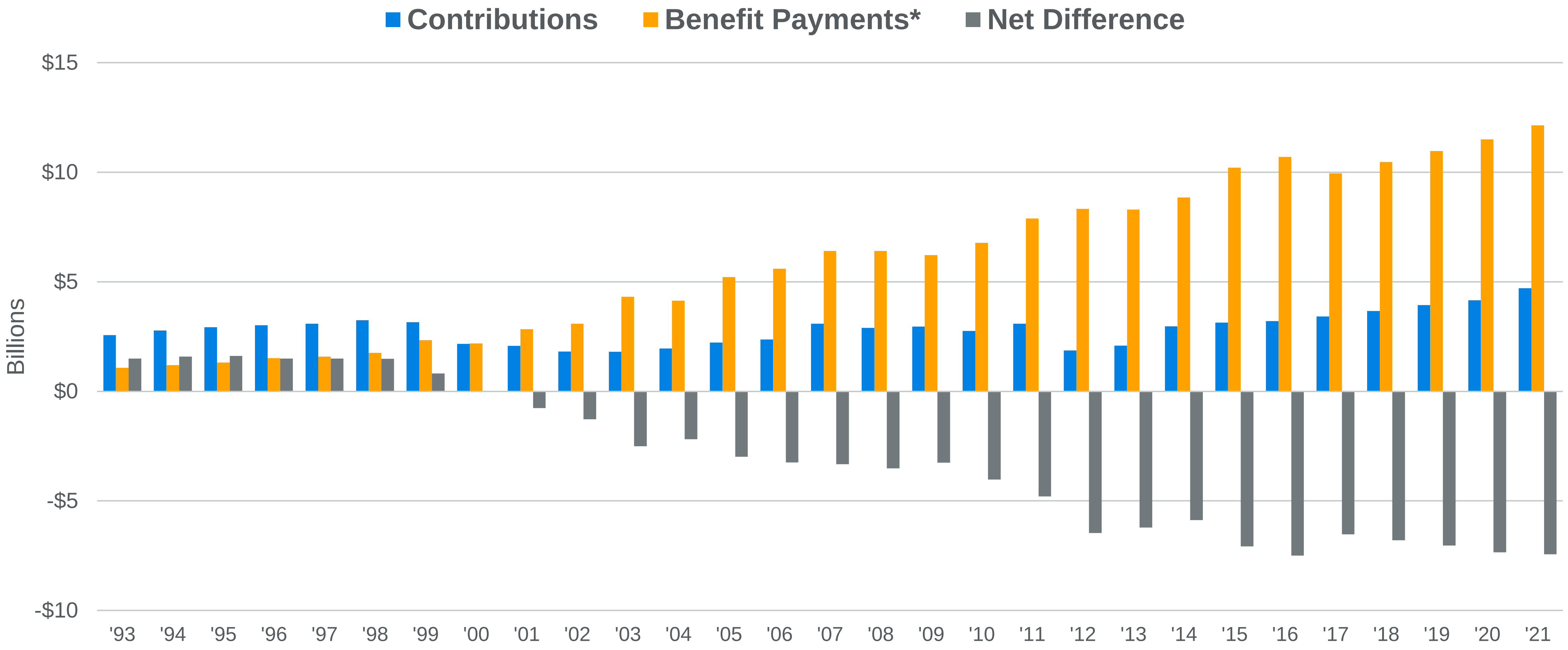
Payroll: FRS + Non-FRS UAL Contributory



- Payroll increased by 1.6% last year; with 10-year annualized growth of 2.0%

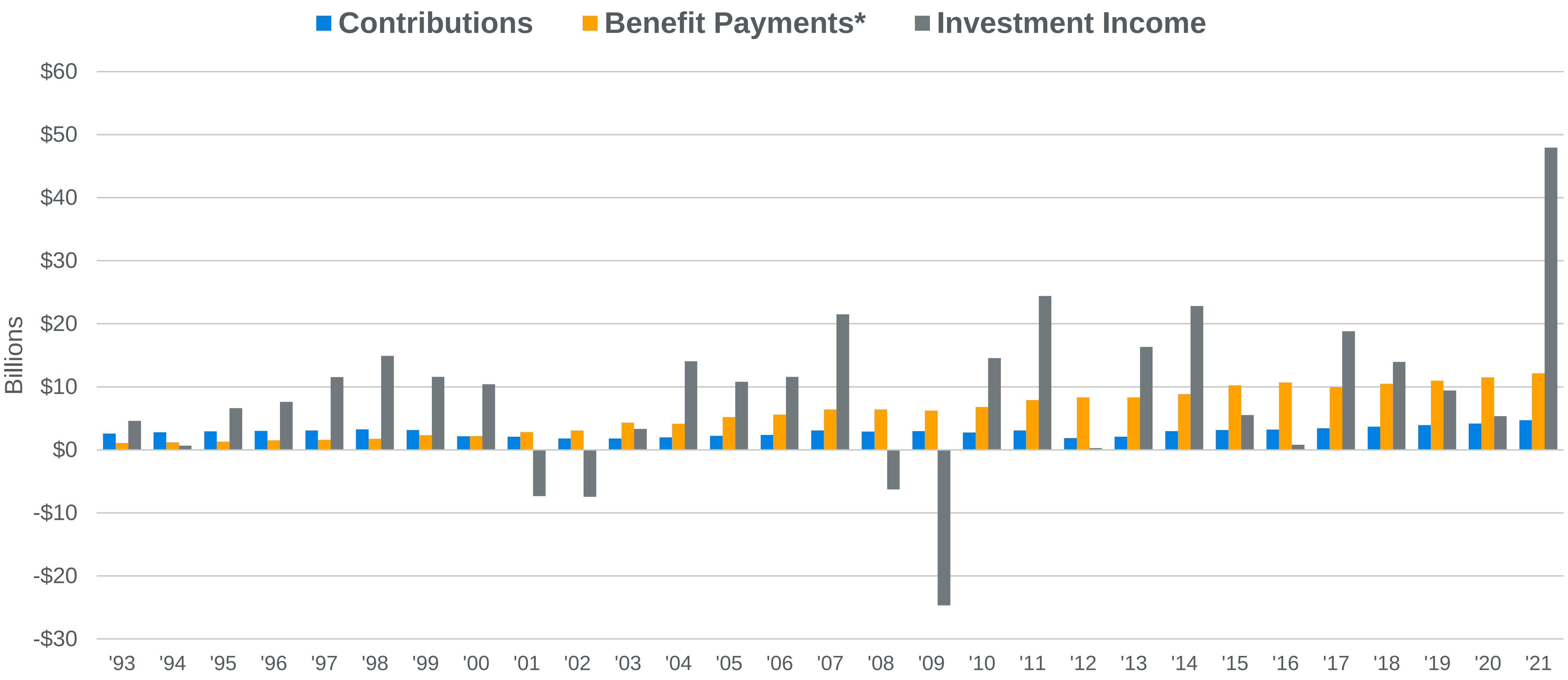
**Includes payroll for participants in certain non-FRS defined contribution plans upon which UAL Rate contributions to the FRS Pension Plan are made. This payroll component is projected to be $3.8B in the 2021-22 plan year.*

Contributions and Benefit Payments



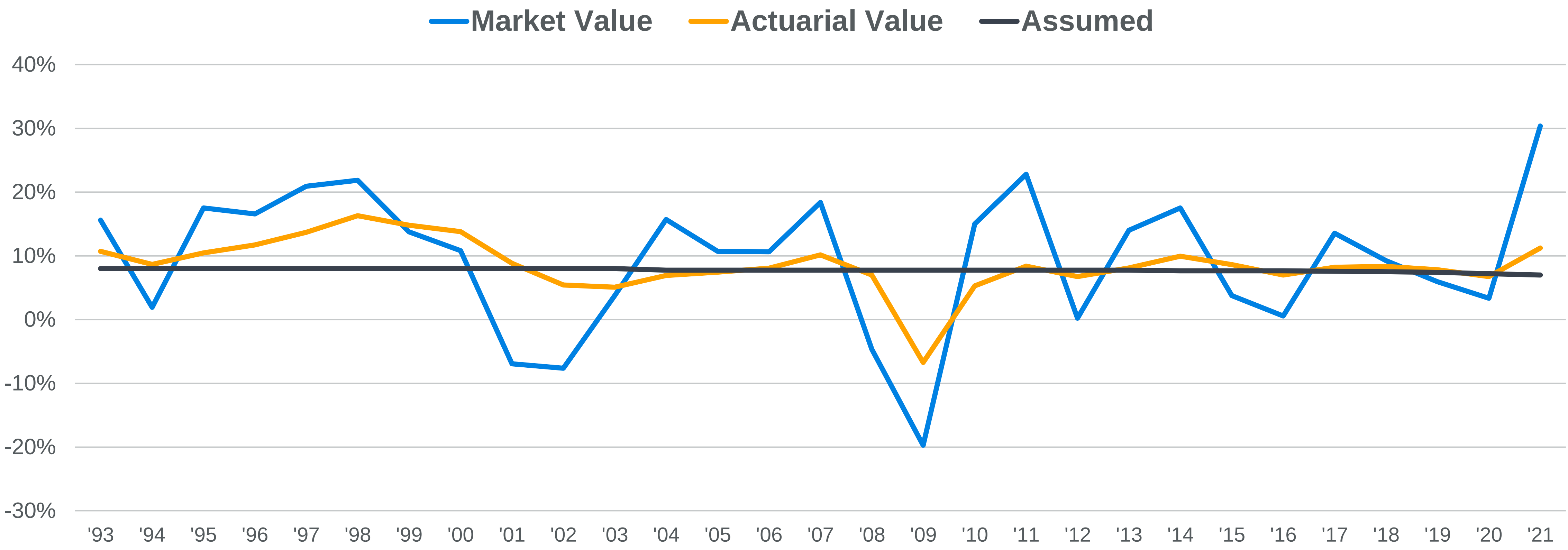
** Includes transfers to Investment Plan in 2013 and subsequent years.*

