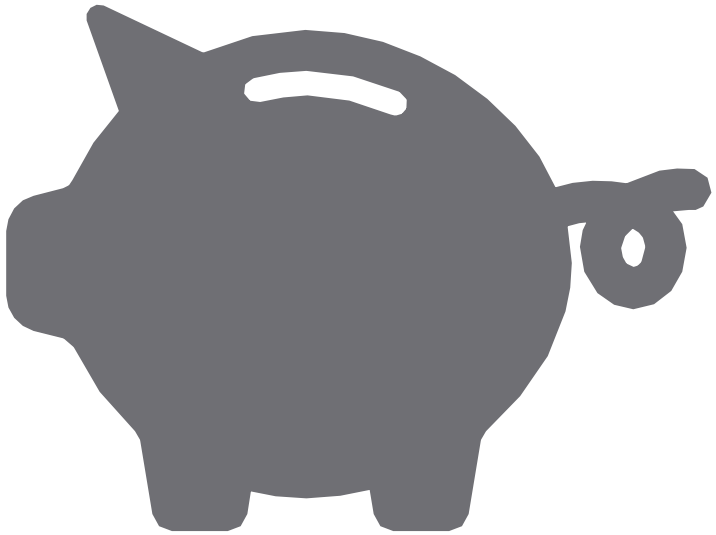
Pension Overview

Part 2: How Did We Get Here?



Vermont Legislative
JOINT FISCAL OFFICE

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Part 1: Overview of Pensions (February 12, 2021)

Link: Video of presentation

Part 2: How Did We Get Here?

- History of the Plan Funding Status
- Demographic Trends
- ADEC Funding History
- History of Investment Performance
- What Caused the Recent Increases?
- Data Appendix

Part 3*(coming soon)*: Possible Options and Strategies from Other States

Characteristics of the Pension Systems

Both VSERS and VSTRS are relatively mature plans with high ratios of non-actives to actives and relatively weak funded ratios.

VMERS has a different set of fundamental characteristics than VSERS and VSTRS and will not be a focus of this presentation.

	VSERS	VSTRS	VMERS
Active Members	8,539	9,996	7,987
Retired Members and Beneficiaries	7,424	9,843	3,693
Terminated Vested Members	767	887	927
Ratio of Non-Active to Active	0.96	1.07	0.58
Average Payroll	$64,642	$64,616	$41,003
Average Monthly Benefit (Retirees Only)	$1,755	$1,830	$891
Average Annual Monthly Benefit (Retirees Only)	$21,060	$21,960	$10,692
Actuarial Value of Assets	$2,054,825,853	$2,035,713,611	$761,505,976
Actuarial Accrued Liability	$3,095,290,972	$3,969,002,977	$1,004,560,034
Unfunded Actuarial Accrued Liability	$1,040,465,119	$1,933,289,366	$243,054,058
Funded Ratio	66.4%	51.3%	75.8%

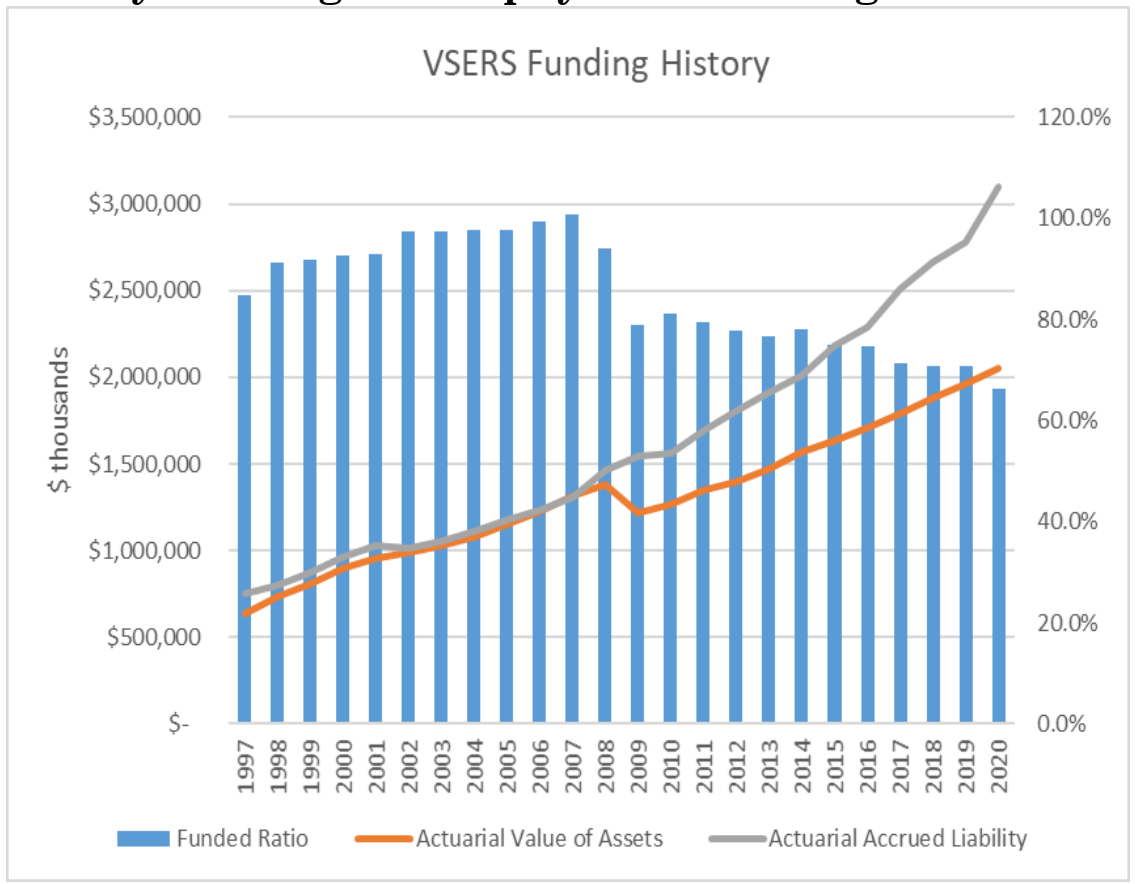
As of June 30, 2020

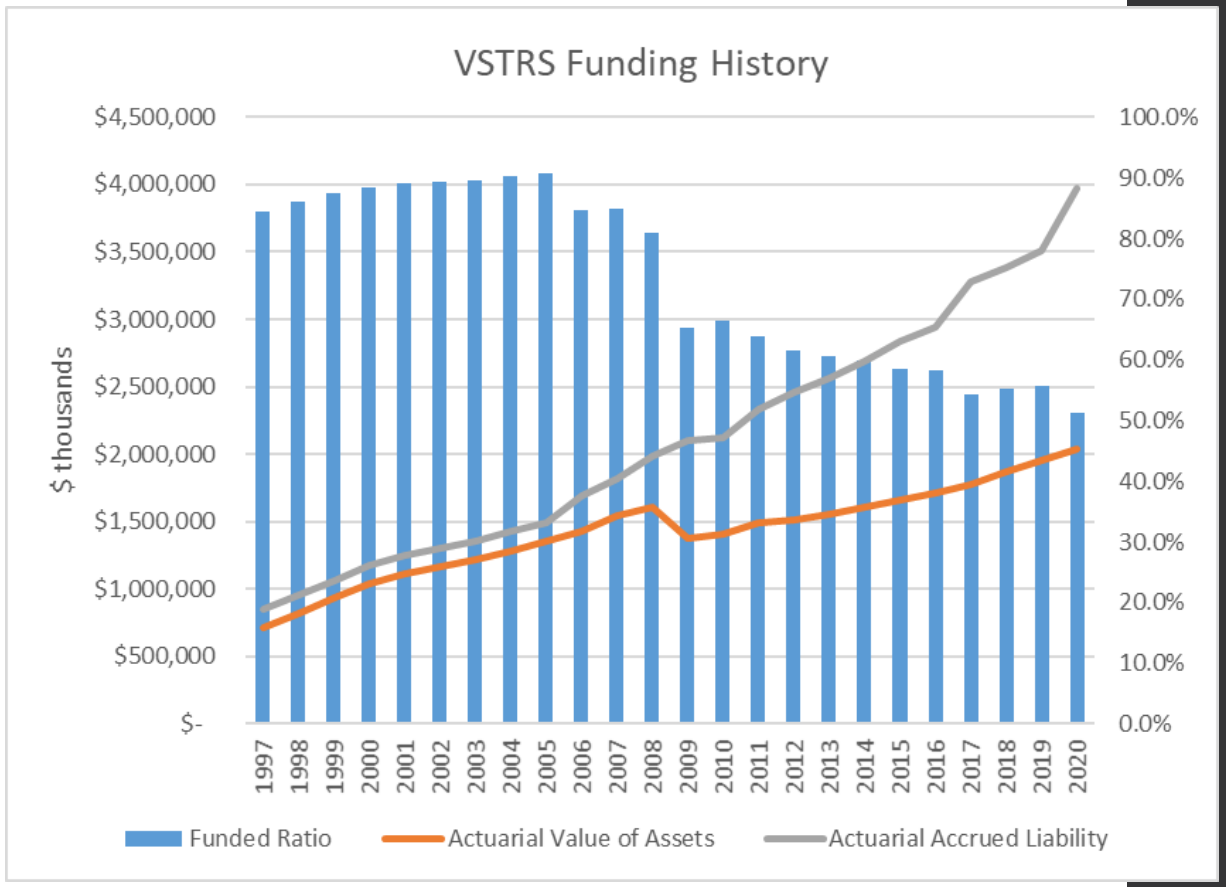
History of the Plan Funding Status

Funding History

- 15 years ago, Vermont's VSERS and VSTRS pension systems were close to fully funded. By FY2021, the funding ratio for VSERS had dropped to 66.4% and the ratio for VSTRS stood at just 51.3%.

- In that time, future pension costs have grown faster than pension assets – and faster than the active payroll. This has caused the unfunded liability (the gap between future benefit costs and assets) to grow significantly and strains budgets to make up for the shortfall. **Most of the gap grew after 2007 despite the employer fully funding ADEC payments during that time.**



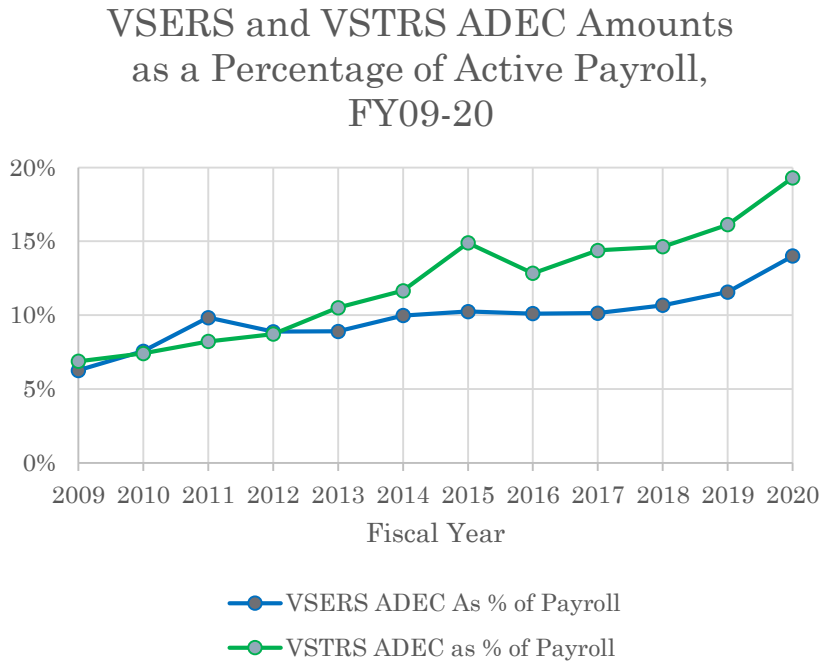


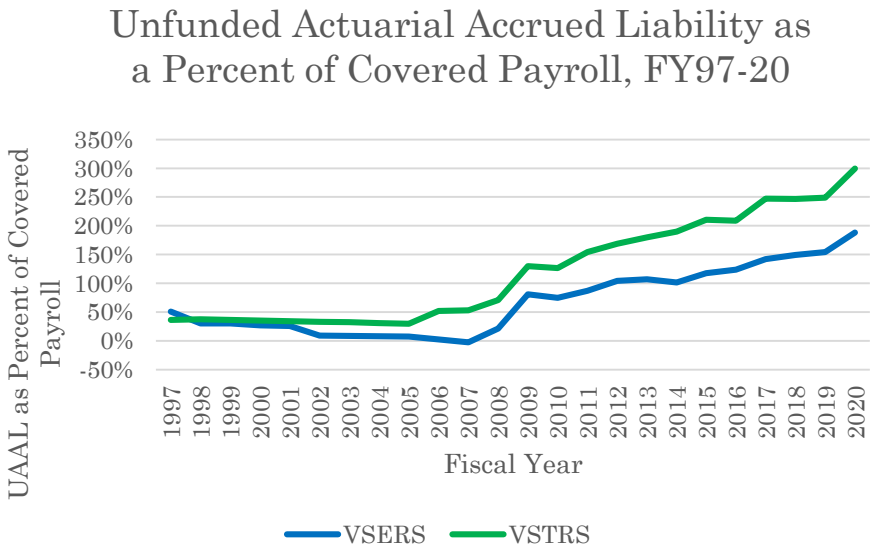
Funding History

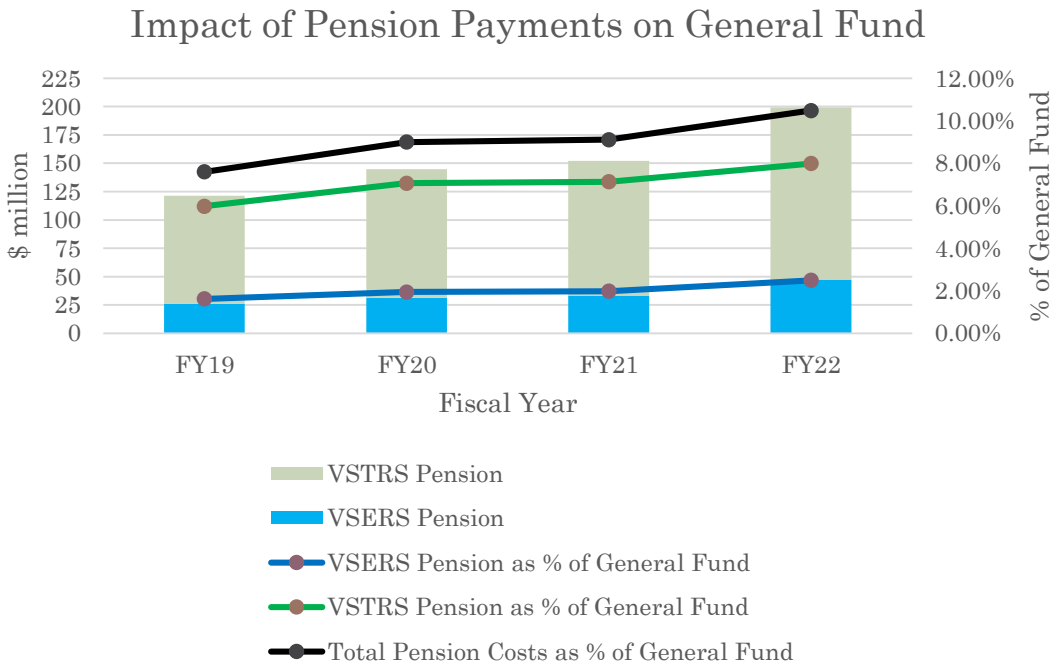
The unfunded liability has increased much faster than the payroll/size of the active workforce. This dynamic has been more severe for the VSTRS plan than the VSERS plan.

As a result, paying down the growing unfunded liability requires higher annual ADEC payments, which have consumed an increasing portion of the budget.

- Pension payments alone now consume $199.4M, or 10.48% of every General Fund dollar.
- OPEB payments consume an additional $50M, or 2.62% of every General Fund Dollar.



