

Florida Retirement System Actuarial Assumption Estimating Conference Executive Summary

The Florida Retirement System Actuarial Assumption Conference met on October 23 and 28, 2019, to consider the methodological and economic assumptions to be used for the actuarial valuation of Florida’s Retirement System (FRS or System). The Conference had met previously on October 8th to discuss the results of the 2019 experience study. This study is conducted every five years to update current demographic assumptions and review the actuarial methods, taking into account actual plan experience.

The 2019 experience study was based on observations drawn from the time period running from 2013 to 2018. The System’s actuary, Milliman Group, recommended using updated mortality tables from the Society of Actuaries (Pub-2010 and MP-2018) that also include public sector-specific (K-12 instructional personnel, public safety personnel) experience for mortality projections. The study also suggested that the DROP entry assumptions be updated for all membership classes and by gender. At the end of the conference, the principals agreed to the proposed demographic changes presented by the State’s actuary; however, they requested additional policy scenarios related to the amortization base and the cost method. Further, the principals agreed to use a 2.6% inflation rate and 0.65% real wage growth rate, which result in a combined rate of 3.25% for system payroll growth. These rates were proposed by the System’s actuary and were considered reasonable after evaluating the experience study results.

At the Florida Retirement System Actuarial Assumptions Conference on October 23rd, the preliminary results for July 1, 2019 were presented. They showed that the FRS would continue to have an unfunded actuarial liability (UAL). Using 2019 data and the newly adopted assumptions, the projected UAL was expected to decrease slightly from the \$29.9 billion shown in 2018’s final valuation to \$29.2 billion in 2019. Similarly, the system was anticipated to be 84.6% funded on an actuarial basis, another slight improvement from the prior year. These results were based on the prior assumptions of a 7.4% investment return and the use of the Ultimate Entry Age Normal cost allocation method.

The actual rate of return has been declining since FY 2016-17, albeit remaining healthy. The investment return in FY 2016-17 was a strong 13.77% -- the strongest result in the past five years. Both FY 2017-18 and FY 2018-19 returns were consecutively lower. The final FY 2018-19 return was projected to be 6.26% as of June 30, 2019. The tables below show the actual investment returns for the past five fiscal years and the cumulative returns over a 5-year, 10-year, 15-year, and 20-year timeframe.

Fiscal Year	Investment Return
2014-15	3.67%
2015-16	0.54%
2016-17	13.77%
2017-18	8.98%
2018-19	6.26%

	Investment Return
3-year	9.63%
5-year	6.55%
10-year	9.80%
15-year	7.19%
20-year	5.97%

The System’s actuary (Milliman), the State Board of Administration (SBA), and the SBA’s financial consultant Aon Hewitt Investment Consultants (AHIC) all recommended a reduction in the investment return assumption to somewhere between 6.6% and 6.7%. Representatives from the Division of Bond Finance and the SBA

advocated for a lower assumption primarily due to the higher risk to long-term fund viability that is associated with higher return expectations. The presenters also noted that other large public pension systems are lowering their return expectations, as shown in the Public Fund Survey (NASRA, Oct. 2019); the median return expectation in these results is 7.25%.

Overall, the principals were aware of the changing investment climate and the urgency of adjusting investment return expectations to keep the fund inherently viable; however, some also advocated for caution in making abrupt changes to the funding obligations that could later prove to be unnecessary. After much deliberation and assessing a large number of simulations involving differing rates of return, the principals agreed on 7.20%.

The Conference principals were also generally in favor of moving to the Individual Entry Age Normal cost allocation method from the Ultimate Entry Age Normal cost allocation method. After some deliberation of the costs associated with simultaneously changing the allocation method and the amortization method, the principals agreed to change the FRS cost allocation method to Individual Entry Age Normal, but made no changes to the existing amortization period (level percentage of projected payroll).

The table below displays the nominal returns, inflation rates, and real returns used in the four most recent valuations.

2016	2017	2018	2019
7.60% Investment Return	7.50% Investment Return	7.40% Investment Return	7.20% Investment Return
2.60% Inflation	2.60% Inflation	2.60% Inflation	2.60% Inflation
4.87% Real Return	4.78% Real Return	4.68% Real Return	4.48% Real Return

Note: The real return takes into account administrative expenses, so the numbers in this table are not additive.

The 2019 Legislature fully funded the UAL at the recommended contribution rate provided as part of the 2018 valuation report. This action and continued full funding of the recommended UAL rate, as committed to by the Legislature, will result in the gradual increase of the funded ratio in future years. The UAL contribution rate is calculated assuming the liability will be funded over a period of 30 years. The contribution rates should remain stable as long as contributions are made as recommended and actual experience mirrors projections. However, many factors affect these calculations and can cause the contribution rates to increase or decrease over time. For example, investment returns have been and will continue to be a relatively volatile factor, and if actual investment results are lower than assumed, there could be a significant impact on the UAL and future contribution rates.

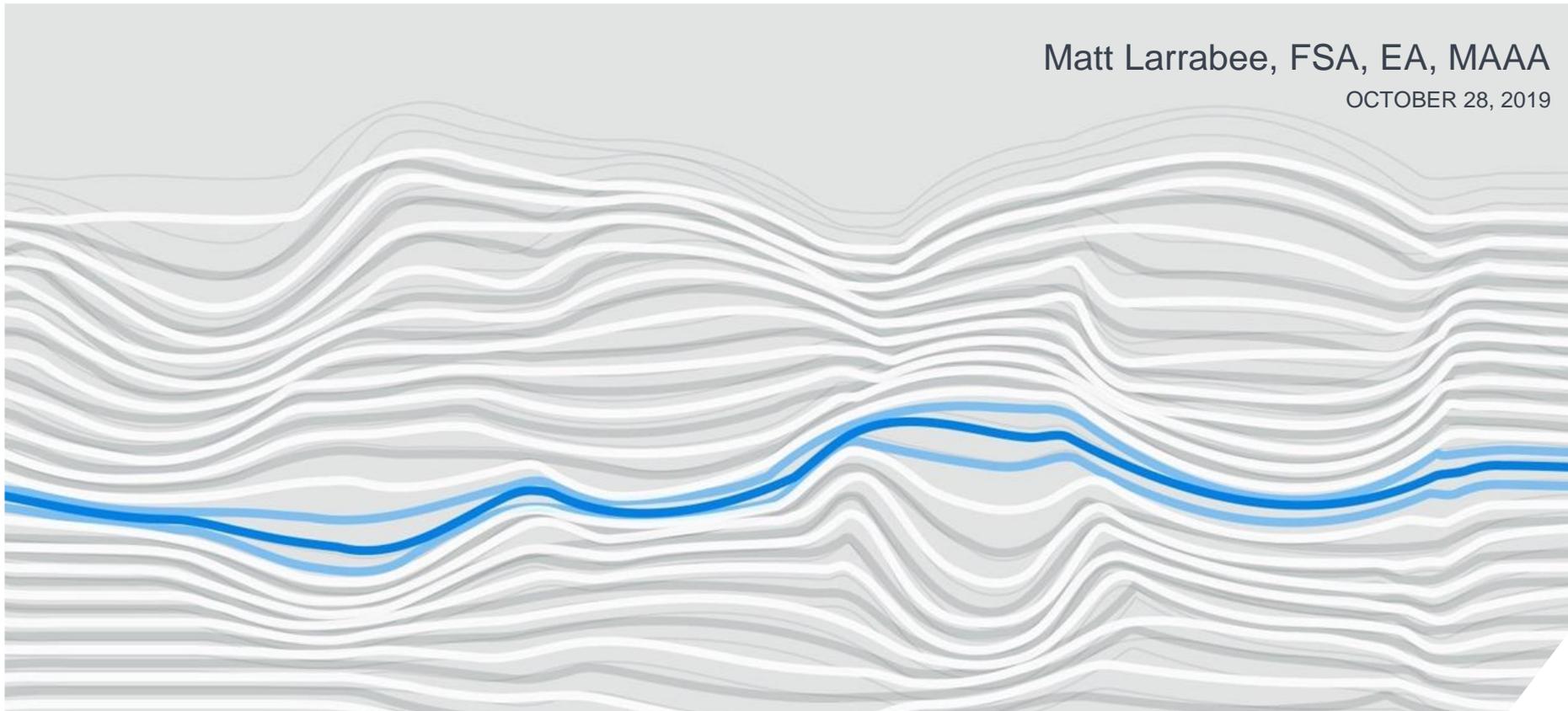
The final actuarial valuation for July 1, 2019, will be released in December 2019. Those results will differ slightly from the preliminary numbers reviewed by the Conference principals.

Florida Retirement System

2019 FRS Actuarial Assumption Estimating Conference
Materials Requested at October 23, 2019 Conference

Matt Larrabee, FSA, EA, MAAA

OCTOBER 28, 2019



Agenda

- Needed policy inputs
- Additional analysis of 45 policy input scenarios
- Amortization detail of possible actuarial cost allocation method change
- Needed guidance

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Overview of Needed Policy Inputs

- Return assumption for nominal average future investment return
- Actuarial cost allocation method
 - Ultimate entry age (prior year's policy) or individual entry age
- Amortization period
 - Potential modification to existing tranches, only adjusting tranches where combined amortization period will not exceed 30 years
- Amortization approach
 - Level % of projected pay (prior year's policy) or level annual \$ amount
 - Potentially amortize effect of cost allocation method to mirror Tier I Pension Plan payroll (schedule on slide 82 of October 23 Conference presentation and last slide of today's presentation)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Composite System – 7.4% Assumed Investment Return

Composite System

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.40% Assumed Nominal Investment Return												
1	7.40%	4.68%	Ultimate	Level % of Pay	No Change	n/a	4.94%	5.23%	10.17%	\$1,690 M	\$1,981 M	\$3,671 M
2	7.40%	4.68%	Ultimate	Level % of Pay	23 Years	n/a	4.94%	5.35%	10.29%	\$1,690 M	\$2,026 M	\$3,716 M
3	7.40%	4.68%	Ultimate	Level % of Pay	20 Years	n/a	4.94%	5.54%	10.48%	\$1,690 M	\$2,098 M	\$3,788 M
4	7.40%	4.68%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	6.29%	4.13%	10.42%	\$2,152 M	\$1,564 M	\$3,716 M
5	7.40%	4.68%	Individual	Level % of Pay	No Change	30 Years	6.29%	4.66%	10.95%	\$2,152 M	\$1,765 M	\$3,917 M
6	7.40%	4.68%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	6.29%	4.26%	10.55%	\$2,152 M	\$1,613 M	\$3,765 M
7	7.40%	4.68%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	6.29%	4.44%	10.73%	\$2,152 M	\$1,682 M	\$3,834 M
8	7.40%	4.68%	Individual	Level % of Pay	23 Years	23 Years	6.29%	4.69%	10.98%	\$2,152 M	\$1,776 M	\$3,928 M
9	7.40%	4.68%	Individual	Level % of Pay	20 Years	20 Years	6.29%	4.82%	11.11%	\$2,152 M	\$1,825 M	\$3,977 M
10	7.40%	4.68%	Ultimate	Level Dollar	23 Years	n/a	4.94%	6.98%	11.92%	\$1,690 M	\$2,644 M	\$4,334 M
11	7.40%	4.68%	Ultimate	Level Dollar	20 Years	n/a	4.94%	7.13%	12.07%	\$1,690 M	\$2,700 M	\$4,390 M
12	7.40%	4.68%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	6.29%	5.89%	12.18%	\$2,152 M	\$2,231 M	\$4,383 M
13	7.40%	4.68%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	6.29%	6.05%	12.34%	\$2,152 M	\$2,291 M	\$4,443 M
14	7.40%	4.68%	Individual	Level Dollar	23 Years	23 Years	6.29%	6.12%	12.41%	\$2,152 M	\$2,318 M	\$4,470 M
15	7.40%	4.68%	Individual	Level Dollar	20 Years	20 Years	6.29%	6.22%	12.51%	\$2,152 M	\$2,356 M	\$4,508 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Composite System – 7.3% Assumed Investment Return

Composite System

Policy Inputs							Results of Policy Inputs						
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions						
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution	
7.30% Assumed Nominal Investment Return													
16	7.30%	4.58%	Ultimate	Level % of Pay	No Change	n/a	5.11%	5.54%	10.65%	\$1,748 M	\$2,098 M	\$3,846 M	
17	7.30%	4.58%	Ultimate	Level % of Pay	23 Years	n/a	5.11%	5.72%	10.83%	\$1,748 M	\$2,166 M	\$3,914 M	
18	7.30%	4.58%	Ultimate	Level % of Pay	20 Years	n/a	5.11%	5.95%	11.06%	\$1,748 M	\$2,253 M	\$4,001 M	
19	7.30%	4.58%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	6.50%	4.42%	10.92%	\$2,223 M	\$1,674 M	\$3,897 M	
20	7.30%	4.58%	Individual	Level % of Pay	No Change	30 Years	6.50%	4.96%	11.46%	\$2,223 M	\$1,879 M	\$4,102 M	
21	7.30%	4.58%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	6.50%	4.60%	11.10%	\$2,223 M	\$1,742 M	\$3,965 M	
22	7.30%	4.58%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	6.50%	4.83%	11.33%	\$2,223 M	\$1,829 M	\$4,052 M	
23	7.30%	4.58%	Individual	Level % of Pay	23 Years	23 Years	6.50%	5.06%	11.56%	\$2,223 M	\$1,916 M	\$4,139 M	
24	7.30%	4.58%	Individual	Level % of Pay	20 Years	20 Years	6.50%	5.21%	11.71%	\$2,223 M	\$1,973 M	\$4,196 M	
25	7.30%	4.58%	Ultimate	Level Dollar	23 Years	n/a	5.11%	7.48%	12.59%	\$1,748 M	\$2,833 M	\$4,581 M	
26	7.30%	4.58%	Ultimate	Level Dollar	20 Years	n/a	5.11%	7.67%	12.78%	\$1,748 M	\$2,905 M	\$4,653 M	
27	7.30%	4.58%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	6.50%	6.36%	12.86%	\$2,223 M	\$2,409 M	\$4,632 M	
28	7.30%	4.58%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	6.50%	6.55%	13.05%	\$2,223 M	\$2,481 M	\$4,704 M	
29	7.30%	4.58%	Individual	Level Dollar	23 Years	23 Years	6.50%	6.60%	13.10%	\$2,223 M	\$2,500 M	\$4,723 M	
30	7.30%	4.58%	Individual	Level Dollar	20 Years	20 Years	6.50%	6.73%	13.23%	\$2,223 M	\$2,549 M	\$4,772 M	

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Composite System – 7.2% Assumed Investment Return

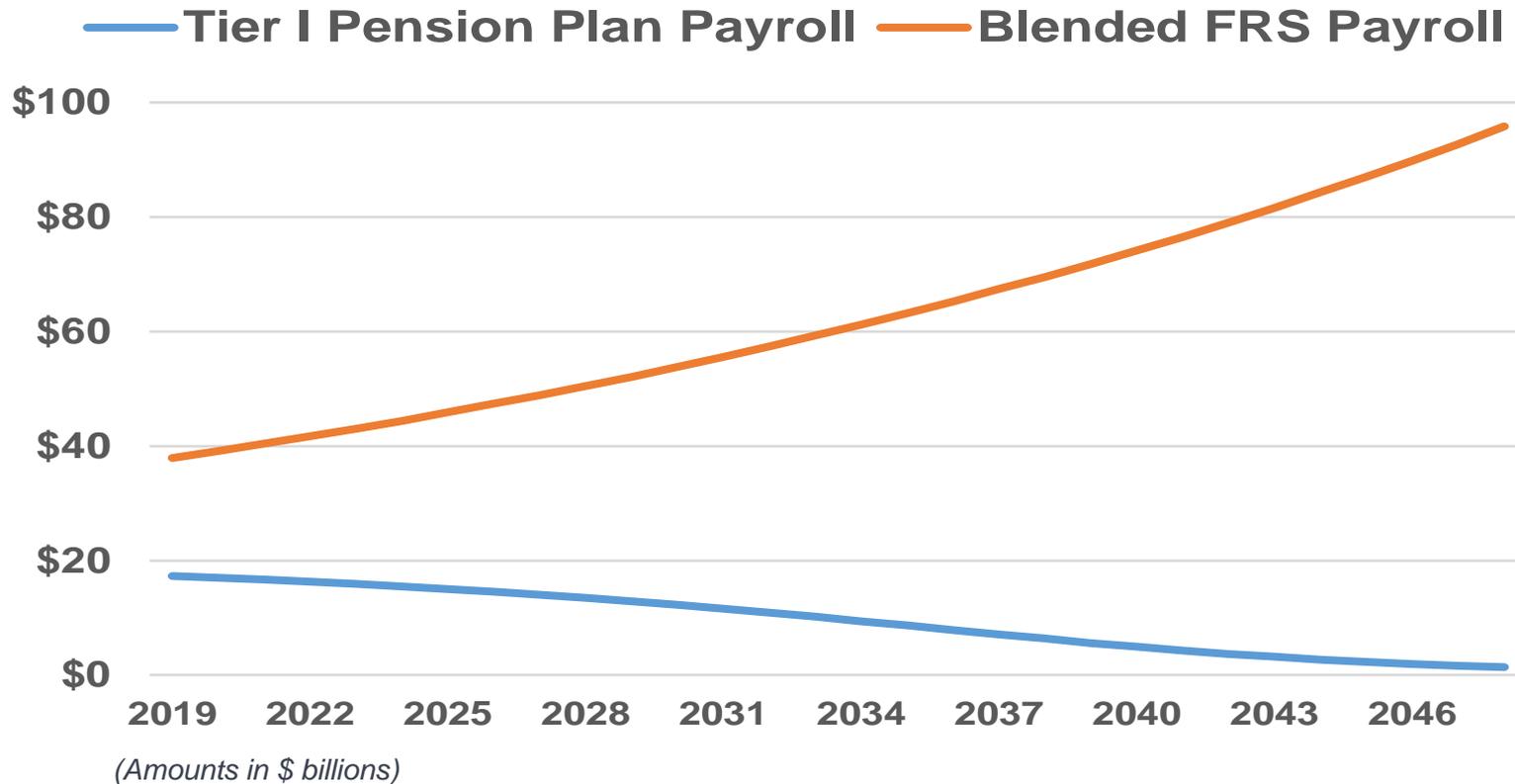
Composite System

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.20% Assumed Nominal Investment Return												
31	7.20%	4.48%	Ultimate	Level % of Pay	No Change	n/a	5.27%	5.85%	11.12%	\$1,803 M	\$2,216 M	\$4,019 M
32	7.20%	4.48%	Ultimate	Level % of Pay	23 Years	n/a	5.27%	6.10%	11.37%	\$1,803 M	\$2,310 M	\$4,113 M
33	7.20%	4.48%	Ultimate	Level % of Pay	20 Years	n/a	5.27%	6.35%	11.62%	\$1,803 M	\$2,405 M	\$4,208 M
34	7.20%	4.48%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	6.70%	4.69%	11.39%	\$2,292 M	\$1,776 M	\$4,068 M
35	7.20%	4.48%	Individual	Level % of Pay	No Change	30 Years	6.70%	5.26%	11.96%	\$2,292 M	\$1,992 M	\$4,284 M
36	7.20%	4.48%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	6.70%	4.94%	11.64%	\$2,292 M	\$1,871 M	\$4,163 M
37	7.20%	4.48%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	6.70%	5.20%	11.90%	\$2,292 M	\$1,969 M	\$4,261 M
38	7.20%	4.48%	Individual	Level % of Pay	23 Years	23 Years	6.70%	5.40%	12.10%	\$2,292 M	\$2,045 M	\$4,337 M
39	7.20%	4.48%	Individual	Level % of Pay	20 Years	20 Years	6.70%	5.59%	12.29%	\$2,292 M	\$2,117 M	\$4,409 M
40	7.20%	4.48%	Ultimate	Level Dollar	23 Years	n/a	5.27%	7.97%	13.24%	\$1,803 M	\$3,019 M	\$4,822 M
41	7.20%	4.48%	Ultimate	Level Dollar	20 Years	n/a	5.27%	8.20%	13.47%	\$1,803 M	\$3,106 M	\$4,909 M
42	7.20%	4.48%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	6.70%	6.82%	13.52%	\$2,292 M	\$2,583 M	\$4,875 M
43	7.20%	4.48%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	6.70%	7.04%	13.74%	\$2,292 M	\$2,666 M	\$4,958 M
44	7.20%	4.48%	Individual	Level Dollar	23 Years	23 Years	6.70%	7.07%	13.77%	\$2,292 M	\$2,678 M	\$4,970 M
45	7.20%	4.48%	Individual	Level Dollar	20 Years	20 Years	6.70%	7.23%	13.93%	\$2,292 M	\$2,738 M	\$5,030 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

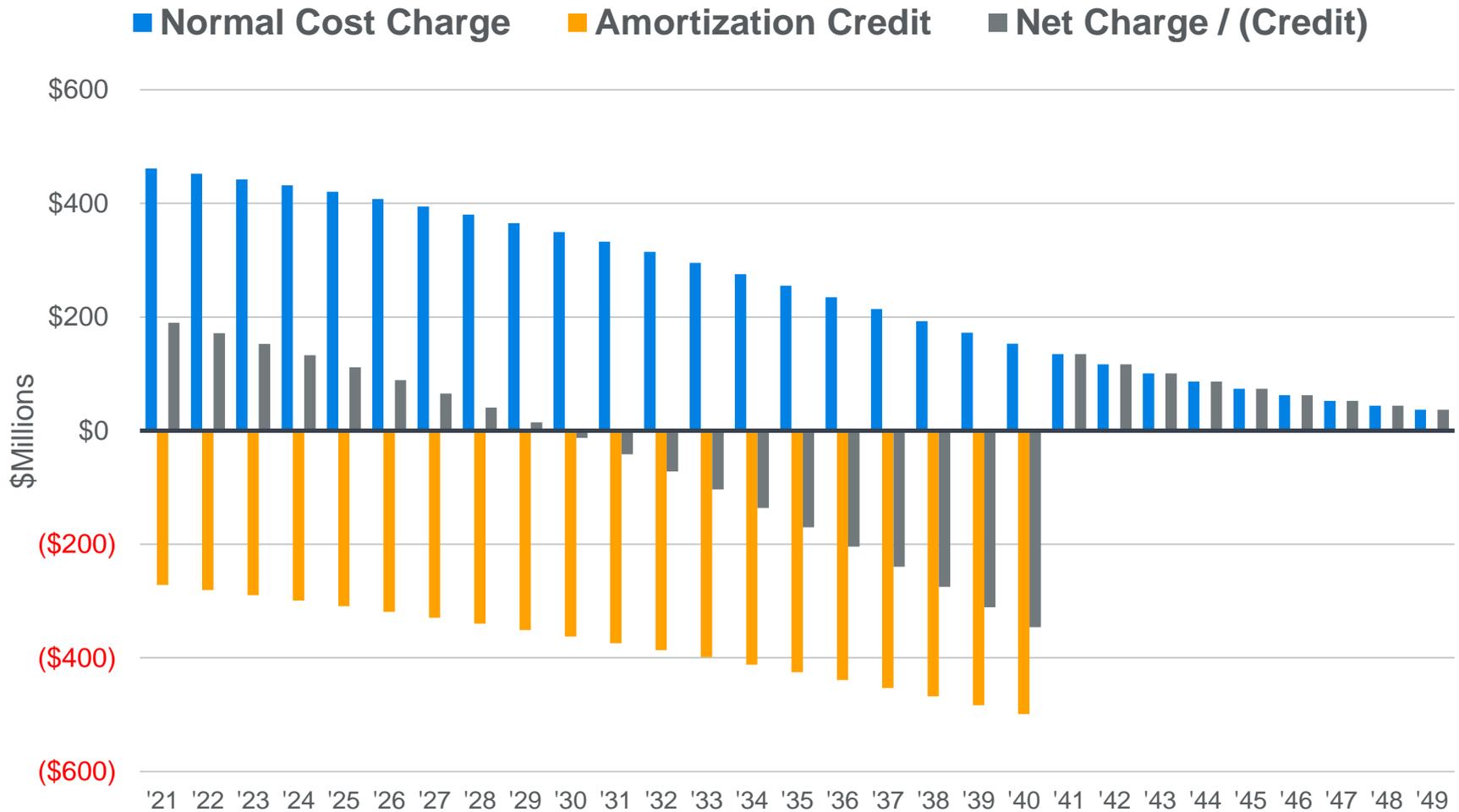
Projected Payroll over 30 Years



The chart above shows the projected change over a 30 year period of the payroll for a) Tier I active Pension Plan members and b) all FRS active members (Tiers I and II, both Pension Plan and Investment Plan)

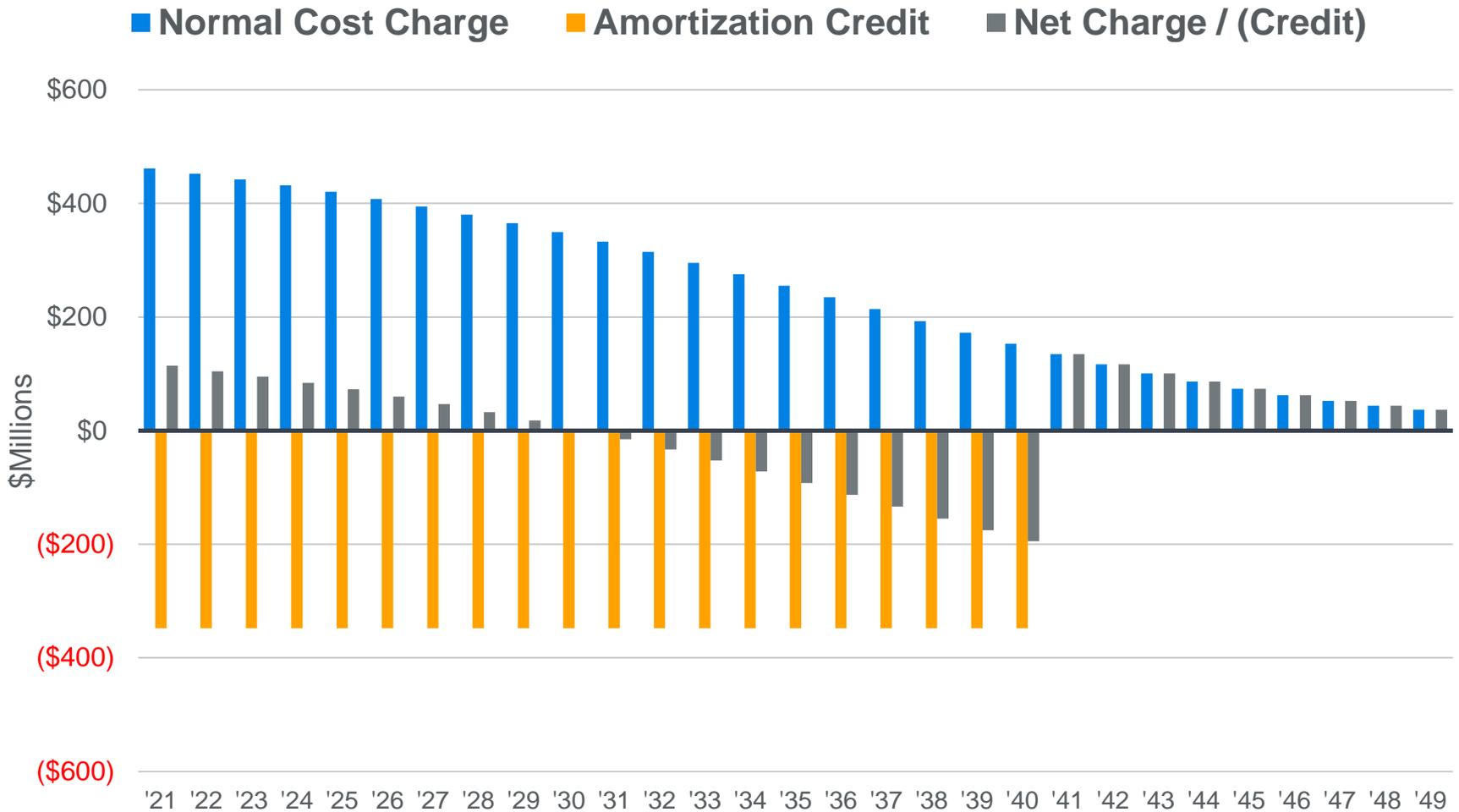
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

20-Year Level % of FRS Pay Amortization



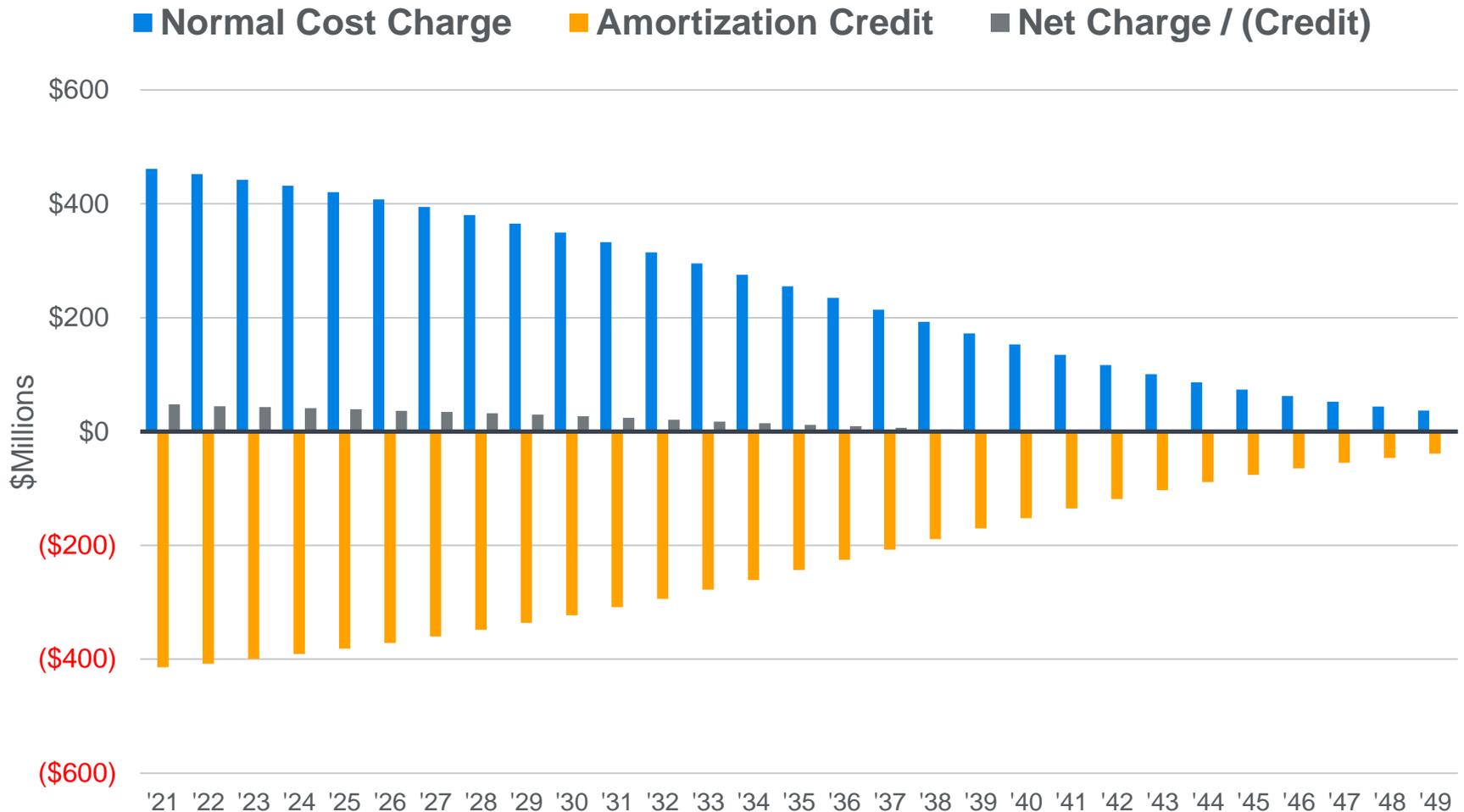
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

20-Year Level \$ Amount Amortization



This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Mirror Tier I Pension Plan Payroll Amortization



This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Needed Guidance for FRS Pension Plan

- From Conference Principals for system funding calculations, identification of remaining **methods** and **assumptions** to use in the 2019 FRS Pension Plan valuation calculations for system funding purposes to calculate blended proposed 2020-21 statutory contribution rates:
 - Investment return assumption
 - Actuarial cost allocation method
 - Amortization policy (period and approach)
- Various assumptions have already been approved by Conference Principals during the October 8 and October 23 meetings
 - Demographic assumptions, reflecting the 2019 Experience Study
 - Inflation and real wage growth assumptions

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Appendix

Additional Scenario Analysis

Regular Class – 7.4% Assumed Investment Return

REG Class Only

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.40% Assumed Nominal Investment Return												
1	7.40%	4.68%	Ultimate	Level % of Pay	No Change	n/a	3.58%	3.64%	7.22%	\$923 M	\$1,070 M	\$1,993 M
2	7.40%	4.68%	Ultimate	Level % of Pay	23 Years	n/a	3.58%	3.75%	7.33%	\$923 M	\$1,103 M	\$2,026 M
3	7.40%	4.68%	Ultimate	Level % of Pay	20 Years	n/a	3.58%	3.91%	7.49%	\$923 M	\$1,150 M	\$2,073 M
4	7.40%	4.68%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	4.61%	2.83%	7.44%	\$1,189 M	\$832 M	\$2,021 M
5	7.40%	4.68%	Individual	Level % of Pay	No Change	30 Years	4.61%	3.22%	7.83%	\$1,189 M	\$947 M	\$2,136 M
6	7.40%	4.68%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	4.61%	2.94%	7.55%	\$1,189 M	\$864 M	\$2,053 M
7	7.40%	4.68%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	4.61%	3.10%	7.71%	\$1,189 M	\$911 M	\$2,100 M
8	7.40%	4.68%	Individual	Level % of Pay	23 Years	23 Years	4.61%	3.27%	7.88%	\$1,189 M	\$961 M	\$2,150 M
9	7.40%	4.68%	Individual	Level % of Pay	20 Years	20 Years	4.61%	3.37%	7.98%	\$1,189 M	\$991 M	\$2,180 M
10	7.40%	4.68%	Ultimate	Level Dollar	23 Years	n/a	3.58%	4.94%	8.52%	\$923 M	\$1,453 M	\$2,376 M
11	7.40%	4.68%	Ultimate	Level Dollar	20 Years	n/a	3.58%	5.08%	8.66%	\$923 M	\$1,494 M	\$2,417 M
12	7.40%	4.68%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	4.61%	4.13%	8.74%	\$1,189 M	\$1,214 M	\$2,403 M
13	7.40%	4.68%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	4.61%	4.27%	8.88%	\$1,189 M	\$1,256 M	\$2,445 M
14	7.40%	4.68%	Individual	Level Dollar	23 Years	23 Years	4.61%	4.30%	8.91%	\$1,189 M	\$1,264 M	\$2,453 M
15	7.40%	4.68%	Individual	Level Dollar	20 Years	20 Years	4.61%	4.40%	9.01%	\$1,189 M	\$1,294 M	\$2,483 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Regular Class – 7.3% Assumed Investment Return

REG Class Only

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.30% Assumed Nominal Investment Return												
16	7.30%	4.58%	Ultimate	Level % of Pay	No Change	n/a	3.71%	3.92%	7.63%	\$957 M	\$1,153 M	\$2,110 M
17	7.30%	4.58%	Ultimate	Level % of Pay	23 Years	n/a	3.71%	4.08%	7.79%	\$957 M	\$1,200 M	\$2,157 M
18	7.30%	4.58%	Ultimate	Level % of Pay	20 Years	n/a	3.71%	4.27%	7.98%	\$957 M	\$1,256 M	\$2,213 M
19	7.30%	4.58%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	4.78%	3.08%	7.86%	\$1,232 M	\$906 M	\$2,138 M
20	7.30%	4.58%	Individual	Level % of Pay	No Change	30 Years	4.78%	3.49%	8.27%	\$1,232 M	\$1,026 M	\$2,258 M
21	7.30%	4.58%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	4.78%	3.25%	8.03%	\$1,232 M	\$956 M	\$2,188 M
22	7.30%	4.58%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	4.78%	3.44%	8.22%	\$1,232 M	\$1,011 M	\$2,243 M
23	7.30%	4.58%	Individual	Level % of Pay	23 Years	23 Years	4.78%	3.58%	8.36%	\$1,232 M	\$1,053 M	\$2,285 M
24	7.30%	4.58%	Individual	Level % of Pay	20 Years	20 Years	4.78%	3.72%	8.50%	\$1,232 M	\$1,094 M	\$2,326 M
25	7.30%	4.58%	Ultimate	Level Dollar	23 Years	n/a	3.71%	5.38%	9.09%	\$957 M	\$1,582 M	\$2,539 M
26	7.30%	4.58%	Ultimate	Level Dollar	20 Years	n/a	3.71%	5.55%	9.26%	\$957 M	\$1,632 M	\$2,589 M
27	7.30%	4.58%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	4.78%	4.55%	9.33%	\$1,232 M	\$1,338 M	\$2,570 M
28	7.30%	4.58%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	4.78%	4.71%	9.49%	\$1,232 M	\$1,385 M	\$2,617 M
29	7.30%	4.58%	Individual	Level Dollar	23 Years	23 Years	4.78%	4.72%	9.50%	\$1,232 M	\$1,388 M	\$2,620 M
30	7.30%	4.58%	Individual	Level Dollar	20 Years	20 Years	4.78%	4.84%	9.62%	\$1,232 M	\$1,423 M	\$2,655 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Regular Class – 7.2% Assumed Investment Return

REG Class Only

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.20% Assumed Nominal Investment Return												
31	7.20%	4.48%	Ultimate	Level % of Pay	No Change	n/a	3.84%	4.18%	8.02%	\$990 M	\$1,229 M	\$2,219 M
32	7.20%	4.48%	Ultimate	Level % of Pay	23 Years	n/a	3.84%	4.40%	8.24%	\$990 M	\$1,294 M	\$2,284 M
33	7.20%	4.48%	Ultimate	Level % of Pay	20 Years	n/a	3.84%	4.63%	8.47%	\$990 M	\$1,361 M	\$2,351 M
34	7.20%	4.48%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	4.94%	3.33%	8.27%	\$1,274 M	\$979 M	\$2,253 M
35	7.20%	4.48%	Individual	Level % of Pay	No Change	30 Years	4.94%	3.75%	8.69%	\$1,274 M	\$1,103 M	\$2,377 M
36	7.20%	4.48%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	4.94%	3.54%	8.48%	\$1,274 M	\$1,041 M	\$2,315 M
37	7.20%	4.48%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	4.94%	3.77%	8.71%	\$1,274 M	\$1,108 M	\$2,382 M
38	7.20%	4.48%	Individual	Level % of Pay	23 Years	23 Years	4.94%	3.88%	8.82%	\$1,274 M	\$1,141 M	\$2,415 M
39	7.20%	4.48%	Individual	Level % of Pay	20 Years	20 Years	4.94%	4.06%	9.00%	\$1,274 M	\$1,194 M	\$2,468 M
40	7.20%	4.48%	Ultimate	Level Dollar	23 Years	n/a	3.84%	5.81%	9.65%	\$990 M	\$1,708 M	\$2,698 M
41	7.20%	4.48%	Ultimate	Level Dollar	20 Years	n/a	3.84%	6.01%	9.85%	\$990 M	\$1,767 M	\$2,757 M
42	7.20%	4.48%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	4.94%	4.95%	9.89%	\$1,274 M	\$1,455 M	\$2,729 M
43	7.20%	4.48%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	4.94%	5.14%	10.08%	\$1,274 M	\$1,511 M	\$2,785 M
44	7.20%	4.48%	Individual	Level Dollar	23 Years	23 Years	4.94%	5.14%	10.08%	\$1,274 M	\$1,511 M	\$2,785 M
45	7.20%	4.48%	Individual	Level Dollar	20 Years	20 Years	4.94%	5.29%	10.23%	\$1,274 M	\$1,555 M	\$2,829 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Special Risk Class – 7.4% Assumed Investment Return

SR Class Only

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.40% Assumed Nominal Investment Return												
1	7.40%	4.68%	Ultimate	Level % of Pay	No Change	n/a	11.67%	9.79%	21.46%	\$595 M	\$501 M	\$1,096 M
2	7.40%	4.68%	Ultimate	Level % of Pay	23 Years	n/a	11.67%	9.98%	21.65%	\$595 M	\$511 M	\$1,106 M
3	7.40%	4.68%	Ultimate	Level % of Pay	20 Years	n/a	11.67%	10.22%	21.89%	\$595 M	\$523 M	\$1,118 M
4	7.40%	4.68%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	14.39%	6.60%	20.99%	\$733 M	\$338 M	\$1,071 M
5	7.40%	4.68%	Individual	Level % of Pay	No Change	30 Years	14.39%	8.14%	22.53%	\$733 M	\$417 M	\$1,150 M
6	7.40%	4.68%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	14.39%	6.79%	21.18%	\$733 M	\$348 M	\$1,081 M
7	7.40%	4.68%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	14.39%	7.03%	21.42%	\$733 M	\$360 M	\$1,093 M
8	7.40%	4.68%	Individual	Level % of Pay	23 Years	23 Years	14.39%	8.06%	22.45%	\$733 M	\$413 M	\$1,146 M
9	7.40%	4.68%	Individual	Level % of Pay	20 Years	20 Years	14.39%	8.13%	22.52%	\$733 M	\$416 M	\$1,149 M
10	7.40%	4.68%	Ultimate	Level Dollar	23 Years	n/a	11.67%	12.89%	24.56%	\$595 M	\$660 M	\$1,255 M
11	7.40%	4.68%	Ultimate	Level Dollar	20 Years	n/a	11.67%	13.10%	24.77%	\$595 M	\$671 M	\$1,266 M
12	7.40%	4.68%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	14.39%	9.70%	24.09%	\$733 M	\$497 M	\$1,230 M
13	7.40%	4.68%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	14.39%	9.91%	24.30%	\$733 M	\$507 M	\$1,240 M
14	7.40%	4.68%	Individual	Level Dollar	23 Years	23 Years	14.39%	10.36%	24.75%	\$733 M	\$530 M	\$1,263 M
15	7.40%	4.68%	Individual	Level Dollar	20 Years	20 Years	14.39%	10.42%	24.81%	\$733 M	\$534 M	\$1,267 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Special Risk Class – 7.3% Assumed Investment Return

SR Class Only

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.30% Assumed Nominal Investment Return												
16	7.30%	4.58%	Ultimate	Level % of Pay	No Change	n/a	12.00%	10.28%	22.28%	\$612 M	\$526 M	\$1,138 M
17	7.30%	4.58%	Ultimate	Level % of Pay	23 Years	n/a	12.00%	10.58%	22.58%	\$612 M	\$542 M	\$1,154 M
18	7.30%	4.58%	Ultimate	Level % of Pay	20 Years	n/a	12.00%	10.89%	22.89%	\$612 M	\$558 M	\$1,170 M
19	7.30%	4.58%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	14.78%	7.01%	21.79%	\$753 M	\$359 M	\$1,112 M
20	7.30%	4.58%	Individual	Level % of Pay	No Change	30 Years	14.78%	8.60%	23.38%	\$753 M	\$440 M	\$1,193 M
21	7.30%	4.58%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	14.78%	7.32%	22.10%	\$753 M	\$375 M	\$1,128 M
22	7.30%	4.58%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	14.78%	7.62%	22.40%	\$753 M	\$390 M	\$1,143 M
23	7.30%	4.58%	Individual	Level % of Pay	23 Years	23 Years	14.78%	8.62%	23.40%	\$753 M	\$441 M	\$1,194 M
24	7.30%	4.58%	Individual	Level % of Pay	20 Years	20 Years	14.78%	8.74%	23.52%	\$753 M	\$448 M	\$1,201 M
25	7.30%	4.58%	Ultimate	Level Dollar	23 Years	n/a	12.00%	13.70%	25.70%	\$612 M	\$702 M	\$1,314 M
26	7.30%	4.58%	Ultimate	Level Dollar	20 Years	n/a	12.00%	13.95%	25.95%	\$612 M	\$714 M	\$1,326 M
27	7.30%	4.58%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	14.78%	10.43%	25.21%	\$753 M	\$534 M	\$1,287 M
28	7.30%	4.58%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	14.78%	10.70%	25.48%	\$753 M	\$548 M	\$1,301 M
29	7.30%	4.58%	Individual	Level Dollar	23 Years	23 Years	14.78%	11.11%	25.89%	\$753 M	\$569 M	\$1,322 M
30	7.30%	4.58%	Individual	Level Dollar	20 Years	20 Years	14.78%	11.21%	25.99%	\$753 M	\$574 M	\$1,327 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Scenario Analysis

Special Risk Class – 7.2% Assumed Investment Return

SR Class Only

Policy Inputs							Results of Policy Inputs					
Scenario Reference Number	Assumed Nominal Investment Return	Assumed Real Investment Return	Entry Age Cost Allocation Method	Amortization Technique	Change to Existing Amortization Periods*	Amortization of Cost Allocation Method Change	Blended 2020-21 PP/IP Employer Rates and Projected Employer Contributions					
							NC Rate	UAL Rate	Total Rate	NC Contribution	UAL Contribution	Total Contribution
7.20% Assumed Nominal Investment Return												
31	7.20%	4.48%	Ultimate	Level % of Pay	No Change	n/a	12.32%	10.77%	23.09%	\$628 M	\$551 M	\$1,179 M
32	7.20%	4.48%	Ultimate	Level % of Pay	23 Years	n/a	12.32%	11.17%	23.49%	\$628 M	\$572 M	\$1,200 M
33	7.20%	4.48%	Ultimate	Level % of Pay	20 Years	n/a	12.32%	11.54%	23.86%	\$628 M	\$591 M	\$1,219 M
34	7.20%	4.48%	Individual	Level % of Pay	No Change	Mirror Tier I Payroll	15.17%	7.43%	22.60%	\$773 M	\$380 M	\$1,153 M
35	7.20%	4.48%	Individual	Level % of Pay	No Change	30 Years	15.17%	9.06%	24.23%	\$773 M	\$464 M	\$1,237 M
36	7.20%	4.48%	Individual	Level % of Pay	23 Years	Mirror Tier I Payroll	15.17%	7.83%	23.00%	\$773 M	\$401 M	\$1,174 M
37	7.20%	4.48%	Individual	Level % of Pay	20 Years	Mirror Tier I Payroll	15.17%	8.20%	23.37%	\$773 M	\$420 M	\$1,193 M
38	7.20%	4.48%	Individual	Level % of Pay	23 Years	23 Years	15.17%	9.17%	24.34%	\$773 M	\$470 M	\$1,243 M
39	7.20%	4.48%	Individual	Level % of Pay	20 Years	20 Years	15.17%	9.35%	24.52%	\$773 M	\$479 M	\$1,252 M
40	7.20%	4.48%	Ultimate	Level Dollar	23 Years	n/a	12.32%	14.48%	26.80%	\$628 M	\$741 M	\$1,369 M
41	7.20%	4.48%	Ultimate	Level Dollar	20 Years	n/a	12.32%	14.80%	27.12%	\$628 M	\$758 M	\$1,386 M
42	7.20%	4.48%	Individual	Level Dollar	23 Years	Mirror Tier I Payroll	15.17%	11.15%	26.32%	\$773 M	\$571 M	\$1,344 M
43	7.20%	4.48%	Individual	Level Dollar	20 Years	Mirror Tier I Payroll	15.17%	11.47%	26.64%	\$773 M	\$587 M	\$1,360 M
44	7.20%	4.48%	Individual	Level Dollar	23 Years	23 Years	15.17%	11.85%	27.02%	\$773 M	\$607 M	\$1,380 M
45	7.20%	4.48%	Individual	Level Dollar	20 Years	20 Years	15.17%	12.00%	27.17%	\$773 M	\$614 M	\$1,387 M

*Amortization period is not changed for bases that would have total amortization period of more than 30 years if reamortized.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Disclaimer

At your request, we have provided these draft results prior to completion of the July 1, 2019 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, 2019 Actuarial Valuation Report, and such changes or corrections may be material.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Certification

This presentation summarizes key preliminary results of an actuarial valuation of the Florida Retirement System (“FRS” or “the System”) as of July 1, 2019. The valuation, when finalized, will develop actuarially calculated contribution rates for the Plan Year ending June 30, 2021. The results in this presentation are preliminary in nature and may not be relied upon to, for example, prepare the System’s Consolidated Annual Financial Report (CAFR). The reliance document will be the formal July 1, 2019 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 2018 FRS Actuarial Assumption Conference. At the time of their review and adoption, those assumptions, with the exception of the investment return assumption as disclosed in the July 1, 2018 Actuarial Valuation Report, 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.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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, 2018. 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):

(a) The System may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.

(b) The System may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

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.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Actuarial Basis

Data

We have based our calculations on demographic member census data as of July 1, 2019 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, 2019, which will be published in the 4th quarter of this year. Assets as of June 30, 2019, were based on values provided by the Division.

Methods / Policies

Actuarial Cost Method: Ultimate Entry Age Normal, using the interpretation of that method as most recently endorsed by the 2018 FRS Actuarial Assumption Conference, except where Individual Entry Age normal is explicitly modeled as a policy alternative in the body of the presentation.

UAL Amortization: Newly arising UAL each plan year is amortized as a level percentage of projected payroll over a closed 30-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 2019 valuation calculations use assumptions as detailed July 1, 2018 Actuarial Valuation Report for funding purposes, with modifications for recommended updates to demographic assumptions from our 2019 Experience Study. Those updates are as summarized in this presentation and our October 8, 2019 presentation.

Provisions

Provisions valued are as summarized in the July 1, 2018 Actuarial Valuation Report for system funding purposes as subsequently modified by Senate Bill 426, which was enacted into law during the 2019 legislative session.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Amortization Schedule to Mirror Tier I Pay

Amortization of UAL Decrease from Method Change

To Mirror Pattern
of Decreasing
Tier I Pension Plan
Active Payroll

Contribution Year	Percent of Total Amortization	Contribution Year	Percent of Total Amortization
2020 - 2021	6.1%	2035 - 2036	3.3%
2021 - 2022	6.0%	2036 - 2037	3.0%
2022 - 2023	5.9%	2037 - 2038	2.8%
2023 - 2024	5.7%	2038 - 2039	2.5%
2024 - 2025	5.6%	2039 - 2040	2.2%
2025 - 2026	5.4%	2040 - 2041	2.0%
2026 - 2027	5.3%	2041 - 2042	1.7%
2027 - 2028	5.1%	2042 - 2043	1.5%
2028 - 2029	4.9%	2043 - 2044	1.3%
2029 - 2030	4.7%	2044 - 2045	1.1%
2030 - 2031	4.5%	2045 - 2046	1.0%
2031 - 2032	4.3%	2046 - 2047	0.8%
2032 - 2033	4.1%	2047 - 2048	0.7%
2033 - 2034	3.8%	2048 - 2049	0.6%
2034 - 2035	3.6%	2049 - 2050	<u>0.5%</u>
			100.0%

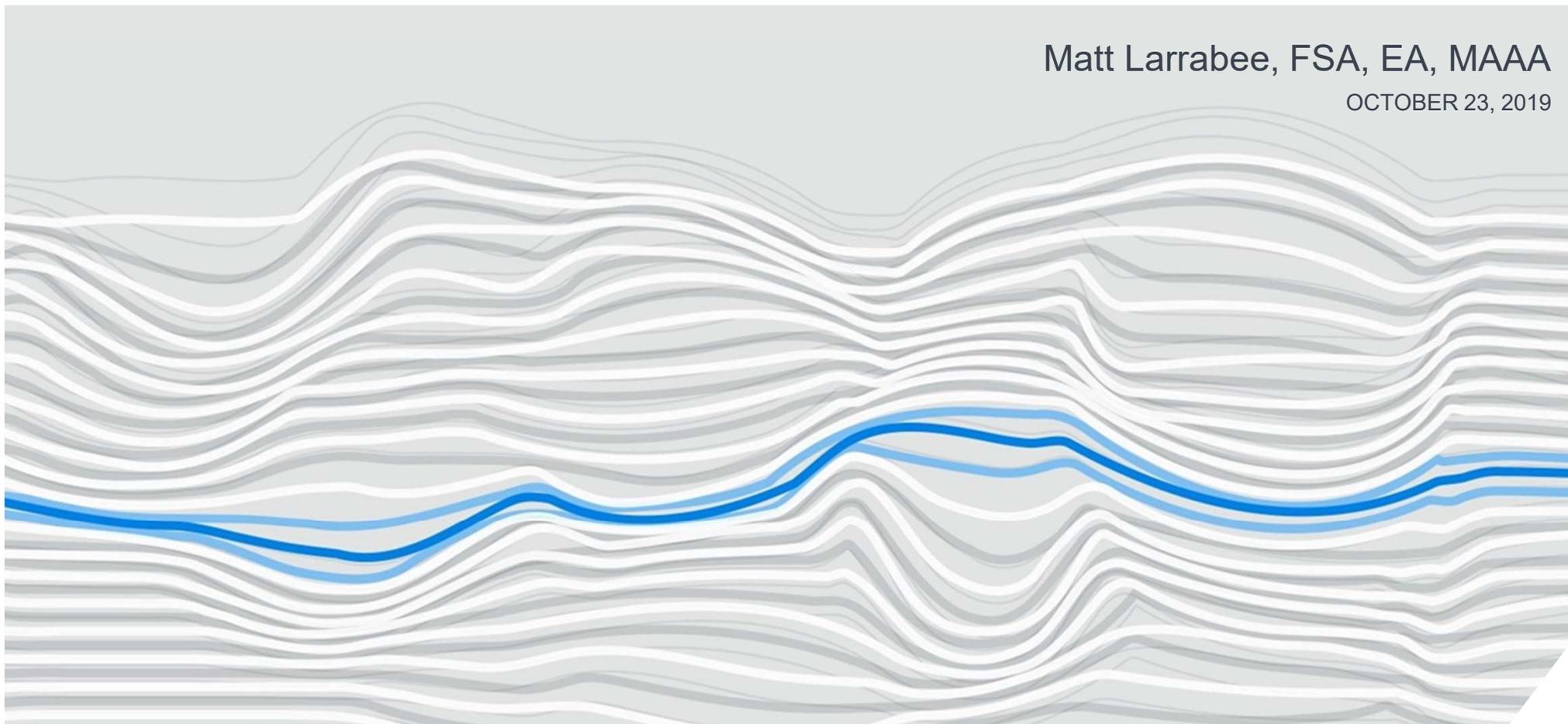
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Florida Retirement System

2019 FRS Actuarial Assumption Estimating Conference
Including Preliminary July 1, 2019 Actuarial Funding Valuation Results

Matt Larrabee, FSA, EA, MAAA

OCTOBER 23, 2019



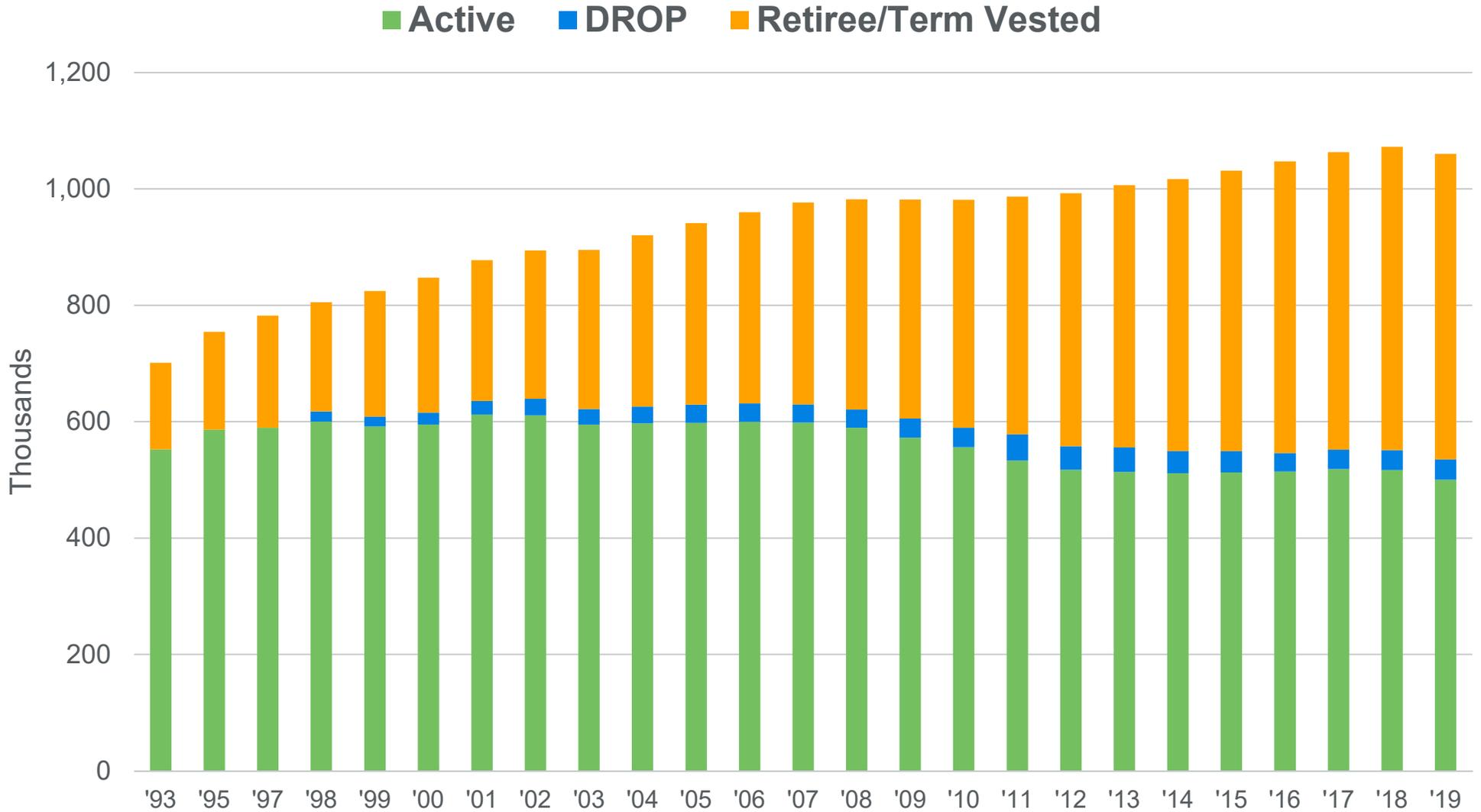
Agenda

- FRS Pension Plan assets, member demographics
- Valuation process and projected benefit payments
- Current actuarial methods for system funding calculations
- Additional statistical analysis and recommended demographic assumption updates
- Preliminary 2019 actuarial funding valuation results
- Investment return assumption for system funding
- Actuarial cost allocation method and amortization policy
- Needed guidance

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

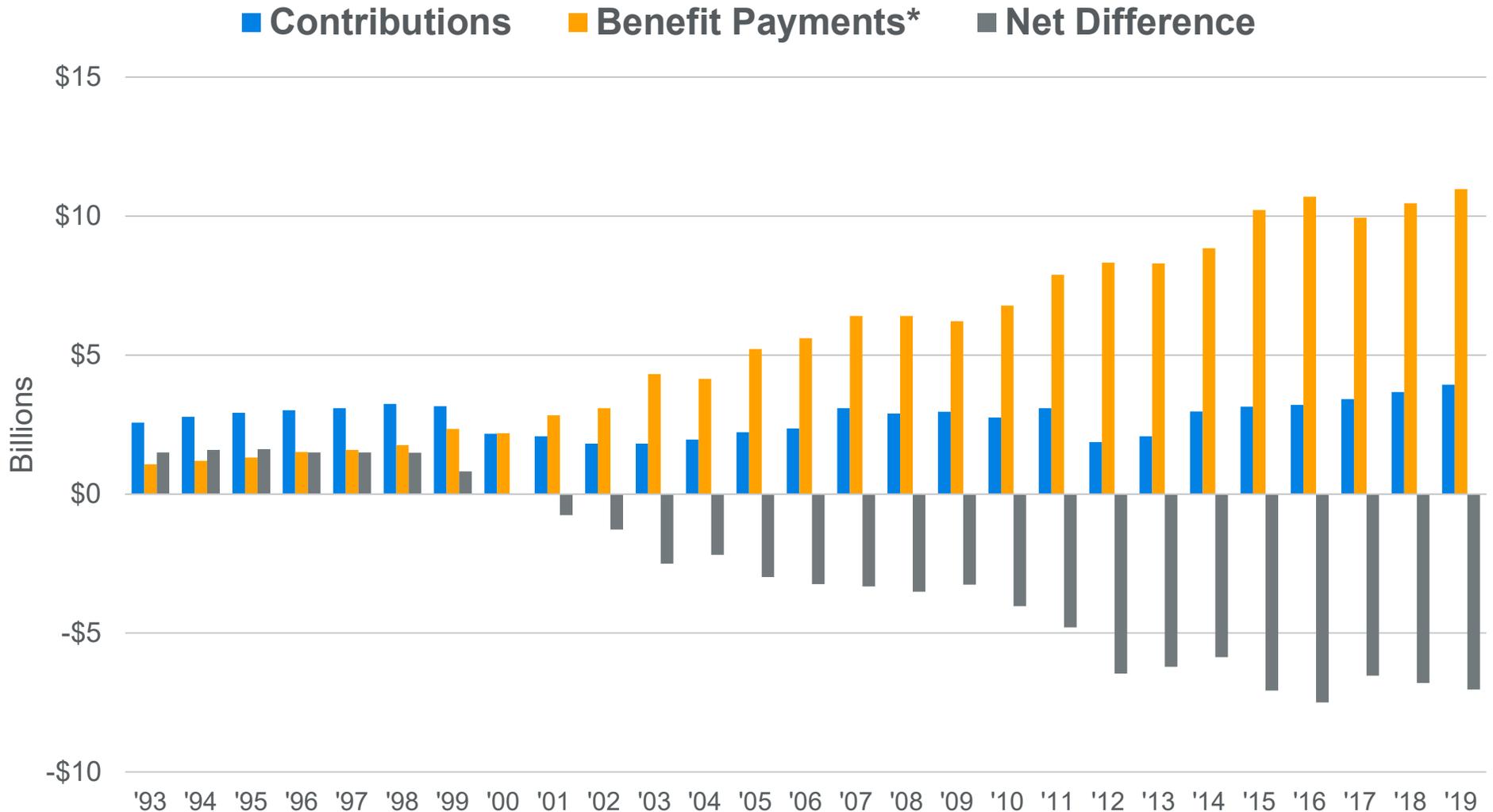
FRS Pension Plan Assets, Member Demographics

FRS Pension Plan Membership



This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Contributions and Benefit Payments

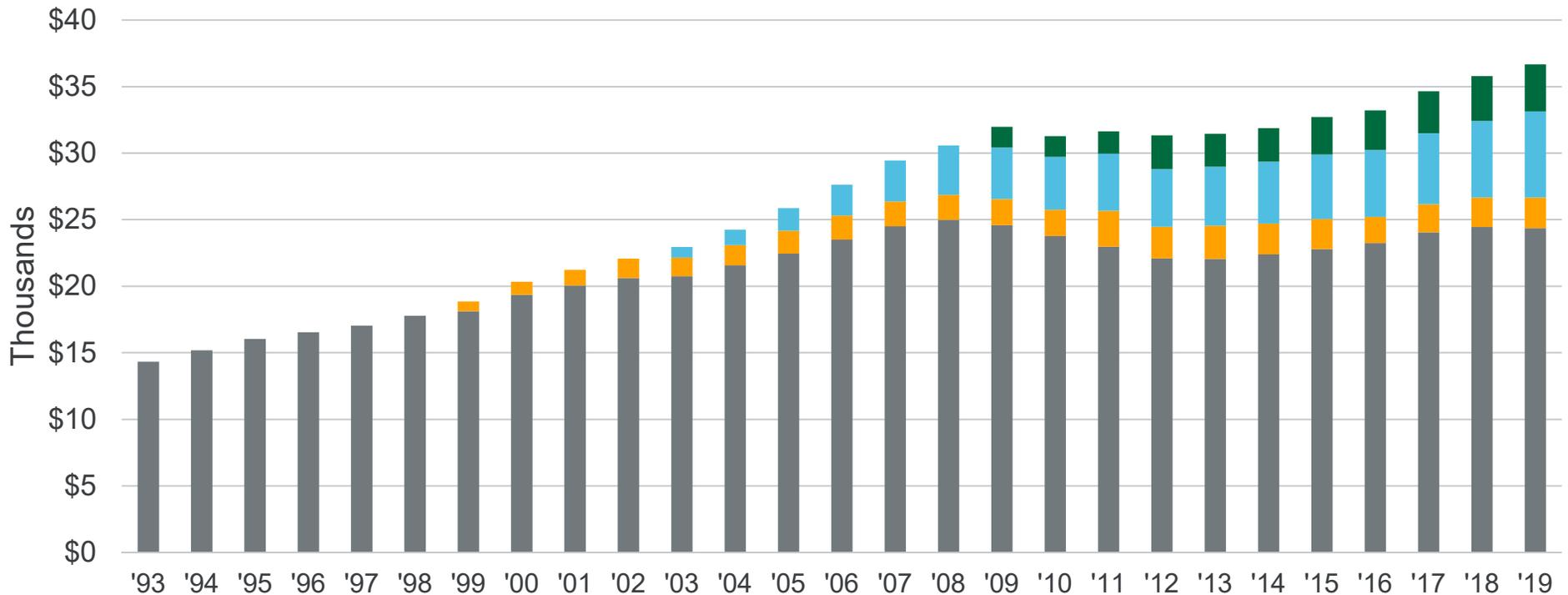


* Includes transfers to Investment Plan in 2013 and subsequent years.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Payroll: FRS + Non-FRS UAL Contributory

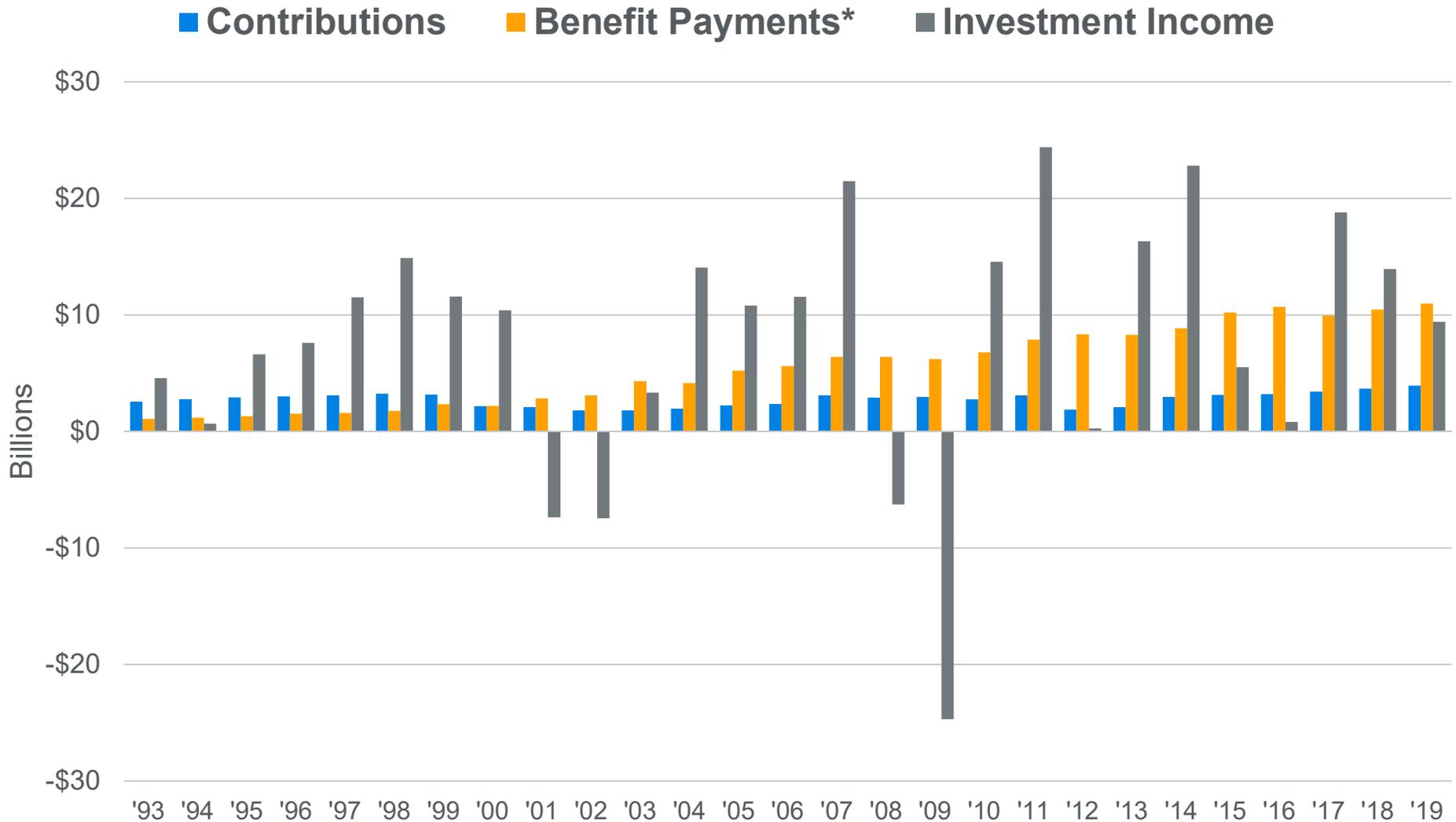
- Additional Payroll Subject to UAL Contributions*
- Investment Plan Payroll
- DROP Member Payroll
- Non-DROP Pension Plan Payroll



**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 \$3.6B in the 2019-20 plan year.*

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

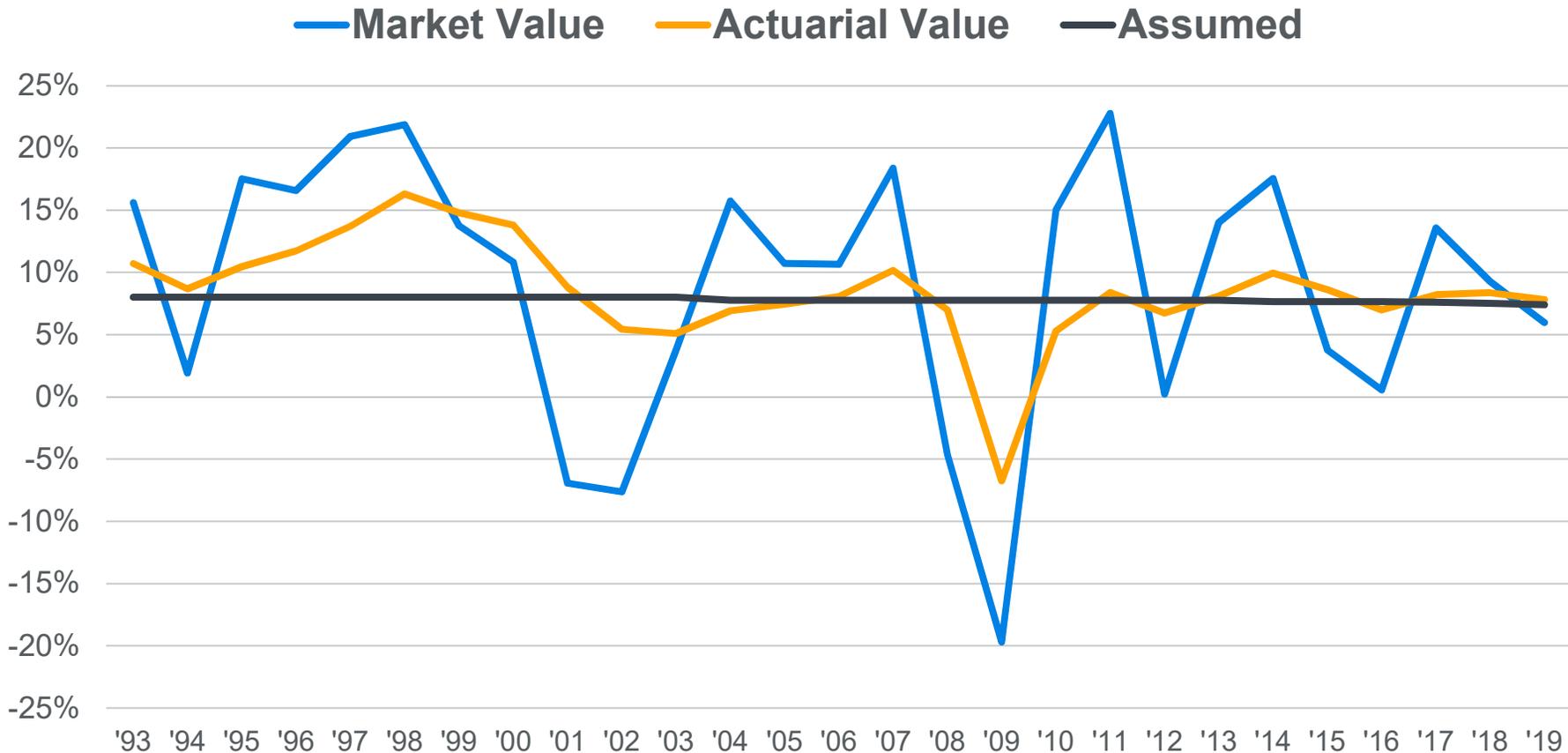
Pension Plan Cash Flows



* Includes transfers to Investment Plan

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

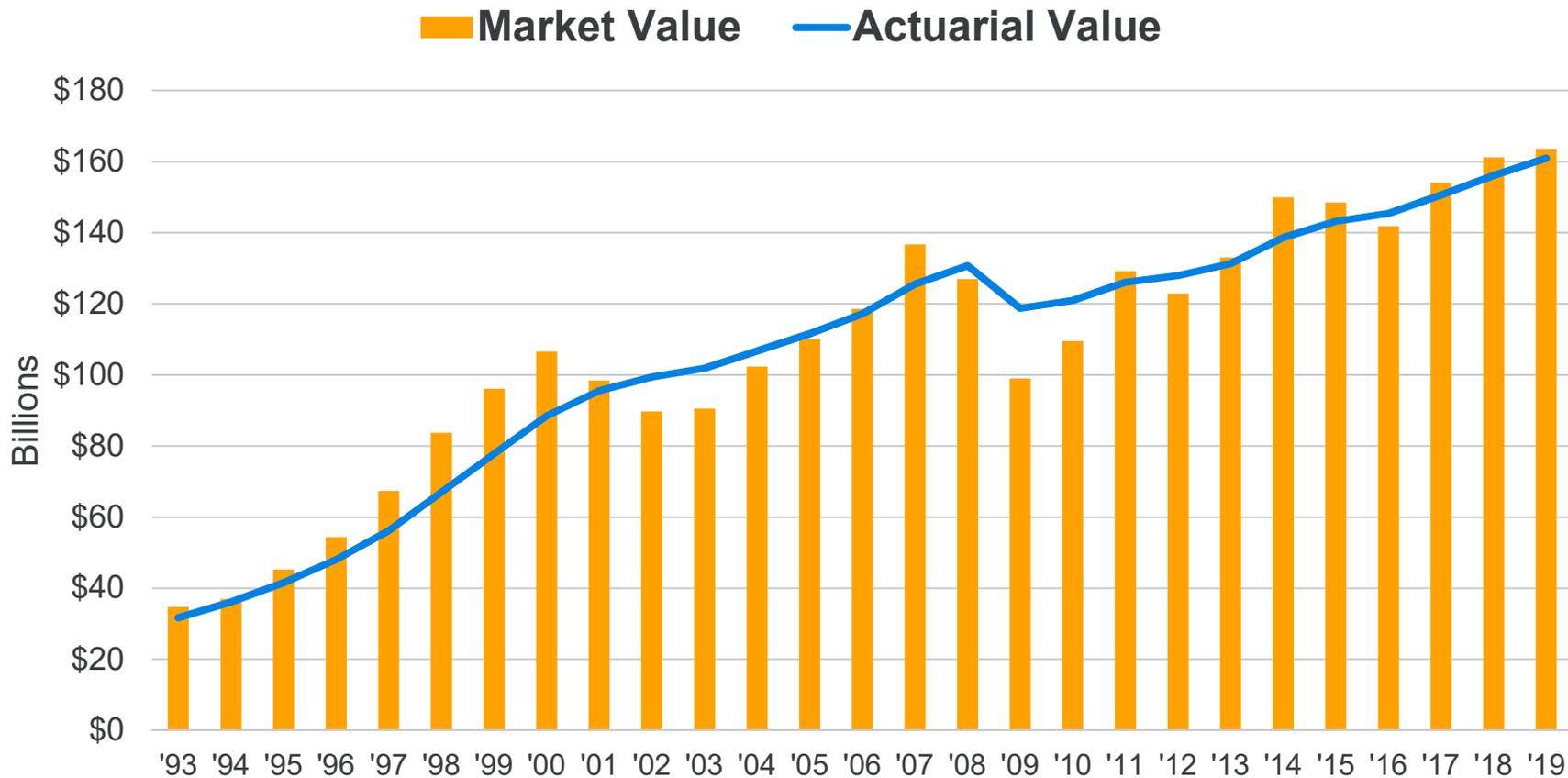
Historic Asset Returns



- The 2018-19 return was +6.0% on a market value of assets (MVA) basis and +7.8% on a smoothed actuarial value of assets (AVA) basis
 - AVA return is determined by market value returns over the prior five years

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Market & Actuarial Value of Assets



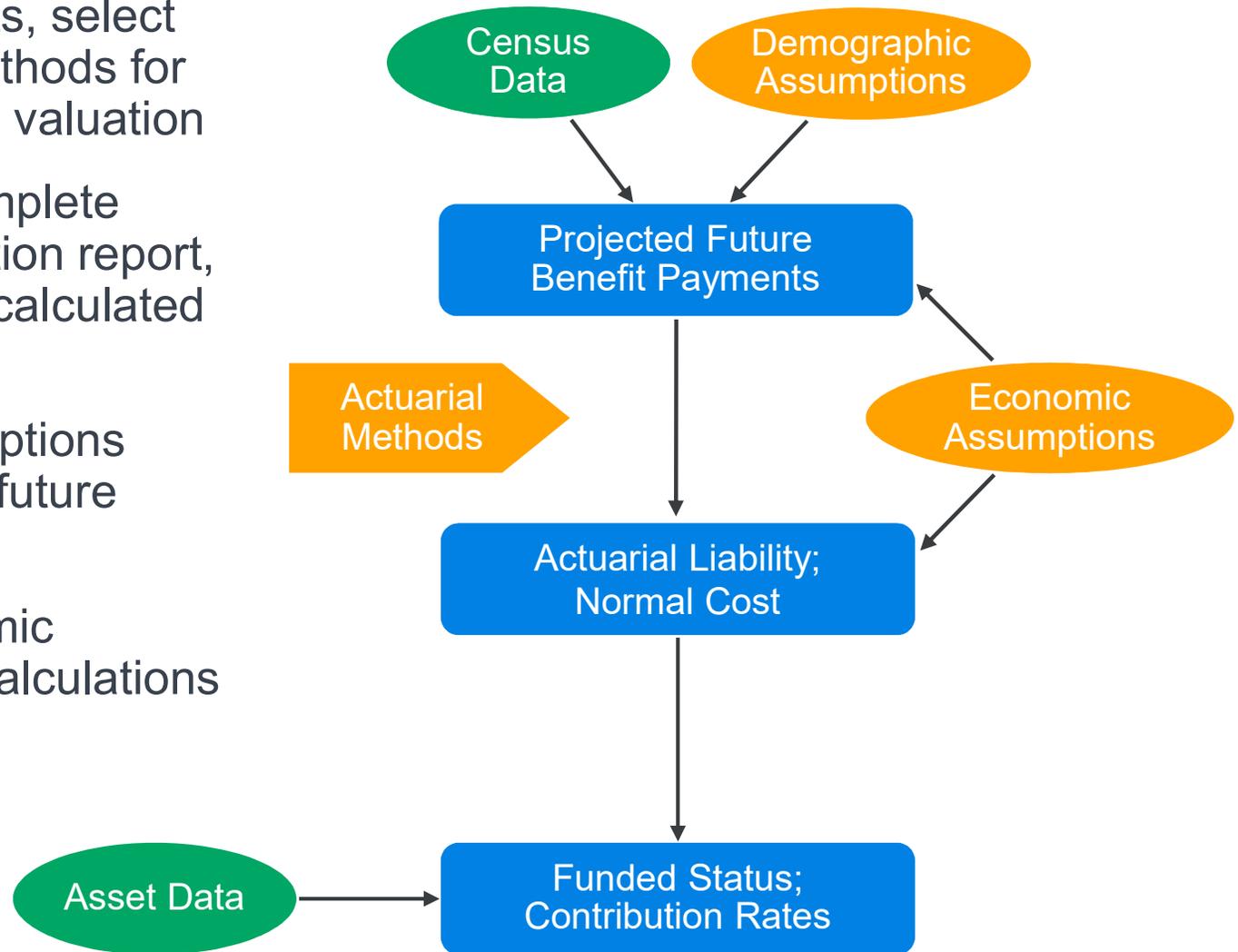
- Market value of assets (MVA) is \$2.6 billion **above** Actuarial Value of Assets (AVA) at July 2019. That deferred investment gain will be recognized in AVA returns (and associated contribution rate decreases) in subsequent valuations if future investment performance meets assumption.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Valuation Process and Projected Benefit Payments