Pension Plan Cash Flows



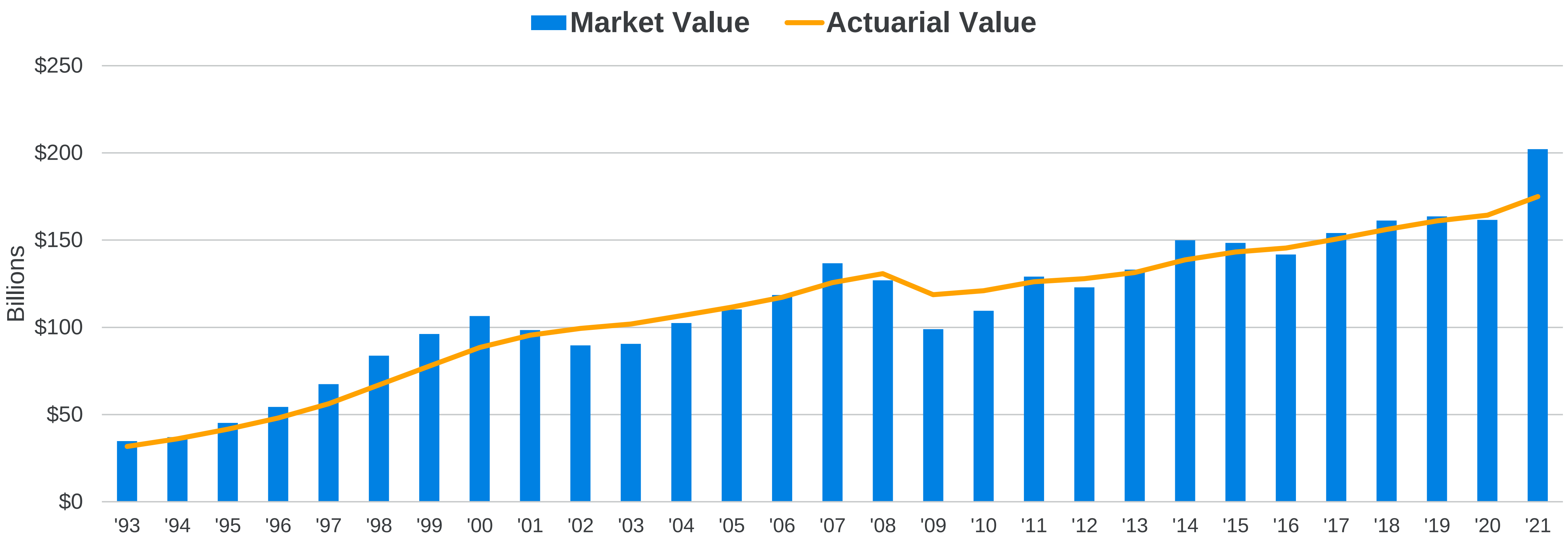
** Includes transfers to Investment Plan*

Historic Asset Returns



- The 2020-21 return was **+30.4%** on a market value of assets (MVA) basis and +11.2% on a smoothed actuarial value of assets (AVA) basis
  - AVA return is determined by market value returns over the prior five years

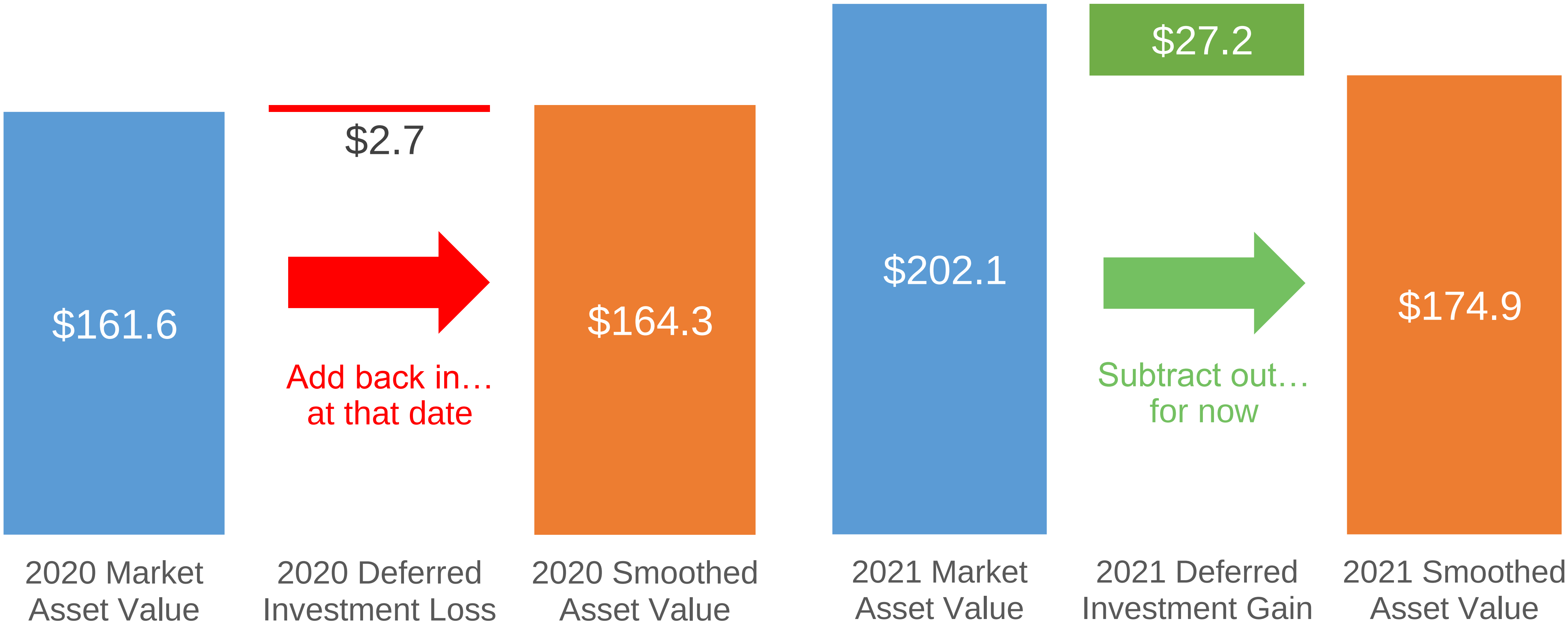
Market & Actuarial Value of Assets



- Market value of assets (MVA) is **$27.2 billion above** the Actuarial Value of Assets (AVA) at July 2021. That **deferred investment gain** will be recognized in higher AVA returns (and associated **contribution rate decreases**) in future valuations if future market investment performance meets current assumption and valuation assumptions are not changed.

Fair Market and Smoothed Asset Measures for 2020 & 2021

(Amounts in billions)

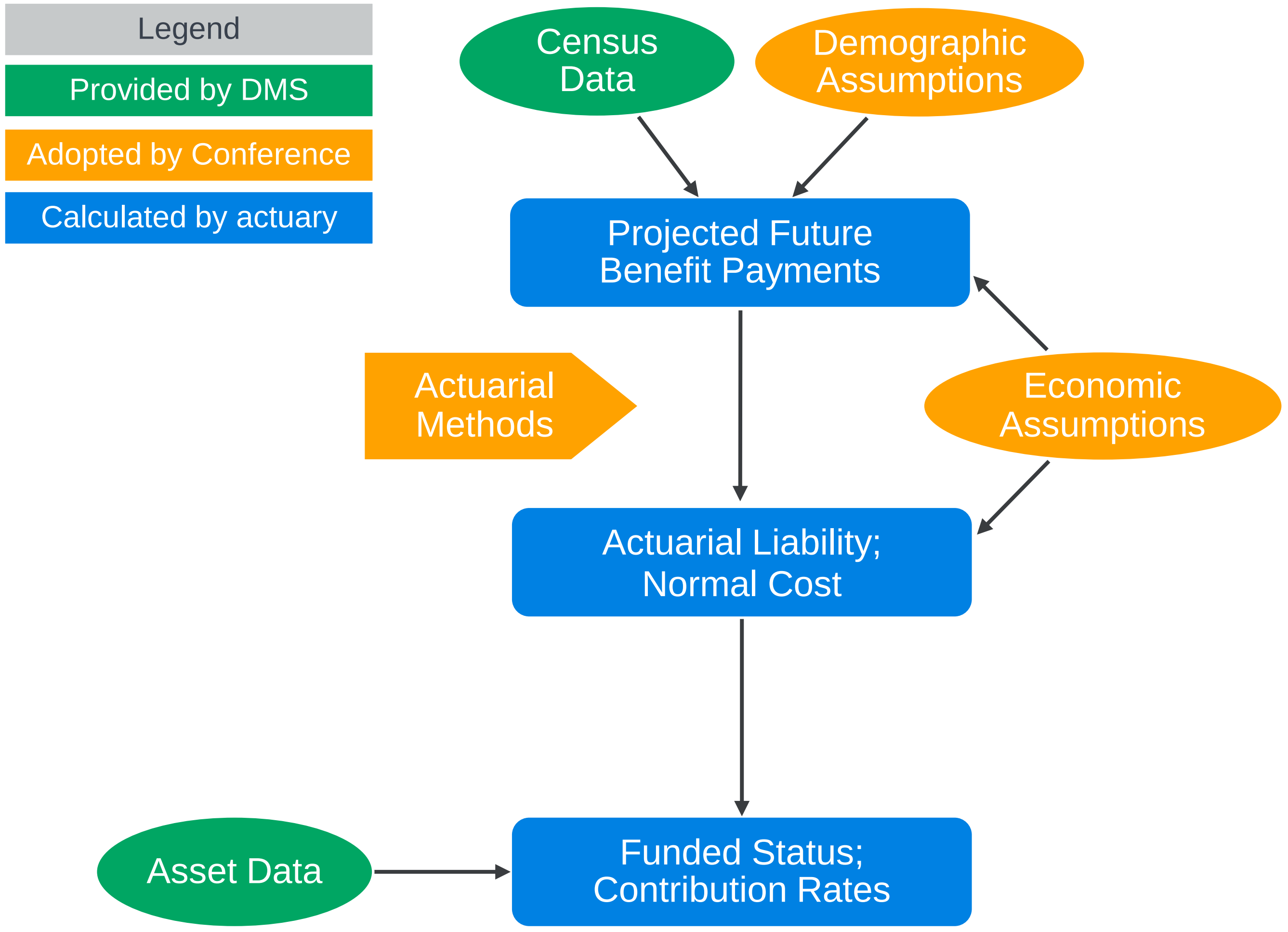


- The **smoothed asset value** is used to set actuarially determined contribution rates