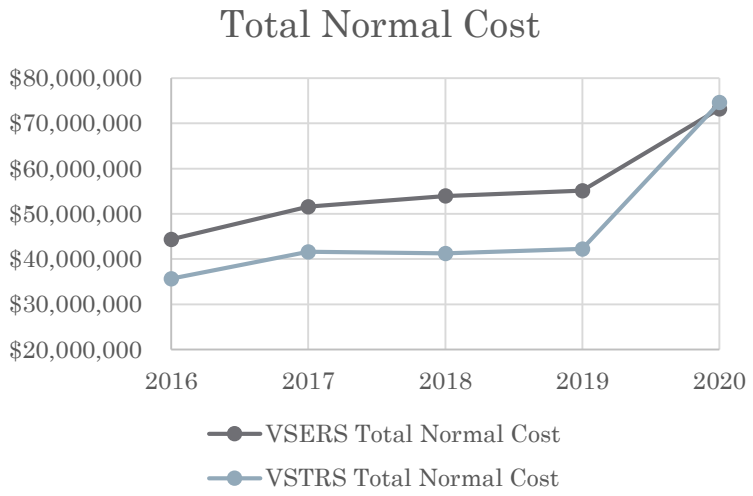




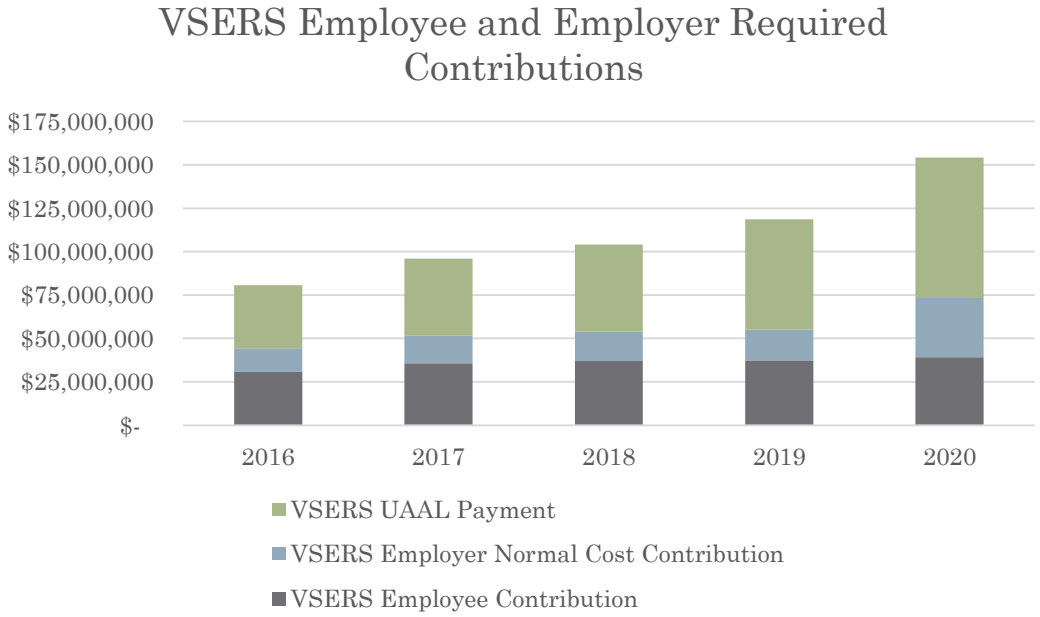
In the last 5 years, pension costs to the employer (the employer normal cost plus UAAL payment) have grown significantly – and at a faster rate than employee contributions.

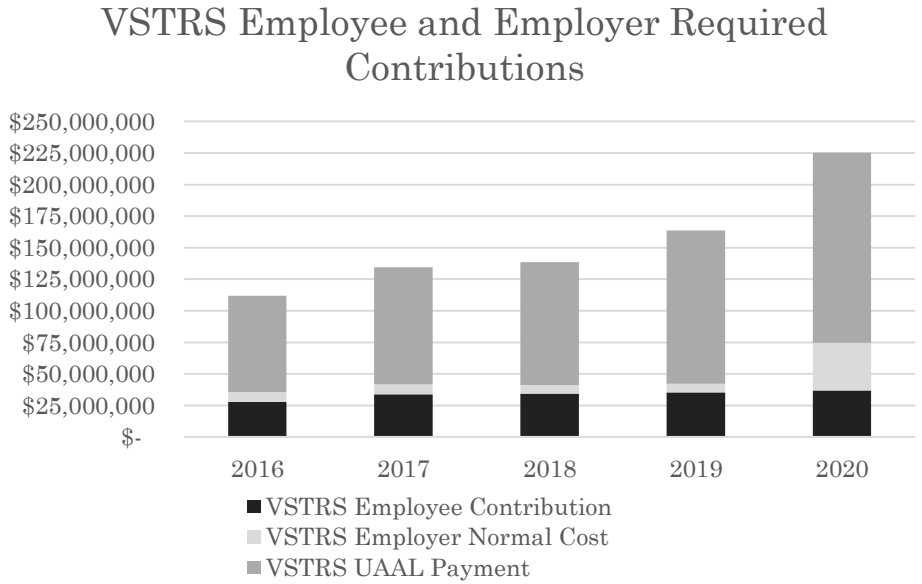
Recent changes to demographic and economic assumptions have increased the normal cost, as well. This means that the cost of each year's pension benefits accrued by the active workforce is increasing, and also increasing the employer ADEC payment amount.

VSTRS Employer Normal Cost now impacts the Education Fund by $37.6M.



As of July 1 2020, VSERS Total Normal Cost is 12.67% of payroll and 11.02% of payroll for VSTRS.



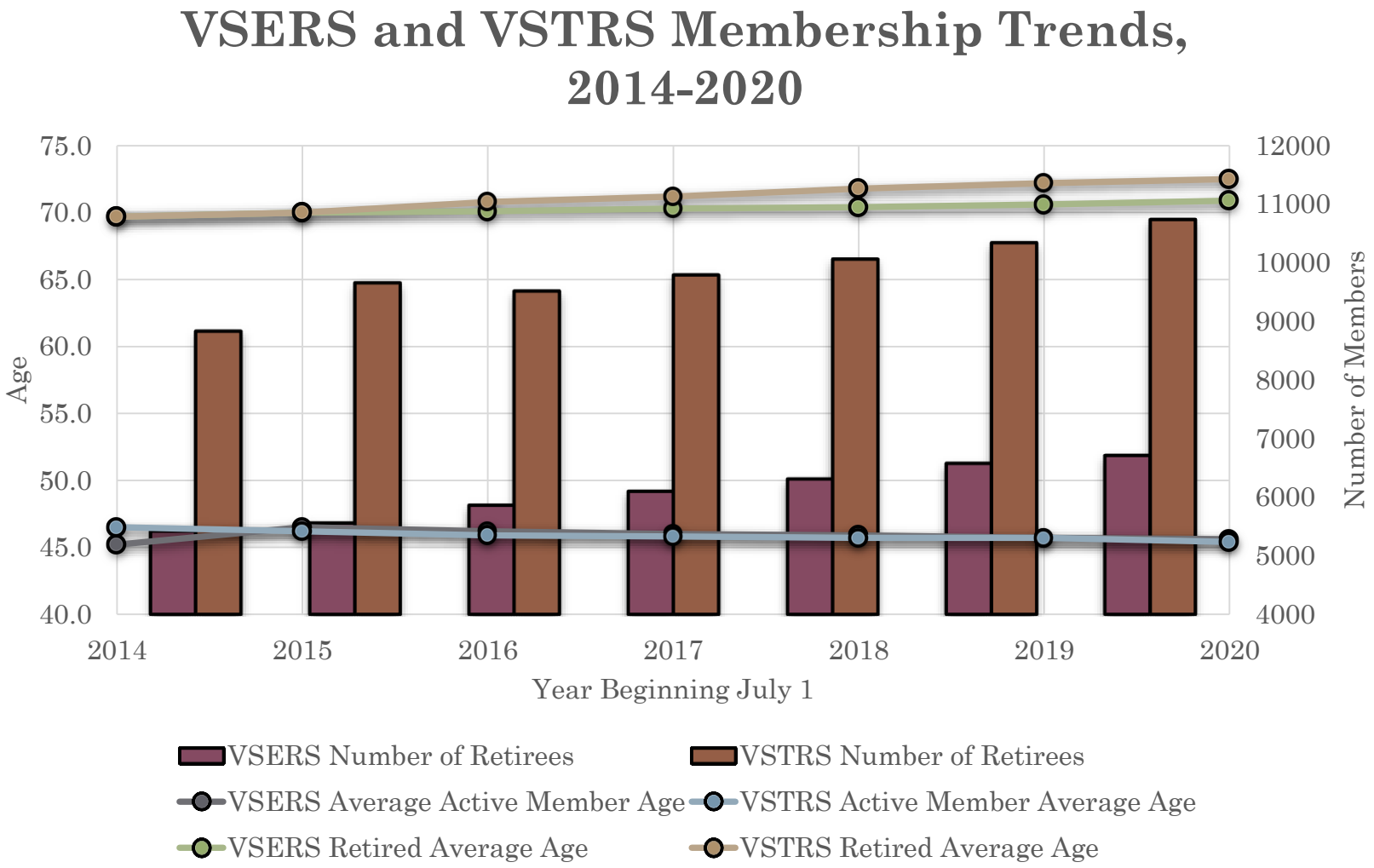


Demographic Trends

As the two plans have matured, the number of retirees drawing a benefit from the system has significantly increased while the number of active employees paying into the system has not. This dynamic increases the financial risk to active employees and employers if investment returns and member experience fall short of assumptions. It also makes it more difficult to make rapid progress at lowering the unfunded liability considering how many dollars must be paid out in benefits rather than invested to grow over a long time.

Membership Trends

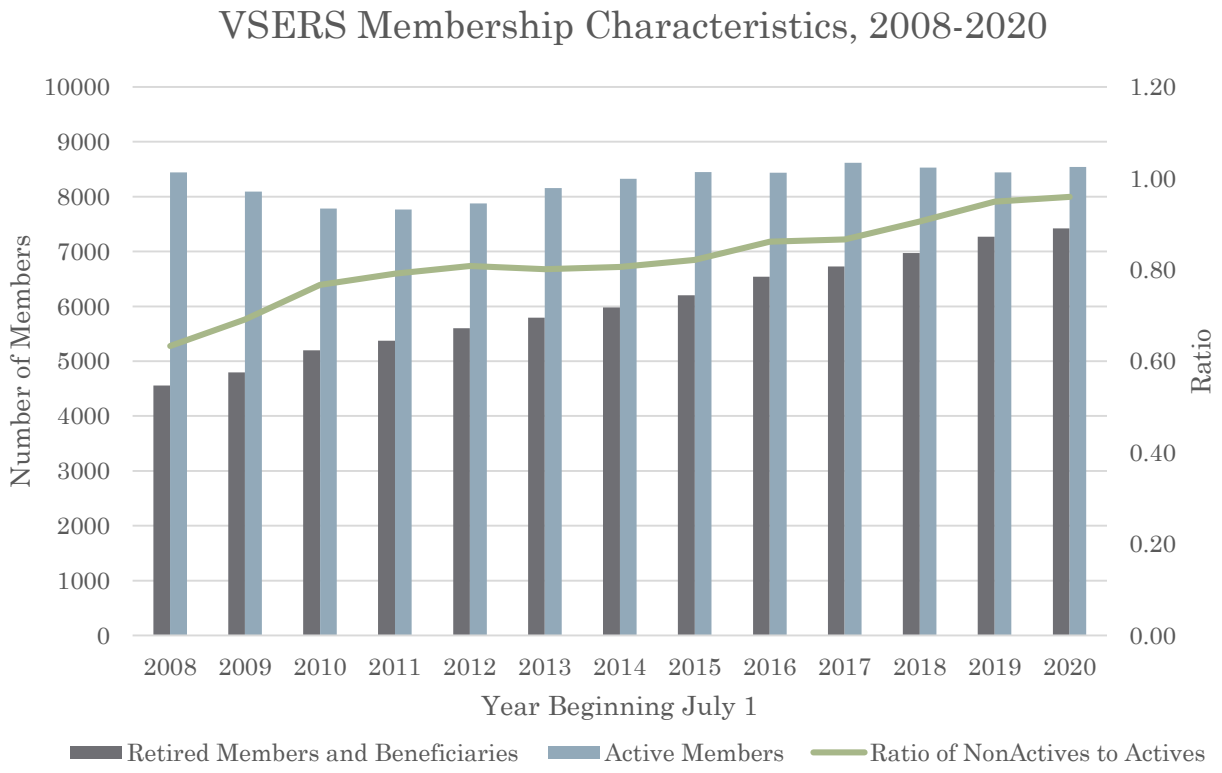
- Since 2014, more people are receiving retirement benefits and the average age of retirees has grown older.
  - VSERS: From 69.7 to 70.9
  - VSTRS: From 69.7 to 72.5
- At the same time, the average active member age for both systems has fluctuated by less than one year and remained around 45 years old.



Plan Maturity

The total number of active VSERS members currently working and paying contributions into the pension system has remained relatively flat while the number of retired members and beneficiaries who are drawing a pension benefit (plus those who are vested and entitled to a benefit but not currently working or receiving one) has increased.

The number of VSERS retirees grew by 63% between 2008 and 2020. This demographic trend is projected to continue growing in future years.

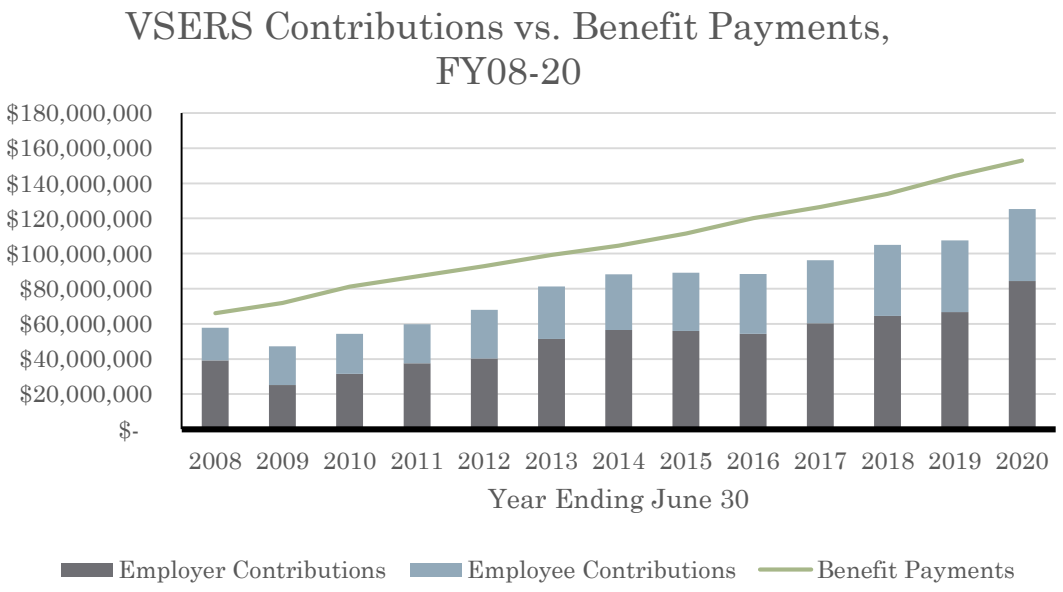


VSERS			
Year Beginning July 1	Active Members	Retirees and Beneficiaries Currently Receiving Benefits	Ratio of Total Non-Active (including deferred) to Active Members
2008	8442	4555	0.63
2009	8095	4797	0.69
2010	7782	5201	0.77
2011	7768	5375	0.79
2012	7878	5600	0.81
2013	8158	5795	0.80
2014	8325	5980	0.81
2015	8446	6204	0.82
2016	8436	6542	0.86
2017	8620	6727	0.87
2018	8530	6974	0.91
2019	8443	7268	0.95
2020	8539	7424	0.96

Plan Trends

Both the average and aggregate benefit payments to VSERS members have increased since 2008 and at a faster rate than contributions into the system from active members and employers.

Like many mature plans, VSERS pays out more in benefits than it takes in from employer and member contributions each year. Prefunded systems like VSERS rely on investment gains from plan assets to fund most of the aggregate costs of benefit payments.