Actuarial Valuation Process

- Today: Discuss preliminary 2019 valuation results, select assumptions and methods for 2019 system funding valuation
- By December 1: Complete 2019 actuarial valuation report, including actuarially calculated contribution rates
- Demographic assumptions determine projected future benefit payments
- Methods and economic assumptions affect calculations of funded status and contribution rates



Legend
Provided by FRS
Adopted by Conference
Calculated by actuary

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Overview of an Actuarial Valuation

Two Pension Plan valuations are conducted annually in parallel to:

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

Data

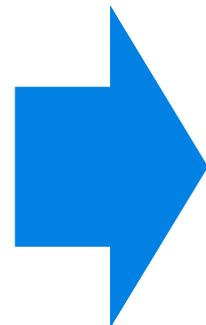
Assumptions

Methods

Provisions



**Projected
Benefit
Payments**



Funded Status

**Actuarially Calculated
Contribution Rates**

GASB Reporting

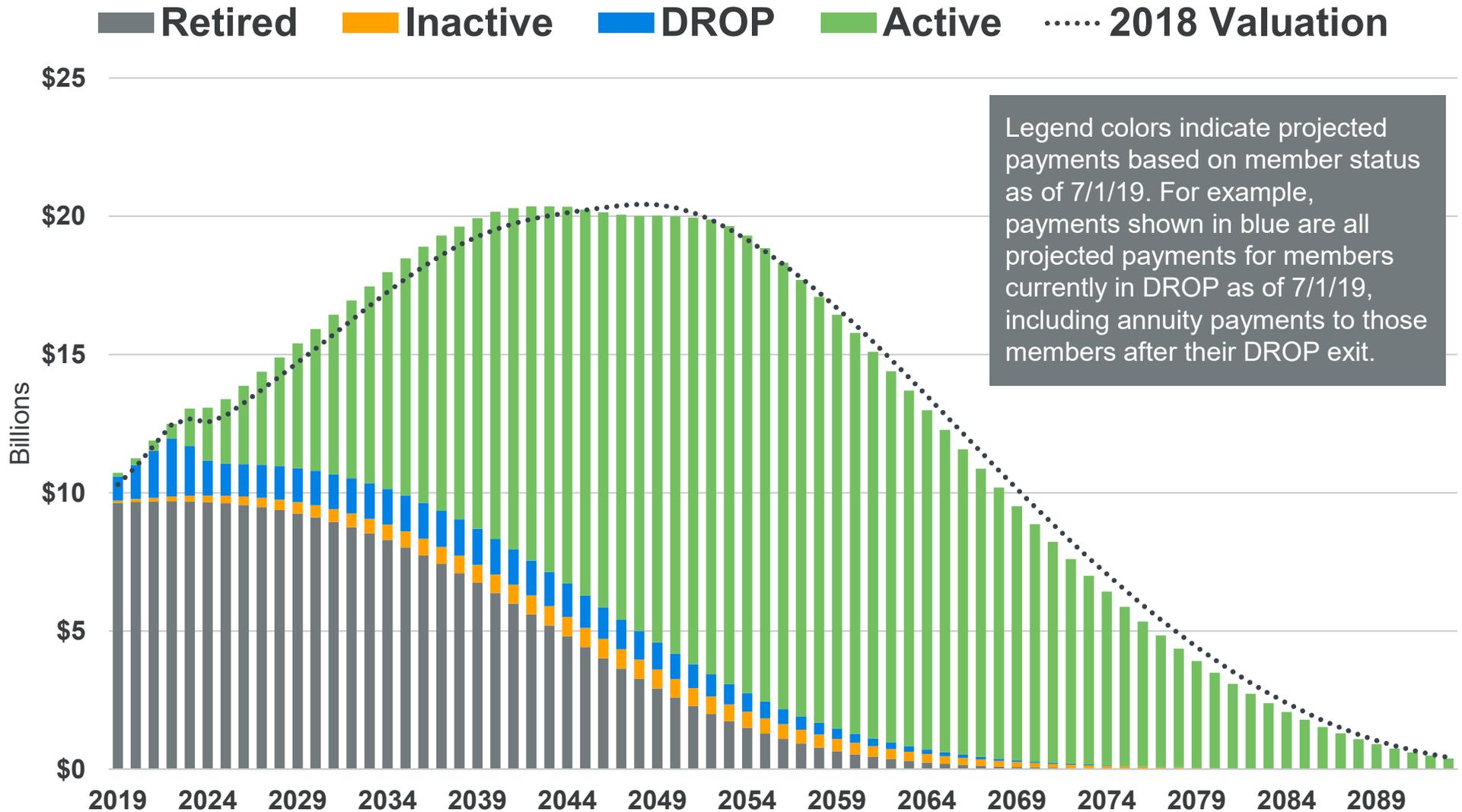
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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 DMS
- Assumptions listed above are typically formally reviewed in detail every five years as part of an actuarial experience study

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

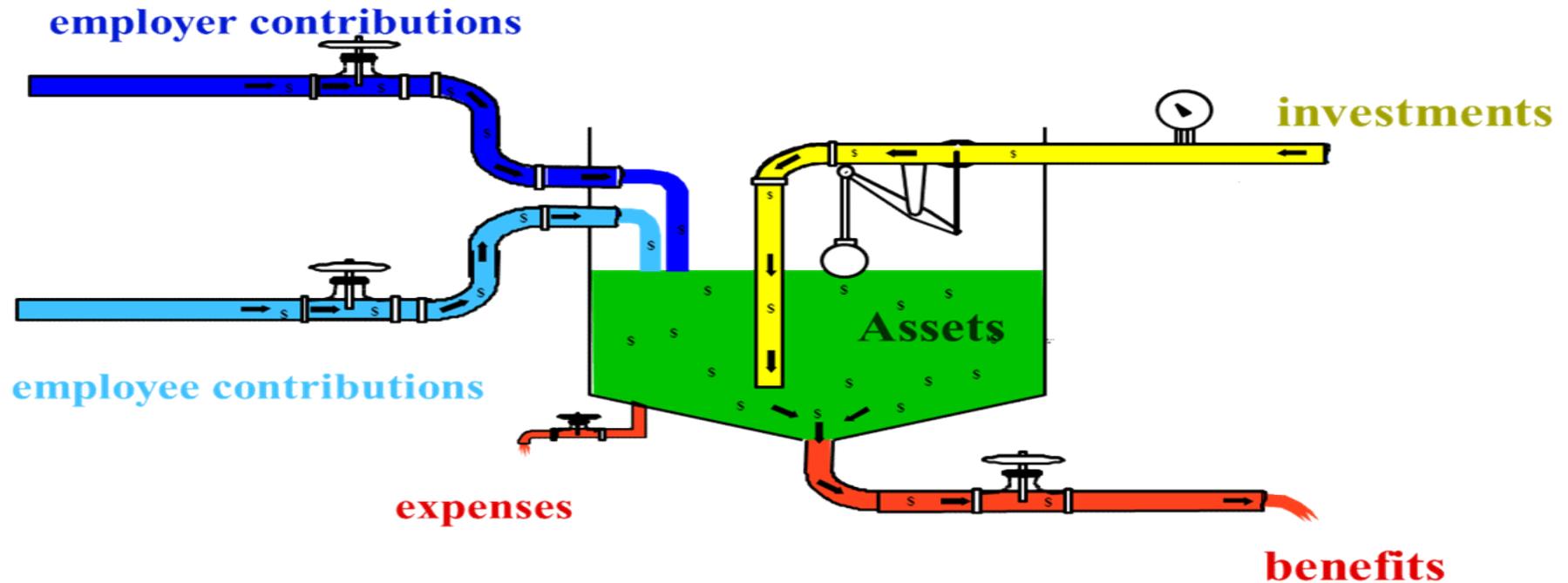
Projected Benefit Payments – 2019 Valuation



This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Current Actuarial Methods 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

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Actuarial Methods for Funding Valuation

- Key actuarial methods previously adopted by the Conference in 2018:
 - Ultimate Entry Age Normal (Ultimate EAN) cost allocation method
 - This allocation method sets the normal cost rate as if all members were in Tier II, which means a lower normal cost rate when compared to the Individual EAN method
 - Since the allocation method does not affect the projected cost of total benefits and the allocation method decreases the normal cost rate for Tier I members, Ultimate EAN increases Actuarial Liability compared to the GASB-mandated Individual EAN method
 - 30-year amortization over a closed period, as a level percent of projected payroll, of previously unanticipated changes in UAL that arise during any given year between actuarial valuation dates
 - This approach has an extended period of net negative amortization for each amortization tranche in the UAL contribution rate structure:
 - The unamortized balance increases for the first 11 to 13 years
 - The balance decreases after that, with the original unamortized balance effectively being paid off in the last 10 years of the 30-year amortization period

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Statistical Analysis and Recommended Demographic Assumption Updates

Demographic Assumptions Approved Oct 8

- As part of the 2019 Experience Study we statistically analyzed FRS member demographic data from 2013 to 2018
- On October 8, we discussed key demographic assumptions where:
 - We recommended structural and/or table updates
 - Those recommended updates impact three key valuation metrics (UAL in \$, normal cost and UAL contribution rates)
- Those key October 8 demographic assumption updates were for:
 - Timing and likelihood of immediate unreduced retirement or DROP entry
 - Life expectancy (i.e., mortality assumption) for non-disabled members
- Impact of October 8 demographic assumption update recommendations: slightly downward at a system-wide level on all three metrics
- Recommendations for those assumptions, which were detailed in slides 73-80 of the prior presentation, were approved on October 8

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Additional Analysis Since Oct 8

- Since October 8, our analysis has continued on other demographic assumptions that are typically less key to valuation metrics
- Based on that additional analysis, today we have recommendations for additional demographic assumption updates in four areas
 - Details on the recommendations are in slides 68 - 81 of today's material
- **Combining** the effects of today's recommended demographic assumption updates with those approved on October 8:
 - Two key valuation metrics (UAL in \$, UAL contribution rate) are now slightly down at a system-wide level
 - The other metric (normal cost contribution rate) is now slightly up at system-wide level

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Effect of Additional Recommended Assumption Updates

	UAL in \$	Normal Cost Rate	UAL Rate
Pre-retirement termination of FRS-covered employment	↑	↑	↑
Individual member annual salary increases	↓	↓	↓
Disability incidence and post-disability mortality	↔	↔	↔
Unused annual leave available at retirement	↓	↓	↓
Combined effect of above four assumption updates	↑	↑	↑
Combined effect of assumption updates approved Oct 8	↓	↓	↓
Effect of all demographic assumption updates	↓	↑	↓

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Demographic Assumptions Wrap-Up

- Including the effects of **both**
 - Demographic assumption updates approved on October 8
 - Additional demographic assumption updates recommended today

The estimated system average impact of the proposed demographic assumption updates on the 2018 actuarial valuation which set the 2019-2020 proposed blended statutory rates would have been:

	Approximate Effect
Unfunded Actuarial Liability (UAL)	Down \$308 million
Normal Cost Rate	Up 0.16% of affected payroll
UAL Rate	Down 0.05% of affected payroll

- Based on the additional experience study analysis since October 8, the table above shows the revised totals including the net savings in the table on slide 47 of our October 8 presentation

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Preliminary 2019 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 “2019 Preliminary” funding valuation results using:
 - Actual 2018-19 investment returns
 - Member demographic census data as of July 2019
 - Actuarial methods for the 2018 valuation:
 - Ultimate entry age cost allocation method
 - Amortization of previously unexpected changes in UAL over a closed thirty-year period as a level percent of projected payroll
 - Recommended demographic assumption updates based on the 2019 Experience Study
 - Those approved on October 8, as detailed in that presentation’s appendix
 - Those summarized in today’s material, as detailed in the appendix

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pension Plan UAL and Funded Status

	2018 Final (2018 data; 2018 assumptions)	2019 Preliminary (2019 data; recommended demographic assumptions updates from 2019 Experience Study)
Actuarial Liability (AL)	\$ 186.0	\$ 190.2
Actuarial Value of Assets (AVA)	<u>156.1</u>	<u>161.0</u>
Unfunded Actuarial Liability (UAL)	\$ 29.9	\$ 29.2
Funded Status	83.9%	84.6%

(Amounts in \$ billions)

- Market Value of Assets (MVA) is \$2.6 billion **above** AVA at July 2019. That deferred investment gain will be recognized in future AVA returns (and associated UAL contribution rate decreases) if future market value investment performance meets or exceeds 7.40%
- Results shown above use a 7.40% investment return assumption and the ultimate entry age cost allocation method

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Blended Proposed Statutory Rates at 7.40%

Weighted Average of Rates Across All Membership Classes	Final 2019-20 Rates (7.40% Assumption)			Preliminary 2020-21 Rates (7.40% Assumption)		
	NC	UAL	Total	NC	UAL	Total
PP composite employer rate	4.70%	6.36%	11.06%	4.97%	6.35%	11.32%
IP composite employer rate	4.94%	0.00%	4.94%	4.83%	0.00%	4.83%
Blended PP / IP employer rate	4.74%	5.34%	10.08%	4.94%	5.23%	10.17%
Employee contribution rate			3.00%			3.00%
Composite blended employer plus employee rate			13.08%			13.17%

- Pension Plan contribution rates are blended with Investment Plan contribution rates to create blended PP/IP proposed statutory employer rates
- Rates here reflect effect of all recommended demographic assumption updates
- Statutory IP rates by membership class are unchanged, but the 2020-21 IP payroll is more heavily weighted to Regular Class, which decreases the IP composite employer rate

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Projected Contributions in Dollars at 7.4%

Total Across All Membership Classes	Normal Cost Rate	Applicable Normal Cost Payroll	UAL Rate	Applicable UAL Payroll	Employer Contribution
Final 2019-20	4.74%	\$33.5 billion	5.34%	\$37.0 billion	\$3.56 billion
Preliminary 2020-21	4.94%	\$34.2 billion	5.23%	\$37.9 billion	\$3.67 billion

- Pension Plan contribution rates are blended with Investment Plan contribution rates to create blended PP/IP proposed statutory employer rates
- Preliminary 2020-21 rates above reflect effect of all recommended demographic assumption updates

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Results Under Current Methods, 7.4% Return

Valuation Results at 7.4% Assumption	Blended PP/IP Employer Rate	UAL (AVA)	Funded Status
Final 2019-20	10.08%	\$29.9 B	83.9%
Preliminary 2020-21:			
- At 7.40% assumption, ultimate entry age cost allocation method, 30-year level % of pay amortization on all amortization bases	10.17%	\$29.2 B	84.6%

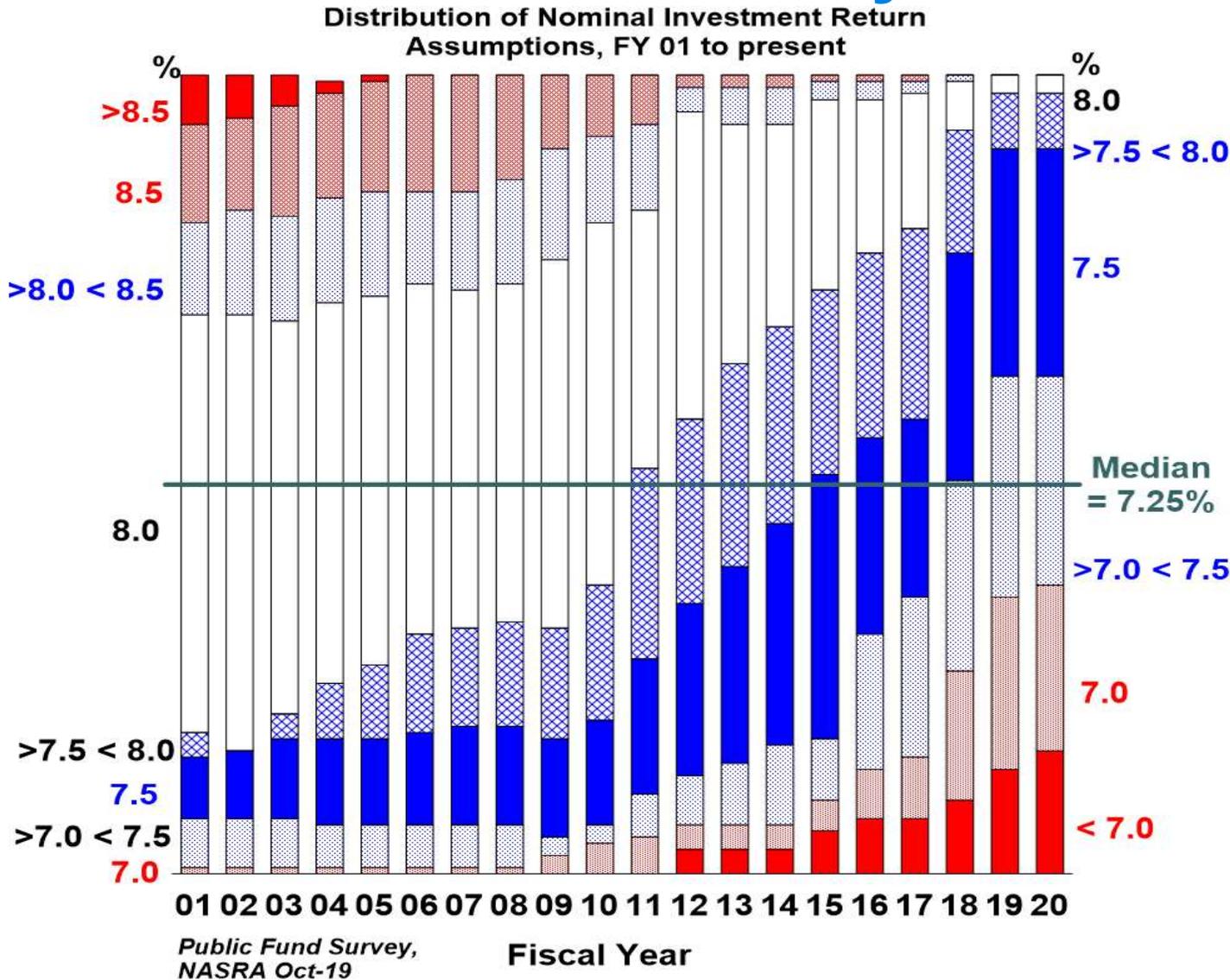
- Based on projected 2020-21 PP/IP payroll of \$37.9 billion (including payroll subject to only UAL contributions), estimated combined 2020-21 PP/IP employer contribution of:
 - \$3.67 billion reflecting all recommended demographic assumption updates, along with actual 2018-19 investment performance and July 1, 2019 FRS member census, but before any potential modification to the return assumption, cost allocation method, or amortization policy

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Investment Return Assumption for System Funding

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

What are Other Public Systems Doing?

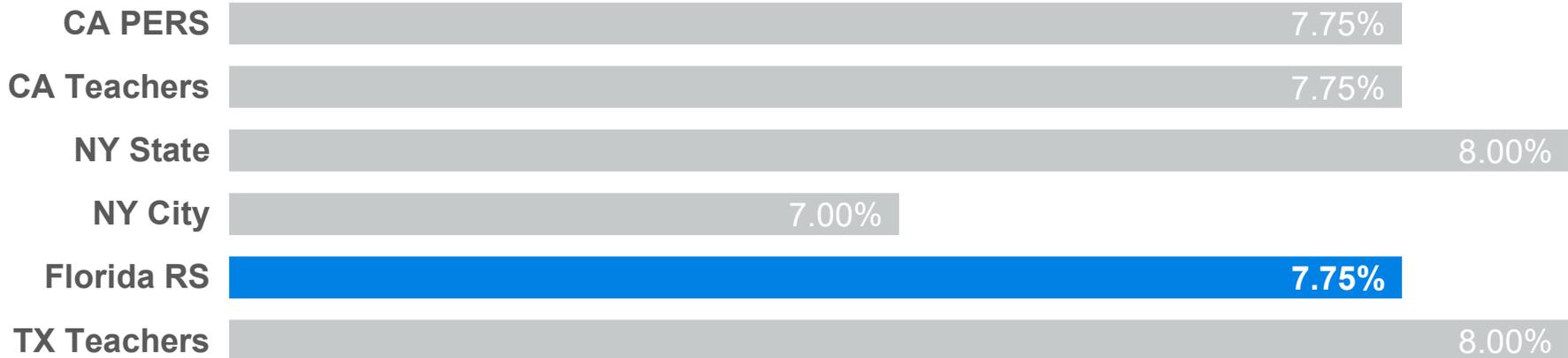


- In response to changing market outlooks for future inflation and real return, large public systems continue to lower their return assumptions
- This chart shows current assumptions for the largest 120+ public systems, as tracked by NASRA
- The current median assumption is **7.25%**

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

What Are FRS's Jumbo Peer Systems Doing?

2010



2019



Source: Public Fund Survey, NASRA (Oct. '19)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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 2018 Conference are summarized below:
 - “SBA Approach” model developed in Q1 of 2018 by Aon using average global equity risk premiums from several large investment consultancies:
6.44% median return
 - Used Aon’s outlook for inflation at that time of 2.3%
 - Milliman model: **6.4%** median return
 - Used Conference’s adopted inflation assumption of 2.6%
 - The default inflation assumption in Milliman’s model at that time was 2.3%
- The Conference lowered the return assumption from **7.5%** to **7.4%** for the 2018 actuarial valuation for funding purposes

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Updates to Return Models for This Year

- Aon's "SBA Approach" model from its Q3 2019 asset-liability study that blends the global equity risk premiums of several large investment consultancies: **6.59%** median return
 - Reflects 4.41% real return and 2.1% inflation
- Milliman model: **6.7%** median return
 - Reflects 4.0% real return, along with uses the Conference's adopted inflation assumption for the 2018 valuation 2.6%
 - The current default inflation assumption in Milliman's model is 2.2%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

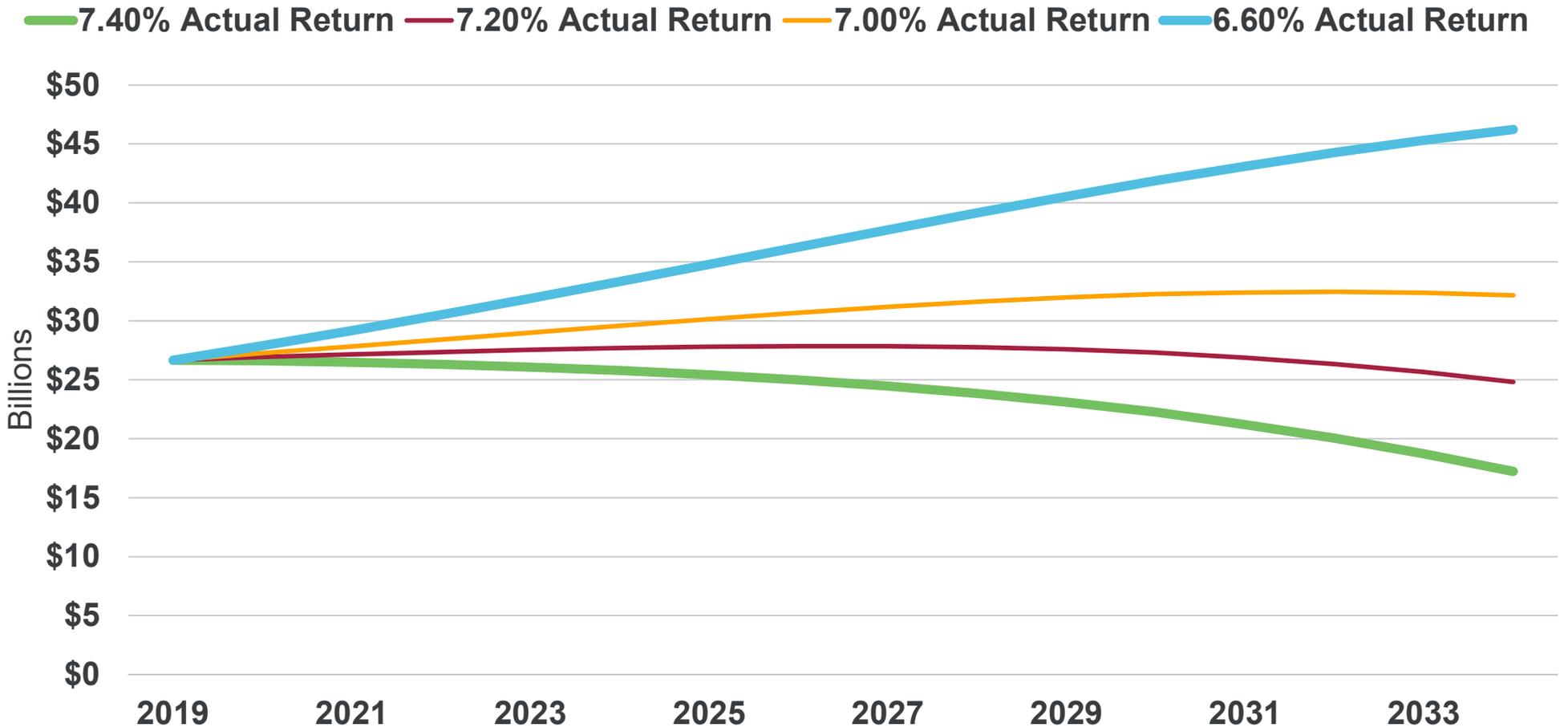
Milliman Investment Return Model

Percentile	30-Year Average
65 th	7.5%
60 th	7.2%
55 th	7.0%
50th	6.7%
45 th	6.4%
40 th	6.2%
35 th	5.9%

- 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 2.6% inflation assumption most recently adopted by the Conference
 - In this table, the 60th percentile means that in the Milliman model 60% of possible 30-year average annualized returns are at or below 7.2%
 - Details on the model inputs in the appendix

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Unfunded Liability under Varying Actual Returns

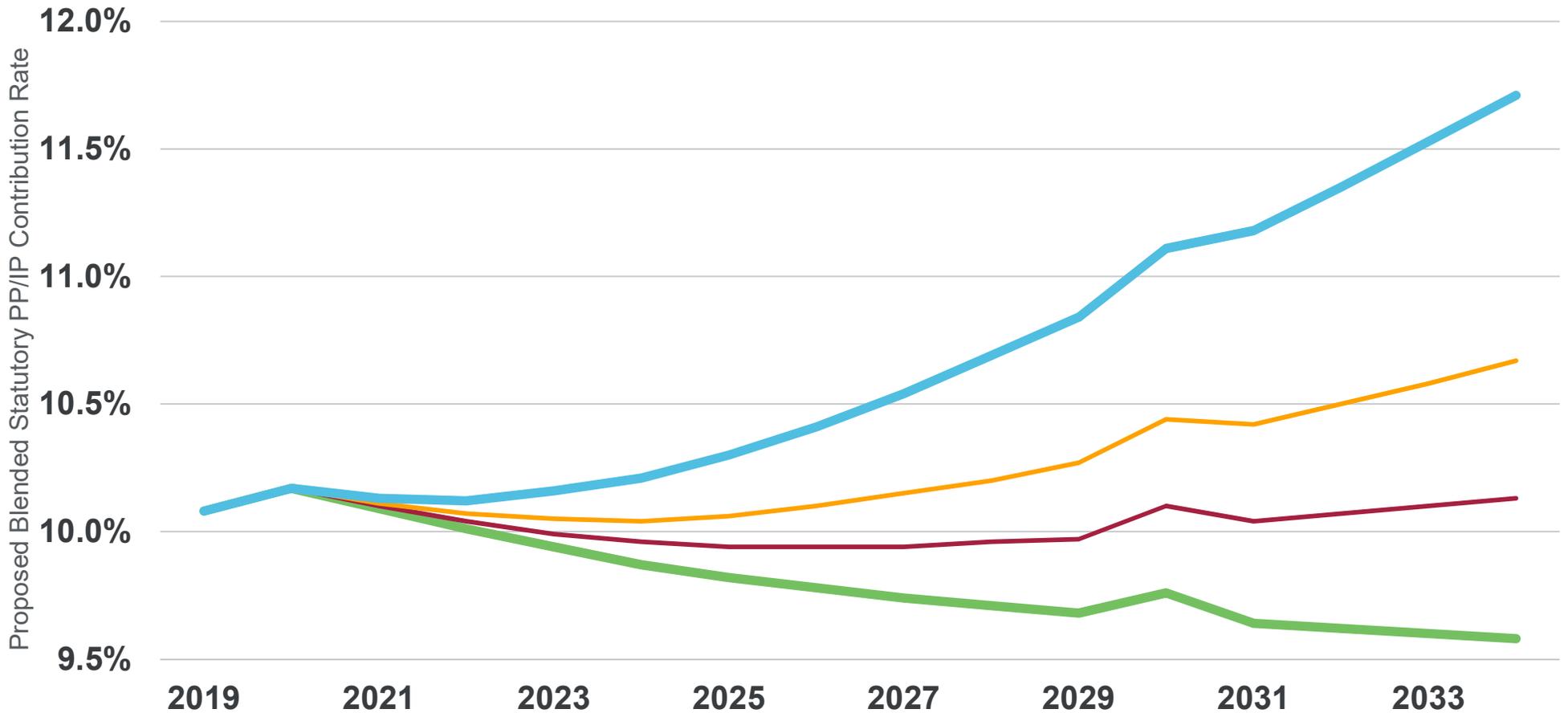


Using a 7.40% adopted assumption for the actuarial valuation's assumed return, this chart projects unfunded liability on a **market value of assets basis** under four scenarios for actual annual investment return on a market value of assets basis

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Contribution Rate under Varying Actual Returns

— 7.40% Actual Return
 — 7.20% Actual Return
 — 7.00% Actual Return
 — 6.60% Actual Return



Using a 7.40% 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 four scenarios for actual annual investment return on a fair market value of assets basis

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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”

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Effect of Various Return Assumptions

System Average Valuation Results	Blended PP/IP Employer Rate	UAL (AVA)	Funded Status
Final 2019-20 at 7.40% assumption	10.08%	\$29.9 B	83.9%
Preliminary 2020-21*:			
- At 7.40% assumption**	10.17%	\$29.2 B	84.6%
- At 7.20% assumption***	11.12%	\$33.7 B	82.7%
- At 7.00% assumption	12.09%	\$38.4 B	80.7%
- At 6.60% assumption	14.06%	\$48.3 B	76.9%

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll of \$37.9 billion (including payroll subject to only UAL contributions), estimated combined 2020-21 PP/IP contribution of:

** \$3.67 billion at 7.40% return assumption

*** \$4.02 billion at 7.20% return assumption

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Actuarial Cost Allocation Method and Amortization Policy

Projected Cost of Total Benefits

- The **projected cost of total benefits** is calculated for each individual member as a present value as of the valuation date
- The projected cost of total benefits we calculate **does** reflect the member's tier and member's actual amount of pre-July 2011 service
- The projected cost of total benefits we calculate is **not** affected by the cost allocation method used
 - The cost allocation method only affects the allocation of the projected cost of total benefits between past, current and assumed future service

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Introduction to Cost Allocation Methods

- The division of each member's projected cost of total benefits between past, current and assumed future service is done via the application of a **cost allocation method**
- The portion of the projected cost of total benefits allocated to the year of future service starting on the valuation date is the **Normal Cost (NC)**
- The portion of the projected cost of total benefits allocated to all years of assumed future service is the **Present Value of Future Normal Costs (PVFNC)**
- The portion of the projected cost of total benefits allocated to service already performed is the **Actuarial Liability (AL)**
- The difference between the Actuarial Value of Assets and the Actuarial Liability is the **Unfunded Actuarial Liability (UAL)**

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Entry Age Normal Cost Allocation Method

- By far the most commonly used cost allocation method for state public pension systems is the entry age normal (EAN) method
 - Conceptually, EAN sets normal cost rate as a level percent of payroll over a member's full projected working career
- There are two variations of entry age normal:
 - **Ultimate EAN** (currently used by FRS for funding calculations)
 - **Individual EAN** (used by most systems, used by FRS for GASB calculations)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Ultimate EAN Cost Allocation Method

- Ultimate EAN sets Normal Cost as if each member is in Tier II
 - As such, Normal Cost is lower with Ultimate EAN than it is under Individual EAN
- Differing cost methods **do** allocate the projected cost of total benefits between past, current and projected future service differently
 - However, the method used **does not** affect the calculated projected cost of total benefits
 - For Tier I members, since Ultimate EAN allocates less of the projected cost of total benefits to assumed future service it thus allocates more of the projected cost to past service
 - This means Ultimate EAN has a higher Actuarial Liability (and higher UAL) than Individual EAN

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Individual EAN Normal Cost Rate Calculation

- A Tier I member's Individual EAN normal cost rate is the level percent of payroll contribution needed during a member's career to fund a Tier I projected cost of total benefits if experience follows assumptions
 - The structure of Tier I COLAs means that two Tier I members who are identical in all regards except for their level of pre-July 2011 service will have **different** Individual EAN normal cost rates
 - Those differing normal cost rates reflect the differing level of COLA each member is projected to receive
- Also, Tier I members will have different and higher normal cost rates than similarly situated Tier II members

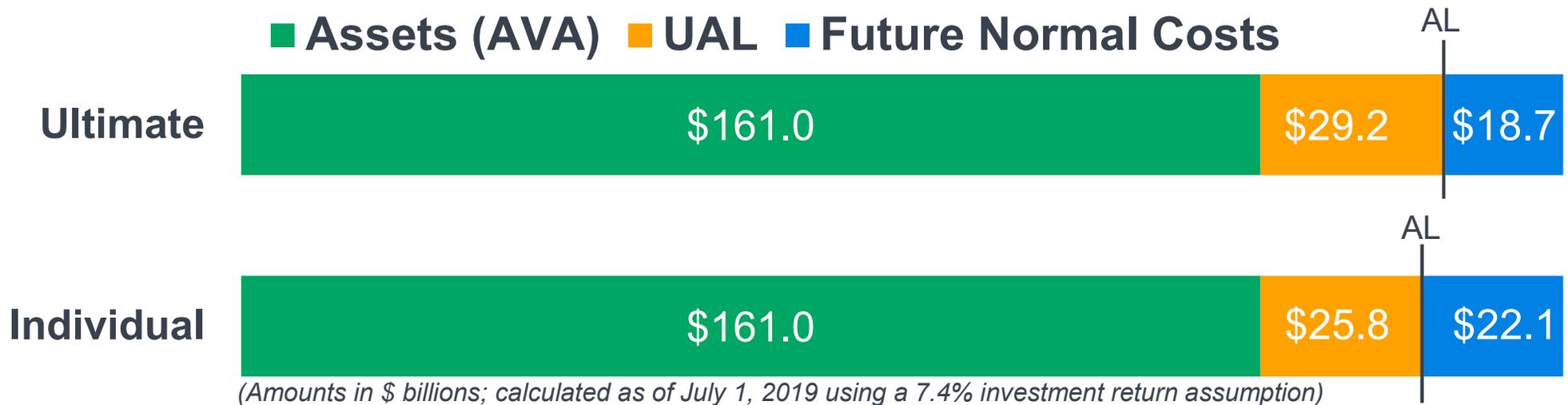
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Individual EAN v. Ultimate EAN Comparison

	Individual EAN	Ultimate EAN
Projected cost of total benefits	Same under either method	Same under either method
Calculation of Tier I member normal cost rates	Reflects projected total cost of Tier I benefit	Reflects projected total cost of Tier II benefit
Present value of future normal costs (PVFNC)	Higher under this method	Lower under this method
Actuarial Liability (AL)	Lower under this method	Higher under this method
System average normal cost rate	Drifts down over time as Tier II members replace Tier I members	Remains effectively level over time

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Ultimate v. Individual EAN Comparison (7.4%)



Weighted Average Across All Membership Classes	Composite Blended 2020-21 PP/IP Employer Contribution Rate		
	NC Rate	UAL Rate	Total Rate
Ultimate Entry Age	4.94%	5.23%	10.17%
Individual Entry Age	6.29%	Set by amortization policy	Set by amortization policy

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Effect of Allocation / Amortization at 7.4%

Valuation Results	Blended PP/IP Employer Rate	UAL (AVA)	Funded Status
Final 2019-20 at 7.40% assumption	10.08%	\$29.9 B	83.9%
Preliminary 2020-21 at 7.40%*:			
- Ultimate EAN; 30 yr % of pay amortization	10.17%	\$29.2 B	84.6%
- Individual EAN; 10 yr level \$ amortization	10.15%	\$25.8 B	86.2%
- Individual EAN; 20 yr level \$ amortization	10.60%	\$25.8 B	86.2%
- Individual EAN; 10 yr level % amortization	10.32%	\$25.8 B	86.2%
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	10.43%	\$25.8 B	86.2%

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll of \$37.9 billion (including payroll subject to only UAL contributions), estimated combined 2020-21 PP/IP contribution of:
 - \$3.67 billion with ultimate EAN and 30 year % of projected pay amortization
 - \$3.61 / \$3.78 / \$3.68 / \$3.72 billion respectively from changing to individual EAN and **amortizing only the UAL decrease from that method change** under the four Individual EAN amortization policies shown above

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Effect of Allocation / Amortization at 7.2%

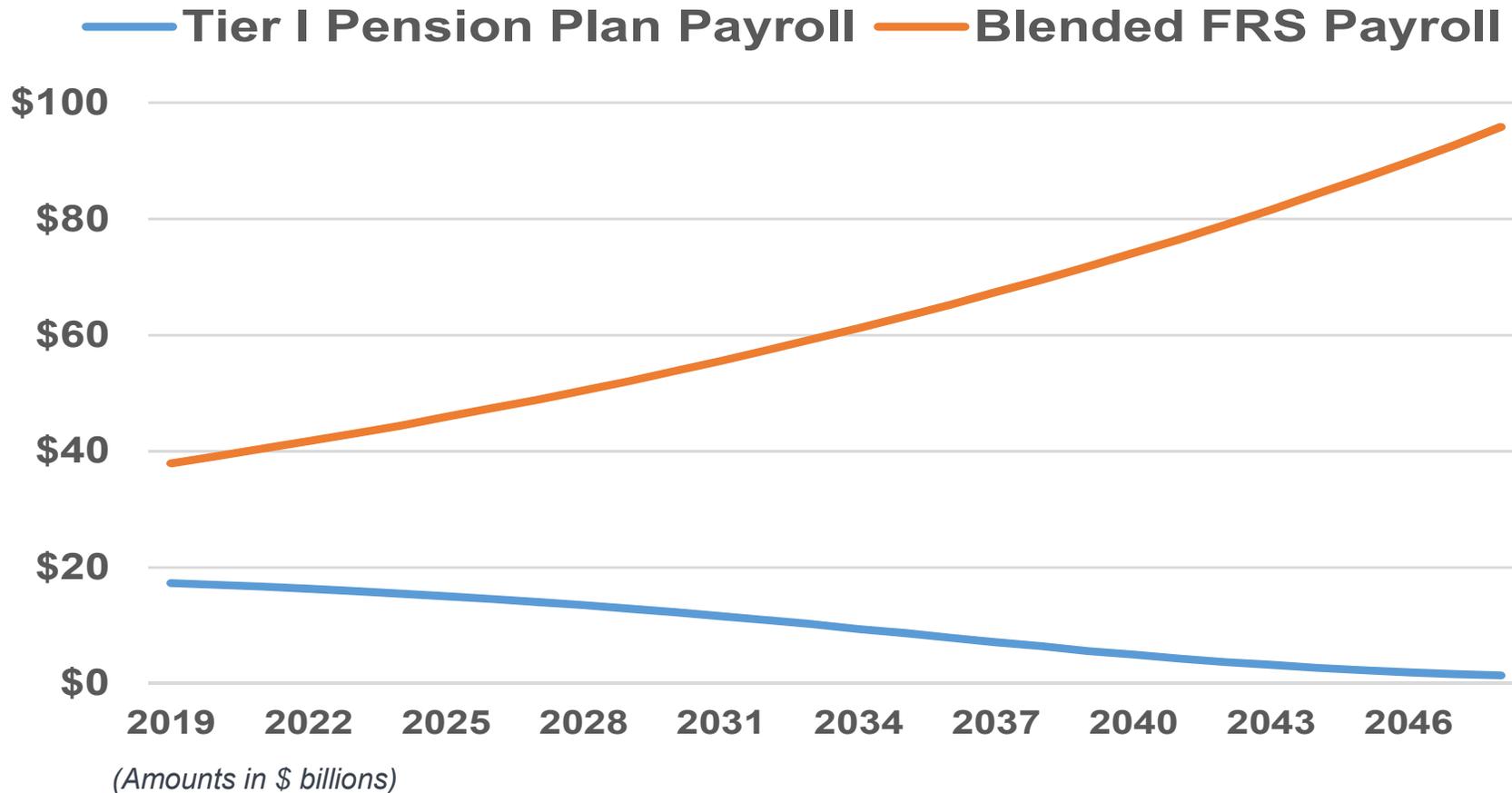
Valuation Results	Blended PP/IP Employer Rate	UAL (AVA)	Funded Status
Final 2019-20 at 7.40% assumption	10.08%	\$29.9 B	83.9%
Preliminary 2020-21 at 7.20%*:			
- Ultimate EAN; 30 yr % of pay amortization	11.12%	\$33.7 B	82.7%
- Individual EAN; 10 yr level \$ amortization	11.10%	\$30.0 B	84.3%
- Individual EAN; 20 yr level \$ amortization	11.58%	\$30.0 B	84.3%
- Individual EAN; 10 yr level % amortization	11.28%	\$30.0 B	84.3%
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	11.40%	\$30.0 B	84.3%

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll of \$37.9 billion (including payroll subject to only UAL contributions), estimated combined 2020-21 PP/IP contribution of:
 - \$4.02 billion with ultimate EAN and 30 year % of projected pay amortization
 - \$3.96 / \$4.14 / \$4.03 / \$4.07 billion respectively from changing to individual EAN and **amortizing only the UAL decrease from that method change** under the four Individual EAN amortization policies shown above

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Projected Payroll over 30 Years



The chart above shows the projected change over a 30 year period of the payroll for a) Tier I active Pension Plan members and b) all FRS active members (Tiers I and II, both Pension Plan and Investment Plan)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Needed Guidance

Needed Guidance for FRS Pension Plan

- From Conference Principals for system funding calculations, identification of **methods** and **assumptions** to use in the 2019 FRS Pension Plan valuation calculations for system funding purposes to calculate blended proposed 2020-21 statutory contribution rates:
 - Investment return assumption
 - Inflation and real wage growth assumptions (combine to create system payroll growth assumption)
 - Actuarial cost allocation method
 - Amortization policy
 - Demographic assumptions updates other than those already approved by the Conference on October 8
 - Already approved: Mortality / life expectancy for non-disabled members; likelihood and timing of immediate unreduced retirement or DROP entry, as detailed in slides 73 – 80 of the October 8 presentation
 - Requesting approval: Recommended additional demographic assumption updates as detailed in the appendix slides 68– 81 of today’s presentation

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Appendix

Milliman Capital Market Outlook Assumptions

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 5, 2019.

	Policy Allocation	Annual Arithmetic Mean	Annualized Geometric Mean	Annual Standard Deviation	
US Cash	1.00%	3.33%	3.32%	1.20%	*2.6% is the inflation assumption most recently adopted by the FRS Actuarial Assumption Conference. That 2.6% assumption is then applied to real return assumptions in Milliman’s capital market outlook model to calculate a median (50 th) 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 2.2%.
US Interm Bonds	18.00%	4.12%	4.07%	3.45%	
US Gvt Bonds	0.24%	3.95%	3.85%	4.75%	
US Bank / Leveraged Loans	1.14%	5.58%	5.38%	6.90%	
Global Equity	54.20%	7.99%	6.82%	16.45%	
US REITs	1.00%	7.66%	6.11%	18.85%	
Private Real Estate Property	9.42%	6.55%	5.91%	12.00%	
Timber	0.48%	6.76%	6.01%	13.00%	
Infrastructure	0.96%	7.51%	6.67%	13.85%	
Private Equity	8.76%	12.08%	8.42%	30.00%	
Commodities	0.36%	5.57%	4.01%	18.70%	
Hedge Funds - MultiStrategy	1.68%	6.00%	5.71%	8.15%	
Hedge Funds - Event-Driven	0.12%	6.20%	5.91%	8.15%	
Hedge Funds - Equity Hedge	0.48%	6.56%	6.06%	10.60%	
Strategic Investments	1.80%	5.70%	5.41%	8.05%	
Hedge Funds - Distressed	0.36%	6.02%	5.66%	8.95%	
US Inflation (CPI-U)*			2.60%	1.65%	
Total Fund	100%	7.3%	6.7%	11.8%	

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Regular - Various Return Assumptions

Regular Membership Class	Blended PP/IP Employer Rate	Estimated PP/IP Contribution
Final 2019-20 at 7.40% assumption	6.75%	\$1.84 B
Preliminary 2020-21*:		
- At 7.40% assumption	7.22%	\$1.99 B
- At 7.20% assumption	8.02%	\$2.22 B
- At 7.00% assumption	8.85%	\$2.45 B
- At 6.60% assumption	10.51%	\$2.92 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll subject to UAL contributions of \$29.4 billion
 - Does not include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Special Risk - Various Return Assumptions

Special Risk Membership Class	Blended PP/IP Employer Rate	Estimated PP/IP Contribution
Final 2019-20 at 7.40% assumption	23.76%	\$1.16 B
Preliminary 2020-21*:		
- At 7.40% assumption	21.46%	\$1.10 B
- At 7.20% assumption	23.09%	\$1.18 B
- At 7.00% assumption	24.76%	\$1.26 B
- At 6.60% assumption	28.15%	\$1.44 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll subject to UAL contributions of \$5.12 billion
 - Does not include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Regular – Allocation / Amortization @ 7.4%

Regular Membership Class	Blended PP/IP Employer Rate	Estimated PP/IP Contribution
Final 2019-20 at 7.40% assumption	6.75%	\$1.84 B
Preliminary 2020-21* @ 7.40%:		
- Ultimate EAN; 30 yr % of pay amortization	7.22%	\$1.99 B
- Individual EAN; 10 yr level \$ amortization	7.24%	\$1.96 B
- Individual EAN; 20 yr level \$ amortization	7.57%	\$2.06 B
- Individual EAN; 10 yr level % amortization	7.36%	\$2.00 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	7.44%	\$2.02 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll subject to UAL contributions of \$29.4 billion, and does **not** include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)
- Last four options show effect of changing to individual EAN and **amortizing only the UAL decrease from that method change** using the amortization policy noted

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Special Risk - Allocation / Amortization @ 7.4%

Special Risk Membership Class	Blended PP/IP Employer Rate	Estimated PP/IP Contribution
Final 2019-20 at 7.40% assumption	23.76%	\$1.16 B
Preliminary 2020-21* @ 7.40%:		
- Ultimate EAN; 30 yr % of pay amortization	21.46%	\$1.10 B
- Individual EAN; 10 yr level \$ amortization	20.18%	\$1.03 B
- Individual EAN; 20 yr level \$ amortization	21.50%	\$1.10 B
- Individual EAN; 10 yr level % amortization	20.67%	\$1.05 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	20.98%	\$1.07 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and today)

- Based on projected 2020-21 PP/IP payroll subject to UAL contributions of \$5.12 billion, and does **not** include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)
- Last three options show effect of changing to individual EAN and **amortizing only the UAL decrease from that method change** using the amortization policy noted

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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 100% beholden to them
- Since actual results will vary from assumption, review a return model's probability range and consider a margin for variance

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Asset Measurement Method

- 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

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Asset Smoothing

- 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

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Disclaimer

At your request, we have provided these draft results prior to completion of the July 1, 2019 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, 2019 Actuarial Valuation Report, and such changes or corrections may be material.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Certification

This presentation summarizes key preliminary results of an actuarial valuation of the Florida Retirement System (“FRS” or “the System”) as of July 1, 2019. The valuation, when finalized, will develop actuarially calculated contribution rates for the Plan Year ending June 30, 2021. The results in this presentation are preliminary in nature and may not be relied upon to, for example, prepare the System’s Consolidated Annual Financial Report (CAFR). The reliance document will be the formal July 1, 2019 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 2018 FRS Actuarial Assumption Conference. At the time of their review and adoption, those assumptions, with the exception of the investment return assumption as disclosed in the July 1, 2018 Actuarial Valuation Report, 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.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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, 2018. 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):

(a) The System may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.

(b) The System may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

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.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Actuarial Basis

Data

We have based our calculations on demographic member census data as of July 1, 2019 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, 2019, which will be published in the 4th quarter of this year. Assets as of June 30, 2019, were based on values provided by the Division.

Methods / Policies

Actuarial Cost Method: Ultimate Entry Age Normal, using the interpretation of that method as most recently endorsed by the 2018 FRS Actuarial Assumption Conference, except where Individual Entry Age normal is explicitly modeled as a policy alternative in the body of the presentation.

UAL Amortization: Newly arising UAL each plan year is amortized as a level percentage of projected payroll over a closed 30-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 2019 valuation calculations use assumptions as detailed July 1, 2018 Actuarial Valuation Report for funding purposes, with modifications for recommended updates to demographic assumptions from our 2019 Experience Study. Those updates are as summarized in this presentation and our October 8, 2019 presentation.

Provisions

Provisions valued are as summarized in the July 1, 2018 Actuarial Valuation Report for system funding purposes as subsequently modified by Senate Bill 426, which was enacted into law during the 2019 legislative session.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Incidence of In Line of Duty Disability

Age	Special Risk Class	All Other Classes
< 42	0.005%	0.001%
42-46	0.050%	0.001%
47-50	0.050%	0.002%
51-54	0.090%	0.004%
55-56	0.090%	0.005%
57-58	0.090%	0.006%
59	0.090%	0.007%
60-61	0.090%	0.006%
62	0.090%	0.003%
63	0.090%	0.002%
64+	0.090%	0.001%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Incidence of Non-Duty Disability

Age	Special Risk Class	All Other Classes
< 20	0.020%	0.000%
21-27	0.020%	0.010%
28-35	0.040%	0.010%
36-40	0.040%	0.020%
41-44	0.040%	0.030%
45-46	0.040%	0.040%
47-50	0.070%	0.080%
51-54	0.070%	0.130%
55	0.070%	0.160%
56	0.070%	0.170%
57-58	0.070%	0.190%
59	0.070%	0.230%
60	0.070%	0.210%
61	0.070%	0.200%
62	0.070%	0.110%
63	0.070%	0.080%
64+	0.070%	0.040%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Individual Member Annual Salary Increase

Combined Years of Service	Regular	Special Risk	Special Risk Admin	ECO	ESO	Judges	Senior Management
0	8.00%	7.60%	3.90%	3.70%	3.25%	3.70%	8.40%
1	6.00%	5.90%	3.90%	3.70%	3.25%	3.70%	8.40%
2	5.60%	5.60%	3.90%	3.70%	3.25%	3.70%	7.50%
3	5.30%	5.60%	3.90%	3.70%	3.25%	3.70%	6.70%
4	4.90%	5.60%	3.90%	3.70%	3.25%	3.70%	6.30%
5	4.80%	5.60%	3.90%	3.70%	3.25%	3.70%	6.00%
6	4.80%	5.60%	3.90%	3.70%	3.25%	3.70%	5.60%
7	4.70%	5.50%	3.90%	3.70%	3.25%	3.70%	5.30%
8	4.60%	5.50%	3.90%	3.70%	3.25%	3.70%	4.80%
9	4.60%	5.50%	3.90%	3.70%	3.25%	3.70%	4.80%
10	4.60%	5.50%	3.90%	3.70%	3.25%	3.70%	4.80%
11	4.50%	5.30%	3.90%	3.70%	3.25%	3.70%	4.80%
12	4.40%	5.30%	3.90%	3.70%	3.25%	3.70%	4.80%
13	4.40%	5.20%	3.90%	3.70%	3.25%	3.70%	4.80%
14	4.40%	5.20%	3.90%	3.70%	3.25%	3.70%	4.80%
15	4.40%	5.20%	3.90%	3.70%	3.25%	3.70%	4.80%
16	4.40%	5.00%	3.90%	3.70%	3.25%	3.70%	4.80%
17	4.40%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
18	4.30%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
19	4.30%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
20	4.30%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
21	4.20%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
22	4.20%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
23	4.10%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
24	4.10%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
25	4.00%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
26	3.90%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
27	3.80%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
28	3.70%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
29	3.60%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
30+	3.60%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

Regular Class Male

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	27.00%	25.00%	23.00%	22.00%	21.00%	27.00%
1	19.00%	17.00%	15.00%	13.50%	12.50%	12.50%
2	17.50%	13.50%	12.00%	10.50%	9.50%	9.00%
3	16.00%	11.50%	10.00%	9.00%	7.75%	7.75%
4	15.50%	10.00%	8.50%	8.00%	6.50%	6.50%
5	10.50%	9.00%	8.50%	7.50%	6.00%	6.00%
6	10.50%	8.50%	7.50%	6.50%	6.00%	6.00%
7	8.00%	8.00%	6.50%	6.00%	5.00%	5.00%
8	5.50%	5.50%	5.00%	5.50%	5.00%	4.00%
9	5.00%	5.00%	5.00%	4.50%	4.00%	4.00%
10	4.00%	4.00%	4.00%	4.00%	4.00%	3.00%
11	3.50%	3.50%	3.00%	3.50%	3.50%	3.00%
12	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
13	3.00%	3.00%	3.00%	3.00%	3.00%	2.50%
14	2.50%	2.50%	1.50%	2.50%	2.50%	2.50%
15	2.50%	2.50%	1.50%	2.00%	2.50%	2.50%
16	2.00%	2.00%	1.50%	2.00%	2.00%	2.00%
17	2.00%	2.00%	1.50%	2.00%	2.00%	2.00%
18	2.00%	2.00%	1.50%	1.50%	2.00%	2.00%
19	2.00%	2.00%	1.50%	1.50%	2.00%	2.00%
20	1.50%	1.50%	1.50%	1.00%	1.50%	1.50%
21	1.25%	1.25%	1.25%	1.00%	1.25%	1.25%
22	1.25%	1.25%	1.25%	1.00%	1.25%	1.25%
23	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
24	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
25	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
26	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
27	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
28	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
29	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
30+	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

Regular Class Female

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	28.00%	28.00%	27.00%	26.00%	25.00%	30.00%
1	18.00%	17.00%	16.00%	15.00%	12.50%	12.50%
2	16.00%	13.50%	12.50%	11.50%	10.00%	10.00%
3	16.00%	11.50%	10.50%	9.50%	9.00%	9.00%
4	16.00%	10.00%	9.00%	8.00%	7.50%	7.50%
5	13.00%	8.00%	8.00%	7.50%	7.50%	7.50%
6	12.00%	8.00%	8.00%	7.50%	7.50%	7.50%
7	7.50%	7.50%	7.50%	6.50%	6.50%	6.50%
8	6.00%	6.00%	6.00%	5.50%	5.50%	5.50%
9	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
10	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
11	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
12	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
13	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
14	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
15	3.00%	3.00%	3.00%	2.75%	2.75%	2.75%
16	3.00%	3.00%	3.00%	2.50%	2.50%	2.50%
17	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
18	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
19	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
20	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
21	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
22	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
23	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%
24	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%
25	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
26	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
27	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
28	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
29	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
30+	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

Special Risk Class Male

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	17.50%	15.50%	15.50%	17.50%	17.50%	17.50%
1	10.00%	9.00%	9.00%	10.00%	9.00%	9.00%
2	8.00%	8.00%	8.00%	8.00%	7.00%	8.00%
3	7.00%	7.00%	7.00%	7.00%	5.50%	7.00%
4	5.00%	6.00%	6.00%	6.00%	5.50%	6.00%
5	4.00%	5.00%	5.00%	5.00%	4.00%	5.00%
6	4.00%	5.00%	5.00%	5.00%	4.00%	5.00%
7	4.00%	5.00%	4.00%	4.00%	3.50%	4.00%
8	3.50%	4.50%	3.50%	3.50%	3.00%	3.50%
9	3.00%	3.50%	3.00%	3.00%	3.00%	3.00%
10	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
11	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
12	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
13	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
14	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
15	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
16	1.00%	1.00%	1.00%	1.00%	1.50%	1.50%
17	1.00%	1.00%	1.00%	1.00%	1.50%	1.50%
18	1.00%	1.00%	1.00%	1.00%	1.50%	1.50%
19	1.00%	1.00%	1.00%	1.00%	1.50%	1.50%
20	1.00%	1.00%	1.00%	1.00%	1.50%	1.50%
21	1.00%	1.00%	1.00%	1.00%	1.50%	1.50%
22	0.75%	0.75%	0.75%	0.75%	1.00%	1.00%
23	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
24	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
25	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
26	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
27	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
28	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
29	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%
30+	0.50%	0.50%	0.50%	0.50%	1.00%	1.00%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

Special Risk Class Female

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	24.00%	24.00%	24.00%	26.00%	30.00%	30.00%
1	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%
2	11.00%	11.00%	9.00%	10.50%	10.50%	10.50%
3	8.00%	8.00%	8.50%	10.50%	10.00%	10.00%
4	8.00%	8.00%	7.00%	7.00%	10.00%	10.00%
5	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%
6	6.50%	6.50%	6.50%	6.00%	6.00%	6.00%
7	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
8	5.00%	5.00%	4.50%	4.50%	6.00%	6.00%
9	3.50%	3.50%	3.50%	3.50%	6.00%	6.00%
10	3.50%	3.50%	3.50%	3.50%	5.00%	5.00%
11	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
12	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
13	2.50%	2.50%	2.50%	2.50%	3.00%	3.00%
14	2.50%	2.50%	2.50%	2.50%	3.00%	3.00%
15	2.25%	2.25%	2.25%	2.25%	3.00%	3.00%
16	2.00%	2.00%	2.00%	2.00%	3.00%	3.00%
17	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
18	1.50%	1.50%	1.50%	1.50%	2.00%	2.00%
19	1.50%	1.50%	1.50%	1.50%	2.00%	2.00%
20	1.50%	1.50%	1.50%	1.50%	2.00%	2.00%
21	1.50%	1.50%	1.50%	1.50%	2.00%	2.00%
22	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
23	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
24	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
25	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
26	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
27	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
28	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
29	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
30+	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

**Special Risk
Administrative Class
Male**

	Combined Years		Attained Age				
	of Service	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0		17.5%	15.5%	15.5%	17.5%	17.5%	17.5%
1		10.0%	9.0%	9.0%	10.0%	9.0%	9.0%
2		8.0%	8.0%	8.0%	8.0%	7.0%	8.0%
3		7.0%	7.0%	7.0%	7.0%	5.5%	7.0%
4		5.0%	6.0%	6.0%	6.0%	5.5%	6.0%
5		4.0%	5.0%	5.0%	5.0%	4.0%	5.0%
6		4.0%	5.0%	5.0%	5.0%	4.0%	5.0%
7		4.0%	5.0%	4.0%	4.0%	3.5%	4.0%
8		3.5%	4.5%	3.5%	3.5%	3.0%	3.5%
9		3.0%	3.5%	3.0%	3.0%	3.0%	3.0%
10		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
11		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
12		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
13		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
14		1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
15		1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
16		1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
17		1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
18		1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
19		1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
20		1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
21		1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
22		0.8%	0.8%	0.8%	0.8%	1.0%	1.0%
23		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
24		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
25		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
26		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
27		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
28		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
29		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
30+		0.5%	0.5%	0.5%	0.5%	1.0%	1.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

**Special Risk
Administrative Class
Female**

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	24.0%	24.0%	24.0%	26.0%	30.0%	30.0%
1	13.5%	13.5%	13.5%	13.5%	13.5%	13.5%
2	11.0%	11.0%	9.0%	10.5%	10.5%	10.5%
3	8.0%	8.0%	8.5%	10.5%	10.0%	10.0%
4	8.0%	8.0%	7.0%	7.0%	10.0%	10.0%
5	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
6	6.5%	6.5%	6.5%	6.0%	6.0%	6.0%
7	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
8	5.0%	5.0%	4.5%	4.5%	6.0%	6.0%
9	3.5%	3.5%	3.5%	3.5%	6.0%	6.0%
10	3.5%	3.5%	3.5%	3.5%	5.0%	5.0%
11	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
12	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
13	2.5%	2.5%	2.5%	2.5%	3.0%	3.0%
14	2.5%	2.5%	2.5%	2.5%	3.0%	3.0%
15	2.3%	2.3%	2.3%	2.3%	3.0%	3.0%
16	2.0%	2.0%	2.0%	2.0%	3.0%	3.0%
17	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
18	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
19	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
20	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
21	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
22	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
23	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
24	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
29	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
30+	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

Elected Officers' Class

Judicial - All Years of Service						
Attained Age						
Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+	
1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

Leg-Atty-Cab - All Years of Service						
Attained Age						
Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+	
5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

Local - All Years of Service						
Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0-3	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%
4	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%
5-7	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%
8	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
9+	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

**Senior Management
Class
Male**

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	9.0%	9.0%	9.0%	9.0%	9.0%	11.0%
1	10.5%	10.5%	10.5%	10.5%	10.5%	11.0%
2	17.0%	17.0%	17.0%	17.0%	17.0%	14.5%
3	16.0%	16.0%	16.0%	16.0%	16.0%	10.5%
4	12.0%	12.0%	12.0%	12.0%	12.0%	7.0%
5	10.0%	10.0%	10.0%	10.0%	10.0%	5.0%
6	9.5%	9.5%	9.5%	9.5%	9.5%	5.0%
7	7.0%	7.0%	7.0%	7.0%	7.0%	5.0%
8	6.0%	6.0%	6.0%	6.0%	6.0%	4.0%
9	6.0%	6.0%	6.0%	6.0%	6.0%	4.0%
10	5.0%	5.0%	5.0%	5.0%	5.0%	4.0%
11	5.0%	5.0%	5.0%	5.0%	5.0%	4.0%
12	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
13	4.0%	4.0%	4.0%	4.0%	4.0%	3.5%
14	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
15	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
16	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
17	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
18	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
19	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
20	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
21	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
22	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
23	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
24	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
29	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
30+	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Pre-Retirement Termination of Employment

**Senior Management
Class
Female**

Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
1	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
2	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
3	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
4	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
5	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
6	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
7	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
8	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
9	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
10	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
11	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
12	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
13	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
14	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
15	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
16	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
17	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
18	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
19	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
20	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
21	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
22	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
23	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
24	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
25	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
26	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
27	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
28	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
29	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
30+	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Disabled Mortality (Post-Retirement)

Member Category	Pub-2010 base table listed below, no mortality improvement projection scale
Female Disabled Special Risk	80% Headcount Weighted General Disabled Retiree Female Table; 20% Headcount Weighted Safety Disabled Retiree Female Table
Male Disabled Special Risk	80% Headcount Weighted General Disabled Retiree Male Table; 20% Headcount Weighted Safety Disabled Retiree Male Table
Female Disabled (other than Special Risk)	Headcount Weighted General Disabled Retiree Female Table, set forward 3 years
Male Disabled (other than Special Risk)	Headcount Weighted General Disabled Retiree Male Table, set forward 3 years

Despite having “2010” in its title, the “Pub-2010” were issued in 2019 based on the first ever large scale study of public sector-specific mortality by the Society of Actuaries. 2010 was the middle year of the large amount of data collected for the study, as explained at more length in our October 8 presentation.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Unused Annual Leave Available at Retirement

Membership Class	Hours
Regular	230
Special Risk	270
Senior Management Service	310
Others Not Listed Above	230

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

30-Year Amortization as Level % of Tier I Pay

Amortization of UAL Decrease from Method Change

To Mirror Pattern
of Decreasing
Tier I Pension Plan
Active Payroll

Contribution Year	Percent of Total Amortization	Contribution Year	Percent of Total Amortization
2020 - 2021	6.1%	2035 - 2036	3.3%
2021 - 2022	6.0%	2036 - 2037	3.0%
2022 - 2023	5.9%	2037 - 2038	2.8%
2023 - 2024	5.7%	2038 - 2039	2.5%
2024 - 2025	5.6%	2039 - 2040	2.2%
2025 - 2026	5.4%	2040 - 2041	2.0%
2026 - 2027	5.3%	2041 - 2042	1.7%
2027 - 2028	5.1%	2042 - 2043	1.5%
2028 - 2029	4.9%	2043 - 2044	1.3%
2029 - 2030	4.7%	2044 - 2045	1.1%
2030 - 2031	4.5%	2045 - 2046	1.0%
2031 - 2032	4.3%	2046 - 2047	0.8%
2032 - 2033	4.1%	2047 - 2048	0.7%
2033 - 2034	3.8%	2048 - 2049	0.6%
2034 - 2035	3.6%	2049 - 2050	<u>0.5%</u>
			100.0%

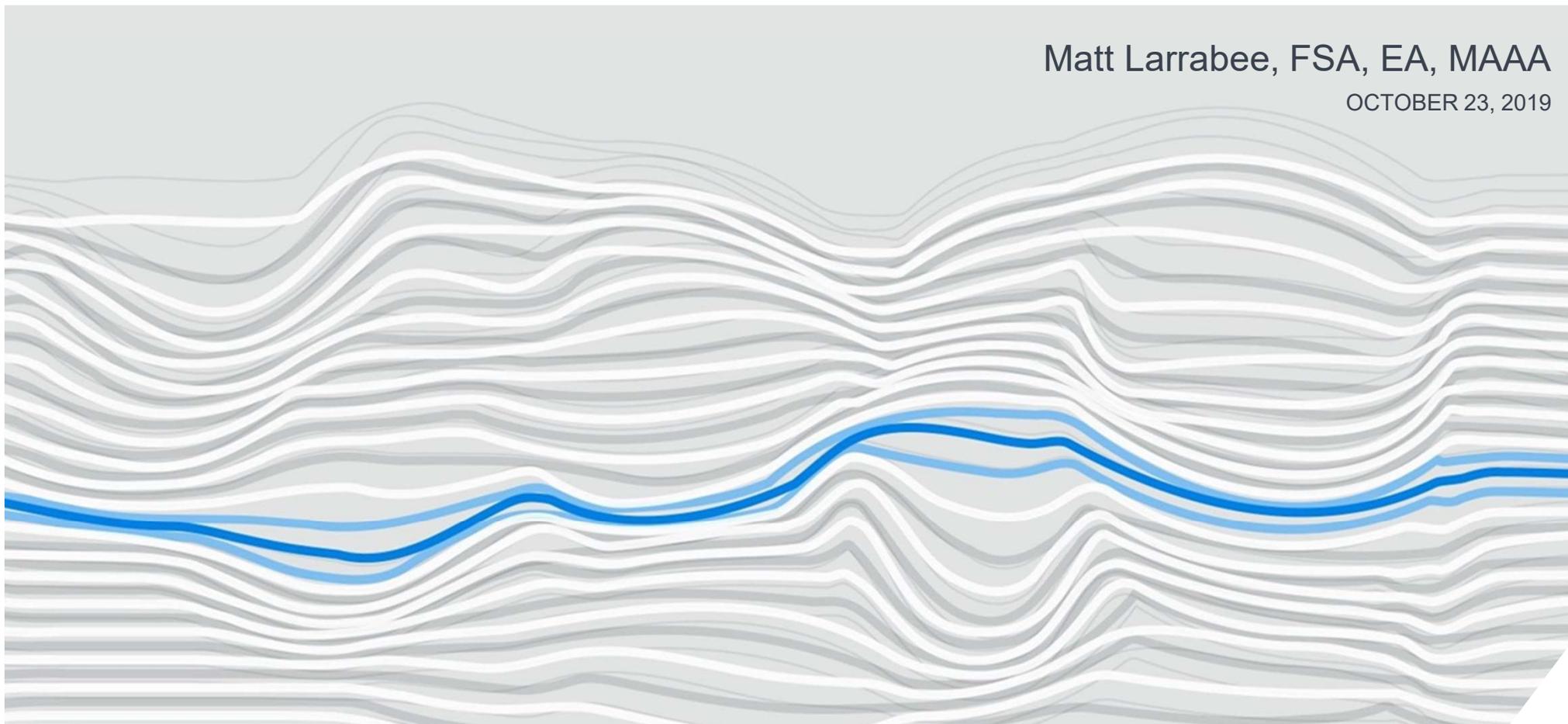
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Florida Retirement System

Supplemental Material for Discussion at
2019 FRS Actuarial Assumption Estimating Conference

Matt Larrabee, FSA, EA, MAAA

OCTOBER 23, 2019



Supplemental to Complete Presentation

- The slides herein illustrate additional alternate amortization policy options requested by a Conference Principal
- These slides are supplemental to the full 82-page “2019 FRS Actuarial Assumption Estimating Conference” presentation, and all caveats and limitations of use are incorporated by reference

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Effect of Allocation / Amortization at 7.4%

Valuation Results	Blended PP/IP Employer Rate	UAL (AVA)	Estimated PP/IP Contribution**
Final 2019-20 at 7.40% assumption	10.08%	\$29.9 B	\$3.56 B
Preliminary 2020-21 at 7.40%*:			
- Ultimate EAN; 30 yr % of pay amortization	10.17%	\$29.2 B	\$3.67 B
Changing to Individual EAN and amortizing <u>only</u> the UAL decrease from that method change as follows:			
- Individual EAN; 10 yr level \$ amortization	10.15%	\$25.8 B	\$3.61 B
- Individual EAN; 12 yr level \$ amortization	10.31%	\$25.8 B	\$3.67 B
- Individual EAN; 15 yr level \$ amortization	10.46%	\$25.8 B	\$3.73 B
- Individual EAN; 20 yr level \$ amortization	10.60%	\$25.8 B	\$3.78 B
- Individual EAN; 10 yr level % amortization	10.32%	\$25.8 B	\$3.68 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	10.43%	\$25.8 B	\$3.72 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and Oct. 23)

** Based on projected 2020-21 PP/IP payroll of \$37.9 billion (including payroll subject to only UAL contributions)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Effect of Allocation / Amortization at 7.2%

Valuation Results	Blended PP/IP Employer Rate	UAL (AVA)	Estimated PP/IP Contribution**
Final 2019-20 at 7.40% assumption	10.08%	\$29.9 B	\$3.56 B
Preliminary 2020-21 at 7.20%*:			
- Ultimate EAN; 30 yr % of pay amortization	11.12%	\$33.7 B	\$4.02 B
Changing to Individual EAN and amortizing <u>only</u> the UAL decrease from that method change as follows:			
- Individual EAN; 10 yr level \$ amortization	11.10%	\$30.0 B	\$3.96 B
- Individual EAN; 12 yr level \$ amortization	11.27%	\$30.0 B	\$4.02 B
- Individual EAN; 15 yr level \$ amortization	11.43%	\$30.0 B	\$4.08 B
- Individual EAN; 20 yr level \$ amortization	11.58%	\$30.0 B	\$4.14 B
- Individual EAN; 10 yr level % amortization	11.28%	\$30.0 B	\$4.03 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	11.40%	\$30.0 B	\$4.07 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and Oct. 23)

** Based on projected 2020-21 PP/IP payroll of \$37.9 billion (including payroll subject to only UAL contributions)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Regular: Allocation / Amortization at 7.4%

Valuation Results	Blended PP/IP Employer Rate	Estimated PP/IP Contribution**
Final 2019-20 at 7.40% assumption	6.75%	\$1.84 B
Preliminary 2020-21 at 7.40%*:		
- Ultimate EAN; 30 yr % of pay amortization	7.22%	\$1.99 B
Changing to Individual EAN and amortizing <u>only</u> the UAL decrease from that method change as follows:		
- Individual EAN; 10 yr level \$ amortization	7.24%	\$1.96 B
- Individual EAN; 12 yr level \$ amortization	7.35%	\$1.99 B
- Individual EAN; 15 yr level \$ amortization	7.46%	\$2.03 B
- Individual EAN; 20 yr level \$ amortization	7.57%	\$2.06 B
- Individual EAN; 10 yr level % amortization	7.36%	\$2.00 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	7.44%	\$2.02 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and Oct. 23)

** Based on projected 2020-21 PP/IP payroll of \$29.4 billion, and does not include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Special Risk: Allocation / Amortization at 7.4%

Valuation Results	Blended PP/IP Employer Rate	Estimated PP/IP Contribution**
Final 2019-20 at 7.40% assumption	23.76%	\$1.16 B
Preliminary 2020-21 at 7.40%*:		
- Ultimate EAN; 30 yr % of pay amortization	21.46%	\$1.10 B
Changing to Individual EAN and amortizing <u>only</u> the UAL decrease from that method change as follows:		
- Individual EAN; 10 yr level \$ amortization	20.18%	\$1.03 B
- Individual EAN; 12 yr level \$ amortization	20.63%	\$1.05 B
- Individual EAN; 15 yr level \$ amortization	21.08%	\$1.08 B
- Individual EAN; 20 yr level \$ amortization	21.50%	\$1.10 B
- Individual EAN; 10 yr level % amortization	20.67%	\$1.05 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	20.98%	\$1.07 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and Oct. 23)

** Based on projected 2020-21 PP/IP payroll of \$5.12 billion, and does not include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Regular: Allocation / Amortization at 7.2%

Valuation Results	Blended PP/IP Employer Rate	Estimated PP/IP Contribution**
Final 2019-20 at 7.40% assumption	6.75%	\$1.84 B
Preliminary 2020-21 at 7.20%*:		
- Ultimate EAN; 30 yr % of pay amortization	8.02%	\$2.22 B
Changing to Individual EAN and amortizing <u>only</u> the UAL decrease from that method change as follows:		
- Individual EAN; 10 yr level \$ amortization	8.04%	\$2.19 B
- Individual EAN; 12 yr level \$ amortization	8.17%	\$2.22 B
- Individual EAN; 15 yr level \$ amortization	8.29%	\$2.26 B
- Individual EAN; 20 yr level \$ amortization	8.40%	\$2.29 B
- Individual EAN; 10 yr level % amortization	8.17%	\$2.22 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	8.26%	\$2.25 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and Oct. 23)

** Based on projected 2020-21 PP/IP payroll of \$29.4 billion, and does not include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Special Risk: Allocation / Amortization at 7.2%

Valuation Results	Blended PP/IP Employer Rate	Estimated PP/IP Contribution**
Final 2019-20 at 7.40% assumption	23.76%	\$1.16 B
Preliminary 2020-21 at 7.20%*:		
- Ultimate EAN; 30 yr % of pay amortization	23.09%	\$1.18 B
Changing to Individual EAN and amortizing <u>only</u> the UAL decrease from that method change as follows:		
- Individual EAN; 10 yr level \$ amortization	21.74%	\$1.11 B
- Individual EAN; 12 yr level \$ amortization	22.22%	\$1.13 B
- Individual EAN; 15 yr level \$ amortization	22.69%	\$1.16 B
- Individual EAN; 20 yr level \$ amortization	23.14%	\$1.18 B
- Individual EAN; 10 yr level % amortization	22.25%	\$1.14 B
- Individual EAN; 30 yr level % of Tier I PP active member payroll amortization	22.56%	\$1.15 B

* Reflecting recommended demographic assumption updates (presentations Oct. 8 and Oct. 23)

** Based on projected 2020-21 PP/IP payroll of \$5.12 billion, and does not include projected contributions on DROP payroll (estimated for 2019-20 to be \$0.297 billion in contributions on \$2.30 billion of applicable payroll)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Disclaimer

At your request, we have provided these draft results prior to completion of the July 1, 2019 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, 2019 Actuarial Valuation Report, and such changes or corrections may be material.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Certification

This presentation summarizes key preliminary results of an actuarial valuation of the Florida Retirement System (“FRS” or “the System”) as of July 1, 2019. The valuation, when finalized, will develop actuarially calculated contribution rates for the Plan Year ending June 30, 2021. The results in this presentation are preliminary in nature and may not be relied upon to, for example, prepare the System’s Consolidated Annual Financial Report (CAFR). The reliance document will be the formal July 1, 2019 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 2018 FRS Actuarial Assumption Conference. At the time of their review and adoption, those assumptions, with the exception of the investment return assumption as disclosed in the July 1, 2018 Actuarial Valuation Report, 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.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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, 2018. 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):

(a) The System may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.

(b) The System may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

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.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Actuarial Basis

Data

We have based our calculations on demographic member census data as of July 1, 2019 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, 2019, which will be published in the 4th quarter of this year. Assets as of June 30, 2019, were based on values provided by the Division.

Methods / Policies

Actuarial Cost Method: Ultimate Entry Age Normal, using the interpretation of that method as most recently endorsed by the 2018 FRS Actuarial Assumption Conference, except where Individual Entry Age normal is explicitly modeled as a policy alternative in the body of the presentation.

UAL Amortization: Newly arising UAL each plan year is amortized as a level percentage of projected payroll over a closed 30-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.

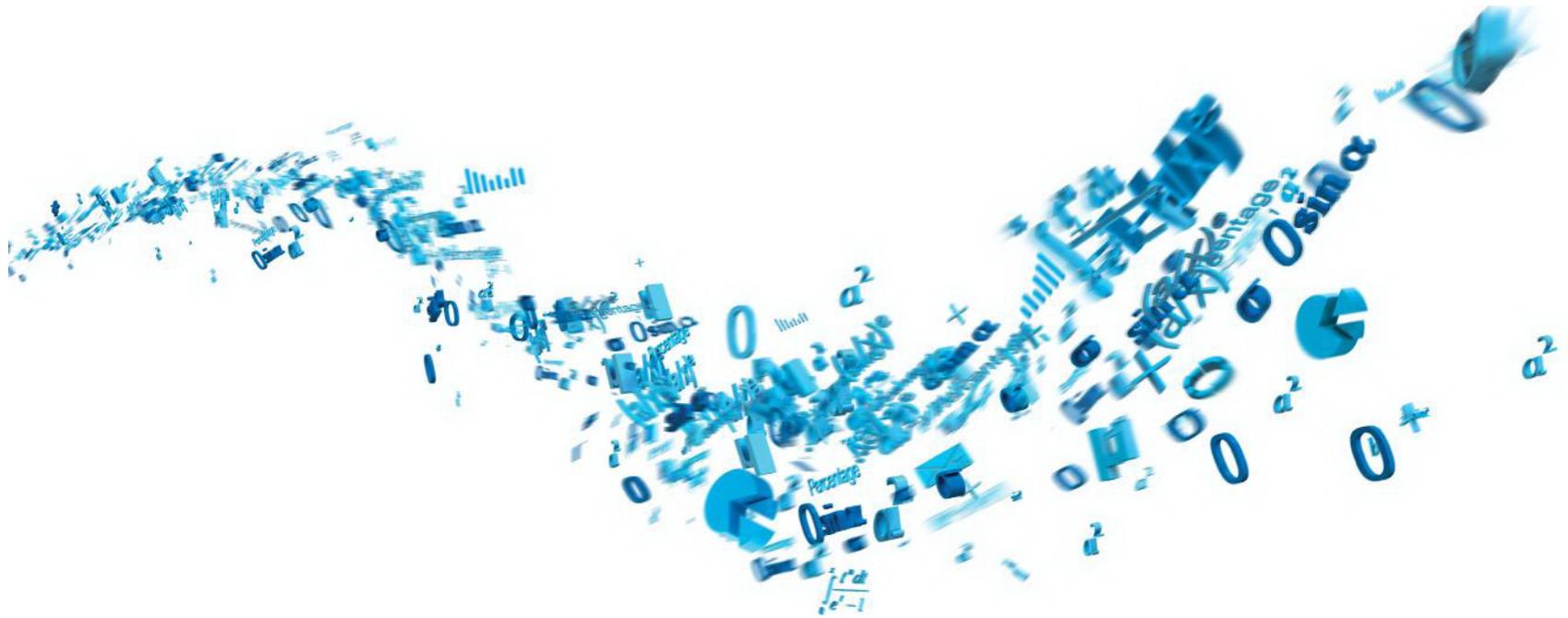
Assumptions

Assumptions for preliminary 2019 valuation calculations use assumptions as detailed July 1, 2018 Actuarial Valuation Report for funding purposes, with modifications for recommended updates to demographic assumptions from our 2019 Experience Study. Those updates are as summarized in this presentation and our October 8, 2019 presentation.