Valuation Process and Projected Benefit Payments

Actuarial Valuation Process

- Today: Discuss preliminary 2021 valuation results, select assumptions and methods for 2021 system funding valuation
- By December 1: Complete 2021 actuarial valuation report, including actuarially calculated contribution rates
- Demographic assumptions, census data, and benefit provisions determine projected future year-by-year benefit payments
- Methods and economic assumptions affect calculations of funded status and contribution rates



Overview of an Actuarial Valuation

Two Pension Plan valuations are conducted annually in parallel to:

- Calculate funded status and develop actuarially calculated contribution rates (funding valuation)
- Satisfy financial reporting requirements (separate GASB valuation)

Data

Assumptions

Methods

Provisions

→

Projected Benefit Payments

→

Funded Status

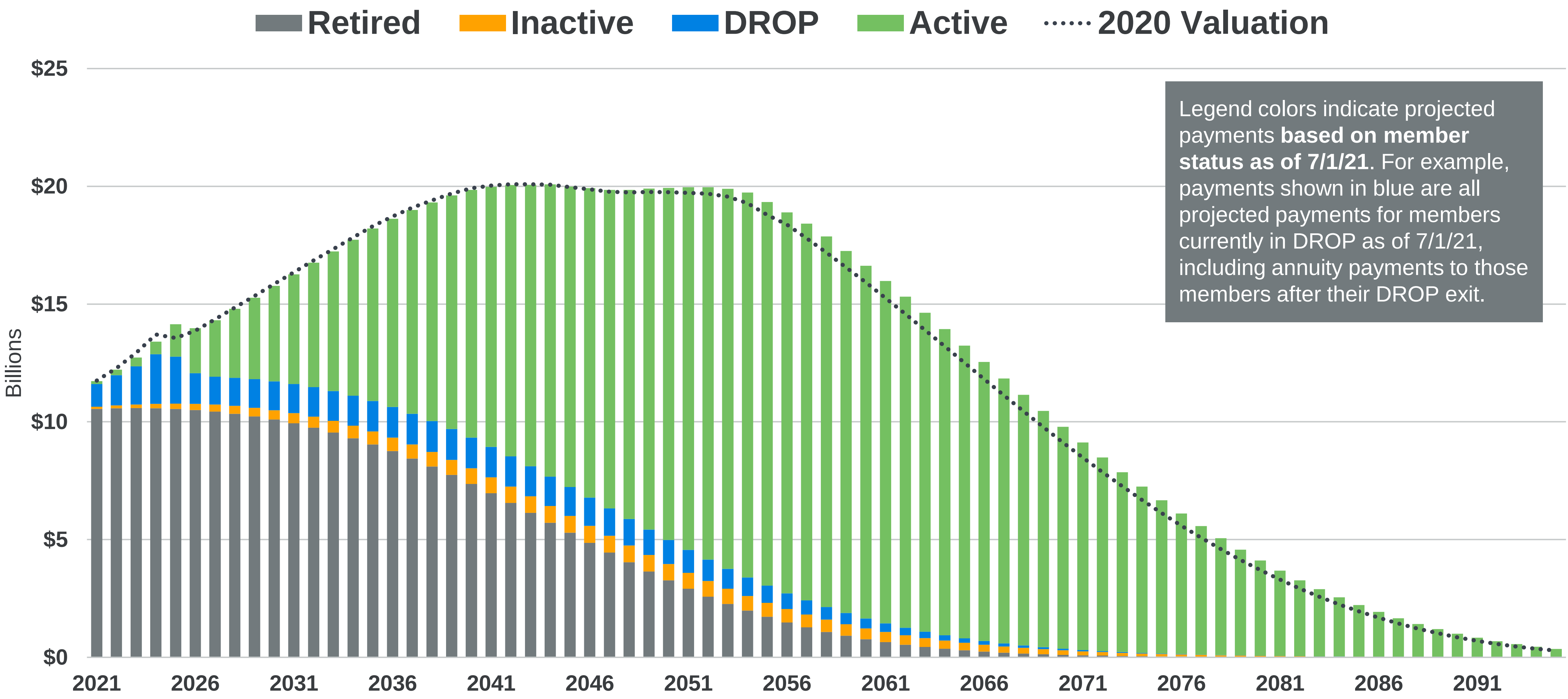
Actuarially Calculated Contribution Rates

GASB Reporting

Projected Benefit Payments

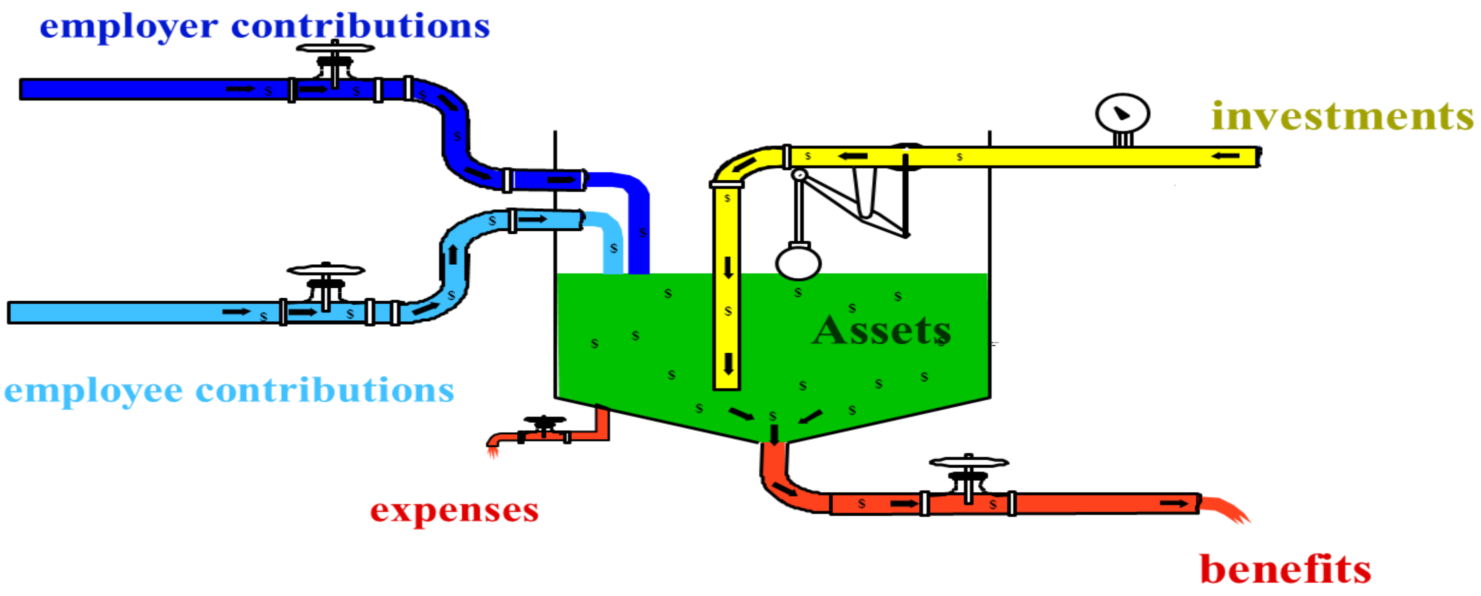
- Projected benefit payments are developed using:
  - Census data provided by the Division of Retirement
  - Demographic assumptions
    - Life expectancy (i.e., mortality)
    - Likelihood and timing of immediate unreduced retirement or DROP entry
    - Likelihood of termination of employment prior to unreduced retirement eligibility
    - Annual salary increase assumption for individual members
    - Incidence of disability
- Membership demographic data is provided annually by the Division of Retirement
- Assumptions listed above are typically formally reviewed in detail every five years as part of an actuarial experience study

Projected Benefit Payments – 2021 Valuation



Actuarial Methods and Assumptions for System Funding Calculations

The Fundamental Cost Equation



- Methods & assumptions do not determine ultimate long-term System cost, only the budgetary **timing** of cost incurrence

Ultimately, the "Fundamental Cost Equation" always governs:

Contributions + Investments = Benefits + Expenses

Key Actuarial Methods Previously Adopted

- Individual Entry Age Normal (Individual EAN) cost allocation method
  - First adopted in 2019
  - This method sets the normal cost rate as a level percent of payroll contribution needed during a member's full career to fund that member's projected cost of total benefits if experience follows assumptions. As such, Tier I members have higher normal cost rates than Tier II members.
- 25-year amortization over a closed period, as a level percent of projected payroll, of previously unanticipated changes in UAL that arise since the prior actuarial valuation
  - First adopted in 2020
  - This approach has a modest period of net negative amortization for each amortization tranche in the UAL contribution rate structure:
    - The unamortized remaining balance increases for the first four years
    - The balance decreases after that, with the original unamortized balance effectively being paid off in the last 18 years of the amortization period