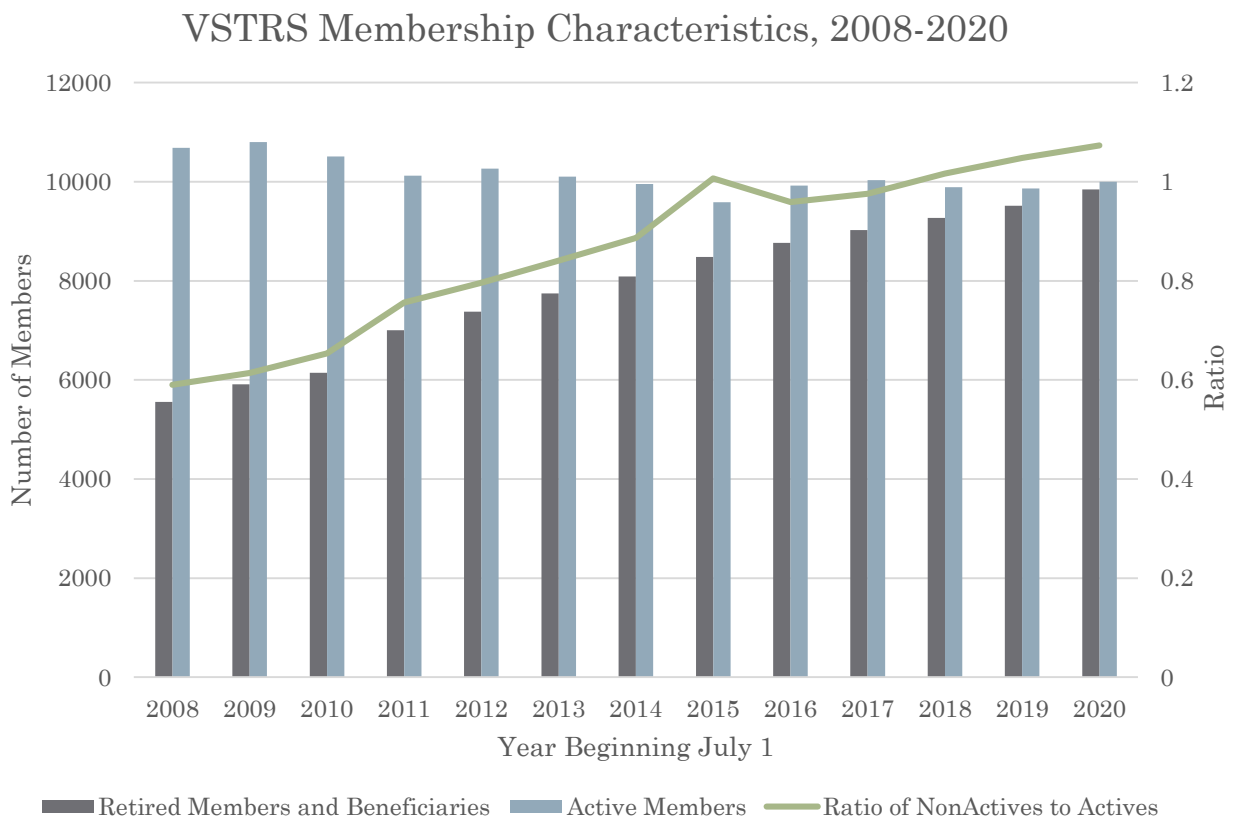


VSERS				
Year Beginning July 1	Employer Contributions	Member Contributions	Benefit Payments	Average Monthly Benefit (Retirees Only)
2008	$ 39,179,823	$ 18,614,102	$ 66,105,953	$ 1,260
2009	$ 25,134,235	$ 22,148,754	$ 71,925,080	$ 1,332
2010	$ 31,468,884	$ 22,840,354	$ 81,091,626	$ 1,348
2011	$ 37,572,599	$ 22,269,041	$ 87,061,787	$ 1,398
2012	$ 40,302,433	$ 27,708,009	$ 92,781,097	$ 1,450
2013	$ 51,370,307	$ 29,847,352	$ 99,194,618	$ 1,478
2014	$ 56,482,985	$ 31,745,692	$ 104,492,553	$ 1,510
2015	$ 55,881,364	$ 33,296,248	$ 111,396,184	$ 1,561
2016	$ 54,347,060	$ 34,055,217	$ 120,093,586	$ 1,587
2017	$ 60,280,480	$ 35,966,987	$ 126,479,801	$ 1,616
2018	$ 64,564,323	$ 40,423,239	$ 134,090,344	$ 1,663
2019	$ 66,617,894	$ 40,818,039	$ 144,296,719	$ 1,718
2020	$ 84,429,972	$ 40,902,188	$ 153,025,531	$ 1,755

Plan Maturity

The total number of active VSTRS members currently working and paying contributions into the pension system has declined while the number of retired members and beneficiaries who are drawing a pension benefit (plus those who are vested and entitled to a benefit but not currently working or receiving one) has steadily increased.

The number of VSTRS retirees has grown by 77.2% between 2008 and 2020. This demographic trend is projected to continue growing in future years.

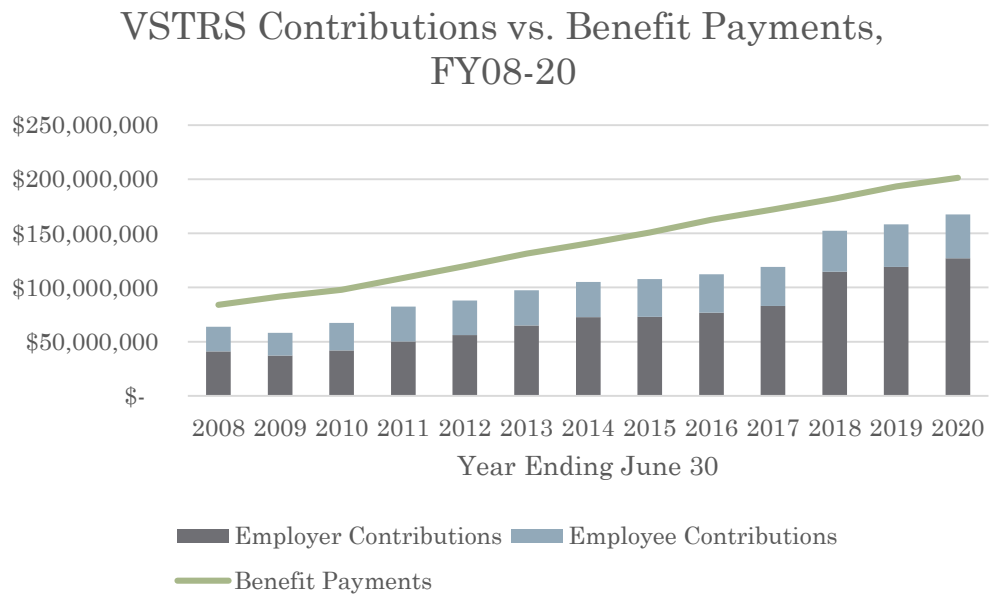


VSTRS			
Year Beginning July 1	Active Members	Retirees and Beneficiaries Currently Receiving Benefits	Ratio of Total Non-Active (including deferred) to Active Members
2008	10685	5555	0.59
2009	10799	5910	0.61
2010	10509	6146	0.65
2011	10123	7005	0.76
2012	10262	7376	0.80
2013	10101	7743	0.84
2014	9952	8086	0.89
2015	9585	8484	1.01
2016	9919	8763	0.96
2017	10028	9021	0.98
2018	9892	9269	1.02
2019	9862	9514	1.05
2020	9996	9843	1.07

Plan Trends

Both the average and aggregate benefit payments to VSTRS members have increased since 2008 and at a faster rate than contributions into the system from active members and employers.

Like many mature plans, VSTRS pays out more in benefits than it takes in from employer and member contributions each year. Prefunded systems like VSTRS rely on investment gains from plan assets to fund most of the aggregate costs of benefit payments.

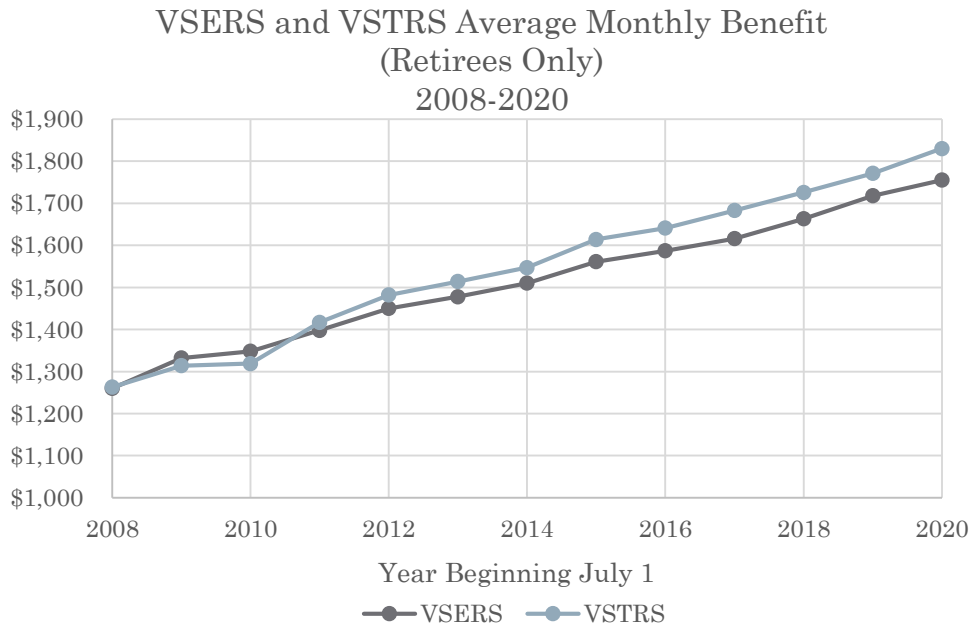


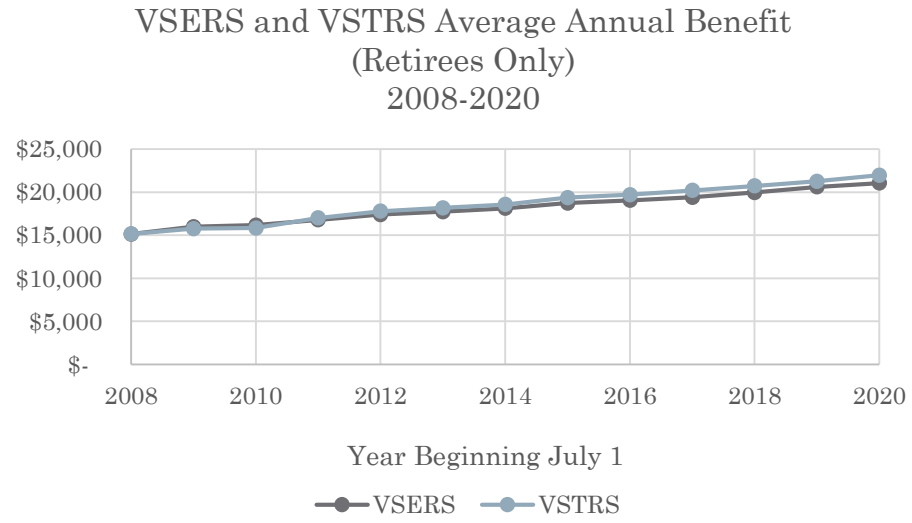
VSTRS				
Year Beginning July 1	Employer Contributions	Member Contributions	Benefit Payments	Average Monthly Benefit (Retirees Only)
2008	$ 40,955,566	$ 22,918,798	$ 83,981,022	$ 1,263
2009	$ 37,349,818	$ 20,937,686	$ 91,853,196	$ 1,314
2010	$ 41,920,603	$ 25,315,397	$ 97,935,502	$ 1,319
2011	$ 50,268,131	$ 32,062,253	$ 108,758,513	$ 1,417
2012	$ 56,152,011	$ 31,827,995	$ 119,713,933	$ 1,482
2013	$ 65,086,320	$ 32,343,368	$ 131,254,070	$ 1,514
2014	$ 72,668,413	$ 32,558,584	$ 140,846,837	$ 1,547
2015	$ 72,908,805	$ 34,863,531	$ 150,732,845	$ 1,614
2016	$ 76,947,869	$ 35,408,763	$ 162,751,409	$ 1,641
2017	$ 82,887,174	$ 36,142,411	$ 172,156,063	$ 1,683
2018	$ 114,598,921	$ 37,888,566	$ 182,258,923	$ 1,726
2019	$ 119,174,913	$ 39,075,342	$ 193,196,825	$ 1,771
2020	$ 126,941,582	$ 40,598,283	$ 201,237,170	$ 1,830

Growth in Retirement Costs

Since 2008, the average monthly benefit received by retirees has grown for both systems.

This trend reflects, in part, the fact that the number of retirees grew significantly since 2008. And those more newly retired members likely left active service earning a higher average final salary than employees who left active service longer ago.





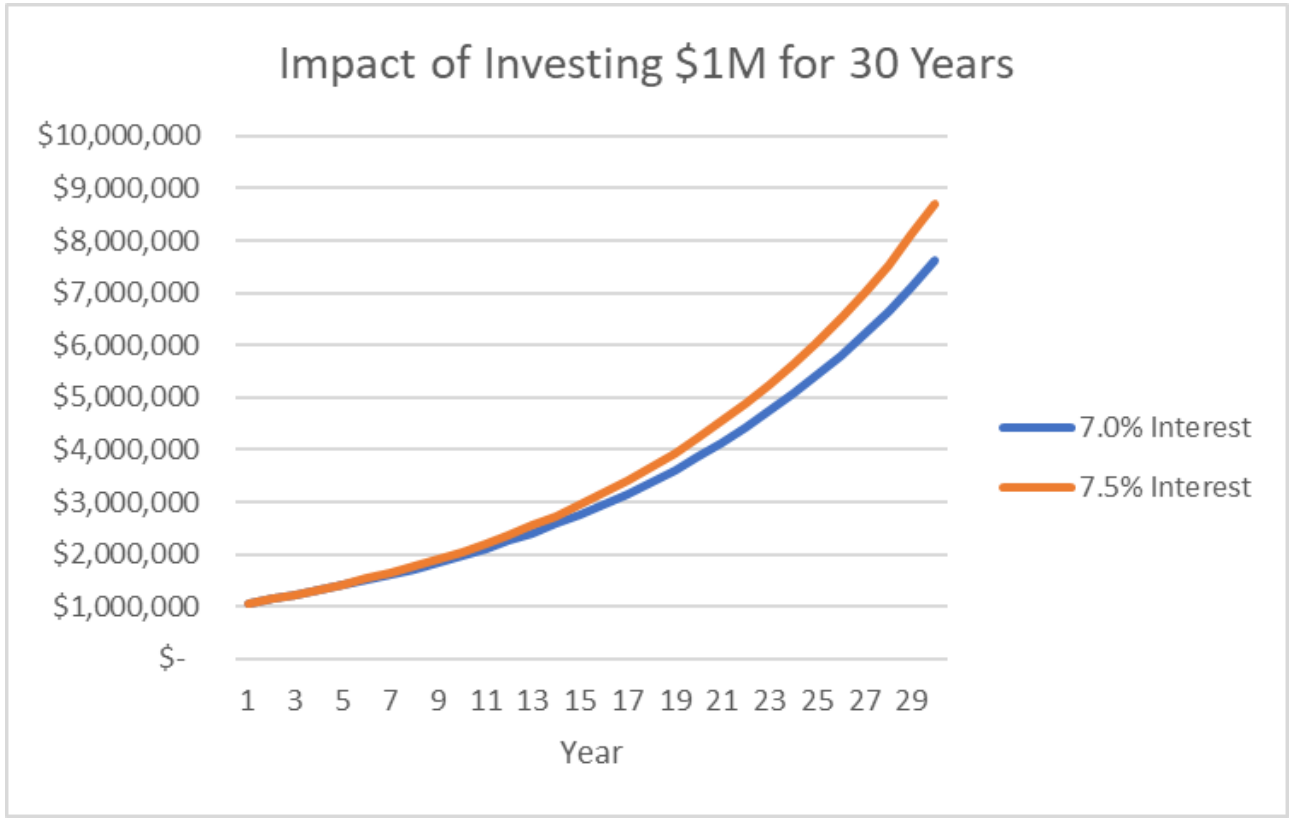
ADEC Funding History

Actuarial Determined Employer Contribution (ADEC): The amount the employer must pay into the pension fund each year to fully fund the normal cost of benefits that accrued by the active workforce that year PLUS a payment toward the unfunded actuarial accrued liability in accordance with the amortization schedule. ADEC was formerly referred to as the ARC (Actuarial Required Contribution).