Provisions

Provisions valued are as summarized in the July 1, 2018 Actuarial Valuation Report for system funding purposes as subsequently modified by Senate Bill 426, which was enacted into law during the 2019 legislative session.

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.



Historical Review of SBA Expected Return on Pension Assets

Florida State Board of Administration
October 2019

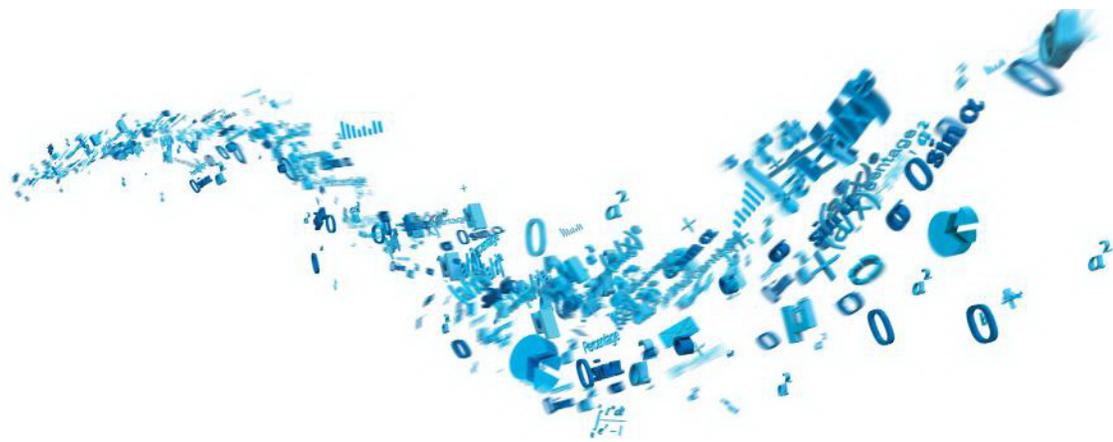
Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

To protect the confidential and proprietary information included in this material, it may not be disclosed or provided to any third parties without the approval of Aon.



Table of Contents

- Executive Summary
- SBA Approach to Assumption Development
- Peer Comparisons
- Horizon Survey of Capital Market Assumptions
- Conclusions
- Appendix



Executive Summary

Executive Summary

- **Purpose of this Presentation**

- Review SBA’s approach to capital market expectations and its implications on the 2019 asset-liability study

- **SBA Approach to Assumption Development**

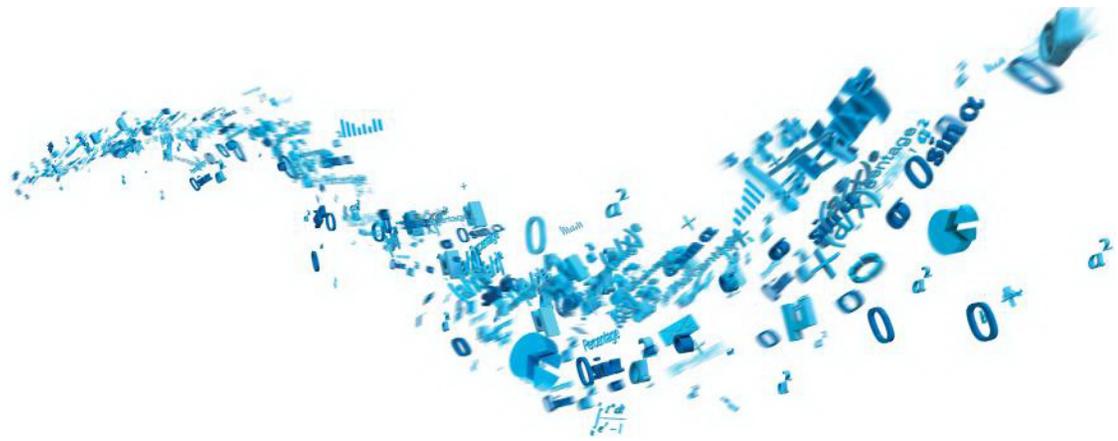
- SBA uses the equity risk premiums from four consulting firms (AHIC, Callan, Wilshire, and Mercer) to remove any biases from any one firm
 - Callan was excluded from the averaging in 2019 because its capital market assumption date did not coincide with the same timeframe as the other consultants given they only update their assumptions once a year while the other consultants update quarterly.
- Using the SBA approach, the assumed equity risk premium increased from 3.62% in 2018 to 3.88% in 2019 resulting in an expected return assumption of 6.59% for the 2019 asset-liability study
 - The equity risk premium applies to 81% of the target asset allocation (i.e., the “return-seeking assets”)

- **Peer Comparisons**

- Compared to the public pension universe, FRS’ assumed rate of return for FYE 2018 (7.40%) is above the median (7.25%) relative to its peers

- **Horizon Survey for Assumption Benchmarking**

- The Horizon Survey reflects assumptions from dozens of investment advisors each year
- AHIC assumptions tend to be similar to somewhat conservative relative to other investment advisors in the Horizon Survey



SBA Approach to Assumption Development

SBA Approach to Assumption Development

Overview

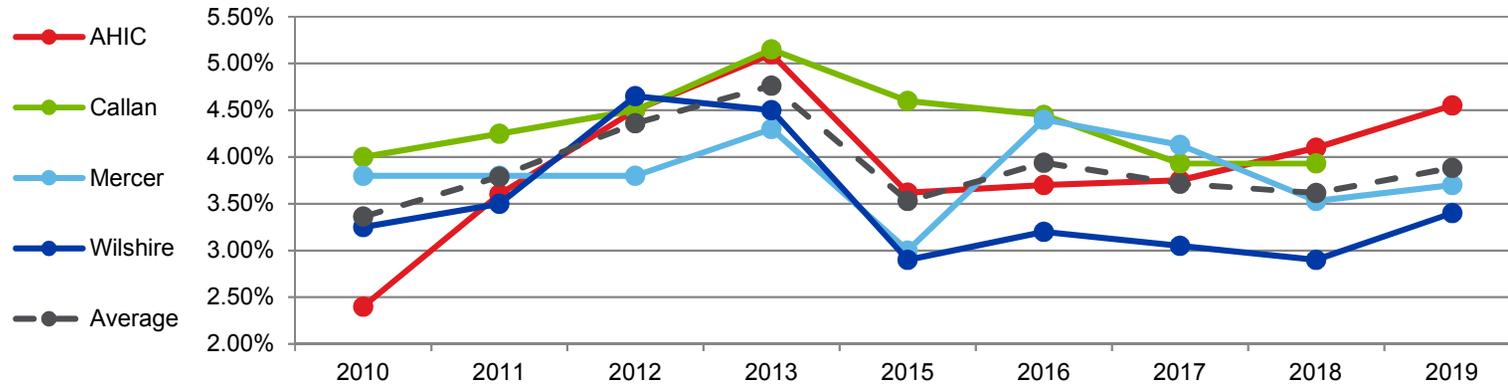
- The SBA approach averages the global equity risk premiums from four investment advisors (AHIC, Callan, Wilshire, Mercer)
 - Callan was excluded from the averaging in 2019 because its capital market assumption date did not coincide with the same timeframe as the other consultants given they only update their assumptions once a year while the other consultants update quarterly.
- Building block approach is used
 - Price inflation and fixed income returns reflect market conditions and yields
 - For all other asset classes (“risk assets”) a risk premium is added to fixed income returns
- Average risk premium is used to scale AHIC’s expected returns for the “Risk Assets”

¹Equity Risk Premium is defined as the excess return earned over bonds that compensates investors for taking on higher risk; all returns are 15-year geometric average (compounded) expected returns

SBA Approach to Assumption Development

Development of Equity Risk Premium (ERP) Assumption¹

Average Global Equity Risk Premium = Average (Global Equity Return – U.S. Bond Return)



Equity Risk Premium ²	Asset-Liability Study/Update ³									
	2010	2011	2012	2013	2015	2016	2017	2018	2019	
AHIC	2.40%	3.60%	4.50%	5.10%	3.62%	3.70%	3.75%	4.10%	4.55%	
Callan	4.00%	4.25%	4.50%	5.15%	4.60%	4.45%	3.93%	3.93%	N/A	
Wilshire	3.25%	3.50%	4.65%	4.50%	2.90%	3.20%	3.05%	2.90%	3.40%	
Mercer	3.80%	3.80%	3.80%	4.30%	3.00%	4.40%	4.13%	3.53%	3.70%	
Average	3.36%	3.79%	4.36%	4.76%	3.53%	3.94%	3.72%	3.62%	3.88%	

¹Equity Risk Premium is defined as the excess return earned over bonds that compensates investors for taking on higher risk; all returns are 15-year geometric average (compounded) expected returns

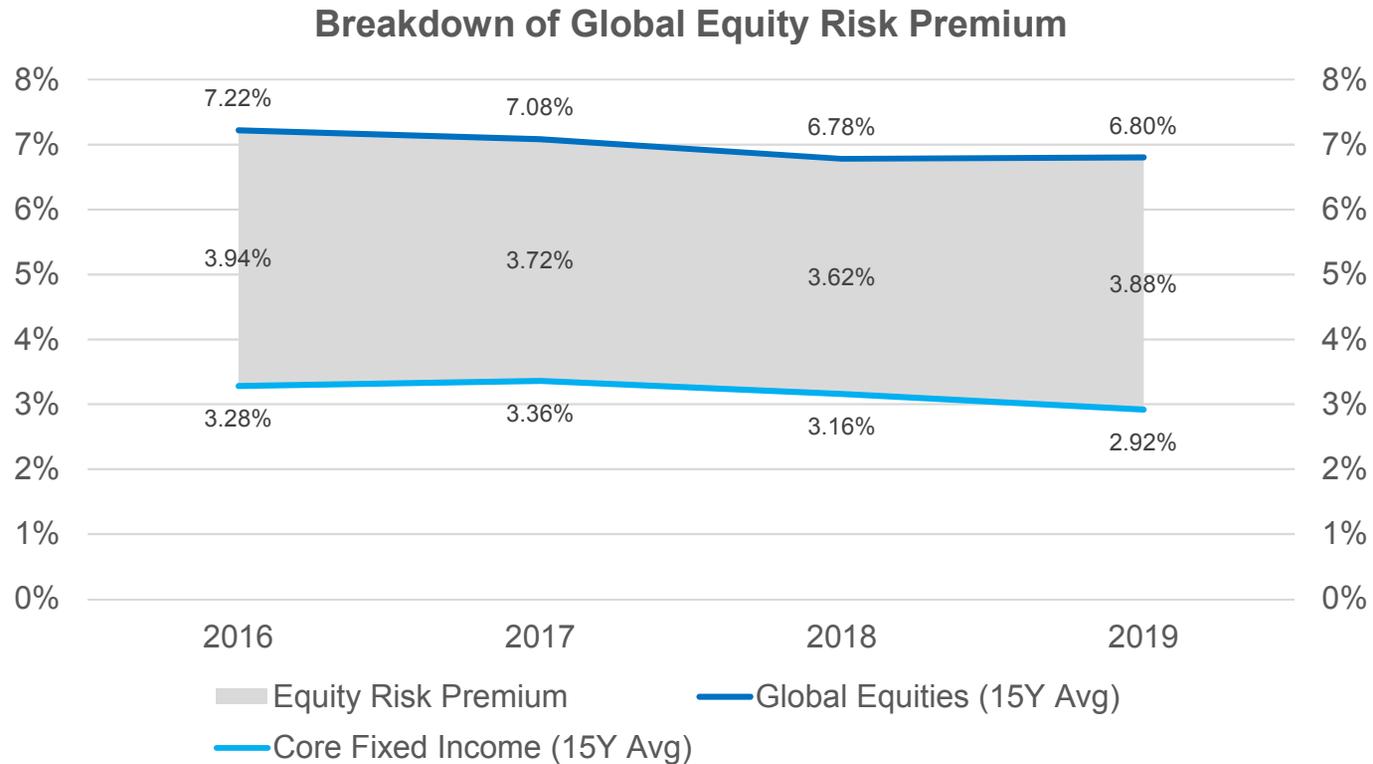
²Global equity risk premium used starting in 2016; prior years were based on U.S. equity risk premiums

³An asset-liability study was not completed in 2014

SBA Approach to Assumption Development

Breakdown of Equity Risk Premium (ERP) Assumption¹

- The increase in the 2019 equity risk premium was largely driven by lower fixed income returns
 - Below is a four year historical look at the breakdown of the global equity risk premium

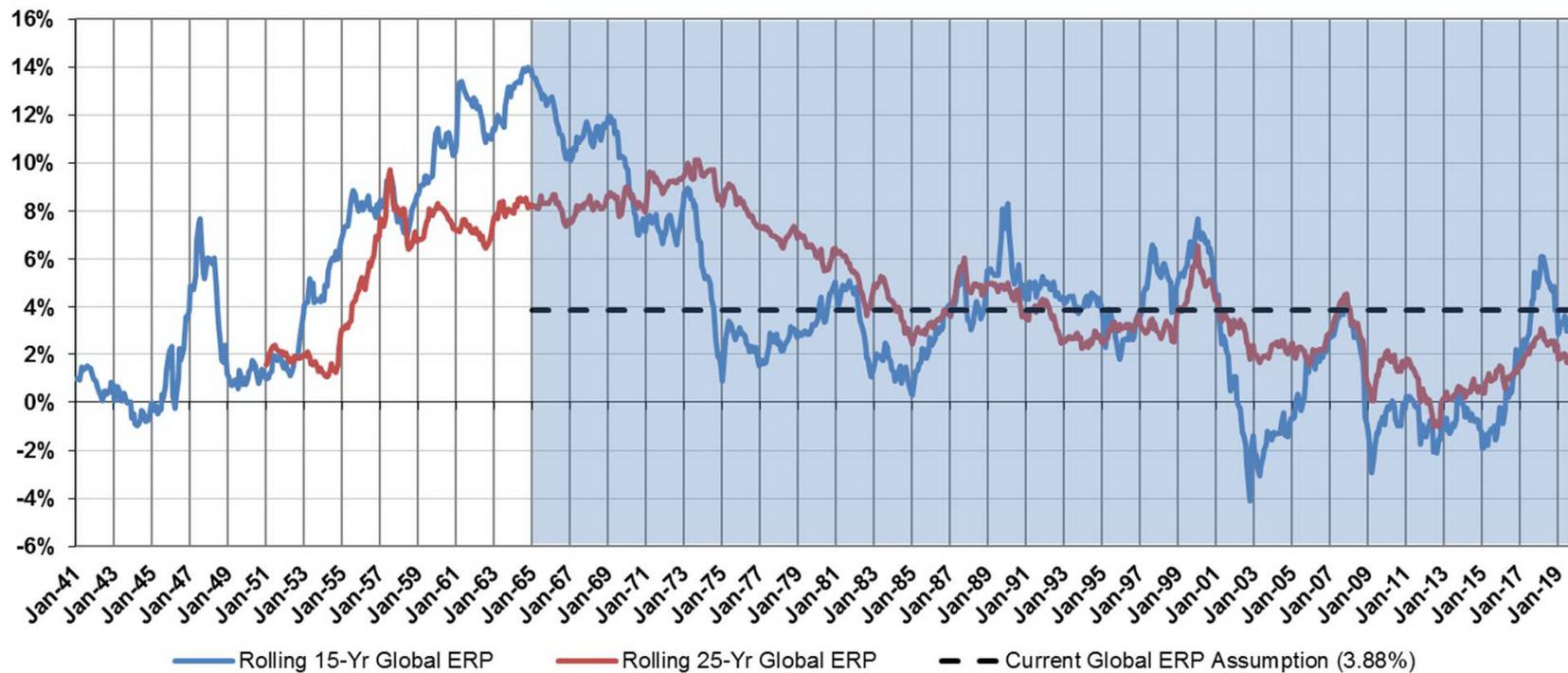


¹Equity Risk Premium is defined as the excess return earned over bonds that compensates investors for taking on higher risk; all returns are 15-year geometric average (compounded) expected returns

SBA Approach to Assumption Development

Historical and Expected Equity Risk Premium

- This graph shows the historical moving average of the global equity risk premium. The shaded section captures the experience since 1950. During this period, the average rolling 15-year global ERP has been 3.70%.

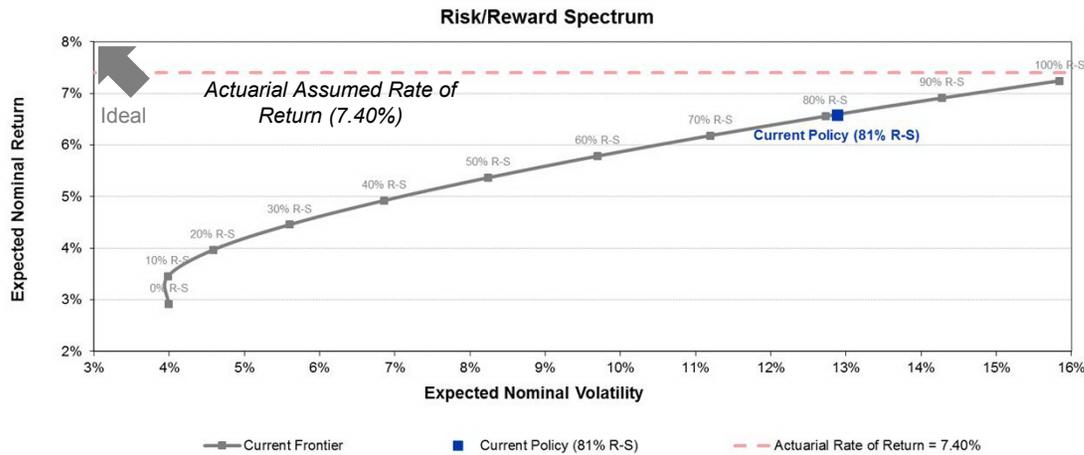


Notes:

- Global equity risk premium measured as the difference between Global Stock returns and U.S. Bonds.
- Global Stocks: January 1926 to December 1969 – 50% U.S. [CRSP 1-10 Deciles Data (cap-based)] / 50% International stock data from Global Financial Database; January 1970 to present – MSCI All-Country Index
- U.S. Bonds: January 1926 to December 1975 – Long-Term Government Bond returns from Ibbotson; January 1976 to present – Barclays Capital Aggregate Bond Index

SBA Approach to Assumption Development

Investment Analysis | Current Frontier (From 2019 A-L Study)



Key Takeaways:

- The current portfolio is well-diversified
 - Return-seeking assets are broadly diversified
 - Safety asset allocation should withstand stressed markets

				Return-Seeking Assets				Risk-Reducing / Safety Assets		
	Exp. Nominal Return ¹	Exp. Nominal Volatility	Sharpe Ratio	Global Equity	Private Equity	Strategic Allocation ²	Real Estate ³	Cash & Short Duration Bonds	Interm. Duration Gov't Bonds	Interm. Duration Credit
Current Policy (81% R-S)	6.59%	12.88%	0.333	53%	6%	12%	10%	1%	9%	9%
Current Frontier										
0% Return-Seeking	2.91%	3.99%	0.154	0%	0%	0%	0%	0%	50%	50%
10% Return-Seeking	3.45%	3.98%	0.290	7%	1%	1%	1%	0%	45%	45%
20% Return-Seeking	3.97%	4.58%	0.364	13%	1%	3%	2%	0%	40%	40%
30% Return-Seeking	4.46%	5.60%	0.385	20%	2%	4%	4%	0%	35%	35%
40% Return-Seeking	4.92%	6.86%	0.383	26%	3%	6%	5%	0%	30%	30%
50% Return-Seeking	5.37%	8.24%	0.372	33%	4%	7%	6%	0%	25%	25%
60% Return-Seeking	5.78%	9.70%	0.359	39%	4%	9%	7%	0%	20%	20%
70% Return-Seeking	6.18%	11.20%	0.347	46%	5%	10%	9%	0%	15%	15%
80% Return-Seeking	6.56%	12.73%	0.334	52%	6%	12%	10%	0%	10%	10%
90% Return-Seeking	6.91%	14.28%	0.323	59%	7%	13%	11%	0%	5%	5%
100% Return-Seeking	7.24%	15.84%	0.312	65%	7%	15%	12%	0%	0%	0%

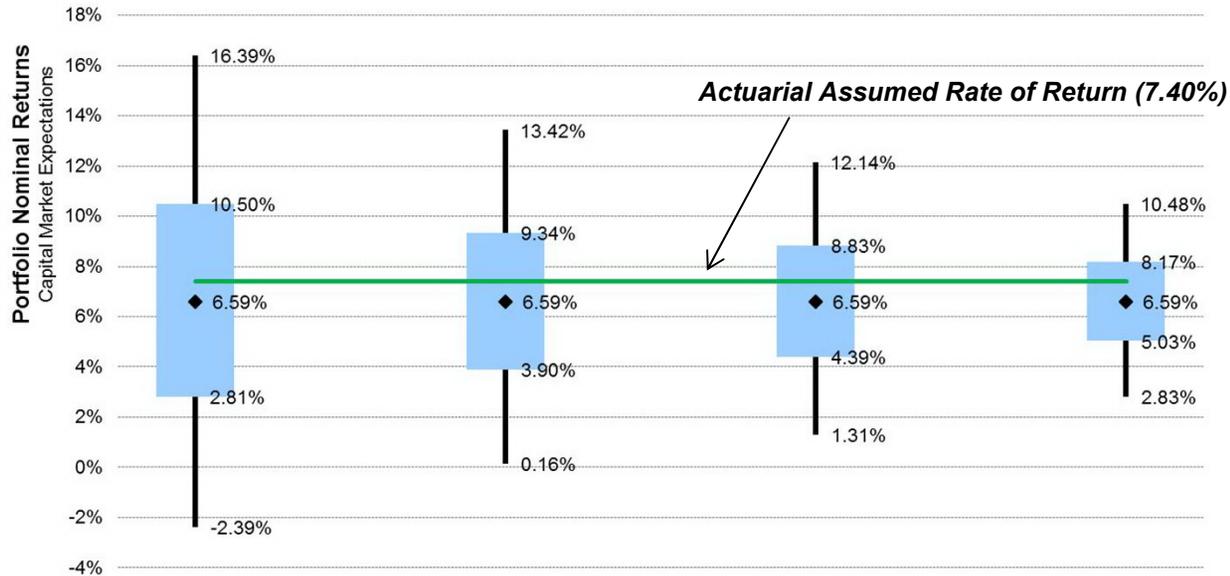
¹ Expected return assumptions are based upon the AHIC capital market assumptions adjusted for the delta in Global Equity Risk Premium (ERP) among three investment advisors: Mercer, Wilshire, and AHIC (-67bps adjustment)

² Strategic assumption breakdown is found in the Appendix

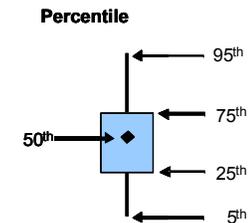
³ Real Estate assumption was modeled as 76.50% Core Real Estate / 13.50% Non-Core Real Estate / 10.00% REITs

SBA Approach to Assumption Development

Investment Analysis | Range of Nominal Returns (From 2019 A-L Study)



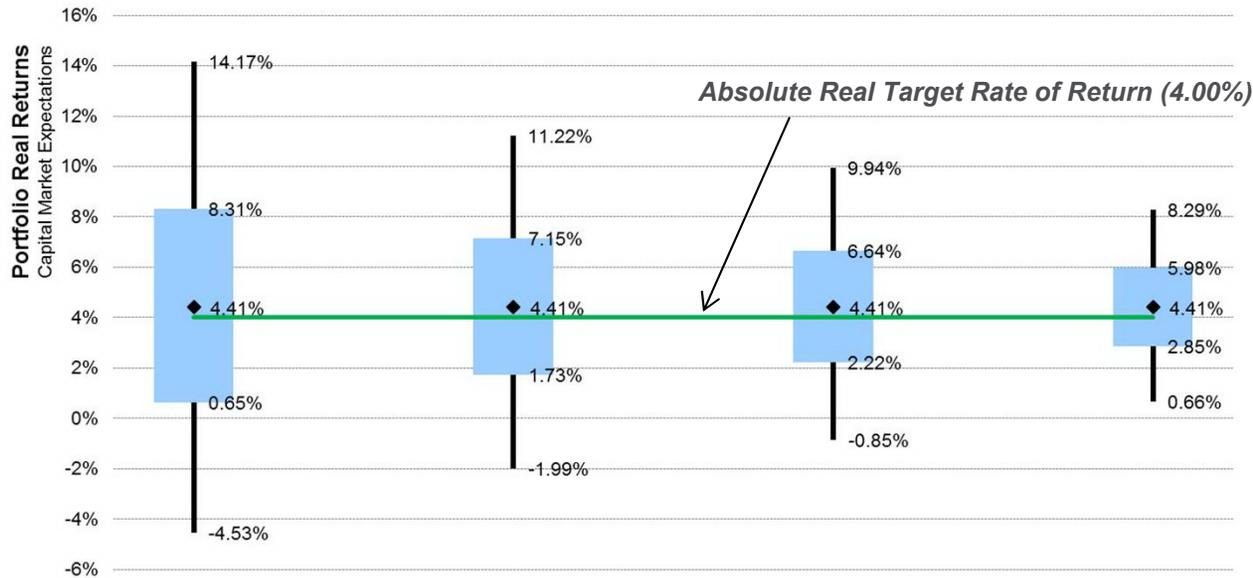
Percentile	Current Policy – 5 Year	Current Policy – 10 Year	Current Policy – 15 Year	Current Policy – 30 Year
5 th	-2.39%	0.16%	1.31%	2.83%
25 th	2.81%	3.90%	4.39%	5.03%
50 th	6.59%	6.59%	6.59%	6.59%
75 th	10.50%	9.34%	8.83%	8.17%
95 th	16.39%	13.42%	12.14%	10.48%



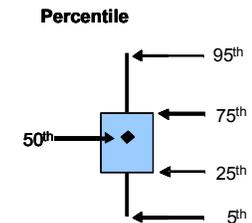
Note: Returns based on AHIC's 30 Year Capital Market Assumptions as of June 30, 2019 adjusted for the average global equity risk premium

SBA Approach to Assumption Development

Investment Analysis | Range of Real Returns (From 2019 A-L Study)



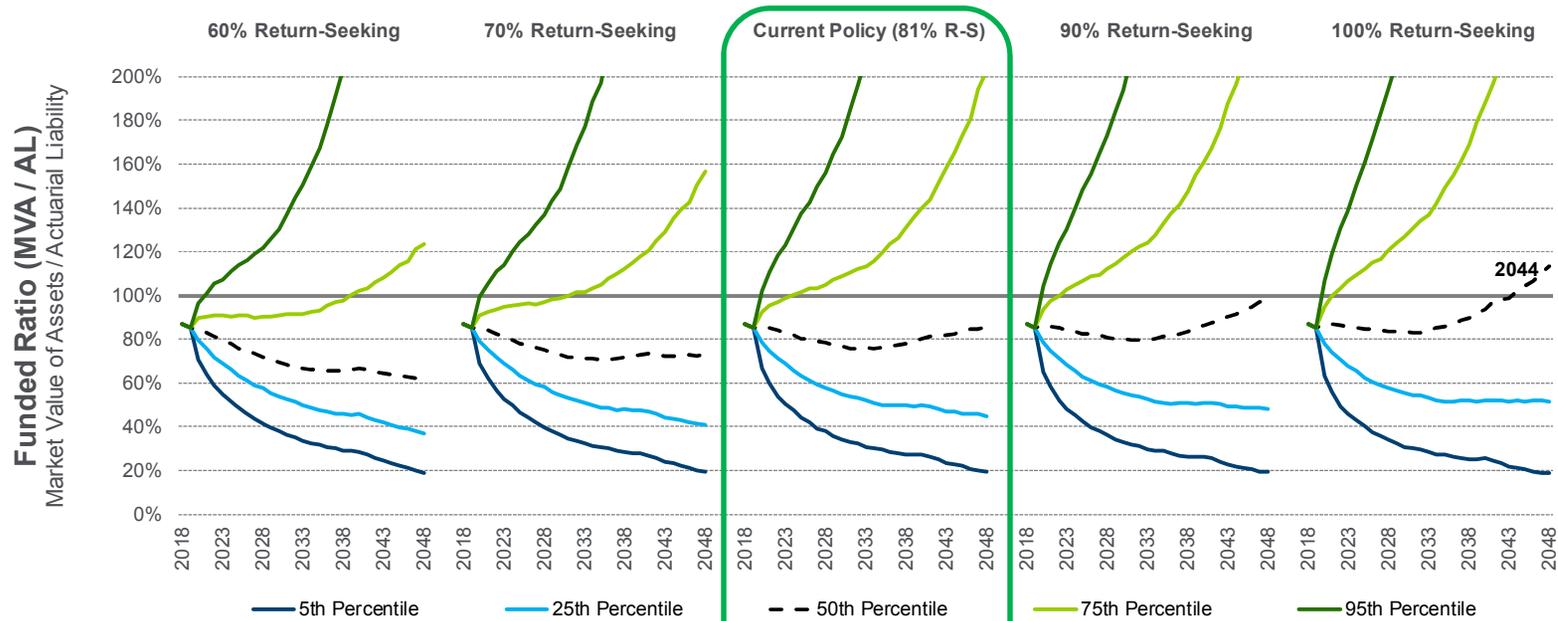
Percentile	Current Policy – 5 Year	Current Policy – 10 Year	Current Policy – 15 Year	Current Policy – 30 Year
5 th	-4.53%	-1.99%	-0.85%	0.66%
25 th	0.65%	1.73%	2.22%	2.85%
50 th	4.41%	4.41%	4.41%	4.41%
75 th	8.31%	7.15%	6.64%	5.98%
95 th	14.17%	11.22%	9.94%	8.29%



Note: Returns based on AHIC's 30 Year Capital Market Assumptions as of June 30, 2019 adjusted for the average global equity risk premium

2019 Asset-Liability Projection Results (Stochastic Results)

Market Value of Assets / Actuarial Liability Funded Ratio

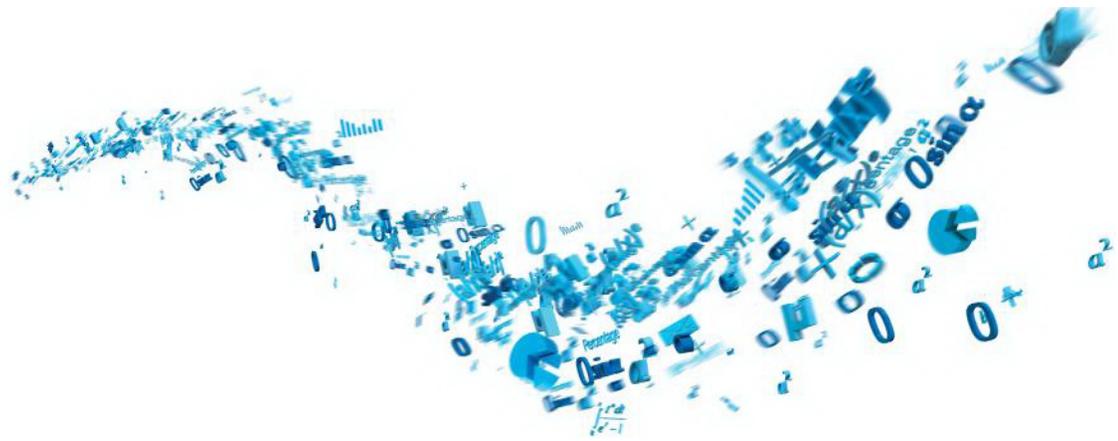


Strategy	60% Return-Seeking			70% Return-Seeking			Current Policy (81% R-S)			90% Return-Seeking			100% Return-Seeking		
Year	2028	2038	2048	2028	2038	2048	2028	2038	2048	2028	2038	2048	2028	2038	2048
5th Percentile	42%	29%	19%	40%	28%	19%	38%	27%	19%	36%	26%	19%	34%	25%	19%
25th Percentile	58%	46%	37%	58%	48%	41%	58%	50%	45%	58%	51%	48%	58%	52%	51%
50th Percentile	72%	66%	62%	75%	71%	73%	78%	78%	86%	81%	83%	98%	84%	89%	113%
75th Percentile	90%	98%	123%	97%	112%	157%	105%	131%	>200%	112%	148%	>200%	121%	169%	>200%
95th Percentile	122%	>200%	>200%	137%	>200%	>200%	156%	>200%	>200%	173%	>200%	>200%	194%	>200%	>200%
Probability > 100%	19%	25%	34%	24%	32%	42%	30%	39%	47%	35%	44%	50%	39%	47%	55%

Key Takeaways:

- Under the Current Policy (81% R-S), the funded ratio is expected to decline in the near-term before increasing later in the period in the central expectation (50th percentile outcome)
- Higher return-seeking allocations will increase the trajectory of funded ratio, albeit with greater downside risk

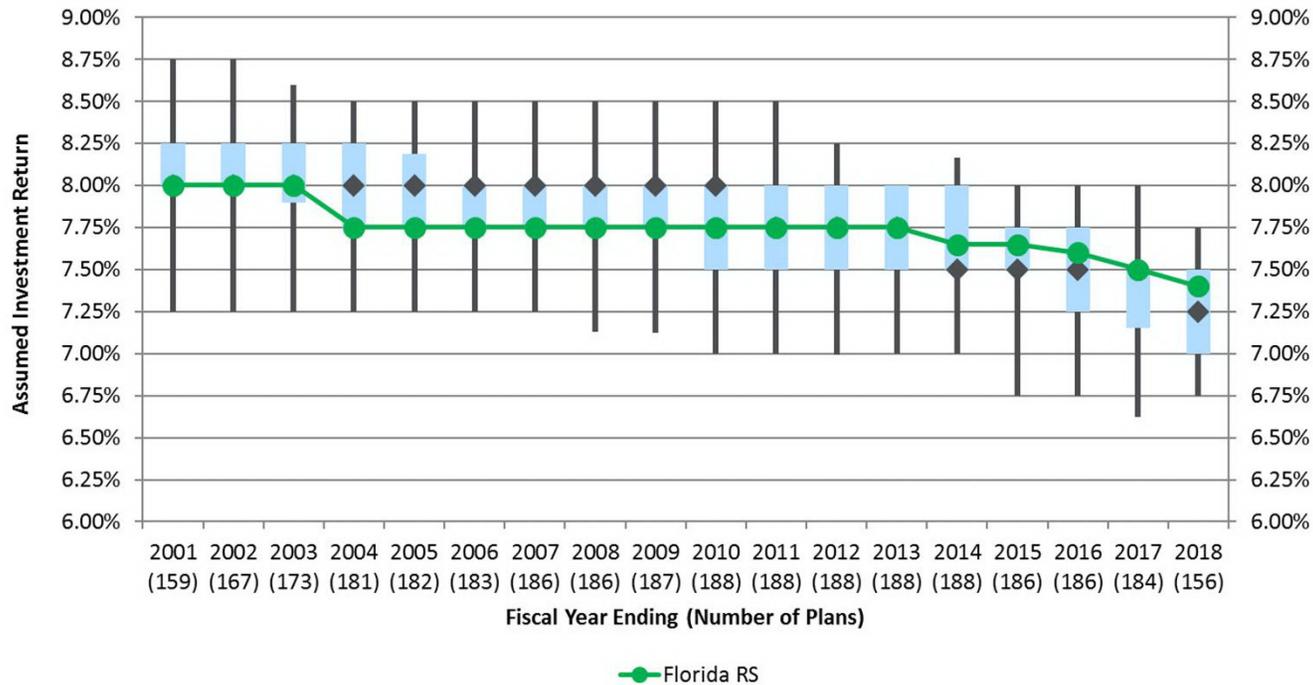
* Liability projections assume discount rates of 7.40% for all investment policies studied



Peer Comparisons

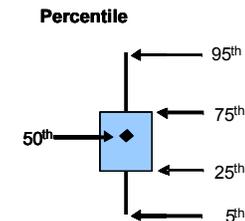
Florida Retirement System (FRS) Expected Return Assumption versus Peers¹

Distribution of U.S. Public Pension Investment Return Assumptions

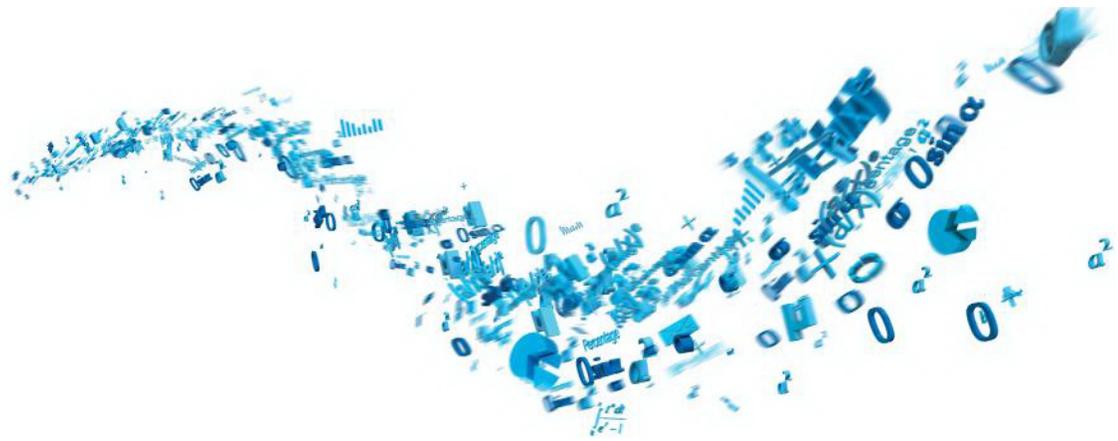


Key Takeaways:

- Median actuarial assumption for investment return has declined from 8.00% in 2001-2010 to 7.25% based on the latest survey data
- FRS' assumption for FYE 2018 (7.40%) fell between the 50th-75th percentiles relative to its peers
- If FRS exceeds (or falls short of) the actuarial return assumption, lower (or higher) funding will be needed in future years



Sources: Public Plans Data (publicplansdata.org) as of August 2019; Expected Returns are the assumptions made by the plans included in the data set.
¹ Peers defined as public funds published within publicplansdata.org as of August 2019; Number of plans per year are shown in parentheses



Horizon Survey of Capital Market Assumptions

2019 Horizon Survey Results

- **What is the Horizon Survey?**

- Since 2010, Horizon Actuarial Services, LLC has conducted a capital market assumption survey of investment firms to aid in determining reasonable assumptions for a pension plan's expected return on assets
 - While Aon does not seek to change our approach based on how we stack up to peers, it is a helpful double-check to make sure we are not too far off from others in the industry

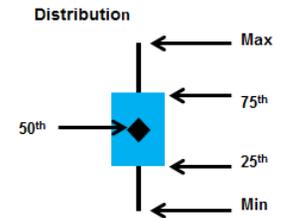
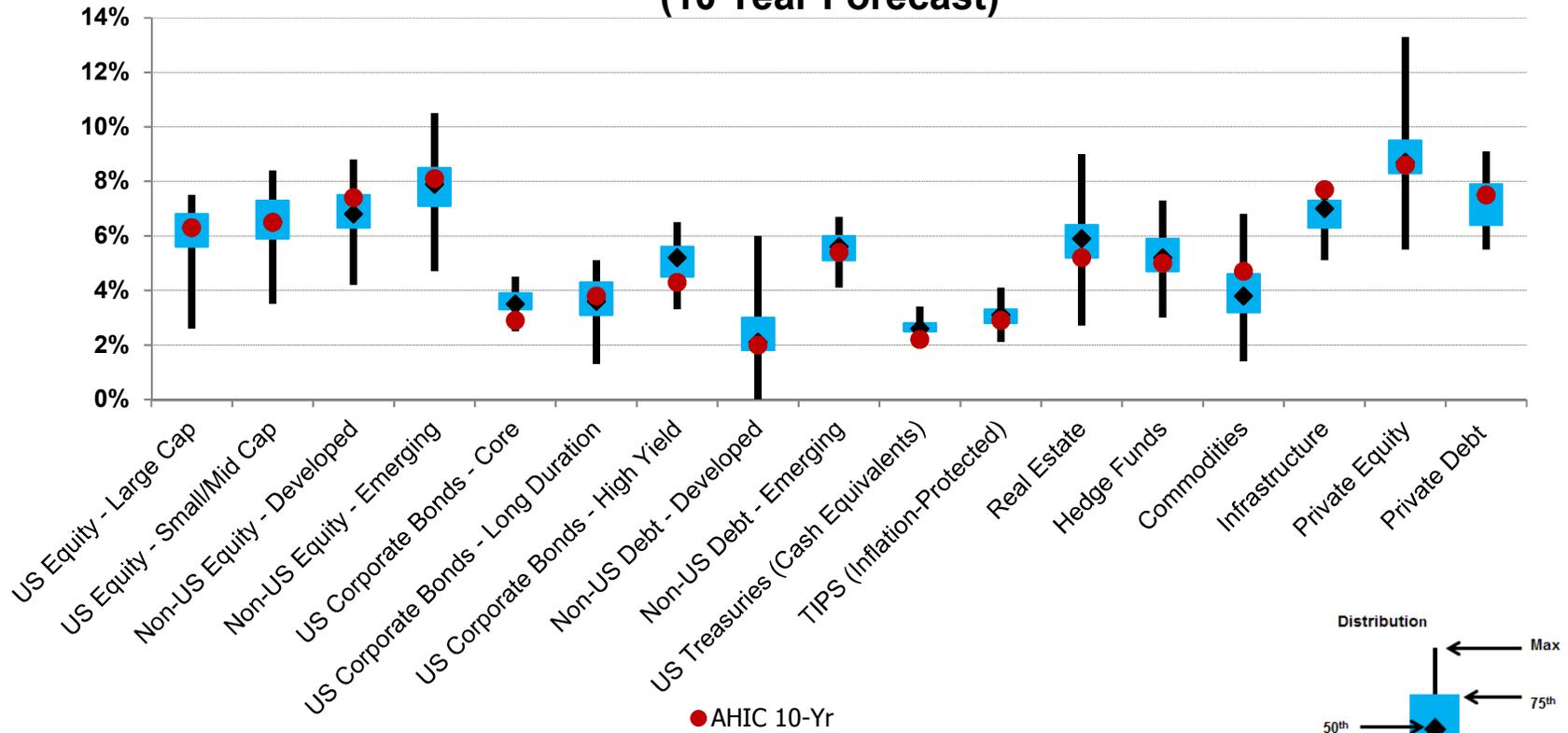
- **How does Aon compare to the 2019 survey results?**

- 2019 AHIC 10-year forecast assumptions of non-US equities tend to be **higher** compared to the survey median level, fixed income assets are generally **lower** and alternative assets are **mixed** relative to the survey's median level

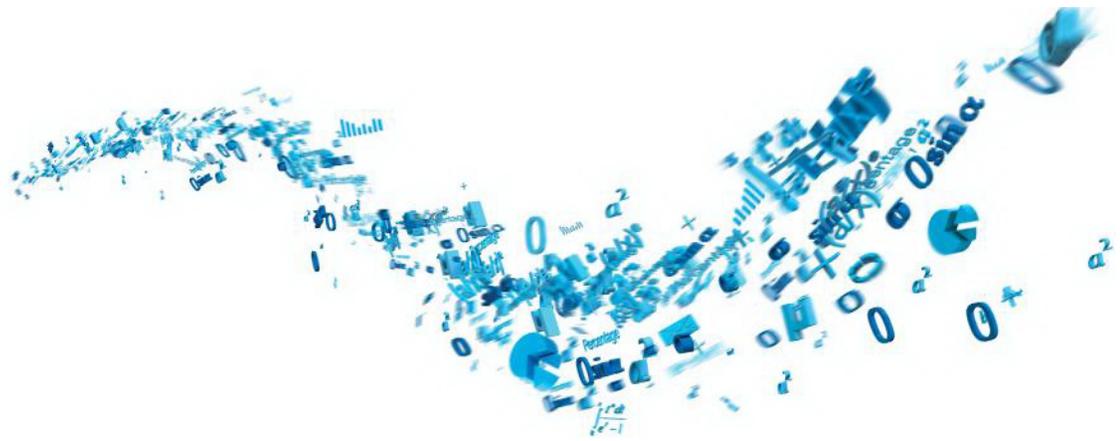
2019 Horizon Survey Results

Distribution of Expected Returns from 34 Consultants

Expected Geometric Returns of 34 Investment Advisors (10 Year Forecast)



SOURCE: Horizon Actuarial survey of 2019 capital market assumptions from 34 independent investment advisors
 Expected returns of the survey are annualized over 10-years (geometric).
 AHIC expected returns are annualized over 10-years as of 2Q 2019



Conclusions

Conclusions

- **SBA Approach to Assumption Development**
 - Using the SBA approach, averaging the equity risk premiums from three consulting firms, the expected return on pension assets from the 2019 asset-liability study was 6.59%

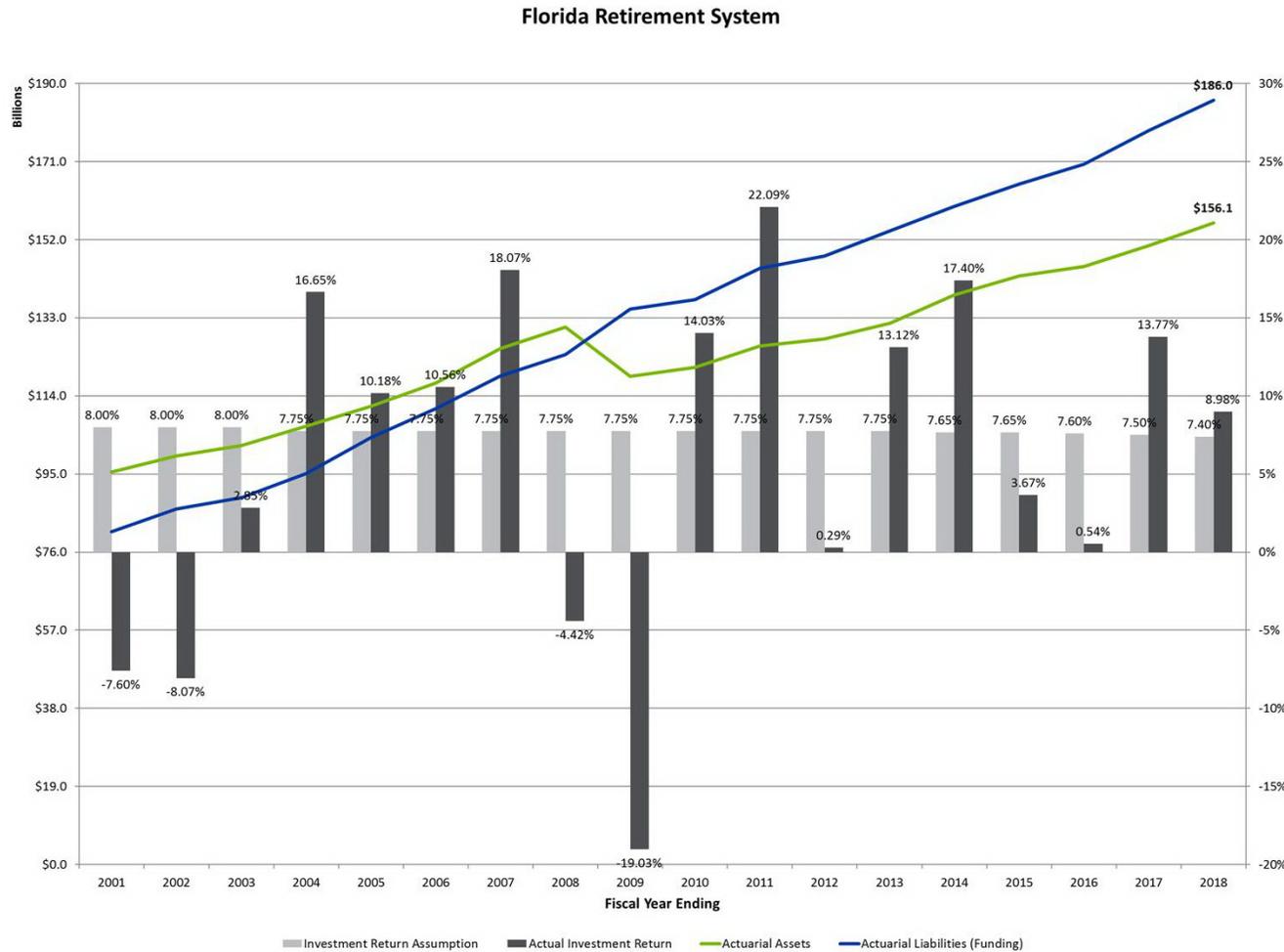
- **Peer Comparisons**
 - FRS' assumption for FYE 2018 (7.40%) is above the median (7.25%) relative to its peers

- **Horizon Survey for Assumption Benchmarking**
 - AHIC assumptions tend to be similar to somewhat conservative relative to other investment advisors in the Horizon Survey



Appendix

Florida Retirement System (FRS) Historical Information



Key Takeaways:

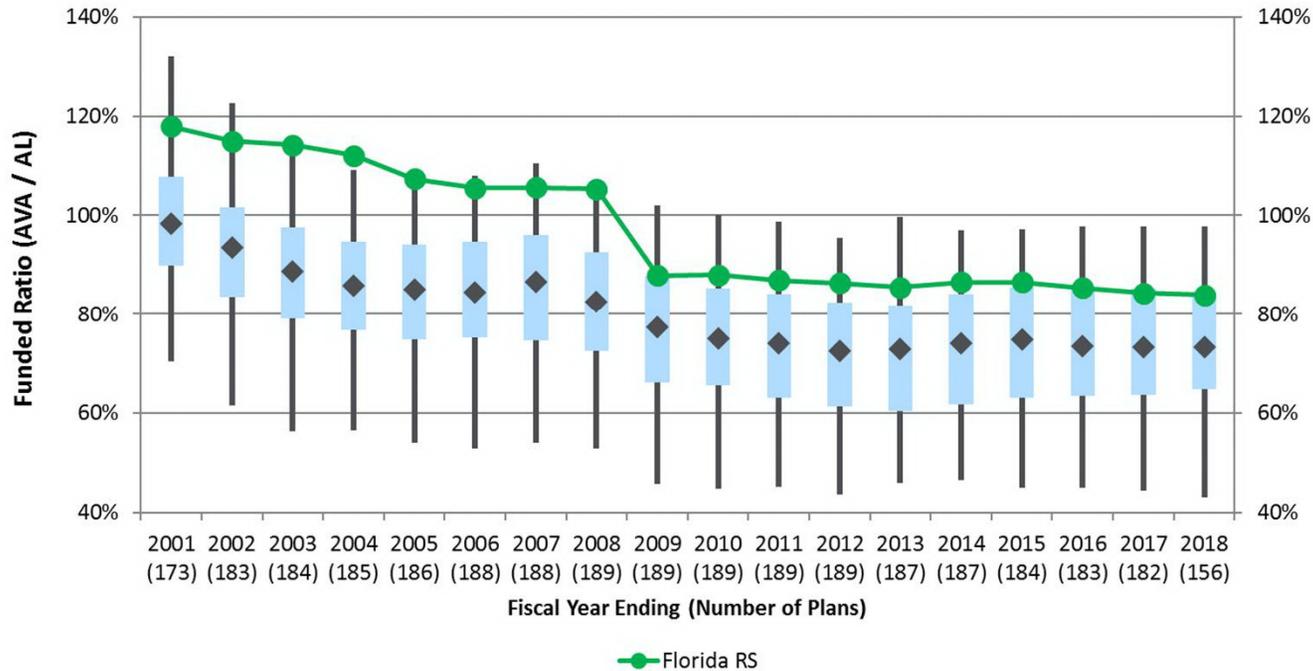
- **Blue line** represents the actuarial liabilities over time
 - Adding to the increase in liability has been the decrease in the assumed investment return in recent years (light gray bar)
- **Green line** represents the actuarial value of plan assets over time
 - Assets reflect smoothing parameters to the actual return on assets (dark gray bar)

Sources: Public Plans Data (publicplansdata.org) as of August 2019

Proprietary & Confidential
Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

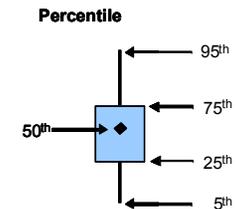
Florida Retirement System (FRS) Funded Ratio (Based on Actuarial Value of Assets) versus Peers¹

Distribution of U.S. Public Pension Funded Ratios



Key Takeaways:

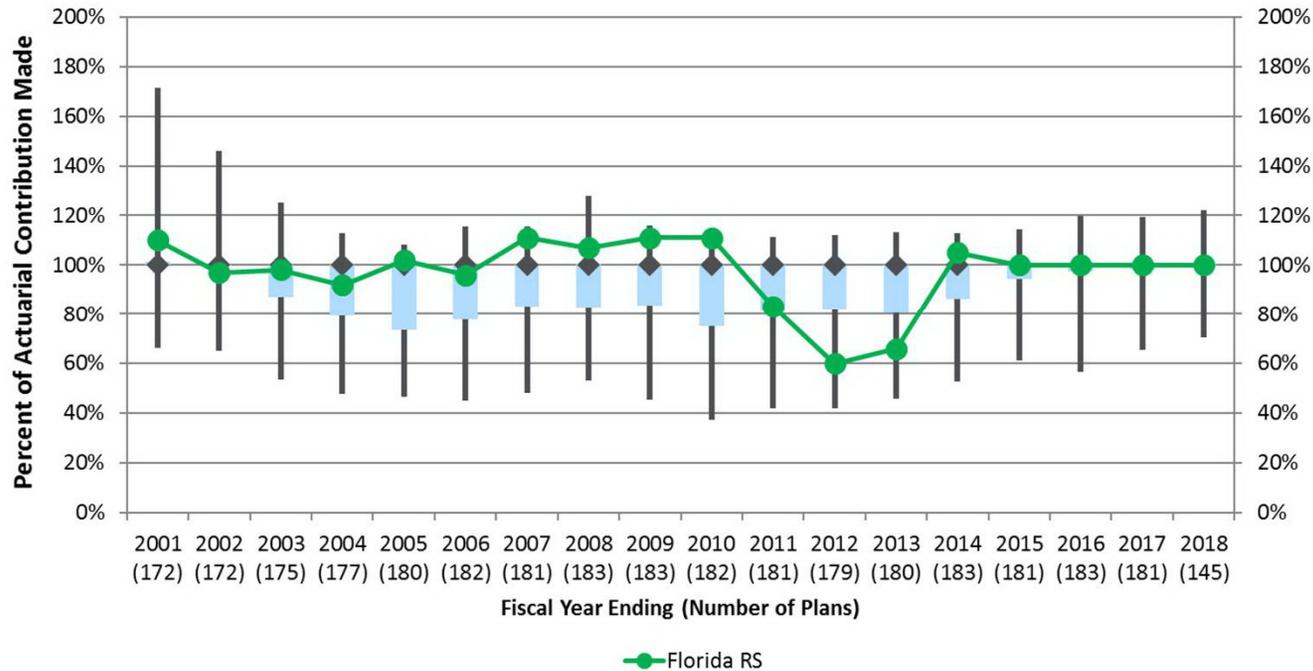
- The median funded ratio as of FYE 2018 was 73% based on the latest survey data
- FRS' FYE 2018 funded ratio (84%) fell at the 75th percentile relative to its peers



Source: Public Plans Data (publicplansdata.org) as of August 2019;
¹ Peers defined as public funds published within publicplansdata.org as of August 2019; Number of plans per year are shown in parentheses

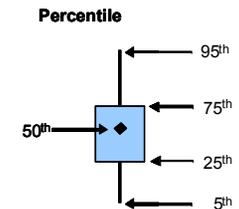
Florida Retirement System (FRS) Percentage of Actuarial Contribution Made versus Peers¹

Distribution of U.S. Public Pension % of Actuarial Contribution



Key Takeaways:

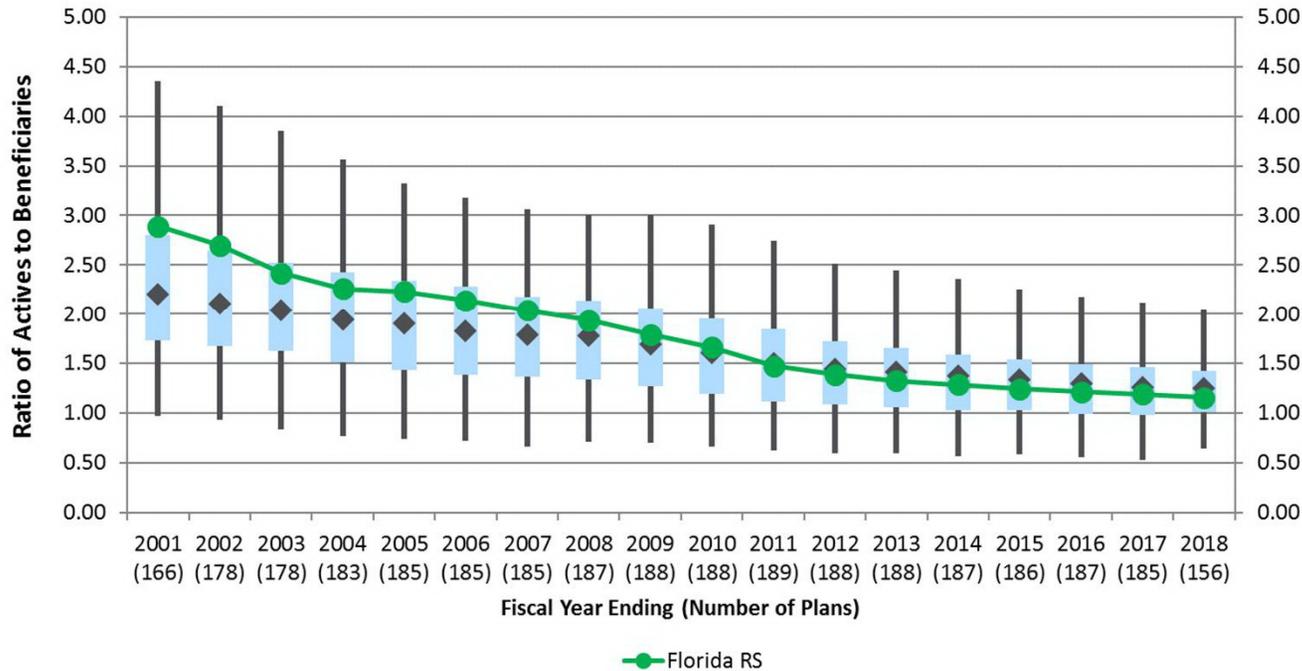
- Median contributions of plans within the data, as a percentage of the actuarial amount, have been approximately 100% since FYE 2001
- FRS has made at least the full actuarial contribution in the last 5 years



Source: Public Plans Data (publicplansdata.org) as of August 2019;
¹ Peers defined as public funds published within publicplansdata.org as of August 2019; Number of plans per year are shown in parentheses

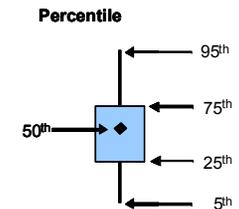
Florida Retirement System (FRS) Demographic Data versus Peers¹

Distribution of Actives to Beneficiaries Amongst U.S. Public Pension Plans



Key Takeaways:

- The median ratio of actives to beneficiaries has declined from 2.2 at FYE 2001 to 1.2 at FYE 2018.
- Over that same time frame, FRS' active to beneficiary ratio has declined from 2.9 to 1.2



Source: Public Plans Data (publicplansdata.org) as of August 2019;

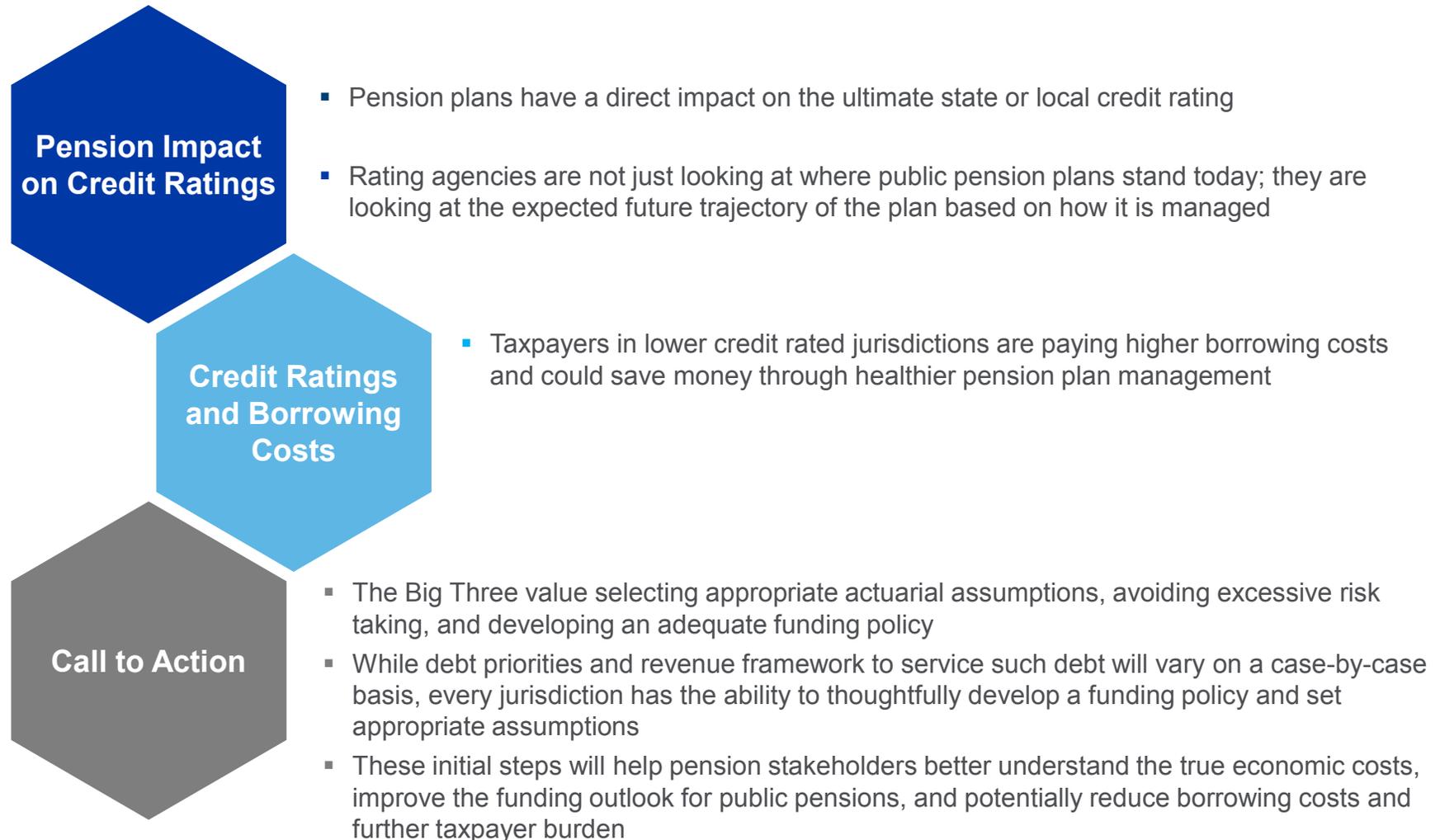
¹ Peers defined as public funds published within publicplansdata.org as of August 2019; Number of plans per year are shown in parentheses

Proprietary & Confidential

Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

How Do Public Pensions Impact Credit Ratings?

Summary and Conclusions



How Do Public Pensions Impact Credit Ratings?

Call to Action: Plan Sponsors Have Ability to Impact Credit Rating

Below are three specific actions plan sponsors can take today to directly improve the impact a pension plan will have on the credit rating of its locality:

	Action	Considerations
	<p>1. Conduct an actuarial assumption audit</p> <ul style="list-style-type: none"> Review reasonability of key assumptions: <ul style="list-style-type: none"> Salary scale, Mortality, Retirement rates, Turnover rates 	<ul style="list-style-type: none"> Assumptions set to plan-specific expectations will lead to lower contribution volatility Aggressive assumptions may provide short-term relief but may have long-term consequences
	<p>2. Consider adjustments to expected return assumption</p> <ul style="list-style-type: none"> Adjustments should be in line with forward-looking expectations for asset returns 	<ul style="list-style-type: none"> Contributing an actuarial amount? <ul style="list-style-type: none"> Yes: Failing to achieve target returns will necessitate increases in future contributions and make what was intended to be a smooth, budget-friendly progression of contribution increases far more volatile No: The funding gap will widen and become highly volatile as contribution policy will not add enough dollars to replenish losses
	<p>3. Review the plan's funding policy</p> <ul style="list-style-type: none"> Look far enough into the future to identify potential pain points 	<ul style="list-style-type: none"> Conduct "tread water"/hurdle rate analysis to ensure short-term contributions are sufficient to keep pace with growth of plan liabilities Consider asset-liability study to understand range of potential future outcomes rather than a single deterministic scenario

AHIC Capital Market Assumptions

Background

- Long-term (10 and 30 year forecasts) forward-looking assumptions (asset class geometric return, volatility, and correlations)
- Building Block approach, primarily based on consensus expectations and market based inputs
- Best estimates of annualized returns (50/50 better or worse)
- Market returns: no active management value added (except for certain assets classes, such as hedge funds)
- Net of investment fees
- Updated quarterly
- We show AHIC's long-term (i.e., 30-year) capital market assumptions throughout this material

Custom FRS Capital Market Assumptions—Q3 2019¹

	Expected Real Return ¹	Expected Nominal Return ¹	Expected Nominal Volatility
Equity			
1 Global Equity IMI	4.7%	6.9%	19.0%
Fixed Income			
2 Cash (Gov't)	0.2%	2.3%	2.0%
3 Intermediate Gov't Bonds (4-Year Duration)	0.3%	2.4%	3.5%
4 Intermediate Corporate Bonds (4-Year Duration)	1.3%	3.4%	5.0%
Alternatives			
5 Strategic Allocation (Custom) ²	5.5%	7.7%	9.0%
6 Real Estate (Custom) ³	3.0%	5.2%	13.0%
7 Private Equity	6.7%	8.9%	25.5%
Inflation			
8 Inflation	0.0%	2.1%	1.5%

¹ Expected return assumptions are based upon the AHIC capital market assumptions adjusted for the delta in Global Equity Risk Premium (ERP) among three investment advisors: Mercer, Wilshire, and AHIC (-67bps adjustment)

² Strategic assumption breakdown is found on the next page

³ Real Estate assumption was modeled as follows:

- 76.50% Core Real Estate
- 13.50% Non-Core Real Estate
- 10.00% REITs

FRS Capital Market Assumptions—Q3 2019

Strategic Investment Allocation

- The Strategic Investment allocation was modeled as follows (consistent with the 2019 asset-liability study):

Capital Market Assumption	% of Total Asset Allocation	% of Strategic Investment
Commodities	0.36%	3.00%
Global Public Equities	1.20%	10.00%
Hedge Funds -- Buy List (Diversified Portfolio of Direct HFs)	1.68%	14.00%
Hedge Funds -- CTAs (Buy List)	0.96%	8.00%
Hedge Funds -- Distressed Debt (Buy List)	0.36%	3.00%
Hedge Funds -- Equity Long/Short (Buy List)	0.48%	4.00%
Hedge Funds -- Event Driven (Buy List)	0.12%	1.00%
Hedge Funds -- Global Macro (Buy List)	0.84%	7.00%
Infrastructure	0.96%	8.00%
Insurance-Linked Securities (Catastrophe Bonds)	0.24%	2.00%
Non-Core Real Estate	0.42%	3.50%
Private Debt -- Commercial Mortgages	0.42%	3.50%
Private Debt -- Direct Lending	0.72%	6.00%
Private Equity	0.84%	7.00%
Private Equity -- Distressed Debt	1.32%	11.00%
Private Equity -- Mezzanine	0.60%	5.00%
Timberland	0.48%	4.00%
Total	12.00%	100.00%

AHIC Capital Market Assumptions—Q3 2019

Nominal Correlations		1	2	3	4	5	6	7	8
1	Global Equity IMI	1.00	0.07	-0.07	0.08	0.88	0.49	0.67	0.06
2	Cash (Gov't)	0.07	1.00	0.61	0.47	0.14	0.15	0.09	0.53
3	Intermediate Gov't Bonds (4-Year Duration)	-0.07	0.61	1.00	0.76	-0.04	0.03	-0.04	0.27
4	Intermediate Corporate Bonds (4-Year Duration)	0.08	0.47	0.76	1.00	0.23	0.09	0.07	0.20
5	Strategic Allocation (Custom)	0.88	0.14	-0.04	0.23	1.00	0.52	0.72	0.13
6	Real Estate (Custom)	0.49	0.15	0.03	0.09	0.52	1.00	0.39	0.09
7	Private Equity	0.67	0.09	-0.04	0.07	0.72	0.39	1.00	0.05
8	Inflation	0.06	0.53	0.27	0.20	0.13	0.09	0.05	1.00

2019 Horizon Survey

AHIC Versus Peers (10-Year)

Asset Class	Horizon Survey		AHIC		Difference (AHIC - Horizon)
	10 Year Horizon		10 Year Forecasts		
	Expected Return	Expected Risk	Expected Return	Expected Risk	
US Equity - Large Cap	6.3%	16.2%	6.3%	17.0%	0.0%
US Equity - Small/Mid Cap	6.5%	20.2%	6.5%	23.0%	0.0%
Non-US Equity - Developed	6.8%	18.2%	7.4%	20.0%	0.6%
Non-US Equity - Emerging	7.9%	24.7%	8.1%	27.0%	0.2%
US Fixed Income - Core	3.5%	5.5%	2.9%	4.0%	-0.6%
US Fixed Income - Long Duration Corp	3.6%	10.5%	3.8%	11.0%	0.2%
US Fixed Income - High Yield	5.2%	10.1%	4.3%	12.0%	-0.9%
Non-US Fixed Income - Developed	2.1%	7.6%	2.0%	5.5%	-0.1%
Non-US Fixed Income - Emerging	5.6%	11.3%	5.4%	14.0%	-0.2%
Treasuries (Cash Equivalents)	2.6%	2.3%	2.2%	1.0%	-0.4%
TIPS (Inflation-Protected)	3.1%	6.1%	2.9%	4.5%	-0.2%
Real Estate	5.9%	15.0%	5.2%	11.5%	-0.7%
Hedge Funds	5.2%	8.4%	5.0%	9.0%	-0.2%
Commodities	3.8%	17.7%	4.7%	17.0%	0.9%
Infrastructure	7.0%	14.4%	7.7%	14.5%	0.7%
Private Equity	8.7%	22.1%	8.6%	24.0%	-0.1%
Private Debt	7.5%	11.6%	7.5%	16.5%	0.0%
Inflation	2.2%	1.7%	2.2%	1.0%	0.0%

Notes (Horizon Survey):

Source: Horizon Actuarial survey of 2019 capital market assumptions from 34 independent investment advisors
Expected returns are median annualized (geometric).

Notes (AHIC Forecasts):

AHIC Forecasts are for Q2 2019

US Equity - Small/Mid Cap forecasts represents AHIC forecasts for US Small Cap

US Fixed Income - Long Duration forecasts represents AHIC forecasts for Long Duration Credit

Non-US Fixed Income - Developed forecasts represents AHIC forecasts for Non-US Fixed Income - Developed (50% Hedged)

Non-US Fixed Income- Emerging forecasts represents AHIC forecasts for Sovereign Local Currency

Real Estate forecasts represents AHIC forecasts for Core Private Real Estate

Hedge Funds forecasts represents AHIC forecasts for Hedge Fund-of-Funds (Buy List)

Leading Methodologies & Reasons for Differences

Leading Methodologies

- Building Block
- Global Capital Asset Pricing Model (Global CAPM)
- Surveys
- Historical data (as a guide to future)
- Black-Litterman (combination of building block and CAPM)

Reasons for Differences

- Methodology
- Time Horizon
- Arithmetic vs. Geometric forecasts*
- Alpha (active management)*
- Inflation
- Investment Fees
- Asset class definition

* While some firms in Horizon survey responded with Arithmetic forecasts, the results have been converted to Geometric forecasts for comparison purposes. Additionally, the return expectations included in the Horizon survey are based on indexed returns (no "alpha"). However, AHIC return assumptions for certain asset classes include "alpha" or active management premium (e.g., Hedge Funds)

Legal Disclosures and Disclaimers

Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc. (“AHIC”). The information contained herein is given as of the date hereof and does not purport to give information as of any other date. The delivery at any time shall not, under any circumstances, create any implication that there has been a change in the information set forth herein since the date hereof or any obligation to update or provide amendments hereto.

This document is not intended to provide, and shall not be relied upon for, accounting, legal or tax advice. Any accounting, legal, or taxation position described in this presentation is a general statement and shall only be used as a guide. It does not constitute accounting, legal, and tax advice and is based on AHIC’s understanding of current laws and interpretation.

AHIC disclaims any legal liability to any person or organization for loss or damage caused by or resulting from any reliance placed on that content. AHIC reserves all rights to the content of this document. No part of this document may be reproduced, stored, or transmitted by any means without the express written consent of AHIC.

Aon Hewitt Investment Consulting, Inc. is a federally registered investment advisor with the U.S. Securities and Exchange Commission. AHIC is also registered with the Commodity Futures Trading Commission as a commodity pool operator and a commodity trading advisor, and is a member of the National Futures Association. The AHIC ADV Form Part 2A disclosure statement is available upon written request to:

Aon Hewitt Investment Consulting, Inc.
200 E. Randolph Street
Suite 700
Chicago, IL 60601
ATTN: AHIC Compliance Officer

© Aon plc 2019. All rights reserved.

State Board of Administration

FRS Pension Plan Performance Review

Actuarial Assumptions Estimating Conference

October 23, 2019

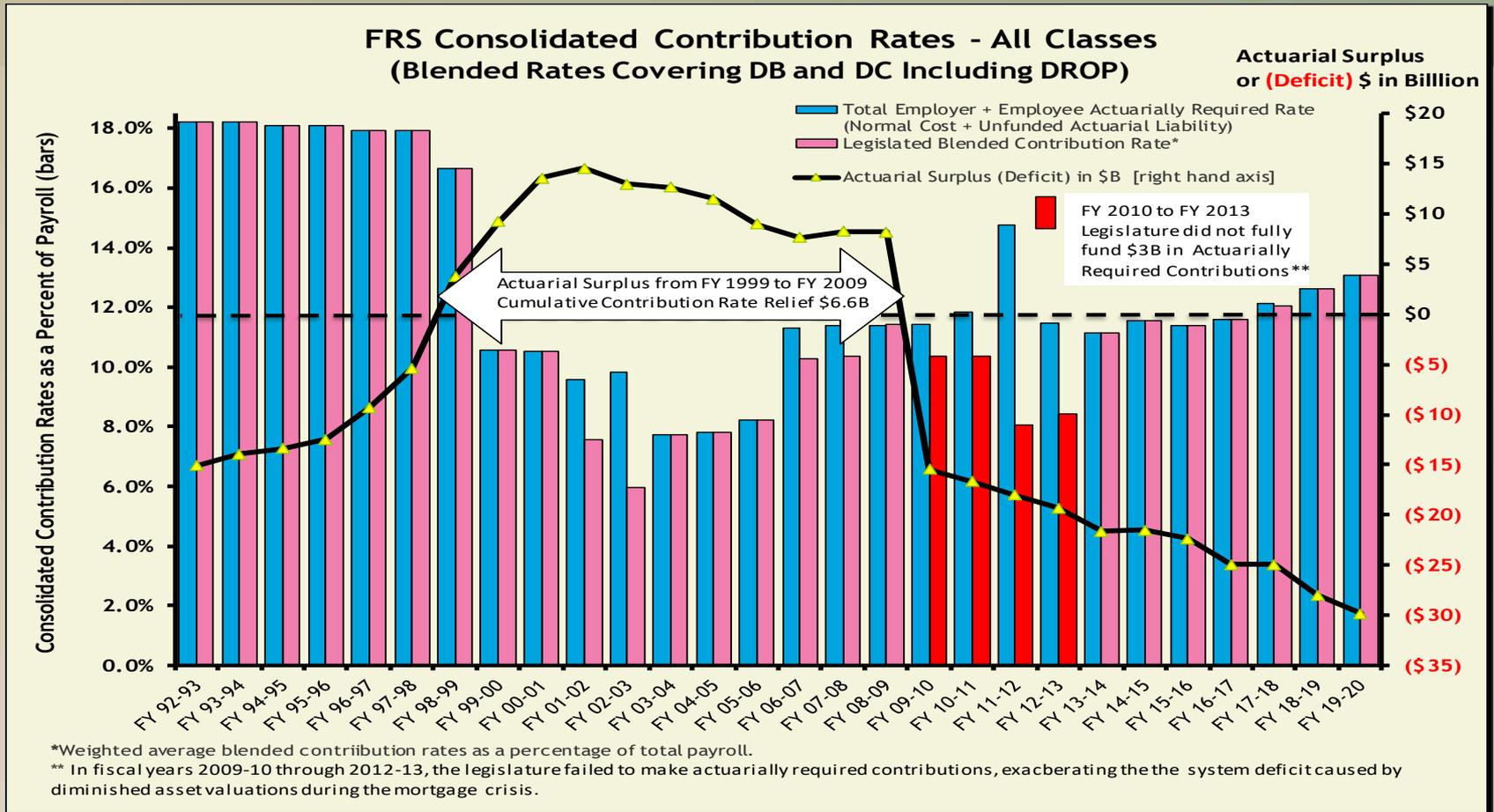


Introduction

- The Legislature, SBA Trustees, Division of Retirement, and SBA staff, have a history of supporting three critical requirements for pension funding sustainability:
 - Reasonable benefits
 - Prudent investments
 - Responsible funding policy

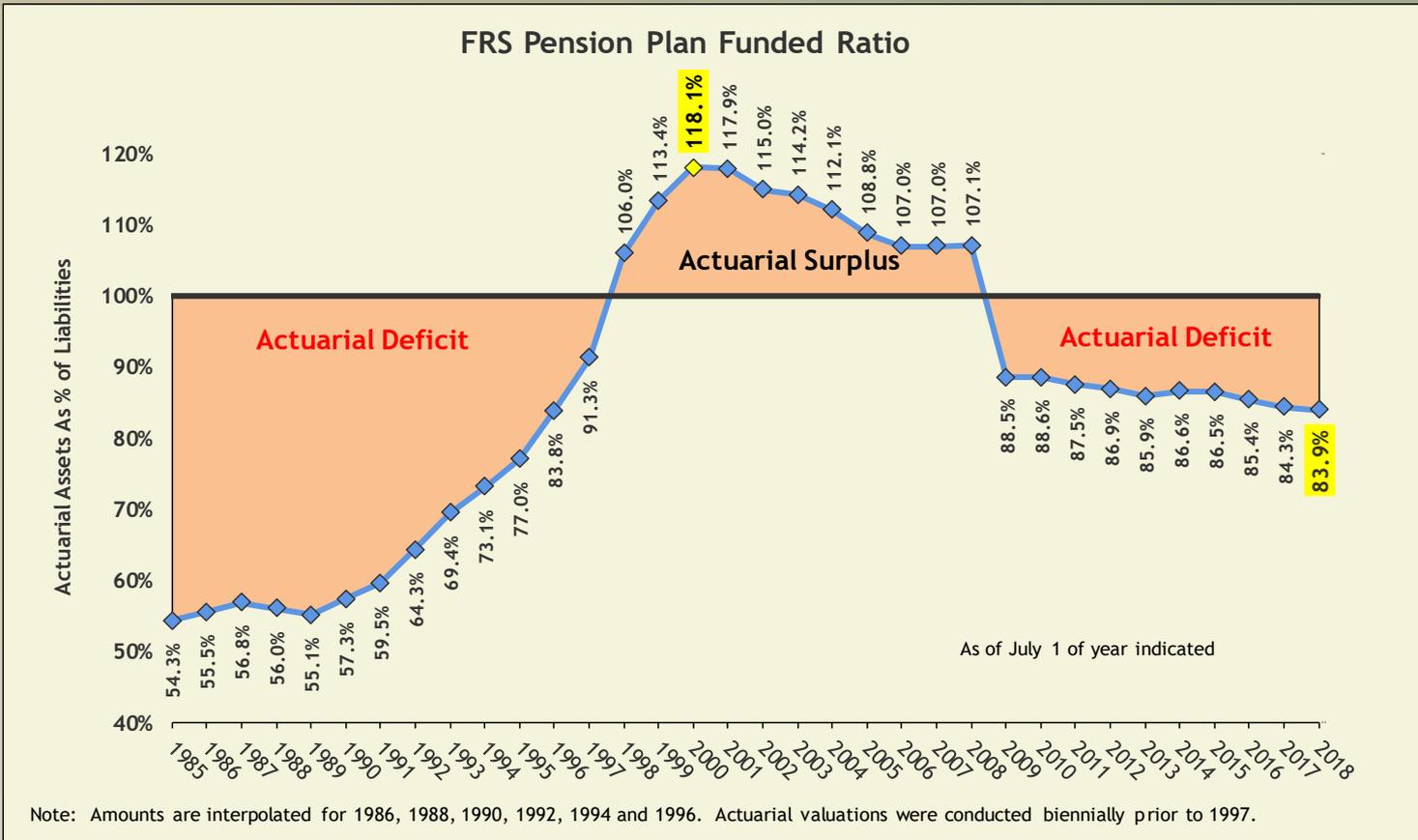
Which resulted in 11-years of actuarial surpluses from 1998 thru 2008 and employers saving a cumulative \$6.6B through reduced contributions.