Preliminary 2021 Actuarial Funding Valuation Results

Calculation of Valuation Results

- Projected year-by-year benefit payments are converted to a present value projected cost of total benefits using the return assumption
  - The present value is allocated between past (Actuarial Liability) and projected future service (Normal Costs) via the cost allocation method
- This establishes “2021 Preliminary” funding valuation results using:
  - Actual 2020-21 investment returns
  - Member demographic census data as of July 2021
  - Methods and assumptions as adopted by the 2020 FRS Actuarial Assumption Conference, based in part on the 2019 Experience Study
    - An experience study is conducted every five years

Pension Plan UAL and Funded Status

	2020 Final (2020 data; 2020 assumptions)	2021 Preliminary (2021 data; 2020 assumptions)
Actuarial Liability (AL)	$ 200.3	$ 204.9
Actuarial Value of Assets (AVA)	164.3	174.9
Unfunded Actuarial Liability (UAL)	**$ 36.0**	**$ 30.0**
Funded Status	**82.0%**	**85.3%**

(Amounts in $ billions)

- Market Value of Assets (MVA) is **$27.2 billion above** AVA at July 2021. That **deferred investment gain** will be recognized in higher future AVA returns (and associated **future UAL contribution rate decreases**) if future market value investment performance meets or exceeds 7.00%.
- On a market value of assets basis, the unfunded liability is $2.7 billion and the funded status is 98.6%
- Results shown above use the 7.00% investment return assumption from the 2020 funding valuation

Blended Proposed Statutory Rates at 7.00%

Weighted Average of Rates Across All Membership Classes	Final 2021-22 Rates (7.00% Assumption)			Preliminary 2022-23 Rates (7.00% Assumption)		
	NC	UAL	Total	NC	UAL	Total
PP composite employer rate	7.23%	7.00%	14.23%	7.21%	5.94%	13.15%
IP composite employer rate	4.70%	0.00%	4.70%	4.64%	0.00%	4.64%
Blended PP / IP employer rate	**6.69%**	**5.64%**	**12.33%**	**6.62%**	**4.70%**	**11.32%**
Employee contribution rate			3.00%			3.00%
Composite blended employer plus employee rate			15.33%			14.32%

- Pension Plan (PP) contribution rates are blended with Investment Plan (IP) contribution rates to create blended PP/IP proposed statutory employer rates
- Statutory IP rates by membership class are unchanged, but the 2022-23 IP payroll is more heavily weighted to Regular Class, which decreases the IP composite employer rate

Projected Employer Contributions in Dollars at 7.00%

Total For All Membership Classes	Normal Cost Rate	Applicable Normal Cost Payroll	UAL Rate	Applicable UAL Payroll	Blended PP/IP Rate	Employer Contribution
Final 2021-22	6.69%	$35.4 billion	5.64%	$39.2 billion	**12.33%**	**$4.58 billion**
Preliminary 2022-23	6.62%	$36.0 billion	4.70%	$39.8 billion	**11.32%**	**$4.25 billion**
Change	-0.07%		-0.94%		**-1.01%**	**-$0.33 billion**

- *(Employer normal cost rate x normal cost payroll) + (UAL rate x UAL payroll) = Employer contribution*
- Pension Plan (PP) contribution rates are blended with Investment Plan (IP) contribution rates to create blended PP/IP proposed statutory employer rates
- Preliminary 2022-23 rates above reflect actual 2020-21 investment performance and July 1, 2021 FRS member census, along with all actuarial methods and assumptions used in the July 1, 2020 valuation

Results Under Current Methods, 7.00% Return

Valuation Results at 7.00% Assumption	Blended PP/IP Employer Rate	UAL (AVA)	Funded Status
Final 2021-22	**12.33%**	$36.0 B	82.0%
Preliminary 2022-23:			
- 7.00% return assumption, 25-year level % of projected pay amortization of newly established UAL amortization bases	**11.32%**	$30.0 B	85.3%

- Based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject to only UAL contributions), estimated combined 2022-23 PP/IP employer contribution of:
  - **$4.25 billion** reflecting actual 2020-21 investment performance and July 1, 2021 FRS member census, but before any potential modification to the return assumption or amortization policy

Investment Return Assumption for System Funding

Note: Today's Milliman speaker is not a credentialed investment advisor

Components of 2020 Conference's Return Assumption

- The Conference identifies investment return and inflation assumptions
- From that, the Conference's implied real return assumption can be mathematically inferred

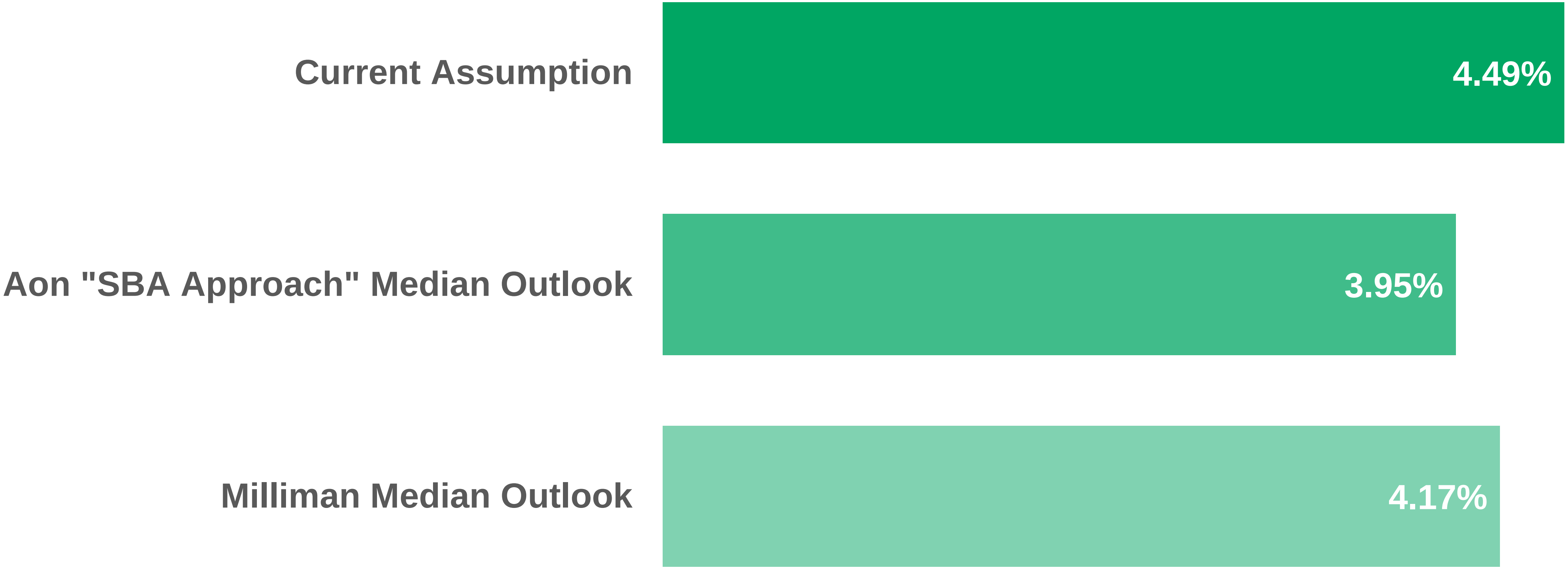
Investment Return 7.00%

Inflation 2.40% | **Real Return 4.49%**

- The governing mathematical formula is:

$$(1 + \text{Investment Return}) = (1 + \text{Inflation}) \times (1 + \text{Real Return})$$

Guidance on Real Return Assumption



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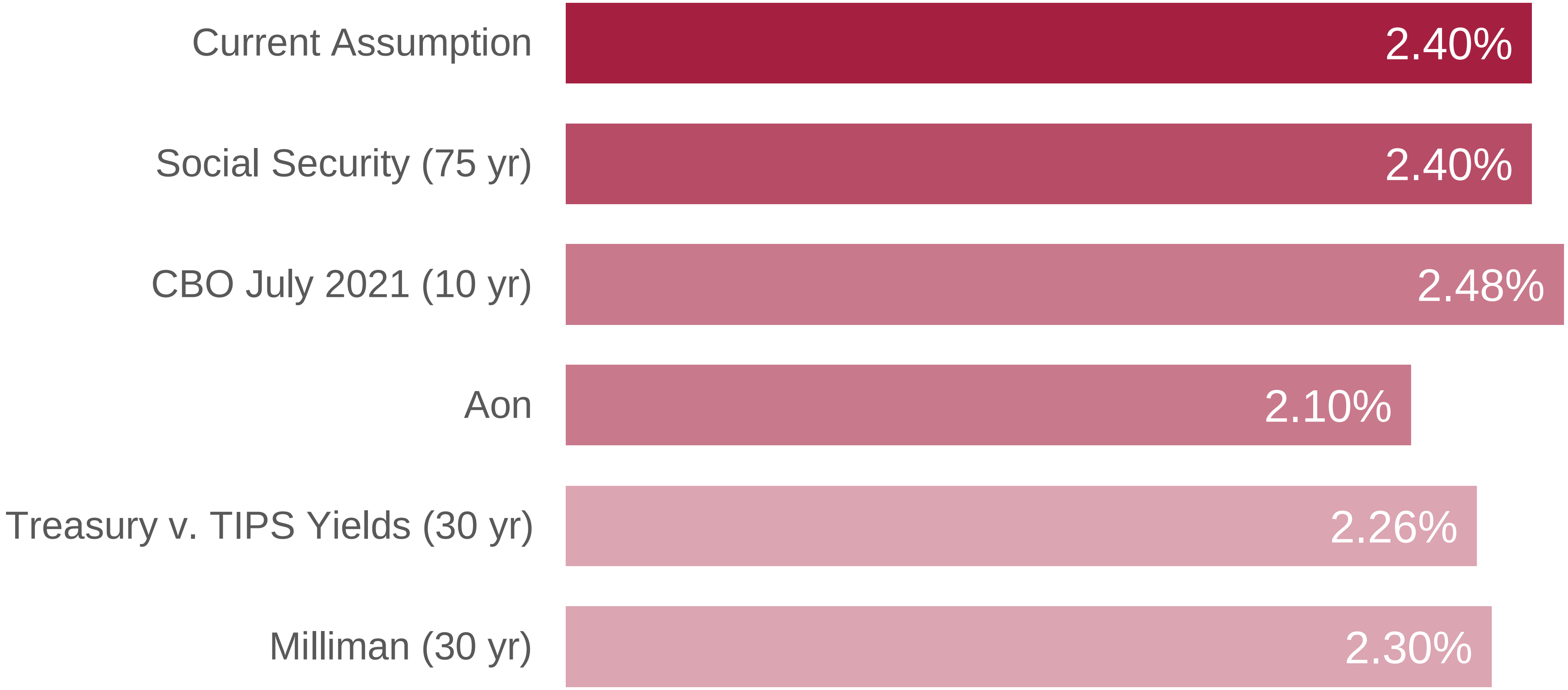
Guidance on Inflation Assumption