ADEC is calculated annually based on recent plan membership statistics, investment performance, and how recent employee experience compared with assumptions. Changes to forward-looking demographic and economic assumptions will typically also change the ADEC.

When holding all else equal, paying amounts in excess of the ADEC will generally improve the pension system's funding ratio…and paying less than the ADEC will generally worsen the funding ratio and increase the unfunded liability.

Impact of Compound Investment Returns



Underfunding the ADEC can lead to enormous actuarial losses over time due to the lost opportunity to invest those funds for a long period of time.

The benefits of compound investment gains grow significantly over time. For example, $1,000,000 for 30 years will grow to….

- $7.6 million at 7.0%
- $8.7 million at 7.5%

The impact of short-funding the ADEC payment by $1,000,000 over 30 years would have the same scale of impacts in the form of an actuarial loss in plan assets.

In other words, the true cost to the pension system of the employer shorting an ADEC payment by $1 million is much greater than $1 million. The impact is $1 million *plus* all of the compounded investment returns that the $1 million would have earned over the amortization period if that money was instead made available to invest.

Larger investments in the near term lead to larger gains in the future.

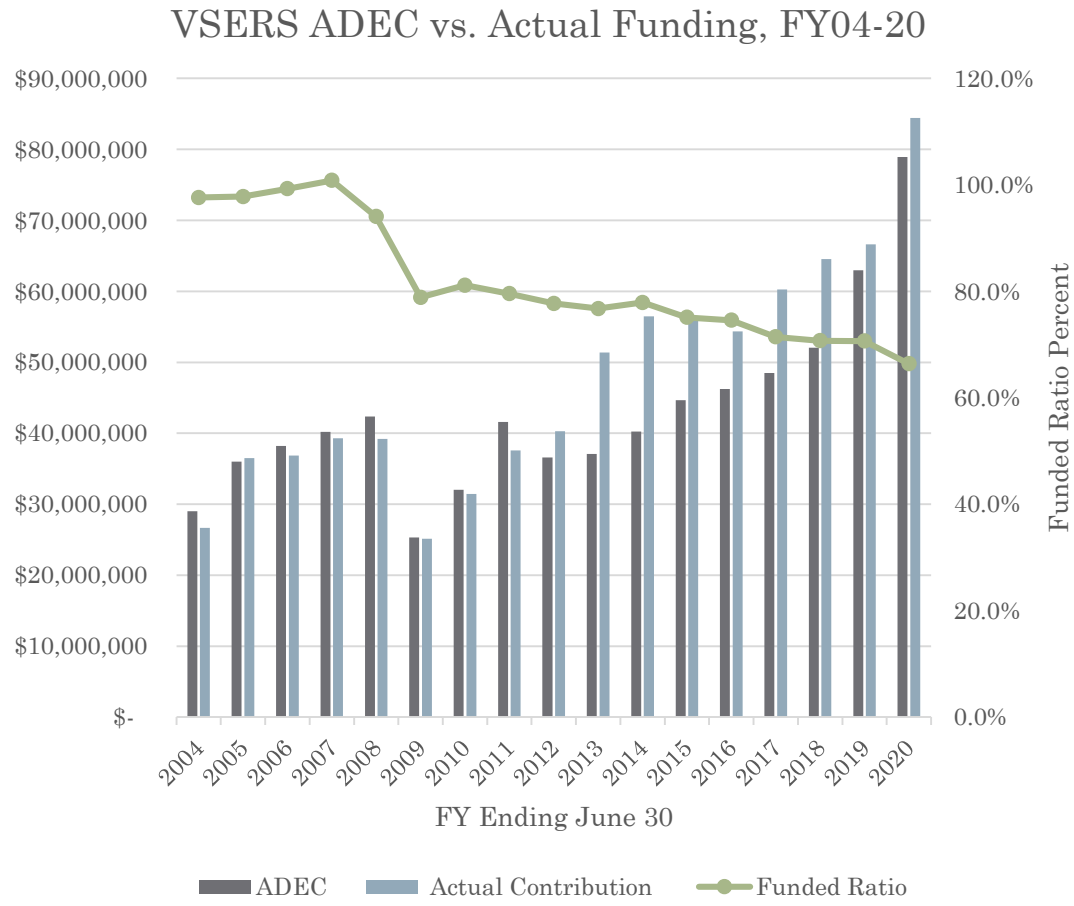
VSERS ADEC Funding

Since 2004, the employer has made a VSERS contribution in excess of the ADEC amount most (but not all) years. In some years, the actual contribution significantly exceeded the ADEC.

In the aggregate, actual employer contributions have exceeded the ADEC by $74,909,428 between FY04 and FY20.

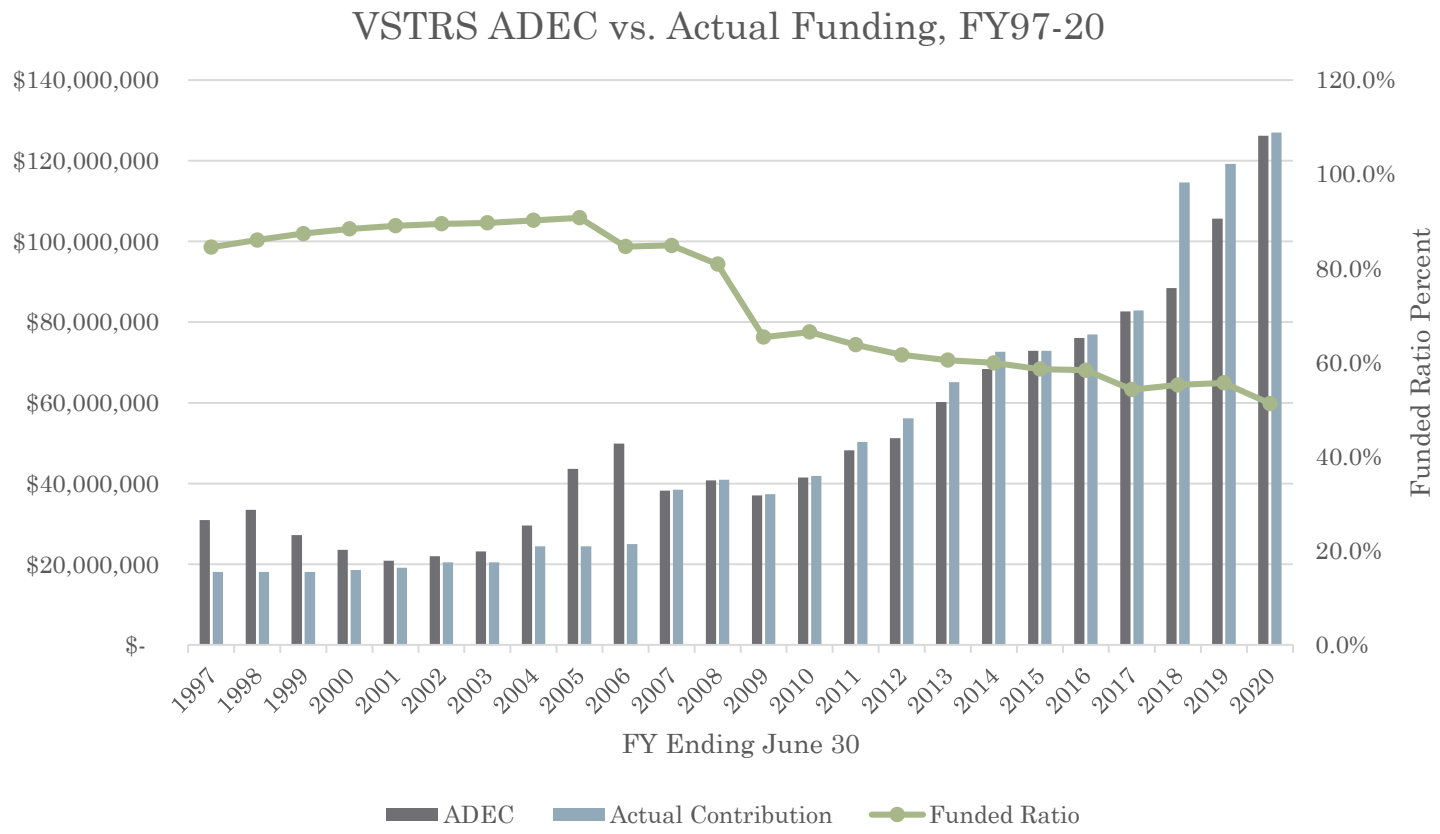
However, these higher employer contributions have not been sufficient to stop the funding ratio of the VSERS system from deteriorating.

VSERS lacked the same degree of severe chronic under-funding that VSTRS experienced, and as a result the VSERS' funding ratio has consistently been slightly higher than the VSTRS ratio since the late 1990s.



VSTRS ADEC Funding

- VSTRS experienced a more severe history of employer under-funding the ADEC than VSERS experienced.
- Since FY2007, the ADEC has been fully funded. Prior to that, the ADEC was underfunded in all but 4 years between 1979 and 2006. In total, the VSTRS ADEC was underfunded by $174 million.
- In recent years, payments in excess of the ADEC have been made; however, these additional payments have not fully offset the impact of prior underfunding and are insufficient to make up for many years of lost investment opportunities.
- In addition to the underfunding of the ADEC, up until FY2014 costs to pay for retiree healthcare were charged to the VSTRS pension system which created additional actuarial losses.



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VSTRS					
FY Ended June 30	ADEC	ADEC Increase Over Prior FY	Actual Contribution	Pct of ADEC	$ Above/Below ADEC
1979	$ 7,806,825		$ 4,825,155	61.8%	$ (2,981,670)
1980	$ 8,944,090	$ 1,137,265	$ 8,471,960	94.7%	$ (472,130)
1981	$ 9,862,861	$ 918,771	$ 8,830,900	89.5%	$ (1,031,961)
1982	$ 10,200,209	$ 337,348	$ 7,822,760	76.7%	$ (2,377,449)
1983	$ 10,721,814	$ 521,605	$ 10,929,355	101.9%	$ 207,541
1984	$ 12,341,069	$ 1,619,255	$ 11,592,100	93.9%	$ (748,969)
1985	$ 13,475,181	$ 1,134,112	$ 12,567,866	93.3%	$ (907,315)
1986	$ 14,668,095	$ 1,192,914	$ 14,461,148	98.6%	$ (206,947)
1987	$ 15,925,452	$ 1,257,357	$ 16,239,416	102.0%	$ 313,964
1988	$ 16,294,346	$ 368,894	$ 17,186,259	105.5%	$ 891,913
1989	$ 18,072,172	$ 1,777,826	$ 19,000,000	105.1%	$ 927,828
1990	$ 21,320,155	$ 3,247,983	$ 19,561,000	91.7%	$ (1,759,155)
1991	$ 25,013,437	$ 3,693,282	$ 15,000,000	60.0%	$ (10,013,437)
1992	$ 28,595,220	$ 3,581,783	$ 14,618,992	51.1%	$ (13,976,228)
1993	$ 28,819,875	$ 224,655	$ 19,890,048	69.0%	$ (8,929,827)
1994	$ 25,805,408	$ (3,014,467)	$ 20,580,000	79.8%	$ (5,225,408)
1995	$ 27,451,926	$ 1,646,518	$ 18,080,000	65.9%	$ (9,371,926)
1996	$ 29,884,559	$ 2,432,633	$ 11,480,000	38.4%	$ (18,404,559)
1997	$ 30,954,237	$ 1,069,678	$ 18,080,000	58.4%	$ (12,874,237)
1998	$ 33,519,949	$ 2,565,712	$ 18,106,581	54.0%	$ (15,413,368)
1999	$ 27,232,542	$ (6,287,407)	$ 18,080,000	66.4%	$ (9,152,542)
2000	$ 23,573,184	$ (3,659,358)	$ 18,586,240	78.8%	$ (4,986,944)
2001	$ 20,882,521	$ (2,690,663)	$ 19,143,827	91.7%	$ (1,738,694)
2002	$ 21,965,322	$ 1,082,801	$ 20,446,282	93.1%	$ (1,519,040)
2003	$ 23,197,088	$ 1,231,766	$ 20,446,282	88.1%	$ (2,750,806)
2004	$ 29,608,892	$ 6,411,804	$ 24,446,282	82.6%	$ (5,162,610)
2005	$ 43,592,332	$ 13,983,440	$ 24,446,282	56.1%	$ (19,146,050)
2006	$ 49,923,599	$ 6,331,267	$ 24,985,506	50.0%	$ (24,938,093)
2007	$ 38,200,000	$ (11,723,599)	$ 38,496,410	100.8%	$ 296,410
2008	$ 40,749,097	$ 2,549,097	$ 40,955,566	100.5%	$ 206,469
2009	$ 37,077,050	$ (3,672,047)	$ 37,349,818	100.7%	$ 272,768
2010	$ 41,503,002	$ 4,425,952	$ 41,920,603	101.0%	$ 417,601
2011	$ 48,233,006	$ 6,730,004	$ 50,268,131	104.2%	$ 2,035,125
2012	$ 51,241,932	$ 3,008,926	$ 56,152,011	109.6%	$ 4,910,079
2013	$ 60,182,755	$ 8,940,823	$ 65,086,320	108.1%	$ 4,903,565
2014	$ 68,352,825	$ 8,170,070	$ 72,668,412	106.3%	$ 4,315,587
2015	$ 72,857,863	$ 4,505,038	$ 72,908,805	100.1%	$ 50,942
2016	$ 76,102,909	$ 3,245,046	$ 76,947,869	101.1%	$ 844,960
2017	$ 82,659,576	$ 6,556,667	$ 82,887,174	100.3%	$ 227,598
2018	$ 88,409,437	$ 5,749,861	$ 114,598,921	129.6%	$ 26,189,484
2019	$ 105,640,777	$ 17,231,340	$ 119,174,913	112.8%	$ 13,534,136
2020	$ 126,197,389	$ 20,556,612	$ 126,941,582	100.6%	$ 744,193