Contributions and Funded Status



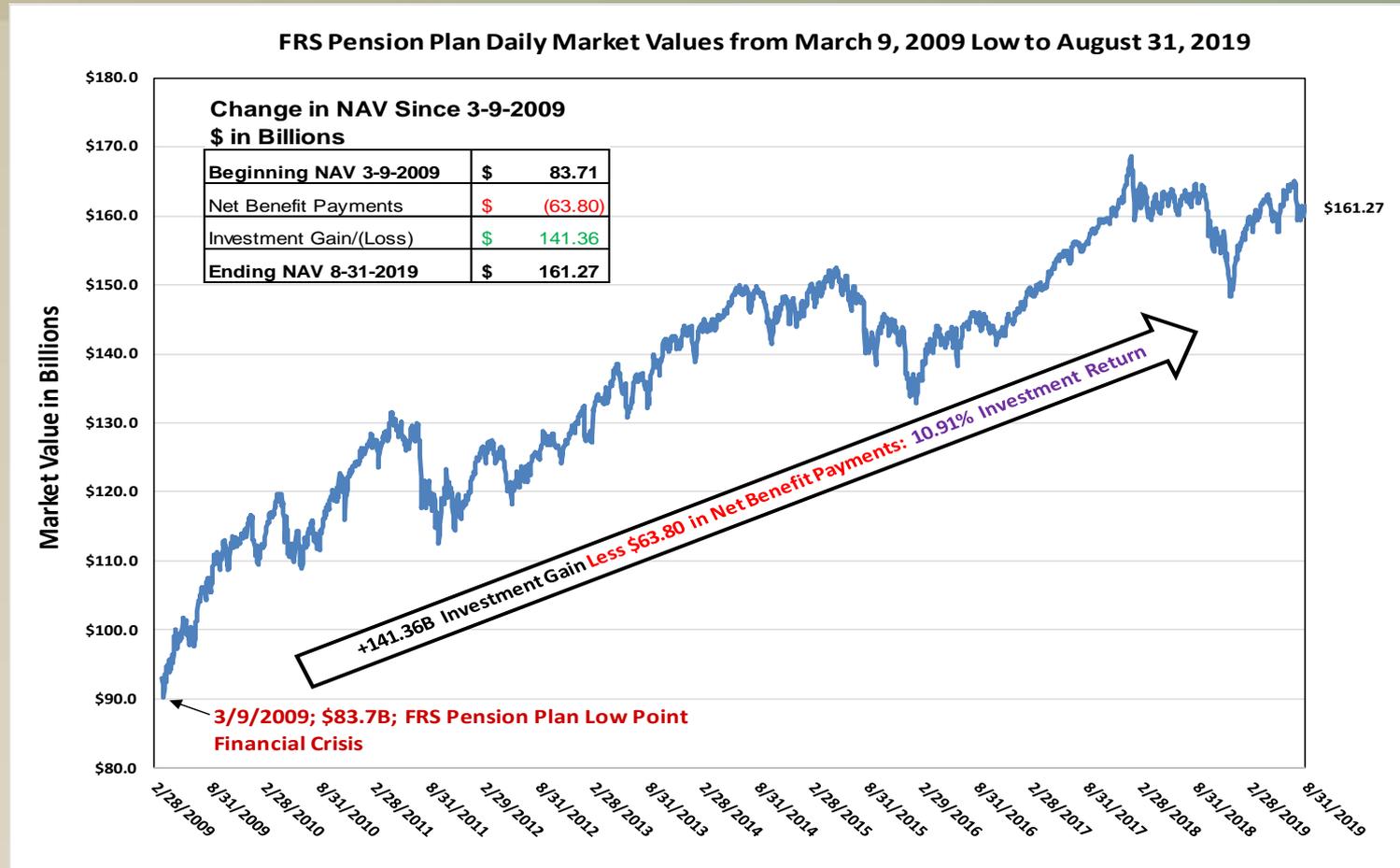
- 11-years of actuarial surpluses from 1998 thru 2008 and employers saving a cumulative \$6.6B through reduced contributions.
- \$3B in actuarially required contribution rates were not funded due to budgetary constraints from 2010 to 2013. Missed an opportunity to gain an estimated \$5.8B in asset value as of June 30, 2019.

FRS Pension Plan's Funded Status Continues to Decline



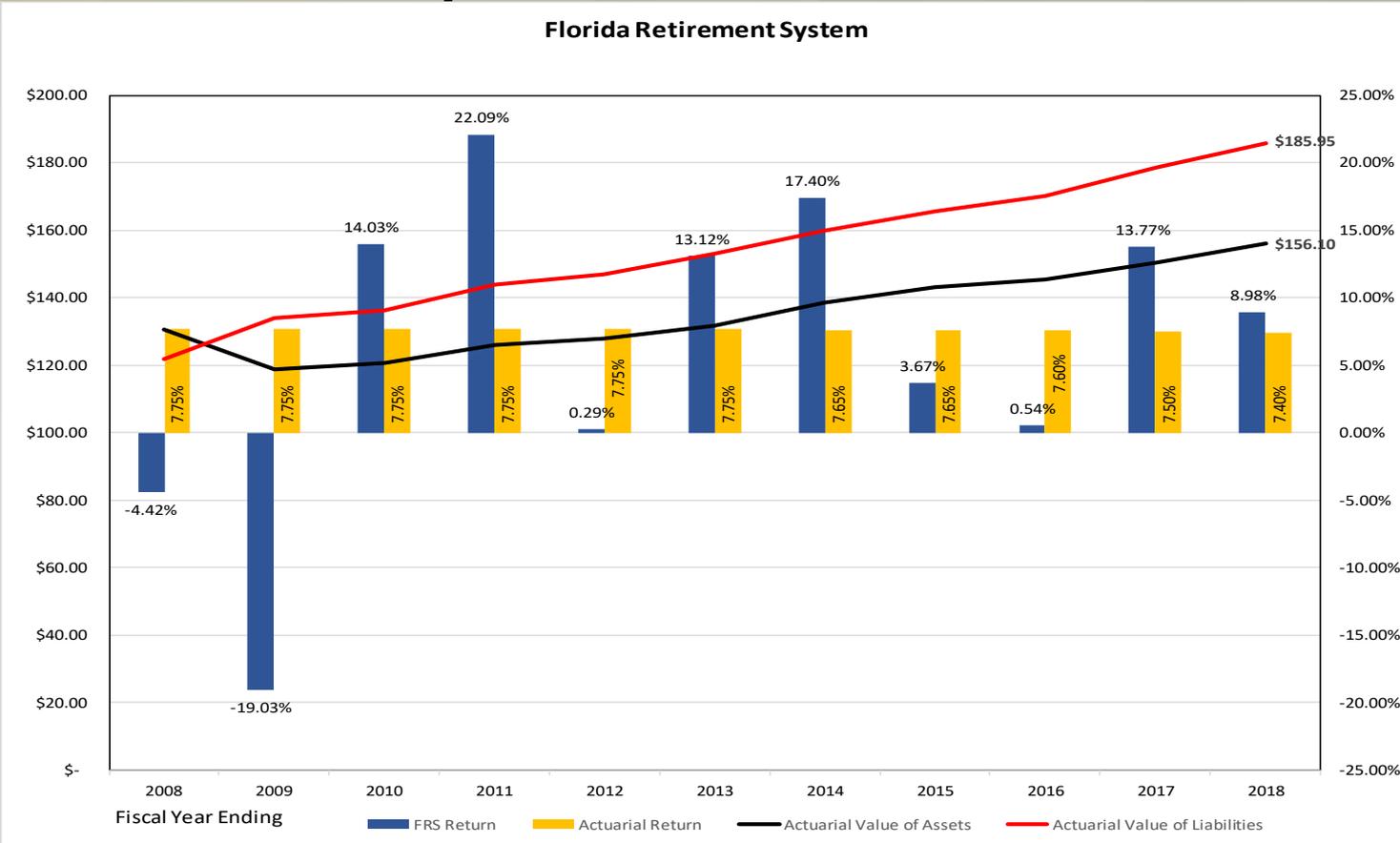
- The “Global Financial Crisis” that began in 2007 led to marked to market asset value declines, creating an unfunded liability.
- The FRS Pension Plan’s funded status continues to decline, currently at 83.9% (July 1, 2018), down from 84.3% (July 1, 2017).

FRS Pension Plan Changes in Market Value and Performance From March 9, 2009 Market Low to August 31, 2019 (10.5 Years)



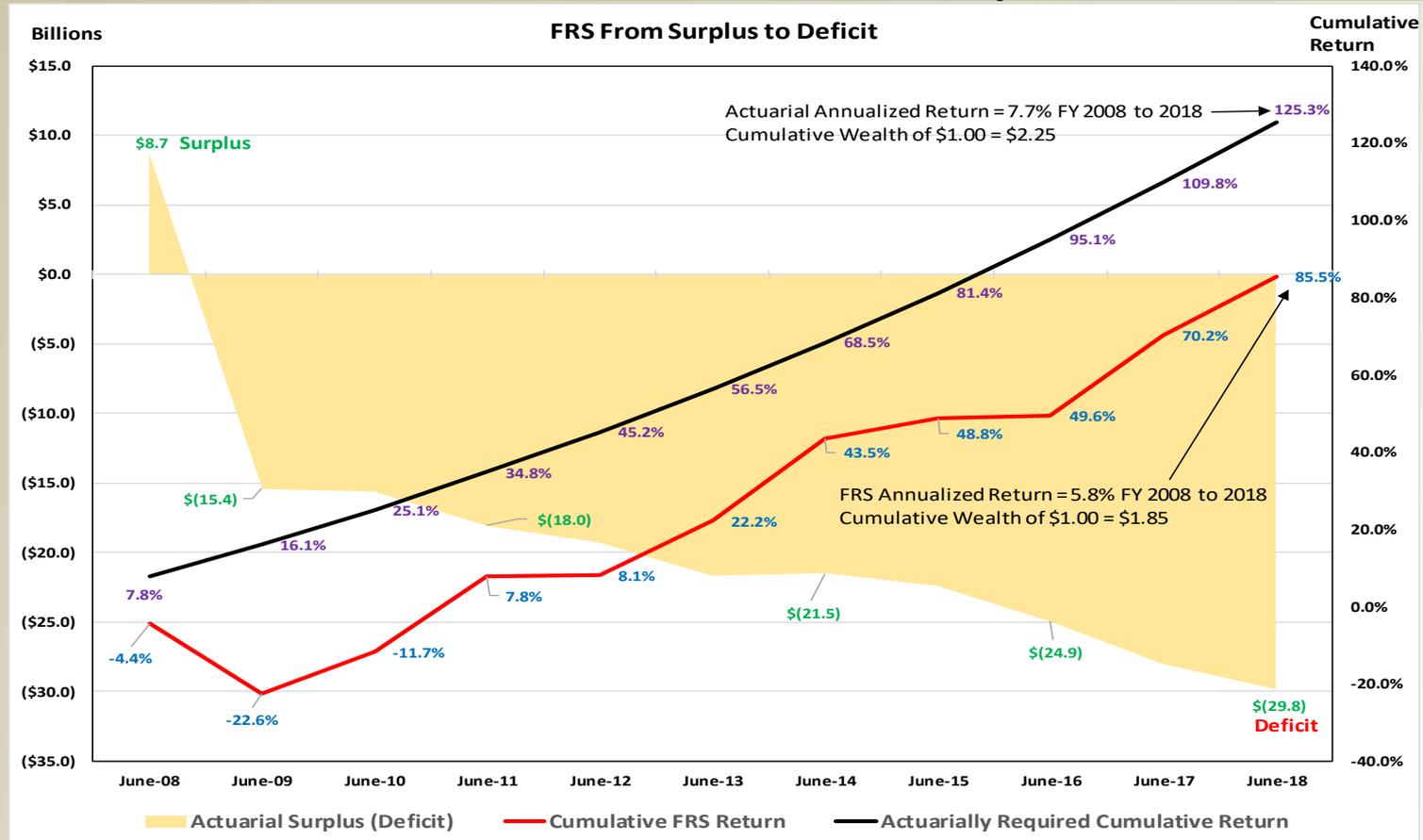
Since the Great Financial Crisis low point, the FRS Pension Plan returned 10.91%, had an investment gain of \$141.4B and paid out \$63.8B in net benefit payments

Growth in Pension Liability Continues to Outpace Growth in Asset Values



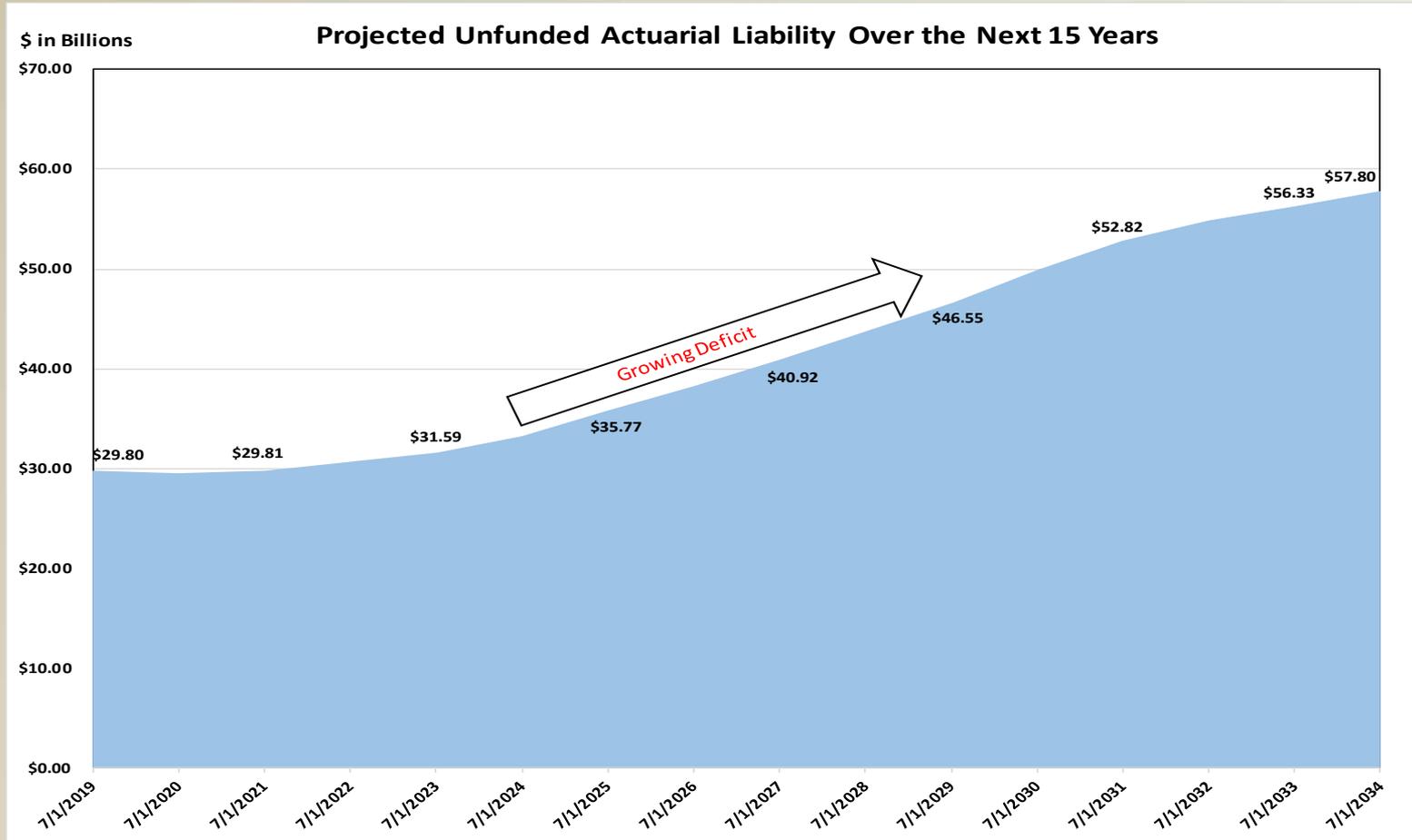
- Actuarial liabilities have continued to outpace asset growth and now stands at \$185.95B as of July 1, 2018.
- Even with a post financial crisis return of 11.5% (from March 2009 to June 2018), the growth in pension liabilities still outpaced the growth in asset values.

FRS Pension Plan From \$8.7B Surplus to \$29.8B Deficit



- From a \$8.7B surplus (7/1/2008) to a \$29.8B deficit (7/1/2018), the actuarial rate of return was 7.7% and assets returned 5.8% (11-yrs, from FY 2008 to 2018)
- The funding deficit has continued to increase and stands at \$29.8B as of July 1, 2018

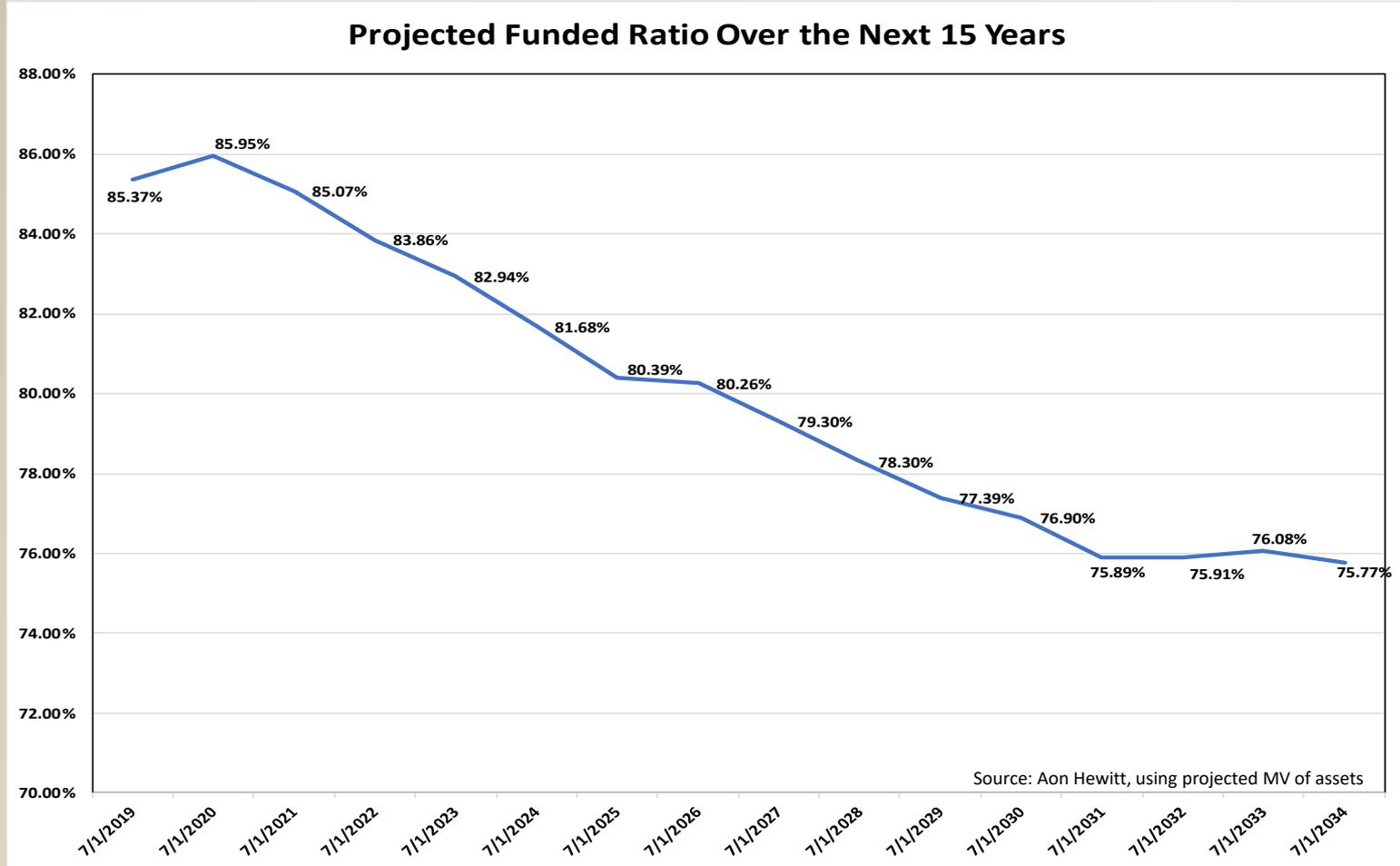
Projected Median Unfunded Actuarial Liability Will Nearly Double Over the Next 15 Years



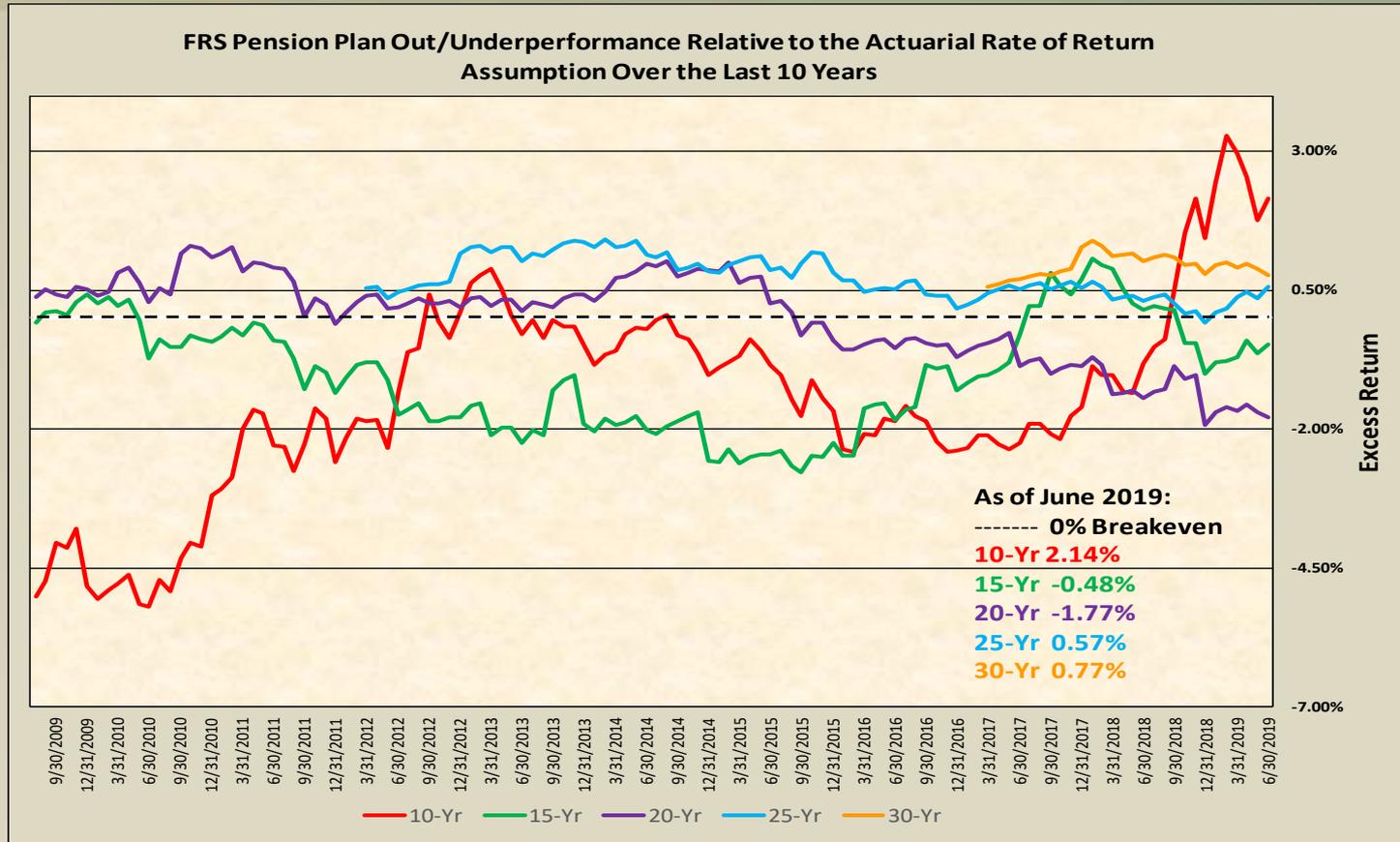
*Source Aon Hewitt, using projected MV of assets

Overstating future investment returns will suppress current contributions in the short-term at the expense of ballooning future debt and weakening long-term funding

Projected Median Funded Ratio is Expected to Decline Over the Next 15 Years

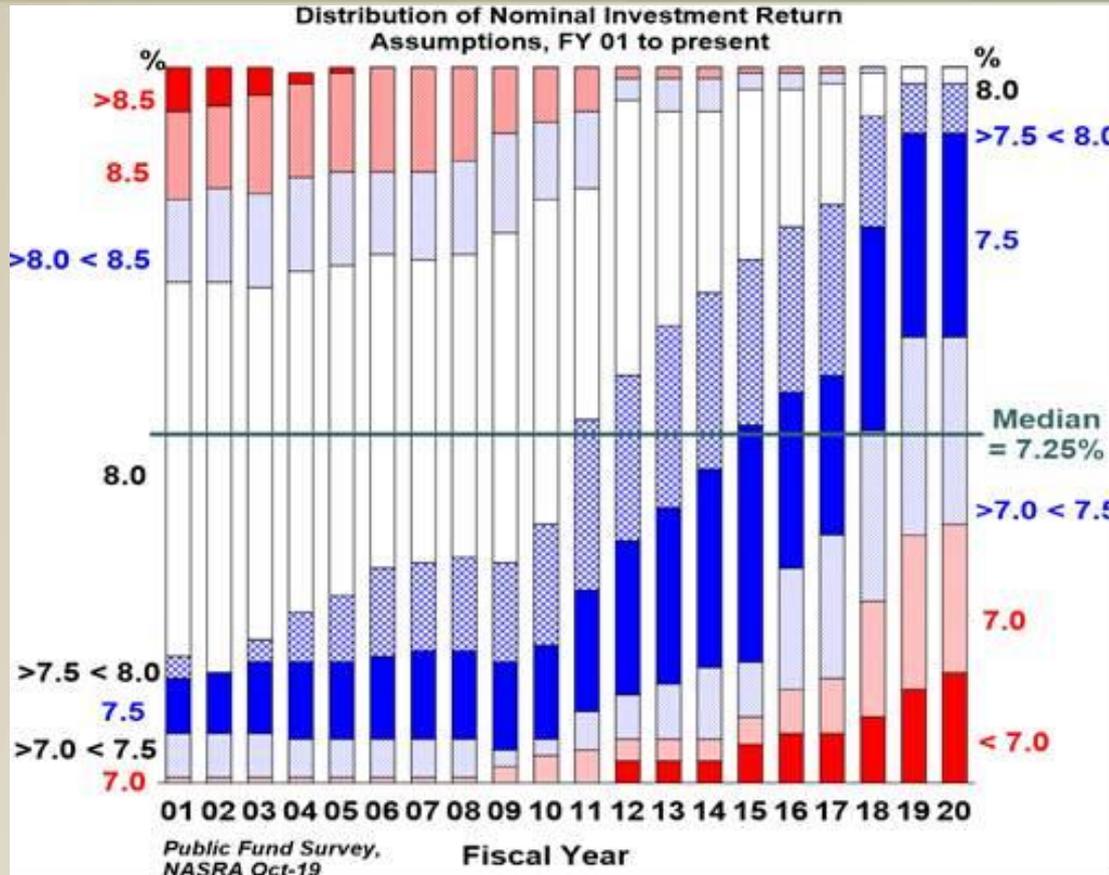


FRS Pension Plan Return vs. Actuarial Return Assumption



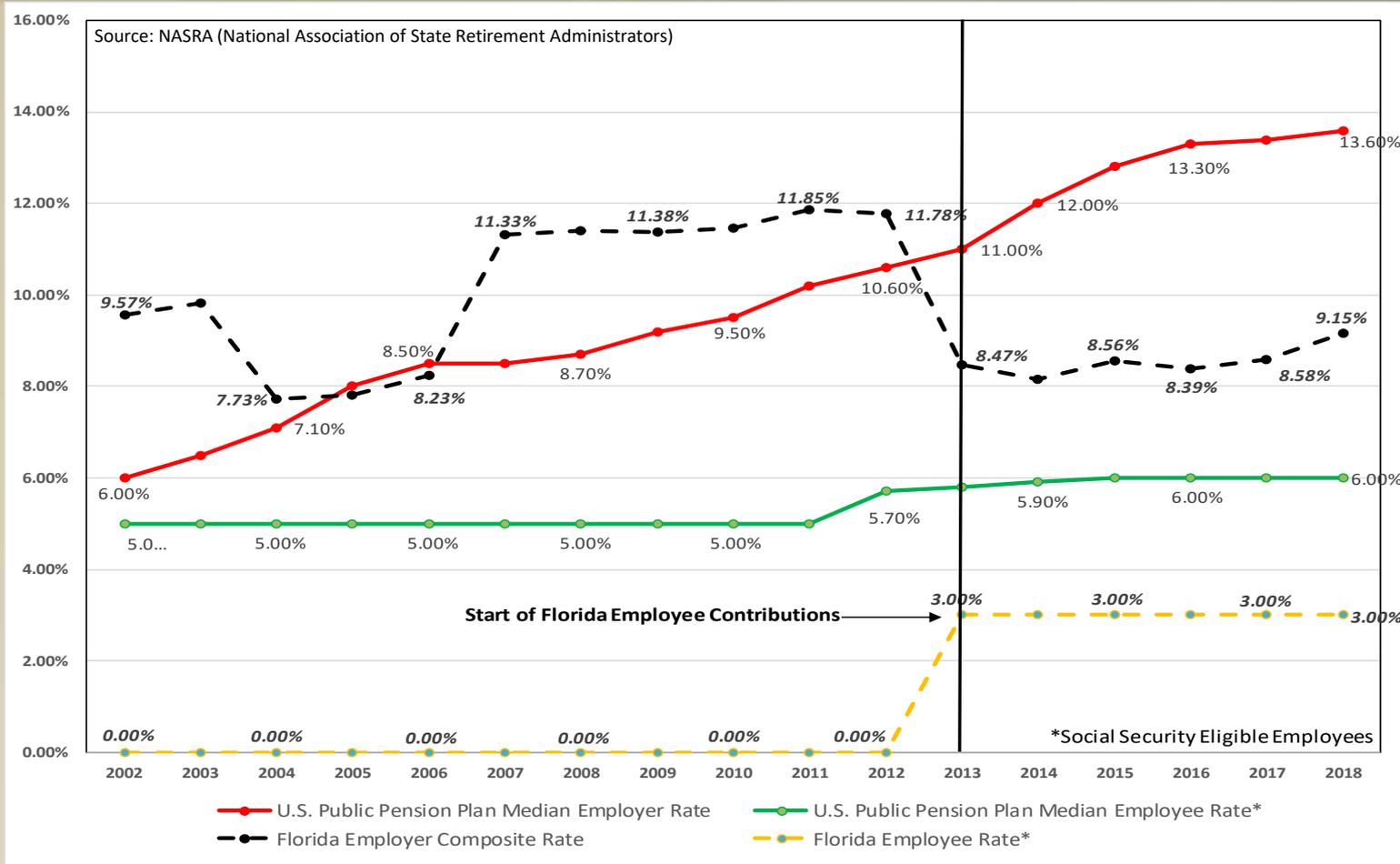
- Relative to historical actuarial return assumptions, the Pension Plan's performance is mixed.

A Significant Number of Public Pension Plans Have Lowered Their Actuarial Return Assumptions Since Fiscal Year 2010



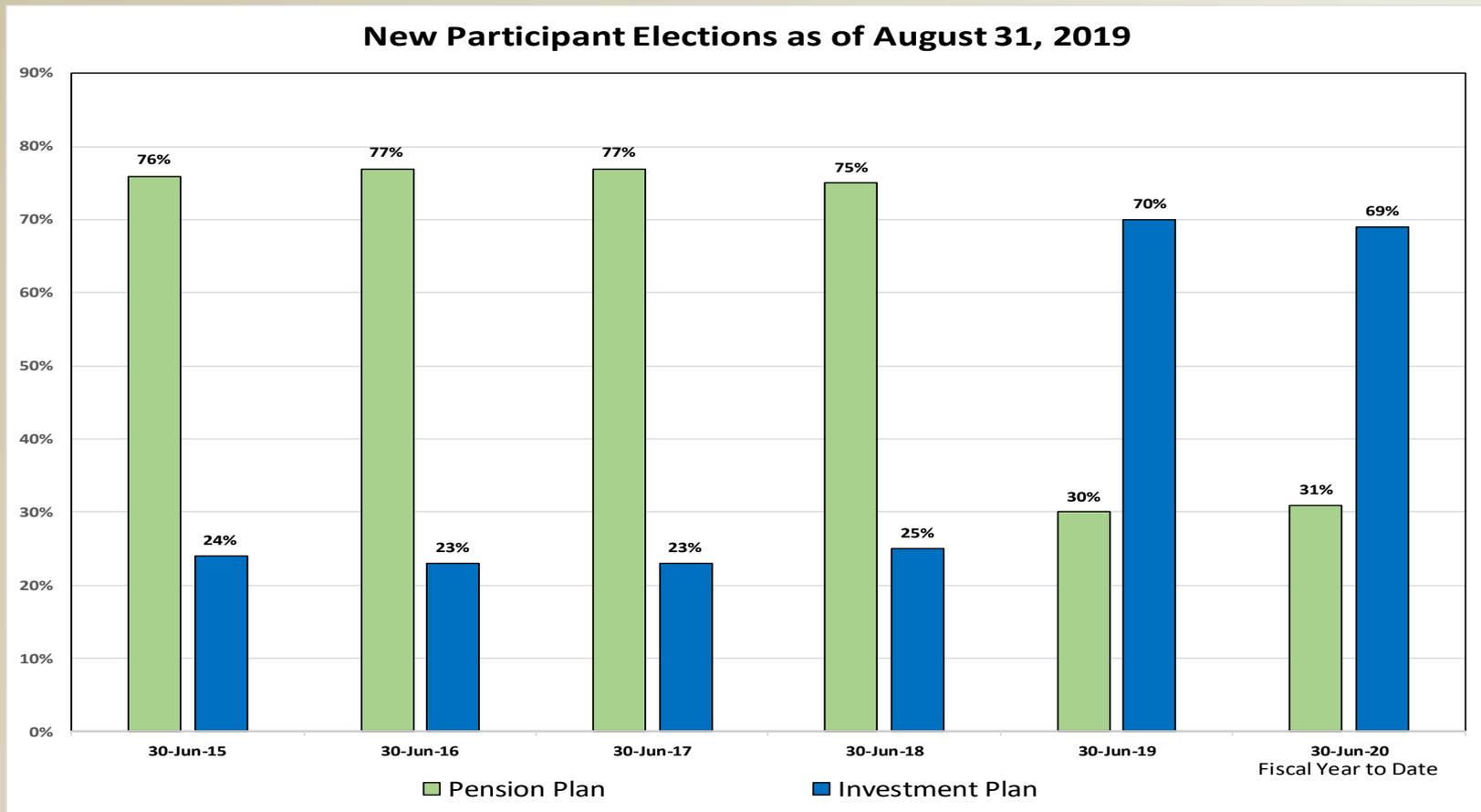
- It is the consensus view among actuaries and investment consulting firms that forward-looking returns are expected to be substantially lower than in the past.
- SBA is expecting a 6.6% forward looking (30-yr) asset return assumption

Florida's Contribution Rates Continue to Be Significantly Lower Than Other States



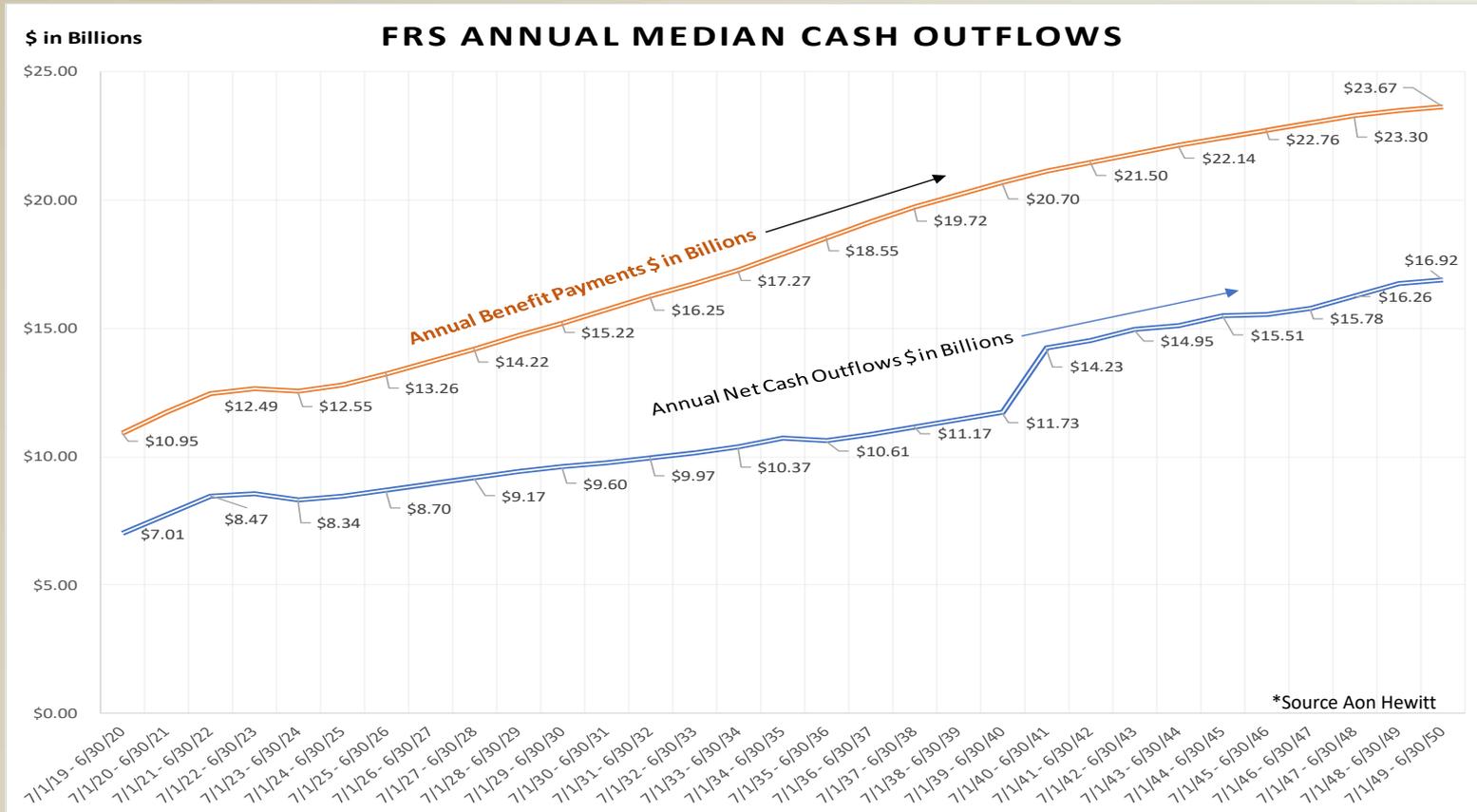
When employees started contributing 3%, employers' composite contribution rate was lowered by more than 3%

Since the Default Change Went into Effect, A Dramatic Shift in New Participant Elections



A significantly lower number of new hires going into the Pension Plan will accelerate the FRS Pension Plan's maturity and net cash outflows

Maturing Plan With Increasing Cash Flow Needs



- Increasing cash outflows adds additional complexity in managing the FRS Pension Plan's assets.
- A maturing plan with increasing cash flows needs will necessitate an asset allocation change to less risky and more liquid assets, thereby, lowering future return expectations

Conclusions

- The SBA has experienced significant growth since the depth of the “Great Financial Crisis”
- Despite the significant growth in assets and strong performance, pension liabilities continue to outpace the growth in asset values
- Funded status is expected to decline and the unfunded actuarial liability is expected to double over the next 15 years
- SBA is projecting a long-term return assumption of 6.6%
- Overstating future investment returns will suppress current contributions at the expense of ballooning future debt and weakening long-term funding
- Actuarial Assumption Conference should continue to decrease the expected return assumption consistent with independent forward-looking return expectations, which are significantly lower than historical expectations

Conclusions

- Florida's employer and employee contribution rates are significantly lower than other states
- A dramatic change in new hire DB/DC election rates, accelerating DB plan maturity and net cash outflows will eventually necessitate a less risky and more liquid asset allocation, thereby, lowering future return expectations
- Intergenerational transfer of pension costs to future taxpayers



Overview of 2019 Experience Study

FLORIDA RETIREMENT SYSTEM

Presented by:

Matt Larrabee, FSA, EA

October 8, 2019

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Agenda

- Demographic assumptions
 - Retiree life expectancy
 - Timing of retirement/DROP entry
- Actuarial methods
 - Amortization Period
 - Actuarial Cost Allocation Method
- System-wide non-investment economic assumptions
 - Inflation
 - Real wage growth

Introduction

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

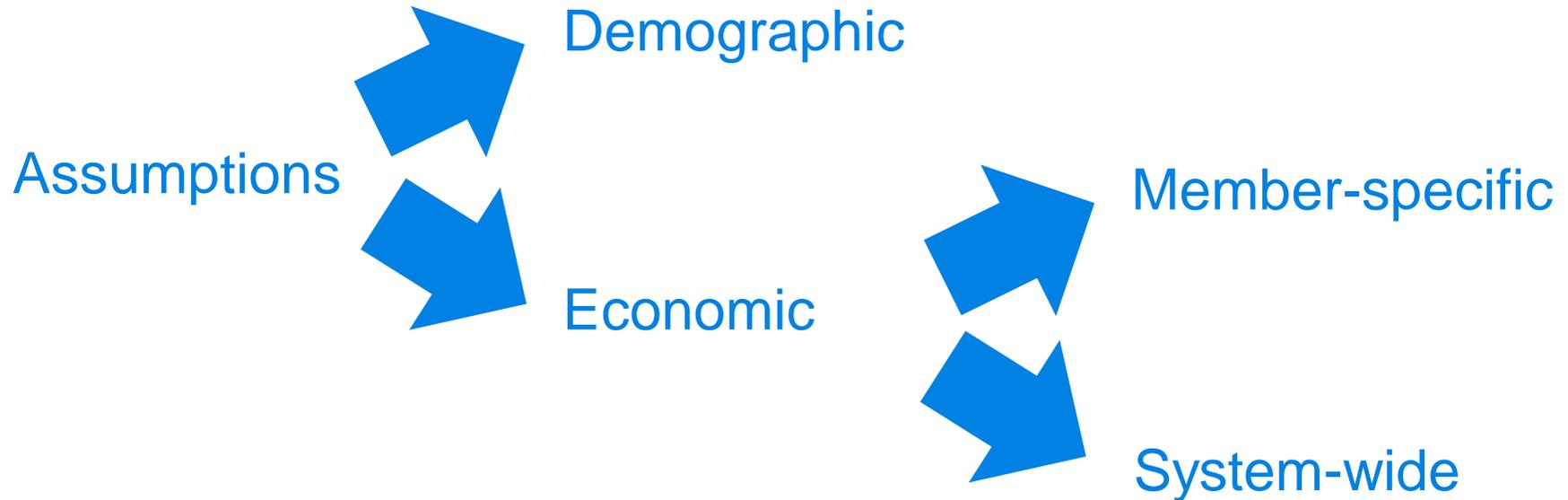
Overview of an Actuarial Experience Study

- The experience study, conducted every five years:
 - Gives Conference Principals information to do normal course review and updates, if appropriate, to valuation assumptions
 - Reviews current actuarial methods, identifying alternatives for consideration by Conference Principals



Categories of Valuation Assumptions

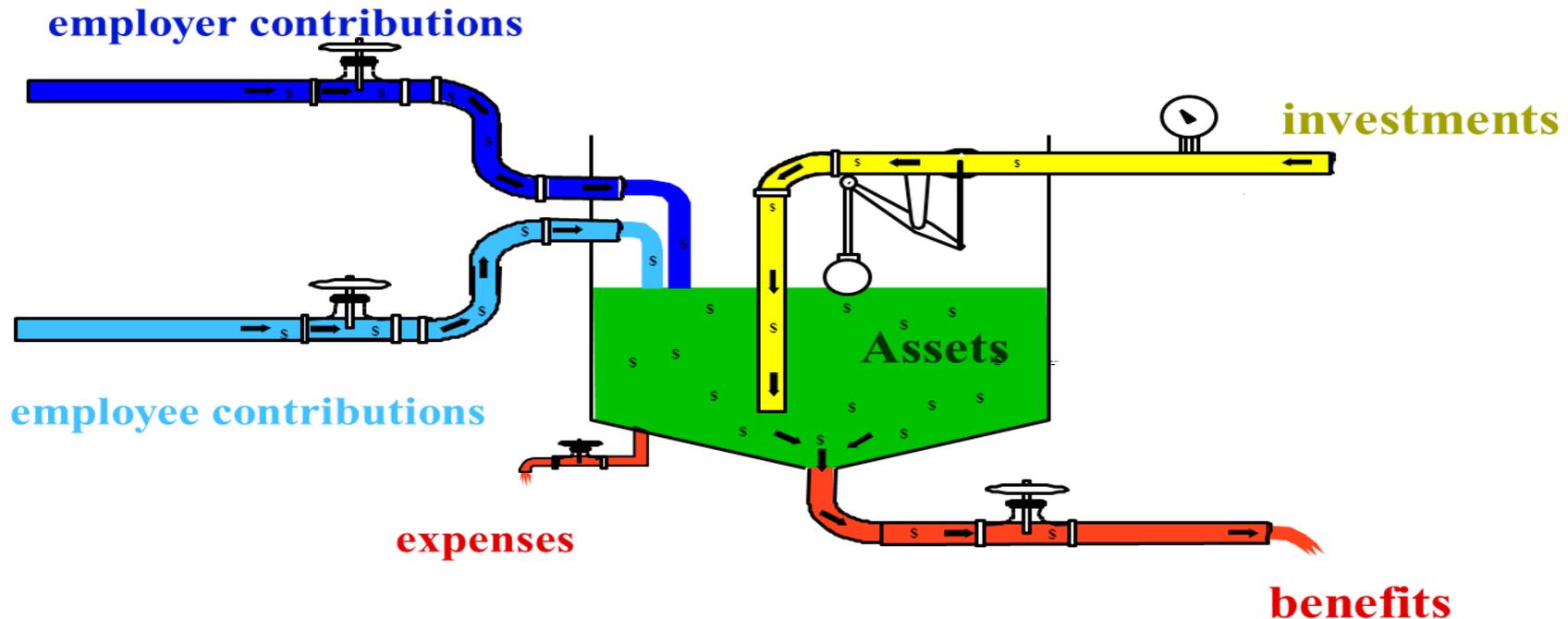
- There are different categories of assumptions, with most assumptions affecting both the FRS and HIS valuations



Areas of Assumption Expertise

- We need actuarial assumptions for all areas that impact the projection of retirement benefits and their present value
- Our expertise is foremost in demographic assumptions
 - Statistical analysis of recent member census data
- We have knowledge in system-wide economic assumptions that complements that of deep subject matter experts
 - Inflation
 - Real (before inflation) return on system investments
 - Real wage growth

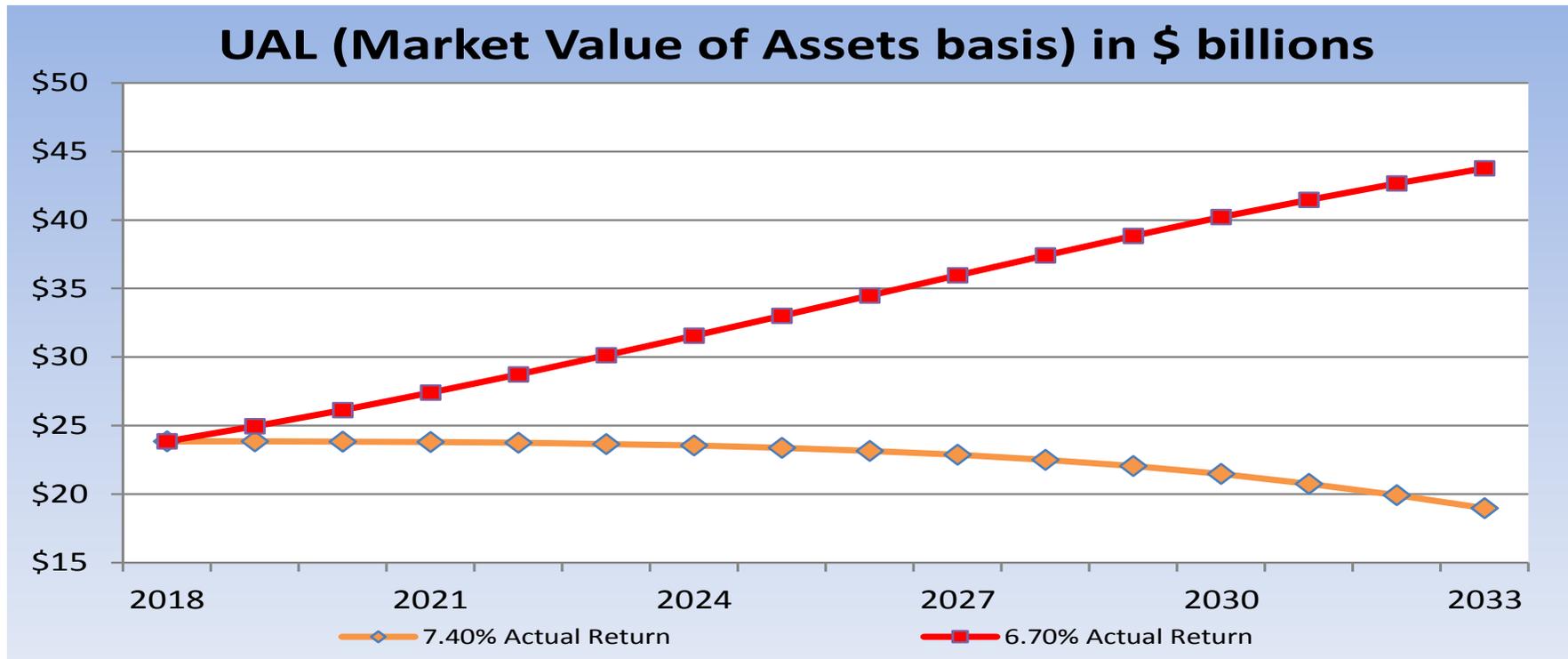
Long-term System Cost Model



- Assumptions and methods do **not** determine long-term system cost, which is governed by the fundamental cost equation:
 - **Contributions + Investments = Benefits + Expenses**
- They only impact the budgetary **timing** of cost incurrence

Why Do Assumptions and Methods Matter?

- Assumptions and methods **don't** determine ultimate long-term System cost, but they **do** determine the projected trajectory of UAL for any given scenario for actual future experience
 - Two scenarios for actual future experience are illustrated below



Excerpt from slide in 2018 FRS Actuarial Assumption Conference Presentation

Guidance in Setting Assumptions

- Given that assumptions and methods do impact budgeting but do not impact ultimate long-term system cost, what guiding principles should be used in selecting assumptions?
 - Identification of best estimates
 - Having internal consistency among assumptions
 - Focusing on the long time horizon of the calculations
 - Remaining cognizant that assuming a particular result:
 - Does not make it so
 - Does not affect the ultimate long-term system cost

Guidance Requested from Today's Meeting

- To prepare for the 2019 FRS Actuarial Assumption Conference we request:
 - Approval of the recommended non-economic demographic assumptions discussed today for use in valuation calculations
 - For system-wide non-investment economic assumptions and actuarial methods either:
 - Identification of approved assumptions and methods
 - or
 - Identification of a limited number of assumption or method policy alternatives to be presented for comparison at the 2019 FRS Actuarial Assumption Conference

Demographic Assumptions

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Use of Assumptions

- Demographic and salary increase assumptions for individual members are combined with census data provided by the Division of Retirement to develop projected benefit payments
- Economic assumptions are used to state those long-term projected benefit payments as a single net present value



Overview of Demographic Assumptions

- While a variety of demographic assumptions are needed and have been studied, today's discussion focuses on the most impactful ones
 - Retiree life expectancy (i.e., the mortality assumption)
 - Timing of retirement or DROP entry

These assumptions estimate the answers to two key questions:

When will benefits commence for a member?

For how long will those benefits be paid?

Overview of Demographic Assumptions

- We will illustrate our analysis for the three largest sub-groups of membership class and gender (listed in decreasing magnitude of liability)
 - Regular Class females
 - Regular Class males
 - Special Risk Class males

These three sub-groups constitute about 95% of System liability

Demographic Assumptions – Life Expectancy (i.e., Mortality)

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Current Retiree Mortality Assumption

- Current assumption based on observed 2008 to 2013 FRS member experience in the 2014 experience study
- Uses a static **base mortality table** (RP2000) family that was current and widely used at the time of the 2014 study
- Uses a **mortality improvement projection scale** (Scale BB) published in 2012 that models assumed increases in future life expectancy
- Uses the same mortality assumption for all non-disabled female retirees regardless of membership class or job description

Changes Since Last Experience Study

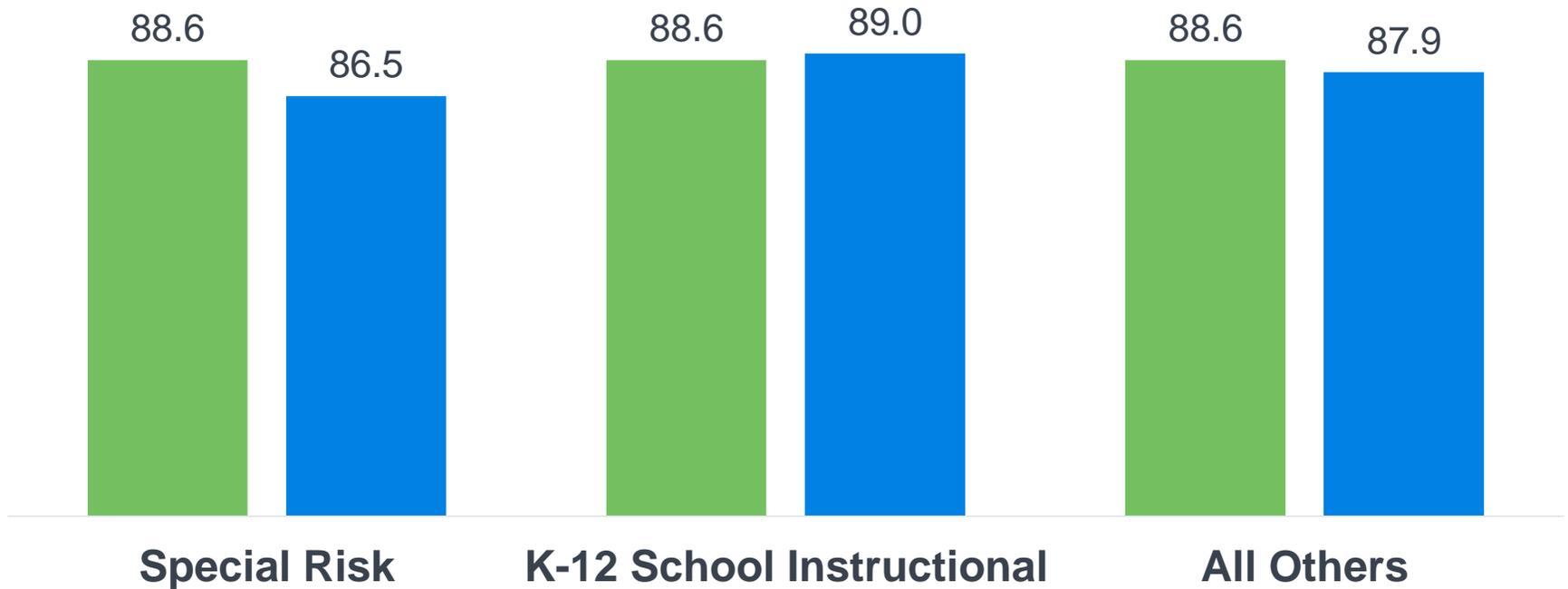
- Five new years of FRS observed experience (2013 – 2018)
- After a major study, the Society of Actuaries issued the “**Pub-2010**” family of static base mortality tables in the past year
 - 2010 in the title refers to central year of collected study data
 - First tables based solely on public sector experience --- FRS contributed data to the study’s data
 - Separate tables for public safety, K-12 school instructional personnel
- Society of Actuaries has issued mortality improvement projection scales annually to model assumed increases in life expectancy
 - The “**MP-2018**” scale was published in October 2018

Proposed Mortality Assumption

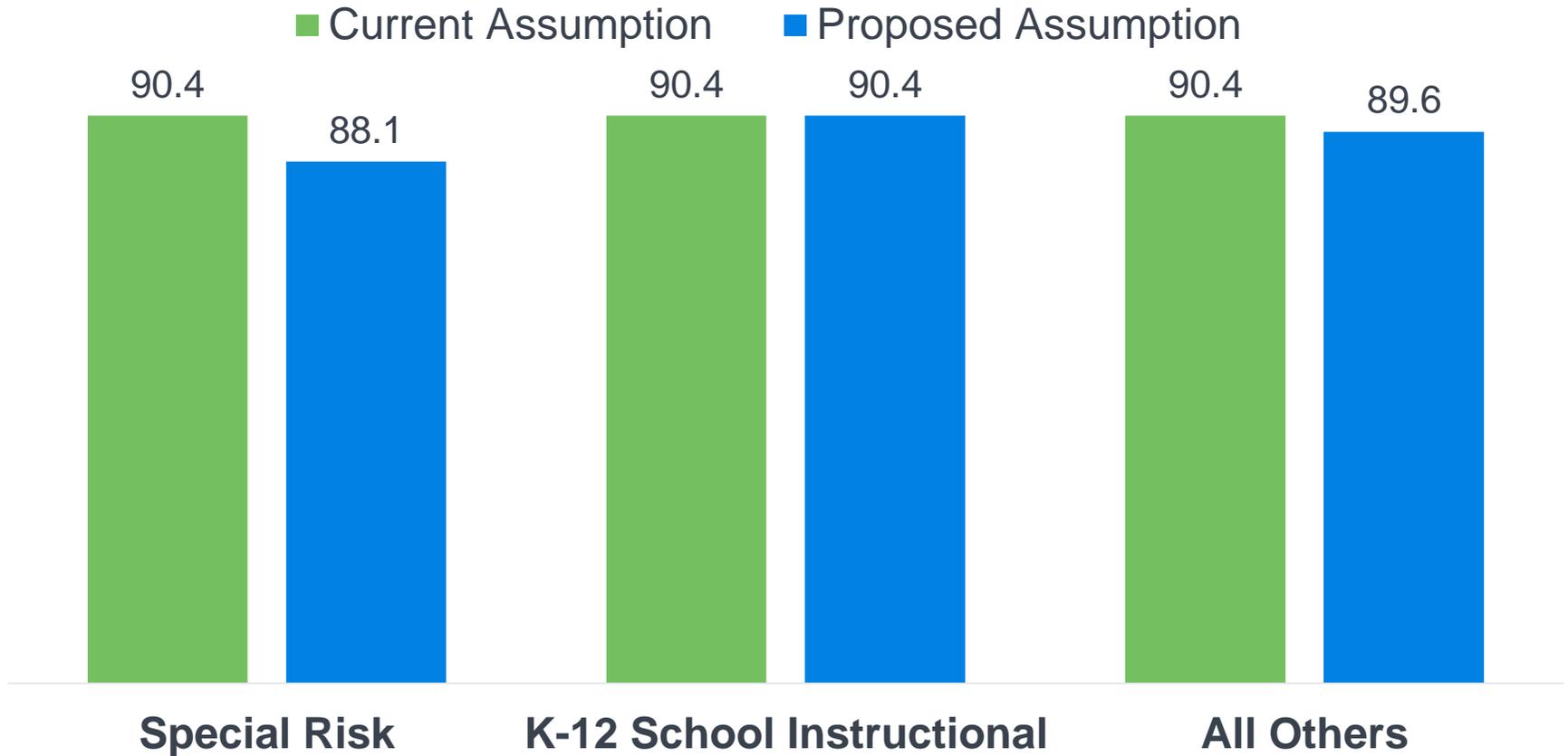
- Use Pub-2010 retiree-specific tables calibrated to match FRS 2013-2018 retiree-specific observed experience
 - Use separate tables for:
 - Public safety
 - K-12 school instructional personnel
 - All other members
- Use the MP-2018 mortality improvement projection scale
- Since each Pub-2010 retiree-specific table has an associated employee-specific table, use the associated employee-specific “sibling” table for members not yet retired
- Technical details on the proposed assumption are in the appendix

Life Expectancy – Female Retiree Age 62 in 2019

■ Current Assumption ■ Proposed Assumption

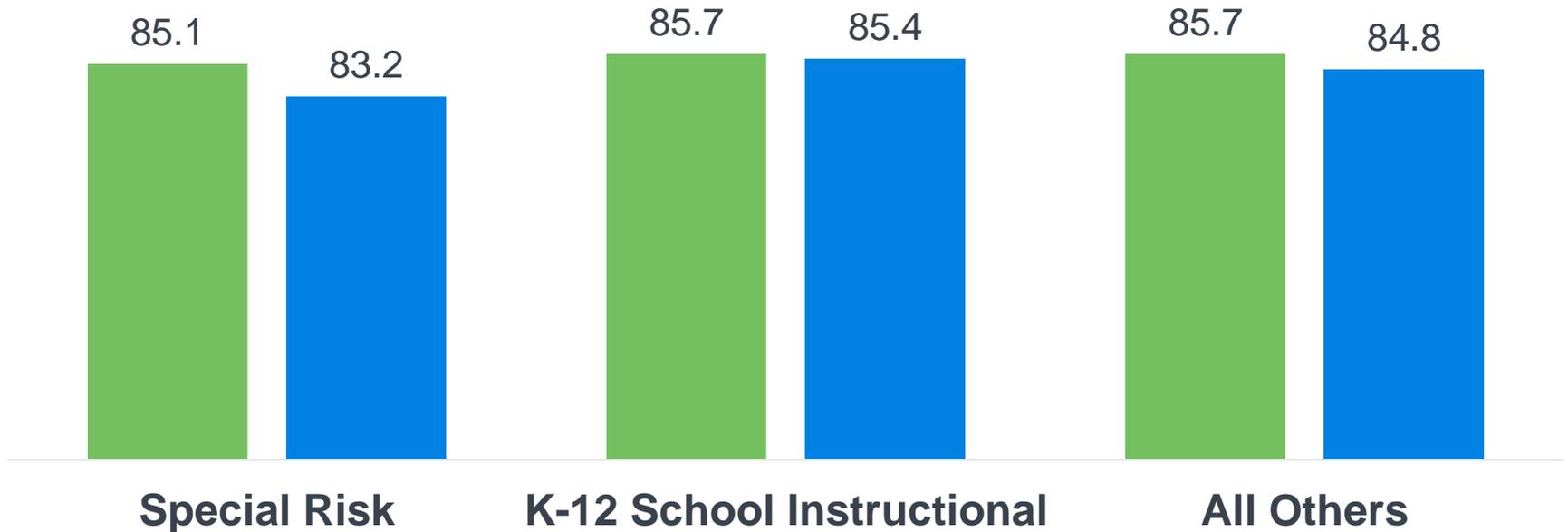


Life Expectancy – Female Retiree Age 62 in 2039



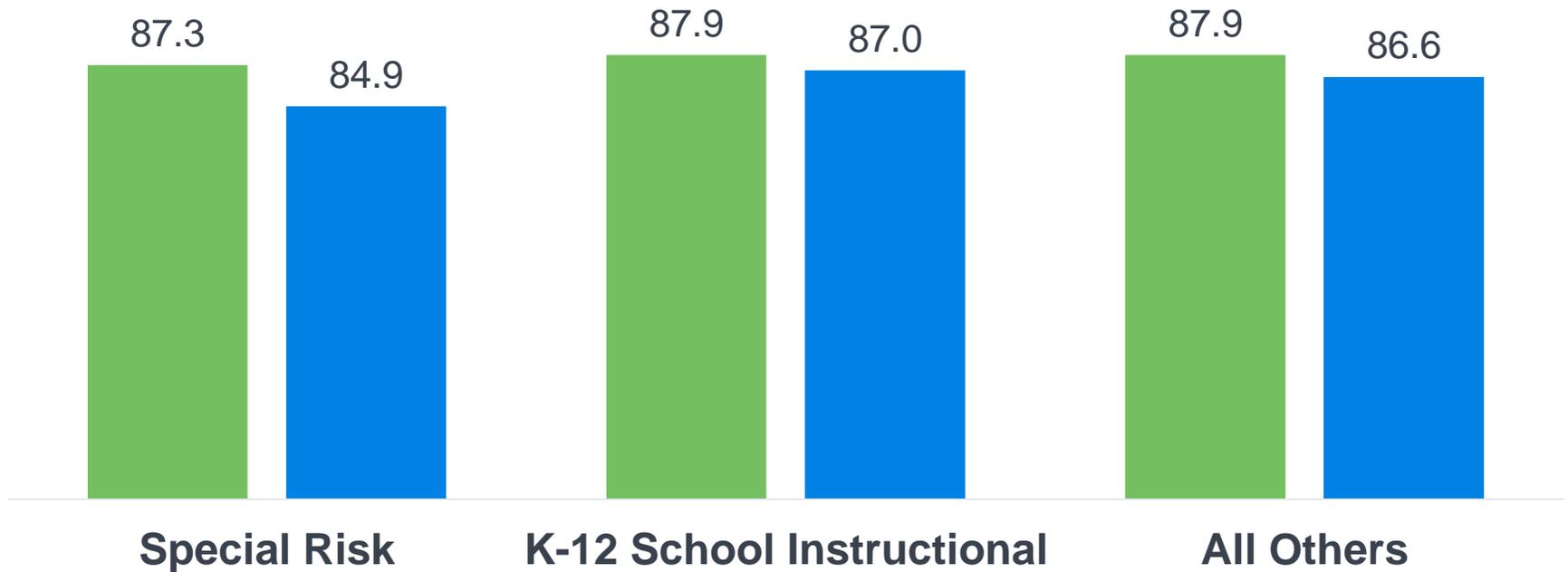
Life Expectancy – Male Retiree Age 62 in 2019

■ Current Assumption ■ Proposed Assumption



Life Expectancy – Male Retiree Age 62 in 2039

■ Current Assumption ■ Proposed Assumption

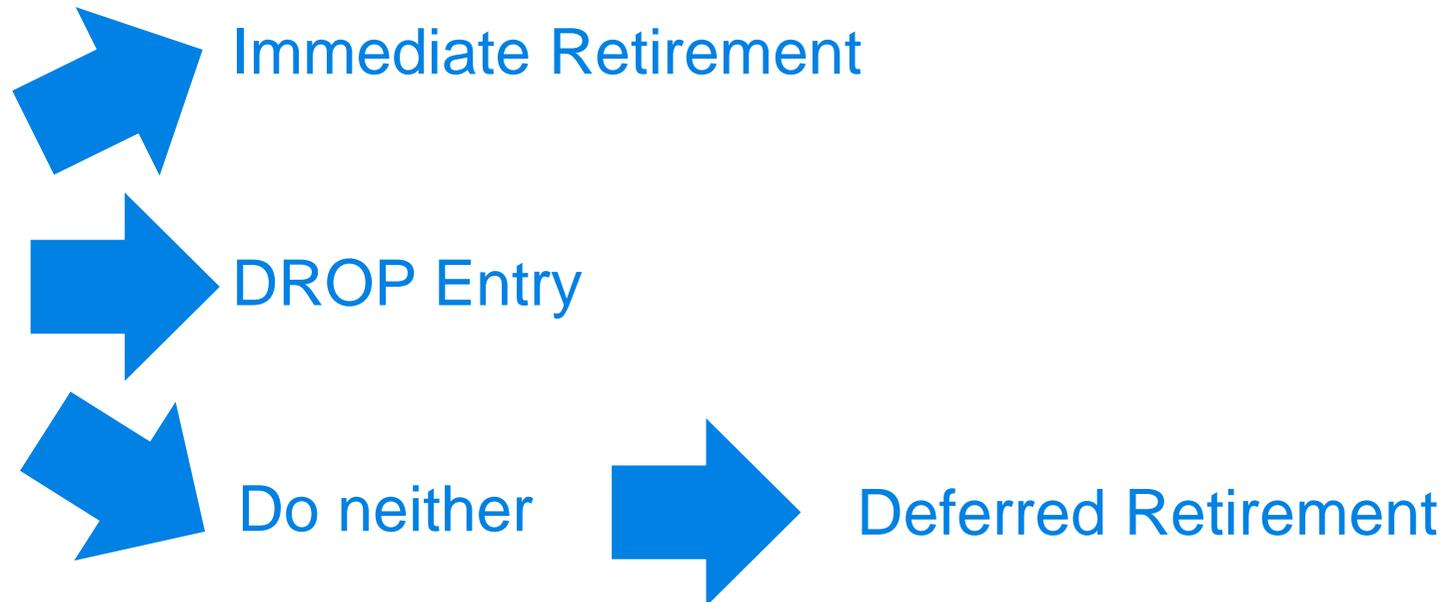


Demographic Assumptions – Retirement / DROP Entry

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Individual Member Decisions When Eligible for DROP Entry

- When a member is eligible to enter DROP, there are three possible paths the member can select



Our study reviewed observed experience for each path

Current Retirement / DROP Entry Assumptions

- Current assumption looks at initial age of eligibility for immediate unreduced retirement and DROP entry
 - Overall likelihood of ceasing benefit accruals (immediate retirement or DROP entry) at initial age eligible combined into a single retirement/DROP entry assumption
- After the initial eligibility age, a “deferred retirement” assumption is used at all subsequent ages for members who did not immediately retire or enter DROP at initial eligibility
- Separate assumptions developed by membership class and gender

Changes Since Last Experience Study

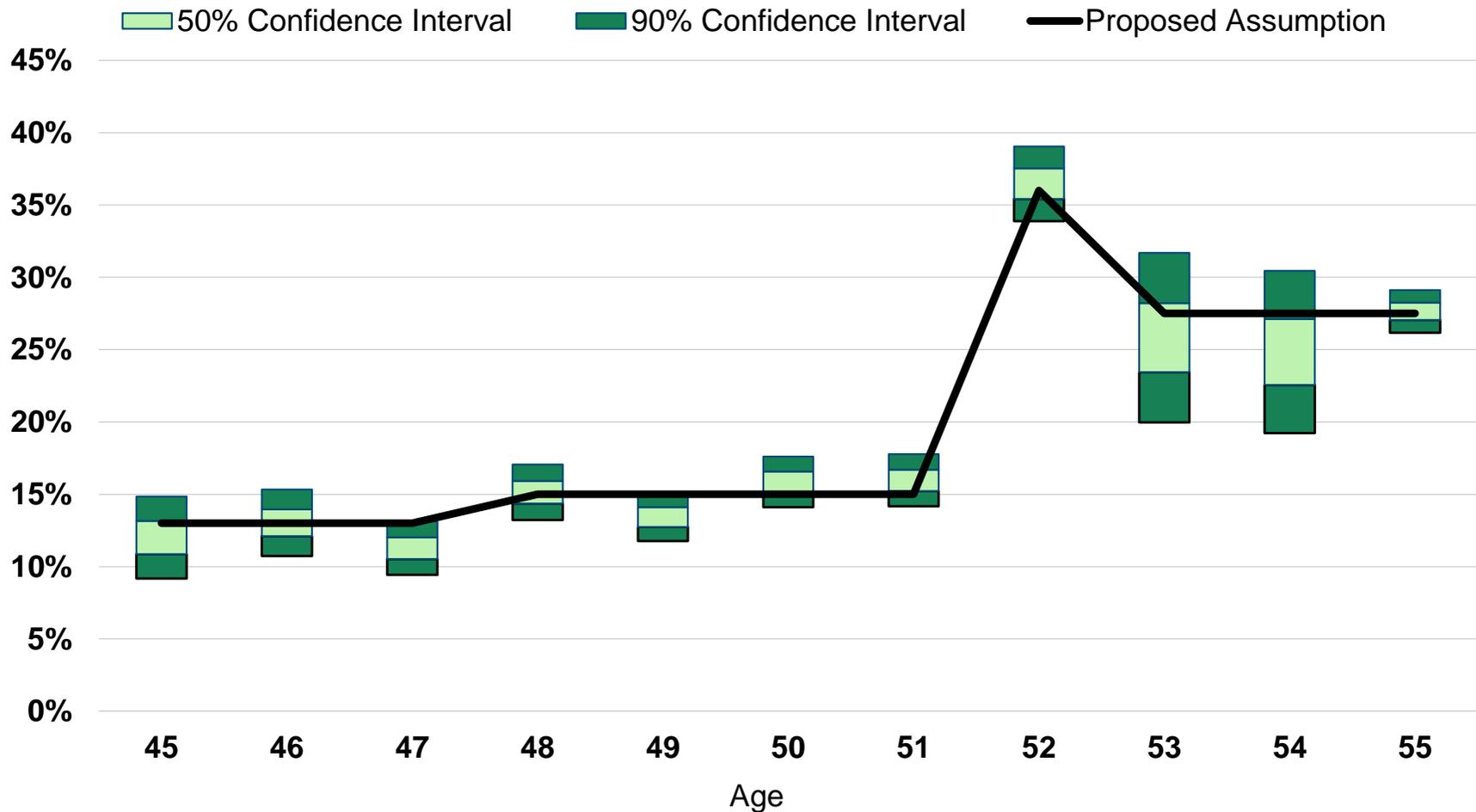
- Five new years of FRS observed experience (2013 – 2018)
- Improved modeling capabilities
 - Allows for fully separate assumptions for DROP entry, immediate retirement
- Enhanced demographic member census data from DMS
 - School instructional personnel in grades K-12 may defer DROP entry longer than other members.
 - Census data for 2019 experience study and 2019 valuation include K-12 school instructional personnel indicator

Proposed Retirement / DROP Entry Assumptions

- Fully separate assumptions for DROP entry, immediate retirement when DROP eligible
- Assumption for likelihood of DROP entry at any eligible-for-entry age, rather than just at initial eligibility age
 - Improved modeling of members who become eligible for DROP entry based on years of service (and therefore have DROP-entry window longer than 12 months)
 - Allows better modeling for instructional personnel (Regular Class members) who can enter DROP without age restrictions
- Deferred retirement assumption for members who are past eligibility for DROP entry
- Separate assumptions developed by membership class
- Technical details on the proposed assumption are in the appendix

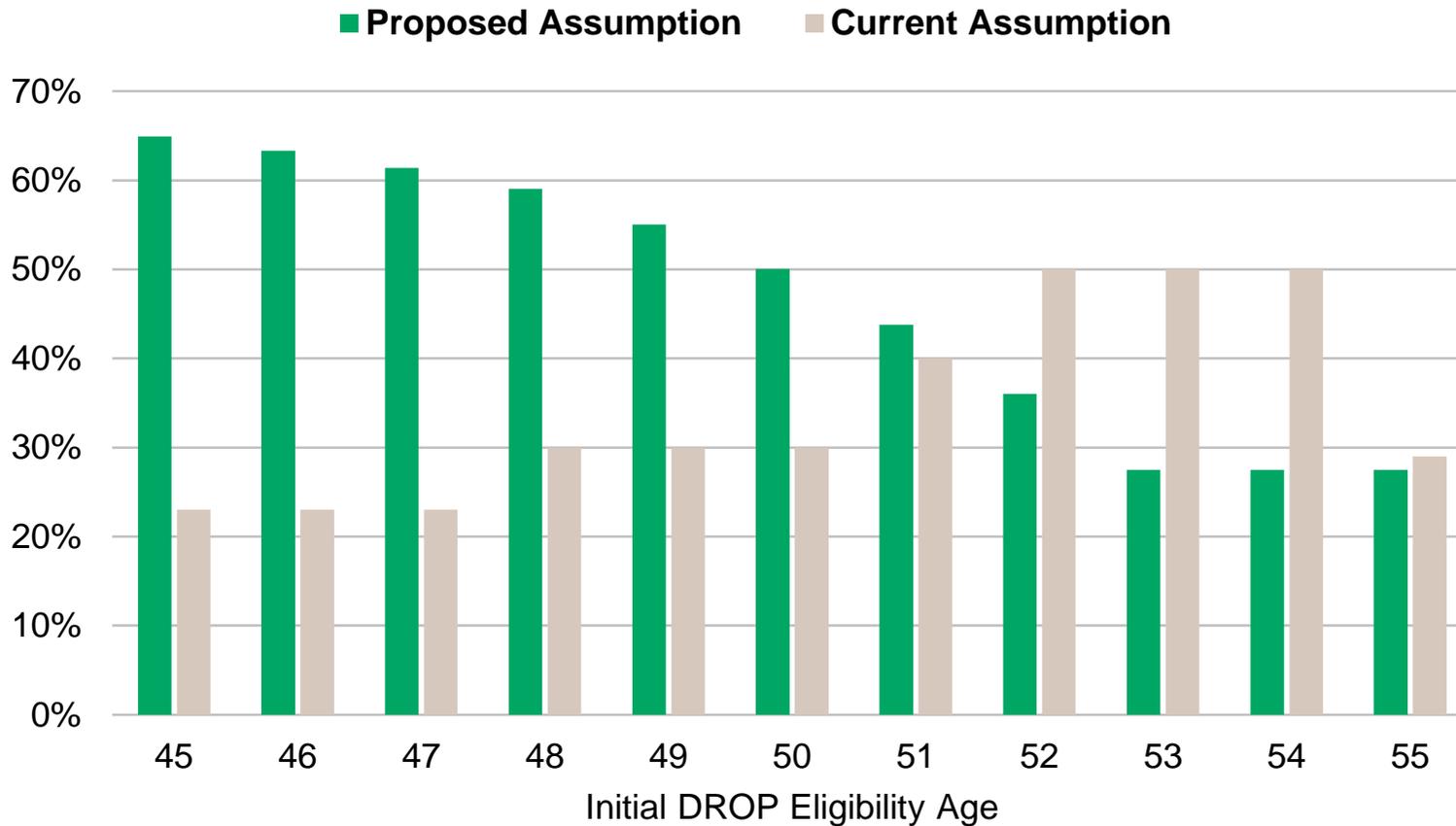
DROP Entry (Tier I) – Setting the “Single Specific Age” Assumption – Special Risk Class Male