What Are FRS's Jumbo Peer Systems Doing?

Assumptions in 2010

Assumptions in 2021

Source: NASRA Public Fund Survey (Aug. '21)

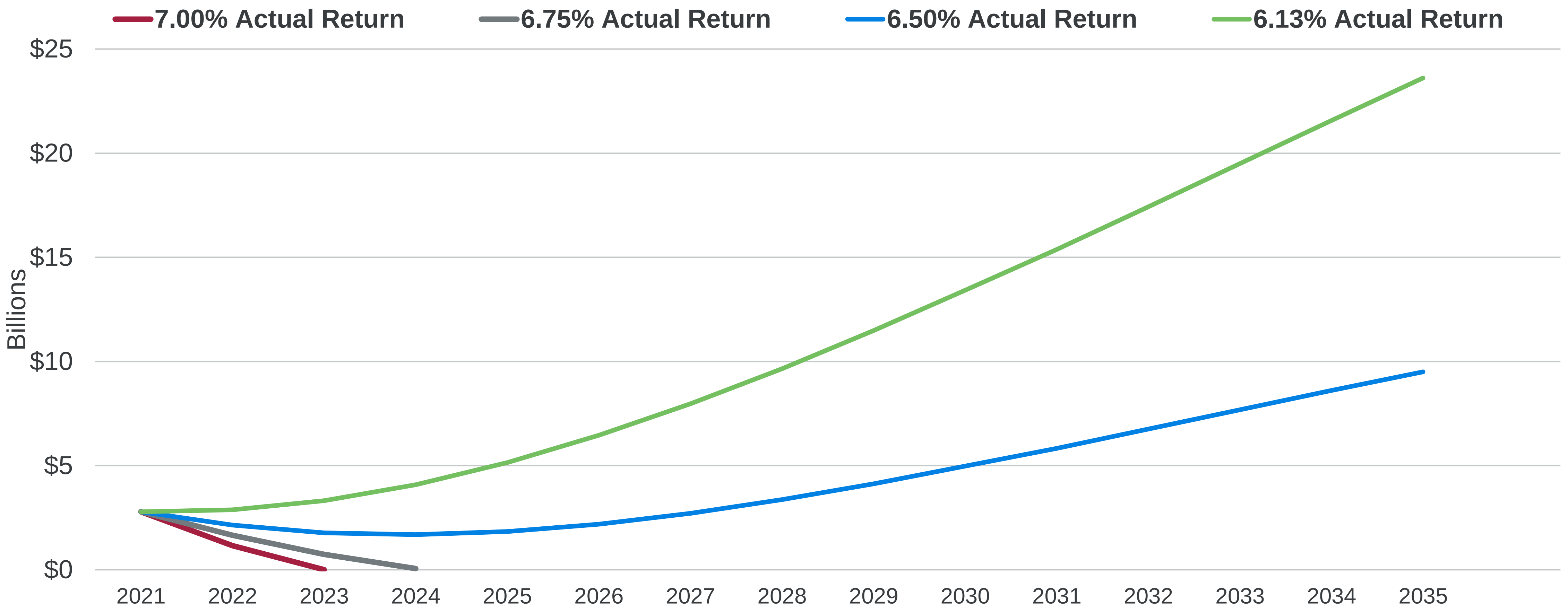
2020 Valuation – Last Year's Return Models and Assumption

- Median (50th percentile) average annual long-term future investment returns from two real return investment models presented at the 2020 Conference are summarized below:
  - "SBA Approach" model developed in Q3 of 2020 by Aon using average global equity risk premiums from several large investment consultancies: **6.46%** median return
    - Used Aon's outlook for inflation at that time of 2.1%
    - Inferred: Aon median real (in excess of inflation) return outlook of **4.27%**
  - Milliman model: **6.56%** median return
    - Used the 2019 Conference's adopted inflation assumption of **2.6%**
    - Inferred: Milliman median real (in excess of inflation) return outlook of 3.86%
    - The default inflation assumption in Milliman's model at that time was 2.2%
- Last year's Conference lowered the return assumption from **7.2%** to **7.0%** for the 2020 actuarial valuation for funding purposes
  - The Conference also lowered the inflation assumption from **2.6%** to **2.4%**

2021 Valuation - Updated Return Models for This Year

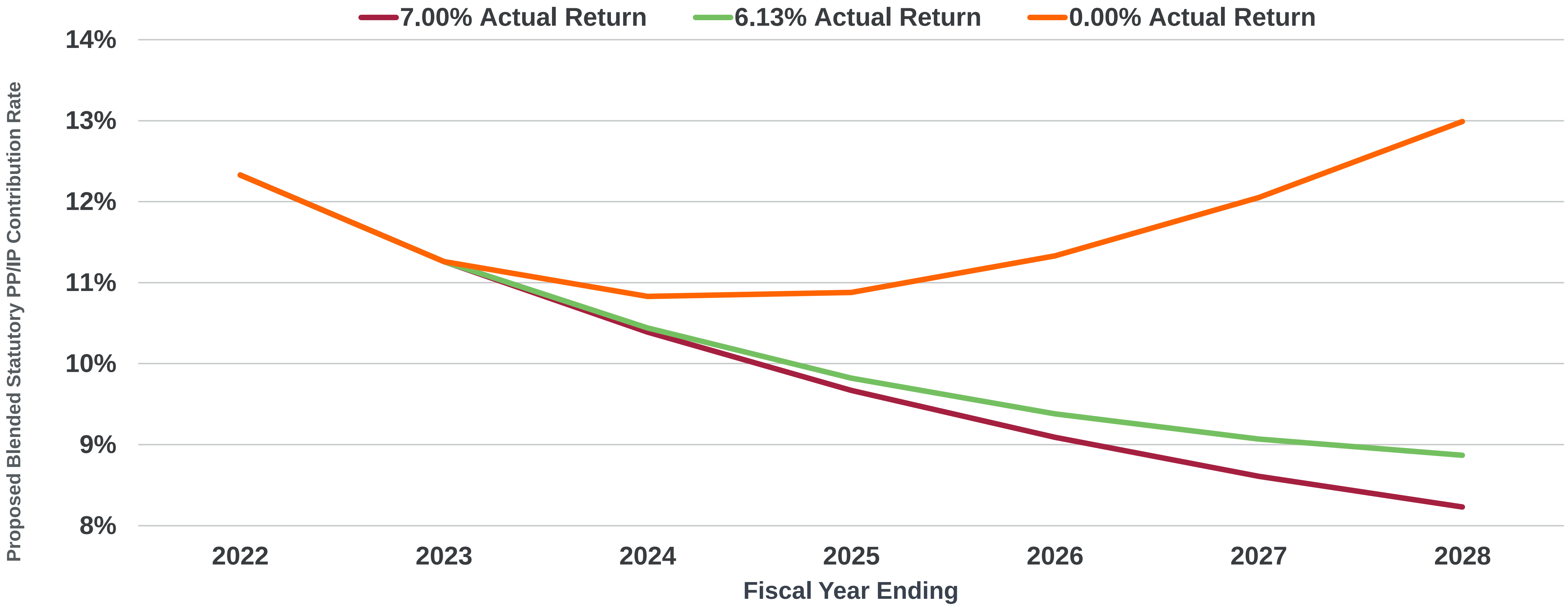
- Aon's "SBA Approach" model from its August 2021 asset-liability study that blends the global equity risk premiums of three large investment consultancies: **6.13%** median return
  - Reflects Aon's current outlook for inflation of 2.1%
  - Inferred: Aon median real (in excess of inflation) return outlook of **3.95%**
- Milliman model: **6.67%** median return
  - Uses the Conference's most recently adopted inflation assumption of **2.4%**
  - Inferred: Milliman median real (in excess of inflation) return outlook of **4.17%**
    - The current default inflation assumption in Milliman's outlook model is 2.3%