History of Investment Performance

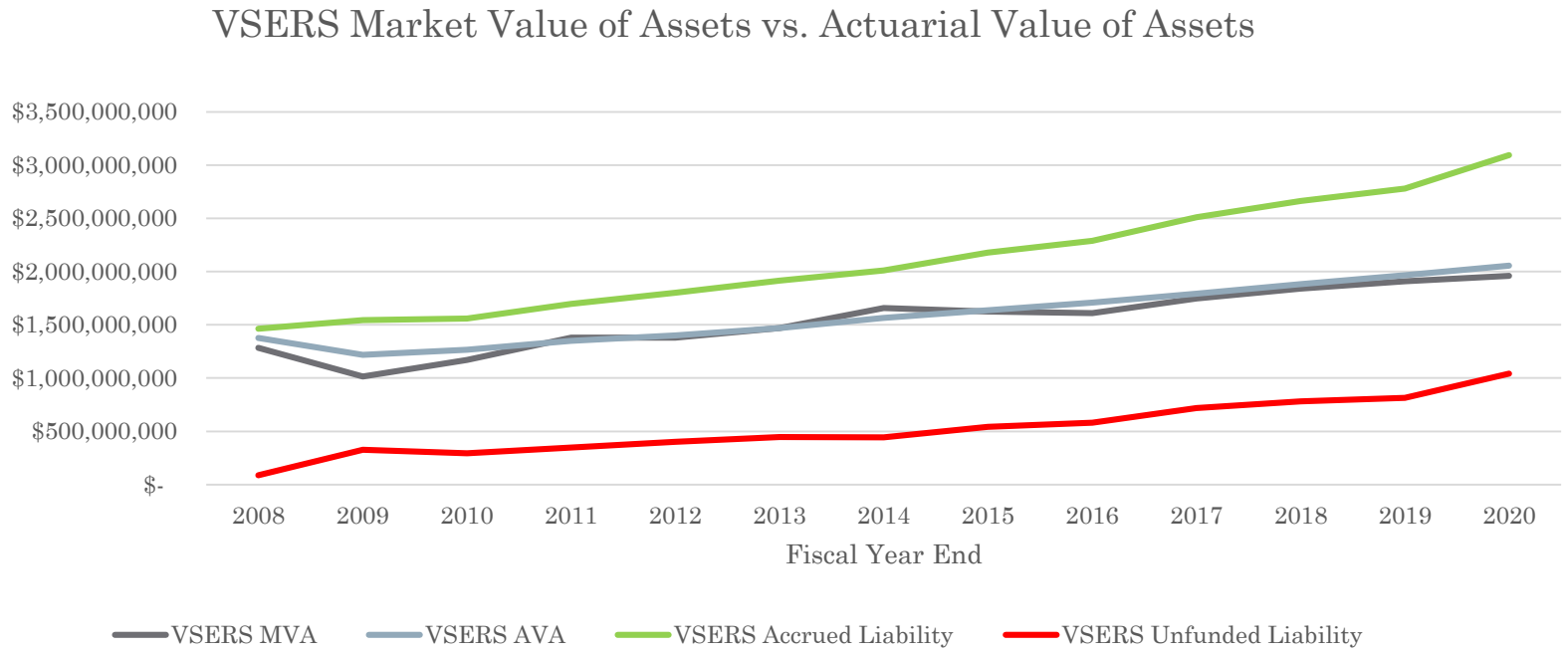
Value of Pension Assets

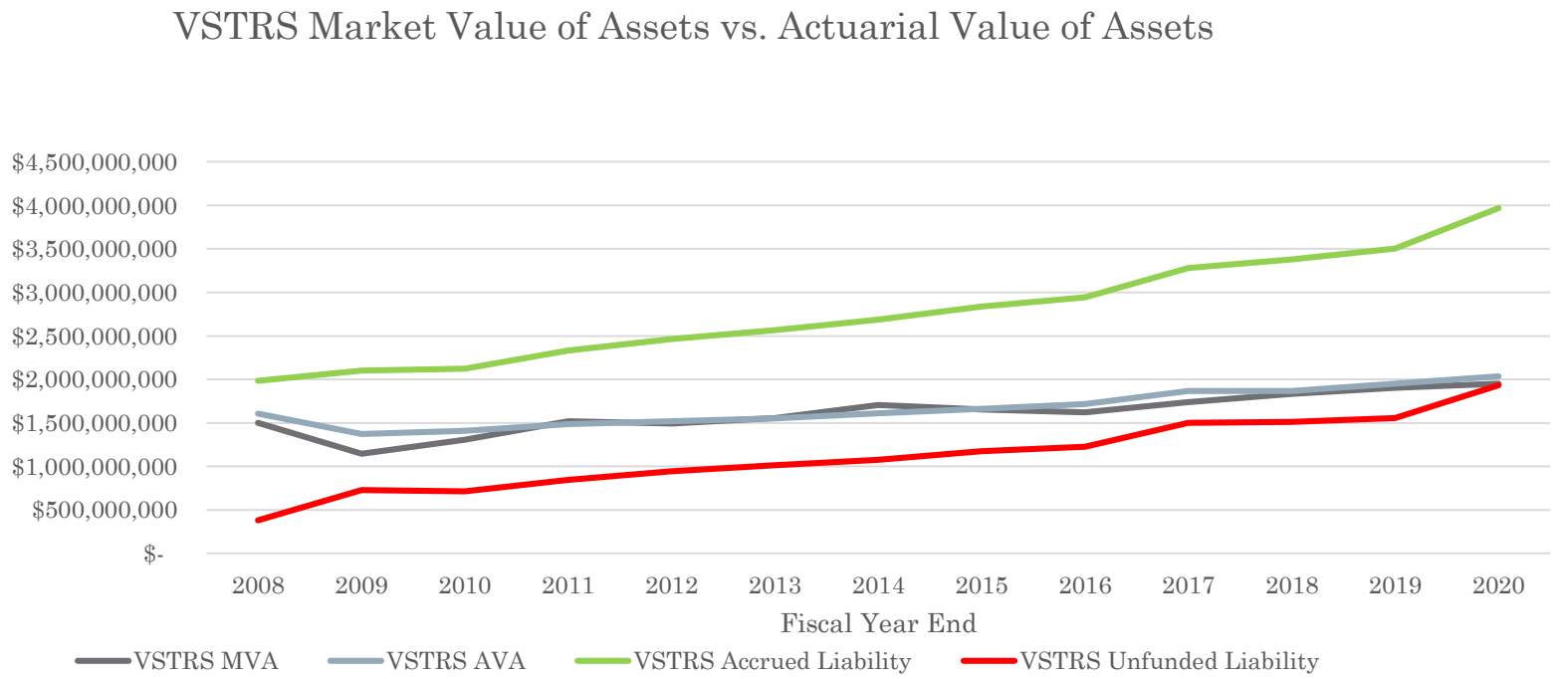
- Pension asset values are tracked two ways:
  - The **Market Value of Assets** reflects what the investments are "worth" at a given point in time.
  - The **Actuarial Value of Assets** adjusts the market value by deferring investment gains/losses over a 5 year period to adjust for short-term volatility.
- The **actuarial value of assets** is used to calculate the normal cost, plan funding ratio, unfunded liability, and ADEC payments.
- The pension systems apply an **assumed rate of return** to estimate how much of the money needed to pay for the actuarial accrued liability will come from future investment returns.
  - Higher assumed rates of return lead to lower ADEC payments due to smaller projected unfunded liabilities.
  - Lower assumed rates of return lead to higher ADEC payments necessary to bridge the gap between liabilities and expected investment returns.
- **Unrealistically high assumed rates of return lead to unrealistic projections - and higher unfunded liabilities and ADEC costs later in the amortization period to make up the difference.**

After suffering from significant investment losses during the Great Recession, the asset value for both plans has steadily increased over the last decade.

These assets have not, however, grown at the assumed rates during this time.

As a result, the gap between future pension costs and assets (the unfunded liability) grew.





Assumed Rate of Return

- In recent years, many pension plans have adopted lower assumed rates of return to more realistically match future anticipated investment experience.

- For FY2012-15, Vermont adopted a "select-and-ultimate" assumed rate of return system. In this system, different short-term and longer-term investment growth rates were applied. This system resulted in lower ADEC payments based on average annual investment assumptions exceeding 8.25% and was discontinued after 4 years.

- The use of this system for 4 years is estimated by the Vermont Business Roundtable to have increased the unfunded pension liability by a total of $137 million for VSERS and $186 million for VSTRS.

- September 2020 – Assumed Rate of Return lowered from 7.5% to 7.0% and inflation assumption lowered from 2.5% to 2.3%. The impact of these changes to economic assumptions between FY21 and FY22 is:

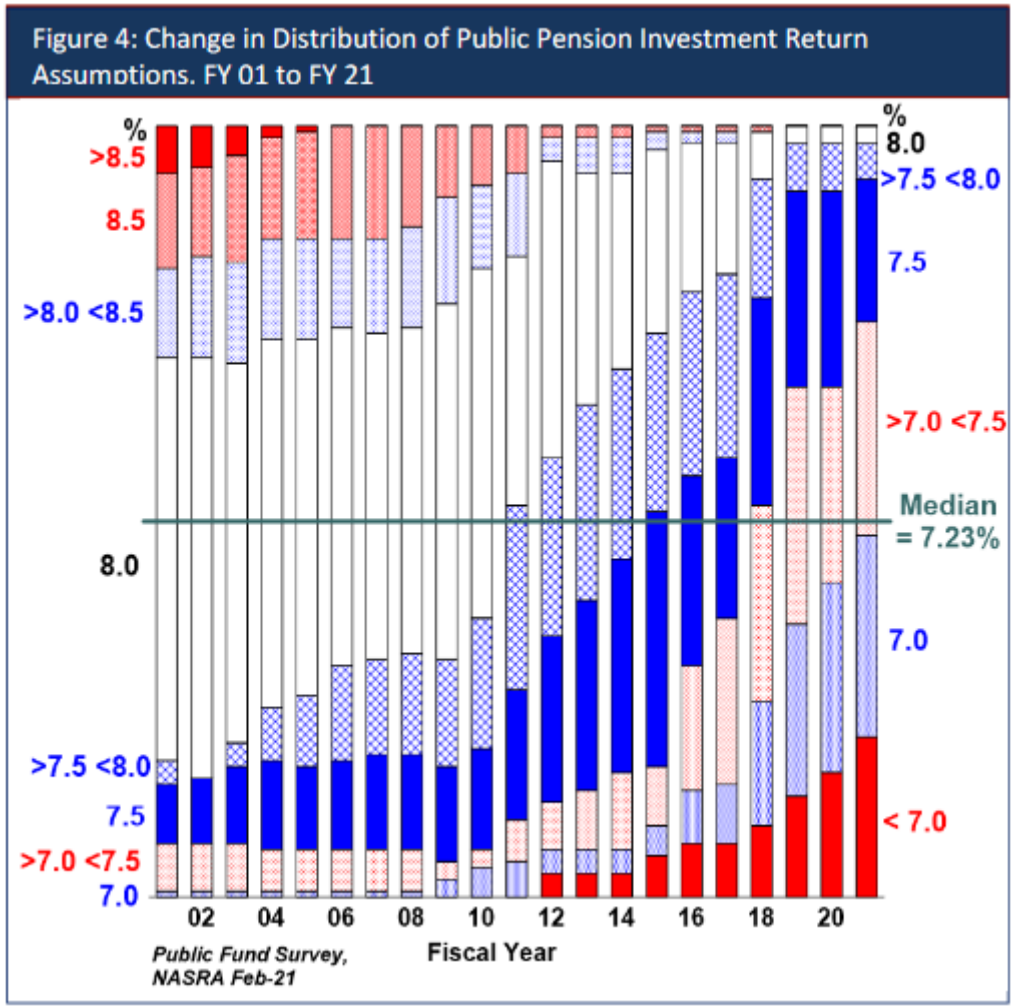
    - VSERS: Increased ADEC by $17.8 million and UAAL by $150.7 million
    - VSTRS: Increased ADEC by $18.3 million and UAAL by $189.9 million

	ARR
2009-2011	8.25%
2012*	8.42%
2013*	8.39%
2014*	8.37%
2015*	8.34%
2016-2017	7.95%
2018-2020	7.50%
2021	7.0%

* Denotes the average annual assumed rate of return through 2038 under the select-and-ultimate system.

Assumed Rate of Return

- Pension plans nationwide have lowered their assumed rates of return in recent years.
- According to data from NASRA, the vast majority of surveyed pension plans now adopt an assumed rate of return lower than 7.5% and a growing number of plans are adopting rates of return lower than 7.0%.
- This trend is driven by:
  - Years of pension plans failing to achieve their assumed rates of return.
  - Lower inflation rate experience and projections.
  - Lower expectations for investment gains in future years.
- A more conservative assumed rate of return leads to more realistic assumptions – but also higher ADEC costs in the near term.



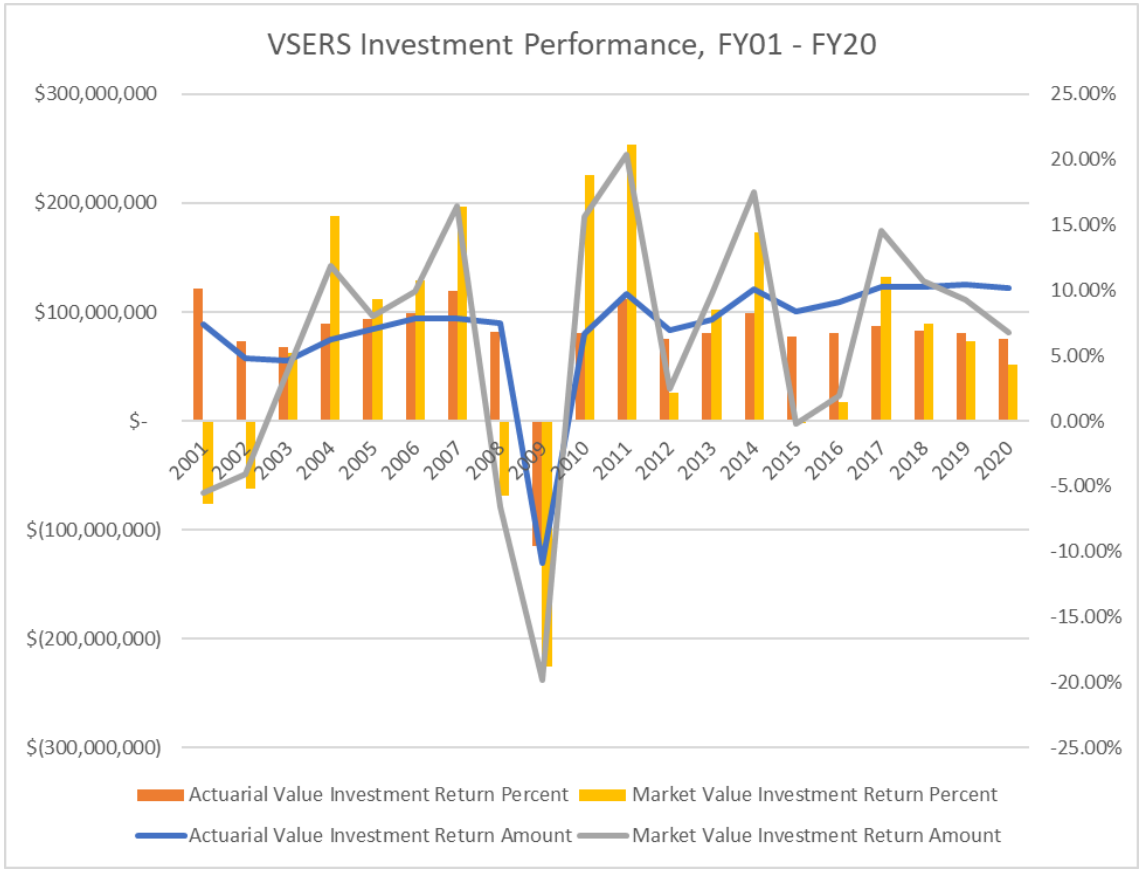
VSERS Investment Performance

The Actuarial Value investment return "smooths out" variations in the Market Value investment return by recognizing gains/losses over a 5 year period.

- As of the end of FY20, VSERS had $95.8 million of deferred market losses which will be recognized in the AVA in future years.

Despite some years with strong market value investment returns, VSERS investment performance has not consistently achieved its assumed rate of return in recent years.

Assumed rate of return recently lowered to 7.0% to more realistically match anticipated investment experience in the future.



VSERS Most Recent Average Returns

	AVA				MVA			
As Of FY	5Yr	10YR	15YR	20YR	5YR	10YR	15YR	20YR
2017	7.09%	5.55%	6.21%	7.15%	6.82%	4.82%	6.68%	6.35%
2018	7.12%	5.61%	6.25%	6.87%	6.67%	6.17%	6.82%	6.04%
2019	6.84%	7.11%	6.24%	6.64%	5.19%	8.23%	6.37%	5.93%
2020	6.78%	7.04%	6.16%	6.39%	6.00%	7.16%	6.05%	5.58%

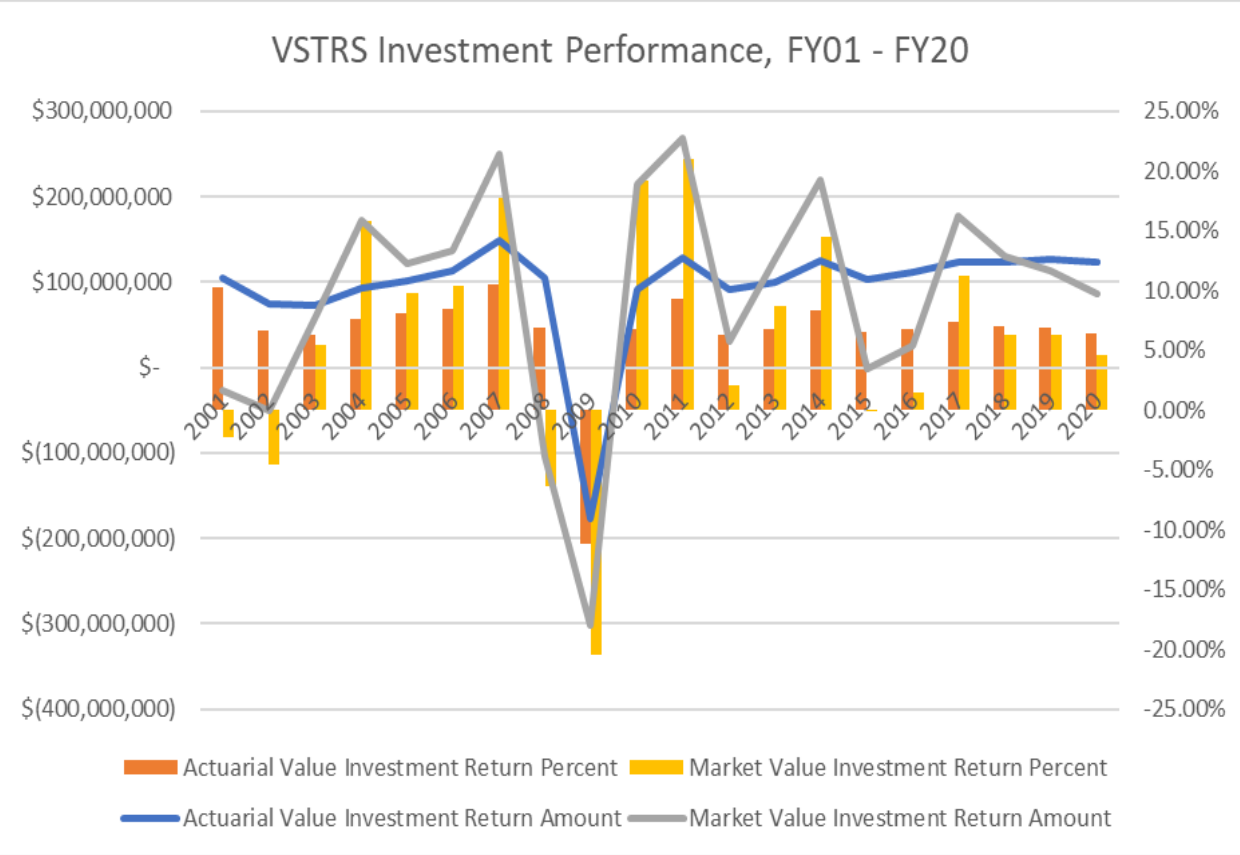
VSTRS Investment Performance

The Actuarial Value investment return "smooths out" variations in the Market Value investment return by recognizing gains/losses over a 5 year period.