Likelihood of DROP Entry at a **Specific Single Age** - Special Risk Males

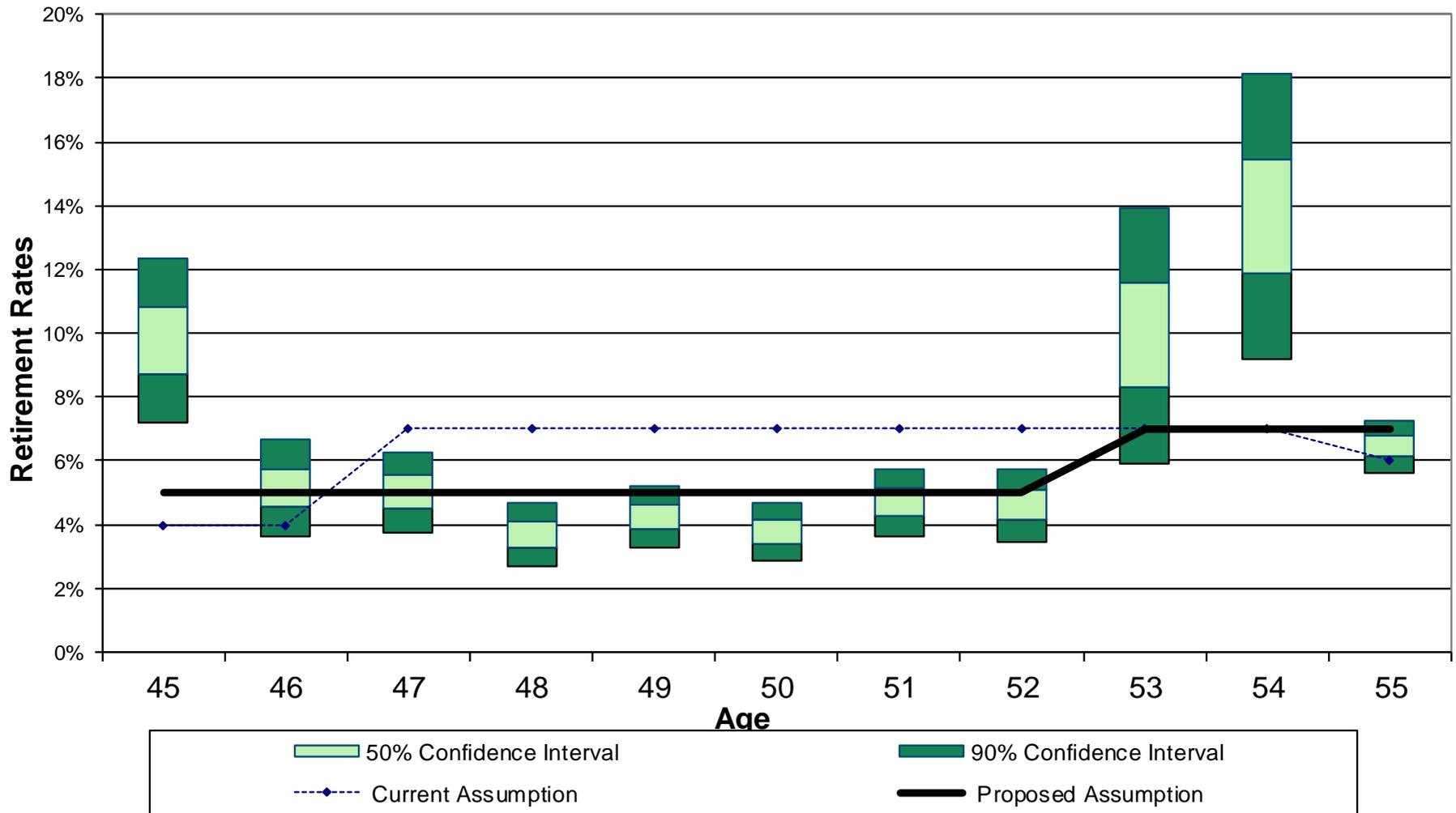


DROP Entry (Tier I) – Cumulative Likelihood of DROP Entry Special Risk Class Male

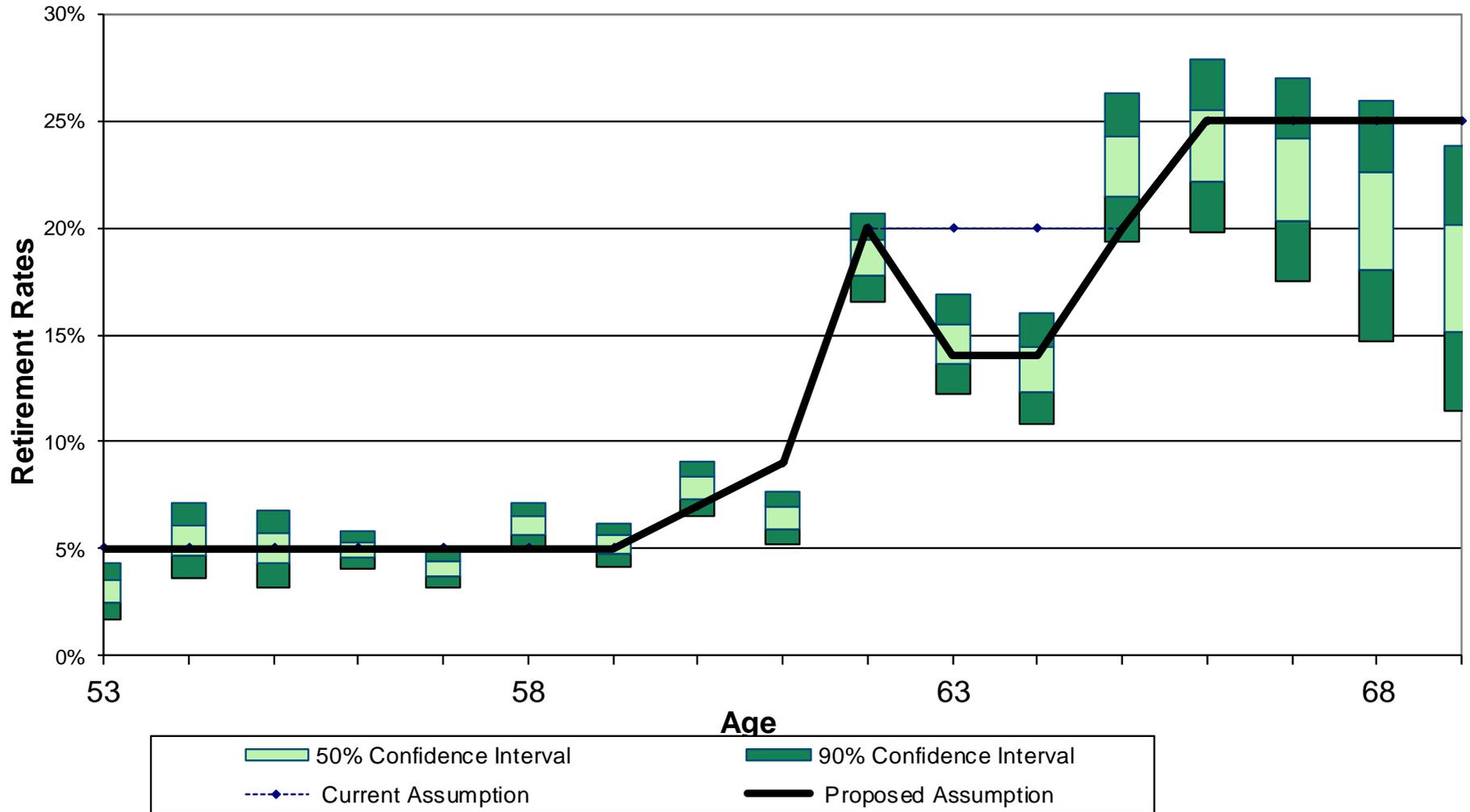
Likelihood of Eventually Entering DROP at **Any Eligible Age**
Based on Initial DROP Eligibility Age - Special Risk Male



Immediate Retirement when DROP Eligible (Tier I) Special Risk Class Male

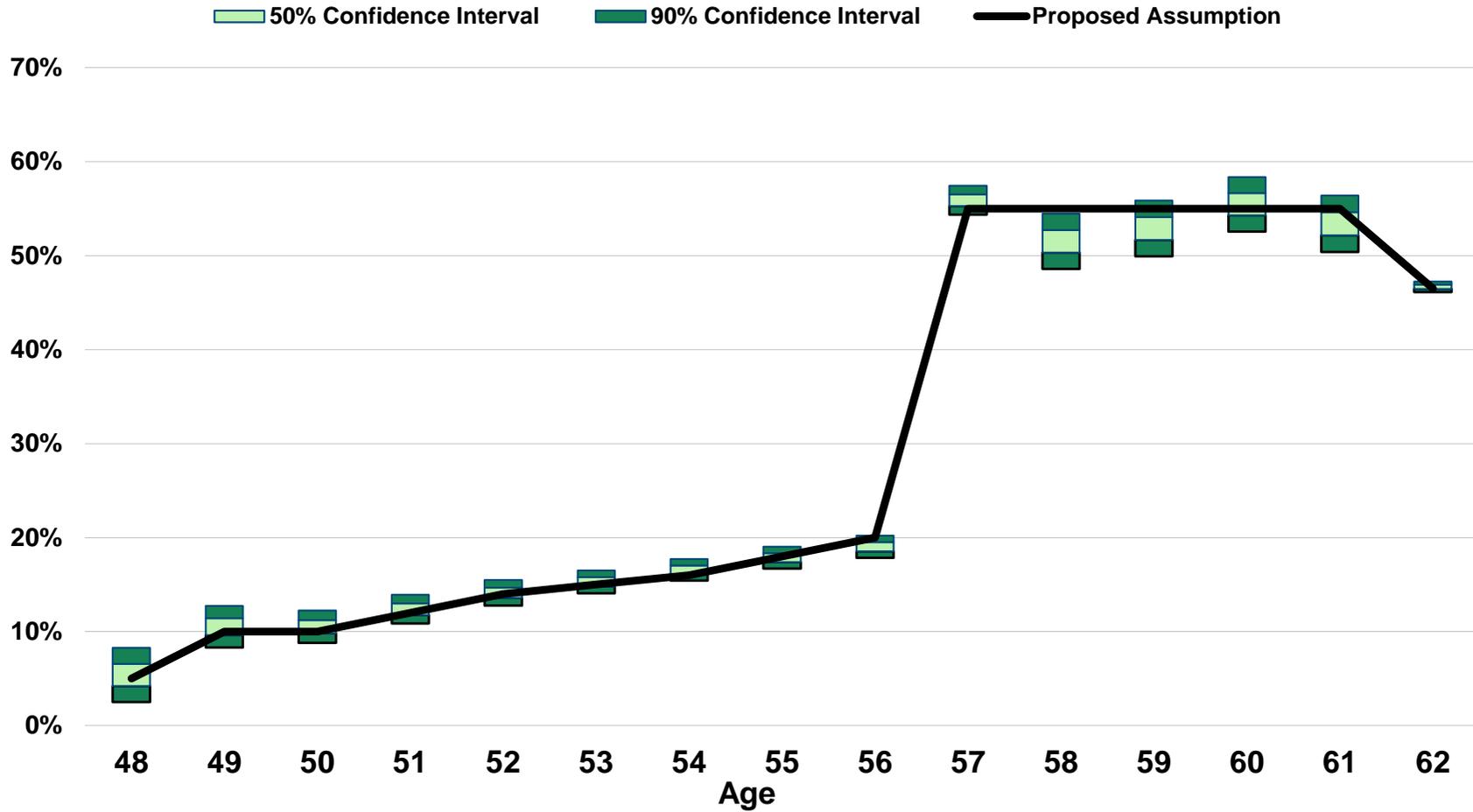


Retirement after DROP Eligibility (Tier I) Special Risk Class Male



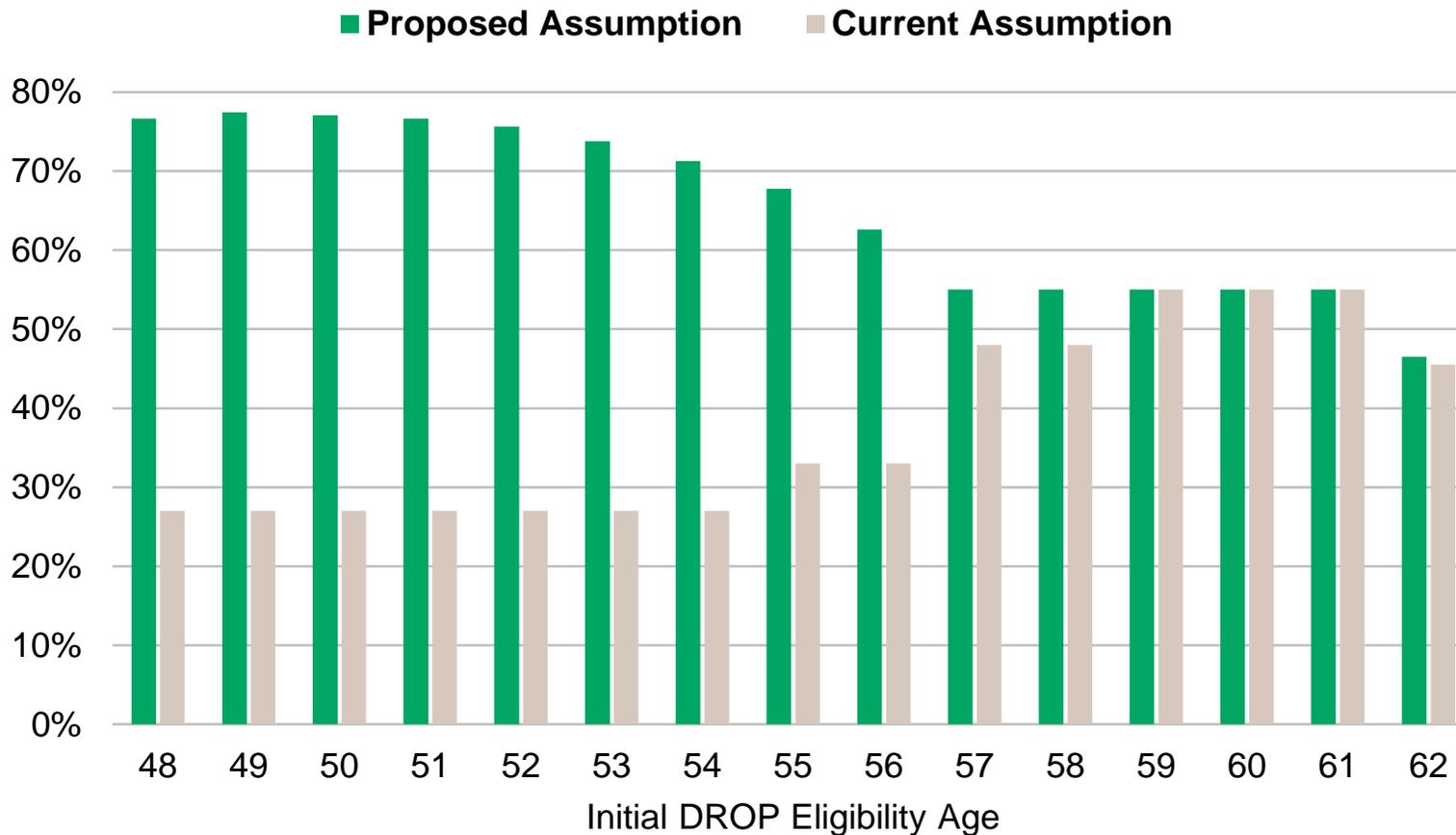
DROP Entry (Tier I) - Single Specific Age Assumption - Regular Class Female (Not K-12 School Instructional)

Likelihood of DROP Entry at a **Specific Single Age** - Regular Non-Instructional Females

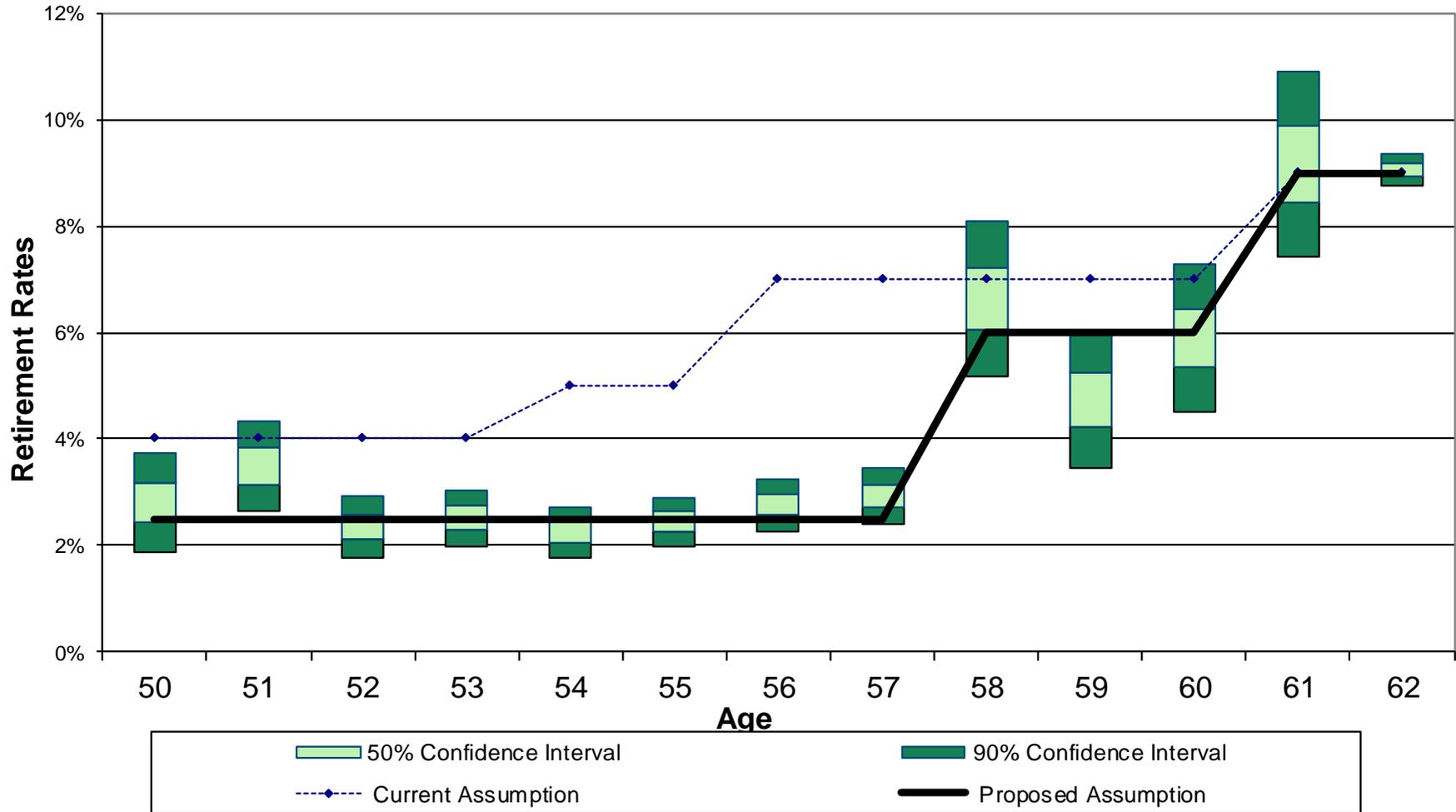


DROP Entry (Tier I) – Cumulative Likelihood of DROP Entry Regular Class Female (Not K-12 School Instructional)

Likelihood of Eventually Entering DROP at **Any Eligible Age** Based on Initial DROP Eligibility Age - Regular Non-Instructional Female

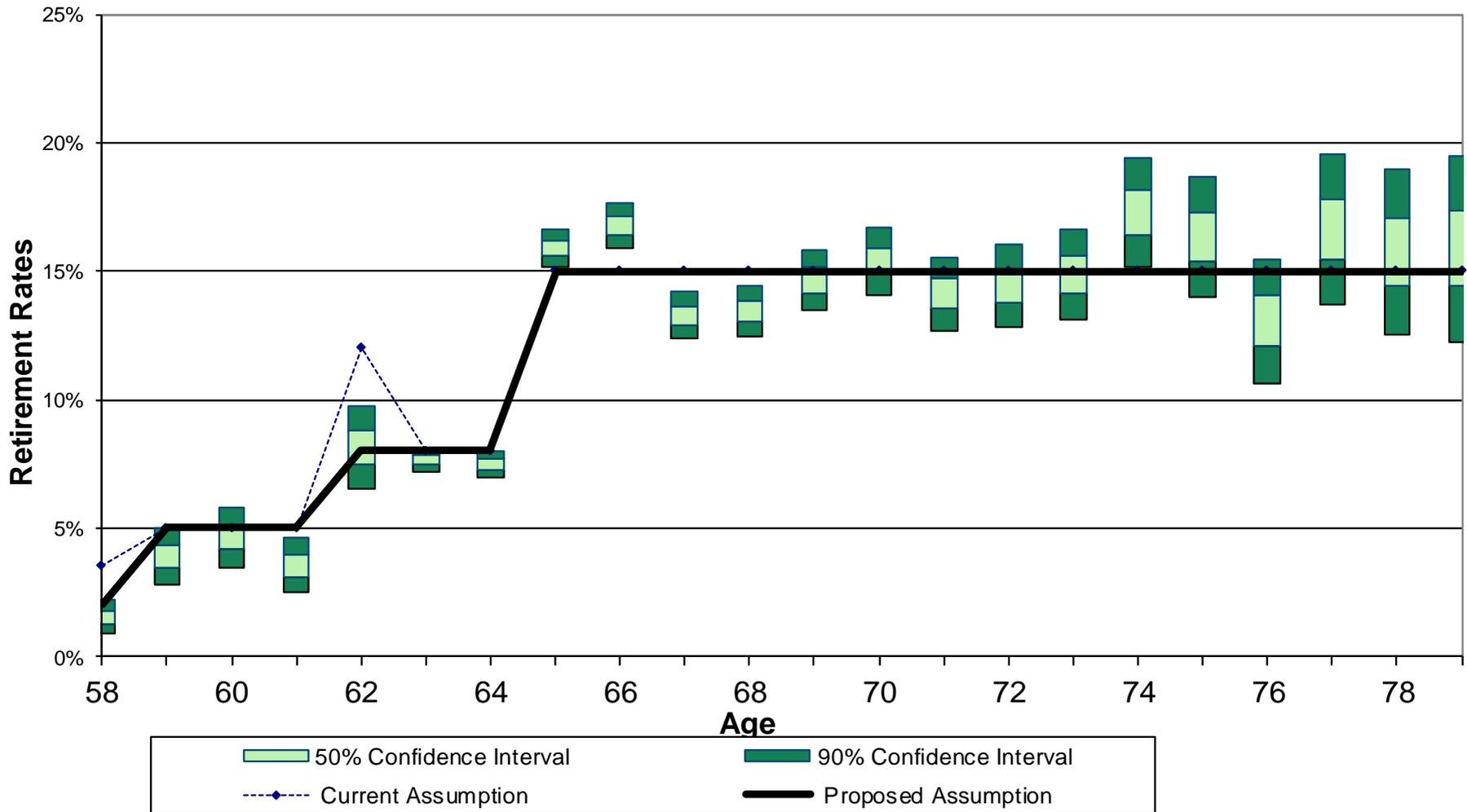


Immediate Retirement when DROP Eligible (Tier I) Regular Class Female (Not K-12 School Instructional)



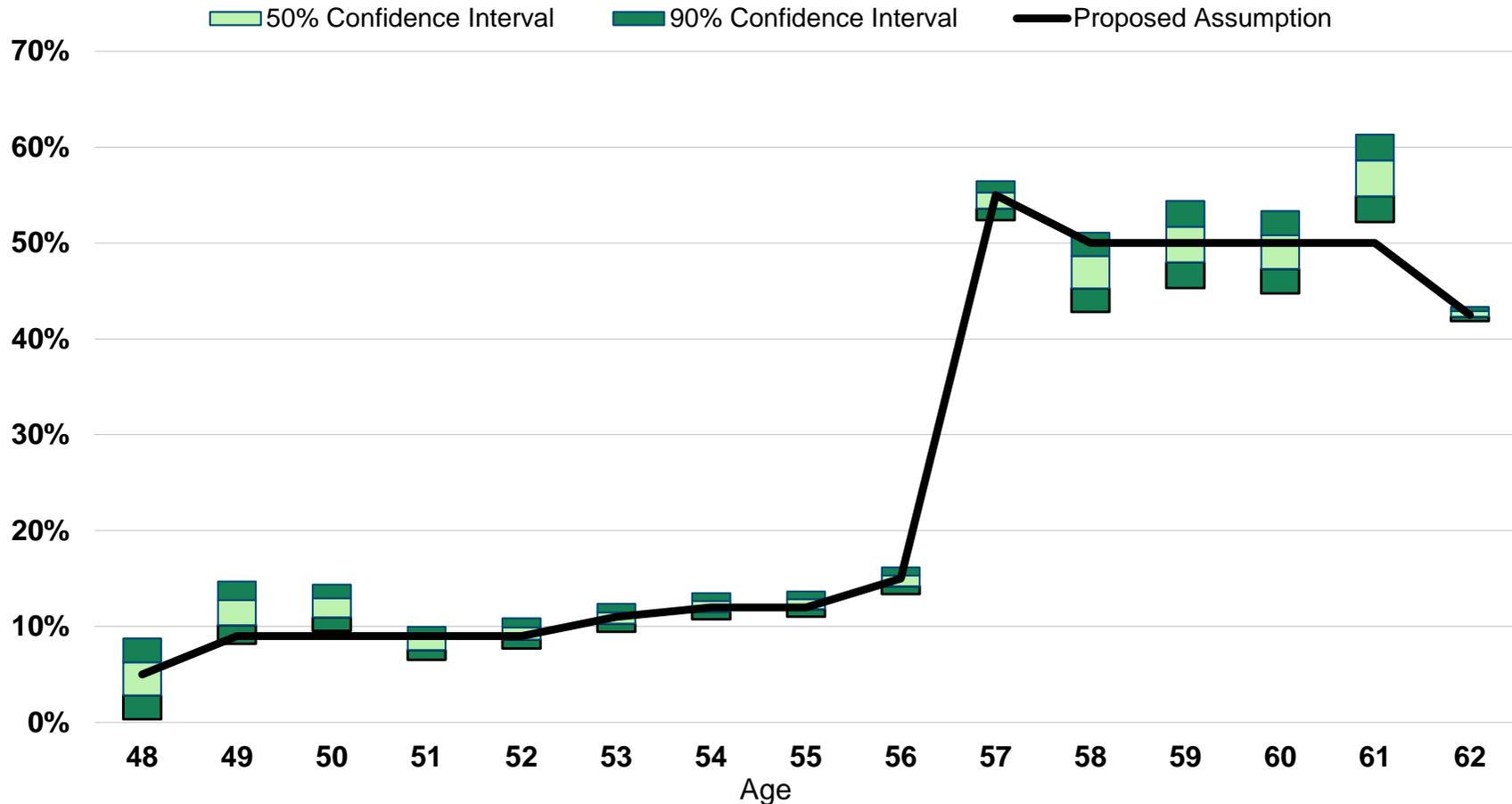
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Retirement after DROP Eligibility (Tier I) Regular Class Female (Not K-12 School Instructional)

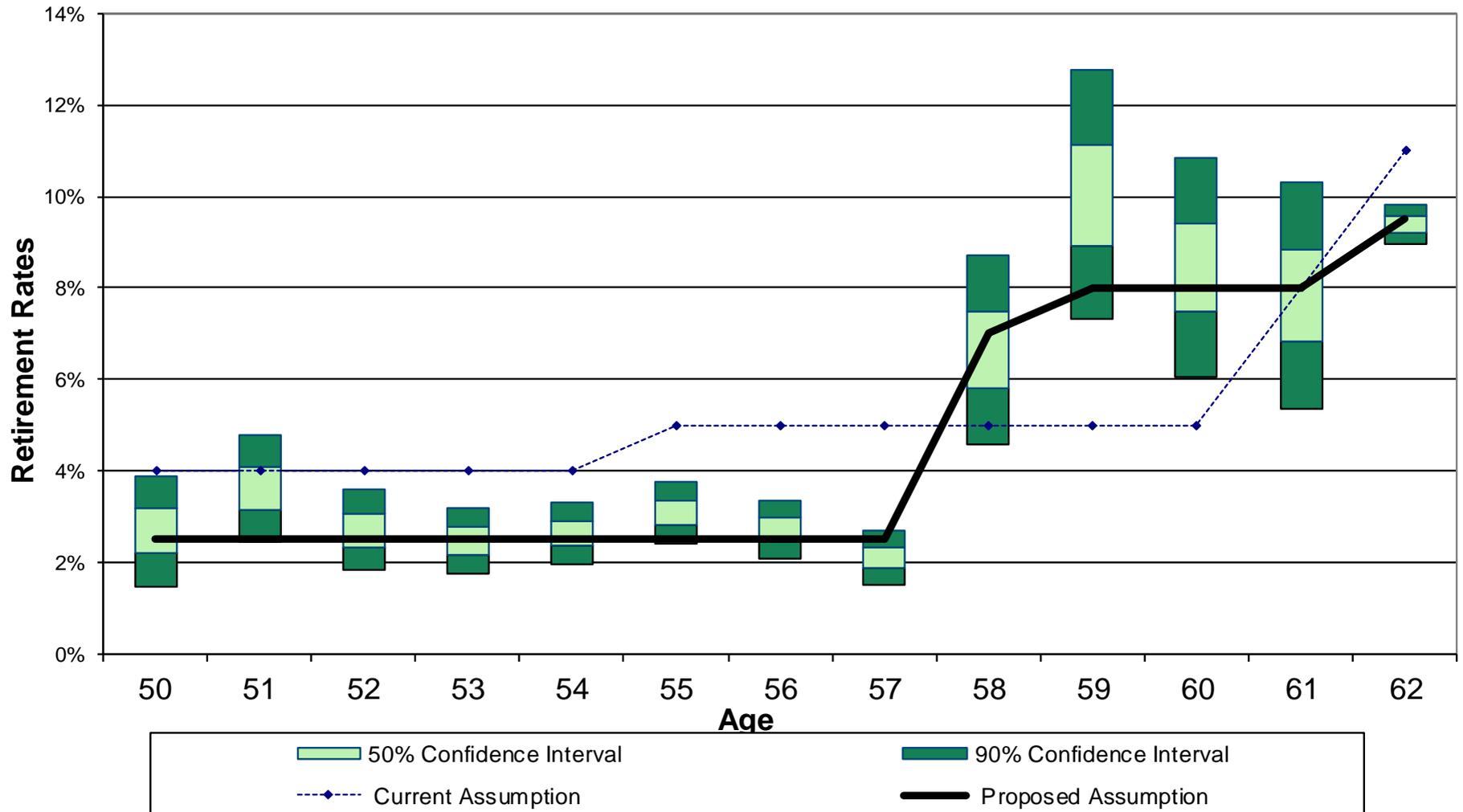


DROP Entry (Tier I) Regular Class Male (Not K-12 School Instructional)

Likelihood of DROP Entry at a **Specific Single Age** - Regular Non-Instructional Male

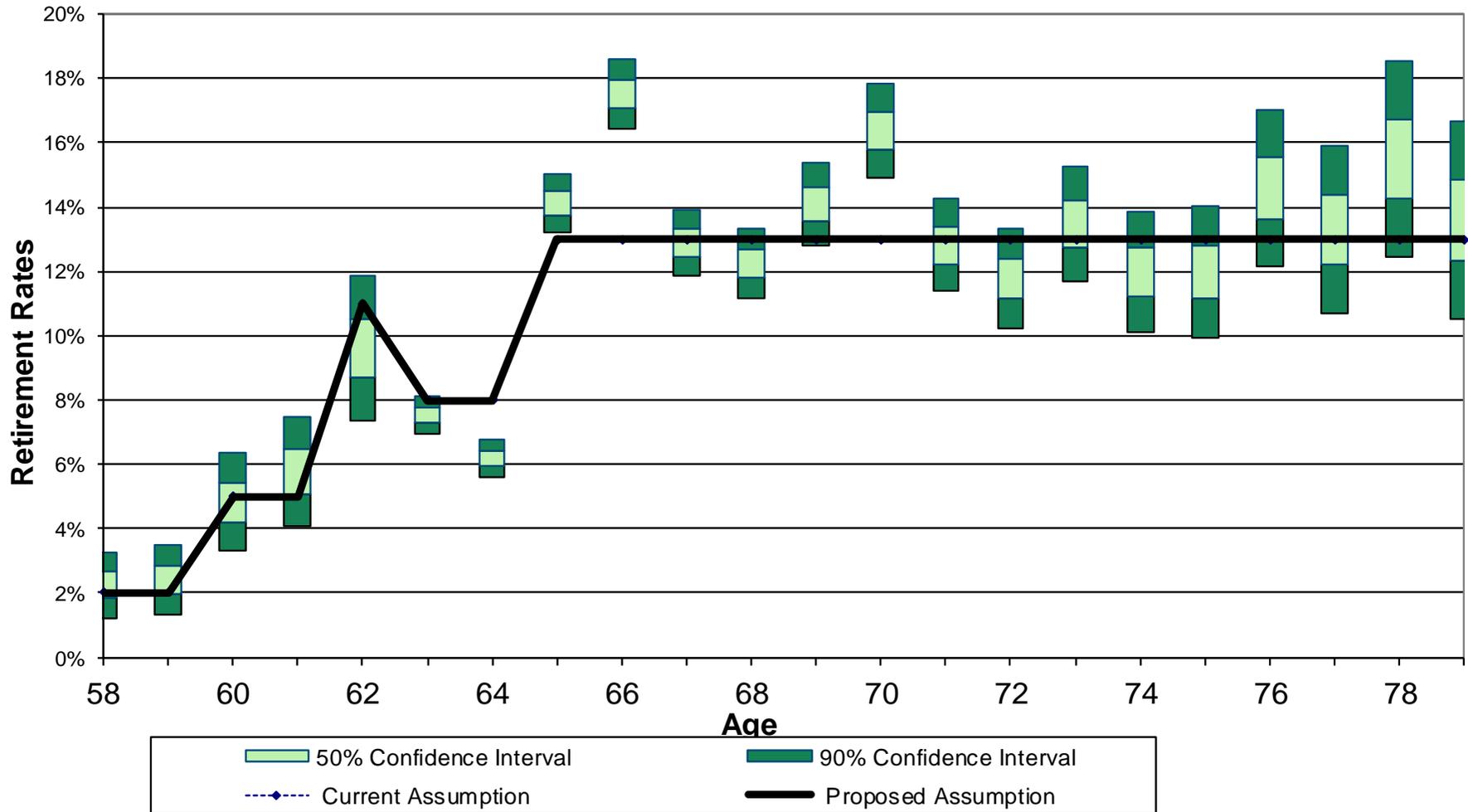


Immediate Retirement when DROP Eligible (Tier I) Regular Class Male (Not K-12 School Instructional)



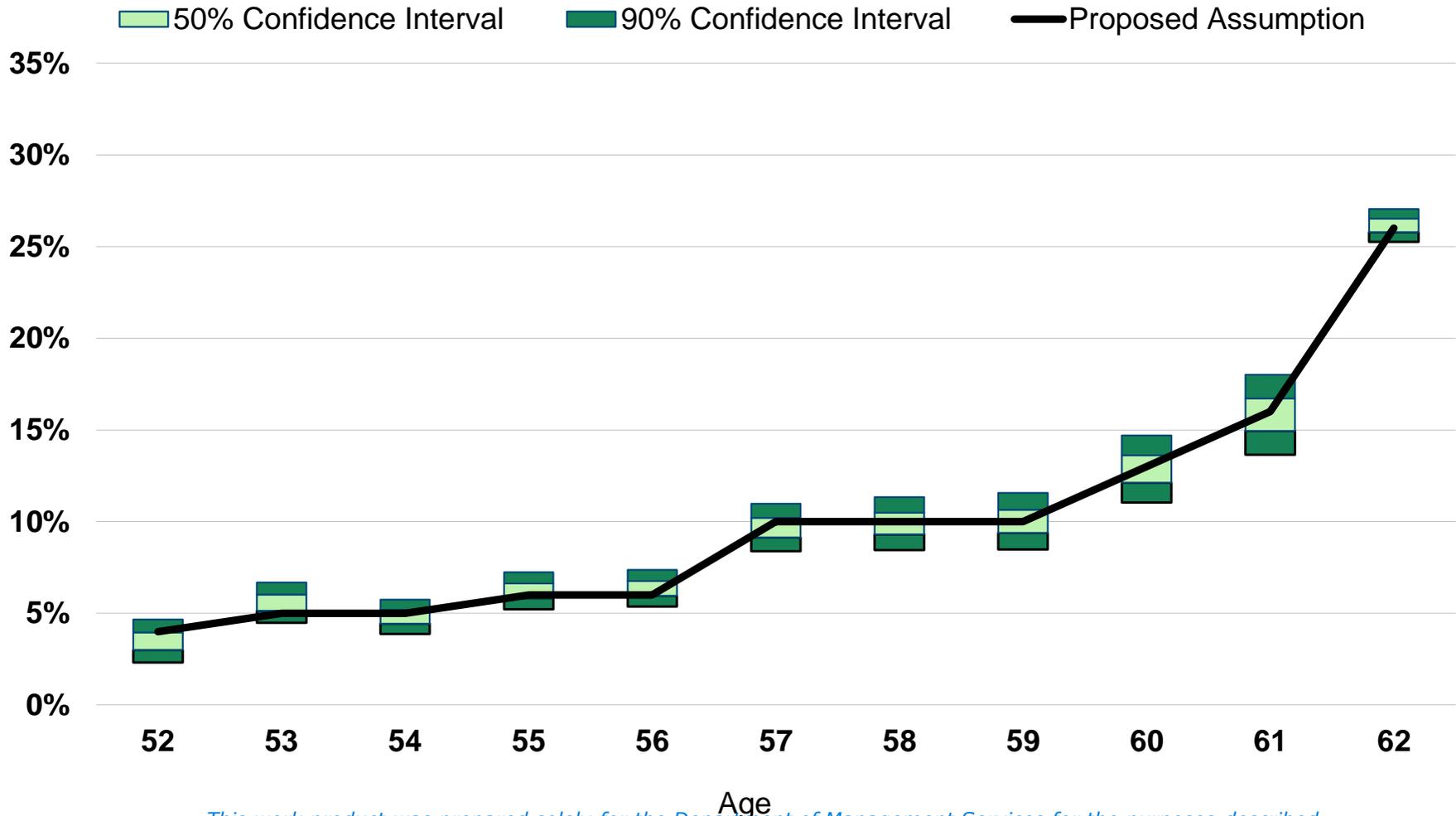
This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Retirement after DROP Eligibility (Tier I) Regular Class Male (Not K-12 School Instructional)



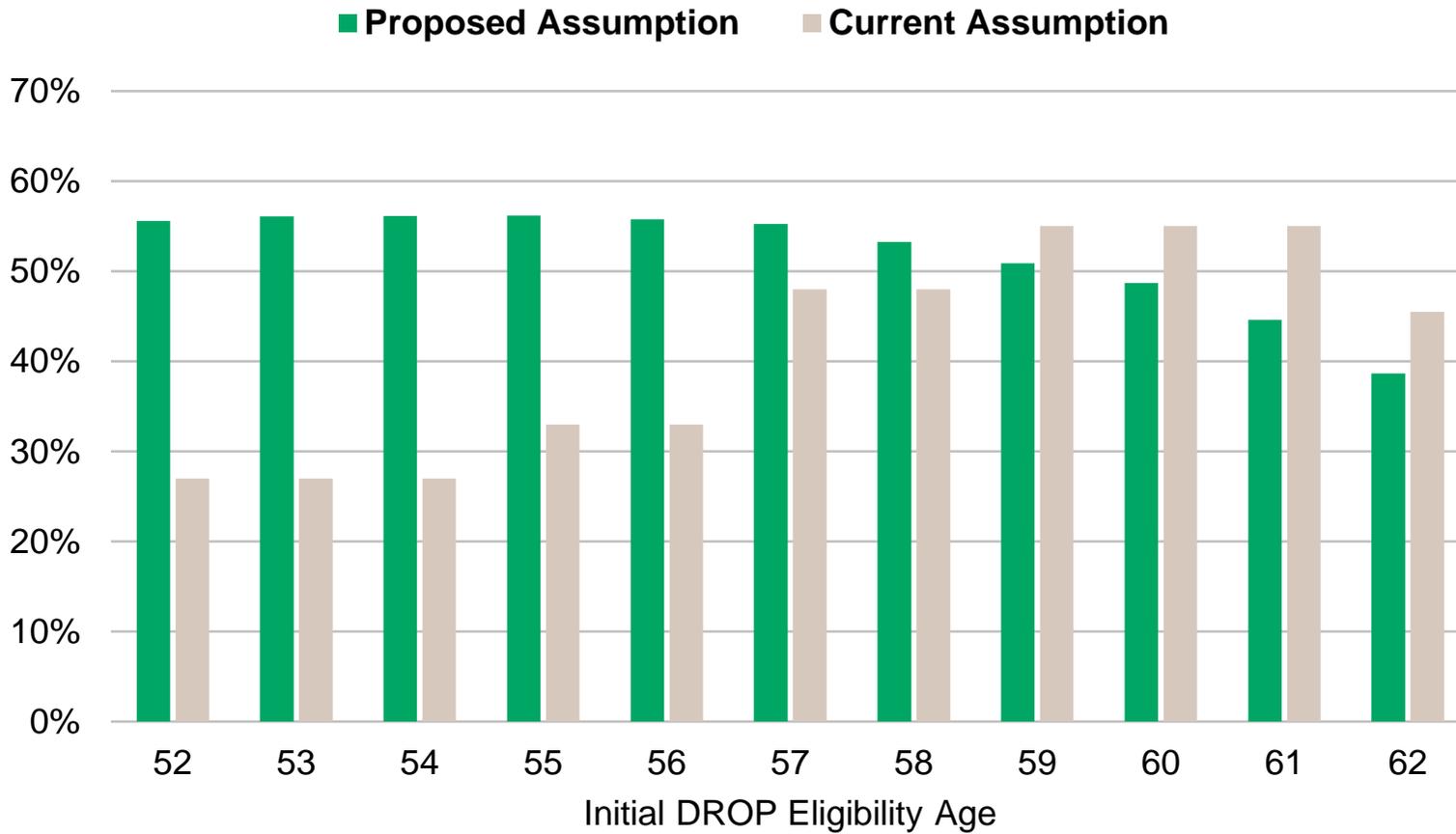
DROP Entry (Tier I) Regular Class Female (K-12 School Instructional)

Likelihood of DROP Entry at a **Single Specific Age** - Regular Instructional Female



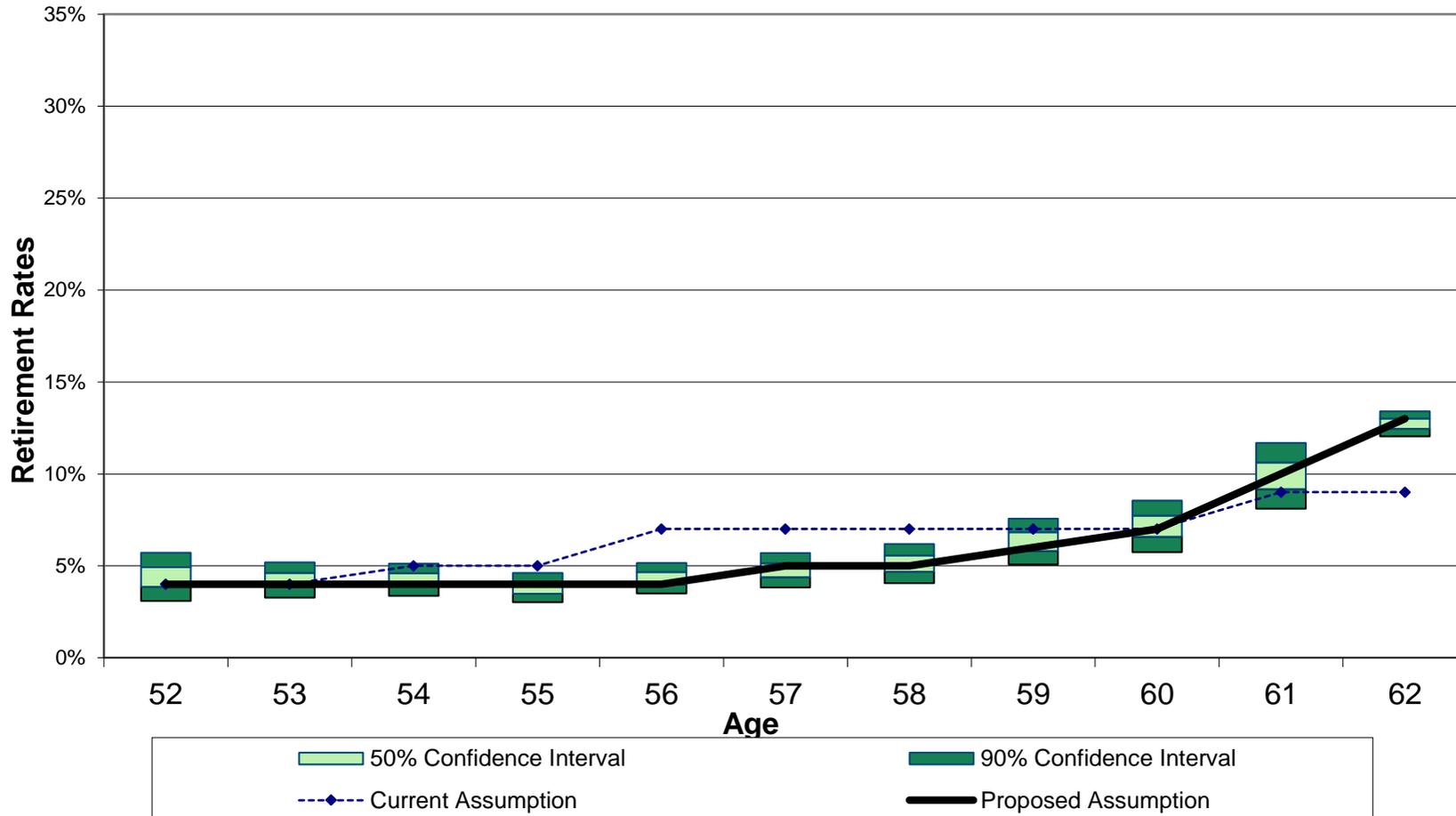
DROP Entry (Tier I) – Cumulative Likelihood of DROP Entry Regular Class Female (K-12 School Instructional)

Likelihood of Eventually Entering DROP at **Any Eligible Age** Based on Initial DROP Eligibility Age - Regular Class Instructional Female



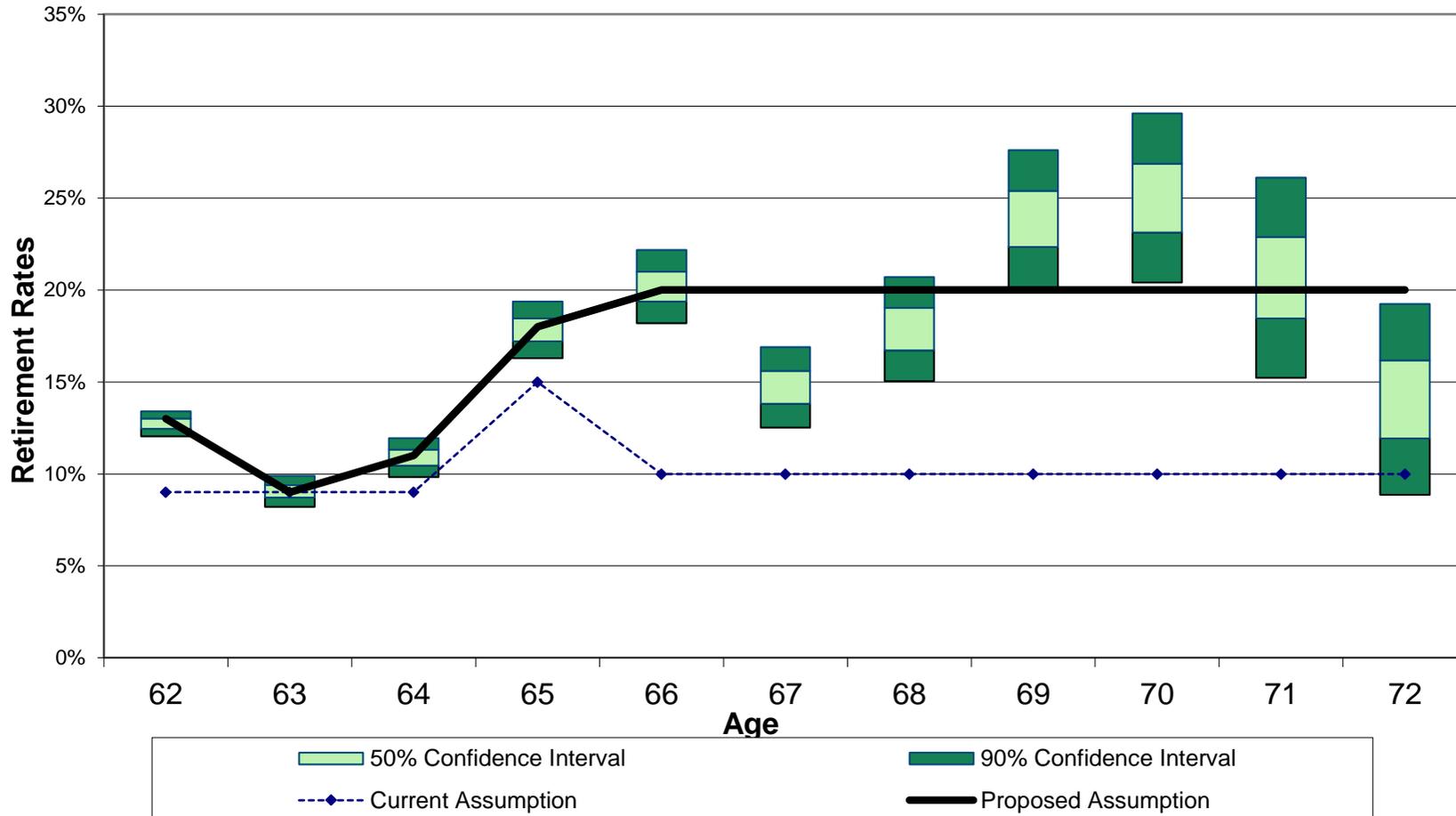
Immediate Retirement (Tier I) Regular Class Female (K-12 School Instructional) Age 52-62

Retirement - Female Teachers



Immediate Retirement (Tier I) Regular Class Female (K-12 School Instructional) Age 62-72

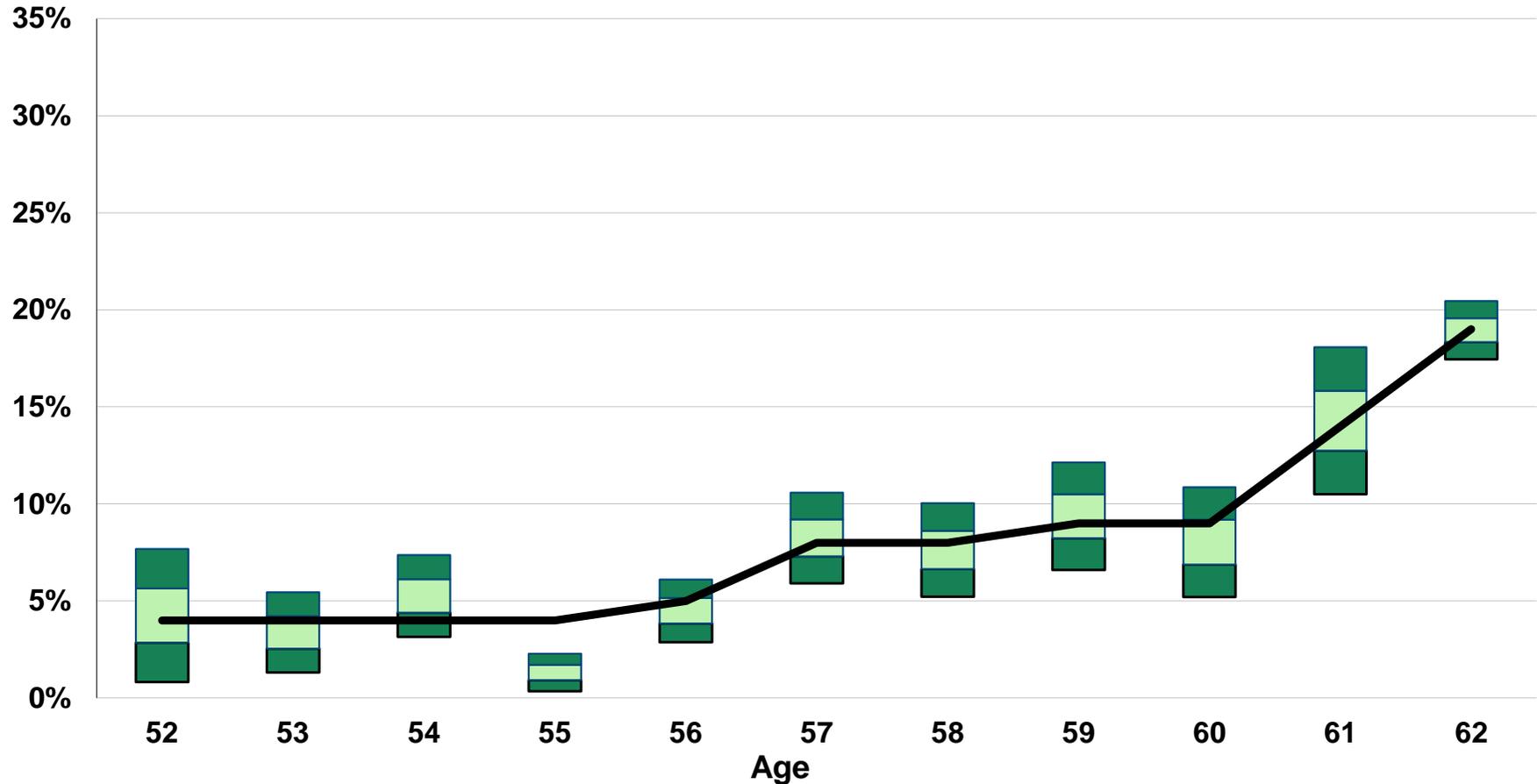
Retirement - Female Teachers



DROP Entry (Tier I) Regular Class Male (K-12 School Instructional)

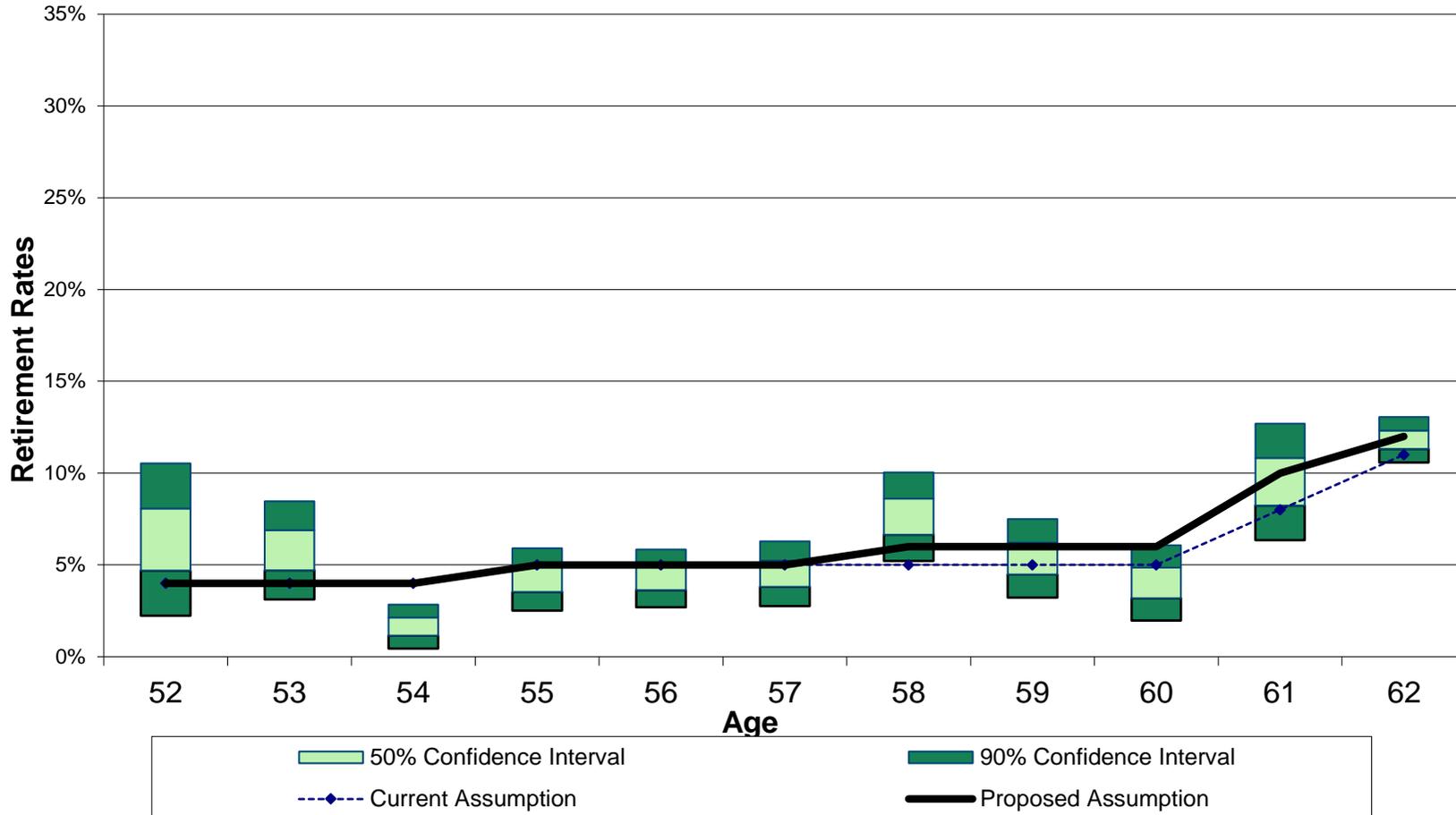
Likelihood of DROP Entry at a **Single Specific Age** - Regular Instructional Male

50% Confidence Interval 90% Confidence Interval Proposed Assumption



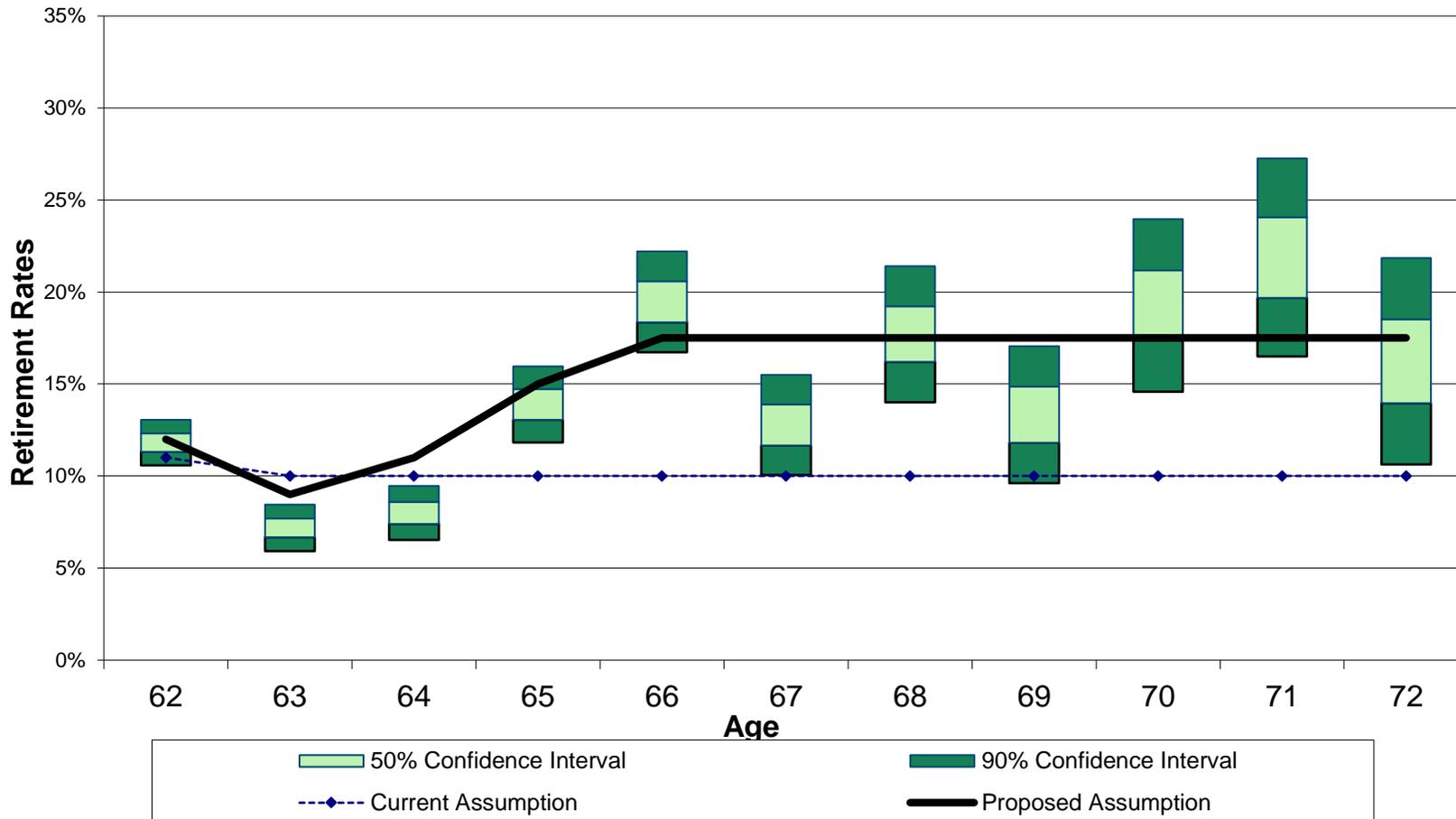
Immediate Retirement (Tier I) Regular Class Male (K-12 School Instructional) Age 52-62

Retirement - Male Teachers



Immediate Retirement (Tier I) Regular Class Male (K-12 School Instructional) Age 62-72

Retirement - Male Teachers



This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Demographic Assumptions – Other Non-Economic / Wrap-Up

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Other Demographic Assumptions

- We compared observed experience versus expected experience under current assumptions for other demographic events
- For each of the following assumptions, observed experience was reasonably close to current assumptions, with any proposed assumption changes not materially affecting liability or System-average contribution rate calculations
 - Termination of employment prior to unreduced retirement
 - Non-duty-related disability incidence
 - Disability mortality

Demographic Assumptions Wrap-Up

- Estimated System average impact of the proposed changes summarized so far in this presentation on the 2019-2020 proposed blended statutory rates, which were set based on the 2018 actuarial valuation, would have been:

Metric	Approximate Effect
Unfunded Actuarial Liability (UAL)	(\$522 million)
Normal Cost Rate	-0.11% of affected payroll
UAL Rate	-0.09% of affected payroll

Actuarial Methods – Amortization Periods

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Use of Actuarial Methods

- Actuarial methods allocate the net present value of the projected benefit payments between past service and projected future service, which establishes funded status
- Methods selected, when combined with assumptions, also develop the pattern of projected contribution rates



Amortization of Previously Unanticipated UAL Changes

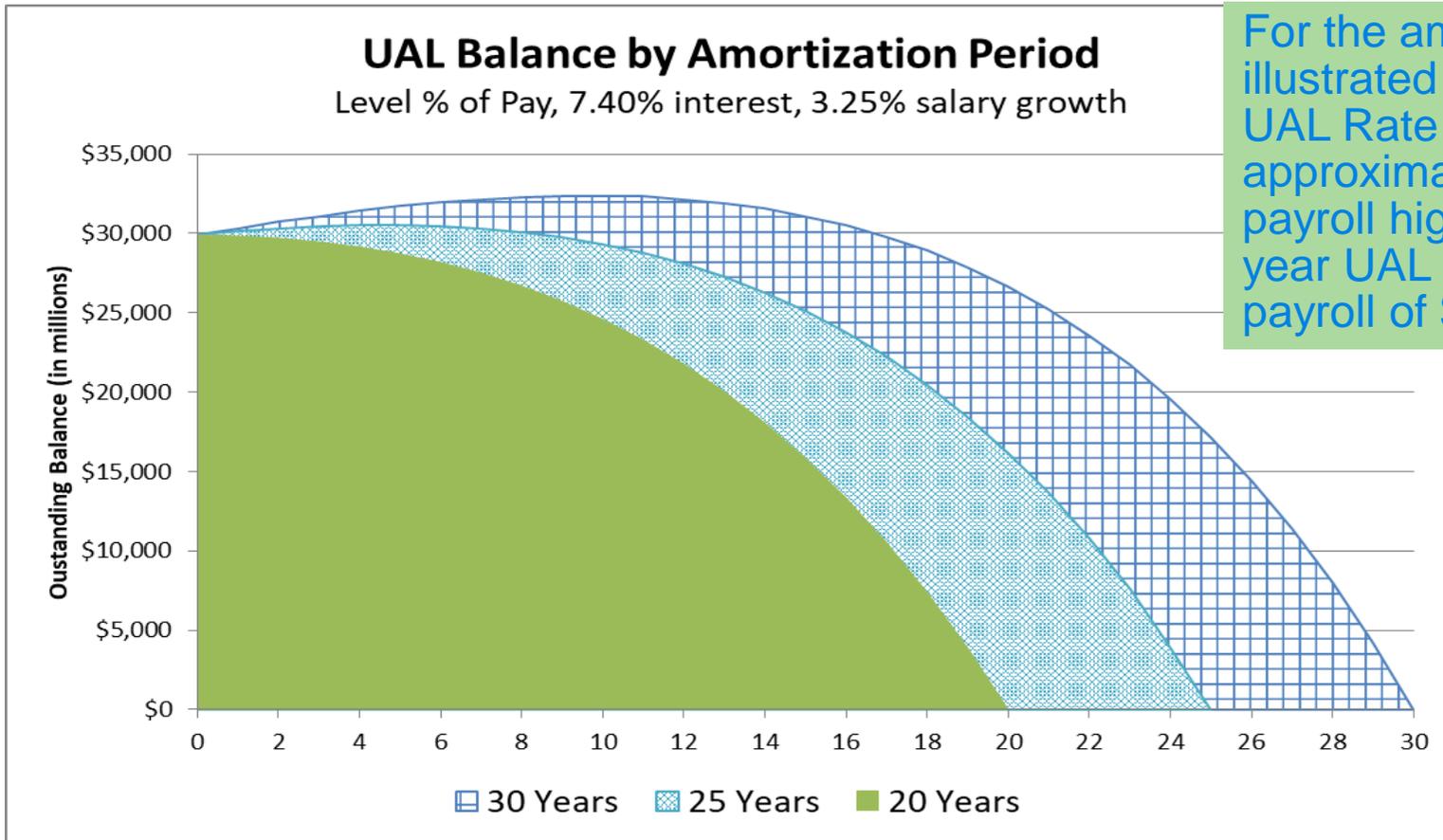
- The system has previously unanticipated UAL (unfunded actuarial liability) changes each and every year
- Sources of previously unanticipated UAL change include:
 - Actual experience different than valuation assumptions
 - Changes to valuation assumptions
 - Changes to valuation methods
 - Legislatively mandated funding different than actuarially determined contribution rates
- Unanticipated UAL changes can lower UAL (e.g., good investment returns) or increase UAL (e.g., decreasing the investment return assumption)

Amortization Period

- Current policy has been to amortize each year's unanticipated UAL change over a closed 30-year period as a level percentage of projected payroll
 - Statute limits amortization to a maximum of 30 years
- In our opinion, a 30 year level percent of projected payroll amortization is not a best practice
 - That opinion is influenced by extended period of net negative amortization if future experience matches assumptions, even if actuarially determined contributions are made

Amortization Period

This slide illustrates the amortization pattern of a \$30 billion UAL over several alternative amortization periods



For the amortization illustrated here, the 20-year UAL Rate would be approximately 1.5%-1.6% of payroll higher than the 30-year UAL Rate for a UAL payroll of \$31 Billion

Actuarial Methods – Cost Allocation Method

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Cost Allocation Methods - Introduction

- The division of the present value of a member's projected benefit payments between past, current & future service is done through use of an actuarial cost allocation method
- The present day value of projected future benefits allocated to a particular working year is the **Normal Cost**
- The present day value of projected future benefits allocated to prior years is the **Actuarial Liability**
- The difference between the Actuarial Value of Assets and the Actuarial Liability is the **Unfunded Actuarial Liability (UAL)**

Entry Age Normal Cost Allocation Method

- By far the most commonly used cost allocation method for state systems is Entry Age Normal (EAN)
 - Conceptually, EAN sets normal cost rate level as a percent of payroll over a member's full projected working career
- There are different categories of EAN, including:
 - Individual EAN (most commonly used)
 - Ultimate EAN (currently used by FRS)

GASB standards mandate Individual EAN with reasonable assumptions for System and employer financial reporting

Ultimate EAN Cost Allocation Method

- FRS currently uses the Ultimate EAN cost allocation method for calculating employer contribution rates to fund the System
 - Individual EAN is used for financial reporting, per GASB
- Ultimate EAN sets Normal Cost as if each member is in Tier II
 - As such, Normal Cost is lower with Ultimate EAN than it is under Individual Entry Age
- Cost methods **do** allocate benefits between past and projected future service, but **do not** affect the level of projected benefits
 - Since Ultimate EAN allocates less of projected benefits to future service, it allocates more to past service and has a higher actuarial liability than Individual Entry Age

Contribution Rates

- Actuarially calculated contribution rates =
 - (Normal Cost) + (Amortization of Unfunded Actuarial Liability)
- The best way to understand the contribution rate differences between Individual EAN and Ultimate EAN is development of the normal cost rate for a Tier I member

Individual EAN Cost Allocation Method

- A Tier I member's Individual EAN normal cost rate is the level % of payroll contribution needed during a member's career to fund a Tier I level of benefits if experience follows assumptions
 - The bifurcated nature of Tier I COLA benefits means that Tier I members with the same age at hire but differing years of service will have **different** Individual EAN normal cost rates
 - This differs from Ultimate EAN, where the normal cost rate is set for Tier I members as if they do not receive COLA benefits, consistent with the lack of COLA in Tier II benefits

Ultimate EAN Cost Allocation Method

- The cost allocation method used by FRS to calculate employer contribution rates to fund the System is Ultimate EAN
- Ultimate EAN calculates the normal cost rate for **all** members as if they all participate in the newest, or ultimate, tier
- Our sample Tier I's Ultimate EAN normal cost rate is the career level % of payroll contribution needed to fund a Tier II level of benefits if experience follows assumptions
 - Members with the same age, membership class and gender at hire will all effectively have the **same** normal cost rate under Ultimate EAN regardless of year of hire or tier

Ultimate EAN Cost Allocation Method

- The total projected benefit levels calculated for individual members **do** reflect tier and year of hire
 - Cost method only affects the allocation of those projected benefits between past, current & future service

Individual EAN v. Ultimate EAN Comparison

- Individual EAN's normal cost rate is higher than Ultimate EAN's
 - The System average Individual EAN normal cost rate would gradually drift to the Ultimate EAN normal cost rate over time
- Similarly, Individual EAN has a higher present value of all future normal costs than Ultimate EAN
- Because Ultimate EAN allocates less of total projected benefits to future years of service, Individual EAN has a lower Actuarial Liability than Ultimate EAN
 - Actuarial Liability = (Net present value of projected future benefits) minus (Costs allocated to projected future service)

Individual EAN v. Ultimate EAN Comparison

- Even though Ultimate EAN has a higher Actuarial Liability and Unfunded Actuarial Liability (UAL), the amortization of that higher UAL is only a partial offset to the higher normal cost rate of Individual EAN
- Under current amortization policy, it is only a partial offset due to the length and method of the amortization period

Individual EAN v. Ultimate EAN Comparison

	Individual EAN	Ultimate EAN
Calculation of Tier I Normal Cost Rate	Reflects career average cost of Tier I benefit	Reflects career average cost of Tier II benefit
Present Value of Future Normal Costs (PVFNC)	Higher under this method	Lower under this method
Total Present Value of Projected Benefits (PVPB)	Equivalent regardless of allocation method	Equivalent regardless of allocation method
Actuarial Liability (= PVPB minus PVFNC)	Lower under this method	Higher under this method
System Average Normal Cost Rate	Drifts down over time as Tier IIs replace Tier Is	Remains level over time

A change to Individual EAN allocation would **increase** Normal Cost and **decrease** Unfunded Actuarial Liability, while not affecting projected benefit payment levels

Cost Allocation Method Wrap-Up

- We propose at the next meeting to illustrate effects of:
 - Retaining use of the ultimate entry age method
versus
 - Changing to individual entry age method and amortizing the decrease in UAL from the change over a shorter amortization period to mitigate or eliminate any increase in actuarially determined 2020-2021 contribution rates due to the method change

We recommend illustration of the individual entry age method

Review of Non-Investment Economic Assumptions

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Assumptions to Be Discussed

	Current Assumptions 7/1/2018 Valuation
Inflation	2.60%
Real Wage Growth	<u>0.65%</u>
System Payroll Growth	3.25%

Economic Assumptions

Inflation

- The inflation assumption affects other assumptions, including system payroll growth, and investment return
- Inflation can vary significantly over time
- One estimate of future inflation can be derived from yields of Treasury securities and Treasury Inflation Protected Securities (TIPS)
- Social Security’s current “intermediate cost” 30-year average inflation assumption is **2.58%**
- In our opinion, the current assumption of **2.60%** is reasonable

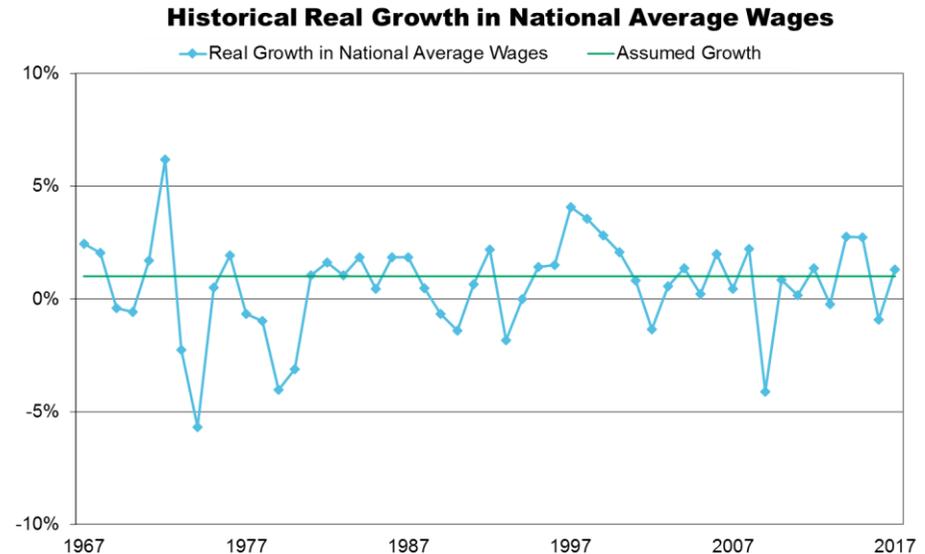
Period Ending 6/30/2019	Average Inflation
10 years	1.73%
20 years	2.19%
30 years	2.44%
40 years	3.21%

As of 6/30/2019	10 Year	30 Year
Treasury Yield	2.00%	2.52%
TIPS Yield	<u>0.31%</u>	<u>0.78%</u>
“Breakeven” Inflation	1.69%	1.74%

Economic Assumptions

Real Wage Growth

- An individual member’s assumed annual salary increase is composed of:
 - Inflation
 - Real wage growth
 - Individual merit/longevity component
- Real wage growth represents the increase in wages in excess of inflation for the entire group due to improvements in productivity and competitive market pressures
- Social Security’s long-term “intermediate cost” real wage growth assumption is 1.2%
- In our opinion, the current assumption of **0.65%** is reasonable



Most Recently Available	Average Real Wage Growth
10 Years	0.59%
20 Years	0.92%
30 Years	0.82%
40 Years	0.65%

Economic Assumptions

System Payroll Growth

- Overall system payroll growth is assumed to equal the sum of:
 - Inflation
 - Real wage growth
- The system payroll growth assumption determines the shape of the curve of payments to amortize the unfunded liability
- Given that in our opinion both an inflation assumption of 2.60% and a real wage growth assumption of 0.65% are reasonable, the current system payroll growth assumption of **3.25%** is also reasonable in our opinion

Trailing Period	Average Annualized Growth in Payroll on Which Blended Statutory UAL Rates Are Charged
5 Years	2.6%
10 Years	1.6%

Guidance Requested from Today's Meeting

- For non-investment, system-level economic assumptions either:
 - Approval of 2.60% inflation and 0.65% real wage growth assumptions for use in the 2019 actuarial valuation
or
 - Identification of a limited number of assumption policy alternatives for presentation at the at the 2019 FRS Actuarial Assumption Conference



Appendix

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Certification

This presentation discusses actuarial methods and assumptions for use in the valuation of the Florida Retirement System (“FRS” or “the System”). For the most recent complete actuarial valuation results, including cautions regarding the limitations of use of valuation calculations, please refer to our formal Actuarial Valuation Report as of July 1, 2018 (“the Valuation Report”) published on December 3, 2018. The Valuation Report, including all supporting information regarding data, assumptions, methods, and provisions, is incorporated by reference into this presentation. The statements of reliance and limitations on the use of this material is reflected in the actuarial report and still apply to this presentation. The Valuation Report, along with prior presentations to the FRS Actuarial Assumption Conference Principals, including our October 2018 presentation, should be referenced for additional detail on the assumptions, methods, and plan provisions underlying this presentation.

In preparing this presentation, we relied, without audit, on information (some oral and some in writing) supplied by the System’s staff. This information includes, but is not limited to, statutory provisions, member data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The 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.

Milliman’s work product was prepared exclusively for the Florida Department of Management Services (“DMS”) for a specific and limited purpose. It is a complex, technical analysis that assumes a high level of knowledge concerning FRS’s operations, and uses FRS’s data, which Milliman has not audited. It is not for the use or benefit of any third party for any purpose. 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. Any third party recipient of Milliman’s work product who desires professional guidance should not rely upon Milliman’s work product, but should engage qualified professionals for advice appropriate to its own specific needs.

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 signing actuaries are independent of the plan sponsors. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.