Unfunded Liability (MVA Basis) for Various Actual Return Levels



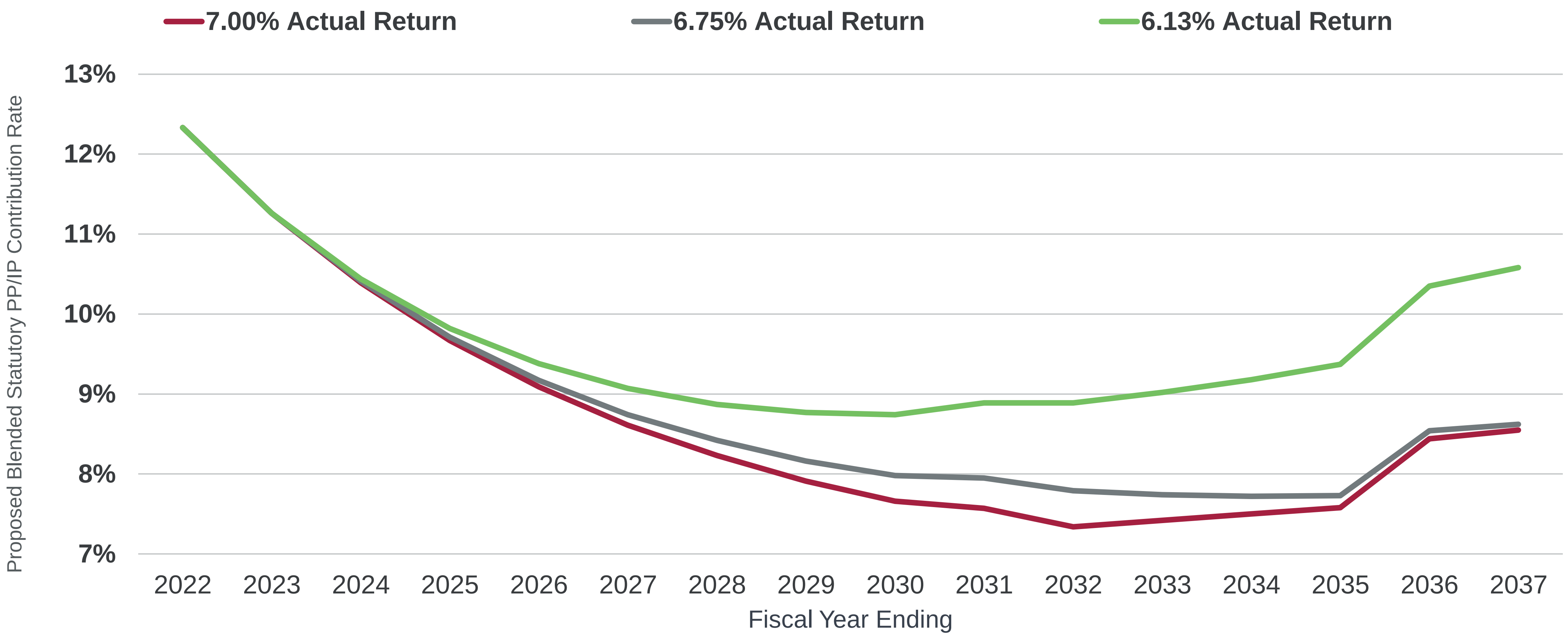
Using a 7.00% adopted assumption for the actuarial valuation’s assumed return, this chart projects unfunded liability on a **market value of assets basis** under four scenarios for the level of actual annual future investment return on a market value of assets basis

Near-Term Contribution Rate for Various Actual Return Levels



Using a 7.00% adopted assumption for the actuarial valuation's assumed return, this chart projects the proposed blended statutory composite Pension Plan/Investment Plan employer contribution rate under three scenarios for actual annual investment return on a fair market value of assets basis

Contribution Rate for Various Actual Return Levels



Using a 7.00% adopted assumption for the actuarial valuation’s assumed return, this chart projects the proposed blended statutory composite Pension Plan/Investment Plan employer contribution rate under three scenarios for actual annual investment return on a fair market value of assets basis

Setting the Assumption for System Funding

- Per statute, the Conference selects the assumption for the valuation report that determines actuarially calculated contribution rates
- To comply with Actuarial Standards of Practice (ASOPs), the actuary assesses the reasonableness of the selected assumption
  - Per the ASOPs, if, in the actuary's professional judgment, the selected assumption "**significantly conflicts** with what…would be **reasonable** for the purpose of the measurement", the actuary must disclose that conflict in his or her written report

What Makes an Assumption “Reasonable”?

- Per the relevant Actuarial Standard of Practice (ASOP), an assumption is **reasonable** for the purpose of the measurement if it:
  - Takes into account current economic data, and
  - Reflects the actuary’s estimate of future experience, and
  - It has no “**significant bias** (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation…are included and disclosed”
- The actuary can incorporate experts’ views (such as those of credentialed investment professionals) in assessing reasonableness

What is “Significant Bias” in an Assumption?

- The governing Actuarial Standard of Practice acknowledges that the meaning of “significant” varies by situation
- For return assumption selection, the relevant meaning is that “a result may be **significant** because it is of consequence”

Effect of Various Return Assumptions

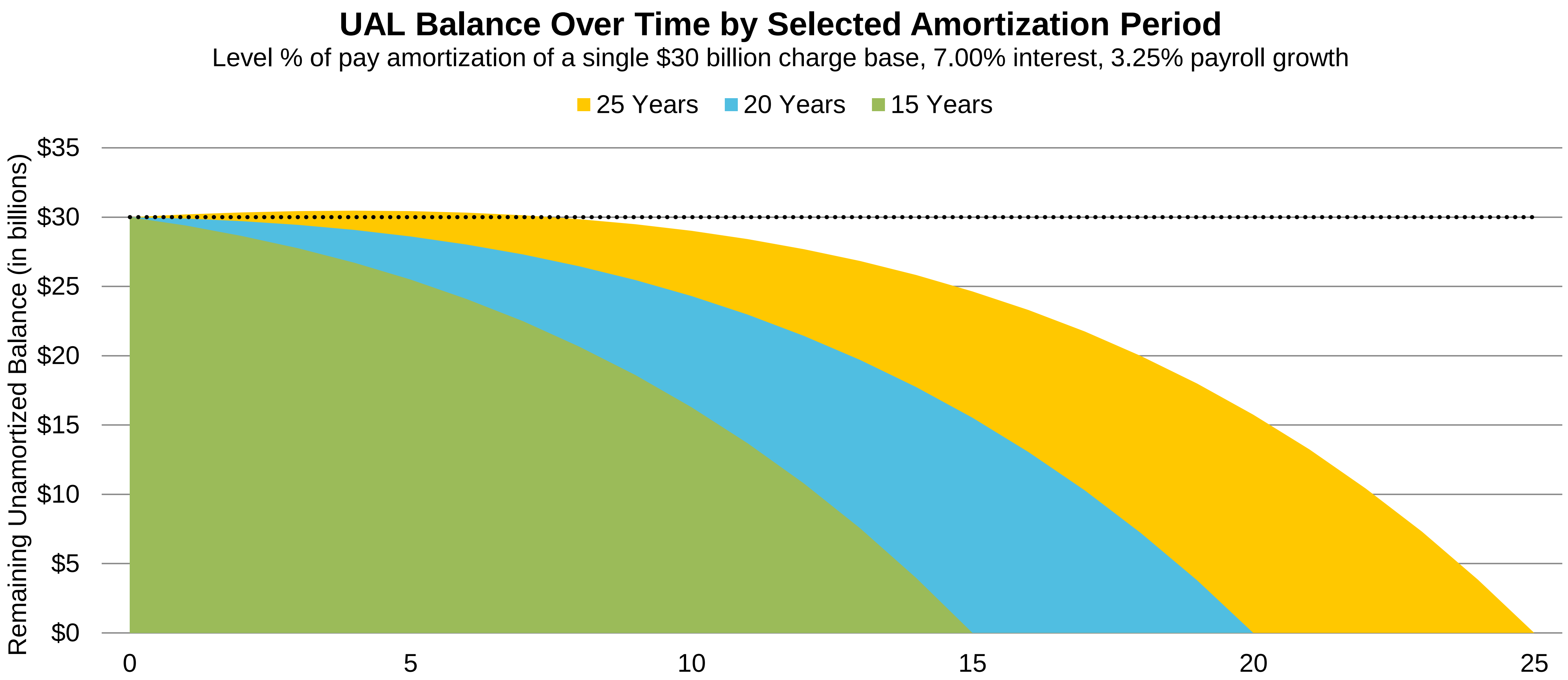
System Average Valuation Results	Blended PP/IP Employer Rate	UAL (AVA)	Funded Status
Final 2021-22 at 7.00% assumption	12.33%	$36.0 B	82.0%
Preliminary 2022-23:			
- At 7.00% assumption[1]	**11.32%**	$30.0 B	85.3%
- At 6.90% assumption[2]	**11.87%**	$32.4 B	84.4%
- At 6.80% assumption[3]	**12.42%**	$34.8 B	83.4%
- At 6.75% assumption[4]	**12.69%**	$35.9 B	83.0%
- At 6.15% assumption	**16.12%**	$51.2 B	77.3%

- Based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject to only UAL contributions), estimated combined 2022-23 PP/IP contribution of:

[1] **$4.25 billion** at 7.00% return assumption
[2] **$4.46 billion** at 6.90% return assumption [**$210 million** increase from 7.00% return assumption]
[3] **$4.67 billion** at 6.80% return assumption [**$420 million** increase from 7.00% return assumption]
[4] **$4.78 billion** at 6.75% return assumption [**$530 million** increase from 7.00% return assumption]