- As of the end of FY20, VSTRS had $84.2 million of deferred market losses which will be recognized in the AVA in future years.

Despite some years with strong market value investment returns, VSTRS investment performance has not consistently achieved its assumed rate of return in recent years.

Assumed rate of return recently lowered to 7.0% to more realistically match anticipated investment experience in the future.



VSTRS Most Recent Average Returns

	AVA				MVA			
As Of FY	5Yr	10YR	15YR	20YR	5YR	10YR	15YR	20YR
2017	7.12%	5.28%	6.17%	7.13%	6.96%	4.42%	6.65%	6.39%
2018	7.18%	5.32%	6.23%	6.90%	6.70%	5.92%	6.75%	6.10%
2019	6.91%	7.16%	6.21%	6.67%	5.23%	8.49%	6.28%	5.92%
2020	6.94%	7.15%	6.15%	6.47%	6.24%	7.33%	5.97%	5.74%

The Importance of Diversification

Pension funds have a long-term investment strategy designed to achieve the assumed rate of return over time with minimal downside risk.

Diversification is important because the performance of a given asset class can vary tremendously from year to year.

Annual Asset Class Performance — **As of September 30, 2020**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	YTD
Best	35.03	39.38	8.44	78.51	27.94	22.49	20.00	38.82	30.14	15.02	21.31	37.28	8.35	31.49	14.20
	32.18	16.23	5.24	58.21	26.85	15.99	18.23	32.39	19.31	9.59	17.13	33.01	1.87	26.00	9.22
	26.34	15.97	2.06	46.78	22.04	13.56	18.06	29.30	13.69	3.20	11.96	25.03	0.01	25.53	6.79
	19.31	11.63	-2.35	31.78	18.88	8.29	17.32	22.78	12.50	1.38	11.77	21.83	-1.26	24.96	5.57
	18.37	11.17	-10.01	28.01	16.83	7.84	16.35	13.94	5.97	0.55	11.19	14.65	-2.08	22.01	3.32
	16.32	10.25	-21.37	27.17	16.36	4.98	16.00	8.96	4.89	0.05	9.29	14.02	-3.38	19.59	2.56
	15.79	6.97	-26.16	26.89	15.12	2.11	15.81	8.19	4.06	-0.27	8.77	10.71	-4.02	18.44	0.64
	14.37	6.60	-29.87	26.46	15.06	1.81	12.66	7.44	3.64	-0.81	8.52	7.77	-4.38	17.08	0.62
	11.86	5.94	-33.79	18.91	14.41	0.10	10.94	2.47	3.37	-1.44	6.67	7.62	-4.62	14.32	-0.11
	10.39	5.49	-35.65	11.47	10.16	-4.18	8.78	0.07	2.45	-2.29	4.68	7.50	-4.68	8.72	-1.16
	4.85	5.00	-37.00	11.41	7.75	-5.72	6.98	-2.02	0.04	-3.30	2.65	5.23	-11.01	8.43	-4.20
	4.34	1.87	-37.74	5.93	6.54	-12.14	4.79	-2.60	-2.19	-4.41	2.18	3.54	-11.25	8.39	-7.09
	2.72	1.45	-43.38	1.92	6.31	-13.32	4.21	-8.61	-4.90	-4.47	1.00	3.01	-13.79	7.69	-8.69
	2.07	-1.57	-47.01	0.21	5.70	-15.94	0.11	-8.83	-4.95	-14.92	0.51	1.70	-14.58	5.34	-12.08
Worst	0.49	-15.70	-53.33	-29.76	0.13	-18.42	-1.06	-9.52	-17.01	-24.66	0.33	0.86	-17.89	2.28	-17.54
	VSERS	S&P 500 - US Large Cap	R 2000 - US Small Cap	MSCI EAFE (Net) - Int'l Dev.	MSCI EAFE SC (Net) - Int'l SC	MSCI EM (Net) - Int'l Emg Mkts	Bloombrg US Agg Bond - FI	Bloombrg US Corp Hi Yield - FI	Bloombrg US Trsy US TIPS - FI	Bloombrg US Gov Credit Lng - FI	NCREIF ODCE (Gross) - Real Estate	FTSE NAREIT Eq REITs Index (TR)	HFRI FOF Comp Index - ARS	Bloombrg Cmdty (TR) - Commod.	ICE BofAML 3 Mo T-Bill - Cash Equiv

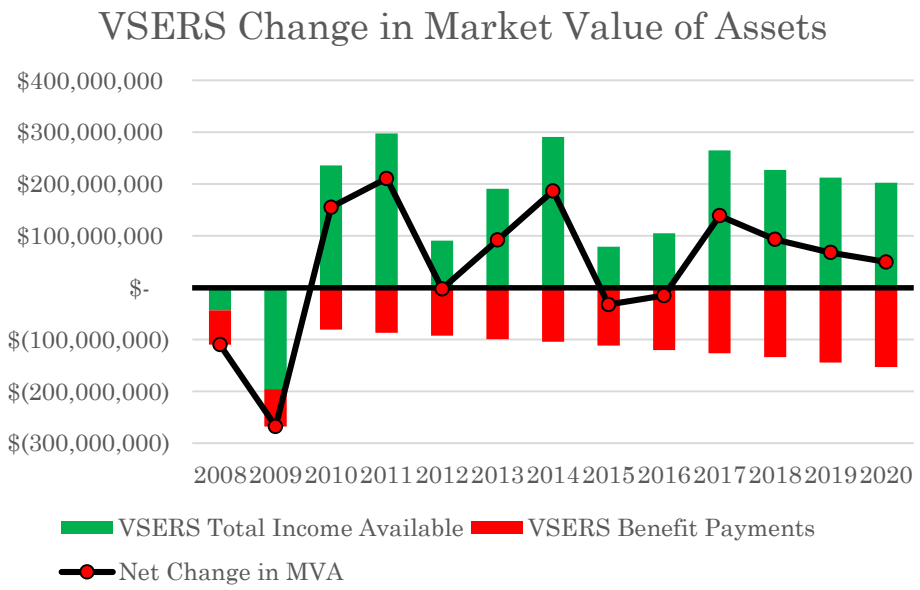
Chart from VSERS Quarterly Investment Performance Analysis, September 30, 2020.

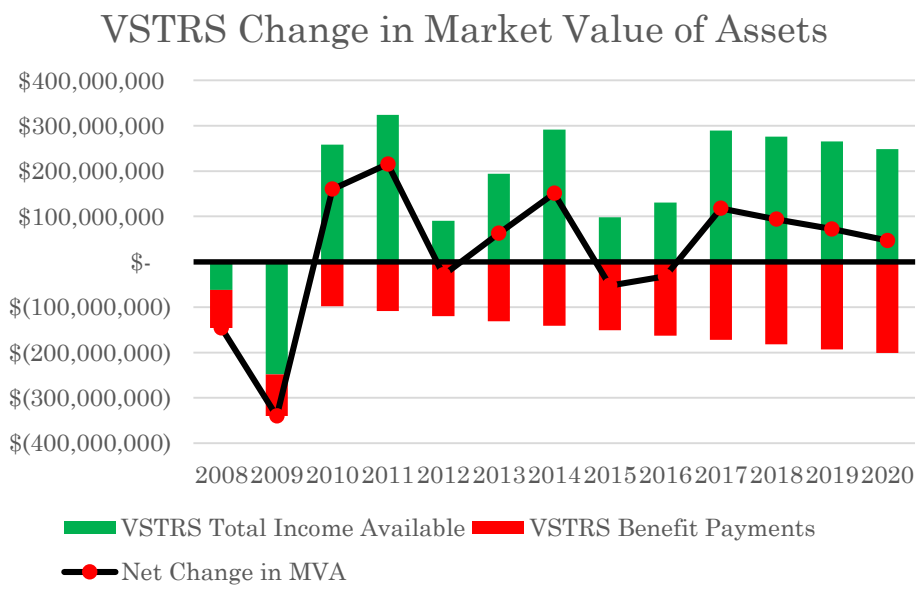
Change in MVA

Total available income (net of fees and expenses) from employee and employer contributions and investment returns has been positive every fiscal year since 2009.

The amount paid out in benefits, however, has steadily increased over that time. Higher benefit payments, plus lower than assumed investment gains, combine to create head winds that slow the net growth in market value of assets.

Over time, the MVA must grow at a rate higher than that of pension liabilities for the funding ratio of the plans to improve.





What caused the recent increases?

Changes FY21 – FY22

- Every year, the pension systems contract with their actuary to perform a **valuation study** to calculate the actuarial liability, actuarial value of assets, the gap between these (the Unfunded Actuarial Accrued Liability), the normal cost, and the actuarially determined contribution (ADEC). The valuation study applies assumptions to the future experience of the pension systems with adjustments for the most recent active/retiree census and investment performance.

- At least every 5 years, an **experience study** is also performed to review and reset plan assumptions. Data from the last 5 years is examined and forward-looking changes may be recommended to the prior plan assumptions.

- In September 2020, plan trustees and VPIC voted to lower the assumed rate of return from 7.5% to 7.0%. Trustees also adopted revised economic and demographic assumptions based on the valuation and experience studies. **These changes resulted in significant increases in the UAAL, normal cost, and ADEC for both plans.**

Scope of Changes for Each Fund		
	VSERS	**VSTRS**
UAAL 2019 Valuation for FY21 Budget	$815.5 million	$1,554.0 million
UAAL 2020 Valuation for FY22 Budget	$1,040.5 million	$1,933.0 million
Change in UAAL	**$225.0 million (+27.6%)**	**$379.0 million (+24.4%)**
ADEC FY21	$83.9 million	$135.6 million
ADEC FY22	$119.9 million	$196.2 million
Change to ADEC	**$36.0 million (+42.9%)**	**$60.6 million (+44.7%)**

Changes FY21-FY22 (VSERS)

- For the VSERS system, the results of the experience study were used in the 2020 valuation which was then used to recommend the FY22 contribution rates.
- The combined impacts of these two studies resulted in a projected $225.0 million increase in the unfunded liability and $36.0 million increase in the ADEC for FY22 compared to FY21.
- **Changes to demographic assumptions** are responsible for increasing overall accrued liability by $66.1 million (29.3% of the $225.0M increase), which increased the ADEC by $11.9 million (33.1% of the $36.0M increase).
- **The lower assumed rate of return and other economic changes** are responsible for $150.7 million (67.0% of the $225.0M increase) of the liability increase and $17.8 million (59.9% of the $36.0M total) of the ADEC increase.
- Other changes (+$8.2M UAAL, +$6.3M ADEC) are due to applying 2019 Experience Study to 2020 Valuation Study to reflect most recent investment and demographic data.

	2019 Valuation (informs FY21 Budget)	Estimated Results from Experience Study	2020 Valuation (informs FY22 budget)
Unfunded Liability	**$815.5 million**	**$1,032.3 million**	**$1,040.5 million**
Cumulative Change		*+ $216.8 million*	*+ $225.0 million*
ADEC	**$83.9 million**	**$113.6 million**	**$119.9 million**
Cumulative Change		*+$29.7 million*	*$36.0 million*

Changes FY07-FY20 (VSERS)

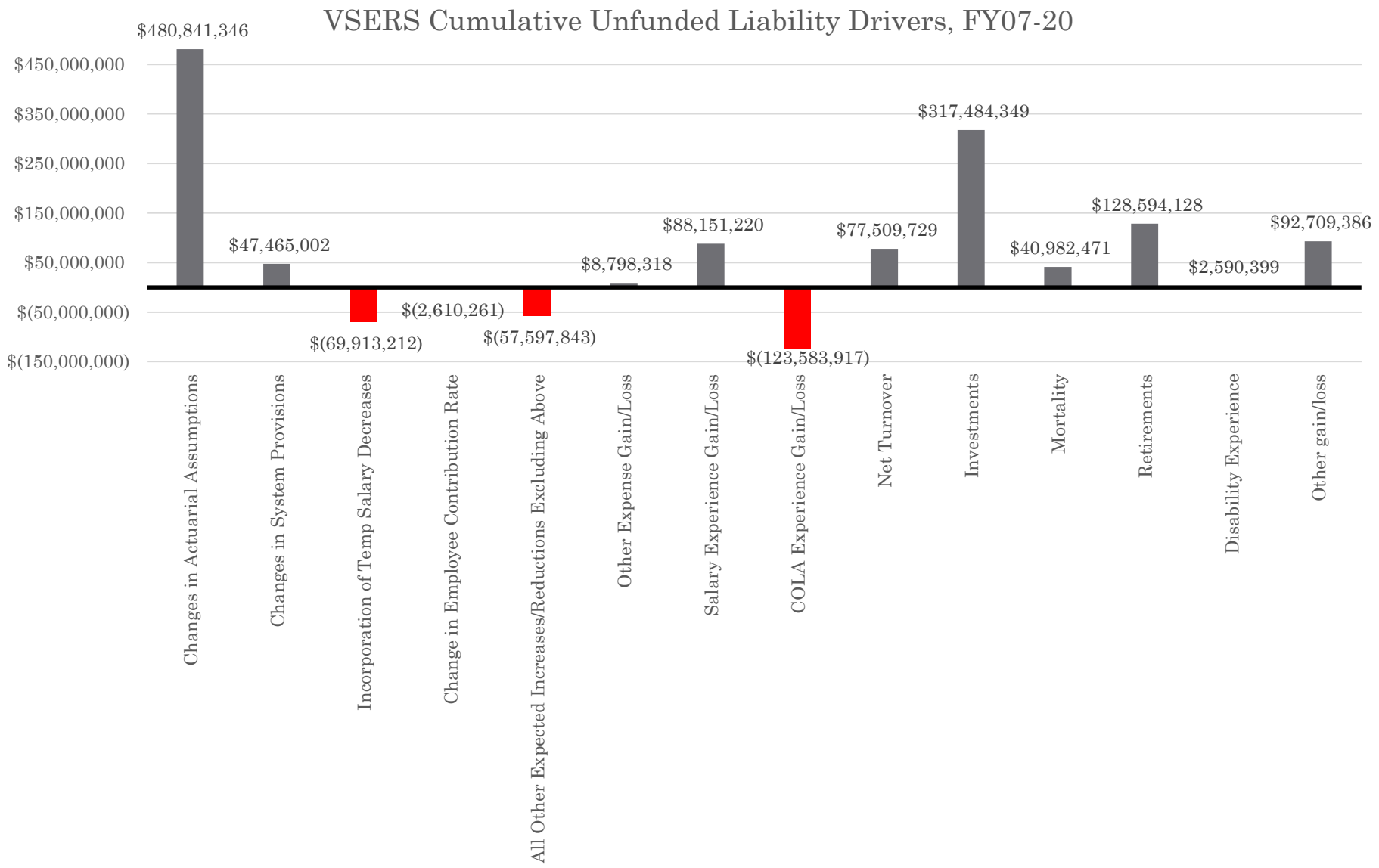
Changes in actuarial assumptions (including the assumed rate of return) are responsible for increasing the UAAL by $480.8 million since FY07.