This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Healthy Mortality (Post-Retirement)

Member Category	PUB-2010 base table listed below, generational mortality using gender-specific MP-2018 mortality improvement projection scale
Female Non-Disabled K-12 School Instructional Personnel	Headcount Weighted Teachers Healthy Retiree Female Table, set forward 1 year
Male Non-Disabled K-12 School Instructional Personnel	Benefits Weighted Teachers Below Median Healthy Retiree Male Table, set forward 2 years
Female Non-Disabled Special Risk	Headcount Weighted Safety Healthy Retiree Female Table, set forward 1 year
Male Non-Disabled Special Risk	Headcount Weighted Safety Below Median Healthy Retiree Male Table, set forward 1 year
Female Non-Disabled (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Healthy Retiree Female Table
Male Non-Disabled (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Healthy Retiree Male Table, set back 1 year

Healthy Mortality (Pre-Retirement)

Member Category	PUB-2010 base table listed below, generational mortality using gender-specific MP-2018 mortality improvement projection scale
Female Non-Disabled K-12 School Instructional Personnel	Headcount Weighted Teachers Employee Female Table, set forward 1 year
Male Non-Disabled K-12 School Instructional Personnel	Benefits Weighted Teachers Below Median Employee Male Table, set forward 2 years
Female Non-Disabled Special Risk	Headcount Weighted Safety Employee Female Table, set-forward 1 year
Male Non-Disabled Special Risk	Headcount Weighted Safety Below Median Employee Male Table, set forward 1 year
Female Non-Disabled (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Employee Female Table
Male Non-Disabled (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Employee Male Table, set back 1 year

DROP Entry Tier 1

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		All Other	
	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
46	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
47	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
48	4.0%	4.0%	5.0%	5.0%	11.0%	15.0%	16.0%	16.0%
49	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
50	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
51	4.0%	4.0%	12.0%	9.0%	11.0%	15.0%	16.0%	16.0%
52	4.0%	4.0%	14.0%	9.0%	15.0%	36.0%	16.0%	16.0%
53	5.0%	4.0%	15.0%	11.0%	15.0%	27.5%	16.0%	16.0%
54	5.0%	4.0%	16.0%	12.0%	15.0%	27.5%	16.0%	16.0%
55	6.0%	4.0%	18.0%	12.0%	32.0%	27.5%	16.0%	16.0%
56	6.0%	5.0%	20.0%	15.0%	5.0%	5.0%	16.0%	16.0%
57	10.0%	8.0%	55.0%	55.0%	5.0%	5.0%	55.0%	55.0%
58	10.0%	8.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
59	10.0%	9.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
60	13.0%	9.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
61	16.0%	14.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
62	26.0%	19.0%	46.5%	42.5%	5.0%	5.0%	43.0%	43.0%
63	8.0%	6.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
64	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
65	5.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
66	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
67	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
68	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
69	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
70-79	3.0%	3.0%	5.0%	5.0%	0.0%	0.0%	3.0%	3.0%
80	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

DROP Entry Tier 2

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		All Other	
	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
46	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
47	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
48	4.0%	4.0%	5.0%	5.0%	11.0%	15.0%	16.0%	16.0%
49	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
50	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
51	4.0%	4.0%	12.0%	9.0%	11.0%	15.0%	16.0%	16.0%
52	4.0%	4.0%	14.0%	9.0%	11.0%	15.0%	16.0%	16.0%
53	5.0%	4.0%	15.0%	11.0%	11.0%	15.0%	16.0%	16.0%
54	5.0%	4.0%	16.0%	12.0%	11.0%	15.0%	16.0%	16.0%
55	6.0%	4.0%	18.0%	12.0%	17.0%	36.0%	16.0%	16.0%
56	6.0%	5.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
57	10.0%	8.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
58	10.0%	8.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
59	10.0%	9.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
60	13.0%	9.0%	55.0%	55.0%	20.0%	5.0%	55.0%	55.0%
61	16.0%	14.0%	55.0%	49.0%	5.0%	5.0%	50.0%	50.0%
62	16.0%	14.0%	49.5%	43.0%	5.0%	5.0%	45.0%	45.0%
63	16.0%	14.0%	43.0%	37.0%	5.0%	5.0%	40.0%	40.0%
64	16.0%	14.0%	36.5%	31.0%	5.0%	5.0%	35.0%	35.0%
65	16.0%	14.0%	30.0%	25.0%	5.0%	5.0%	30.0%	30.0%
66	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
67	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
68	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
69	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
70-79	3.0%	3.0%	5.0%	5.0%	0.0%	0.0%	3.0%	3.0%
80	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Immediate Retirement while DROP Eligible Tier 1

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
46	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
48	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
49	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
50	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
51	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
52	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
53	4.0%	4.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
54	4.0%	4.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
55	4.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
56	4.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
57	5.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
58	5.0%	6.0%	6.0%	7.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
59	6.0%	6.0%	6.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
60	7.0%	6.0%	6.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
61	10.0%	10.0%	9.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
62	13.0%	12.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
63	9.0%	9.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
64	11.0%	11.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
65	18.0%	15.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
66	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
67	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
68	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
69	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
70-79	20.0%	17.5%	9.0%	9.5%	100.0%	100.0%	3.0%	3.0%	3.0%	3.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Immediate Retirement while DROP Eligible Tier 2

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
46	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
48	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
49	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
50	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
51	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
52	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
53	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
54	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
55	4.0%	5.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
56	4.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
57	5.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
58	5.0%	6.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
59	6.0%	6.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
60	7.0%	6.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
61	10.0%	10.0%	9.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
62	10.0%	10.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
63	10.0%	10.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
64	10.0%	10.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
65	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
66	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
67	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
68	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
69	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
70-79	20.0%	17.5%	9.0%	9.5%	100.0%	100.0%	3.0%	3.0%	3.0%	3.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Retirement after DROP Eligibility

Tier 1

Age	Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
46	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
48	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
49	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
51	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
52	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
53	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
54	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
55	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
56	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
57	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
58	2.0%	2.0%	5.0%	5.0%	3.0%	3.0%	6.0%	6.0%
59	5.0%	2.0%	5.0%	5.0%	3.0%	3.0%	6.0%	6.0%
60	5.0%	5.0%	7.0%	7.0%	3.0%	3.0%	6.0%	6.0%
61	5.0%	5.0%	9.0%	9.0%	3.0%	3.0%	6.0%	6.0%
62	8.0%	11.0%	20.0%	20.0%	3.0%	3.0%	6.0%	6.0%
63	8.0%	8.0%	14.0%	14.0%	5.0%	5.0%	11.0%	11.0%
64	8.0%	8.0%	14.0%	14.0%	5.0%	5.0%	11.0%	11.0%
65	15.0%	13.0%	20.0%	20.0%	5.0%	5.0%	11.0%	11.0%
66	15.0%	13.0%	25.0%	25.0%	5.0%	5.0%	11.0%	11.0%
67	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
68	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
69	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
70-79	15.0%	13.0%	100.0%	100.0%	12.0%	12.0%	11.0%	11.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product

Retirement after DROP Eligibility Tier 2

Age	Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
46	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
48	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
49	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
51	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
52	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
53	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
54	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
55	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
56	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
57	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
58	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
59	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
60	0.0%	0.0%	7.0%	7.0%	0.0%	0.0%	0.0%	0.0%
61	5.0%	5.0%	9.0%	9.0%	3.0%	3.0%	6.0%	6.0%
62	5.0%	5.0%	20.0%	20.0%	3.0%	3.0%	6.0%	6.0%
63	5.0%	5.0%	14.0%	14.0%	3.0%	3.0%	6.0%	6.0%
64	5.0%	5.0%	14.0%	14.0%	3.0%	3.0%	6.0%	6.0%
65	15.0%	13.0%	20.0%	20.0%	3.0%	3.0%	11.0%	11.0%
66	15.0%	13.0%	25.0%	25.0%	5.0%	5.0%	11.0%	11.0%
67	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
68	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
69	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
70-79	15.0%	13.0%	100.0%	100.0%	12.0%	12.0%	11.0%	11.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

This work product was prepared solely for the Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product



Florida Retirement System Pension Plan

Actuarial Valuation as of July 1, 2019

Prepared by:

Matt Larrabee, FSA, EA, MAAA
Principal and Consulting Actuary

Daniel Wade, FSA, EA, MAAA
Principal and Consulting Actuary

Kathryn Hunter, FSA, EA, MAAA
Consulting Actuary

1455 SW Broadway Street, Suite 1600
Portland OR 97201
Tel 503 227 0634

1301 Fifth Avenue, Suite 3800
Seattle, WA 98101
Tel 206 624 7940

milliman.com



1455 SW Broadway Street, Suite 1600
Portland, OR 97201
Tel 503 227 0634

1301 Fifth Avenue, Suite 3800
Seattle, WA 98101
Tel 206 624 7940

milliman.com

December 3, 2019

Mr. David DiSalvo
State Retirement Director
Florida Department of Management Services, Division of Retirement

Re: Actuarial Valuation as of July 1, 2019

Dear Director DiSalvo:

We have conducted an annual actuarial valuation of the Florida Retirement System (FRS) Pension Plan as of July 1, 2019, for assessing plan funded status and determining actuarially calculated contribution rates prior to blending with FRS Investment Plan contribution rates to create proposed blended statutory contribution rates for the July 2020 - June 2021 plan year. The major findings of the valuation are contained in the following report.

Section 1 contains an Executive Summary of the results of our valuation followed by four sections containing detailed information on Assets (Section 2), Liabilities (Section 3), Contributions (Section 4), and Accounting Statements (Section 5). In the Appendices, we provide information regarding actuarial methods and assumptions, a summary of plan provisions, membership statistics, cost projections, comparisons/reconciliation, and a glossary of terms.

All costs and liabilities shown in this report have been determined on the basis of actuarial assumptions and methods set forth in Appendix A. Preliminary 2019 valuation results were presented by the actuary to the 2019 FRS Actuarial Assumption Conference held on October 23, 2019. The assumptions are based on Milliman's most recent review of the System's experience, which was for the observation period from July 1, 2013 through June 30, 2018. Additional details on that review of System experience can be located in our October 8, October 23, and October 28, 2019 presentation materials to the 2019 FRS Actuarial Assumption Conference and our formal 2019 Experience Study report, which will be issued in the coming weeks. The assumptions and methods used in this valuation have changed from those used in the prior valuation as of July 1, 2018. The most material changes are a decrease in the investment return assumption for purposes of developing actuarially calculated contribution rates from 7.40% to 7.20%, and change in the actuarial cost allocation method from ultimate entry age normal to individual entry age normal.

In our professional opinion we believe the assumptions and methods used in this report for purposes of developing actuarially calculated contribution rates are reasonable. The accounting calculations for the FRS Pension Plan's financial reporting and its June 30, 2019 CAFR in compliance with the GASB Statement No. 67 use an investment return assumption that differs from that used in this report. The GASB financial reporting information, which is issued under separate cover, uses assumptions and methods which in our professional opinion are also reasonable. The results of this report are dependent upon future experience conforming to the assumptions disclosed in this report. Future actuarial measurements may differ significantly from the current measurements presented in this report due to many factors, including: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions;

This work product was prepared solely for Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

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); 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.

Actuarial computations presented in this report are for purposes of assessing funded status and determining the actuarially calculated contribution rates for the FRS Pension Plan. The calculations in the enclosed report have been made on a basis consistent with our understanding of the FRS Pension Plan's funding requirements and goals. Determinations for purposes other than meeting those requirements referenced in this paragraph may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

In preparing our report we relied, without audit, on information (some oral and some written) supplied by the Florida Department of Management Services, Division of Retirement. This information includes, but is not limited to, statutory provisions, employee census, and financial information. In our examination of these data, we have found them to be reasonably consistent and comparable with data used for other purposes. Since the valuation results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

This actuarial valuation was prepared and completed by us and those under our direct supervision, and we acknowledge responsibility for the results. To the best of our knowledge, the results are complete and accurate. In our opinion, the techniques and assumptions used are reasonable. In our opinion this valuation meets the requirements and intent of Part VII, Chapter 112, Florida Statutes. There is no benefit provision or related expense to be provided by the plan and/or paid from the plan's assets for which liabilities or current costs have not been established or otherwise taken into account in the valuation. To the best of our knowledge, there were no known events that were not taken into account in the valuation.

Milliman's work product was prepared exclusively for the internal business use of Florida Department of Management Services, Division of Retirement, for a specific and limited purpose. It is a complex technical analysis that assumes a high level of knowledge concerning the Florida Retirement System's operations, and uses Division data, which Milliman has not audited. To the extent that Milliman's work is not subject to disclosure under applicable public record 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 exceptions:

- (a) The Division of Retirement may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.
- (b) The Division of Retirement may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

This work product was prepared solely for Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with Actuarial Standards of Practice, the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "Matt Larrabee".

Matt Larrabee, FSA, EA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, appearing to read "Daniel Wade".

Daniel Wade, FSA, EA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, appearing to read "Kathryn M. Hunter".

Kathryn Hunter, FSA, EA, MAAA
Consulting Actuary

ML/DW/KH/nlo

Table of Contents

	Page
1. Executive Summary	1
2. Assets.....	12
3. Liabilities.....	20
4. Contributions.....	25
5. Accounting Statement.....	40
Appendix A: Actuarial Methods, Procedures, and Assumptions	A-1
Appendix B: Summary of Plan Provisions	B-1
Appendix C: Membership Data.....	C-1
Appendix D: Projections	D-1
Appendix E: Comparisons/Reconciliation	E-1
Appendix F: Risk Disclosure.....	F-1
Appendix G: Glossary.....	G-1

1. Executive Summary

This report presents the results of our July 1, 2019 actuarial valuation of the defined benefit Florida Retirement System (FRS) Pension Plan. This valuation is used to determine actuarially calculated Pension Plan-specific employer contribution rates for the July 1, 2020 – June 30, 2021 plan year. The Pension Plan-specific rates developed in this valuation report are then combined with contribution rates from the defined contribution FRS Investment Plan to create blended proposed statutory employer contribution rates. The actual contribution rates paid by employers during the 2020-2021 plan year will be determined by Florida Statutes. The statutory contribution rates in effect for the current 2019-2020 plan year are identical to the blended proposed statutory rates developed in conjunction with the July 1, 2018 actuarial valuation, and further updated to reflect the enactment of Senate Bill 426 which provided Firefighter line-of-duty Cancer Presumption Benefits effective July 1, 2019.

On the smoothed Actuarial Value of Assets (AVA) basis used to determine actuarially calculated contribution rates and the Unfunded Actuarial Liability (UAL), Pension Plan funded status increased from 83.9% to 84.2%. On a Market Value of Assets (MVA) basis, Pension Plan funded status calculated on the assumptions and methods in this report for system funding purposes decreased from 86.7% to 85.5% due to actual plan year investment return of approximately +6.0%, which is below the assumed prior year return of 7.40%¹, along with a decrease in the investment return assumption for funding purposes. The market value funded status decrease from the sources noted above was partially mitigated by a change in the actuarial cost allocation method.

As noted above, actuarially calculated employer contribution rates for the Pension Plan are combined with FRS Investment Plan contribution rates to create proposed blended statutory employer contribution rates. At a system-wide composite level, the blended employer contribution rate increased by 1.29% of payroll from 10.08% of payroll in the 2019-2020 plan year to 11.37% in the 2020-2021 plan year. Please note that the blended rate study is issued under separate cover shortly after the publication of this valuation report. Approximately 75% of the 1.29% of payroll increase was related to the lowering of the investment return assumption from 7.40% to 7.20%. Another 20% of the increase was related to the combined effects of the change in to the actuarial cost allocation method from the Ultimate Entry Age Normal method to the Individual Entry Age Normal method and the amortization of the UAL decrease from that method change in a manner that mirrors the projected payroll for Tier I Pension Plan members. The remaining 5% of the increase related to actual plan experience during the year and updates of demographic assumptions as an outcome of the recent actuarial experience study.

Due to cumulative market value investment performance in excess of the funding valuation's investment return assumption over the past five years, the MVA exceeds the smoothed AVA used for funded status and contribution rate calculations by approximately \$2.6 billion as of July 1, 2019. That \$2.6 billion not yet recognized market investment gain will be systematically recognized as a sequence of actuarial investment gains in the UAL via recognition in the AVA over the next several years. If actual market value investment experience during that period fails to meet or exceed the 7.20% assumption used in this valuation, new investment losses will arise. The not yet recognized market investment gain will serve as buffer, either mitigating or eliminating increases in actuarially calculated employer contribution rates, which are based on the smoothed AVA measure.

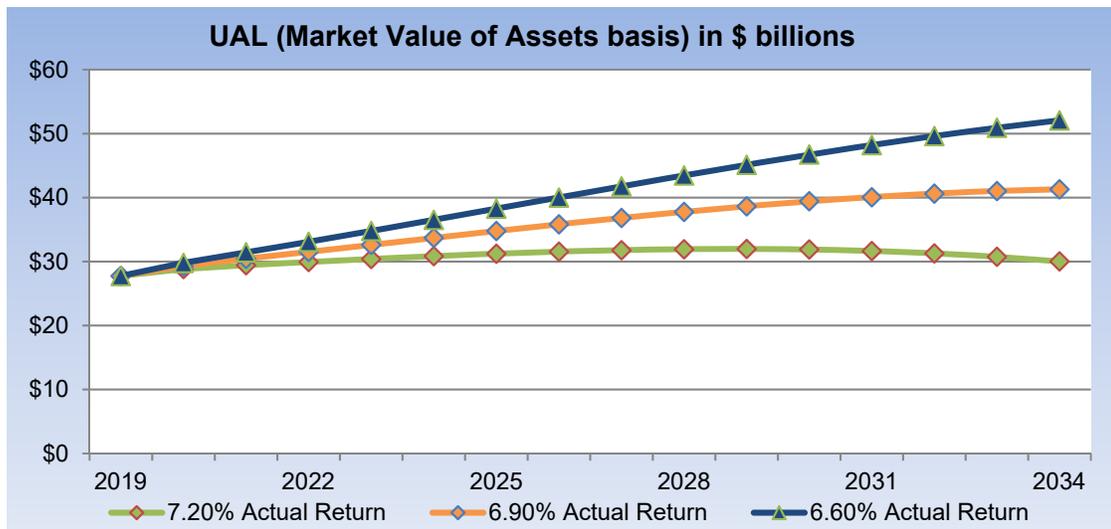
¹ The required financial reporting information under GASB 67 also uses Market Value of Assets, but has an investment return assumption different from those used in this valuation for funding purposes. GASB 67 information was issued under separate cover, and indicated a funded ratio of 82.6% as of June 30, 2019 using a 6.90% investment return assumption.

For this valuation, a long-term average annual future investment return assumption of 7.20% was selected by the 2019 FRS Actuarial Assumption Conference. That assumption is 0.20% lower than the assumption used in the previous valuation. In our professional opinion, the 7.20% assumption does **not** significantly conflict with our judgment regarding what would constitute a reasonable assumption for the purpose of the measurement Actuarial Standard of Practice No. 27 (ASOP 27). Our basis for that opinion is that both the 4.41% 50th percentile geometric average annual long-term future real return assumption developed by the Florida State Board of Administration’s outside investment consultant (Aon Hewitt Investment Consulting) and the 2.60% average annual future inflation assumption selected by the Conference are individually reasonable. Combined, those two individually reasonable assumption components would produce a geometric average annual nominal return assumption of 7.12%, which in our opinion is reasonable. The Conference’s selected 7.20% investment return assumption does not significantly conflict with the reasonable 7.12% assumption level. More details on the return assumption are shown in our 2019 FRS Actuarial Assumption Conference presentation materials.

All else being equal, the lower the selected investment return assumption, the higher the likelihood the FRS Pension Plan will meet or exceed its assumed investment return in future years. A lower assumption would result in higher short-term actuarially calculated contribution rates for employers, but would also serve to lessen the magnitude of actuarially calculated contribution rate increases in the event that actual future investment performance fails to meet the assumption.

Actual future investment return experience for the FRS Pension Plan is not affected by the assumption used in the actuarial valuation. Applying the 7.20% assumption used in this valuation, the following graph illustrates the UAL (Unfunded Actuarial Liability) on a Market Value of Assets basis under three scenarios for steady actual future investment returns:

- 7.20%, which is the assumption selected for this valuation by the 2019 FRS Actuarial Assumption Conference
- 6.90%, which is the assumption used for GASB 67 calculations as of a June 30, 2019 Measurement Date
- 6.60%, which is effectively equal to the 50th percentile assumption of 6.59% in the asset/liability model developed by Aon Hewitt Investment Consulting in consultation with the 2019 FRS Actuarial Assumption Conference



As illustrated in the graph, if actual future investment returns match the 7.20% assumption the UAL would be approximately the same as the current level by the end of the illustrated 15-year period. Currently, there are market investment gains that are not yet recognized in the smoothed Actuarial Value of Assets as of the valuation date. When that is the case, the pattern shown over the first 15 years in the 7.20% actual return scenario is typical of the method of closed 30-year amortization periods used to calculate contribution rates in the valuation. (The UAL still remaining after 15 years is amortized over the latter 15 years of the 30-year amortization schedule if actual investment performance continues to match the assumption.) If actual returns underperform the 7.20% assumption by 0.30%, the UAL would increase by approximately \$13 billion over the illustrated 15-year projection period. If actual investment returns equal the 50th percentile return of 6.6% from the 2019 Aon Hewitt Investment Consulting model, the UAL would increase by 88% over the modeled 15-year period even if actuarially calculated contributions are made and all other experience follows the assumptions used in this valuation.

For the first time in this 2019 actuarial valuation for funding purposes, the Individual Entry Age Normal (Individual EAN) actuarial cost allocation method was selected by the FRS Actuarial Assumption Conference. The actuarial cost allocation method divides the present value of total projected benefits for each active member between past service (Actuarial Liability, or AL) and future service (present value of future normal costs). The actuarial cost allocation method does not impact the calculation of the present value of total projected benefits. The previous valuation used the Ultimate Entry Age Normal (Ultimate EAN) actuarial cost allocation method. The change in the actuarial cost allocation method increased the Normal Cost Rate and decreased the Actuarial Liability and UAL Rate when compared to the prior method. The Individual EAN methodology is mandated by GASB for financial reporting calculations under GASB Statements Nos. 67 & 68, and has been used for GASB reporting in all years those two statements have been in effect.

The tables immediately following compare July 1, 2018 actuarial valuation results with July 1, 2019 actuarial valuation results. The difference column shows the change between the July 1, 2018 valuation results and the July 1, 2019 valuation results.

A. Assets, Liabilities, and Funded Status

A comparison of the Actuarial Liability and Actuarial Value of Assets (AVA) follows. These figures are based upon the actuarial assumptions used to determine the actuarial costs of the FRS Pension Plan (see Appendix A). Under current methodology, and as required by Florida law, the AVA cannot be less than 80% or greater than 120% of the Market Value of Assets (MVA). This corridor restriction does not come into play unless there are dramatic asset gains or losses in the prior plan year. The purpose of the corridor is to ensure that the “smoothed” value of assets does not vary from the market value by more than 20%. As of July 1, 2019, the AVA is 98.4% of the MVA.

		Valuation Results (numbers in \$ billions)		
		July 1, 2018	July 1, 2019	Difference
1.	Actuarial Liability	\$186.0	\$191.3	\$5.3
2.	Actuarial Value of Assets	<u>\$156.1</u>	<u>\$161.0</u>	<u>\$4.9</u>
3.	Unfunded Actuarial Liability (1 - 2)	\$29.9	\$30.3	\$0.4
4.	Funded Percentage (2 / 1)	83.9%	84.2%	0.3%

In Section 5 of this report we present an additional measure of funded status based on a different liability measure, the "Accumulated Benefit Obligation" (ABO), based on both the AVA and the MVA.

B. Contributions

Actuarially calculated contribution rates by class are determined annually in the actuarial valuation. Actual contribution rates paid by employers for each class are set by statute and consist of Normal Cost and UAL Cost components. For the 2019-2020 plan year, the actuarially calculated rates determined by the July 1, 2018 valuation, as subsequently modified to reflect the effects of Senate Bill 426, and the legislated rates are equivalent. The 2020-2021 actual contribution rates will be set by the 2020 session of the Florida Legislature, with advice from this valuation and the associated 2020-2021 Blended Rate Study that will be issued subsequent to the publication of this valuation. The Unfunded Actuarial Liability (UAL) amortization payment will consist primarily of costs or savings associated with plan changes, assumption changes, differences in actual and expected experience, or changes in actuarial methodology. As of July 1, 2019 the FRS Pension Plan has a UAL of \$30.3 billion on a smoothed Actuarial Value of Assets basis. The UAL Cost is calculated to eliminate the UAL over a pre-determined amortization period if future experience follows assumptions.

The comparative FRS Pension Plan-specific employer contribution rates for the Regular and Special Risk membership classes resulting from this valuation and the prior valuation are as follows. See Section 4 for more details on rate development and valuation results for all membership classes.

	July 1, 2018 Valuation (2019-2020 Rates)		July 1, 2019 Valuation (2020-2021 Rates)		Difference	
	Regular	Special Risk	Regular	Special Risk	Regular	Special Risk
Normal Cost Rate	3.09%	12.36%	5.19%	15.41%	2.10%	3.05%
UAL Contribution Rate ¹	<u>4.30%</u>	<u>13.17%</u>	<u>4.26%</u>	<u>8.95%</u>	<u>-0.04%</u>	<u>-4.22%</u>
Employer Contribution Rate Prior to Blending with FRS IP Payroll	7.39%	25.53%	9.45%	24.36%	2.06%	-1.17%

¹ The increase in normal cost rates is driven by the change in cost allocation method from ultimate entry age to individual entry age, and the decrease in the investment return assumption.

² The 0.04% decrease in UAL Contribution Rate for the Regular class represents a 0.96% decrease in rates due to the change in the actuarial cost allocation method, and a 0.92% increase in rates due to assumption changes and other experience. The 4.22% decrease in UAL Contribution Rate for the Special Risk class represents a 0.02% increase in rates due to plan change, a 3.86% decrease in rates due to the change in the actuarial cost allocation method, and a 0.36% decrease in rates due to assumption changes and other experience.

C. Membership

The total membership (active, terminated vested, retired, and DROP) of the FRS Pension Plan decreased by 12,244 members from 1,072,376 as of July 1, 2018 to 1,060,132 as of July 1, 2019, a decrease of 1.1%. The total annualized projected payroll of non-DROP active Pension Plan members decreased by 0.3%, from \$24.44 billion for the 2018-2019 plan year to \$24.37 billion for the 2019-2020 plan year, a \$0.07 billion decrease in payroll. Note that the payroll on which UAL Cost rates are determined is higher and includes the payroll of DROP and members in Optional Retirement Plans subject to the UAL contribution.

A summary of Pension Plan membership change by status follows:

	Valuation Results: Counts		
	July 1, 2018	July 1, 2019	% Change
Active Members	516,825	500,111	-3.2%
Terminated Vested Members	108,831	103,709	-4.7%
Retired Members	412,126	421,130	2.2%
DROP Members	<u>34,594</u>	<u>35,182</u>	1.7%
Total Members	1,072,376	1,060,132	-1.1%

D. Experience

Changes to assets and liabilities between July 1, 2018 and July 1, 2019 are described in this section.

1. Assets:

Changes in the smoothed Actuarial Value of Assets (AVA) during the plan year were due to:

▪ Contributions received	\$3.937	
▪ Payment of benefits and administrative expenses	(10.971)	
▪ Assumed plan year investment returns	11.292	
▪ Investment plan year gain/(loss) experience	<u>0.642</u>	
Total plan year Actuarial Value of Assets increase	\$4.900	Billion

The actual plan investment return on the AVA was 7.82% compared to the prior valuation’s assumed return of 7.40%. On a market-value basis, the assets earned 5.97%. On a year-by-year basis, asset returns were as follows:

	Rates of Return ¹		
	2016/2017	2017/2018	2018/2019
Market Value	13.57%	9.26%	5.97%
Actuarial Value	8.21%	8.36%	7.82%

¹ Assumes net cash flow occurs mid-year.

2. Actuarial Liability (AL):

Changes in the Actuarial Liability during the plan year were due to:

▪ Expected increase, due to combined effects of Normal Cost plus interest-related growth in Actuarial Liability less benefit payments during plan year	\$4.408
▪ Change in plan provisions	0.011
▪ Changes in assumptions	4.004
▪ Change in actuarial cost allocation method	(3.433)

Liability Plan Year (Gain) / Loss Experience

▪ Active member salary increases different than assumption	(0.498)
▪ New active members	0.542
▪ Retirement and DROP entry behavior	0.780
▪ Inactive mortality	(0.167)
▪ Other demographic sources not noted above ¹	<u>(0.266)</u>
▪ Liability plan year (gain) / loss experience	0.391

Total plan year Actuarial Liability increase \$5.381 Billion

¹ Reflects the combined effects of all other liability (gain)/loss sources for actuarial experience compared to assumptions used in the July 1, 2018 actuarial valuation. These include actual experience for pre-retirement turnover, second election transfers to the Investment Plan, active member death and disability, and all other actual experience not otherwise noted in the table above compared to assumed on the demographic assumptions used to calculate July 1, 2018 actuarial valuation results.

3. Unfunded Actuarial Liability (UAL):

The net change in the UAL of the FRS Pension Plan was an increase of \$0.481 billion, from \$29.846 billion to \$30.326 billion. The net change in the UAL of the FRS Pension Plan was an increase of \$0.481 billion, from \$29.846 billion to \$30.326 billion. The net increase is attributable to the following:

Change due to:

▪ Expected increase, based on the net combined effect of plan contributions received, interest, and assumed investment and demographic experience	\$0.150
▪ Change in plan provisions	0.011
▪ Change in actuarial cost allocation method	(3.433)
▪ Changes in assumptions	4.004
▪ Investment plan year (gain)/loss experience	(0.642)
▪ Liability plan year (gain)/loss experience	<u>0.391</u>

Total plan year increase/(decrease) in UAL \$0.481 Billion

See table on the following page for total gains/losses by class.

2018-2019 Plan Year (Gain)/Loss Experience¹
(\$ in Thousands)

	-- Elected Officers' Class --							Grand Total
	Regular	Special Risk	Special Risk Administrative	Judicial	Leg-Atty-Cab	Local	Senior Management	
Investment plan year (gain)/loss experience	(\$490,215)	(\$133,879)	(\$315)	(\$3,985)	(\$251)	(\$1,295)	(\$12,359)	(\$642,299)
<u>Liability plan year (gain) / loss experience by source</u>								
Assumption changes	4,055,599	(21,431)	(2,633)	(41,817)	(2,555)	(7,817)	24,310	4,003,656
Plan Changes	0	10,856	0	0	0	0	0	10,856
Change in actuarial cost allocation method	(1,915,823)	(1,415,556)	(1,874)	(23,280)	(757)	(5,502)	(70,138)	(3,432,930)
Active member salary increases different than assumption	(462,716)	(31,910)	(548)	(2,433)	(590)	(3,762)	3,510	(498,449)
New active Pension Plan members ²	393,688	111,313	2,502	5,136	571	1,707	27,356	542,273
Retirement and Drop Entry Behavior	547,985	214,082	188	2,635	(83)	2,611	14,344	781,762
Inactive Mortality	(188,190)	110	216	(3,465)	1,423	1,906	20,583	(167,417)
Other demographic sources not noted above ³	(260,964)	(32,643)	(95)	(2,274)	(919)	(484)	30,920	(266,459)
Liability plan year (gain) / loss experience	\$2,169,579	(\$1,165,179)	(\$2,244)	(\$65,498)	(\$2,910)	(\$11,341)	\$50,885	\$973,292

¹ For purposes of this exhibit, liabilities and assets associated with members in DROP are allocated to their respective membership classes. This differs from their representation in Section 4, where UAL bases are tracked separately for the DROP.

² Includes transfers and re-hires.

³ Reflects the combined effects of all other liability (gain)/loss sources for actuarial demographic experience compared to assumptions used in the July 1, 2017 valuation. This includes the effects of second election transfers to the Investment Plan and changes to census data reporting.

4. Actuarially Calculated FRS Pension Plan-specific Contribution Rates prior to blending with the FRS Investment Plan:

On a level-rate-of-pay basis, the FRS Pension Plan-specific employer contribution rates for each membership class changed as follows:

	Regular	Special Risk	Special Risk Administrative	-- Elected Officers' Class --			Senior Management
				Judicial	Leg-Atty-Cab	Local	
A. 1. July 1, 2018 Employer Normal Cost Rate	3.09%	12.36%	3.26%	12.46%	6.61%	8.63%	4.47%
2. UAL Contribution Rate	<u>4.30%</u>	<u>13.17%</u>	<u>40.04%</u>	<u>31.59%</u>	<u>58.20%</u>	<u>53.62%</u>	<u>25.75%</u>
3. Total July 1, 2018 Actuarially Calculated Employer Contribution Rate (1.+2.)	7.39%	25.53%	43.30%	44.05%	64.81%	62.25%	30.22%
B. 1. July 1, 2019 Employer Normal Cost Rate	5.19%	15.41%	11.13%	13.64%	8.76%	10.57%	6.90%
2. UAL Contribution Rate (See Table 4-11)	<u>4.26%</u>	<u>8.95%</u>	<u>30.87%</u>	<u>28.26%</u>	<u>60.66%</u>	<u>52.59%</u>	<u>25.95%</u>
3. Total July 1, 2019 Actuarially Calculated Employer Contribution Rate (1.+2.)	9.45%	24.36%	42.00%	41.90%	69.42%	63.16%	32.85%
C. Change in Total Actuarially Calculated Employer Contribution Rate (B.3.-A.3.)	2.06%	-1.17%	-1.30%	-2.15%	4.61%	0.91%	2.63%

E. Graphs

Chart A: Assets / Liabilities



Chart B: Cash Flows

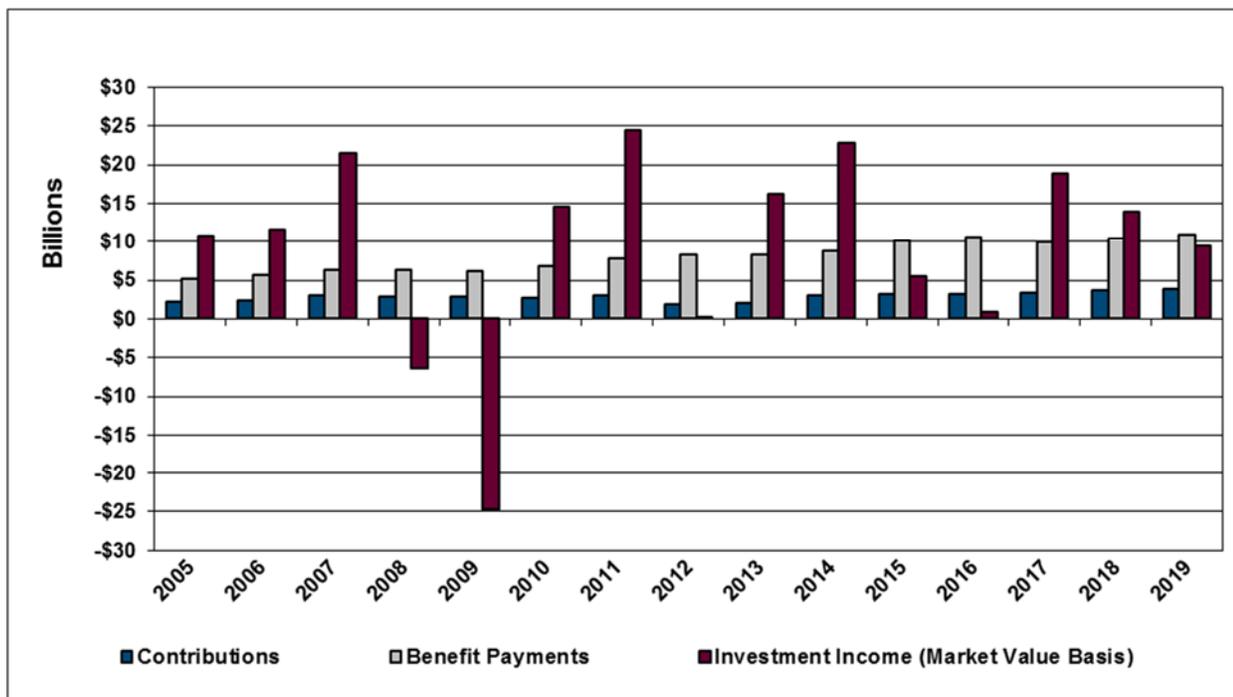


Chart C: Actuarially Calculated Pension Plan Contribution Rates¹ (as % of Payroll)

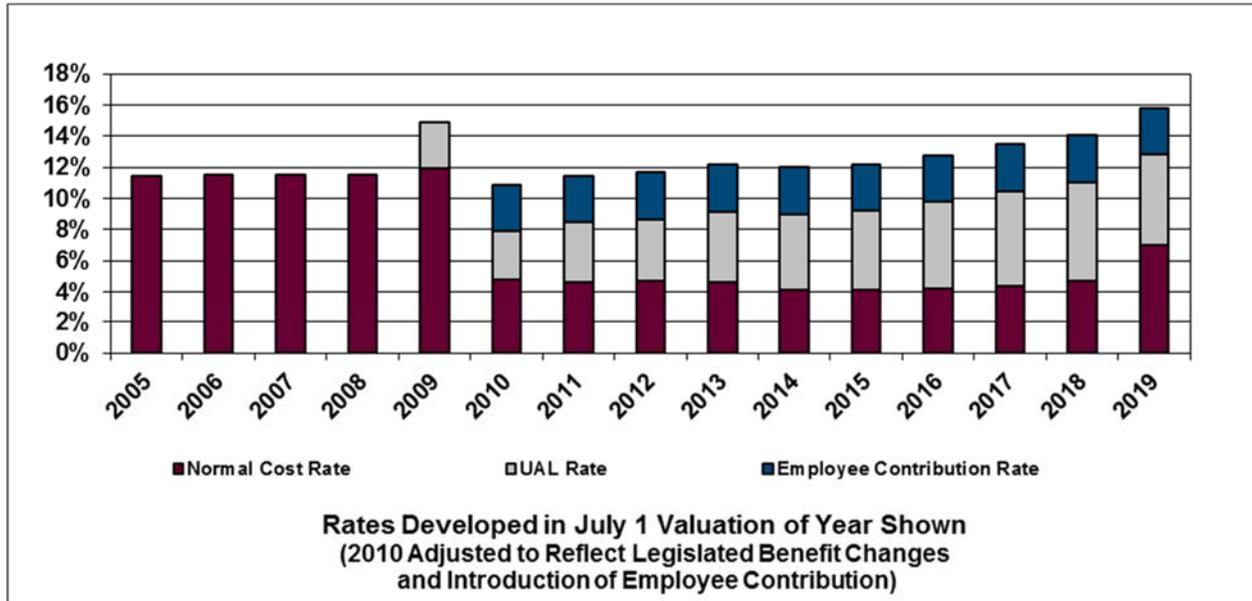
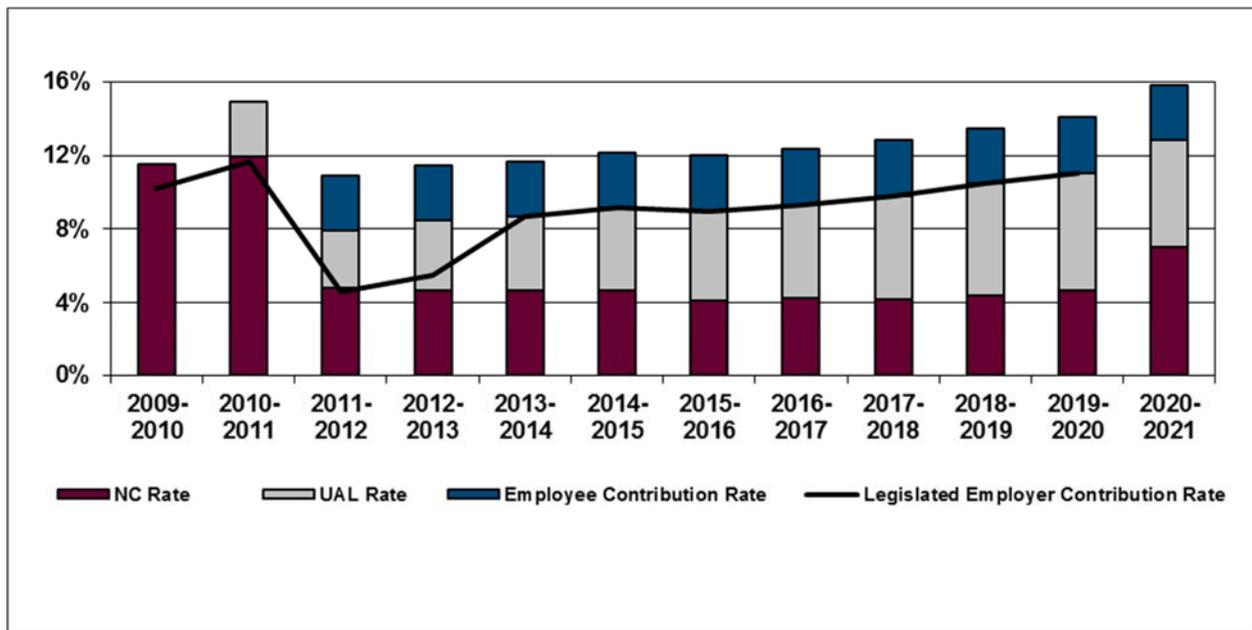


Chart D: Actuarially Calculated vs. Legislated Employer Contribution Rates¹ (as % of Payroll)



¹ Charts C and D show the Pension Plan components of proposed contribution rates prior to blending with Investment Plan contribution rates to create proposed statutory contribution rates. Historically, the Florida Legislature has enacted contribution rates which are charged uniformly on combined Investment Plan and Pension Plan payroll. Charts C and D reflect the Pension Plan component of proposed blended statutory rates, consistent with Table 4-12.

F. Summary Comments

We caution that the results herein are applicable only for the next plan year. More than anything, actual future investment results will impact long-term future contribution rates. The investment return assumption selected affects the timing and pattern of contributions but does not affect the long-term cost of the plan, which is governed by the Fundamental Cost Equation [Benefit Payments + Expenses = Contributions + Actual Investment Returns].

- The most recent experience study covered the period from July 1, 2013 to June 30, 2018. Experience studies are performed every five years and compare actual plan experience to the assumptions used in the annual valuations. This valuation reflects the method and assumptions changes proposed by the 2019 Experience Study and adopted by the 2019 FRS Actuarial Assumption Conference for use in the July 1, 2019 valuation.
- Subsequent FRS Assumption Conferences may, at the discretion of the Conference Principals, consider changes to items such as the investment return assumption or modifications to other assumptions and methods.

Future proposed blended statutory rates for the System will be impacted by choice elections for the defined contribution FRS Investment Plan (IP), which is available as an alternative to the defined benefit FRS Pension Plan for members. The existence of the IP affects the FRS Pension Plan contribution rates inasmuch as active members can elect to participate in either the FRS Pension Plan or the IP. Thus, member plan election decisions can affect the demographic composition of the FRS Pension Plan. Current IP membership is between 22% and 23% of total active membership on a headcount basis. Based on legislation effective January 1, 2018 the default plan for newly enrolled non-Special Risk members who do not make an active plan election is now the FRS Investment Plan.

We mention these caveats because the actuarial valuation process merely measures the impact of these factors on FRS Pension Plan costs and liabilities after they have occurred. Unanticipated benefit or salary changes, changes in member behavior (e.g., withdrawal rates, rates of retirement, etc.), or variations in actual investment return could necessitate changes in the actuarially calculated contribution rates.

Finally, we caution the readers of this report not to overemphasize the results of any single valuation as long-term trends are more important.

G. DROP Contribution Rate

The DROP (Deferred Retirement Option Program) started in 1998, with a study completed prior to the DROP's implementation showing an anticipated material cost increase due to its introduction. Since its introduction and consistent with legislative directive, employers have been charged a uniform DROP contribution rate on all DROP payroll without regard to a participant's membership class. In addition, the asset allocation developed in Table 2-5 is performed so that the DROP's funded percentage is set equal to the composite funded percentage of the FRS Pension Plan.

The DROP contribution rate has two components: Normal Cost and UAL Cost. The Normal Cost is set to the composite FRS Pension Plan average employer-paid Normal Cost Rate of 7.03%. The calculation of the UAL Cost for the DROP is consistent with the calculation of the UAL Cost component of the other membership classes. Essentially, the DROP is allocated a share of plan assets such that the DROP's funded percentage is equal to the composite FRS Pension Plan's funded percentage. This asset allocation to DROP results in a UAL Cost for DROP payroll of 8.29%. The total DROP contribution rate (Normal Cost plus UAL Cost) in this valuation is 12.83%, compared to a DROP contribution rate of 12.92% in the prior valuation.

2. Assets

In many respects, an actuarial valuation can be considered similar to an inventory process. The inventory is taken annually as of the actuarial valuation date, which for this valuation is July 1, 2019. On that date, the assets available for the payment of current and future benefits are appraised. These assets are compared with the inventory of Actuarial Liability. This inventory process leads to a method of calculating what contributions by members and/or their employers are needed to systematically eliminate any shortfall if future experience follows assumptions. Prior to publication of this report, preliminary 2019 valuation results were presented by the actuary to the 2019 FRS Actuarial Assumption Conference.

This section of the report deals with the asset determination. In the next section, the Actuarial Liability will be discussed. Section 4 will deal with the process for determining actuarially calculated contribution rates in order to systematically eliminate any shortfall between the assets and Actuarial Liability.

Two measures of FRS Pension Plan assets are presented in the valuation:

1. The Market Value of Assets (MVA) provides the most accurate fair market “snapshot date” assessment of plan resources at a given date, and will be used on the balance sheet statements of position for the FRS Pension Plan and its participating employers for GASB financial reporting purposes.¹ It tends to be the more volatile of the two asset measures and is not used for determining the actuarially calculated contribution rates.
2. The Actuarial Value of Assets (AVA) is a second measure of FRS Pension Plan asset holdings. It is related to the MVA, but uses a smoothing technique applied to mitigate year-to-year market fluctuations by recognizing actual single year investment returns different from the long-term assumption systematically over a multi-year period. The AVA is the basis for determining actuarially calculated contribution rates, and the smoothing technique is used to stabilize year-to-year contribution rate changes.

The actuarial smoothed asset valuation measure, implemented in 1989, reflects a five-year averaging methodology, as required by Section 121.031(3)(a) of Florida Statutes. Under this method, the expected actuarial value of assets is determined by crediting the rate of investment return assumed in the prior valuation (7.40%) to the prior year’s AVA. Then, 20% of the difference between the actual market value and the expected actuarial value of assets is immediately recognized in the AVA. The AVA is also restricted by a 20% corridor around the MVA, so that the AVA cannot be greater than 120% or less than 80% of the MVA. Table 2-3 presents the details of this calculation. As of July 1, 2019 the AVA is 98.4% of the MVA.

Six tables are presented in this section, summarizing the financial resources of the FRS Pension Plan on July 1, 2019. Table 2-1 shows the reconciliation of valuation assets from June 30, 2018 to June 30, 2019. The assets are presented by category in Table 2-2. Table 2-3 provides a detailed development of the July 1, 2019 AVA. In Table 2-4, the AVA is initially allocated to each membership class, based on estimated cash flows. The table also shows the allocation of assets to/from the various classes from/to the DROP. Table 2-5 shows the derivation of the allocation of assets to/from the DROP in order that the DROP’s funded percentage is equal to the funded

¹ The financial reporting information under GASB 67 requirements is issued under separate cover and uses an investment return assumption different from that used in this valuation report, which is for the purpose of developing actuarially determined contribution rates.

percentage of the FRS Pension Plan as a whole. Finally, Table 2-6 presents rates of return for the 2018-2019 plan year and the two prior plan years.

The Market Value of Assets as of July 1, 2019 was based on information furnished to us by the Division of Retirement, Florida Department of Management Services. The values have been accepted for use in this report without audit but have been reviewed for consistency and reasonableness, when compared to prior reports.

Table 2-1
Florida Retirement System
Reconciliation of Market Value of Assets Used for Valuation
DB Plan Trust

Market Value of Assets for Actuarial Valuation as of June 30, 2018	\$161,196,880,609
Contributions by Source:	
Pension Contributions - Employer	3,100,721,573
Pension Contributions - Employees	746,586,622
Transfers from IP - Second Elections	83,626,975
Purchase of Time by Employees	6,226,912
Investment Income	
Interest Income	909,591,092
Dividend Income	1,923,999,086
Real Estate Income	488,096,289
Securities Lending income	68,288,813
Other	2,249,710,115
Less Investment Activity Expense	(591,470,518)
Less Securities Lending Expense	(37,154,592)
Other Income	4,009,995
Net Realized and Unrealized Appreciation	4,395,369,952
Pension Payments ¹	(10,367,804,874)
Contribution Refunds	(18,326,135)
Disbursements to IP - Second Elections	(565,045,212)
Administrative Expenses	(19,580,485)
 Market Value of Assets for Actuarial Valuation as of June 30, 2019	 \$163,573,726,217

¹ Includes Accrued DROP Liability of \$265,705,863 representing single sum DROP benefits of members who retired from DROP on or before June 30, 2019.

Table 2-2
Florida Retirement System Pension Plan
Summary of Market Value of Assets for Actuarial Valuation ¹
 (by Asset Category; \$ in Thousands)

ASSETS	Market Value as of July 1,	
	2018	2019
Cash and cash equivalents	\$114,331	\$94,880
State Treasury Investment Pool	63,346	66,298
Total cash and cash equivalents	\$177,677	\$161,178
<u>Investments:</u>		
Certificates of Deposit	\$200,077	\$324,980
U.S. Government and Federally Guaranteed Obligations	12,308,170	13,968,174
Federal Agencies	9,641,446	8,366,296
Commercial Paper	4,182,322	3,121,322
Repurchase Agreements	800,000	800,000
International Bonds and Notes	2,197,600	2,057,940
Bonds and Notes	7,005,685	7,386,905
Real Estate Contracts	11,406,346	12,095,897
International Equity Commingled	8,569,818	8,401,273
Short Term Investment Funds	35,981	54,944
Domestic Equity / Domestic Equity Commingled	47,062,304	48,025,526
Alternative Investment	26,432,707	27,784,000
International Equity	33,319,165	32,463,860
Other Investments	546	115,326
Total Investments	\$163,162,166	\$164,966,443
<u>Receivables:</u>		
Contributions receivable	226,542	238,365
Pending Investment Sales	2,877,500	2,641,277
Forward Contracts receivable	3,799,472	0
Other Receivables	1,949,157	573,483
Total receivables	\$8,852,671	\$3,453,125
Security Lending Collateral	\$2,631,692	\$505,785
Prepaid items; Furniture & Equipment net Accumulated Depreciation	5,510	8,223
Restatement of beginning net position	N/A	N/A
Total Assets	\$174,829,717	\$169,094,755
LIABILITIES		
Accrued DROP liability ²	247,611	265,706
Obligations under Security Lending Agreements	2,659,233	537,066
Pending Investment Purchases	5,000,810	4,137,778
Forward Contracts payable	3,793,383	0
Other Liabilities and Payables	1,930,471	578,760
Total Liabilities	\$13,631,508	\$5,519,310
DEFERRED INFLOWS AND OUTFLOWS OF RESOURCES		
Deferred outflows related to other postemployment benefits	519	881
Deferred inflows related to other post employment benefits	(1,847)	(2,600)
Net Deferred Inflows and Outflows of Resources	(\$1,328)	(\$1,719)
FIDUCIARY NET POSITION		
Held in trust for pension benefits	\$161,196,881	\$163,573,726

¹ Amounts shown in exhibit are rounded to the nearest thousand. As such, sums may differ from amounts displayed due to rounding.

² Per our understanding, the accrued DROP liability represents lump sum DROP exit payments made early in the subsequent plan year for members exiting the DROP on or shortly before the asset measurement date.

Table 2-3
Florida Retirement System Pension Plan
Development of 2019 Actuarial Value of Assets

1. FRS Market Value of Assets on June 30, 2018 for Actuarial Valuation	\$161,196,880,609
2. Actuarial Value of Assets on July 1, 2018	\$156,104,350,291
3. 2018/2019 Net Cash Flow (Contributions less Benefits and Expenses)	(\$7,033,594,624)
4. Preliminary Actuarial Value of Assets, July 1, 2019, if Items 2 and 3 earned an assumed rate of 7.40%	\$160,362,234,587
5. Market Value of Assets, June 30, 2019 for Actuarial Valuation	\$163,573,726,217
6. Net Assets (Actuarial Value Basis) Available for Benefits Prior to Application of 80%/20% Corridor $4 + ((5 - 4) \times 20\%)$	\$161,004,532,913
7. 120% of Market Value [120% (5)]	\$196,288,471,461
8. 80% of Market Value [80% (5)]	\$130,858,980,974
9. Actuarial Value of Assets on July 1, 2019 Lesser of (6) and (7), but not less than (8)	\$161,004,532,913
10. Ratio of July 1, 2019 Actuarial Value of Assets to Market Value on June 30, 2019 for Actuarial Valuation	<u><u>98.43%</u></u>

Table 2-4
Florida Retirement System Pension Plan
Development of Actuarial Value of Assets
by Membership Class
 (\$ in Thousands)

	Regular	Special Risk	Special Risk Administrative	-- Elected Officers' Class --			Senior Management	DROP	Total System
			Judicial	Leg-Atty-Cab	Local				
1. Allocated Actuarial Value of Assets by Class, July 1, 2018	\$109,004,083	\$29,062,669	\$72,126	\$881,158	\$57,449	\$299,343	\$2,730,716	\$13,996,806	\$156,104,350
2. Total Contribution for the Plan Year	2,218,063	1,153,038	1,443	49,212	4,054	23,105	148,358	339,889	3,937,162
3. Benefit Payments and other Disbursements	(7,836,578)	(1,954,003)	(7,319)	(89,830)	(8,619)	(49,758)	(271,797)	(752,853)	(10,970,757)
4. Allocated Investment Earnings on AVA Basis	8,305,431	2,241,652	5,411	67,326	4,315	22,369	208,741	1,078,533	11,933,778
5. Unadjusted Actuarial Value of Assets (1) + (2) + (3) + (4)	111,690,999	30,503,356	71,661	907,866	57,199	295,059	2,816,018	14,662,375	161,004,533
6. Net Reallocation (see Table 2-5)	(4,450)	(1,480)	(1)	(71)	(5)	(23)	(218)	6,248	0
7. Allocated Actuarial Value of Assets by Class, July 1, 2019: (5) + (6)	\$111,686,549	\$30,501,876	\$71,660	\$907,795	\$57,194	\$295,036	\$2,815,800	\$14,668,623	\$161,004,533

Table 2-5
Florida Retirement System Pension Plan
Reallocation of Actuarial Value of Assets to/from DROP
by Membership Class
 (\$ in Thousands)

	<u>Regular</u>	<u>Special Risk</u>	<u>Special Risk Administrative</u>	<u>Judicial</u>	<u>-- Elected Officers' Class --</u>		<u>Senior Management</u>	<u>DROP</u>	<u>Total System</u>
					<u>Leg-Atty-Cab</u>	<u>Local</u>			
1. Actuarial Accrued Liability, July 1, 2019								\$17,431,519	\$191,330,896
2. Unadjusted Actuarial Value of Assets, July 1, 2019 prior to reallocation								14,662,375	161,004,533
3. Unfunded Actuarial Liability (UAL): (1) - (2)								\$2,769,144	\$30,326,363
4. Aggregate Funded Percentage: (2) / (1)								84.11%	84.15%
5. DROP Assets Required to Meet Aggregate Funded Percentage: (1) x (4) [Total System] - (2)								\$6,248	
6. Proportion of DROP Liability by Class	0.7124	0.2368	0.0001	0.0113	0.0008	0.0036	0.0349	N/A	1.0000
7. Assets to be Reallocated	(\$4,450)	(\$1,480)	(\$1)	(\$71)	(\$5)	(\$23)	(\$218)	\$6,248	\$0

Table 2-6
Florida Retirement System Pension Plan
Rates of Return on Investments
(Assumes net cash flow occurs mid-year)

Asset Bases	Rates of Return		
	2016/2017	2017/2018	2018/2019
Market Value	13.57%	9.26%	5.97%
Actuarial Value	8.21%	8.36%	7.82%

3. Liabilities

In the previous section, an actuarial valuation was compared to an inventory process, and an analysis was given of the inventory of assets of the FRS Pension Plan as of the valuation date, July 1, 2019. In this section, the discussion will focus on the projected future benefit commitments of the FRS Pension Plan allocated to service already performed under the actuarial cost allocation method, which will be referred to as its Actuarial Liability. In Section 5 other liability measures are presented based on accounting principles of the Financial Accounting Standards Board (FASB). Calculations required by the Governmental Accounting Standards Board (GASB) are developed and issued as part of a separate report. It is important to note that the accounting liabilities shown in Section 5 of this report and in the separate GASB report are for informational disclosure and comparison purposes, while the Actuarial Liability calculated in this section is used for determining the FRS Pension Plan actuarially calculated contribution rates prior to blending with FRS Investment Plan contribution rates to create blended proposed statutory rates.

A fundamental principle in financing a retirement program is that the projected cost of future retirement benefits should be allocated to the period in which service is performed, rather than during the post-retirement period of benefit distribution. There are several methods that can be used in making such an allocation.

Beginning with the July 1, 2019 actuarial valuation for funding purposes, the Individual Entry Age Normal (Individual EAN) actuarial cost allocation method was selected by the FRS Actuarial Assumption Conference. Prior to the July 1, 2019 actuarial valuation, the Pension Plan's Normal Cost and Actuarial Liability was calculated using the Ultimate Entry Age Normal (Ultimate EAN) actuarial cost allocation method. The actuarial cost allocation method used does not affect the calculation of overall projected Pension Plan benefits (Present Value of Benefits), but it does affect the allocation of those benefits over a member's projected working career between past (Actuarial Liability), current year (Normal Cost) and all future projected service (Present Value of Future Normal Costs). The Present Value of Benefits is equal to the sum of the Actuarial Liability and the Present Value of Future Normal Costs.

Members initially enrolled on or after July 1, 2011 (Tier II) have different benefit and retirement eligibility provisions than Tier I members. Under the Individual EAN method, the Normal Cost is calculated separately for each of the individual members, based on their ages at entry into the System, and the tier-specific benefit provisions. The individual Normal Costs of all members are then aggregated and divided by the total current compensation of the individuals included in the valuation to determine the Normal Cost rate as a percentage of compensation. The actuarial Present Value of Benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the Normal Cost. Individual EAN sets normal cost in a manner that is representative of the tier in which the member actually participates. By comparison, Ultimate EAN calculated the Normal Cost allocation for individual members as if each member participated in the tier available to new hires for his or her full working career. For members in Tier I, this meant that the Normal Cost under the Ultimate EAN method was based on the benefit and retirement eligibility provisions of Tier II. Because Tier II results in lower expected benefit payments and later retirement eligibility ages than under Tier I, the calculated Normal Cost Rates were lower than they would have been if the plan provisions specific to the member's actual tier had been used by the actuarial cost allocation method.

The actuarial cost allocation method does not affect the calculation of the Present Value of Benefits, which is based on the plan provisions specific to each member's enrollment date. The Actuarial Liability is the Present

Value of Benefits minus the Present Value of Future Normal Costs. Compared to the Ultimate EAN method, the Individual EAN method allocates more of the cost of projected benefits to future service (via higher normal cost) and hence produces a lower Actuarial Liability for past service as a counterbalance.

The difference between the Actuarial Liability and the Actuarial Value of Assets accumulated as of the actuarial valuation date is referred to as the Unfunded Actuarial Liability (UAL). (If the difference is negative, the excess of the funds accumulated over the liabilities may be referred to as the surplus.) The UAL Contribution Rate is calculated in a manner such that the UAL will fully amortize in accordance with the schedules in Section 4 of this report if actual future experience follows the assumptions used in the valuation and contributions are made each year at levels equal to actuarially calculated contribution rates.

Please note that GASB Statements Nos. 67 & 68 do not permit the use of the Ultimate EAN cost allocation method for accounting calculations. The GASB 67 & 68 mandated variation of Entry Age Normal (Individual EAN) is the method used for GASB 67 & 68 reports for the current and all prior years. The actuarial cost allocation method used for funding purposes now matches the method used for GASB 67 & 68.

The UAL will grow with interest and Normal Cost while contributions will reduce it.

Benefit improvements, actuarial gains and losses (variations in investment results and demographic changes from assumption), and changes in actuarial assumptions and methods will also have an effect on the Actuarial Liability and on the UAL.

After the amount of the UAL has been determined, as part of the rate calculation methodology used in the previous valuation and in preliminary 2019 valuation results discussed with the 2019 FRS Actuarial Assumption Conference, the actuarially calculated contribution rates include a component for the amortization of the UAL. A schedule of contributions is established to amortize the UAL. In Section 4 of the report, we discuss the contribution schedules in detail.

Table 3-1 contains a breakdown of the Actuarial Liabilities and Unfunded Actuarial Liabilities in the FRS Pension Plan for the 2018 valuation and the 2019 valuation. In Table 3-2, the 2019 liabilities are shown for each membership class.

Legislation enacted in 2001 “walls off,” for 25 years, the actuarial gains arising from former FRS Pension Plan participants electing to participate in the FRS Investment Plan. The “walled off” amount is called the contingent liability. The Actuarial Liabilities generally do not include the contingent liability. However, surplus, if any, used for contribution rate reductions is net of the contingent liability. Table 3-3 shows the contingent liability and the number of current active participants, by class, who elected to transfer from the FRS Pension Plan to the FRS Investment Plan during the original 2002-2003 election periods available to FRS Pension Plan members who were active when the Investment Plan first became available for participation.

Table 3-1
Florida Retirement System Pension Plan
Actuarial Liabilities
 (\$ in Thousands)

	July 1, 2018 Valuation	July 1, 2019 Valuation
1. Actuarial Liabilities for:		
(a) Active Members	\$57,218,503	\$57,871,264
(b) Retired, Disabled and Beneficiary Members	106,808,859	110,810,614
(c) Terminated Vested Members	5,249,929	5,217,499
(d) DROP	<u>16,672,788</u>	<u>17,431,519</u>
2. Total Actuarial Liability	\$185,950,079	\$191,330,896
3. Actuarial Value of Assets	<u>\$156,104,350</u>	<u>\$161,004,533</u>
4. Unfunded Actuarial Liability / (Surplus)	\$29,845,729	\$30,326,363
5. Investment Plan Contingent Liability ¹	<u>\$233,816</u>	<u>\$223,535</u>
6. Surplus Available for Rate Reduction	\$0	\$0

¹ See Table 3-3.

Table 3-2
Florida Retirement System Pension Plan
Actuarial Liabilities by Membership Class
July 1, 2019
 (\$ in Thousands)

	Regular	Special Risk	Special Risk Administrative	-- Elected Officers' Class --			Senior Management	DROP	Total System
			Judicial	Leg-Atty-Cab	Local				
1. Present Value of Benefits for:									
a. Active Members	\$55,833,029	\$22,547,019	\$19,511	\$555,888	\$25,086	\$187,623	\$2,081,095	\$0	\$81,249,251
b. Retired, Disabled and Beneficiary Members	83,317,384	22,647,681	70,787	989,007	91,367	507,250	3,187,138	17,431,519	128,242,133
c. Terminated Vested Members	<u>4,367,573</u>	<u>619,084</u>	<u>1,525</u>	<u>17,459</u>	<u>10,546</u>	<u>18,519</u>	<u>182,793</u>	<u>0</u>	<u>5,217,499</u>
d. Total Present Value of Benefits (a)+(b)+(c)	143,517,986	45,813,784	91,823	1,562,354	126,999	713,392	5,451,026	17,431,519	214,708,883
2. Present Value of Future Normal Cost (Actives):	\$14,265,797	\$8,458,699	\$3,995	\$164,236	\$5,386	\$41,217	\$438,657	\$0	\$23,377,987
3. Actuarial Liabilities for:									
a. Active Members (1a) - (2)	\$41,567,232	\$14,088,320	\$15,516	\$391,652	\$19,700	\$146,406	\$1,642,438	\$0	\$57,871,264
b. Retired, Disabled and Beneficiary Members (1b)	83,317,384	22,647,681	70,787	989,007	91,367	507,250	3,187,138	17,431,519	128,242,133
c. Terminated Vested Members (1c)	<u>4,367,573</u>	<u>619,084</u>	<u>1,525</u>	<u>17,459</u>	<u>10,546</u>	<u>18,519</u>	<u>182,793</u>	<u>0</u>	<u>5,217,499</u>
d. Total Actuarial Liability (a)+(b)+(c)	\$129,252,189	\$37,355,085	\$87,828	\$1,398,118	\$121,613	\$672,175	\$5,012,369	\$17,431,519	\$191,330,896
4. Actuarial Value of Assets	<u>\$111,686,549</u>	<u>\$30,501,876</u>	<u>\$71,660</u>	<u>\$907,795</u>	<u>\$57,194</u>	<u>\$295,036</u>	<u>\$2,815,800</u>	<u>\$14,668,623</u>	<u>\$161,004,533</u>
5. Unfunded Actuarial Liability / (Surplus)	\$17,565,640	\$6,853,209	\$16,168	\$490,323	\$64,419	\$377,139	\$2,196,569	\$2,762,896 ¹	\$30,326,363
6. Present Value of Future Pay	\$181,619,587	\$47,936,534	\$29,755	\$1,008,676	\$46,942	\$313,090	\$4,577,847	\$0	\$235,532,431

¹ This is a bookkeeping item. DROP liabilities include the total present value of benefits to all members currently in DROP. When a member leaves DROP, their liability is transferred to the class of membership from which they retired.

Table 3-3
Florida Retirement System Investment Plan
Contingent Actuarial Liabilities
July 1, 2019
 (\$ in Thousands)

	<u>Regular</u>	<u>Special Risk</u>	<u>Special Risk Administrative</u>	<u>-- Elected Officers' Class --</u>		<u>Senior Management</u>	<u>DROP</u>	<u>Total System</u>	
			<u>Judicial</u>	<u>Leg-Atty-Cab</u>	<u>Local</u>				
<u>As of July 1, 2018</u>									
Contingent Liability	\$215,321	\$8,846	(\$37)	(\$815)	\$62	\$94	\$10,345	NA	\$233,816
Participant Counts	4,946	135	1	4	1	6	128	NA	5,221
<u>As of July 1, 2019</u>									
Contingent Liability ^{1&2}	\$205,820	\$8,515	\$0	(\$656)	\$67	\$67	\$9,722	NA	\$223,535
Participant Counts	4,402	121	0	3	1	4	112	NA	4,643

¹ The contingent liability is not included in the actuarial liabilities of FRS and is removed from the surplus.

² The contingent liability as of July 1, 2019 is calculated as the July 1, 2003 contingent liability increased by 16 years of interest, adjusted for the proportion of original transfers remaining in the Investment Plan.

4. Contributions

Differences between the Actuarial Liabilities and the assets can be made up through (1) future contributions in excess of the Normal Costs to amortize the shortfall and/or (2) actual future investment returns in excess of assumed returns. An actuarial valuation sets out a schedule of future contributions that will fully amortize the Unfunded Actuarial Liability (UAL) in a systematic manner if future experience follows the assumptions. By contrast, in prior years when the FRS Pension Plan had an actuarial surplus, legislated contribution rates were generally below the Normal Cost Rate. In this section we develop and present the FRS Pension Plan-specific contribution rates proposed to be effective for the Plan Year beginning July 1, 2020 based on the July 1, 2019 membership data. Under separate cover, the FRS Pension Plan-specific contribution rates calculated in this valuation are blended with contribution rates for the FRS Investment Plan to develop proposed blended statutory contribution rates for the Plan Year beginning July 1, 2020.

First, we present a description of the actuarial method used to determine the actuarially calculated FRS Pension Plan-specific contribution rates for the 2020-2021 plan year. This is followed by a series of tables presenting the details of our calculations.

A. Funding Methods

The actuarial cost method used to determine the pattern of future contributions is called the Individual Entry Age Normal (Individual EAN) actuarial cost allocation method. Under this method (as is the case for most actuarial cost allocation methods), the contribution rates calculated have two components:

- Normal Cost Rate
- UAL Contribution Rate, which amortizes the UAL if future experience follows assumptions.

These components are described in more detail below.

1. Normal Cost Rate

Under the Individual EAN method, the Normal Cost Rate is that level percentage of pay which would fully fund a member's benefit at retirement, if paid from the year of entry (i.e., "entry age") to the year of retirement if future experience were to exactly match the actuarial assumptions. Individual EAN sets normal cost in a manner that is representative of the tier in which the member actually participates.

We have determined the Normal Cost Rates for the FRS Pension Plan separately by membership class and type of benefit (e.g., retirement, disability). These are summarized in Table 4-1.

2. UAL Contribution Rate

The Actuarial Liability is the difference between the Present Value of Projected Benefits (PVB) and the Present Value of Future Normal Costs (PVFNC).

The term "fully funded" is often applied to a system where contributions at the Normal Cost Rate are projected to be completely adequate to fully fund the projected future benefits of all existing members if future experience follows assumptions. Currently, most systems are not fully funded. This can be because contributions for the estimated value of benefits earned in a year have not been fully made, benefit improvements for past service are granted but then are funded gradually over future years, or actual experience has not been as favorable as assumed. Under these circumstances, a UAL exists. For the FRS Pension Plan, there has been a UAL for every

valuation since the July 1, 2009 valuation. Prior to that time, the Actuarial Value of Assets exceeded the Actuarial Liability for the valuations from 1998 through 2008 and the UAL for those valuations was considered fully amortized.

Tables 4-2 through 4-10 show how the FRS Pension Plan-specific UAL contribution rates are derived. The FRS Pension Plan-specific contribution rates calculated in this valuation are blended with contribution rates for the FRS Investment Plan to develop proposed blended statutory contribution rates for the Plan Year beginning July 1, 2020. Table 4-2 shows the calculations on a composite basis, while Tables 4-3 through 4-10 show the calculations for each individual membership class and sub-class and for the DROP.

As part of the funding policy selected by the Florida Legislature, the actuarially calculated contribution rate is based on a “layered” approach that includes closed 30-year charge and credit bases for the amortization of the UAL. Starting in the 1998 actuarial valuation, the Legislature required all UAL bases in existence at that time to be considered fully amortized, since the Plan was in surplus position. Since then, new amortization bases were created whenever there were changes in plan provisions or changes in assumptions pursuant to an experience study or other action by the FRS Actuarial Assumption Conference to modify actuarial assumptions or methods. Since a UAL currently exists, all experience gains and losses are also subject to amortization. In this valuation, we show the amortization base of each plan/assumption change since 1998 and amortization bases for experience gains/losses starting in 2009, when the plan no longer had an actuarial surplus.

For a given base of UAL amortization, annual amortization payments in non-inflation-adjusted dollars are calculated as increasing by 3.25% per year (“level percent of projected payroll amortization”), consistent with the valuation’s long-term annual payroll growth assumption as adopted by the FRS Actuarial Assumption Conference. If future experience follows the actuarial assumptions, this should result in amortization payments that align with the assumed growth in overall compensation. Please note that with the current closed amortization periods of 30 years, amortization payments will not be large enough to cover interest on the UAL for several years, which means that as a dollar amount the UAL for each amortization base is expected to grow for a period of time subsequent to its establishment. Under current assumptions, the expected UAL for a newly established amortization base will grow until the amortization period is down to 21 years remaining. After that time, the amortization payments will be large enough that the amortization payments will cover both interest and principal, and the UAL as a dollar amount will be projected to decrease in each subsequent year. After approximately 17 years, the unamortized balance for the base will be approximately at the same level (in non-inflation-adjusted dollars) as the initial amount of the base.

The benefit changes effective in 2011 reduced the Normal Cost, PVFNC, and the PVB for current and future active members. All members initially enrolled before July 1, 2011 (Tier I) will continue to earn benefits at levels greater than those annually earned by members initially enrolled on or after July 1, 2011 (Tier II). While the base benefits are higher for Tier I members than Tier II members, the projected benefit levels for Tier I members are decreased from what they would have been before benefit changes in 2011 due to the determination of the annual COLA percentage being based on the ratio of pre-July 2011 service to total service.

As noted on the prior page, the Actuarial Liability is defined as PVB less PVFNC. In 2011, for some membership classes the decrease in the PVFNC from the 2011 benefit changes was larger than the decrease in the PVB, resulting in an increase in an Actuarial Liability. For the remaining membership classes, the decrease in the PVFNC was smaller than the decrease in the PVB, resulting in a decrease in the Actuarial Liability. The variation is due to the different demographics, benefit multipliers and unique interrelation of the modified benefit provisions of each membership class under the actuarial cost allocation method approved for use in 2011 by the FRS

Actuarial Assumption Conference. The PVB will be lower in future valuations than it would have been had the 2011 benefit changes not been adopted.

Effective July 1, 2019, the FRS Actuarial Assumption Conference adopted the use of Individual EAN for system funding calculations. The change in the actuarial cost allocation method increased the cost allocation of projected benefits to future service (via a higher normal cost rate than the prior method) and decreased the allocation of projected benefits to past service, meaning decreased actuarial accrued liability and UAL when compared to the prior method. The decrease in UAL arising from the cost method change is amortized separately from other UAL change amortization bases. The increase in Normal Cost and the decrease in UAL due to the actuarial cost allocation method change is specific to active Tier I Pension Plan members. There is no change, however, in the projected benefits for Tier I active members. Given this financial dynamic, the decrease in the UAL due to the actuarial cost allocation method change is amortized over a closed 30-year period in a manner that mirrors the projected payroll of the closed Tier I population in the FRS Pension Plan. This method was discussed and illustrated in Milliman's October 23, 2019 and October 28, 2019 presentation materials to the FRS Actuarial Assumption Conference.

B. FRS Pension Plan-Specific Employer Contribution Rates

Table 4-11 presents the actuarially calculated 2020-2021 employer contribution rates for the FRS Pension Plan prior to blending with FRS Investment Plan contribution rates to create 2020-2021 blended proposed statutory rates.

The reader should note that the payroll base for UAL Cost contributions is larger than the payroll base for Normal Cost contributions. Florida Statute requires the employers of certain defined contribution program participants and reemployed retirees who are not eligible for renewed membership to make UAL Cost contributions based on their payroll. The payroll base for UAL Cost contributions includes approximately \$3.6 billion of payroll for employees who are not currently participating in the FRS Pension Plan or the FRS Investment Plan. Thus, the total contribution rate shown is an arithmetic sum, but the actual contribution percentages will be determined on a blended rate basis so that employers pay the same contribution rate for FRS Pension Plan members and FRS Investment Plan members in the same membership class or subclass.

Table 4-12 compares the legislated FRS Pension Plan-specific employer contribution rates to those calculated in the actuarial valuations for the prior plan years. The legislated rates for the 2013-2014 through 2018-2019 plan years were the same as the actuarially calculated rates in the 2012 through 2017 actuarial valuations, respectively, as subsequently modified to reflect enacted legislation when necessary.

Table 4-1
Florida Retirement System Pension Plan
Normal Cost Rates by Decrement
July 1, 2019

	----- Elected Officers' Class -----						Senior Management	DROP	Total
	Regular	Special Risk	Special Risk Administrative	Judicial	Leg-Atty-Cab	Local			
1. Vested Benefits and Early Retirement	1.24%	1.90%	2.61%	1.21%	3.94%	2.85%	1.72%	NA	1.37%
2. Regular Retirement	6.48%	15.39%	11.09%	14.49%	7.17%	9.99%	7.66%	NA	8.07%
3. Non-Duty Death	0.16%	0.27%	0.24%	0.63%	0.38%	0.45%	0.24%	NA	0.19%
4. Line of Duty Death	0.01%	0.36%	0.01%	0.03%	0.02%	0.03%	0.02%	NA	0.07%
5. Non-Duty Disability	0.13%	0.17%	0.15%	0.26%	0.15%	0.15%	0.14%	NA	0.13%
6. Line of Duty Disability	0.01%	0.22%	0.01%	0.01%	0.01%	0.01%	0.01%	NA	0.05%
7. Refund of Employee Contributions	<u>0.16%</u>	<u>0.10%</u>	<u>0.02%</u>	<u>0.01%</u>	<u>0.09%</u>	<u>0.09%</u>	<u>0.11%</u>	<u>NA</u>	<u>0.15%</u>
8. Total Normal Cost Rate	8.19%	18.41%	14.13%	16.64%	11.76%	13.57%	9.90%	NA	10.03%
9. Expected Employee Contributions	<u>-3.00%</u>	<u>-3.00%</u>	<u>-3.00%</u>	<u>-3.00%</u>	<u>-3.00%</u>	<u>-3.00%</u>	<u>-3.00%</u>	<u>NA</u>	<u>-3.00%</u>
10. Employer Normal Cost Rate	5.19%	15.41%	11.13%	13.64%	8.76%	10.57%	6.90%	7.03% ¹	7.03%

¹ DROP Normal Cost Rate is set equivalent to the Pension Plan composite Normal Cost rate.