Amortization Policy

Hypothetical Illustration of Different Amortization Periods



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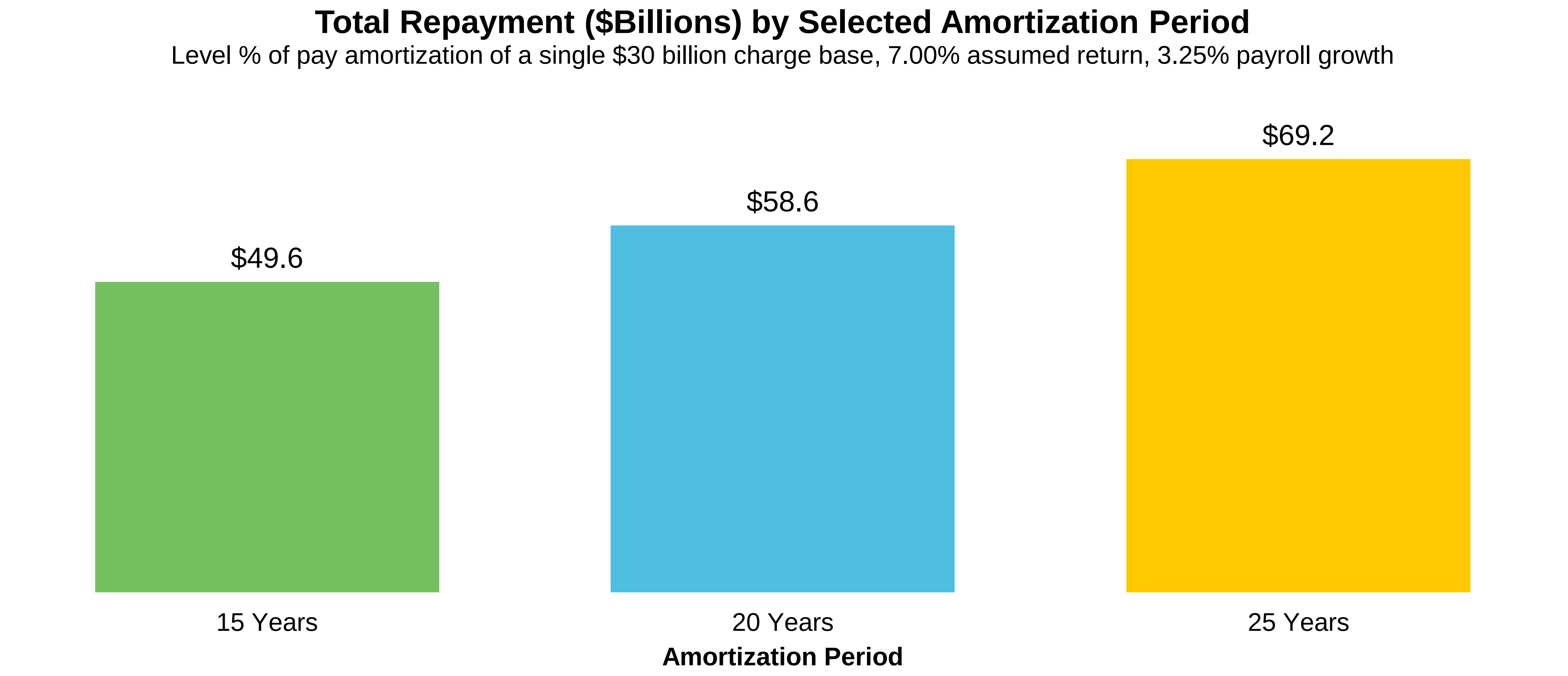
Hypothetical Illustration of Different Amortization Periods



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Effect of Amortization at 7.00% Return

Preliminary 2022-23 Valuation[1] at 7.00%:	Blended PP/IP Employer Rate	Employer Contribution
Level % of pay – 25-year amortization on new bases	11.32%	$4.25 B
Level % of pay - maximum 25-year amortization on all bases	11.38%	$4.27 B
Level % of pay – 20-year amortization on new bases	11.15%	$4.18 B
Level % of pay - maximum 20-year amortization on all bases	11.63%	$4.37 B

- Projected baseline contributions for comparison purposes (current assumptions, including 7.00% return):
  - Final 2021-2022: 12.33% composite blended PP/IP employer rate, $4.58 billion employer contribution
  - Preliminary 2022-2023: 11.32% composite blended PP/IP employer rate, $4.25 billion employer contribution

[1] Reflecting current demographic assumptions and individual entry age normal cost method, and based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject only to UAL contributions)

Effect of Amortization at 6.90% Return

Preliminary 2022-23 Valuation[1] at 6.90%[2]:	Blended PP/IP Employer Rate	Employer Contribution
Level % of pay – 25-year amortization on new bases	11.87%	$4.46 B
Level % of pay - maximum 25-year amortization on all bases	11.92%	$4.48 B
Level % of pay – 20-year amortization on new bases	11.75%	$4.41 B
Level % of pay - maximum 20-year amortization on all bases	12.24%	$4.61 B

- Projected baseline contributions for comparison purposes (current assumptions, including 7.00% return):
  - Final 2021-2022: 12.33% composite blended PP/IP employer rate, $4.58 billion employer contribution
  - Preliminary 2022-2023: 11.32% composite blended PP/IP employer rate, $4.25 billion employer contribution

[1] Reflecting current demographic assumptions and individual entry age normal cost method, and based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject only to UAL contributions)

[2] Reflecting a decrease in the real return assumption, with inflation and other inflation-related assumptions left unchanged

Effect of Amortization at 6.80% Return

Preliminary 2022-23 Valuation[1] at 6.80%[2]:	Blended PP/IP Employer Rate	Employer Contribution
Level % of pay – 25-year amortization on new bases	12.42%	$4.67 B
Level % of pay - maximum 25-year amortization on all bases	12.48%	$4.70 B
Level % of pay – 20-year amortization on new bases	12.37%	$4.65 B
Level % of pay - maximum 20-year amortization on all bases	12.86%	$4.85 B

- Projected baseline contributions for comparison purposes (current assumptions, including 7.00% return):
  - Final 2021-2022: 12.33% composite blended PP/IP employer rate, $4.58 billion employer contribution
  - Preliminary 2022-2023: 11.32% composite blended PP/IP employer rate, $4.25 billion employer contribution

[1] Reflecting current demographic assumptions and individual entry age normal cost method, and based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject only to UAL contributions)

[2] Reflecting a decrease in the real return assumption, with inflation and other inflation-related assumptions left unchanged

Effect of Amortization at 6.75% Return

Preliminary 2022-23 Valuation[1] at 6.75%[2]:	Blended PP/IP Employer Rate	Employer Contribution
Level % of pay – 25-year amortization on new bases	12.69%	$4.78 B
Level % of pay - maximum 25-year amortization on all bases	12.75%	$4.80 B
Level % of pay – 20-year amortization on new bases	12.67%	$4.77 B
Level % of pay - maximum 20-year amortization on all bases	13.16%	$4.96 B

- Projected baseline contributions for comparison purposes (current assumptions, including 7.00% return):
  - Final 2021-2022: 12.33% composite blended PP/IP employer rate, $4.58 billion employer contribution
  - Preliminary 2022-2023: 11.32% composite blended PP/IP employer rate, $4.25 billion employer contribution

[1] Reflecting current demographic assumptions and individual entry age normal cost method, and based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject only to UAL contributions)

[2] Reflecting a decrease in the real return assumption, with inflation and other inflation-related assumptions left unchanged

Discount Rate Assumption for HIS and National Guard Accounting Valuations

GASB Discount Rate Assumption

- Currently, the Florida Health Insurance Subsidy (HIS) and Florida National Guard benefits are effectively funded on a pay-as-you-go basis
- Accounting standards first effective several years ago (GASB 67 & 68) give direction on the discount rate assumption to be used for financial reporting of programs funded on a pay-as-you-go basis
  - The assumption should reflect an **index of 20-year, tax exempt, high quality (AA/Aa or higher) general obligation municipal bonds**
  - The assumption selected should be based on **market conditions as of the measurement date** of the financial reporting in question
- After consideration of these requirements at the time of initial implementation of the accounting standards, the Conference adopted the **Bond Buyer General Obligation 20-Bond Municipal Bond Index** for use in HIS and National Guard GASB calculations
  - That index has been used for pay-as-you-go GASB financial reporting valuations by all public systems with which I am familiar

Historical Values of the Bond Index

- The table below shows the value of the Bond Buyer General Obligation 20-Bond Municipal Bond Index as of the last five fiscal year-end measurement dates

June 30	Index
2021	**2.16%**
2020	2.21%
2019	3.50%
2018	3.87%
2017	3.58%

- The **lower** the index, the **higher** the calculated present value liability, with an index **decrease** from 2.21% to 2.16% estimated to **increase** HIS liability and National Guard liability by approximately $95 million and $16 million, respectively

Needed Guidance

Needed Guidance for FRS Pension Plan

- From Conference Principals for system funding calculations, identification of **methods** and **assumptions** to use in the 2021 FRS Pension Plan valuation calculations for system funding purposes to calculate blended proposed 2022-23 statutory contribution rates, including:
  - Investment return assumption (currently 7.00%)
  - Inflation assumption (currently 2.40%)
  - Amortization policy - currently 25-year amortization as a level percent of projected future payroll for newly arising UAL (unfunded actuarial liability) bases

Needed Guidance for the HIS and National Guard Programs

- From Conference Principals for GASB accounting valuations of the Health Insurance Subsidy (HIS) and Florida National Guard programs:
  - Re-confirmation of the Bond Buyer General Obligation 20-Bond Municipal Bond Index as the discount rate for the two programs' GASB valuations
  - Re-confirmation of the demographic assumptions used in the prior valuation

Appendix

Milliman Capital Market Outlook Assumptions

	Policy Allocation	Annual Arithmetic Mean	**Annualized Geometric Mean**	**Annual Standard Deviation**
US Cash	1.0%	2.08%	2.07%	1.13%
US Government Bonds	1.0%	2.95%	2.83%	4.96%
US Interm (1-10 Yr) Government Bonds	9.0%	2.86%	2.79%	3.68%
US Interm (1-10 Yr) Credit Bonds	9.0%	4.14%	4.05%	4.39%
Private Credit	1.0%	9.56%	8.91%	12.00%
Global Equity	54.2%	8.21%	6.73%	17.81%
US REITs	1.0%	8.15%	6.06%	21.17%
Private Real Estate Property - Core	9.3%	7.02%	6.07%	14.24%
Private Equity	8.9%	12.70%	8.64%	30.00%
Timber	0.4%	7.16%	6.37%	13.00%
Infrastructure - Public	1.2%	7.62%	6.24%	17.24%
Commodities	0.4%	4.33%	3.01%	16.54%
Hedge Funds - MultiStrategy	1.7%	6.15%	5.72%	9.25%
Hedge Funds - Event-Driven	0.1%	6.26%	5.76%	9.50%
Hedge Funds - Equity Hedge	0.4%	6.77%	6.01%	12.29%
Hedge Funds - Macro	1.2%	4.69%	4.07%	8.51%
Hedge Funds - Distressed	0.4%	6.23%	5.62%	10.04%
US Inflation (CPI-U)*			2.40%	1.16%
Total Fund	100%	7.40%	**6.67%**	**12.8%**

For assessing the expected portfolio return under Milliman's capital market assumptions, we considered FRS investments to be allocated among the model's asset classes as shown below. This allocation is based on our understanding of the current target allocation policy, as provided to us by Aon Hewitt Investment Consulting via email on September 24, 2021.