Investment performance falling below assumptions is responsible for increasing the UAAL by $317.5 million since FY07.

Changes between demographic experience and assumptions based on salary, COLA, net turnover, mortality, retirements, disability, and other member experience are collectively responsible for increasing the UAAL by $307.0 million since FY07.

	Cumulative Impact on VSERS UAAL FY07-20	% of Cumulative UAAL Change
UAAL At Start of FY2007	**$9,044,004**	
Changes in actuarial assumptions/assumed rate of return	$480,841,346	46.6%
Changes in system provisions	$47,465,002	4.6%
Incorporation of temporary salary decreases	-$69,913,212	-6.8%
Changes in employee contribution rate	-$2,610,261	-0.3%
All other expected increases/reductions not listed above	-$57,597,843	-5.6%
Other experience (gain)/loss	$8,798,318	0.9%
Salary experience (gain)/loss	$88,151,220	8.5%
COLA experience (gain)/loss	-$123,583,917	-12.0%
Net turnover	$77,509,729	7.5%
Investments	$317,484,349	30.8%
Mortality	$40,982,471	4.0%
Retirements	$128,594,128	12.5%
Disability Experience	$2,590,399	0.3%
Other (gain)/loss	$92,709,386	9.0%
UAAL At End of FY2020	**$1,040,465,119**	

Unfunded Liability Drivers (VSERS)



Changes FY21-FY22 (VSTRS)

- For the VSTRS system, the results of the experience study were used in the 2020 valuation which was then used to recommend the FY22 contribution rates.
- The combined impacts of these two studies resulted in a projected $379.0 million increase in the unfunded liability and $60.6 million increase in the ADEC for FY22 compared to FY21.
- **Changes to demographic assumptions** are responsible for increasing overall accrued liability by $136.3 million (40.0% of the $379.0M increase), which increased the ADEC by $32.5 million (53.6% of the $60.6M increase).
- **The lower assumed rate of return and other economic changes** are responsible for $189.9 million (50.1% of the $379.0M increase) of the liability increase and $18.3 million (30.2% of the $60.6M total) of the ADEC increase.
- Other changes (+$52.8M UAAL, +$9.8M ADEC) are due to applying 2019 Experience Study to 2020 Valuation Study to reflect most recent investment and demographic data.

	2019 Valuation (informs FY21 Budget)	Estimated Results from Experience Study	2020 Valuation (informs FY22 budget)
Unfunded Liability	**$1,554.0 million**	**$1,880.0 million**	**$1,933.0 million**
Cumulative Change		*+ $326.2 million*	*+ $379.0 million*
ADEC	**$135.6 million**	**$186.4 million**	**$196.2 million**
Cumulative Change		*+$50.8 million*	*$60.6 million*

Changes FY07-FY20 (VSTRS)

Changes in actuarial assumptions (including the assumed rate of return) are responsible for increasing the UAAL by $828.5 million since FY07.

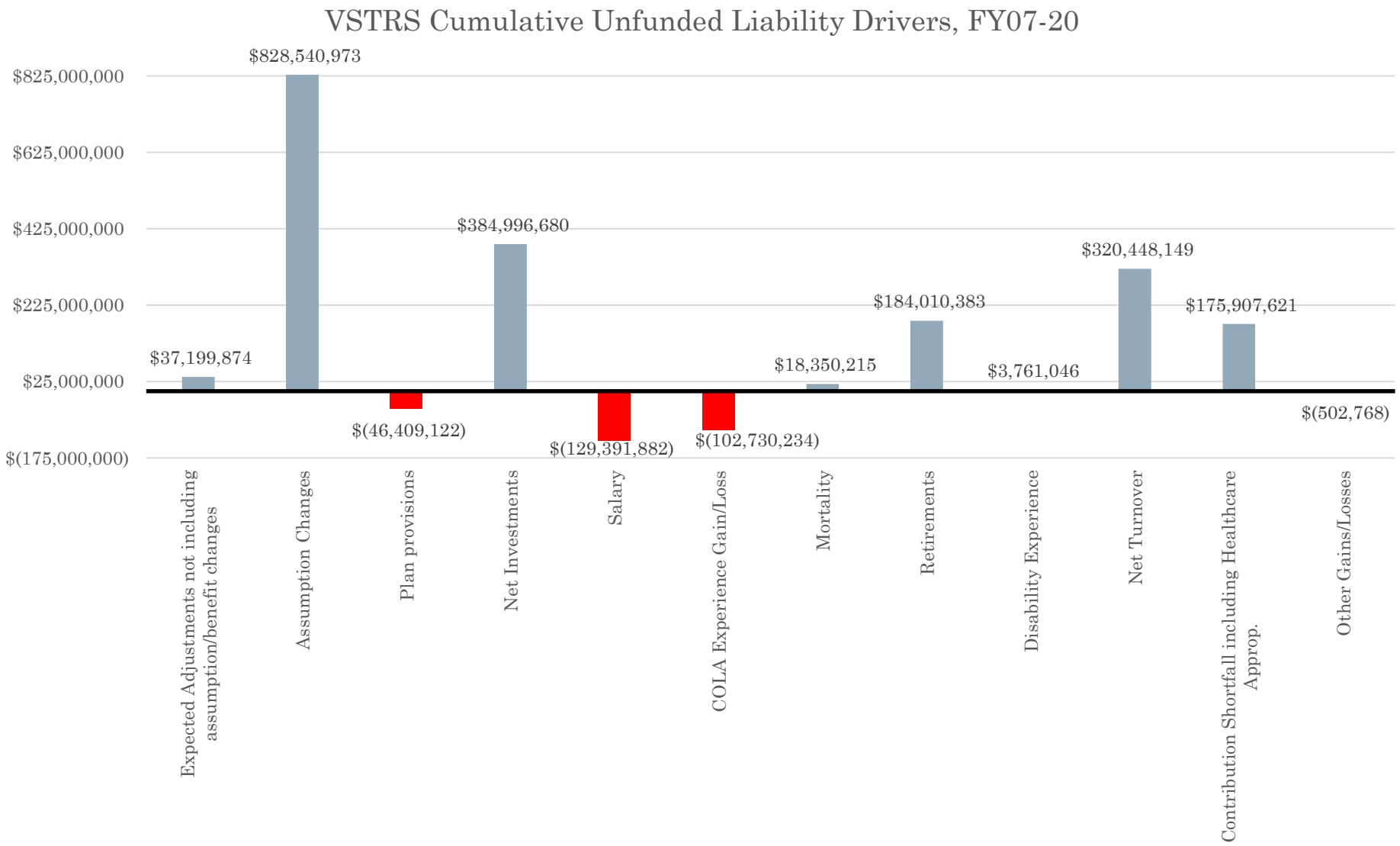
Investment performance falling below assumptions is responsible for increasing the UAAL by $385.0 million since FY07.

Historic and since-discontinued practices of charging OPEB costs to the pension fund are responsible for $176 million of the UAAL growth since FY07.

Changes between demographic experience and assumptions based on salary, COLA, net turnover, mortality, retirements, disability, and other member experience are collectively responsible for increasing the UAAL by $293.9 million since FY07.

	Cumulative Impact on VSTRS UAAL FY07-20	% of Cumulative UAAL Change
UAAL At Start of FY2007	**$259,108,435**	
Changes in actuarial assumptions/assumed rate of return	$828,540,973	49.5%
Expected adjustments excluding assumption/benefit changes	$37,199,874	2.2%
Changes to plan provisions	-$46,409,122	-2.8%
Investments	$384,996,680	23.0%
Salary experience (gain)/loss	-$129,391,882	-7.7%
COLA experience (gain)/loss	-$102,730,234	-6.1%
Mortality	$18,350,215	1.1%
Retirements	$184,010,383	11.0%
Disability Experience	$3,761,046	0.2%
Net Turnover	$320,448,149	19.1%
Contribution shortfall including healthcare costs	$175,907,621	10.5%
Other (gain)/loss	-$502,768	-0.0%
UAAL At End of FY2020	**$1,933,289,370**	

Unfunded Liability Drivers (VSTRS)



In Summary…

- Since the Great Recession, retirement liabilities have grown much faster than pension plan assets:
    - The number of retirees has grown substantially in the last decade while the size of the active workforce has not.
    - The size of the average retirement benefit has also grown, though remains relatively modest.
    - The demographic and economic experience of the workforce, such as retirement and turnover rates, COLAs, salary growth, and mortality rates, have led to higher costs than originally assumed. Assumptions have been revised based on this experience, and those assumptions have led to higher pension costs.
- Because of these factors, the amount paid out in benefits every year has grown and exceeds the amount paid in from employee and employer contributions, requiring investment gains to make up the difference. These factors make it more difficult to dig out of the "hole" from the Great Recession, make progress toward paying down the unfunded liability, and increase the risk to the employer and active members when investment returns fail to meet assumptions or assumptions change based on demographic or economic factors.
- Historic underfunding of the pensions had a significant impact on the growth of the unfunded liability– particularly for VSTRS. By not investing enough assets to grow over time, assets cannot keep up with projected growth in costs/liabilities and the funding ratio will decrease (leading to higher future payments into the pension fund). This impact was exacerbated by paying for retiree healthcare costs from the VSTRS system before FY2015 from assets that could have earned interest instead.
- In addition to demographics, overly optimistic investment assumptions and underperformance relative to those assumptions were also significant contributors to the growth in unfunded liabilities since the Great Recession.
- Most defined benefit pension systems nationwide have lowered their assumed rates of return in recent years to more realistically match anticipated investment performance. This *may* lead to less substantial deviations between investment experience and assumptions in the future (and less risk of suddenly higher costs from year to year), but it also increases the unfunded liability and ADEC payment and lowers the funding ratio for the plans.

Up Next…

Part 1: Pension Overview (February 12, 2021) (video)

Part 3: Possible Options and Strategies from Other States

Questions?

crupe@leg.state.vt.us

Thank you!

Vermont Legislative
JOINT FISCAL OFFICE

VSERS GROUP COMPARISONS

VSERS GROUP COMPARISONS	GROUP A	GROUP C	GROUP D	GROUP F *Hired before 7/1/08*	GROUP F *Hired on or after 7/1/08*
Employee Contributions	6.65% of gross salary	8.53% of gross salary	6.65% of gross salary	6.65% of gross salary	Same
Employer Contributions	21.4% of gross salary (includes pension & post employment benefits)	21.4% of gross salary (includes pension & post employment benefits)	21.4% of gross salary (includes pension & post employment benefits)	21.4% of gross salary (includes pension & post employment benefits)	Same
Average Final Compensation (AFC)	Highest 3 consecutive years, including unused annual leave payoff	Highest 2 consecutive years, including unused annual leave payoff	Final salary at retirement	Highest 3 consecutive years, excluding unused annual leave payoff	Same
Benefit Formula	1.67% x creditable service	2.5% x creditable service	3.33% x creditable service (after 12 years in Group D)	1.25% x service prior to 12/31/90 + 1.67% x service after 1/1/91	Same
Maximum Benefit Payable	100% of AFC	50% of AFC	100% of Final Salary	50% of AFC	60% of AFC
Normal Retirement (no reduction)	Age 65 or 62 with 20 years of service	Age 55 (mandatory)	Age 62	Age 62 or with 30 years of service	Age 65 or a combination of age & service credit that equals 87
Post-Retirement COLA	Full CPI, from a minimum of 1% up to a maximum of 5%, after 12 months of retirement	Full CPI, from a minimum of 1% up to a maximum of 5%, after 12 months of retirement	Full CPI, from a minimum of 1% up to a maximum of 5%, after 12 months of retirement	50% CPI until 1/1/2014; 100% of CPI thereafter, from a minimum of 1% up to a maximum of 5%, after reaching age 62, or (if retired after June 30, 1997) 30 years service	50% CPI until 1/1/2014; 100% of CPI thereafter, from a minimum of 1% up to a maximum of 5%, after reaching age 65 or age and service to equal 87
Early Retirement Eligibility	Age 55 with 5 years of service or 30 years of service (any age)	Age 50 with 20 years of service	Age 55 with 5 years of service	Age 55 with 5 years of service	Same
Early Retirement Reduction	Actuarially reduced benefit if under 30 years of service	No reduction	3% per year from age 62	6% per year from age 62	Ser. Years / Monthly Red. 35+ / 1/8th of 1% 30-34 / 1/4th of 1% 25-29 / 1/3rd of 1% 20-24 / 5/12th of 1% < 20 / 5/9th of 1%
Post-Retirement Survivorship Options	100% and 50% (with or without pop-ups), all actuarially reduced based on age of beneficiary	70% spousal survivorship with no reduction in retiree's benefit	100% and 50% (with or without pop-ups), all actuarially reduced based on age of beneficiary	100% and 50% (with or without pop-ups), all actuarially reduced based on age of beneficiary	Same

VSTRS GROUP COMPARISONS

VSTRS GROUP COMPARISONS	GROUP A	GROUP C – Group #1*	GROUP C – Group #2**
Employee Contributions	5.5% of gross salary	5.0% of gross salary	5.0% of gross salary***
Employer Contributions	varies based on actuarial recommendation	varies based on actuarial recommendation	varies based on actuarial recommendation
Benefit Formula	1.67% x creditable service	1.25% x service prior to 6/30/90 + 1.67% x service after 7/1/90	1.25% x service prior to 6/30/90 1.67% x service after 7/1/90 2.0% after attaining 20.0 years
Maximum Benefit Payable	100% of AFC	53.34% of AFC	60% of AFC
Average Final Compensation (AFC)	Highest 3 consecutive years, including unused annual leave, sick leave, and bonus/incentives	Highest 3 consecutive years, excluding all payments for anything other than service actually performed	Highest 3 consecutive years, excluding all payments for anything other than service actually performed
Normal Retirement (no reduction)	Age 60 or with 30 years of service	Age 62 or with 30 years of service	Age 65 or when the sum of age and service credit equals 90
Post-Retirement COLA	Full CPI, up to a maximum of 5% after 12 months of retirement; minimum of 1%	50% CPI, up to a maximum of 5% after 12 months of retirement or with 30 years; minimum of 1%	50% CPI, up to a maximum of 5%
Early Retirement Eligibility	Age 55 with 5 years of service	Age 55 with 5 years of service	Age 55 with 5 years of service
Early Retirement Reduction	Actuarial reduction	6% per year from age 62	Actuarial reduction
Post-Retirement Survivorship Options	100%, 75%, and 50% (with or without pop-ups), all actuarially reduced based on age of beneficiary	100%, 75%, and 50% (with or without pop-ups), all actuarially reduced based on age of beneficiary	100%, 75%, and 50% (with or without pop-ups), all actuarially reduced based on age of beneficiary
Benefit Eligibility - Other (Vested Rights, Disability, Death-in-Service)	5 years of service (vested and disability) 10 years of service, or age 55 with 5 years (death-in-service)	5 years of service (vested and disability) 10 years of service, or age 55 with 5 years (death-in-service)	5 years of service (vested and disability) 10 years of service, or age 55 with 5 years (death-in-service)
Disability Benefit	Unreduced, accrued benefit with minimum of 25% of AFC	Unreduced, accrued benefit with minimum of 25% of AFC	Unreduced, accrued benefit with minimum of 25% AFC
Death-in-Service Benefit	Disability benefit or early retirement benefit, whichever is greater, with 100% survivorship factor applied, plus children's benefit up to maximum of 3 concurrently	Disability benefit or early retirement benefit, whichever is greater, with 100% survivorship factor applied, plus children's benefit up to maximum of 3 concurrently	Disability benefit or early retirement benefit, whichever is greater, with 100% survivorship factor applied, plus children's benefit up to maximum of 3 concurrently
Medical Benefits	Health subsidy based on member's service credit	Health subsidy based on member's service credit	Health subsidy based on member's service credit
Dental	Member pays the full premium	Member pays the full premium	Member pays the full premium

Group A members cease contributions upon attainment of 25 years of service.
Group #1 are members who were at least 57 years of age or had at least 25 years of service on June 30, 2010.
**Group #2 are members who were less than age 57 and had less than 25 years of service credit on June 30, 2010.
*** Group #2 members who had less than 5 years of service credit as of June 30, 2014 will contribute 6% of gross salary.