Table 4-2
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Composite Plan
(\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor ¹	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor ¹	Amortization Payment for FY 2020-2021
June 30, 1999	Assumption Change from 1998 Experience Study	11	(\$347,009)	8.7839	(\$39,505)	10	(\$331,091)	8.2045	(\$40,355)
June 30, 2000	Special Risk 65% In-Line-Of-Duty Disability (2000)	12	(2,308)	9.4094	(245)	11	(2,220)	8.8680	(250)
June 30, 2000	Special Risk-Regular 12% Pre-2000 Retired Benefit Increase (2000)	12	293,980	9.4094	31,243	11	282,798	8.8680	31,890
June 30, 2004	Assumption Change from 2003 Experience Study	16	(3,427,496)	11.6789	(293,477)	15	(3,370,417)	11.2865	(298,624)
June 30, 2009	Assumption Change from 2008 Experience Study	21	6,982,713	14.0562	496,769	20	6,971,126	13.8410	503,658
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	21,912,703	14.0562	1,558,930	20	21,876,342	13.8410	1,580,549
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(6,409,659)	14.0562	(456,001)	20	(6,399,023)	13.8410	(462,324)
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(1,325,086)	14.0562	(94,270)	20	(1,322,887)	13.8410	(95,578)
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	1,191,281	14.4780	82,282	21	1,191,860	14.2968	83,365
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	(1,304,879)	14.4780	(90,128)	21	(1,305,514)	14.2968	(91,315)
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	2,906,471	14.8835	195,281	22	2,913,548	14.7359	197,718
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	(116,975)	15.2734	(7,659)	23	(117,468)	15.1587	(7,749)
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	2,947,313	15.6481	188,349	24	2,964,508	15.5660	190,448
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	2,114,425	16.0084	132,082	25	2,129,909	15.9583	133,467
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(2,867,669)	16.0084	(179,135)	25	(2,888,669)	15.9583	(181,014)
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	585,939	16.3548	35,827	26	591,033	16.3361	36,180
June 30, 2016	Special Risk 100% In-Line-Of-Duty Death (2016)	28	44,563	16.6877	2,670	27	45,007	16.7000	2,695
June 30, 2016	2016 Assumption Changes	28	1,180,850	16.6877	70,762	27	1,192,607	16.7000	71,414
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	1,300,426	16.6877	77,927	27	1,313,373	16.7000	78,645
June 30, 2017	Special Risk 100% In-Line-Of-Duty Death (2017)	29	92,604	17.0079	5,445	28	93,634	17.0505	5,492
June 30, 2017	2017 Assumption Changes	29	2,313,605	17.0079	136,032	28	2,339,341	17.0505	137,201
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	510,533	17.0079	30,018	28	516,212	17.0505	30,276
June 30, 2018	2018 Assumption Changes	30	2,361,040	17.3156	136,353	29	2,389,858	17.3881	137,443
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	(792,795)	17.3156	(45,785)	29	(802,472)	17.3881	(46,151)
June 30, 2019	Special Risk Cancer Presumption Disability and Death (2019)		10,856			30	11,638	17.7132	657
June 30, 2019	2019 Assumption Changes		4,003,656			30	4,291,919	17.7132	242,301
June 30, 2019	2019 Method Changes		(3,432,930)			30	(3,680,101)	9.0527	(406,519)
June 30, 2019	2018-2019 Experience (Gains) / Losses		(399,788) ²			30	(428,573)	17.7132	(24,195)
UAL as of Valuation Date			\$30,326,363				\$30,466,276	Total:	\$1,809,323
						Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:			\$31,195,399
						FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:			5.80%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-3
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Regular Class
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021
June 30, 1999	Assumption Change from 1998 Experience Study	11	(\$264,350)	8.7839	(\$30,095)	10	(\$252,224)	8.2045	(\$30,742)
June 30, 2004	Assumption Change from 2003 Experience Study	16	(3,028,015)	11.6789	(259,272)	15	(2,977,589)	11.2865	(263,819)
June 30, 2009	Assumption Change from 2008 Experience Study	21	5,680,039	14.0562	404,094	20	5,670,614	13.8410	409,697
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	34,893,357	14.0562	2,482,409	20	34,835,456	13.8410	2,516,834
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(27,370,674)	14.0562	(1,947,225)	20	(27,325,256)	13.8410	(1,974,228)
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(1,041,735)	14.0562	(74,112)	20	(1,040,006)	13.8410	(75,140)
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	1,327,981	14.4780	91,724	21	1,328,627	14.2968	92,932
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	(1,685,826)	14.4780	(116,440)	21	(1,686,646)	14.2968	(117,974)
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	1,437,726	14.8835	96,598	22	1,441,227	14.7359	97,804
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	519,000	15.2734	33,981	23	521,185	15.1587	34,382
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	1,790,360	15.6481	114,414	24	1,800,805	15.5660	115,688
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	619,083	16.0084	38,672	25	623,617	15.9583	39,078
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(1,299,153)	16.0084	(81,154)	25	(1,308,667)	15.9583	(82,006)
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	774,623	16.3548	47,364	26	781,356	16.3361	47,830
June 30, 2016	2016 Assumption Changes	28	800,301	16.6877	47,957	27	808,269	16.7000	48,399
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	1,337,838	16.6877	80,169	27	1,351,158	16.7000	80,908
June 30, 2017	2017 Assumption Changes	29	1,552,245	17.0079	91,266	28	1,569,512	17.0505	92,051
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	(319,424)	17.0079	(18,781)	28	(322,977)	17.0505	(18,942)
June 30, 2018	2018 Assumption Changes	30	1,566,490	17.3156	90,467	29	1,585,610	17.3881	91,190
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	(1,135,551)	17.3156	(65,580)	29	(1,149,411)	17.3881	(66,104)
June 30, 2019	2019 Assumption Changes		3,879,904			30	4,159,257	17.7132	234,811
June 30, 2019	2019 Method Changes		(1,915,823)			30	(2,053,762)	9.0527	(226,867)
June 30, 2019	2018-2019 Experience (Gains) / Losses		(552,757)			30	(592,555)	17.7132	(33,453)
		UAL as of Valuation Date	\$17,565,640					Total:	\$1,012,331
						Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:			\$23,739,856
						FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:			4.26%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-4
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Special Risk Class
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021
June 30, 1999	Assumption Change from 1998 Experience Study	11	(\$80,034)	8.7839	(\$9,111)	10	(\$76,362)	8.2045	(\$9,307)
June 30, 2000	Special Risk 65% In-Line-Of-Duty Disability (2000)	12	(2,354)	9.4094	(250)	11	(2,265)	8.8680	(255)
June 30, 2000	Special Risk-Regular 12% Pre-2000 Retired Benefit Increase (2000)	12	293,980	9.4094	31,243	11	282,798	8.8680	31,890
June 30, 2004	Assumption Change from 2003 Experience Study	16	(618,596)	11.6789	(52,967)	15	(608,295)	11.2865	(53,896)
June 30, 2009	Assumption Change from 2008 Experience Study	21	557,901	14.0562	39,691	20	556,975	13.8410	40,241
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	7,687,735	14.0562	546,927	20	7,674,978	13.8410	554,511
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(2,550,998)	14.0562	(181,485)	20	(2,546,765)	13.8410	(184,002)
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(194,569)	14.0562	(13,842)	20	(194,247)	13.8410	(14,034)
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	(421,911)	14.4780	(29,141)	21	(422,117)	14.2968	(29,525)
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	471,454	14.4780	32,563	21	471,683	14.2968	32,992
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	267,937	14.8835	18,002	22	268,589	14.7359	18,227
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	(578,750)	15.2734	(37,893)	23	(581,187)	15.1587	(38,340)
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	512,432	15.6481	32,747	24	515,421	15.5660	33,112
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	1,395,515	16.0084	87,174	25	1,405,735	15.9583	88,088
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(909,931)	16.0084	(56,841)	25	(916,594)	15.9583	(57,437)
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	(17,874)	16.3548	(1,093)	26	(18,030)	16.3361	(1,104)
June 30, 2016	Special Risk 100% In-Line-Of-Duty Death (2016)	28	44,563	16.6877	2,670	27	45,007	16.7000	2,695
June 30, 2016	2016 Assumption Changes	28	254,721	16.6877	15,264	27	257,257	16.7000	15,405
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	222,916	16.6877	13,358	27	225,136	16.7000	13,481
June 30, 2017	Special Risk 100% In-Line-Of-Duty Death (2017)	29	92,604	17.0079	5,445	28	93,634	17.0505	5,492
June 30, 2017	2017 Assumption Changes	29	504,639	17.0079	29,671	28	510,252	17.0505	29,926
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	503,500	17.0079	29,604	28	509,101	17.0505	29,858
June 30, 2018	2018 Assumption Changes	30	527,380	17.3156	30,457	29	533,817	17.3881	30,700
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	202,967	17.3156	11,722	29	205,445	17.3881	11,815
June 30, 2019	Special Risk Cancer Presumption Disability and Death (2019)		10,856			30	11,638	17.7132	657
June 30, 2019	2019 Assumption Changes		(24,591)			30	(26,362)	17.7132	(1,488)
June 30, 2019	2019 Method Changes		(1,415,556)			30	(1,517,476)	9.0527	(167,626)
June 30, 2019	2018-2019 Experience (Gains) / Losses		117,274			30	125,717	17.7132	7,097
UAL as of Valuation Date			\$6,853,209			\$543,914	\$6,783,485	Total:	\$389,173
								Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$4,346,448
								FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	8.95%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-5
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Special Risk Administrative Support Class
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021
June 30, 1999	Assumption Change from 1998 Experience Study	11	(\$287)	8.7839	(\$33)	10	(\$274)	8.2045	(\$33)
June 30, 2000	Special Risk 65% In-Line-Of-Duty Disability (2000)	12	46	9.4094	5	11	45	8.8680	5
June 30, 2004	Assumption Change from 2003 Experience Study	16	10,327	11.6789	884	15	10,155	11.2865	900
June 30, 2009	Assumption Change from 2008 Experience Study	21	1,342	14.0562	95	20	1,340	13.8410	97
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	20,174	14.0562	1,435	20	20,140	13.8410	1,455
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(22,389)	14.0562	(1,593)	20	(22,352)	13.8410	(1,615)
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	0	14.0562	0	20	0	13.8410	0
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	1,214	14.4780	84	21	1,215	14.2968	85
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	(554)	14.4780	(38)	21	(554)	14.2968	(39)
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	2,929	14.8835	197	22	2,936	14.7359	199
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	609	15.2734	40	23	611	15.1587	40
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	2,917	15.6481	186	24	2,934	15.5660	189
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	(6,027)	16.0084	(377)	25	(6,071)	15.9583	(380)
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	6,829	16.0084	427	25	6,879	15.9583	431
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	(5,998)	16.3548	(367)	26	(6,050)	16.3361	(370)
June 30, 2016	2016 Assumption Changes	28	502	16.6877	30	27	507	16.7000	30
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	2,002	16.6877	120	27	2,022	16.7000	121
June 30, 2017	2017 Assumption Changes	29	972	17.0079	57	28	983	17.0505	58
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	2,447	17.0079	144	28	2,474	17.0505	145
June 30, 2018	2018 Assumption Changes	30	987	17.3156	57	29	999	17.3881	57
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	676	17.3156	39	29	684	17.3881	39
June 30, 2019	2019 Assumption Changes		(2,638)			30	(2,828)	17.7132	(160)
June 30, 2019	2019 Method Changes		(1,874)			30	(2,009)	9.0527	(222)
June 30, 2019	2018-2019 Experience (Gains) / Losses		<u>1,962</u>			30	<u>2,103</u>	17.7132	<u>119</u>
		UAL as of Valuation Date	\$16,168				\$15,889	Total:	\$1,151
								Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$3,729
								FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	30.87%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-6
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Elected Officers' Class: Judicial Subclass
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)	
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021	
June 30, 1999	Assumption Change from 1998 Experience Study	11	\$37	8.7839	\$4	10	\$35	8.2045	\$4	
June 30, 2004	Assumption Change from 2003 Experience Study	16	27,288	11.6789	2,337	15	26,833	11.2865	2,377	
June 30, 2009	Assumption Change from 2008 Experience Study	21	20,505	14.0562	1,459	20	20,471	13.8410	1,479	
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	518,735	14.0562	36,904	20	517,874	13.8410	37,416	
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(281,394)	14.0562	(20,019)	20	(280,927)	13.8410	(20,297)	
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(25,915)	14.0562	(1,844)	20	(25,872)	13.8410	(1,869)	
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	(22,657)	14.4780	(1,565)	21	(22,668)	14.2968	(1,586)	
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	3,257	14.4780	225	21	3,258	14.2968	228	
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	86,601	14.8835	5,819	22	86,811	14.7359	5,891	
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	6,807	15.2734	446	23	6,836	15.1587	451	
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	110,847	15.6481	7,084	24	111,494	15.5660	7,163	
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	25,344	16.0084	1,583	25	25,529	15.9583	1,600	
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(56,042)	16.0084	(3,501)	25	(56,452)	15.9583	(3,538)	
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	5,601	16.3548	342	26	5,650	16.3361	346	
June 30, 2016	2016 Assumption Changes	28	7,450	16.6877	446	27	7,524	16.7000	451	
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	36,455	16.6877	2,185	27	36,818	16.7000	2,205	
June 30, 2017	2017 Assumption Changes	29	14,384	17.0079	846	28	14,544	17.0505	853	
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	(2,640)	17.0079	(155)	28	(2,669)	17.0505	(157)	
June 30, 2018	2018 Assumption Changes	30	15,110	17.3156	873	29	15,295	17.3881	880	
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	36,914	17.3156	2,132	29	37,365	17.3881	2,149	
June 30, 2019	2019 Assumption Changes		(43,080)			30	(46,182)	17.7132	(2,607)	
June 30, 2019	2019 Method Changes		(23,280)			30	(24,956)	9.0527	(2,757)	
June 30, 2019	2018-2019 Experience (Gains) / Losses		<u>29,996</u>			30	<u>32,155</u>	17.7132	<u>1,815</u>	
UAL as of Valuation Date			\$490,323		\$35,600		\$488,767	Total:	\$32,498	
									Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$114,991
									FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	28.26%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-7
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Elected Officers' Class: Legislature/Attorney/Cabinet Subclass
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)	
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021	
June 30, 1999	Assumption Change from 1998 Experience Study	11	\$2	8.7839	\$0	10	\$2	8.2045	\$0	
June 30, 2004	Assumption Change from 2003 Experience Study	16	2,055	11.6789	176	15	2,020	11.2865	179	
June 30, 2009	Assumption Change from 2008 Experience Study	21	2,058	14.0562	146	20	2,054	13.8410	148	
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	63,031	14.0562	4,484	20	62,927	13.8410	4,546	
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(36,047)	14.0562	(2,565)	20	(35,988)	13.8410	(2,600)	
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(818)	14.0562	(58)	20	(817)	13.8410	(59)	
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	2,950	14.4780	204	21	2,951	14.2968	206	
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	134	14.4780	9	21	134	14.2968	9	
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	8,729	14.8835	587	22	8,750	14.7359	594	
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	(4,105)	15.2734	(269)	23	(4,122)	15.1587	(272)	
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	19,676	15.6481	1,257	24	19,791	15.5660	1,271	
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	(3,041)	16.0084	(190)	25	(3,064)	15.9583	(192)	
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(937)	16.0084	(59)	25	(944)	15.9583	(59)	
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	(7,440)	16.3548	(455)	26	(7,505)	16.3361	(459)	
June 30, 2016	2016 Assumption Changes	28	627	16.6877	38	27	634	16.7000	38	
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	10,567	16.6877	633	27	10,672	16.7000	639	
June 30, 2017	2017 Assumption Changes	29	1,266	17.0079	74	28	1,280	17.0505	75	
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	4,057	17.0079	239	28	4,102	17.0505	241	
June 30, 2018	2018 Assumption Changes	30	1,304	17.3156	75	29	1,320	17.3881	76	
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	2,733	17.3156	158	29	2,767	17.3881	159	
June 30, 2019	2019 Assumption Changes		(2,581)			30	(2,767)	17.7132	(156)	
June 30, 2019	2019 Method Changes		(757)			30	(812)	9.0527	(90)	
June 30, 2019	2018-2019 Experience (Gains) / Losses		957			30	1,025	17.7132	58	
UAL as of Valuation Date			\$64,419			\$4,486	\$64,413	Total:	\$4,353	
									Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$7,177
									FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	60.66%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-8
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Elected Officers' Class: Local Subclass
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)	
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021	
June 30, 1999	Assumption Change from 1998 Experience Study	11	\$4	8.7839	\$0	10	\$4	8.2045	\$1	
June 30, 2004	Assumption Change from 2003 Experience Study	16	34,540	11.6789	2,957	15	33,964	11.2865	3,009	
June 30, 2009	Assumption Change from 2008 Experience Study	21	11,965	14.0562	851	20	11,945	13.8410	863	
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	245,587	14.0562	17,472	20	245,180	13.8410	17,714	
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(60,806)	14.0562	(4,326)	20	(60,705)	13.8410	(4,386)	
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(7,423)	14.0562	(528)	20	(7,411)	13.8410	(535)	
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	2,159	14.4780	149	21	2,160	14.2968	151	
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	308	14.4780	21	21	308	14.2968	22	
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	14,423	14.8835	969	22	14,458	14.7359	981	
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	(5,900)	15.2734	(386)	23	(5,925)	15.1587	(391)	
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	113,630	15.6481	7,262	24	114,293	15.5660	7,342	
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	(24,178)	16.0084	(1,510)	25	(24,355)	15.9583	(1,526)	
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(10,742)	16.0084	(671)	25	(10,821)	15.9583	(678)	
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	(10,698)	16.3548	(654)	26	(10,791)	16.3361	(661)	
June 30, 2016	2016 Assumption Changes	28	3,347	16.6877	201	27	3,381	16.7000	202	
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	22,074	16.6877	1,323	27	22,294	16.7000	1,335	
June 30, 2017	2017 Assumption Changes	29	6,990	17.0079	411	28	7,068	17.0505	415	
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	39,554	17.0079	2,326	28	39,994	17.0505	2,346	
June 30, 2018	2018 Assumption Changes	30	7,106	17.3156	410	29	7,192	17.3881	414	
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	10,881	17.3156	628	29	11,014	17.3881	633	
June 30, 2019	2019 Assumption Changes		(8,227)			30	(8,819)	17.7132	(498)	
June 30, 2019	2019 Method Changes		(5,502)			30	(5,898)	9.0527	(652)	
June 30, 2019	2018-2019 Experience (Gains) / Losses		<u>(1,953)</u>			30	<u>(2,093)</u>	17.7132	<u>(118)</u>	
UAL as of Valuation Date			\$377,139			\$26,905	\$376,436	Total:	\$25,983	
									Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$49,410
									FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	52.59%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-9
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
Senior Management Service Class
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)	
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021	
June 30, 1999	Assumption Change from 1998 Experience Study	11	(\$2,382)	8.7839	(\$271)	10	(\$2,273)	8.2045	(\$277)	
June 30, 2004	Assumption Change from 2003 Experience Study	16	212,160	11.6789	18,166	15	208,626	11.2865	18,485	
June 30, 2009	Assumption Change from 2008 Experience Study	21	65,963	14.0562	4,693	20	65,854	13.8410	4,758	
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	1,284,732	14.0562	91,399	20	1,282,601	13.8410	92,667	
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	(291,608)	14.0562	(20,746)	20	(291,124)	13.8410	(21,034)	
June 30, 2009	2009-2010 Plan Changes (HB 479)	21	(54,625)	14.0562	(3,886)	20	(54,535)	13.8410	(3,940)	
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	35,747	14.4780	2,469	21	35,764	14.2968	2,502	
June 30, 2010	2010-2011 Plan Changes (SB 2100)	22	(93,652)	14.4780	(6,469)	21	(93,698)	14.2968	(6,554)	
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	135,453	14.8835	9,101	22	135,782	14.7359	9,214	
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	69,709	15.2734	4,564	23	70,002	15.1587	4,618	
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	392,213	15.6481	25,065	24	394,502	15.5660	25,344	
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	(154,202)	16.0084	(9,633)	25	(155,331)	15.9583	(9,734)	
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	62,219	16.0084	3,887	25	62,675	15.9583	3,927	
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	53,244	16.3548	3,256	26	53,707	16.3361	3,288	
June 30, 2016	2016 Assumption Changes	28	31,635	16.6877	1,896	27	31,950	16.7000	1,913	
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	99,317	16.6877	5,951	27	100,306	16.7000	6,006	
June 30, 2017	2017 Assumption Changes	29	59,477	17.0079	3,497	28	60,139	17.0505	3,527	
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	80,667	17.0079	4,743	28	81,564	17.0505	4,784	
June 30, 2018	2018 Assumption Changes	30	61,261	17.3156	3,538	29	62,009	17.3881	3,566	
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	79,213	17.3156	4,575	29	80,180	17.3881	4,611	
June 30, 2019	2019 Assumption Changes		21,252			30	22,782	17.7132	1,286	
June 30, 2019	2019 Method Changes		(70,138)			30	(75,188)	9.0527	(8,306)	
June 30, 2019	2018-2019 Experience (Gains) / Losses		<u>118,915</u>			30	<u>127,477</u>	17.7132	<u>7,197</u>	
UAL as of Valuation Date			\$2,196,569		\$145,794		\$2,203,770	Total:	\$147,849	
									Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$569,732
									FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	25.95%

Table 4-10
Florida Retirement System Pension Plan
Unfunded Actuarial Liability (UAL) Bases
July 1, 2019
DROP
 (\$ in Thousands)

(a)	(b)	(c)	(d)	(e)	(f) = (d) / (e)	(g)	(h)	(i)	(j) = (h) / (i)
Date Established	Description	Remaining Payments as of Valuation Date	Balance as of Valuation Date	Amortization Factor	Amortization Payment for FY 2019-2020	Remaining Payments one year after Valuation Date	Balance One Year After Valuation Date	Amortization Factor	Amortization Payment for FY 2020-2021
June 30, 2004	Assumption Change from 2003 Experience Study	16	(\$67,253)	11.6789	(\$5,758)	15	(\$66,133)	11.2865	(\$5,859)
June 30, 2009	Assumption Change from 2008 Experience Study	21	642,939	14.0562	45,740	20	641,872	13.8410	46,375
June 30, 2009	2008-2009 Experience (Gains) / Losses	21	(22,800,649)	14.0562	(1,622,101)	20	(22,762,814)	13.8410	(1,644,596)
June 30, 2009	Unrecognized (Gains)/Losses while in Surplus	21	24,204,258	14.0562	1,721,958	20	24,164,094	13.8410	1,745,837
June 30, 2010	2009-2010 Experience (Gains) / Losses	22	265,799	14.4780	18,359	21	265,928	14.2968	18,601
June 30, 2011	2010-2011 Experience (Gains) / Losses	23	952,674	14.8835	64,009	22	954,994	14.7359	64,807
June 30, 2012	2011-2012 Experience (Gains) / Losses	24	(124,345)	15.2734	(8,141)	23	(124,868)	15.1587	(8,237)
June 30, 2013	2012-2013 Experience (Gains) / Losses	25	5,237	15.6481	335	24	5,268	15.5660	338
June 30, 2014	Assumption/Method Change from 2013 Experience Study	26	261,931	16.0084	16,362	25	263,849	15.9583	16,534
June 30, 2014	2013-2014 Experience (Gains) / Losses	26	(659,912)	16.0084	(41,223)	25	(664,745)	15.9583	(41,655)
June 30, 2015	2014-2015 Experience (Gains) / Losses	27	(205,518)	16.3548	(12,566)	26	(207,305)	16.3361	(12,690)
June 30, 2016	2016 Assumption Changes	28	82,267	16.6877	4,930	27	83,086	16.7000	4,975
June 30, 2016	2015-2016 Experience (Gains) / Losses	28	(430,744)	16.6877	(25,812)	27	(435,032)	16.7000	(26,050)
June 30, 2017	2017 Assumption Changes	29	173,631	17.0079	10,209	28	175,562	17.0505	10,297
June 30, 2017	2016-2017 Experience (Gains) / Losses	29	202,372	17.0079	11,899	28	204,623	17.0505	12,001
June 30, 2018	2018 Assumption Changes	30	181,402	17.3156	10,476	29	183,616	17.3881	10,560
June 30, 2018	2017-2018 Experience (Gains) / Losses	30	9,371	17.3156	541	29	9,485	17.3881	546
June 30, 2019	2019 Assumption Changes		183,617			30	196,837	17.7132	11,112
June 30, 2019	2018-2019 Experience (Gains) / Losses		<u>(114,182)</u>			30	<u>(122,403)</u>	17.7132	<u>(6,910)</u>
		UAL as of Valuation Date	\$2,762,896			\$189,215	\$2,765,916	Total:	\$195,985
								Projected FY 2020-2021 UAL Payroll Excluding FRS Investment Plan Payroll:	\$2,364,056
								FY 2020-2021 UAL Contribution Rate Prior to Blending with FRS Investment Plan Payroll:	8.29%

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table 4-11
Florida Retirement System Pension Plan
Actuarially Calculated Employer Contribution Rates
Prior to Blending with FRS Investment Plan
July 1, 2019 Valuation for Fiscal Year Beginning July 1, 2020

No surplus available for rate reduction

	Regular	Special Risk	Special Risk Administrative	-- Elected Officers' Class --			Senior Management	Composite (excluding DROP)	DROP ¹	Composite (including DROP)
			Judicial	Leg-Atty-Cab	Local					
1. Employer Normal Cost Rate	5.19%	15.41%	11.13%	13.64%	8.76%	10.57%	6.90%	7.03%	7.03%	7.03%
2. UAL Contribution Rate ²	4.26%	8.95%	30.87%	28.26%	60.66%	52.59%	25.95%	5.59%	8.29%	5.80%
3. Total Employer Contribution Rate [(1) + (2)]	9.45%	24.36%	42.00%	41.90%	69.42%	63.16%	32.85%	12.62%	15.32%	12.83%
4. UAL Cost Paid from Surplus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5. Rate Reduction from Surplus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6. Total Adjusted Employer Contribution Rate for FRS Trust Fund [(3) + (4) + (5)]	9.45%	24.36%	42.00%	41.90%	69.42%	63.16%	32.85%	12.62%	15.32%	12.83%

¹ DROP rates are special charges to cover the assumed cost of DROP participants; they are not Normal Cost or UAL in the traditional sense. See Section G of Executive Summary for discussion of the DROP contribution rate.

² Prior to blending with FRS Investment Plan Payroll.

Table 4-12
Florida Retirement System Pension Plan
Actuarially Calculated vs. Legislated Defined Benefit Plan Contribution Rates (Before Blending) ^{1 & 2 & 3}

Membership Class	Plan Year 2018-2019		Plan Year 2019-2020		Plan Year 2020-2021	
	Actuarially Calculated	Legislated	Actuarially Calculated	Legislated	Actuarially Calculated	Legislated
1. Regular	7.10%	7.10%	7.39%	7.39%	9.45%	TBD
2. Special Risk	24.39%	24.39%	25.63%	25.63%	24.36%	TBD
3. Special Risk Administrative	42.30%	42.30%	43.30%	43.30%	42.00%	TBD
4. Elected Officers' Class - Judicial	41.93%	41.93%	44.05%	44.05%	41.90%	TBD
5. Elected Officers' Class - Leg-Atty-Cab	65.19%	65.19%	64.81%	64.81%	69.42%	TBD
6. Elected Officers' Class - Local	61.22%	61.22%	62.25%	62.25%	63.16%	TBD
7. Senior Management Service	28.03%	28.03%	30.22%	30.22%	32.85%	TBD
8. Composite without DROP	10.35%	10.35%	10.91%	10.91%	12.62%	TBD
9. DROP	12.37%	12.37%	12.94%	12.94%	15.32%	TBD
10. Composite with DROP	10.50%	10.50%	11.06%	11.06%	12.83%	TBD

¹ The above rates (applied to DB plan payroll) are combined with the Investment Plan contribution rates (applied to IP payroll) to derive the uniform blended rates employers contribute.

² Contribution rates shown above do not include the 3% required employee contribution rate.

³ The Plan Year 2019-2020 rates shown in this table differ from those developed in the July 1, 2018 actuarial valuation due to the modification of Special Risk cancer presumption disability and death benefit provisions by the Florida Legislature subsequent to the publication of the valuation report.

5. Accounting Statement

The liabilities presented in this report differ by section regarding whether future anticipated salary increases or service credits are included in the calculation. Actuarial Liabilities in Sections 3 and 4 are determined for plan funding purposes and include a provision for the projected effects of future salary increases and future service expected to be performed by current FRS Pension Plan members.

Statement No. 67 of the Governmental Accounting Standards Board (GASB) is the current standard for pension plan accounting disclosure by governmental pension systems. GASB 67 information for the FRS Pension Plan as of July 1, 2019 was provided under separate cover in November 2019.¹ GASB 67 liability calculations also include a provision for the projected effects of future salary increases and future service performed by current FRS Pension Plan members.

Accounting Standards Codification (ASC) 960 – Plan Accounting – Defined Benefit Pension Plans, formerly titled Statement No. 35 of the Financial Accounting Standards Board (FASB), specifies a different methodology for disclosure of certain information regarding pension plan funded status. Accounting liabilities calculated under ASC 960 do not include the effects of either projected future salary increases or projected future service performed.

The ASC 960 disclosures are intended to provide a “snap shot” view of how the Plan’s assets compare to its liabilities if contributions stopped and accrued benefit claims had to be satisfied. The Accumulated Benefit Obligation (ABO) is determined based on each member’s accrued benefit, that is, the benefit based on employee service performed and compensation earned up to the valuation date. We assume that the plan is ongoing and that members continue to terminate employment, retire, and otherwise act in accordance with the actuarial assumptions. Liabilities are discounted at the assumed valuation interest rate of 7.20% per annum.

Table 5-1 presents the ABO for the FRS Pension Plan determined as of July 1, 2019. All of the calculations presented in that table are based on the actuarial assumptions used in the valuation, as described in Appendix A, except salaries are not projected to increase and no future benefit service is credited for service performed after the valuation date. Values of the ABO are shown by type of member and by class. The active members' values are also divided between the employee-financed (accumulated member contributions) and employer-financed portions, with the employer-financed portions shown separately for vested benefits and non-vested benefits. For purposes of calculating the ABO post-Senate Bill 2100, we estimated the COLA percentage for each member as 3% multiplied by service through June 30, 2011, divided by projected total service at the time of retirement.

Table 5-2 presents the total ABO for the FRS Pension Plan for the current and two prior valuations. The trend of the Pension Plan’s ASC 960 funded status, as measured by the ABO over a period of time, is one indication of the progress being made in accumulating sufficient assets to pay benefits when due. Past and future results are affected by changes in actuarial assumptions, benefit provisions, and accounting policies.

Table 5-3 reconciles the ABO determined as of the prior valuation, July 1, 2018, to the ABO as of July 1, 2019. This reconciliation indicates the impact of the assumption changes and plan changes, if any.

¹ The valuation report in prior years included Table 5-4 which showed the Net Pension Obligation under GASB Statement No. 27. That exhibit has been discontinued since GASB Statement No. 27 is not applicable after plan year 2013-2014. Please refer to the separate GASB 67 report for financial reporting information.

Table 5-1
Florida Retirement System Pension Plan
Accumulated Benefit Obligation - ASC 960
July 1, 2019
(\$ in Thousands)

	Regular	Special Risk	Special Risk Administrative	-- Elected Officers' Class --			Senior Management	DROP	Total
			Judicial	Leg-Atty-Cab	Local				
A. Accumulated Benefit Obligation									
1. Active Members									
a. Accumulated Member Contributions	\$3,278,946	\$658,749	\$795	\$19,482	\$1,094	\$7,707	\$92,830	\$0	\$4,059,603
b. Employer-Financed Vested Benefits	19,366,431	6,620,062	9,585	226,974	11,845	88,585	829,800	0	27,153,282
c. Employer-Financed Non-Vested Benefits	2,347,995	931,565	1,230	19,201	1,324	7,648	130,309	0	3,439,272
d. Total	\$24,993,372	\$8,210,376	\$11,610	\$265,657	\$14,263	\$103,940	\$1,052,939	\$0	\$34,652,157
2. Annuitants	\$83,317,384	\$22,647,681	\$70,787	\$989,007	\$91,367	\$507,250	\$3,187,138	\$17,431,519	\$128,242,133
3. Other Inactive Members	\$4,367,573	\$619,084	\$1,525	\$17,459	\$10,546	\$18,519	\$182,793	\$0	\$5,217,499
4. Total Accumulated Benefit Obligation	\$112,678,329	\$31,477,141	\$83,922	\$1,272,123	\$116,176	\$629,709	\$4,422,870	\$17,431,519	\$168,111,789
B. Assets Available for Benefits									
1. Market	\$113,468,762	\$30,988,603	\$72,803	\$922,281	\$58,107	\$299,744	\$2,860,732	\$14,902,694	\$163,573,726
2. Actuarial Basis	\$111,686,549	\$30,501,876	\$71,660	\$907,795	\$57,194	\$295,036	\$2,815,800	\$14,668,623	\$161,004,533
C. Unfunded / (Surplus) Total Accumulated Benefit Obligation, Assets at:									
1. Market	(\$790,433)	\$488,538	\$11,119	\$349,842	\$58,069	\$329,965	\$1,562,138	\$2,528,825	\$4,538,063
2. Actuarial Basis	\$991,780	\$975,265	\$12,262	\$364,328	\$58,982	\$334,673	\$1,607,070	\$2,762,896	\$7,107,256
D. Percent of Accumulated Obligation Funded, Assets at:									
1. Market	100.70%	98.45%	86.75%	72.50%	50.02%	47.60%	64.68%	85.49%	97.30%
2. Actuarial Basis	99.12%	96.90%	85.39%	71.36%	49.23%	46.85%	63.66%	84.15%	95.77%

Table 5-2
Florida Retirement System Pension Plan
Analysis of Funding Progress - ASC 960
 (\$ in Thousands)

	July 1, 2017 <u>Valuation Basis</u>	July 1, 2018 <u>Valuation Basis</u>	July 1, 2019 <u>Valuation Basis</u>
A. Accumulated Benefit Obligation			
1. Active Members			
a. Accumulated Member Contributions	\$3,237,901	\$3,666,837	\$4,059,603
b. Employer-Financed Vested Benefits	27,040,073	25,443,712	27,153,282
c. Employer-Financed Non-Vested Benefits	<u>1,090,274</u>	<u>2,960,330</u>	<u>3,439,272</u>
d. Total	\$31,368,248	\$32,070,879	\$34,652,157
2. Annuitants	\$101,665,423	\$106,808,859	\$110,810,614
3. Other Inactive Members	\$5,071,085	\$5,249,929	\$5,217,499
4. DROP	<u>\$15,749,075</u>	<u>\$16,672,788</u>	<u>\$17,431,519</u>
5. Total Accumulated Benefit Obligation	\$153,853,831	\$160,802,455	\$168,111,789
B. Assets Available for Benefits			
1. Market	\$154,053,263	\$161,196,881	\$163,573,726
2. Actuarial Basis	\$150,593,242	\$156,104,350	\$161,004,533
C. Unfunded/(Surplus) Total Accumulated Benefit Obligation, Assets at:			
1. Market	(\$199,432)	(\$394,426)	\$4,538,063
2. Actuarial Basis	\$3,260,589	\$4,698,105	\$7,107,256
D. Percent of Accumulated Benefit Obligation Funded, Assets at:			
1. Market	100.13%	100.25%	97.30%
2. Actuarial Basis	97.88%	97.08%	95.77%
E. Annual Salaries ¹	\$26,171,584	\$26,669,323	\$26,663,415
F. Unfunded/(Surplus) Accumulated Benefit Obligation as a Percent of Salary, Assets at:			
1. Market	-0.76%	-1.48%	17.02%
2. Actuarial Basis	12.46%	17.62%	26.66%

¹ Includes Drop Salaries

Table 5-3
Florida Retirement System Pension Plan
Statement of Changes in Accumulated
Benefit Obligation
 (\$ in Thousands)

	ASC 960 Basis
Accumulated Benefit Obligation at July 1, 2018	\$160,802,455
Increase (Decrease) During Year Attributable to:	
Increase for Interest Due to Passage of Time	\$11,503,746
Benefits Paid - PY 2019	(\$10,887,130)
Benefits Accrued, & Other Gains/Losses	\$3,174,929
Plan Provision / Assumption Changes	\$3,517,789
Net Increase (Decrease)	\$7,309,334
Accumulated Benefit Obligation at July 1, 2019	\$168,111,789

Appendix A: Actuarial Methods, Procedures, and Assumptions

The actuarial assumptions are intended to estimate the future experience of FRS Pension Plan members, employers and investments. Any variations in future actual experience from these assumptions will result in corresponding changes in actuarially calculated contribution rates.

Assumption Tables

A complete listing of all the assumptions, methods, and procedures that are used in the 2019 actuarial valuation of the FRS Pension Plan are summarized on the following pages. These assumptions, methods, and procedures were approved by the 2019 FRS Actuarial Assumption Conference and are based on the 2019 Experience Study.

Data

Except where noted, the analysis in this valuation was based on data as of June 30, 2019, as provided by the Division of Retirement, Florida Department of Management Services. The data used in this valuation consists of financial information and records of age, service and income of active members, annuitants, and other inactive members entitled to future benefits. The Division of Retirement, Florida Department of Management Services is solely responsible for the validity, accuracy and comprehensiveness of this information; the results of our analysis can be expected to differ and may need to be revised if the underlying data supplied is incomplete or inaccurate.

Methods and Procedures

Actuarial cost allocation method: The total cost of the FRS Pension Plan, over time, will be equal to the benefits paid and expenses less actual investment earnings and is not affected directly by the actuarial cost allocation method. The actuarial cost allocation method is simply a tool to allocate costs to past, current, or future years and thus primarily affects the timing of cost recognition.

The FRS Pension Plan uses Entry Age Normal (EAN), which is the most commonly used general cost method approach for state pension systems. Conceptually, EAN sets the normal cost rate level as a percent of payroll over a member's full projected working career. There are different categories of EAN, including Individual EAN, which is by far the most commonly used EAN category, and Ultimate EAN, which is the category of EAN used by the FRS Pension Plan prior to this valuation. Even each category of EAN contains different interpretations of how to calculate the key metrics. GASB Statements Nos. 67 & 68 mandate the use of a particular interpretation of Individual EAN for financial reporting purposes. GASB 67 & 68 information is provided under separate cover.

In October 2019, the FRS Actuarial Assumption Conference adopted the use of Individual EAN for system funding calculations starting with this 2019 valuation. The system now uses the same actuarial cost allocation method and interpretation for financial reporting purposes and for purposes of setting system funding policy.

Individual EAN sets normal cost in a manner that is representative of the tier in which the member actually participates. Members initially enrolled on or after July 1, 2011 (Tier II) have different benefit and retirement eligibility criteria than Tier I members. Cost methods do allocate benefits between past and projected future service, but do not affect the level of projected benefits; projected benefits are based on the actual tier of membership under either Ultimate EAN or Individual EAN. Compared to the Ultimate EAN method, the Individual EAN method allocates more of the cost of projected benefits to future service (via higher Normal Cost) and hence produces a lower Actuarial Liability for past service as a counterbalance.

UAL amortization method: The Unfunded Actuarial Liability (UAL) is amortized as a level percentage of projected payroll on which UAL Rates are charged in an effort to maintain level contribution rates as a percentage of payroll during the specified amortization period if future experience follows assumptions.

New UAL arises each year and is calculated in each new actuarial valuation. The newly arising UAL can be either positive or negative, and can be due either to experience varying from assumptions or to changes in Actuarial Liability from modifications to assumptions, plan provisions, or actuarial methods. Each year’s newly arising UAL is currently amortized over a closed 30-year period as a level percent of the projected payroll on which UAL rates are charged.

The decrease in UAL arising as a result of changing the actuarial cost allocation method from Ultimate EAN to Individual EAN is amortized separately from other UAL bases. The change in UAL due to the actuarial cost allocation method change is specific to active Tier I members whose calculated normal costs are higher under Individual EAN than under Ultimate EAN. Since there is no change in the projected benefits for Tier I members, there is a corresponding decrease in Actuarial Liability. Therefore, the decrease in the UAL due to the actuarial cost allocation method change is amortized over a closed 30-year period in a manner that mirrors the projected payroll of the closed Tier I population in the FRS Pension Plan. This method was discussed and illustrated in Milliman’s October 23, 2019 and October 28, 2019 presentation materials to the FRS Actuarial Assumption Conference, including quantified year-by-year detail on the amortization schedule.

Amortization periods longer than 20 years can incur significant negative amortization, wherein the calculated UAL increases for an extended period of time prior to final payoff even if all contributions are made and all assumptions are met. This was discussed and illustrated in Milliman’s October 8, 2019 presentation materials to the FRS Actuarial Assumption Conference.

Asset valuation method: This method recognizes actual investment performance different from the long-term assumption systematically. The expected Actuarial Value of Assets (AVA) is determined by crediting the rate of investment return assumed in the prior valuation to the prior year’s AVA. Then, 20% of the difference between the actual Market Value of Assets (MVA) and the expected AVA is immediately recognized in the AVA. To ensure that the AVA remains reasonably close to the MVA, the asset method includes a corridor whereby the AVA must remain within 80% to 120% of MVA.

Economic Assumptions

Assumption	
Inflation	2.60%
Real wage growth	0.65%
Payroll growth	3.25% (sum of two items above)
Investment Return	7.20%

Demographic Assumptions

Mortality

Healthy Inactive Mortality (Post-Employment)

Member Category (Non-Disabled Inactive)	PUB-2010 base table listed below, generational mortality using gender-specific MP-2018 mortality improvement projection scale
Female K-12 School Instructional Personnel	Headcount Weighted Teachers Healthy Retiree Female Table, set forward 1 year
Male K-12 School Instructional Personnel	Benefits Weighted Teachers Below Median Healthy Retiree Male Table, set forward 2 years
Female Special Risk	Headcount Weighted Safety Healthy Retiree Female Table, set forward 1 year
Male Special Risk	Headcount Weighted Safety Below Median Healthy Retiree Male Table, set forward 1 year
Female (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Healthy Retiree Female Table
Male (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Healthy Retiree Male Table, set back 1 year

Healthy Active Mortality (During Employment)

Member Category (Non-Disabled Active)	PUB-2010 base table listed below, generational mortality using gender-specific MP-2018 mortality improvement projection scale
Female K-12 School Instructional Personnel	Headcount Weighted Teachers Employee Female Table, set forward 1 year
Male K-12 School Instructional Personnel	Benefits Weighted Teachers Below Median Employee Male Table, set forward 2 years
Female Special Risk	Headcount Weighted Safety Employee Female Table, set forward 1 year
Male Special Risk	Headcount Weighted Safety Below Median Employee Male Table, set forward 1 year
Female (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Employee Female Table
Male (other than Special Risk or K-12 School Instructional Personnel)	Headcount Weighted General Below Median Employee Male Table, set back 1 year

Disabled Mortality

Member Category (Disabled Inactive)	PUB-2010 base table listed below, generational mortality using gender-specific MP-2018 mortality improvement projection scale
Female Disabled Special Risk	80% Headcount Weighted General Disabled Retiree Female Table; 20% Headcount Weighted Safety Disabled Retiree Female Table
Male Disabled Special Risk	80% Headcount Weighted General Disabled Retiree Male Table; 20% Headcount Weighted Safety Disabled Retiree Male Table
Female Disabled (other than Special Risk)	Headcount Weighted General Disabled Retiree Female Table, set forward 3 years
Male Disabled (other than Special Risk)	Headcount Weighted General Disabled Retiree Male Table, set forward 3 years

Retirement for Vested Terminated Members (Tier I and Tier II)

All current vested terminated members are assumed to begin receiving benefits on the normal retirement benefit age for the appropriate class and tier. All future members who terminate employment with a vested benefit are also assumed to commence benefit at the normal retirement benefit age.

Optional Form of Payment

All future retirees are assumed to elect the straight life (Option 1) form of benefit. For current retirees and members in DROP, the actual elected form is used.

**Retirement Assumptions (Tier I)
 DROP Entry**

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		All Other	
	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
46	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
47	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
48	4.0%	4.0%	5.0%	5.0%	11.0%	15.0%	16.0%	16.0%
49	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
50	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
51	4.0%	4.0%	12.0%	9.0%	11.0%	15.0%	16.0%	16.0%
52	4.0%	4.0%	14.0%	9.0%	15.0%	36.0%	16.0%	16.0%
53	5.0%	4.0%	15.0%	11.0%	15.0%	27.5%	16.0%	16.0%
54	5.0%	4.0%	16.0%	12.0%	15.0%	27.5%	16.0%	16.0%
55	6.0%	4.0%	18.0%	12.0%	32.0%	27.5%	16.0%	16.0%
56	6.0%	5.0%	20.0%	15.0%	5.0%	5.0%	16.0%	16.0%
57	10.0%	8.0%	55.0%	55.0%	5.0%	5.0%	55.0%	55.0%
58	10.0%	8.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
59	10.0%	9.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
60	13.0%	9.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
61	16.0%	14.0%	55.0%	50.0%	5.0%	5.0%	55.0%	55.0%
62	26.0%	19.0%	46.5%	42.5%	5.0%	5.0%	43.0%	43.0%
63	8.0%	6.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
64	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
65	5.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
66	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
67	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
68	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
69	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
70-79	3.0%	3.0%	5.0%	5.0%	0.0%	0.0%	3.0%	3.0%
80	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Immediate Retirement when eligible for DROP

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
46	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
48	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
49	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
50	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
51	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
52	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
53	4.0%	4.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
54	4.0%	4.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
55	4.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
56	4.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
57	5.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
58	5.0%	6.0%	6.0%	7.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
59	6.0%	6.0%	6.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
60	7.0%	6.0%	6.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
61	10.0%	10.0%	9.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
62	13.0%	12.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
63	9.0%	9.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
64	11.0%	11.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
65	18.0%	15.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
66	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
67	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
68	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
69	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
70-79	20.0%	17.5%	9.0%	9.5%	100.0%	100.0%	3.0%	3.0%	3.0%	3.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Retirement Assumptions (Tier I) (continued)

Immediate Retirement when not eligible for DROP

Age	Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male
52	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
53	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
54	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
55	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
56	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
57	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
58	2.0%	2.0%	5.0%	5.0%	3.0%	3.0%	6.0%	6.0%
59	5.0%	2.0%	5.0%	5.0%	3.0%	3.0%	6.0%	6.0%
60	5.0%	5.0%	7.0%	7.0%	3.0%	3.0%	6.0%	6.0%
61	5.0%	5.0%	9.0%	9.0%	3.0%	3.0%	6.0%	6.0%
62	8.0%	11.0%	20.0%	20.0%	3.0%	3.0%	6.0%	6.0%
63	8.0%	8.0%	14.0%	14.0%	5.0%	5.0%	11.0%	11.0%
64	8.0%	8.0%	14.0%	14.0%	5.0%	5.0%	11.0%	11.0%
65	15.0%	13.0%	20.0%	20.0%	5.0%	5.0%	11.0%	11.0%
66	15.0%	13.0%	25.0%	25.0%	5.0%	5.0%	11.0%	11.0%
67	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
68	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
69	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
70-79	15.0%	13.0%	100.0%	100.0%	12.0%	12.0%	11.0%	11.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Retirement Assumptions (Tier II)

DROP Entry

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		All Other	
	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
46	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
47	0.0%	0.0%	0.0%	0.0%	8.0%	13.0%	5.0%	5.0%
48	4.0%	4.0%	5.0%	5.0%	11.0%	15.0%	16.0%	16.0%
49	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
50	4.0%	4.0%	10.0%	9.0%	11.0%	15.0%	16.0%	16.0%
51	4.0%	4.0%	12.0%	9.0%	11.0%	15.0%	16.0%	16.0%
52	4.0%	4.0%	14.0%	9.0%	11.0%	15.0%	16.0%	16.0%
53	5.0%	4.0%	15.0%	11.0%	11.0%	15.0%	16.0%	16.0%
54	5.0%	4.0%	16.0%	12.0%	11.0%	15.0%	16.0%	16.0%
55	6.0%	4.0%	18.0%	12.0%	17.0%	36.0%	16.0%	16.0%
56	6.0%	5.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
57	10.0%	8.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
58	10.0%	8.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
59	10.0%	9.0%	20.0%	15.0%	11.0%	5.0%	16.0%	16.0%
60	13.0%	9.0%	55.0%	55.0%	20.0%	5.0%	55.0%	55.0%
61	16.0%	14.0%	55.0%	49.0%	5.0%	5.0%	50.0%	50.0%
62	16.0%	14.0%	49.5%	43.0%	5.0%	5.0%	45.0%	45.0%
63	16.0%	14.0%	43.0%	37.0%	5.0%	5.0%	40.0%	40.0%
64	16.0%	14.0%	36.5%	31.0%	5.0%	5.0%	35.0%	35.0%
65	16.0%	14.0%	30.0%	25.0%	5.0%	5.0%	30.0%	30.0%
66	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
67	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
68	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
69	3.0%	3.0%	5.0%	5.0%	5.0%	5.0%	3.0%	3.0%
70-79	3.0%	3.0%	5.0%	5.0%	0.0%	0.0%	3.0%	3.0%
80	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Retirement Assumptions (Tier II) (continued)

Immediate Retirement when eligible for DROP

Age	Regular K-12 School Instructional		Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
45	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
46	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	4.0%	5.0%	0.0%	0.0%	0.0%	0.0%
48	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
49	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
50	4.0%	4.0%	2.5%	2.5%	4.0%	5.0%	3.0%	3.0%	3.0%	3.0%
51	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
52	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
53	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
54	4.0%	4.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
55	4.0%	5.0%	2.5%	2.5%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%
56	4.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
57	5.0%	5.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
58	5.0%	6.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
59	6.0%	6.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
60	7.0%	6.0%	2.5%	2.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
61	10.0%	10.0%	9.0%	8.0%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
62	10.0%	10.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
63	10.0%	10.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
64	10.0%	10.0%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
65	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	10.0%	10.0%
66	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
67	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
68	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
69	20.0%	17.5%	9.0%	9.5%	7.0%	7.0%	3.0%	3.0%	3.0%	3.0%
70-79	20.0%	17.5%	9.0%	9.5%	100.0%	100.0%	3.0%	3.0%	3.0%	3.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Retirement Assumptions (Tier II) (continued)

Immediate Retirement when not eligible for DROP

Age	Regular Not K-12 School Instructional		Special Risk and Special Risk Admin		Elected Officers' Subclasses		Senior Management Service Class	
	Female	Male	Female	Male	Female	Male	Female	Male
55	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
56	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
57	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
58	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
59	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	0.0%	0.0%
60	0.0%	0.0%	7.0%	7.0%	0.0%	0.0%	0.0%	0.0%
61	5.0%	5.0%	9.0%	9.0%	3.0%	3.0%	6.0%	6.0%
62	5.0%	5.0%	20.0%	20.0%	3.0%	3.0%	6.0%	6.0%
63	5.0%	5.0%	14.0%	14.0%	3.0%	3.0%	6.0%	6.0%
64	5.0%	5.0%	14.0%	14.0%	3.0%	3.0%	6.0%	6.0%
65	15.0%	13.0%	20.0%	20.0%	3.0%	3.0%	11.0%	11.0%
66	15.0%	13.0%	25.0%	25.0%	5.0%	5.0%	11.0%	11.0%
67	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
68	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
69	15.0%	13.0%	25.0%	25.0%	12.0%	12.0%	11.0%	11.0%
70-79	15.0%	13.0%	100.0%	100.0%	12.0%	12.0%	11.0%	11.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Line-of-Duty Disability Annual Rates

Age	Special Risk Class	All Other Classes
<42	0.005%	0.001%
42-46	0.050%	0.001%
47-50	0.050%	0.002%
51-54	0.090%	0.004%
55-56	0.090%	0.005%
57-58	0.090%	0.006%
59	0.090%	0.007%
60-61	0.090%	0.006%
62	0.090%	0.003%
63	0.090%	0.002%
64+	0.090%	0.001%

Non-Duty Disability Annual Rates

Age	Special Risk Class	All Other Classes
20	0.020%	0.000%
21-27	0.020%	0.010%
28-35	0.040%	0.010%
36-40	0.040%	0.020%
41-44	0.040%	0.030%
45-46	0.040%	0.040%
47-50	0.070%	0.080%
51-54	0.070%	0.130%
55	0.070%	0.160%
56	0.070%	0.170%
57-58	0.070%	0.190%
59	0.070%	0.230%
60	0.070%	0.210%
61	0.070%	0.200%
62	0.070%	0.110%
63	0.070%	0.080%
64+	0.070%	0.040%

Withdrawal – Other Terminations of Employment Annual Rates

Combined Years of Service	Regular – Male					
	Under 25	25 to 29	Attained Age			55+
			30 to 34	35 to 44	45 to 54	
0	27.0%	25.0%	23.0%	22.0%	21.0%	27.0%
1	19.0%	17.0%	15.0%	13.5%	12.5%	12.5%
2	17.5%	13.5%	12.0%	10.5%	9.5%	9.0%
3	16.0%	11.5%	10.0%	9.0%	7.8%	7.8%
4	15.5%	10.0%	8.5%	8.0%	6.5%	6.5%
5	10.5%	9.0%	8.5%	7.5%	6.0%	6.0%
6	10.5%	8.5%	7.5%	6.5%	6.0%	6.0%
7	8.0%	8.0%	6.5%	6.0%	5.0%	5.0%
8	5.5%	5.5%	5.0%	5.5%	5.0%	4.0%
9	5.0%	5.0%	5.0%	4.5%	4.0%	4.0%
10	4.0%	4.0%	4.0%	4.0%	4.0%	3.0%
11	3.5%	3.5%	3.0%	3.5%	3.5%	3.0%
12	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
13	3.0%	3.0%	3.0%	3.0%	3.0%	2.5%
14	2.5%	2.5%	1.5%	2.5%	2.5%	2.5%
15	2.5%	2.5%	1.5%	2.0%	2.5%	2.5%
16	2.0%	2.0%	1.5%	2.0%	2.0%	2.0%
17	2.0%	2.0%	1.5%	2.0%	2.0%	2.0%
18	2.0%	2.0%	1.5%	1.5%	2.0%	2.0%
19	2.0%	2.0%	1.5%	1.5%	2.0%	2.0%
20	1.5%	1.5%	1.5%	1.0%	1.5%	1.5%
21	1.3%	1.3%	1.3%	1.0%	1.3%	1.3%
22	1.3%	1.3%	1.3%	1.0%	1.3%	1.3%
23	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
24	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
29	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
30+	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

Withdrawal (continued)

Combined Years of Service	Regular – Female					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	28.0%	28.0%	27.0%	26.0%	25.0%	30.0%
1	18.0%	17.0%	16.0%	15.0%	12.5%	12.5%
2	16.0%	13.5%	12.5%	11.5%	10.0%	10.0%
3	16.0%	11.5%	10.5%	9.5%	9.0%	9.0%
4	16.0%	10.0%	9.0%	8.0%	7.5%	7.5%
5	13.0%	8.0%	8.0%	7.5%	7.5%	7.5%
6	12.0%	8.0%	8.0%	7.5%	7.5%	7.5%
7	7.5%	7.5%	7.5%	6.5%	6.5%	6.5%
8	6.0%	6.0%	6.0%	5.5%	5.5%	5.5%
9	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
10	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
11	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
12	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
13	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
14	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
15	3.0%	3.0%	3.0%	2.8%	2.8%	2.8%
16	3.0%	3.0%	3.0%	2.5%	2.5%	2.5%
17	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
18	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
19	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
20	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
21	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
22	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
23	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
24	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
28	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
29	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
30+	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

Withdrawal (continued)

Combined Years of Service	Elected Officers' Class: Local					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
1	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
2	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
3	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
4	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
5	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
6	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
7	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
8	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
9	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
10	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
11	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
12	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
13	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
14	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
15	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
16	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
17	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
18	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
19	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
20	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
21	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
22	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
23	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
24	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
25	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
26	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
27	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
28	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
29	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%
30+	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%

Withdrawal (continued)

Combined Years of Service	Elected Officers' Class: Leg-Atty-Cab					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
1	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
2	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
3	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
4	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
5	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
6	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
7	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
8	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
9	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
10	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
11	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
12	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
13	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
14	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
15	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
16	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
17	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
18	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
19	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
20	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
21	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
22	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
23	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
24	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
25	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
26	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
27	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
28	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
29	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
30+	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%

Withdrawal (continued)

Combined Years of Service	Elected Officers' Class: Judges					
	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
1	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
2	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
3	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
4	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
5	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
6	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
7	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
8	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
9	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
10	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
11	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
12	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
13	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
14	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
15	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
16	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
17	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
18	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
19	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
20	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
21	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
22	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
23	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
24	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
29	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
30+	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

Withdrawal (continued)

Combined Years of Service	Senior Management – Male					
	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	9.0%	9.0%	9.0%	9.0%	9.0%	11.0%
1	10.5%	10.5%	10.5%	10.5%	10.5%	11.0%
2	17.0%	17.0%	17.0%	17.0%	17.0%	14.5%
3	16.0%	16.0%	16.0%	16.0%	16.0%	10.5%
4	12.0%	12.0%	12.0%	12.0%	12.0%	7.0%
5	10.0%	10.0%	10.0%	10.0%	10.0%	5.0%
6	9.5%	9.5%	9.5%	9.5%	9.5%	5.0%
7	7.0%	7.0%	7.0%	7.0%	7.0%	5.0%
8	6.0%	6.0%	6.0%	6.0%	6.0%	4.0%
9	6.0%	6.0%	6.0%	6.0%	6.0%	4.0%
10	5.0%	5.0%	5.0%	5.0%	5.0%	4.0%
11	5.0%	5.0%	5.0%	5.0%	5.0%	4.0%
12	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
13	4.0%	4.0%	4.0%	4.0%	4.0%	3.5%
14	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
15	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
16	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
17	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
18	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
19	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
20	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
21	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
22	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
23	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
24	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
29	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
30+	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

Withdrawal (continued)

Combined Years of Service	Senior Management – Female					
	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
1	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
2	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
3	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
4	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
5	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
6	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
7	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
8	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
9	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
10	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
11	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
12	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
13	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
14	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
15	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
16	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
17	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
18	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
19	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
20	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
21	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
22	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
23	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
24	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
29	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
30+	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

Withdrawal (continued)

Special Risk & Special Risk Administrative – Male						
Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	17.5%	15.5%	15.5%	17.5%	17.5%	17.5%
1	10.0%	9.0%	9.0%	10.0%	9.0%	9.0%
2	8.0%	8.0%	8.0%	8.0%	7.0%	8.0%
3	7.0%	7.0%	7.0%	7.0%	5.5%	7.0%
4	5.0%	6.0%	6.0%	6.0%	5.5%	6.0%
5	4.0%	5.0%	5.0%	5.0%	4.0%	5.0%
6	4.0%	5.0%	5.0%	5.0%	4.0%	5.0%
7	4.0%	5.0%	4.0%	4.0%	3.5%	4.0%
8	3.5%	4.5%	3.5%	3.5%	3.0%	3.5%
9	3.0%	3.5%	3.0%	3.0%	3.0%	3.0%
10	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
11	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
12	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
13	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
14	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
15	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
16	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
17	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
18	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
19	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
20	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
21	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%
22	0.8%	0.8%	0.8%	0.8%	1.0%	1.0%
23	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
24	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
25	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
26	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
27	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
28	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
29	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
30+	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%

Withdrawal (continued)

Special Risk & Special Risk Administrative – Female						
Combined Years of Service	Attained Age					
	Under 25	25 to 29	30 to 34	35 to 44	45 to 54	55+
0	24.0%	24.0%	24.0%	26.0%	30.0%	30.0%
1	13.5%	13.5%	13.5%	13.5%	13.5%	13.5%
2	11.0%	11.0%	9.0%	10.5%	10.5%	10.5%
3	8.0%	8.0%	8.5%	10.5%	10.0%	10.0%
4	8.0%	8.0%	7.0%	7.0%	10.0%	10.0%
5	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
6	6.5%	6.5%	6.5%	6.0%	6.0%	6.0%
7	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
8	5.0%	5.0%	4.5%	4.5%	6.0%	6.0%
9	3.5%	3.5%	3.5%	3.5%	6.0%	6.0%
10	3.5%	3.5%	3.5%	3.5%	5.0%	5.0%
11	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
12	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
13	2.5%	2.5%	2.5%	2.5%	3.0%	3.0%
14	2.5%	2.5%	2.5%	2.5%	3.0%	3.0%
15	2.3%	2.3%	2.3%	2.3%	3.0%	3.0%
16	2.0%	2.0%	2.0%	2.0%	3.0%	3.0%
17	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
18	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
19	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
20	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
21	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%
22	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
23	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
24	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
25	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
26	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
27	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
28	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
29	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
30+	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

Individual Member Salary Increase Assumptions

(Based on 2.60% inflation assumption)

Combined Years of Service	Regular	Special Risk	Special Risk Admin	ECO	ESO	Judges	Senior Management
0	8.00%	7.60%	3.90%	3.70%	3.25%	3.70%	8.40%
1	6.00%	5.90%	3.90%	3.70%	3.25%	3.70%	8.40%
2	5.60%	5.60%	3.90%	3.70%	3.25%	3.70%	7.50%
3	5.30%	5.60%	3.90%	3.70%	3.25%	3.70%	6.70%
4	4.90%	5.60%	3.90%	3.70%	3.25%	3.70%	6.30%
5	4.80%	5.60%	3.90%	3.70%	3.25%	3.70%	6.00%
6	4.80%	5.60%	3.90%	3.70%	3.25%	3.70%	5.60%
7	4.70%	5.50%	3.90%	3.70%	3.25%	3.70%	5.30%
8	4.60%	5.50%	3.90%	3.70%	3.25%	3.70%	4.80%
9	4.60%	5.50%	3.90%	3.70%	3.25%	3.70%	4.80%
10	4.60%	5.50%	3.90%	3.70%	3.25%	3.70%	4.80%
11	4.50%	5.30%	3.90%	3.70%	3.25%	3.70%	4.80%
12	4.40%	5.30%	3.90%	3.70%	3.25%	3.70%	4.80%
13	4.40%	5.20%	3.90%	3.70%	3.25%	3.70%	4.80%
14	4.40%	5.20%	3.90%	3.70%	3.25%	3.70%	4.80%
15	4.40%	5.20%	3.90%	3.70%	3.25%	3.70%	4.80%
16	4.40%	5.00%	3.90%	3.70%	3.25%	3.70%	4.80%
17	4.40%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
18	4.30%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
19	4.30%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
20	4.30%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
21	4.20%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
22	4.20%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
23	4.10%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
24	4.10%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
25	4.00%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
26	3.90%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
27	3.80%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
28	3.70%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
29	3.60%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%
30+	3.60%	5.00%	3.90%	3.70%	3.25%	3.70%	4.30%

Unused Annual Leave Available at Retirement

Membership Class	Hours
Regular	230
Special Risk	270
Senior Management Service	310
Others Not Listed Above	230

Eligible Survivors

It is assumed that 80% of deceased active members will have survivors eligible for lifetime benefits upon their deaths. Males are assumed to be three years older than their female spouses.

Commencement of Survivor Benefits

It is assumed that survivors of deceased active members will defer commencement of benefits until the following:

Membership Class / Tier	Member Age
Special Risk / Tier 1	45
Special Risk / Tier 2	50
Other classes/ Tier 1 and 2	55

Military Service and Out-of-State Service Credits

Active members are assumed to have purchased the following additional years of service credit.

Type of Service Credit	Special Risk Class		All other classes	
	Men	Women	Men	Women
Military Service Credit ¹	0.2818	0	0.1853	0
Out-of-State Service Credit ²	0	0	0.0910	0.0910

¹ Pre-1987 hires only; service is eligible for the COLA.

² Service for pre-July 1, 2011 enrollees is eligible for the COLA; assumption applies to both tiers.

No extra service credit was assumed for TRS and IFAS participants.

Changes to the Actuarial Assumptions and Methods

All assumptions and methods were reviewed as part of the 2019 Experience Study and changes were adopted by the 2019 FRS Actuarial Assumption Conference during its meetings in October 2019.

Appendix B: Summary of Plan Provisions

All actuarial calculations are based upon our understanding of Florida Statutes regarding the benefit and eligibility provisions of the retirement systems. These provisions are briefly summarized below for reference purposes, along with corresponding references to the Statutes. This summary encompasses the major provisions; it does not attempt to cover all of the detailed provisions.

Florida Retirement System (FRS)

The benefit, eligibility, and contribution provisions of the FRS are set forth in Chapter 121 of the Florida Statutes. Provisions relating to other State-administered retirement systems are set forth in other sections of the Florida Statutes, under Chapters 112, 122, and 238.

Effective Date

The effective date of the FRS was December 1, 1970. The FRS was created with closure and consolidation of the Teachers' Retirement System, the State and County Officers and Employees' Retirement System, and the Highway Patrol Pension Fund. In 1972, the Judicial Retirement System was also consolidated with the FRS. The FRS was created to provide a defined benefit retirement, disability, and survivor program for participating public employees. Social Security coverage is also required for all members.

Beginning in 2002, the FRS became one system with two primary programs, the existing defined benefit FRS Pension Plan and a defined contribution plan alternative known as the FRS Investment Plan (IP). The earliest that any member could participate in the IP was July 1, 2002.

As of July 1, 2007, the Institute for Food and Agricultural Sciences Supplemental Retirement Program was consolidated under the FRS as a closed group.

(Section 121.011(2))

Membership

Membership is a condition of employment for all new state, county, or other participating agency employees filling regularly established positions and employed on or after December 1, 1970, or who elected to transfer from an existing system. Employees may be full-time or part-time and can be elected, appointed, or employed in state government, county government, a state university, or a community college. A city or special district may join the FRS at its option.

Effective July 1, 1978, a member in an existing retirement system who is re-employed after termination of employment may remain in that system, provided his or her member contributions have not been withdrawn.

Members of the FRS Pension Plan when the FRS Investment Plan was created were provided an educational period about their plan choice options prior to a 90-day election period to elect between the FRS Pension Plan and the FRS Investment Plan (IP). Members newly hired after the IP became effective are provided eight months after their month of hire to file an election between the two primary programs. Members who do not make an election default into the FRS Investment Plan except for Special Risk Class members who default into the FRS Pension Plan.

After the initial active or default election to participate in the FRS Pension Plan or the FRS Investment Plan, the employee has one opportunity, at the employee's discretion before termination or retirement, to choose to move from the FRS Pension Plan to the FRS Investment Plan or vice versa.

(Sections 121.051, 121.4501)

Classification

There are five separate classes of members: Regular Class, Special Risk Class, Special Risk Administrative Support Class, Elected Officers' Class, and Senior Management Service Class. In addition, the Deferred Retirement Option Program (DROP) is available to FRS Pension Plan members who meet the requirements for normal retirement under the FRS Pension Plan.

Regular Class – members who are not classified as members of the Special Risk Class, Special Risk Administrative Support Class, Elected Officers' Class, or Senior Management Service Class.

Special Risk Class – members employed as law enforcement officers, emergency medical technicians, paramedics, firefighters, firefighter trainers, fire prevention inspectors, correctional officers, correctional probation officers, certain professional health care positions within the Department of Children and Family Services and the Department of Corrections, or certain forensic positions within a law enforcement agency, or a medical examiner's office who meet the criteria set forth in the Florida Retirement System law and administrative rules.

Special Risk Administrative Support Class – former Special Risk Class members employed as law enforcement officers, firefighters, correctional officers, or emergency medical technicians who have been moved or been re-assigned to non-Special Risk administrative support positions within a Florida Retirement System Special Risk employing agency.

Elected Officers' Class – members include the Governor, Lieutenant Governor, cabinet officers, legislators, Supreme Court justices, district court of appeals judges, circuit judges, county court judges, state attorneys, public defenders, and elected county officers. Also included are city and special district officers if the employer chose to place their elected officials in this class. All such elected officers may withdraw from the Florida Retirement System, elect membership in the Senior Management Service Class or, if state officers, elect membership in the Senior Management Service Optional Annuity Program if initially enrolled before July 1, 2017.

Senior Management Service Class – members who hold positions in the Senior Management Service of the State of Florida; community college presidents; appointed school board superintendents; county and city managers; selected managerial staff of the Legislature; the Auditor General and managerial staff; the Executive Director of the Ethics Commission; the State University System Executive Service and university presidents; selected managerial staff of the State Board of Administration; judges of compensation claims; selected managerial staff with the Judicial Branch; Chief Deputy Court Administrator; capital collateral regional counsels and assistant capital collateral regional counsels; assistant state attorneys; assistant public defenders; assistant statewide prosecutors or assistant attorneys general; and non-elective managerial positions designated for SMSC membership by local government agencies. Members in this class have either chosen not to participate or are not eligible to participate in the elective Senior Management Service Optional Annuity Program for state senior managers or to withdraw from the FRS if employed by non-state employers. This class became effective February 1, 1987, and members of an existing retirement system and members

of the Special Risk or Special Risk Administrative Support Classes who were employed prior to February 1, 1987, could elect to remain in such system or class.

Deferred Retirement Option Program (DROP) – allows members of the FRS Pension Plan in any of the above five classes to elect to retire when they reach normal retirement and have their FRS benefits accumulate in the FRS Trust Fund, earning interest, while the member continues to work for an FRS employer. DROP membership is for a specific and limited period.

(Sections 121.021(12), 121.0515, 121.052, 121.055, 121.091 (13))

Contributions

From January 1, 1975, for the state and for school boards, and from October 1, 1975, for other agencies, through June 30, 2011, the total cost of the System was paid by the participating employers.

Beginning July 1, 2011, all FRS Pension Plan and FRS Investment Plan members, except those FRS Pension Plan members participating in DROP, are required to pay member contributions equal to 3% of compensation. TRS members already pay required employee contributions. Member contributions do not accrue interest except for TRS members.

(Section 121.071 (2))

The employer contribution rates enacted for the July 1, 2019 – June 30, 2020 plan year are as follows:

	Regular	Special Risk	Special Risk Administrative	Judicial	Elected Officers Class		Senior Management	DROP
					Leg-Atty-Cab	Local		
Defined Benefit Plan								
- Normal Cost Rate	3.09%	12.44%	3.26%	12.46%	6.61%	8.63%	4.47%	4.68%
- UAL Rate	<u>4.30</u>	<u>13.19</u>	<u>40.04</u>	<u>31.59</u>	<u>58.20</u>	<u>53.62</u>	<u>25.75</u>	<u>8.26</u>
- Total DB Rate	7.39%	25.63%	43.30%	44.05%	64.81%	62.25%	30.22%	12.94%
Investment Plan								
- Employer Rate	3.60%	13.54%	5.43%	11.05%	6.94%	8.95%	4.98%	n/a
- UAL Rate	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>n/a</u>
- Total IP Rate	3.60%	13.54%	5.43%	11.05%	6.94%	8.95%	4.98%	n/a
Blended Uniform Contribution Rates								
- Normal Cost Rate	3.19%	12.61%	3.61%	12.30%	6.67%	8.73%	4.60%	4.68%
- UAL Rate	<u>3.56</u>	<u>11.15</u>	<u>33.26</u>	<u>27.98</u>	<u>47.64</u>	<u>38.37</u>	<u>19.09</u>	<u>8.26</u>
- Total Rate	6.75%	23.76%	36.87%	40.28%	54.31%	47.10%	23.69%	12.94%

The above rates exclude the 0.06% administrative charge for Investment Plan administration and education (except DROP), and the 1.66% for the financing of the Florida Retiree Health Insurance Subsidy program.

(Sections 121.71, 121.74)

Compensation

“Compensation” means the monthly salary paid a member by his or her employer for work performed arising from that employment.

- (a) Compensation shall include:
1. Overtime payments paid from a salary fund.
 2. Accumulated annual leave payments.
 3. Payments in addition to the employee's base rate of pay if all the following apply:
 - a. The payments are paid according to a formal written policy that applies to all eligible employees equally;
 - b. The policy provides that payments shall commence no later than the 11th year of employment;
 - c. The payments are paid for as long as the employee continues his or her employment; and
 - d. The payments are paid at least annually.
 4. Amounts withheld for tax sheltered annuities or deferred compensation programs, or any other type of salary reduction plan authorized under the Internal Revenue Code.
 5. Payments made in lieu of a permanent increase in the base rate of pay, whether made annually or in 12 or 26 equal payments within a 12-month period, when the member's base pay is at the maximum of his or her pay range. When a portion of a member's annual increase raises his or her pay range and the excess is paid as a lump sum payment, such lump sum payment shall be compensation for retirement purposes.
- (b) Compensation for a member participating in the FRS Pension Plan or the FRS Investment Plan may not include:
1. Fees paid professional persons for special or particular services or salary payments made from a faculty practice plan authorized by the Board of Governors of the State University System for eligible clinical faculty at a college in a state university that has a faculty practice plan; or
 2. Any bonuses or other payments prohibited from inclusion in the member's average final compensation.
- (c) For all purposes under this chapter, the member's compensation or gross compensation contributed as employee-elective salary reductions or deferrals to any salary reduction, deferred compensation, or tax-sheltered annuity program authorized under the Internal Revenue Code shall be deemed to be the compensation or gross compensation which the member would receive if he or she were not participating in such program and shall be treated as compensation for retirement purposes under this chapter. Any public funds otherwise paid by an employer into an employee's salary reduction, deferred compensation, or tax-sheltered annuity program on or after July 1, 1990 (the date as of which all employers were notified in writing by the division to cease making contributions to the System Trust Fund based on such amounts), shall be considered a fringe benefit and shall not be treated as compensation for retirement purposes under this chapter. However, if an employer was notified in writing by the division to cease making such contributions as of a different date, that employer shall be subject to the requirements of said written notice.
- (d) For any person who first becomes a member on or after July 1, 1996, compensation for any plan year shall not include any amounts in excess of the Section 401(a)(17), Internal Revenue Code limitation (as amended by the Omnibus Budget Reconciliation Act of 1993), which limitation of \$150,000 effective July 1, 1996, shall be adjusted as required by federal law for qualified government plans and shall be further adjusted for changes in the cost of living in the manner provided by Section 401(a)(17)(B), Internal Revenue Code. For any person who first became a member prior to July 1, 1996, compensation for all plan years beginning on or after July 1, 1990, shall not include any amounts in excess of the compensation limitation (originally \$200,000) established by Section 401(a)(17), Internal Revenue Code prior to the Omnibus Budget Reconciliation Act of 1993, which limitation shall be adjusted for changes in the cost of living since 1989, in the manner provided by Section 401(a)(17) of the Internal Revenue Code of 1991. This limitation, which has

been part of the Florida Retirement System since plan years beginning on or after July 1, 1990, shall be adjusted as required by federal law for qualified government plans.

“Annual compensation” means the total compensation paid a member during a year. A “year” is 12 continuous months.

(Section 121.021(22) and (23))

FRS Pension Plan

Normal Retirement Benefit

Eligibility – Members initially enrolled before July 1, 2011 (Tier I)

- Regular Class
 1. 30 years of creditable service at any age.
 2. Age 62 and 6 or more years of creditable service.
(Section 121.021(29)(a)(1))
- Special Risk Class
 1. 25 years of special risk service at any age; or
 2. Age 55 and 6 or more years of special risk service; or
 3. Age 52 and 25 years of creditable service, including special risk service and up to a maximum of four years of active duty wartime military service credit.
 4. 30 years of any creditable service, at any age, or age 62 and 6 or more years of creditable service when the member has service in any other membership class in addition to Special Risk Class (same requirement as the Regular Class).
(Section 121.021(29)(b)(1))
- Special Risk Administrative Support Class
(with six or more years of Special Risk Class service, the same requirements as apply to the Special Risk Class, otherwise same as apply to the Regular Class)
(Sections 121.0515(8) and 121.021(29)(b)(1))
- Elected Officers' Class
(same requirements as apply to Regular Class)
(Section 121.021(29)(a)(1))
- Senior Management Service Class
(same requirements as apply to Regular Class)
(Section 121.021(29)(a)(1))

Eligibility – Members initially enrolled on and after July 1, 2011 (Tier II)

- Regular Class
 1. 33 years of creditable service at any age.
 2. Age 65 and 8 or more years of creditable service.
(Section 121.021(29)(a)(2))

- Special Risk Class
 1. 30 years of special risk service at any age; or
 2. Age 60 and 8 or more years of special risk service; or
 3. 33 years of any creditable service, at any age, or age 65 and 8 or more years of creditable service (same requirement as the Regular Class).(Section 121.021(29)(b)(2))
- Special Risk Administrative Support Class
(with eight or more years of Special Risk Class service, the same requirements as apply to the Special Risk Class, otherwise same as apply to the Regular Class)
(Sections 121.0515(8) and 121.021(29)(b)(2))
- Elected Officers' Class
(same requirements as apply to Regular Class)
(Section 121.021(29)(a)(2))
- Senior Management Service Class
(same requirements as apply to Regular Class)
(Section 121.021(29)(a)(2))

Normal Form

Straight life benefit (Option 1), payable on the last state working day of each month, with a guarantee that benefits paid will at least equal member contributions.

(Section 121.091(1))

Optional Forms

10-year certain and life benefit (Option 2), 100% joint and contingent benefit (Option 3), or 66-2/3% joint and survivor benefit (Option 4). If the joint annuitant is the member's non-disabled child, payment ceases upon attainment of the joint annuitant's 25th birthday under the 100% and 66- 2/3% joint and survivor benefit.

(Section 121.091(6))

Dual Retirement

In the event a member accumulates retirement benefits to commence at different normal retirement ages by virtue of having performed duties for an employer which would entitle him or her to benefits as both a Special Risk Class member and a member of another class, the amount of the benefits payable shall be computed separately with respect to each such age, and the sum of such computed amounts shall be paid. Note that this does not apply to a Special Risk Administrative Support Class member with at least 6 years of Special Risk Class Membership (8 years for members enrolled on or after July 1, 2011) when the Special Risk and Special Risk Administrative Support Classes are the only memberships held because such a member is treated as a Special Risk Class member.

(Section 121.091(2))

Regular Benefit Amount

The monthly FRS Pension Plan allowance is the product of:

1. Average final compensation
 - a. For members initially enrolled before July 1, 2011, the average of the highest five plan years of creditable service;
 - b. For members initially enrolled on or after July 1, 2011, the average of the highest eight plan years of creditable service;
2. Creditable service during the applicable period; and
3. The appropriate benefit percentage for periods of service.

All benefits are limited to 100% of average final compensation.

(Sections 121.021(17), (24) and (25), 121.091(1))

The appropriate benefit percentages are as follows:

- For Members initially enrolled before July 1, 2011, for Creditable Service as a Regular Class member Subsequent to November 30, 1970:

Retirement at:	Percentage
Age 62 with 6 years of creditable service, or 30 years of creditable service	1.60%
Age 63 with 6 years of creditable service, or 31 years of creditable service	1.63%
Age 64 with 6 years of creditable service, or 32 years of creditable service	1.65%
Age 65 with 6 years of creditable service, or 33 years of creditable service	1.68%

- For Members initially enrolled on or after July 1, 2011, for Creditable Service as a Regular Class member Subsequent to November 30, 1970:

Retirement at:	Percentage
Age 65 with 8 years of creditable service, or 33 years of creditable service	1.60%
Age 66 with 8 years of creditable service, or 34 years of creditable service	1.63%
Age 67 with 8 years of creditable service, or 35 years of creditable service	1.65%
Age 68 with 8 years of creditable service, or 36 years of creditable service	1.68%

(Section 121.091(1))

Service as a Special Risk Class member:

Retirement on or After July 1, 2001 with Service Performed During:	Percentage
December 1, 1970 to September 30, 1974	2.00%
October 1, 1974 and thereafter	3.00%

(Section 121.091(1))

- For Members initially enrolled before July 1, 2011, for Creditable Service as a Special Risk Administrative Support Class member Subsequent to November 30, 1970:

Retirement at:	Percentage
Age 55 with 6 years of creditable special risk service, or age 52 with 25 years of creditable service, which may include up to four years of active duty wartime military service, or 25 years of creditable special risk service	1.60%
Age 56 with 6 years of creditable special risk service, or age 53 with 26 years of creditable service, which may include up to four years of active duty wartime military service, or 26 years of creditable special risk service	1.63%
Age 57 with 6 years of creditable special risk service, or age 54 with 27 years of creditable service, which may include up to four years of active duty wartime military service, or 27 years of creditable special risk service	1.65%
Age 58 with 6 years of creditable special risk service, or age 55 with 28 years of creditable service, which may include up to four years of active duty wartime military service, or 28 years of creditable special risk service	1.68%

- For Members initially enrolled on or after July 1, 2011, for Creditable Service as a Special Risk Administrative Support Class member Subsequent to November 30, 1970:

Retirement at:	Percentage
Age 60 with 8 years of creditable special risk service, or age 57 with 30 years of creditable service, which may include up to four years of active duty wartime military service, or 30 years of creditable special risk service	1.60%
Age 61 with 8 years of creditable special risk service, or age 58 with 31 years of creditable service, which may include up to four years of active duty wartime military service, or 31 years of creditable special risk service	1.63%
Age 62 with 8 years of creditable special risk service, or age 59 with 32 years of creditable service, which may include up to four years of active duty wartime military service, or 32 years of creditable special risk service	1.65%
Age 63 with 8 years of creditable special risk service, or age 60 with 33 years of creditable service, which may include up to four years of active duty wartime military service, or 33 years of creditable special risk service	1.68%

(Section 121.0515(8) and 121.091(1))

- For Service as an Elected Officers' Class member:
 3% for each year of creditable service in such class, except 3-1/3% for service in the judicial class. Military service credit is at the rate for Regular Class members.

(Sections 121.052(5)(a) and (d), 121.091(1))

- For Service as a Senior Management Service Class member:
 2% for each year of creditable service in such class, after January 31, 1987.

(Section 121.055(4)(d))

Early Retirement

Eligibility

For members initially enrolled before July 1, 2011, six years of creditable service for all classes of membership.

For members initially enrolled on or after July 1, 2011, eight years of creditable service for all classes of membership.

(Section 121.021(30))

Benefit Amount

The normal retirement benefit accrued to the date of early retirement, reduced by 5/12% for each month that the early retirement date precedes the normal retirement date based upon age. The normal retirement date is as follows:

1. Special Risk Class members:
 - a. Initially enrolled before July 1, 2011: Age 55
 - b. Initially enrolled on or after July 1, 2011: Age 60
2. Members in all other Classes
 - a. Initially enrolled before July 1, 2011: Age 62
 - b. Initially enrolled on or after July 1, 2011: Age 65

(Sections 121.021(30), 121.091(3))

Non-Duty Disability Retirement

Eligibility

Members are eligible if totally and permanently disabled after completing at least eight years of creditable service (or after six years if disability retirement is ordered for a judge by the Supreme Court).

Benefit Amount

Same as for normal retirement, but based on average final compensation and creditable service to the date of disability retirement.

Minimum Benefit Amount

25% of average final compensation.

If the Supreme Court orders disability retirement for a judge, the minimum is two-thirds of compensation at disability. This benefit for a defined benefit plan member is not paid from the FRS Trust Fund. This benefit for an Investment Plan member is paid from the FRS Trust Fund after the member's IP account balance is transferred to the FRS Trust Fund.

(Section 121.091(4))

Line-of-Duty Disability

Eligibility

Members are eligible if totally and permanently disabled during the actual performance of duty. There is no service credit requirement.

Benefit Amount

Same as for normal retirement, but based on average final compensation and creditable service to the date of disability retirement.

Minimum Benefit Amount

42% of average final compensation, except for the Special Risk and the Special Risk Administrative Support classes whose members are entitled to 65% of average final compensation.

If the Supreme Court orders disability retirement for a judge, the minimum is two-thirds of compensation at disability. This benefit for a defined benefit plan member is not paid from the FRS Trust Fund.

(Section 121.091(4))

Post-Retirement Death Benefits

Based on the optional form elected.

Non-Duty Pre-Retirement Death Benefits

Eligibility

Employment is terminated by death after vested for all classes of membership.

Benefit Amount

The normal or early retirement benefit amount for which the member would have been eligible had the member retired on his or her date of death and elected the 100% joint and survivor (Option 3) form of payment in favor of his or her beneficiary who is the surviving spouse or other eligible dependent. The monthly benefit is normally payable to the member's beneficiary for the beneficiary's lifetime. If the beneficiary is the member's non-disabled child, payment ceases upon attainment of the beneficiary's 25th birthday.