*2.4% is the inflation assumption most recently adopted by the FRS Actuarial Assumption Conference. That 2.4% assumption is then applied to real return assumptions in Milliman's capital market outlook model to calculate a median (50th) percentile return.

Real return assumptions in the Milliman model are set semi-annually by a committee of credentialed investment professionals.

The default inflation assumption in the Milliman model is currently 2.3%.

Milliman Investment Return Model

Percentile	30-Year Average
65th	7.57%
60th	7.26%
55th	6.97%
50th	**6.67%**
45th	6.38%
40th	6.09%
35th	5.78%

- Based on the current target asset allocation, model results are geometric annual average net returns based on:
  - A series of average annual real returns by asset class, plus asset class correlations
  - The 2020 Conference's 2.4% inflation assumption
  - The 55th percentile means that in the Milliman model 55% of possible 30-year average annualized returns are at or below 6.97%
  - Details on the model inputs on the previous slide

Regular - Various Return Assumptions

Regular Membership Class	Blended PP/IP Employer Rate	Estimated PP/IP Contribution
Final 2021-22 at 7.00% assumption	9.10%	$2.59 B
Preliminary 2022-23:		
- At 7.00% assumption	8.10%	$2.32 B
- At 6.90% assumption	8.55%	$2.45 B
- At 6.80% assumption	9.01%	$2.58 B
- At 6.75% assumption	9.24%	$2.65 B
- At 6.15% assumption	12.10%	$3.49 B

- Based on projected 2022-23 PP/IP payroll subject to UAL contributions of $30.8 billion
  - Does not include projected contributions on DROP payroll (estimated for 2021-22 to be $0.407 billion in contributions on $2.44 billion of applicable payroll)

Special Risk - Various Return Assumptions

Special Risk Membership Class	Blended PP/IP Employer Rate	Estimated PP/IP Contribution
Final 2021-22 at 7.00% assumption	24.17%	$1.27 B
Preliminary 2022-23:		
- At 7.00% assumption	22.76%	$1.24 B
- At 6.90% assumption	23.70%	$1.30 B
- At 6.80% assumption	24.66%	$1.35 B
- At 6.75% assumption	25.14%	$1.37 B
- At 6.15% assumption	31.12%	$1.70 B

- Based on projected 2022-23 PP/IP payroll subject to UAL contributions of $5.48 billion
  - Does not include projected contributions on DROP payroll (estimated for 2021-22 to be $0.407 billion in contributions on $2.44 billion of applicable payroll)

Level Dollar Amortization at 7.00% Return

Preliminary 2022-23 Valuation[1] at 7.00%:	Blended PP/IP Employer Rate	Employer Contribution
Level % of pay – 25-year amortization on new bases	11.32%	$4.25 B
Level $ – 25-year amortization on new bases	10.94%	$4.10 B
Level $ - maximum 25-year amortization on all bases	13.09%	$4.95 B
Level $ – 20-year amortization on new bases	10.79%	$4.04B
Level $ - maximum 20-year amortization on all bases	13.31%	$5.04 B

[1] Reflecting current demographic assumptions and individual entry age normal cost method, and based on projected 2022-23 PP/IP payroll of $39.8 billion (including payroll subject only to UAL contributions)

Setting the Investment Return Assumption

Actual future investment returns are not knowable in advance, so how should the assumption be set?

- Prudently select a best estimate
- Review return models from credentialed investment professionals
- Remain cognizant that hoping for a result does not make it happen; the assumption selected does not affect actual investment returns
- Avoid myopia – the objective is to make a prudent long-term estimate, not to get a single individual year right
- Neither ignore historical results nor be beholden to them
- Since actual results will vary from assumption, review a return model's probability range and consider a margin for variance

Contribution Rate Calculations

- Pension Plan-specific contribution rates have two components:
  - Normal cost rate
    - Cost assigned to current year benefits by the allocation method
  - UAL rate
    - Rate calculated to eliminate UAL in a systematic manner over a specified time period if future experience follows assumptions
- To calculate the UAL rate, an additional assumption and an additional method are needed
  - For amortizations as a level percentage of projected payroll, the system's **general wage increase** assumption affects the rate
  - In addition, the length of the **amortization period** affects the rate

Asset Smoothing

- Contribution rates established annually based on the reported unfunded actuarial liability (UAL)
  - UAL compares Actuarial Liability against a system asset measure
- The Actuarial Value of Assets (AVA) measure used by FRS to calculate UAL is specified by statute, and employs an “asset smoothing” technique
  - The mandated method annually recognizes 20% of investment return deviations from assumption
- The statutory calculation approach includes a “corridor” to ensure smoothed assets vary no more than 20% from fair market value
- The objective of asset smoothing is to keep long-term contribution levels appropriately linked to actual investment performance, and to have year-to-year contribution rate changes be less volatile and more predictable
- Five-year smoothing method recognizes heavy losses gradually following times of unfavorable asset performance
- The smoothing is symmetrical, so that any large investment gains are also not “felt” all at once, but instead serve as a cushion against potential future unfavorable asset performance

Disclaimer

At your request, we have provided these draft results prior to completion of the July 1, 2021 Actuarial Valuation Report. Because these are draft results, Milliman does not make any representation or warranty regarding the contents of the presentation. Milliman advises any reader not to take any action in reliance on anything contained in this presentation. All results from this presentation are subject to revision or correction prior to the release of the final July 1, 2021 Actuarial Valuation Report, and such changes or corrections may be material.

Certification

This presentation summarizes key preliminary results of an actuarial valuation of the Florida Retirement System ("FRS" or "the System") as of July 1, 2021. The valuation, when finalized, will develop actuarially calculated contribution rates for the Plan Year ending June 30, 2023. The results in this presentation are preliminary in nature and may not be relied upon to, for example, prepare the System's Annual Consolidated Financial Report. The reliance document will be the formal July 1, 2021 Actuarial Valuation Report.

In preparing this presentation, we relied, without audit, on information (some oral and some in writing) supplied by Division of Retirement ("Division") staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

Preliminary results have been determined on the basis of actuarial assumptions and methods as most recently adopted by the 2020 FRS Actuarial Assumption Conference. At the time of their review and adoption, in our professional opinion those assumptions were individually reasonable (taking into account the experience of the System and reasonable expectations); and offered a reasonable estimate of anticipated future experience affecting the System.

Future actuarial measurements may differ significantly from the current measurements presented in this presentation due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The FRS Actuarial Assumption Conference has the final decision regarding the selection of assumptions for System funding calculations.

Certification

Computations presented in this presentation are for purposes of preliminarily estimating the actuarially calculated contribution rates for funding the System. Computations prepared for other purposes may differ. The calculations in the presentation have been made on a basis consistent with our understanding of the System's funding requirements and goals. The calculations in this presentation have been made on a basis consistent with our understanding of the plan provisions described in the appendix of our formal actuarial valuation report as of July 1, 2020. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this presentation. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the internal business use of the Florida Department of Management Services ("DMS"). To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exception(s):

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The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel. The presenting actuaries are independent of the plan sponsors. I am not aware of any relationship that would impair the objectivity of Milliman's work.

On the basis of the foregoing, I hereby certify that, to the best of my knowledge and belief, this presentation has been prepared in accordance with generally recognized and accepted actuarial principles and practices. I am a member of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Actuarial Basis

Data

We have based our calculations on demographic member census data as of July 1, 2021 as supplied by the Division of Retirement ("Division"). That data will be summarized in our formal actuarial valuation report for funding purposes as of July 1, 2021, which will be published in the 4th quarter of this year. Assets as of June 30, 2021, were based on values provided by the Division.

Methods / Policies

Actuarial Cost Method: Individual Entry Age Normal, as initially adopted by the 2019 FRS Actuarial Assumption Conference and most recently adopted by the 2020 FRS Actuarial Assumption Conference

UAL Amortization: Newly arising UAL each plan year is amortized as a level percentage of projected payroll over a closed 25-year period, except where explicitly modeled as a policy alternative in the body of the presentation.

Actuarial Value of Assets: A smoothed asset value specified by Florida Statutes that annually recognizes 20% of deviations in investment performance from the long-term assumption systematically over time. The statutory calculation approach includes a "corridor" to ensure smoothed assets vary no more than 20% from fair market value.

Assumptions

Assumptions for preliminary 2021 valuation calculations use assumptions as detailed July 1, 2020 Actuarial Valuation Report for funding purposes

Provisions

Provisions valued are as summarized in the July 1, 2020 Actuarial Valuation Report for system funding purposes