If the member is more than 10 years away from normal retirement age, the reduction is 5% for each year the member would be younger than the normal retirement age at retirement. There are exceptions if within 10 years of normal retirement:

1. For members initially enrolled before July 1, 2011, who were within 10 years of normal retirement eligibility, the reduction for early retirement is applied from the earlier of age 62 (age 55 for Special Risk Class and Special Risk Administrative Support Class members) or the date on which the member would have completed 30 years of creditable service, had he or she continued employment.
2. For members initially enrolled on or after July 1, 2011, who were within 10 years of normal retirement eligibility, the reduction for early retirement is applied from the earlier of age 65 (age 60 for Special Risk Class and Special Risk Administrative Support Class members) or the date on which the member would have completed 33 years of creditable service, had he or she continued employment. The value of this benefit may not be less than the member's accumulated contributions, if any.

(Sections 121.091(3) and (7))

Line-of-Duty Pre-Retirement Death Benefits

Eligibility

Member died during the actual performance of duty. There is no service credit requirement.

Benefit Amount

For members in all classes except the Special Risk Class, the surviving spouse will receive one-half of the member's base monthly compensation at death. If the spouse dies, or if there is no surviving spouse, the monthly benefits continue until the youngest child is 18.

For members in the Special Risk Class the surviving spouse will receive a benefit equal to 100% of the member's base monthly compensation at death. If there is no surviving spouse, the monthly benefits continue until the youngest child is age 18 and surviving child payments may be extended up to age 25 if the child is unmarried and enrolled as a full-time student.¹

A surviving spouse may elect to receive a non-duty death benefit in lieu of the duty death benefit.

(Section 121.091(7))

Vesting

Eligibility

For members initially enrolled before July 1, 2011, six years of creditable service for all classes of membership. For members initially enrolled on or after July 1, 2011, eight years of creditable service for all membership classes.

Benefit Amount

The normal or early retirement benefit amount based on average final compensation and creditable service to the date of termination.

(Sections 121.021(45), 121.091(5))

DROP – Deferred Retirement Option Program

Eligibility

Except as allowed by statute, notably for K-12 instructional personnel², members have a limited eligibility window during which they can elect to enter the DROP. A member initially becomes eligible to enter DROP in the same month he or she first becomes eligible to file for unreduced immediate retirement benefits. Eligibility windows differ by tier and membership class, and are initially reached via satisfying either service-only criteria or age-plus-service criteria.

¹ Effective July 1, 2016 and retroactive to the survivors of Special Risk Class members killed in the line of duty on or after July 1, 2013, the benefit increased from 50% to 100% of the member's base pay. Effective July 1, 2017 the same benefits were provided retroactively to the survivors of Special Risk Class members killed in the line of duty between July 1, 2002 and June 30, 2013.

² Instructional personnel in grades K-12 may defer DROP participation to any age.

For most members achieving DROP entry eligibility via service-only criteria, the window to enter DROP lasts more than 12 months, with the window's length varying by individual. (The window must be at least 12 months in length.) The window for members satisfying service-only eligibility criteria is shown in the table below.

DROP Entry Eligibility Window for Members Satisfying Service-Only Criteria			
Membership Class	Tier	Window Opens	Window Closes
Special Risk	Tier I	25 Years of Service	53 rd Birthday ¹
Special Risk	Tier II	30 Years of Service	56 th Birthday ¹
All Other Classes	Tier I	30 Years of Service	58 th Birthday ¹
All Other Classes	Tier II	33 Years of Service	61 st Birthday ¹

¹Or 12 months after the window opens, if later than the date listed above for the member

Members who do not reach unreduced retirement eligibility through service-only eligibility criteria become eligible to enter DROP upon satisfaction of age-plus-service criteria. For those members, the eligibility window to enter DROP lasts for 12 months.

DROP Entry Eligibility Window for Members Satisfying Age-Plus-Service Criteria			
Membership Class	Tier	Window Opens	Window Closes
Special Risk	Tier I	Age 55 and 6 Years of Service	After 12 months
Special Risk	Tier II	Age 60 and 8 Years of Service	After 12 months
All Other Classes	Tier I	Age 62 and 6 Years of Service	After 12 months
All Other Classes	Tier II	Age 65 and 8 Years of Service	After 12 months

The maximum length of DROP participation is five years. As such, members who satisfy service-only criteria and enter DROP prior to age 60 are required to exit DROP and terminate FRS-covered employment and cease providing services to FRS employers prior to becoming eligible for Medicare benefits at age 65.

Benefit Amount

Effective July 1, 1998, eligible members can retire without terminating their employment during DROP participation. Monthly retirement benefits will be invested in the FRS Trust Fund, earning tax-deferred interest while the member continues to work for a maximum of 60 months. The interest credit for those entering the DROP prior to July 1, 2011, is 6.5% annually. For those entering the DROP after that date, it is 1.3% annually. Upon completion of the maximum five-year period, DROP participation ends and participants must terminate employment with all FRS employers. At that time, the participant will receive payment of the accumulated DROP benefits, and begin receiving his FRS monthly retirement benefit (in the same amount as determined at retirement, plus annual cost-of-living increases).

Effective July 1, 2003, participants employed in eligible instructional positions with a district school board, the Florida School for the Deaf and Blind, or a developmental research school can extend their participation beyond their initial 60-month period, for up to an additional 36 months. The employer must approve the request for DROP extension as well as the period of extension granted to an eligible DROP participant, if any, within the 36-month limit.

Disabled While in DROP

Participants that became disabled while participating in DROP will continue to accumulate the same monthly benefit in the FRS Trust Fund until termination. Since the normal retirement benefit commenced upon DROP participation, the participant is not eligible for a disability benefit.

Death While in DROP

The designated beneficiary of a participant who dies while participating in DROP will receive all accumulated DROP benefits, and a continuing monthly benefit, if the participant had elected Option 2, 3, or 4. Survivors of DROP participants are not eligible for FRS line-of-duty death benefits.

(Section 121.091 (13))

Return of Employee Contributions

A member who terminates employment but is not eligible to retire, receive a vested retirement allowance, or receive a disability pension will be entitled to a refund of any employee contributions. The beneficiary of a member who passes away before satisfying the requirement for a pre-retirement death benefit will be entitled to a refund of any employee contributions made by the member. No interest is credited on employee contribution accounts.

A vested terminated participant may elect to receive a return of employee contributions in lieu of a retirement benefit.

(Sections 121.071(2)(b), 121.091(7)(a), Sections 121.091(5)(a) and (c))

Cost-of-Living Adjustment

Legislation enacted in 2011 eliminated post-retirement benefit increases on service credit earned on and after July 1, 2011. FRS Pension Plan members who retired before July 1, 2011 receive post-retirement benefit increases of 3% per year. Tier II members (those initially enrolled on and after July 1, 2011) will receive no post-retirement benefit increases. Tier I members (those initially enrolled before July 1, 2011) who retire after July 1, 2011 will receive individual post-retirement benefit increases equal to 3% per year multiplied by a fraction, the numerator of which is service through June 30, 2011 and the denominator of which is total service at retirement. Cost-of-Living Adjustments take effect annually on July 1. A pro-rated rate may apply in the initial year of applicability.

(Section 121.101)

Additional Benefit Amount

In addition, members may receive an additional retirement allowance under the pre-1971 existing systems. The benefit is a percentage of average final compensation times the creditable service in that system up to November 30, 1970. The system percentages are:

State and County Officers and Employees' Retirement System:

2.00% for creditable service rendered under Division A prior to Social Security coverage; and 1.50% for creditable service rendered under Division B subsequent to Social Security coverage.

Teachers Retirement System:

Plan E: 2.00%

(Sections 121.091(1)(c), 122.28, 238.07(7)(a))

Minimum Benefit

Eligibility

The month following attainment of age 65 by a pensioner or, in the case of a beneficiary receiving the survivor's portion of a member's benefit, the 65th anniversary of the deceased member's birth. The member must have earned at least 10 years of creditable service and retired under normal retirement.

Benefit Amount

An eligible benefit recipient will receive a benefit adjustment to bring the benefit to the calculated minimum benefit. Effective July 1, 2019, the minimum monthly benefit is \$33.25 multiplied by years of creditable service prior to application of the reduction factor for electing an optional form of payment. For retirements on or after July 1, 1987, creditable service for the minimum benefit calculation does not include any service earned on or after that date.

(Section 112.362)

FRS Investment Plan (IP)

The FRS Investment Plan (IP) is a defined contribution plan offered to eligible members as an alternative to the FRS Pension Plan. The plan is qualified under sec. 401(a) of the Internal Revenue Code.

Benefits

Under the IP, benefits accrue in individual member accounts funded by employer and employee contributions made on or after July 1, 2011, and earnings thereon. Benefits are provided through employee-directed investments offered by approved investment providers. Vested benefits are payable upon termination or death as a lump-sum distribution, direct rollover distribution, or periodic distribution. In addition to normal benefits and death benefits, the plan also provides disability coverage as described below.

(Sections 121.4501, 121.591)

Contributions

The employer contributions deposited in each participant's IP account are based upon allocation rates established by law for each membership class. This statutorily prescribed percentage of the participant's gross compensation for the reporting month is deducted from the total amount paid by the employer on behalf of all members in the same class of membership based on the uniform contribution rate established by law. Current IP allocation rates are set forth in the following charts. The allocation rates shown in the first chart below do not include the 0.06% charge for FRS Investment Plan administration and education, the separate employer contribution assessed to fund the IP disability program and ILOD survivor benefit program, or the contribution of 1.66% for the financing of the Florida Retiree Health Insurance Subsidy program.

(Sections 121.71, 121.72)

Effective July 1, 2012, the employer allocations to the IP accounts are based on contribution rates as follows:

Classification	2019-2020 Plan Year Rates
Regular	3.30%
Special Risk	11.00%
Special Risk Administrative Support	4.95%
Elected Officers'	
- Judicial	10.23%
- Leg/Atty/Cab	6.38%
- Local	8.34%
Senior Management Service	4.67%

The employer contribution rates to fund the disability benefit under the IP are as follows:

Classification	2019-2020 Plan Year Rates
Regular	0.25%
Special Risk	1.33%
Special Risk Administrative Support	0.45%
Elected Officers'	
- Judicial	0.73%
- Leg/Atty/Cab	0.41%
- Local	0.41%
Senior Management Service	0.26%

(Section 121.73)

Effective July 1, 2019 the employer contribution rates to fund the line of duty death benefit under the IP are as follows:

Classification	2019-2020 Plan Year Rates
Regular	0.05%
Special Risk	1.21%
Special Risk Administrative Support	0.03%
Elected Officers'	
- Judicial	0.09%
- Leg/Atty/Cab	0.15%
- Local	0.20%
Senior Management Service	0.05%

(Section 121.735)

Non-Duty Disability Retirement

Eligibility

Investment Plan participants who have completed at least eight years of creditable service (or six years of creditable service if disability retirement is ordered for a judge by the Supreme Court) are eligible for regular disability benefits if they become totally and permanently disabled due to injury or illness suffered while actively employed in an FRS-covered position. Upon approval for disability retirement, the IP participant may choose either to retain his/her IP account balance or to surrender his/her account balance to the FRS Pension Plan and receive guaranteed lifetime monthly disability benefits, assuming the member remains disabled.

Benefit Amount

If the disabled IP participant chooses to retain his/her account balance, he/she may elect to receive the normal benefit payable under the IP. If he/she elects to surrender the account balance and receive lifetime monthly disability benefits, the amount of each monthly payment is calculated in the same manner as provided for regular disability retirement under the FRS Pension Plan and is subject to the same threshold benefit amounts.

(Sections 121.091(4), 121.591(1) and (2))

Line-of-Duty Disability

Eligibility

IP participants are eligible for in-line-of-duty disability benefits if they become totally and permanently disabled due to injury or illness suffered during the actual performance of duty while actively employed in an FRS-covered position. There is no service credit requirement for in-line-of-duty disability benefits. Upon approval for disability retirement, the IP member may choose either to retain his/her IP account balance or to surrender his/her account balance to the FRS Pension Plan and receive guaranteed lifetime monthly disability benefits, assuming the member remains disabled.

Benefit Amount

If the disabled IP participant elects to retain his/her account balance, he/she may elect to receive the normal benefit payable under the IP. If he/she elects to surrender the account balance and receive lifetime monthly disability benefits, the amount of each monthly payment is calculated in the same manner as provided for line-of-duty disability retirement under the FRS Pension Plan, and is subject to the same threshold benefit amounts.

(Sections 121.091(4), 121.591(1) and (2))

Line-of-Duty Death

Eligibility

IP participants are eligible for in-line-of-duty death benefits if they die during the actual performance of duty while actively employed in an FRS-covered position. There is no service credit requirement for in-line-of-duty death benefits. The beneficiary of the IP member may choose either to retain the member's IP account balance or to surrender his/her account balance to the FRS Pension Plan and receive guaranteed monthly death benefits, payable for the life of the surviving spouse or, if the spouse dies or there is no spouse, until the 18th birthday of the member's youngest surviving child. Such payments may be extended until the 25th

birthday of the youngest child of a Special Risk Class member if the child is unmarried and enrolled as a full-time student.

Benefit Amount

If the beneficiary of the IP participant elects to retain his/her account balance, he/she may elect to receive the normal benefit payable under the IP. If he/she elects to surrender the account balance and receive the annuity from the FRS Pension Plan, the amount of each monthly payment is calculated in the same manner as provided for line-of-duty death benefits under the FRS Pension Plan, and is subject to the same threshold benefit amounts.

(Sections 121.091(7), 121.591(1), (3) and (4))

Teachers' Retirement System (TRS)

The benefit and contribution provisions of the Statutes for this closed system are set forth in Chapter 238 of the Florida Statutes. Certain provisions are from other sections of the Florida Statutes.

Effective Date

The effective date of the Retirement System was July 1, 1939.

(Section 238.02)

Membership

All employees who were teachers in public schools, employees of professional non-profit teachers associations, county superintendents, Department of Education employees and the staff of the Teachers' Retirement System, and who were employed prior to December 1, 1970, are members of the Teachers' Retirement System. The benefit and contribution provisions of the Statutes are set forth in Chapter 238 of the Florida Statutes. Certain provisions are drawn from other sections of the Florida Statutes. TRS retirees are included with the Regular Membership Class in the valuation.

State and County Officers and Employees' Retirement System (SCOERS)

The benefit and contribution provisions of the Statutes are set forth in Chapter 122 of the Florida Statutes. Certain provisions are drawn from other sections of the Florida Statutes. This is a closed system that no longer includes any members in the high hazard or legislative categories. Effective with the July 1, 2013 valuation, there are no longer any actively employed members of this system. SCOERS retirees are included with the Regular Membership Class in the valuation.

Effective Date

The effective date of the Retirement System was July 1, 1955.

(Section 122.01(2))

Membership

All full-time employees of the state and its counties not covered by another system who were employed prior to December 1, 1970.

Institute of Food and Agricultural Sciences Supplemental Retirement Program (IFAS)

The benefit and contribution provisions of the Statutes are set forth in Chapter 121 of the Florida Statutes. Certain provisions are drawn from other sections of the Florida Statutes. This is a closed system. IFAS retirees are included with the Regular Membership Class in the valuation.

Effective Date

The effective date of the Supplemental Retirement Program was July 1, 1985.

(Section 121.40)

Membership

Employees hired on or before July 1, 1983 who:

- a. hold both state and federal appointments while employed at the Institute,
- b. are not entitled to any benefit from a state-supported retirement system or Social Security based on service as an employee of the Institute, and
- c. are participants in the Federal Civil Service Retirement System.

Appendix C: Membership Data

This valuation is based upon the membership of the Pension Plan as of July 1, 2019.

The membership of the FRS Pension Plan includes employees of the State of Florida and participating political subdivisions. The membership is divided into several categories by membership class and subclass.

Tables C-1 through C-5 present distributions of annuitants (including beneficiaries of deceased members), and potential annuitants (terminated vested members). The tables show the numbers of persons receiving benefits and the total annual benefits.

Table C-6 summarizes the DROP membership and provides total annual benefits.

Table C-7 presents a summary by category of active membership, payroll, and accumulated employee contributions.

Tables C-8 through C-17 contain summaries of the active members in each category of membership. Values shown in the tables are the numbers of members and their average annual salaries. Table C-17 is the grand total of active members included in this valuation.

Table C-1
Florida Retirement System Pension Plan
Annuitants at July 1, 2019
Regular and Early Retirement by Age

Age	Number of Persons	Annual Benefits (in Thousands)
Under 50	2,430	\$31,776
50 to 54	4,565	140,638
55 to 59	18,157	515,031
60 to 64	49,194	1,203,088
65 to 69	94,255	2,191,423
70 to 74	97,840	2,301,315
75 to 79	64,596	1,457,059
80 & Up	76,184	1,685,200
Total	407,221	\$9,525,530

Table C-2
Florida Retirement System Pension Plan
Annuitants at July 1, 2019
Disability Retirement by Age

Age	Number of Persons	Annual Benefits (in Thousands)
Under 50	593	\$10,706
50 to 54	1,004	19,115
55 to 59	2,079	36,221
60 to 64	2,945	48,261
65 to 69	2,880	48,629
70 to 74	2,263	38,142
75 to 79	1,311	21,597
80 & Up	834	12,377
Total	13,909	\$235,048

Table C-3
Florida Retirement System Pension Plan
Potential Annuitants at July 1, 2019
Vested Terminated Members by Age for the Regular,
Senior Management Service, and Elected Officers' Classes

Age	Number of Persons	Annual Benefits (in Thousands)¹
Under 30	180	\$443
30 to 34	2,638	10,717
35 to 39	7,864	41,255
40 to 44	11,188	65,858
45 to 49	15,989	100,067
50 to 54	19,751	127,904
55 to 59	20,381	145,369
60 & Up	20,190	116,156
Total	98,181	\$607,769

¹ Deferred to Age 62

Table C-4
Florida Retirement System Pension Plan
Potential Annuitants at July 1, 2019
Vested Terminated Members by Age for the
Special Risk & Special Risk Administrative Support Classes

Age	Number of Persons	Annual Benefits (in Thousands)²
Under 30	37	\$318
30 to 34	371	3,894
35 to 39	760	9,073
40 to 44	943	11,599
45 to 49	1,514	19,996
50 to 54	1,251	17,546
55 to 59	440	5,873
60 & Up	212	2,568
Total	5,528	\$70,867

² Deferred to Age 55

Table C-5
Florida Retirement System Pension Plan
Annuitants and Potential Annuitants at July 1, 2019
All Types of Retirement by System

System	Annuitants	Potential Annuitants	Total
Number of Persons			
Regular	375,197	96,625	471,822
Senior Management Service	4,959	1,223	6,182
Special Risk	38,214	5,513	43,727
Special Risk Administrative	162	15	177
EOC: Judicial	961	39	1,000
EOC: Legislative/Attorneys/Cabinet	224	93	317
EOC: Local	1,413	201	1,614
Total	421,130	103,709	524,839
Annual Benefits (in Thousands)			
Regular	\$7,590,279	\$577,841	\$8,168,120
Senior Management Service	259,921	24,502	284,423
Special Risk	1,751,724	70,724	1,822,448
Special Risk Administrative	6,804	144	6,948
EOC: Judicial	93,424	1,990	95,414
EOC: Legislative/Attorneys/Cabinet	8,838	1,248	10,086
EOC: Local	49,588	2,187	51,775
Total	\$9,760,578	\$678,636	\$10,439,214

Table C-6
Florida Retirement System Pension Plan
Annuitants at July 1, 2019
DROP Members

Age	Number of Persons	Annual Benefits (in Thousands)
Under 50	509	\$31,635
50 to 54	2,662	140,709
55 to 59	8,974	328,516
60 to 64	14,941	374,524
65 to 69	7,873	161,987
70 to 74	205	4,086
75 to 79	12	204
80 & Up	6	99
Total	35,182	\$1,041,760

Table C-7
Florida Retirement System Pension Plan
Summary of Active Members at July 1, 2019

System	Number of Persons	Annual Salary (in Thousands) ¹	Accumulated Employee Contributions (in Thousands)
Regular	429,224	\$19,043,523	\$3,275,651
Senior Management Service	5,558	523,142	92,830
Special Risk	63,652	4,075,849	658,749
Special Risk Administrative	78	3,543	795
EOC: Judicial	703	108,740	19,482
EOC: Legislative/Attorneys/Cabinet	113	6,274	1,094
EOC: Local	769	42,889	7,707
Teachers' Retirement System (TRS)	9	1,210	3,295
Institute of Food and Agricultural Sciences (IFAS)	5	752	0
Total	500,111	\$23,805,922	\$4,059,603

¹ The salary shown in Tables C-7 through C-17 represents the salaries of the FRS DB plan members on July 1, 2019. The payroll on which normal costs are determined (\$24,371,774,000) equals the salaries for these DB plan members (excluding TRS and IFAS), adjusted to the middle of the plan year. The payroll on which UAL costs are charged additionally includes the payroll of certain other groups, and is described in Section 4 of the report.

Table C-8
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Regular Class

Count												
		Years of Service										
Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	All Years
Under 20	851											851
20 to 24	10,589	162	2									10,753
25 to 29	24,684	5,643	74									30,401
30 to 34	20,249	15,933	4,001	115								40,298
35 to 39	16,086	12,396	14,211	4,686	103							47,482
40 to 44	13,363	9,742	11,531	12,840	3,601	78						51,155
45 to 49	12,893	9,639	10,888	12,406	11,717	3,650	130					61,323
50 to 54	11,569	9,023	10,627	11,418	10,660	10,192	2,979	69				66,537
55 to 59	9,553	7,856	10,258	11,696	10,733	9,871	4,546	712	6			65,231
60 to 64	4,964	5,126	6,740	7,422	6,397	5,540	1,713	721	133	6		38,762
65 & Up	2,538	2,585	3,704	3,056	1,812	1,179	736	400	270	123	28	16,431
Total Count	127,339	78,105	72,036	63,639	45,023	30,510	10,104	1,902	409	129	28	429,224

Average Salary (\$)												
		Years of Service										
Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	All Years
Under 20	10,467											10,467
20 to 24	22,833	24,844	33,288									22,865
25 to 29	33,148	38,897	36,911									34,225
30 to 34	34,484	43,761	45,542	48,398								39,290
35 to 39	33,897	43,684	49,709	51,612	55,422							42,979
40 to 44	33,752	42,305	48,707	54,859	56,790	58,758						45,710
45 to 49	33,952	41,068	46,482	52,872	59,628	62,911	63,213					47,814
50 to 54	33,497	40,117	44,313	49,894	55,744	64,702	64,330	62,604				48,691
55 to 59	32,577	38,976	43,341	47,323	51,426	60,776	67,677	65,632	51,566			47,862
60 to 64	30,274	38,000	43,377	46,937	49,870	58,418	65,575	66,681	63,601	58,155		46,377
65 & Up	21,621	32,807	40,853	45,191	47,899	54,798	61,348	81,515	82,950	87,652	105,105	42,261
Avg. Annual Salary	32,238	41,201	46,065	50,557	54,658	61,679	65,815	69,260	76,198	86,280	105,105	44,367

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table C-9
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Special Risk Class

Count	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20	47		1									48
	20 to 24	4,480	17	1									4,498
	25 to 29	8,183	1,934	12									10,129
	30 to 34	4,974	3,788	1,911	15								10,688
	35 to 39	2,285	2,071	3,626	1,513	21							9,516
	40 to 44	1,171	1,092	2,337	2,921	1,016	15						8,552
	45 to 49	853	788	1,696	2,520	2,816	728	16					9,417
	50 to 54	656	571	1,060	1,456	1,846	943	158	1				6,691
	55 to 59	306	396	540	512	462	294	104	13				2,627
	60 to 64	106	156	274	268	172	113	51	26	2			1,168
	65 & Up	18	34	83	73	57	21	17	9	4	2		318
Total Count		23,079	10,847	11,541	9,278	6,390	2,114	346	49	6	2		63,652

Average Salary (\$)	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20	26,248		39,536									26,525
	20 to 24	38,735	44,020	63,401									38,761
	25 to 29	44,852	53,600	55,297									46,535
	30 to 34	46,863	60,250	69,443	73,301								55,682
	35 to 39	47,082	59,512	76,710	81,955	82,190							66,699
	40 to 44	46,285	58,475	76,289	85,299	86,435	86,718						74,207
	45 to 49	48,943	57,864	73,320	84,727	89,464	94,217	93,274					79,348
	50 to 54	48,916	61,493	71,236	83,257	87,412	90,568	88,280	69,813				78,422
	55 to 59	45,685	65,622	72,246	77,283	79,663	79,276	78,360	77,412				71,494
	60 to 64	48,812	59,448	68,972	77,144	71,496	78,687	84,844	89,068	107,154			70,263
	65 & Up	35,865	46,992	72,094	70,906	75,052	74,544	101,391	101,883	112,082	129,645		71,053
Avg. Annual Salary		44,643	58,755	73,968	83,467	87,045	89,433	85,667	87,936	110,439	129,645		64,033

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table C-10
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Special Risk Administrative Support Class

Count	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20												
	20 to 24												
	25 to 29			1									1
	30 to 34	1	1	5									7
	35 to 39		1	5	5								11
	40 to 44			3	4	3							10
	45 to 49		2	2	7	12	4						27
	50 to 54		1	1	2	6	3	1					14
	55 to 59			1	2		1						4
	60 to 64				1		2						3
	65 & Up						1						1
Total Count		1	5	18	21	21	11	1					78

Average Salary (\$)	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20												
	20 to 24												
	25 to 29			39,767									39,767
	30 to 34	34,519	37,174	42,001									40,242
	35 to 39		34,491	40,827	40,919								40,293
	40 to 44			40,856	49,576	53,987							48,283
	45 to 49		35,538	41,996	42,171	47,522	56,824						46,216
	50 to 54		39,027	51,000	41,409	44,988	63,206	48,500					48,635
	55 to 59			37,184	49,500		47,818						46,001
	60 to 64				40,390		49,308						46,335
	65 & Up						43,584						43,584
Avg. Annual Salary		34,519	36,354	41,592	43,824	47,722	55,175	48,500					45,421

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table C-11
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Elected Officers' Class: Judicial Subclass

Count	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20												
	20 to 24												
	25 to 29												
	30 to 34	2											2
	35 to 39	8	10	5									23
	40 to 44	21	9	14	13								57
	45 to 49	20	22	18	26	20							106
	50 to 54	20	26	25	32	29	20						152
	55 to 59	15	19	34	33	23	27	17					168
	60 to 64	5	21	31	23	33	22	12	6				153
	65 & Up	1	5	15	11	4	4	1	1				42
Total Count		92	112	142	138	109	73	30	7				703

Average Salary (\$)	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20												
	20 to 24												
	25 to 29												
	30 to 34	149,072											149,072
	35 to 39	145,418	128,564	124,549									133,554
	40 to 44	147,101	155,119	149,043	149,378								149,363
	45 to 49	157,721	143,837	157,111	156,505	154,527							153,835
	50 to 54	154,887	151,232	154,375	155,670	159,474	155,721						155,327
	55 to 59	147,642	155,176	155,918	156,692	157,194	156,287	158,594					155,752
	60 to 64	142,937	151,492	157,172	160,632	158,331	157,597	158,626	160,688				157,010
	65 & Up	154,866	162,461	158,972	159,897	175,666	158,472	151,822	151,822				160,733
Avg. Annual Salary		150,945	149,287	154,611	156,643	158,333	156,647	158,381	159,421				154,679

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table C-12
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Elected Officers' Class: Legislators/Attorney/Cabinet Subclass

Age	Years of Service											All Years
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	
Under 20												
20 to 24												
25 to 29	2											2
30 to 34	4											4
35 to 39	4	5	2									11
40 to 44	12	3	4	2								21
45 to 49	8	3	2	2	3							18
50 to 54	8	1	2	3		2						16
55 to 59	4	2	2	3		2		2				15
60 to 64	3	4	2	1	4	3						17
65 & Up	2	1	1	2	2						1	9
Total Count	47	19	15	13	9	7		2			1	113

Age	Years of Service											All Years
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	
Under 20												
20 to 24												
25 to 29	31,394											31,394
30 to 34	30,360											30,360
35 to 39	30,360	29,697	29,697									29,938
40 to 44	37,251	26,232	71,250	29,697								41,433
45 to 49	29,419	32,047	99,626	169,554	76,316							61,044
50 to 54	28,119	29,697	33,222	76,316		169,554						55,572
55 to 59	30,546	29,697	32,636	29,697		169,554		100,744				58,436
60 to 64	28,495	64,661	29,697	169,554	99,626	167,841						86,771
65 & Up	31,394	29,697	29,697	29,697	99,626						169,554	61,153
Avg. Annual Salary	31,562	36,882	50,964	72,730	91,856	168,820		100,744			169,554	55,519

Table C-13
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Elected Officers' Class: Local Subclass

Count	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20												
	20 to 24												
	25 to 29	4	2										6
	30 to 34	10	4	1									15
	35 to 39	24	5	7	1								37
	40 to 44	21	12	10	10	2							55
	45 to 49	35	28	9	10	17	7	1					107
	50 to 54	29	20	17	13	10	16	9	1				115
	55 to 59	36	22	18	13	12	10	15	1				127
	60 to 64	28	16	14	25	12	18	8	4	1			126
	65 & Up	31	34	49	23	19	15	4	3	3			181
Total Count		218	143	125	95	72	66	37	9	4			769

Average Salary (\$)	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
	Under 20												
	20 to 24												
	25 to 29	15,784	6,233										12,600
	30 to 34	35,309	51,984	29,669									39,380
	35 to 39	22,076	63,607	49,534	109,401								35,243
	40 to 44	35,018	31,762	53,451	83,583	107,924							49,140
	45 to 49	33,180	52,942	73,806	61,175	69,662	94,025	102,805					54,812
	50 to 54	42,502	52,843	75,971	62,851	70,304	88,482	114,990	106,475				66,592
	55 to 59	43,465	31,561	75,891	67,587	94,220	101,601	71,195	151,244				61,965
	60 to 64	35,965	62,571	55,115	61,863	61,102	77,526	116,493	129,834	99,998			63,542
	65 & Up	30,702	39,522	59,447	36,184	74,400	41,698	69,856	90,130	62,517			48,713
Avg. Annual Salary		34,857	45,441	63,338	59,279	74,731	77,437	92,352	116,383	71,887			55,772

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table C-14
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Senior Management Service Class

Count	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
Under 20													
20 to 24		1											1
25 to 29		343	2										345
30 to 34		352	268	22	1								643
35 to 39		124	212	166	38	1							541
40 to 44		86	83	161	203	72	3						608
45 to 49		49	84	97	204	265	85	7					791
50 to 54		63	62	105	144	204	332	81	2				993
55 to 59		81	69	102	108	160	254	118	13				905
60 to 64		29	58	75	79	83	118	37	21	1			501
65 & Up		5	19	44	58	36	24	17	14	12	1		230
Total Count		1,133	857	772	835	821	816	260	50	13	1		5,558

Average Salary (\$)	Years of Service											All Years	
	Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50		50 & Up
Under 20													
20 to 24		63,967											63,967
25 to 29		45,094	71,886										45,249
30 to 34		49,394	63,540	66,695	113,766								55,982
35 to 39		55,741	70,759	81,252	88,662	75,667							71,803
40 to 44		71,988	88,938	82,842	93,511	93,534	132,476						87,212
45 to 49		90,896	97,915	94,647	98,034	106,563	99,474	84,410					100,055
50 to 54		94,499	96,535	103,906	115,054	103,558	117,924	117,228	95,551				110,151
55 to 59		104,013	104,996	107,711	103,326	112,081	118,768	116,969	86,445				111,427
60 to 64		113,506	130,868	110,403	114,834	107,835	122,023	129,305	124,567	102,586			117,936
65 & Up		152,787	123,016	129,758	121,549	113,559	151,121	157,564	166,061	202,899	135,782		135,432
Avg. Annual Salary		60,820	82,774	95,026	103,369	106,147	117,888	120,583	125,113	195,182	135,782		94,124

This work product was prepared solely for the Florida Department of Management Services for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

Table C-15
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
TRS – Teachers’ Retirement System

Count	Years of Service											
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	All Years
Age												
Under 20												
20 to 24												
25 to 29												
30 to 34												
35 to 39												
40 to 44												
45 to 49												
50 to 54												
55 to 59												
60 to 64												
65 & Up			1							2	6	9
Total Count			1							2	6	9

Average Salary (\$)	Years of Service											
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	All Years
Age												
Under 20												
20 to 24												
25 to 29												
30 to 34												
35 to 39												
40 to 44												
45 to 49												
50 to 54												
55 to 59												
60 to 64												
65 & Up			14,806							100,165	165,785	134,428
Avg. Annual Salary			14,806							100,165	165,785	134,428

Table C-16
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
IFAS – Institute of Food and Agricultural Sciences

Age	Years of Service											All Years
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	
Under 20												
20 to 24												
25 to 29												
30 to 34												
35 to 39												
40 to 44												
45 to 49												
50 to 54												
55 to 59												
60 to 64												
65 & Up											5	5
Total Count											5	5

Age	Years of Service											All Years
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	
Under 20												
20 to 24												
25 to 29												
30 to 34												
35 to 39												
40 to 44												
45 to 49												
50 to 54												
55 to 59												
60 to 64												
65 & Up											150,345	150,345
Avg. Annual Salary											150,345	150,345

Table C-17
Florida Retirement System Pension Plan
Member Counts and Average Salaries at July 1, 2019
Grand Totals of All Active Participants

Count												
		Years of Service										
Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	All Years
Under 20	898		1									899
20 to 24	15,070	179	3									15,252
25 to 29	33,216	7,581	87									40,884
30 to 34	25,592	19,994	5,940	131								51,657
35 to 39	18,531	14,700	18,022	6,243	125							57,621
40 to 44	14,674	10,941	14,060	15,993	4,694	96						60,458
45 to 49	13,858	10,566	12,712	15,175	14,850	4,474	154					71,789
50 to 54	12,345	9,704	11,837	13,068	12,755	11,508	3,228	73				74,518
55 to 59	9,995	8,364	10,955	12,367	11,390	10,459	4,800	741	6			69,077
60 to 64	5,135	5,381	7,136	7,819	6,701	5,816	1,821	778	137	6		40,730
65 & Up	2,595	2,679	3,896	3,223	1,930	1,244	780	427	289	128	35	17,226
Total Count	151,909	90,089	84,649	74,019	52,445	33,597	10,783	2,019	432	134	35	500,111

Average Salary (\$)												
		Years of Service										
Age	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 & Up	All Years
Under 20	11,293		39,536									11,324
20 to 24	27,563	26,665	43,326									27,555
25 to 29	36,153	42,648	39,480									37,364
30 to 34	37,104	47,151	53,304	51,748								42,893
35 to 39	35,701	46,363	55,449	59,192	60,081							47,196
40 to 44	35,143	44,350	53,791	61,000	63,790	65,431						50,258
45 to 49	35,250	43,014	50,614	58,962	66,256	68,743	67,557					52,696
50 to 54	34,842	42,058	47,529	54,606	61,334	68,566	66,966	64,207				52,426
55 to 59	33,768	41,025	45,766	49,362	53,682	63,010	69,453	66,414	51,566			49,884
60 to 64	31,267	40,158	45,578	49,055	51,727	60,590	68,246	70,041	64,787	58,155		48,428
65 & Up	22,140	33,946	43,208	47,466	50,505	57,156	65,048	84,941	88,122	88,880	117,349	44,482
Avg. Annual Salary	34,411	43,850	50,524	55,489	59,657	65,048	68,159	71,650	80,214	87,504	117,349	47,601

Appendix D: Projections

Table D-1 presents a projection of total costs of the employers covered by the FRS Pension Plan (exclusive of the Investment Plan) during the five-year period following the actuarial valuation date, July 1, 2019. The contributions shown beginning with plan year 2020-2021 are based on the assumption that the contribution levels calculated in this report are extended throughout the projection period. The contributions shown for plan year 2019-2020 are based on the legislated rates (before blending) on page B-3 of this report.

Table D-2 reflects, for each membership class and DROP, the outstanding UAL balance of all amortization bases combined as of July 1, 2019. The table develops the associated duration of the amortization of the combined amortization bases.

Beginning in the July 1, 1998 actuarial valuation with the emergence of the surplus, all UAL bases in existence as that time were considered to be fully amortized. While the Plan was in surplus, the UAL amortization payment or credit was made from the surplus for certain post-1998 benefit increases and the 1998 and 2003 experience studies prior to any use of the surplus for contribution rate reductions or any other FRS uses. Now that the plan is no longer in surplus, the UAL payment is made by employers as part of the contribution rate.

Table D-3 estimates the UAL payment / (available surplus) for the next three plan years based on Florida law. The estimates are projections of the July 1, 2019 valuation results, and assume experience occurs as stated in the July 1, 2019 valuation.

All three tables reflect that no surplus is available for rate reduction. The amortization methodology recognizes the time value of money.

Table D-1
Florida Retirement System Pension Plan
Projection of Retirement Costs (Excluding Member Contributions)
July 1, 2019
Based on Contribution Rates Before Blending

(\$ in Millions)

	2019 -2020	2020 -2021	2021 -2022	2022 -2023	2023 -2024
A. Employer Normal Cost ¹	\$1,273	\$1,936	\$1,999	\$2,064	\$2,131
B. UAL Payment / (Surplus Utilization) ²	\$1,941	\$1,809 ²	\$1,868 ²	\$1,929 ²	\$1,992 ²
C. Total	\$3,214	\$3,745	\$3,867	\$3,993	\$4,123

¹ Includes DROP contributions on behalf of DROP members.

² UAL Payment increase is based on assumed increasing payroll, but does not reflect the recognition and funding of deferred investment gains/losses.

Table D-2
Florida Retirement System Pension Plan
Funding of UAL by Duration of Amortization
July 1, 2019
 (\$ in thousands)

	Regular	Special Risk	Special Risk Administrative	-- Elected Officers' Class --			Senior Management	DROP
				Judicial	Leg-Atty-Cab	Local		
Valuation Date Outstanding UAL Balance	\$17,565,640	\$6,853,209	\$16,168	\$490,323	\$64,419	\$377,139	\$2,196,569	\$2,762,896
UAL Contribution Rate (see Table 4-11)	4.26%	8.95%	30.87%	28.26%	60.66%	52.59%	25.95%	8.29%
Projected UAL Payroll PY 2020 - 2021 ¹	\$23,739,856	\$4,346,448	\$3,729	\$114,991	\$7,177	\$49,410	\$569,732	\$2,364,056
Annual Payment for PY 2020 - 2021	\$1,012,331	\$389,173	\$1,151	\$32,498	\$4,353	\$25,983	\$147,849	\$195,985
Amortization Period in Years Calculated Assuming								
Level Dollar	NA ²	NA ²	38	NA ²	73	52	NA ²	42
Level Percent of Payroll	28	27	19	22	21	20	21	20

¹ The UAL payroll shown here includes salaries for defined contribution program members who pay only the UAL contribution rate, but excludes FRS Investment Plan Payroll.

² Current annual payment / (savings) will never accumulate to the UAL if the earned interest rate is 7.20%.

Table D-3
Florida Retirement System Pension Plan
Projected Annual Payments of UAL Amortization Bases¹
July 1, 2019

Projected PY 2020-2021 and Forward Based on 07/01/2019 Valuation Results and 07/01/2019 Assets

	<u>2020 - 2021</u>	<u>2021 - 2022</u>	<u>2022 - 2023</u>
1 Estimated Surplus Available Rate Stabilization Mechanism ²	\$0.0	\$0.0	\$0.0
2 (Increase)/Decrease in Available Surplus from prior year	\$0.0	\$0.0	\$0.0
UAL Bases			
3 1993 - 1998 Experience Study Assumption Changes ³	(\$40.4)	(\$41.7)	(\$43.0)
4 Special Risk Minimum In-Line-of-Duty Disability Increased to 65% ⁴	(\$0.3)	(\$0.3)	(\$0.3)
5 12% Increase in Special Risk benefits (in pay status before 07/01/2000) ⁵	\$31.9	\$32.9	\$34.0
6 1998 - 2003 Experience Study Assumption Changes ⁵	(\$298.6)	(\$308.3)	(\$318.3)
7 2003 - 2008 Experience Study Assumption Changes	\$503.7	\$520.0	\$536.9
8 2009 Experience (Gain)/Loss	\$1,580.5	\$1,631.9	\$1,685.0
9 Unrecognized (Gains)/Losses while in Surplus	(\$462.3)	(\$477.3)	(\$492.9)
10 2009 Plan Change (House Bill 479)	(\$95.6)	(\$98.7)	(\$101.9)
11 2010 Experience (Gain)/Loss	\$83.4	\$86.1	\$88.9
12 2010 Plan Change (Senate Bill 2100)	(\$91.3)	(\$94.3)	(\$97.3)
13 2011 Experience (Gain)/Loss	\$197.7	\$204.1	\$210.8
14 2012 Experience (Gain)/Loss	(\$7.7)	(\$8.0)	(\$8.3)
15 2013 Experience (Gain)/Loss	\$190.4	\$196.6	\$203.0
16 2008 - 2013 Experience Study Assumption/Method Changes	\$133.5	\$137.8	\$142.3
17 2014 Experience (Gain)/Loss	(\$181.0)	(\$186.9)	(\$193.0)
18 2015 Experience (Gain)/Loss	\$36.2	\$37.4	\$38.6
19 Special Risk 100% In-Line-Of-Duty Death (2016)	\$2.7	\$2.8	\$2.9
20 2016 Assumption Changes	\$71.4	\$73.7	\$76.1
21 2016 Experience (Gain)/Loss	\$78.6	\$81.2	\$83.8
22 Special Risk 100% In-Line-Of-Duty Death (2017)	\$5.5	\$5.7	\$5.9
23 2017 Assumption Changes	\$137.2	\$141.7	\$146.3
24 2016-2017 Experience (Gains) / Losses	\$30.3	\$31.3	\$32.3
25 2018 Assumption Changes	\$137.4	\$141.9	\$146.5
26 2017-2018 Experience (Gains) / Losses	(\$46.2)	(\$47.7)	(\$49.2)
27 Special Risk Cancer Presumption Disability and Death (2019)	\$0.7	\$0.7	\$0.7
28 2019 Assumption Changes	\$242.3	\$250.2	\$258.3
29 2019 Method Changes	(\$406.5)	(\$400.4)	(\$392.1)
30 2019 Experience (Gain)/Loss	<u>(\$24.2)</u>	<u>(\$25.0)</u>	<u>(\$25.8)</u>
Subtotal [(3) through (30)]	\$1,809.3	\$1,887.4	\$1,970.2
31 Across the Board Rate Reduction of 0% ⁶	<u>\$0.0</u>	<u>\$0.0</u>	<u>\$0.0</u>
Total [Subtotal + (31)]	\$1,809.3	\$1,887.4	\$1,970.2
32 UAL payment / (Surplus Available) [(1) + Total] =	\$1,809.3	\$1,887.4	\$1,970.2

1 Numbers exclude contributions to the Investment Plan.

2 Projected surplus based on 07/01/2019 valuation results. Using amortization method that reflects interest.

3 In the absence of a surplus there is an additional charge or credit to each class. See Tables 4-2 through 4-10 for details.

4 In the absence of a surplus there is an additional cost to the Special Risk Administrative Class of 0.14% and an additional cost to the Special Risk Class of -0.01% attributable to the Increase in Minimum ILOD Disability Benefit.

5 In the absence of a surplus there is an additional cost to the Special Risk Class of 0.73% attributable to the 12% increase in pre-2000 retired benefits.

6 No surplus available for rate reduction.

Appendix E: Comparisons/Reconciliation

This Appendix contains certain comparative information required by the state. Table E-1 compares actual investment return, aggregate payroll growth, and individual salary increases with the actuarial assumptions.

Table E-2 reconciles the flow of participants from the 2018 actuarial valuation to the 2019 actuarial valuation, while Table E-3 cross-references the required sections of 112.64 with this report.

Table E-1
Florida Retirement System Pension Plan
One-Year Comparisons

1. Annual Rate of Investment Return on Actuarial Value of Assets			
	Period	Actual	Assumed
	July 2016 to June 2017	8.21%	7.60%
	July 2017 to June 2018	8.36%	7.50%
	July 2018 to June 2019	7.82%	7.40%

2. Annual Rate of Pension Plan Payroll Growth (Excludes IP Payroll)			
	Period	Actual ¹	Assumed ¹
	July 2016 to June 2017	4.10%	3.25%
	July 2017 to June 2018	2.43%	3.25%
	July 2018 to June 2019	0.58%	3.25%

3. Individual Rates of Salary Increases for Regular Class Members and Special Risk Class Members			
Year Ended	Rate of Increase During Year		
	Regular	Special Risk	Assumed ²
June 30			
2017	5.8%	8.6%	4.59%
2018	4.6%	8.0%	4.59%
2019	4.3%	6.8%	4.59%

¹ The payroll base compared is used for UAL cost calculations and includes payroll for DROP members and certain defined contribution plan participants for whom only UAL contributions are due, but excludes FRS Investment Plan Payroll.

² Individual rates of salary increase vary by service and membership class. Single assumed rate shown above reflects the population and assumptions adopted with the 2014 experience study. The most recent experience study was for the period July 1, 2013 through June 30, 2018. The assumptions adopted as a result of that study are effective July 1, 2019 and will be reflected for the first time in this table for the year ending June 30, 2020.

Table E-2
Florida Retirement System Pension Plan
Data Reconciliation

	Active Participants	Disabled Participants	Retired Participants and Beneficiaries	DROP	Terminated Vested Participants	Total
Number reported as of July 1, 2018	516,825	14,158	397,968	34,594	108,831	1,072,376
New Entrants ¹	52,454	0	0	0	0	52,454
Exits from Active Status ² or DROP	(59,900)	240	15,528	(8,701)	8,064	(44,769)
DROP Entry	(9,268)	0	0	9,268	0	0
Cessation of benefit payments	NA	(694)	(12,073)	0	0	(12,767)
Other reported status changes, including changes from Terminated Vested status	0	205	5,798	21	(13,186)	(7,162)
Number reported as of July 1, 2019	500,111	13,909	407,221	35,182	103,709	1,060,132

¹ Includes rehires

² Includes retirement, vested termination, IP transfer, non-vested termination and death

Table E-3
Florida Retirement System Pension Plan
Cross Reference to Section 112.64 Reporting Requirements

<u>Code Ref</u>		<u>Page/Section</u>
1 General Information:		
1.003 (3g)	Includes certification by the enrolled actuary (signed and dated)?	Cover Letter
1.003 (11)	Do procedures follow commonly accepted procedures and determinations?	Cover Letter
1.003 (4g)	Disclosure of events not taken into account by actuary?	Cover Letter
1.003 (4g)	Disclosure of trends not assumed to continue (by actuary)?	Executive Summary
2 Assumptions:		
1.003 (3e)	Description and explanation of all actuarial assumptions?	Appendix A
1.003 (3f)	Is there a comparison of actual to expected salary increases over the preceding 3-year period?	E-1
1.003 (3f)	Is there a comparison of actual to expected investment returns over the preceding 3-year period?	E-1
1.003 (6)	Do assumptions factor in actual experience?	Appendix A
1.003 (6)	Is impact of inflation considered?	A-3
1.003 (6)	Any consistent experience gains or losses to suggest assumption changes?	No
1.003 (7)	Listing of changed assumptions?	A-18
3 Plan Provisions & Funding Method:		
1.003 (4c)	Contain a summary of plan provisions?	Appendix B
1.003 (4d)	Contain a detailed summary of funding method?	Appendix A
1.003 (5)	Does funding method provide a contribution sufficient to meet the NC and amortize the UAL?	Section 4
4 Assets & Method:		
1.003 (3a)	Is the MVA breakdown included (by cash, bonds, stocks, and other)?	2-2
1.003 (3a)	Is the "statement value" breakdown included?	No
1.003 (3a)	Is the derivation of AVA included?	2-3
1.003 (8)	Are administrative expenses being paid on a current basis?	2-1
	Asset reconciliation, including:	Exhibit
1.003 (4j)	- contributions by source	2-1
1.003 (4j)	- interest and dividends	2-1
1.003 (4j)	- realized gains / (losses)	2-1
1.003 (4j)	- unrealized appreciation	2-1
1.003 (4j)	- pension payments	2-1
1.003 (4j)	- contribution refunds	2-1
1.003 (4j)	- expenses	2-1
1.003 (4j)	- other receipts (identified)	2-1 (transfer)
1.003 (4j)	- other disbursements (identified)	2-1 (IP)

<u>Code Ref</u>		<u>Page/Section</u>
	5 UAL & Amortization Schedule:	Exhibit
1.003 (3b)	Include a plan to amortize any UAL?	4-2 & D-3
	Does amortization schedule of UAL exist (as of the valuation date) ...	Page
1.003 (3c)	- on an annual basis for the next 3-years?	Exhibit D-3
1.003 (3c)	- for the final year?	No
1.003 (3c)	Is a statement as to how method was derived included?	A-2
1.003 (3d)	Is a description of actions taken to reduce the UAL included?	Section 4 Exec Summary
	Reconciliation of UAL (must include items below):	Exhibit
1.003 (4h)	- UAL for prior valuation (w/ start date)	Page 6
1.003 (4h)	- Normal Cost, contributions, & accrued interest	Page 6
1.003 (4h)	- Impact of changes (assumption, funding method, amendments, gain/loss)	4-2—4-10
1.003 (4h)	- UAL for current valuation	4-2—4-10
	6 Results:	Exhibit
1.003 (4a)	Valuation Date clearly indicated?	Page 1
1.003 (4e)	Are results separated by employee group?	3-2 and Sections 4 & 5
1.003 (4f)	Is there disclosure of any benefit and expense provided by and/or paid from plan assets for which no liabilities or current costs have been established?	Cover Letter
1.003 (4i)	Projection of emerging liabilities/cash flow needs for next 10-15 years (optional)	No
1.003 (4l)	Summary of principal results (for current and prior valuation) including:	
	- participant data (counts, total pay, total annual benefits by group)	Appendix C
	- assets (market and actuarial)	2-2, 2-3
	- PVB (split: active by decrement, tv, ret & ben, dis, and total)	3-2
	- PV of future benefit payments	3-2
	- AL and UAL, i.e., including amount, date, amortization period	3-2, 4-2
	- PVVB (by group), non-vested PVAB, Total PVAB	5-1, 5-2
1.003 (4l)	Reconciliation of PVAB, including:	
	- PVAB at beginning of year	5-3
	- changes due to amendment and/or assumptions	5-3
	- change due to decrease in discount period and benefits accrued	5-3
	- Benefits paid	5-3
	- Other changes	5-3
	- Net increase (decrease)	5-3
	- PVAB at end of year	5-3
1.003 (4l)	Pension Cost	
	- Normal cost (shown for each benefit and amount for admin expense)	4-1
	- Payment to amortize UAL	4-2—4-10
	- Expected plan sponsor contribution (i.e. total of above pieces with interest, also as % of pay)	4-11
	- Amount to be contributed by members (total and % of pay)	Pages B-3—B-4
1.003 (4l)	Past Contributions	
	- Required plan sponsor & member contribution	4-12

<u>Code Ref</u>		Page/Section
	- Actual contributions made by: plan sponsor, members, other	4-12
1.003 (4k)	Active member accumulated contributions with interest	5-2
1.003 (4l)	Net actuarial gain / loss	4-2—4-10
1.003 (4l)	Other (PVFS & PVFC at attained age and at entry age, PVFC from other sources, PVF Expected BP)	3-2
	7 Data:	Exhibit
1.003 (4i)	Are membership demographics and financial statistics included?	Appendix C
1.003 (4i)	Age/service table for actives included?	C-7—C-17
1.003 (4i)	Data reconciliation?	E-2
	8 Contribution Rate:	Page
1.003 (4a)	Applicable beginning and ending dates for recommended contribution indicated?	4
1.003 (4b)	Are ER and EE contribution rates adequate to meet benefits?	4
1.003 (4b)	Are contribution rate changes necessary to achieve or preserve funding?	Yes, Executive Summary and Exhibit 4-11
1.003 (7)	Is the impact of assumption or cost method changes indicated?	7, Exhibit 3-1
1.003 (9)	Were costs to be paid at a later date adjusted for interest and/or salary?	Yes 3—4
1.003 (10)	Is the effective date of recommended changes no later than the next fiscal year?	Yes 3—4

Appendix F: Risk Disclosure

The purpose of this appendix is to identify, assess, and provide illustrations of risks that are significant to the Plan, and in some cases to the Plan's members.

In addition, as plans mature they accumulate larger pools of assets and liabilities. This increases the potential risk to plan funding and the finances of those who are responsible for plan funding. As shown by the Asset Volatility Ratio discussed later in this section, the System's assets are now much larger compared to UAL payroll than in the past. The Asset Volatility Ratio example shows that because of this, a 10% investment loss on assets today would cost more than two times as much, when measured as a percentage of UAL payroll, than a 10% investment loss would have cost in 1993. Since pension plans make long-term promises and rely on long-term funding, it is important to consider how mature the plan is today, and how mature it may become in the future.

The results of any actuarial valuation are based on one set of assumptions. Although we believe the current assumptions for the System provide a reasonable estimate of future expectations, it is almost certain that future experience will differ from the assumptions to some extent. It is therefore important to consider the potential impacts of these potential differences between assumptions and experience when making decisions that may affect the future financial health of the Plan, or of the Plan's participants.

Actuarial Standard of Practice No. 51 (ASOP 51) addresses these issues by providing actuaries with guidance for assessing and disclosing the risk associated with measuring pension liabilities and the determination of pension plan contributions. Specifically, it directs the actuary to:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

ASOP 51 states that if, in the actuary's professional judgment, a more detailed assessment would be significantly beneficial in helping the individuals responsible for the plan to understand the risks identified by the actuary, then the actuary should recommend that such an assessment be performed.

This Section uses the framework of ASOP 51 to communicate important information about significant risks to the System, the System's maturity, and relevant historical Plan data.

Identification of Risks

There are a number of factors that affect future valuation results. To the extent actual experience for these factors varies from the assumptions, this will likely cause either increases or decreases in the plan's future funding level and calculated contribution rates. Examples of factors that can have a significant impact on valuation results are:

- Investment return as this will impact the level of assets available to pay benefits
- Payroll variation as this will impact the ability to finance unfunded amounts as a percent of future pay
- Salary variation as this will impact the size of benefits members receive as a percent of final earnings
- Mortality as this will impact how long retirees receive benefits

- Service retirement as this will impact: how long retirees receive benefits, the size of retiree benefits, the amount of time to receive employer and employee contributions, and the amount of time for investment earnings to accumulate on those contributions
- Termination (members leaving active employment for reasons other than death, disability or service retirement) as this will impact the size of those members benefits

Investment Return

Of the factors listed above, we believe the factor with the greatest potential risk is future investment returns. For this reason, we studied this assumption in the executive summary of this report.

In that section, we performed deterministic projections to study the impact of various investment return scenarios on the UAL compared to the case in which the actual investment rate of return matches the assumed investment rate of return. See our October 23, 2019 presentation material to the Actuarial Assumption Conference for additional details and discussion regarding the return assumption, including sensitivity analysis showing the impact on the UAL, Funded Status and blended employer contribution rate of changing the investment return assumption.

Demographic Experience

While future investment returns will likely cause the greatest deviation from expected experience, there are many other assumptions made in an actuarial valuation. For these assumptions, differences between actual and assumed experience will also result in actuarial gains and losses. The executive summary of this report provides a look at the impact in the past year of actual experience deviating from assumed.

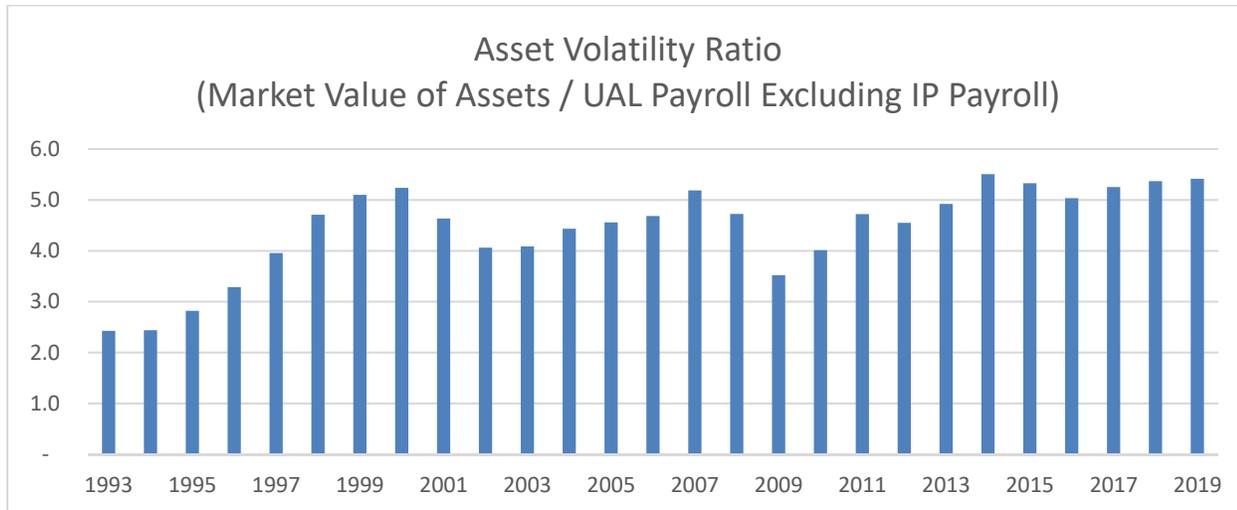
Maturity Measures and Historical Information

The remainder of this section contains historical information concerning the System's Asset Volatility Ratio (AVR) and Liability Volatility Ratio (LVR), plus a forward-looking projection of future benefit payments on behalf of current Plan members. Additional historical information can be found in the Executive Summary.

Asset Volatility Ratios and Liability Volatility Ratios

The magnitude of any contribution rate increase or decrease is affected by the System's maturity level. As systems mature, they accumulate larger pools of assets. Gains and losses on these larger pools of assets create more volatility in the contributions needed to fund the system.

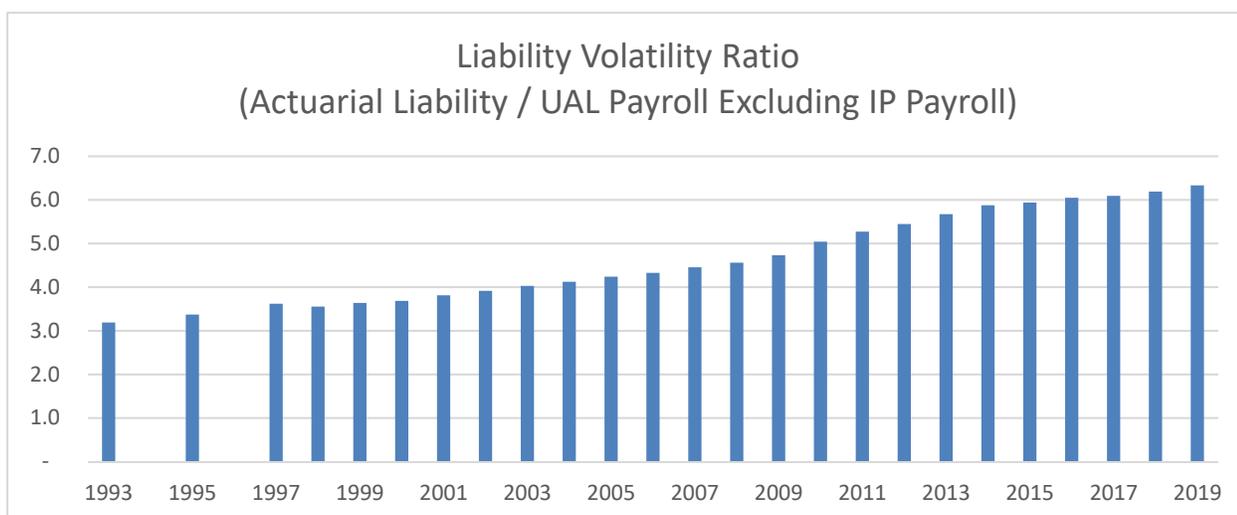
One indicator of this potential volatility is the Asset Volatility Ratio (AVR), which is equal to the Market Value of Assets divided by total UAL payroll. As assets grow compared to UAL payroll, any percentage gain or loss on those assets will be larger compared to UAL payroll. This causes any resulting changes in required contributions from those gains or losses to also be larger when measured as a percentage of UAL payroll. Therefore, plans with a high AVR will be subject to a greater level of volatility in required contributions. The AVR is a current measure since it is based on the current level of assets and will vary from year to year.



The current AVR for the FRS Pension Plan is 5.4. The AVR grew from 2.5 in 1993 to a high of 6.0 in 2000. The following chart provides an illustration of how increases in the AVR increase the volatility of contributions from asset gains and losses.

A return of negative 2.80% is approximately a 10% loss for FRS because it is 10% below the 7.20% investment return assumption. If a return of negative 2.80% were experienced and was not offset by future gains and the AVR was 2.4, the loss would be expected to increase contributions by about 1.5% of pay when amortized over 30 years. However, with the AVR of 5.4, the same return would be expected to increase contributions by about 3.3% of UAL payroll when amortized over 30 years.

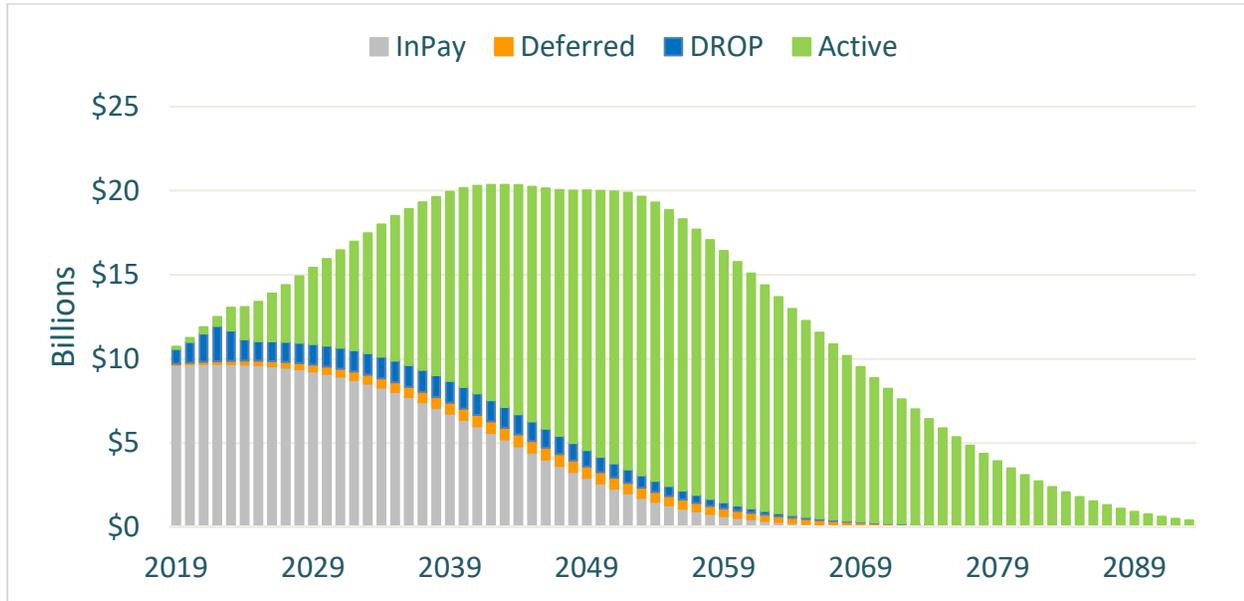
Another measure of a system’s maturity is the Liability Volatility Ratio (LVR), which is equal to the AL divided by the total UAL payroll. This ratio provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. In addition, this ratio provides an indication of the potential contribution volatility due to liability experience (gains and losses) and liability re-measurements (assumption changes). For FRS, the current LVR is 6.5.



The graph above shows the historical LVR since 1993¹. It is a similar pattern to the Asset Volatility Ratio, except the increase is more gradual and the year-to-year variance is significantly less.

Projected Benefit Payments

The graph below show projected benefit payments based on member status as of July 1, 2019. For example, payments shown in blue are all projected payments for members currently in DROP as of July 1, 2019, including annuity payments to those members after their DROP exit.



¹ Prior to 1997, actuarial valuations were conducted biennially. Therefore, there was no measure of the Actuarial Liability at July 1, 1994 or July 1, 1996.

Appendix G: Glossary

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the FRS.

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Accumulated Benefit Obligation (ABO)

The actuarial present value of benefits attributed by the pension benefit formula to employee service rendered before a specified date and based on employee service and compensation prior to that date.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disability, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Allocation Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Liability.

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Actuarial Gain/Loss

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation Dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Liability (AL)

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Present Value of Pension Plan Benefits

Total projected benefits include all benefits estimated to be payable to plan members as a result of their service through the valuation date and their expected future service. The actuarial present value of total projected benefits as of the valuation date is the present value of the cost to finance benefits payable in the future, discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.

Actuarial Valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets (AVA)

The value of cash, investments, and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

Amortization

Paying an interest-bearing liability by gradual reduction through a series of installments, as opposed to one lump-sum payment.

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Liability.

Level Percent of Pay: Produces a level series of payments when expressed as a percent of payroll.
Cash payment increases in line with payroll growth assumption.

Level Dollar: Produces a decreasing pattern of payments when expressed as a percent of payroll.
Cash payment remains level.

Entry Age Normal Actuarial Cost Method (EAN)

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Liability.

Funded Ratio

Ratio of the assets of a pension plan to its liabilities.

Government Accounting Standards Board (GASB)

This Board sets standards of state and local accounting and financial reporting.

Interest Rate

The rate used to discount projected benefit payments to determine the present value in a valuation.

Market Value of Assets (MVA)

The price for which an asset could be sold at a particular date. May also be referred to as the Fair Value of Assets.

Normal Cost (NC)

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Allocation Method.

Present Value (PV)/ Actuarial Present Value (APV)

The value of an amount or series of amounts of cash flows payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions, including selected interest rate.

Projected Benefits

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and anticipated future compensation and service credits.

Unfunded Actuarial Liability

The excess of the Actuarial Liability over the Actuarial Value of Assets. When the Actuarial Value of Assets exceeds Actuarial Liabilities a point-in-time actuarial surplus exists.

Valuation Date

The date as of which the liabilities are determined.



1455 SW Broadway Street, Suite 1600
Portland, OR 97201
Tel 503 227 0634

1301 Fifth Avenue, Suite 3800
Seattle, WA 98101
Tel 206 624 7940

milliman.com

December 5, 2019

Mr. David DiSalvo
State Retirement Director
Florida Department of Management Services, Division of Retirement

Re: **Blended Proposed Statutory Rates for the 2020-2021 Plan Year
Reflecting a Uniform UAL Rate for All Membership Classes and DROP**

Dear Director DiSalvo:

As requested, we have calculated the uniform or “blended” proposed statutory employer rates for the 2020-2021 plan year based on the statutory contributions for the FRS Investment Plan and the actuarially calculated 2020-2021 rates for the defined benefit FRS Pension Plan, as specified in the FRS 2019 Actuarial Valuation Report. The blended rates reflect a uniform Unfunded Actuarial Liability (UAL) Contribution Rate for all payroll bases on which the Blended UAL Contribution Rate is assessed.

Analysis

We determined the uniform blended 2020-2021 employer rate for each membership class and subclass of the Florida Retirement System by projecting contributions for both the FRS Pension Plan and the FRS Investment Plan. We did this by dividing the projected combined amount that would be contributed for both the FRS Pension Plan and the FRS Investment Plan by the total projected combined payroll for both plans. The uniform blended rate calculation assumes plan year 2020-2021 contributions for the FRS Pension Plan will be made at the actuarially calculated rate levels. The actuarially calculated rate levels are based on the July 1, 2019 actuarial valuation of the FRS Pension Plan, as presented in Table 4-11 of the FRS 2019 Actuarial Valuation Report. The FRS Investment Plan rates are the sum of the rates in Sections 121.72, 121.73, and 121.735 of Florida Statutes and assume those rates continue in effect during plan year 2020-2021. The employer contribution rates shown in the attached table are net of the 3% of payroll employee contribution rate.

The payroll for some employee groups is subject to only the UAL Cost component of the FRS Pension Plan’s contribution rate (e.g. participants in SUSORP, SMSOAP, and SCCORP, and reemployed retirees not eligible for renewed membership in a state-sponsored retirement program). The payroll for those employee groups is included in the calculation of the Blended UAL Contribution Rate, but is excluded from the calculation of the Blended Normal Cost Contribution Rate.

Based on the data provided to us for this study, as of July 1, 2019 FRS Investment Plan payroll comprised between 19% and 20% of total payroll. On a headcount basis, FRS Investment Plan members constitute between 22% and 23% of active FRS membership. Please note, Senate Bill 7022 enacted by the 2017 Florida legislature changed the default plan for initial enrollments on and after January 1, 2018

from the FRS Pension Plan to the FRS Investment Plan for all membership classes other than Special Risk. As a result of the enactment, new entrants who would have defaulted into the FRS Pension Plan under prior statute will now default into the FRS Investment Plan in the absence of an active election. The actual levels of participation in the FRS Pension Plan and the FRS Investment Plan as of July 1, 2019 reflect that Investment Plan payroll now comprises an increased percentage of total payroll than it did one year ago.

Results

Table I shows the results of our study based on actual levels of participation in the FRS Pension Plan and the FRS Investment Plan as of July 1, 2019, projected to plan year 2020-2021 using the long-term payroll growth assumption of 3.25%.

Section A of the table includes the Normal Cost Rates developed in the July 1, 2019 funding actuarial valuation of the FRS Pension Plan. Section A does not include the UAL Cost. UAL Cost Rates are applied to a larger total payroll than the Normal Cost Rates and are developed in a later section. Section A, line 3 shows the total employer Normal Cost of the FRS Pension Plan as the product of Normal Cost Rates and projected Normal Cost payroll.

Similarly, Section B calculates the total employer cost of the FRS Investment Plan as the product of applicable employer contribution rates in effect since July 1, 2019 and the projected FRS Investment Plan payroll. FRS Investment Plan payroll is projected as described above.

Section C of the table shows the sum of the FRS Pension Plan employer Normal Cost and FRS Investment Plan employer cost as dollars and as a percentage of total projected combined payroll (FRS Pension Plan projected Normal Cost payroll plus FRS Investment Plan projected payroll).

Section D of the table shows the UAL Cost as of July 1, 2019 of the FRS Pension Plan, as shown in Table 4-11 of the FRS 2019 Actuarial Valuation Report.

Section E shows the projected payroll of the FRS Investment Plan. There is no UAL Cost attributable to the FRS Investment Plan.

Section F calculates the “Blended” UAL Cost as dollars and as a percentage of total payroll (FRS Pension Plan projected UAL payroll plus FRS Investment Plan projected payroll).

Section G shows the Total “Blended” Contribution Rates as the sum of the “Blended” Normal Cost Contribution Rates from Line (C3) and the “Blended” UAL Contribution Rates from Line (F3). The employers of employee groups subject to only the UAL Contribution Rate would contribute the “Blended” UAL Contribution Rates shown in Line (G2) of the table on applicable payroll. The Total “Blended” Contribution Rates shown in Line (G3) of the table will be applied to all other payroll subject to employer contributions.

The contribution rates shown in Table I exclude the 0.06% contribution rate for FRS Investment Plan administration and education (applied to all classes except DROP) and the 1.66% contribution rate for the Florida Retiree Health Insurance Subsidy (HIS) program, which apply across the board to the FRS Pension Plan and the FRS Investment Plan.

The calculations are based on census and payroll data provided to us by the Florida Department of Management Services, Division of Retirement for the July 1, 2019 actuarial valuation. We have not audited or verified this data and other information. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete. These calculations are based on the Individual Entry Age actuarial cost allocation method, as described in the FRS 2019 Actuarial Valuation Report for use in developing 2020-2021 actuarially calculated contribution rates for the FRS Pension Plan.

Certification

We performed a limited review of the data used directly in our analysis for reasonableness and consistency and have not found material defects in the data. If there are material defects in the data, it is possible that they would be uncovered by a detailed, systematic review and comparison of the data to search for data values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Except where otherwise noted in this letter, this analysis is based on the FRS Pension Plan provisions, actuarial methods and actuarial assumptions as summarized in the FRS 2019 Actuarial Valuation Report as published on December 3, 2019. Further, the data used in these calculations were based on FRS Pension Plan data as summarized in the FRS 2019 Actuarial Valuation Report and FRS Investment Plan census data as of July 1, 2019 as provided to us by the Florida Department of Management Services, Division of Retirement. The results of our study depend on future experience conforming to those actuarial assumptions discussed earlier in this letter. Future actuarial measurements may differ significantly from the current measurements presented in this analysis due to many factors, including: 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) 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.

Milliman's work product was prepared exclusively for the internal business use of Florida Department of Management Services, Division of Retirement. It is a complex technical analysis that assumes a high level of knowledge concerning the Florida Retirement System's operations, and uses Division data, which Milliman has not audited. To the extent that Milliman's work is not subject to disclosure under applicable public record 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 exceptions:

- (a) The Florida Department of Management Services, Division of Retirement may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty



of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.

- (b) The Florida Department of Management Services, Division of Retirement may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

We are consulting actuaries for Milliman, Inc. We are also members of the American Academy of Actuaries, and meet their Qualification Standards to render the actuarial opinion contained herein.

Please call if you would like to further discuss this project.

Respectfully submitted,

Matt Larrabee, FSA, EA, MAAA
Principal and Consulting Actuary

Daniel Wade, FSA, EA, MAAA
Principal and Consulting Actuary

Kathryn Hunter, FSA, EA, MAAA
Consulting Actuary

Enclosures

FLORIDA RETIREMENT SYSTEM
FISCAL IMPACT ANALYSIS

Blended Proposed Statutory Normal Cost Plus UAL Rates for 2020-2021 Plan Year
Please see the attached letter for details regarding data, assumptions, methodology, and plan provisions used
(Dollars in Thousands)

	Regular	Special Risk	Special Risk Administrative	Judicial	-----Elected Officers' Class----- Leg-Atty-Cab	Local	Senior Management	Composite (excluding DROP)	DROP	Composite (including DROP)
Blended Proposed Statutory Normal Cost Contribution Rates										
A. Defined Benefit FRS Pension Plan Normal Cost										
1. Employer Cost										
a. Normal Cost Rate ¹	5.19%	15.41%	11.13%	13.64%	8.76%	10.57%	6.90%	7.03%	7.03%	7.03%
b. Rate Reduction Techniques	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
c. Total Adjusted Contribution Rate ²										
-PYE 2021	5.19%	15.41%	11.13%	13.64%	8.76%	10.57%	6.90%	7.03%	7.03%	7.03%
2. Projected Payroll	\$20,118,483	\$4,322,041	\$3,729	\$114,351	\$6,583	\$45,103	\$553,566	\$25,163,856	\$2,364,056	\$27,527,912
3. Total Employer Normal Cost [(1c) x (2)]										
-PYE 2021	\$1,044,149	\$666,027	\$415	\$15,597	\$577	\$4,767	\$38,196	\$1,769,728	\$166,193	\$1,935,921
B. Defined Contribution FRS Investment Plan (IP) Employer Cost										
1. Employer Rates effective July 1, 2019 (Sec 121.72, Sec 121.73 and Sec 121.735)	3.60%	13.54%	5.43%	11.05%	6.94%	8.95%	4.98%	4.83%	0.00%	4.83%
2. Projected Payroll	\$5,663,268	\$774,118	\$1,021	\$16,582	\$1,743	\$20,089	\$201,290	\$6,678,111	\$0	\$6,678,111
3. Total Employer Cost [(1) x (2)]										
-PYE 2021	\$203,878	\$104,816	\$55	\$1,832	\$121	\$1,798	\$10,024	\$322,524	\$0	\$322,524
C. Total System Normal Cost (FRS Pension Plan + FRS Investment Plan)										
1. Total Normal Cost Contribution [(A3) + (B3)]	\$1,248,027	\$770,843	\$470	\$17,429	\$698	\$6,565	\$48,220	\$2,092,252	\$166,193	\$2,258,445
2. Total System Projected Payroll [(A2) + (B2)]	\$25,781,751	\$5,096,159	\$4,750	\$130,933	\$8,326	\$65,192	\$754,856	\$31,841,967	\$2,364,056	\$34,206,023
3. "Blended" Normal Cost Contribution Rate										
As a Percentage of Total Payroll [(C1) / (C2)] ²	4.84%	15.13%	9.89%	13.31%	8.38%	10.07%	6.39%	6.57%	7.03%	6.60%

¹ As reported in the July 1, 2019 actuarial valuation report - Table 4-11

² Rates shown do not include the Health Insurance Subsidy contribution rate or FRS Investment Plan education and administration assessment.

This work product was prepared solely for the Florida Department of Management Services for the purposes stated herein, and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

FLORIDA RETIREMENT SYSTEM
FISCAL IMPACT ANALYSIS

Blended Proposed Statutory Normal Cost Plus UAL Rates for 2020-2021 Plan Year
Please see the attached letter for details regarding data, assumptions, methodology, and plan provisions used
(Dollars in Thousands)

	Regular	Special Risk	Special Risk Administrative	Judicial	-----Elected Officers' Class----- Leg-Atty-Cab	Local	Senior Management	Composite (excluding DROP)	DROP	Composite (including DROP)
Blended Proposed Statutory UAL Contribution Rates										
D. Defined Benefit FRS Pension Plan UAL Contribution										
1. Employer UAL Contribution Rate ^{1&2}	4.26%	8.95%	30.87%	28.26%	60.66%	52.59%	25.95%	5.59%	8.29%	5.80%
2. Projected Payroll	\$23,739,856	\$4,346,448	\$3,729	\$114,991	\$7,177	\$49,410	\$569,732	\$28,831,343	\$2,364,056	\$31,195,399
3. Total Employer UAL Contribution [(1) x (2)] -PYE 2021	\$1,011,318	\$389,007	\$1,151	\$32,496	\$4,354	\$25,985	\$147,845	\$1,612,156	\$195,980	\$1,808,136
E. Defined Contribution FRS Investment Plan Projected Payroll	\$5,663,268	\$774,118	\$1,021	\$16,582	\$1,743	\$20,089	\$201,290	\$6,678,111	\$0	\$6,678,111
F. Total System UAL Contribution (FRS Pension Plan + FRS Investment Plan)										
1. Total UAL Contribution [(D3)]	\$1,011,318	\$389,007	\$1,151	\$32,496	\$4,354	\$25,985	\$147,845	\$1,612,156	\$195,980	\$1,808,136
2. Total System Projected Payroll [(D2) + (E)]	\$29,403,124	\$5,120,566	\$4,750	\$131,573	\$8,920	\$69,499	\$771,022	\$35,509,454	\$2,364,056	\$37,873,510
3. "Blended" UAL Contribution Rate As a Percentage of Total Payroll [(F1) / (F2)] ²	3.44%	7.60%	24.23%	24.70%	48.81%	37.39%	19.18%	4.54%	8.29%	4.77%
Blended Proposed Statutory Uniform Contribution Rates ³										
G: Total Employer Contribution Rate (FRS Pension Plan + FRS Investment Plan)										
1. "Blended" Normal Cost Contribution Rate [(C3)]	4.84%	15.13%	9.89%	13.31%	8.38%	10.07%	6.39%	6.57%	7.03%	6.60%
2. "Blended" UAL Contribution Rates [(F3)]	<u>3.44%</u>	<u>7.60%</u>	<u>24.23%</u>	<u>24.70%</u>	<u>48.81%</u>	<u>37.39%</u>	<u>19.18%</u>	<u>4.54%</u>	<u>8.29%</u>	<u>4.77%</u>
3. Total Blended Contribution Rate ² -PYE 2021 [(G1) + (G2)]	8.28%	22.73%	34.12%	38.01%	57.19%	47.46%	25.57%	11.11%	15.32%	11.37%

¹ As reported in the July 1, 2019 actuarial valuation report - Table 4-11

² Rates shown do not include the Health Insurance Subsidy contribution rate or FRS Investment Plan education and administration assessment.

³ Employers of employee groups subject to only the UAL contribution rate will pay the rates shown in line (G2).

This work product was prepared solely for the Florida Department of Management Services for the purposes stated herein, and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing the Milliman work product.