Glossary of Key Terms

- **Actuarial Accrued Liability (AAL):** The present value of the cost of future pension benefits based on the service credits that have been accrued by the workforce as of the valuation date.
- **Actuarial Value of Assets (AVA):** The value of the pension plan's assets when smoothed over time to reduce the effects of short-term volatility in the market value
- **ADEC: Actuarially Determined Employer Contribution.** Formerly called the ARC, the ADEC represents the total amount the employer must pay into the pension system in a given year to pay for the employer share of the normal cost plus a payment toward amortizing the unfunded liability according to schedule.
- **Amortization Period:** The amount of time by which unfunded liabilities are expected to be paid off and the pension system is expected to be fully funded**.**
- **Assumed Rate of Return:** The rate by which invested plan assets are assumed to grow from investment returns over time.
- **Funding Ratio:** The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL).
- **Market Value of Assets (MVA):** The value of the pension plan's investments at a given point in time.
- **Normal Cost:** The cost of projected pension benefits allocated to the current plan year.
- **Unfunded Actuarial Accrued Liability (UAAL):** The shortfall between the Actuarial Value of Assets and the Actuarial Accrued Liability. The UAAL represents the present value of retirement benefits earned to date that are not covered by the current plan assets.

Funding History, 1997 - 2020

VSERS ($000)						
Year Ending June 30	Actuarial Value of Assets	Actuarial Accrued Liability	UAAL	Funded Ratio	Covered Payroll	UAAL as Pct of Covered Payroll
1997	$ 639,128	$ 753,883	$ 114,755	84.8%	$ 227,000	50.6%
1998	$ 733,716	$ 804,501	$ 70,785	91.2%	$ 235,956	30.0%
1999	$ 804,970	$ 876,412	$ 71,442	91.8%	$ 238,281	30.0%
2000	$ 895,151	$ 967,064	$ 71,913	92.6%	$ 266,519	27.0%
2001	$ 954,821	$ 1,026,993	$ 72,172	93.0%	$ 278,507	25.9%
2002	$ 990,450	$ 1,017,129	$ 26,679	97.4%	$ 300,994	8.9%
2003	$ 1,025,469	$ 1,052,004	$ 26,535	97.5%	$ 319,855	8.3%
2004	$ 1,081,359	$ 1,107,634	$ 26,275	97.6%	$ 336,615	7.8%
2005	$ 1,148,908	$ 1,174,796	$ 25,888	97.8%	$ 349,258	7.4%
2006	$ 1,223,323	$ 1,232,367	$ 9,044	99.3%	$ 369,310	2.4%
2007	$ 1,318,687	$ 1,307,643	$ (11,044)	100.8%	$ 386,917	-2.9%
2008	$ 1,377,101	$ 1,464,202	$ 87,101	94.1%	$ 404,593	21.5%
2009	$ 1,217,638	$ 1,544,144	$ 326,506	78.9%	$ 404,516	80.7%
2010	$ 1,265,404	$ 1,559,324	$ 293,920	81.2%	$ 393,829	74.6%
2011	$ 1,348,763	$ 1,695,301	$ 346,538	79.6%	$ 398,264	87.0%
2012	$ 1,400,779	$ 1,802,604	$ 401,825	77.7%	$ 385,526	104.2%
2013	$ 1,469,170	$ 1,914,300	$ 445,130	76.7%	$ 416,766	106.8%
2014	$ 1,566,076	$ 2,010,090	$ 444,014	77.9%	$ 437,676	101.4%
2015	$ 1,636,268	$ 2,178,827	$ 542,559	75.1%	$ 462,057	117.4%
2016	$ 1,707,268	$ 2,289,452	$ 582,184	74.6%	$ 471,268	123.5%
2017	$ 1,793,795	$ 2,511,373	$ 717,578	71.4%	$ 504,553	142.2%
2018	$ 1,881,805	$ 2,661,609	$ 779,804	70.7%	$ 521,671	149.5%
2019	$ 1,964,501	$ 2,779,966	$ 815,465	70.7%	$ 527,571	154.6%
2020	$ 2,054,826	$ 3,095,291	$ 1,040,465	66.4%	$ 551,981	188.5%

VSTRS ($000)						
Year Ending June 30	Actuarial Value of Assets	Actuarial Accrued Liability	UAAL	Funded Ratio	Covered Payroll	UAAL as Pct of Covered Payroll
1997	$ 717,396	$ 849,179	$ 131,783	84.5%	$ 364,695	36.1%
1998	$ 821,977	$ 955,694	$ 133,717	86.0%	$ 357,899	37.4%
1999	$ 931,056	$ 1,065,754	$ 134,698	87.4%	$ 372,299	36.2%
2000	$1,037,466	$ 1,174,087	$ 136,621	88.4%	$ 387,999	35.2%
2001	$1,116,846	$ 1,254,341	$ 137,495	89.0%	$ 403,258	34.1%
2002	$1,169,294	$ 1,307,202	$ 137,908	89.5%	$ 418,904	32.9%
2003	$1,218,001	$ 1,358,822	$ 140,821	89.6%	$ 437,239	32.2%
2004	$1,284,833	$ 1,424,661	$ 139,828	90.2%	$ 453,517	30.8%
2005	$1,354,006	$ 1,492,150	$ 138,144	90.7%	$ 468,858	29.5%
2006	$1,427,393	$ 1,686,502	$ 259,109	84.6%	$ 499,044	51.9%
2007	$1,541,860	$ 1,816,650	$ 274,790	84.9%	$ 515,573	53.3%
2008	$1,605,462	$ 1,984,967	$ 379,505	80.9%	$ 535,807	70.8%
2009	$1,374,079	$ 2,101,838	$ 727,759	65.4%	$ 561,588	129.6%
2010	$1,410,368	$ 2,122,191	$ 711,823	66.5%	$ 562,150	126.6%
2011	$1,486,698	$ 2,331,806	$ 845,108	63.8%	$ 547,748	154.3%
2012	$1,517,410	$ 2,462,913	$ 945,503	61.6%	$ 561,179	168.5%
2013	$1,552,924	$ 2,566,834	$ 1,013,910	60.5%	$ 563,623	179.9%
2014	$1,610,286	$ 2,687,049	$ 1,076,763	59.9%	$ 567,074	189.9%
2015	$1,662,346	$ 2,837,375	$ 1,175,029	58.6%	$ 557,708	210.7%
2016	$1,716,296	$ 2,942,024	$ 1,225,728	58.3%	$ 586,397	209.0%
2017	$1,779,592	$ 3,282,045	$ 1,502,453	54.2%	$ 607,355	247.4%
2018	$1,866,121	$ 3,379,554	$ 1,513,433	55.2%	$ 612,899	246.9%
2019	$1,950,860	$ 3,505,319	$ 1,554,459	55.7%	$ 624,908	248.8%
2020	$2,035,714	$ 3,969,003	$ 1,933,289	51.3%	$ 645,903	299.3%

ADEC Funding History

VSERS						
FY Ended June 30	ADEC	ADEC Increase Over Prior FY	Actual Contribution	Pct of ADEC	$ Above/Below ADEC	Funding Ratio
2004	$ 29,023,431		$ 26,645,619	91.8%	$ (2,377,812)	97.6%
2005	$ 36,019,056	$ 6,995,625	$ 36,493,435	101.3%	$ 474,379	97.8%
2006	$ 38,214,704	$ 2,195,648	$ 36,866,451	96.5%	$ (1,348,253)	99.3%
2007	$ 40,189,812	$ 1,975,108	$ 39,297,002	97.8%	$ (892,810)	100.8%
2008	$ 42,375,068	$ 2,185,256	$ 39,179,823	92.5%	$ (3,195,245)	94.1%
2009	$ 25,333,307	$(17,041,761)	$ 25,134,235	99.2%	$ (199,072)	78.9%
2010	$ 32,013,894	$ 6,680,587	$ 31,468,884	98.3%	$ (545,010)	81.2%
2011	$ 41,581,656	$ 9,567,762	$ 37,572,599	90.4%	$ (4,009,057)	79.6%
2012	$ 36,587,864	$ (4,993,792)	$ 40,302,433	110.2%	$ 3,714,569	77.7%
2013	$ 37,081,933	$ 494,069	$ 51,370,307	138.5%	$ 14,288,374	76.7%
2014	$ 40,217,666	$ 3,135,733	$ 56,482,985	140.4%	$ 16,265,319	77.9%
2015	$ 44,651,783	$ 4,434,117	$ 55,881,364	125.1%	$ 11,229,581	75.1%
2016	$ 46,237,853	$ 1,586,070	$ 54,347,060	117.5%	$ 8,109,207	74.6%
2017	$ 48,503,358	$ 2,265,505	$ 60,280,480	124.3%	$ 11,777,122	71.4%
2018	$ 52,065,397	$ 3,562,039	$ 64,564,323	124.0%	$ 12,498,926	70.7%
2019	$ 62,984,742	$ 10,919,345	$ 66,617,894	105.8%	$ 3,633,152	70.7%
2020	$ 78,943,914	$ 15,959,172	$ 84,429,972	106.9%	$ 5,486,058	66.4%
2021	$ 83,876,570	$ 4,932,656				
2022*	$ 119,967,769	$ 36,091,199				
2023*	$ 123,742,634	$ 3,774,865				

VSTRS					
FY Ended June 30	ADEC	ADEC Increase Over Prior FY	Actual Contribution	Pct of ADEC	$ Above/Below ADEC
1979	$ 7,806,825		$ 4,825,155	61.8%	$ (2,981,670)
1980	$ 8,944,090	$ 1,137,265	$ 8,471,960	94.7%	$ (472,130)
1981	$ 9,862,861	$ 918,771	$ 8,830,900	89.5%	$ (1,031,961)
1982	$ 10,200,209	$ 337,348	$ 7,822,760	76.7%	$ (2,377,449)
1983	$ 10,721,814	$ 521,605	$ 10,929,355	101.9%	$ 207,541
1984	$ 12,341,069	$ 1,619,255	$ 11,592,100	93.9%	$ (748,969)
1985	$ 13,475,181	$ 1,134,112	$ 12,567,866	93.3%	$ (907,315)
1986	$ 14,668,095	$ 1,192,914	$ 14,461,148	98.6%	$ (206,947)
1987	$ 15,925,452	$ 1,257,357	$ 16,239,416	102.0%	$ 313,964
1988	$ 16,294,346	$ 368,894	$ 17,186,259	105.5%	$ 891,913
1989	$ 18,072,172	$ 1,777,826	$ 19,000,000	105.1%	$ 927,828
1990	$ 21,320,155	$ 3,247,983	$ 19,561,000	91.7%	$ (1,759,155)
1991	$ 25,013,437	$ 3,693,282	$ 15,000,000	60.0%	$ (10,013,437)
1992	$ 28,595,220	$ 3,581,783	$ 14,618,992	51.1%	$ (13,976,228)
1993	$ 28,819,875	$ 224,655	$ 19,890,048	69.0%	$ (8,929,827)
1994	$ 25,805,408	$ (3,014,467)	$ 20,580,000	79.8%	$ (5,225,408)
1995	$ 27,451,926	$ 1,646,518	$ 18,080,000	65.9%	$ (9,371,926)
1996	$ 29,884,559	$ 2,432,633	$ 11,480,000	38.4%	$ (18,404,559)
1997	$ 30,954,237	$ 1,069,678	$ 18,080,000	58.4%	$ (12,874,237)
1998	$ 33,519,949	$ 2,565,712	$ 18,106,581	54.0%	$ (15,413,368)
1999	$ 27,232,542	$ (6,287,407)	$ 18,080,000	66.4%	$ (9,152,542)
2000	$ 23,573,184	$ (3,659,358)	$ 18,586,240	78.8%	$ (4,986,944)
2001	$ 20,882,521	$ (2,690,663)	$ 19,143,827	91.7%	$ (1,738,694)
2002	$ 21,965,322	$ 1,082,801	$ 20,446,282	93.1%	$ (1,519,040)
2003	$ 23,197,088	$ 1,231,766	$ 20,446,282	88.1%	$ (2,750,806)
2004	$ 29,608,892	$ 6,411,804	$ 24,446,282	82.6%	$ (5,162,610)
2005	$ 43,592,332	$ 13,983,440	$ 24,446,282	56.1%	$ (19,146,050)
2006	$ 49,923,599	$ 6,331,267	$ 24,985,506	50.0%	$ (24,938,093)
2007	$ 38,200,000	$ (11,723,599)	$ 38,496,410	100.8%	$ 296,410
2008	$ 40,749,097	$ 2,549,097	$ 40,955,566	100.5%	$ 206,469
2009	$ 37,077,050	$ (3,672,047)	$ 37,349,818	100.7%	$ 272,768
2010	$ 41,503,002	$ 4,425,952	$ 41,920,603	101.0%	$ 417,601
2011	$ 48,233,006	$ 6,730,004	$ 50,268,131	104.2%	$ 2,035,125
2012	$ 51,241,932	$ 3,008,926	$ 56,152,011	109.6%	$ 4,910,079
2013	$ 60,182,755	$ 8,940,823	$ 65,086,320	108.1%	$ 4,903,565
2014	$ 68,352,825	$ 8,170,070	$ 72,668,412	106.3%	$ 4,315,587
2015	$ 72,857,863	$ 4,505,038	$ 72,908,805	100.1%	$ 50,942
2016	$ 76,102,909	$ 3,245,046	$ 76,947,869	101.1%	$ 844,960
2017	$ 82,659,576	$ 6,556,667	$ 82,887,174	100.3%	$ 227,598
2018	$ 88,409,437	$ 5,749,861	$ 114,598,921	129.6%	$ 26,189,484
2019	$ 105,640,777	$ 17,231,340	$ 119,174,913	112.8%	$ 13,534,136
2020	$ 126,197,389	$ 20,556,612	$ 126,941,582	100.6%	$ 744,193

Investment Performance

VSERS				
FY Ending	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2001	$ 89,249,154	10.14%	$ (66,366,171)	-6.36%
2002	$ 57,320,146	6.07%	$ (49,030,960)	-5.15%
2003	$ 55,169,045	5.63%	$ 45,639,510	5.17%
2004	$ 75,261,848	7.41%	$ 142,588,476	15.70%
2005	$ 84,075,397	7.83%	$ 95,845,599	9.28%
2006	$ 94,266,315	8.28%	$ 119,220,681	10.74%
2007	$ 94,266,315	9.93%	$ 197,642,924	16.37%
2008	$ 89,281,830	6.85%	$ (78,966,292)	-5.74%
2009	$ (130,060,430)	-9.55%	$ (238,392,427)	-18.80%
2010	$ 80,550,116	6.71%	$ 187,930,419	18.82%
2011	$ 116,660,083	9.34%	$ 244,063,320	21.16%
2012	$ 83,600,231	6.27%	$ 29,466,721	2.16%
2013	$ 93,222,330	6.71%	$ 116,835,891	8.55%
2014	$ 120,645,037	8.28%	$ 210,491,370	14.43%
2015	$ 100,145,920	6.46%	$ (2,430,832)	-0.15%
2016	$ 108,862,988	6.73%	$ 22,651,623	1.41%
2017	$ 122,942,180	7.28%	$ 175,207,530	11.01%
2018	$ 123,141,054	6.93%	$ 128,188,928	7.41%
2019	$ 125,762,614	6.76%	$ 111,036,177	6.10%
2020	$ 122,202,359	6.27%	$ 81,474,149	4.30%

VSTRS				
FY Ending	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2001	$ 105,052,742	10.25%	$ (26,277,091)	-2.23%
2002	$ 74,521,272	6.71%	$ (50,765,984)	-4.50%
2003	$ 73,318,724	6.34%	$ 57,742,544	5.48%
2004	$ 92,527,288	7.68%	$ 172,235,639	15.86%
2005	$ 102,130,985	8.05%	$ 120,839,819	9.83%
2006	$ 112,662,977	8.44%	$ 136,026,631	10.35%
2007	$ 148,468,597	10.53%	$ 250,776,668	17.74%
2008	$ 105,606,299	6.94%	$ (103,733,250)	-6.38%
2009	$ (177,198,490)	-11.23%	$ (302,070,164)	-20.49%
2010	$ 90,911,582	6.75%	$ 214,806,420	19.22%
2011	$ 129,010,590	9.32%	$ 268,197,459	20.97%
2012	$ 91,041,364	6.25%	$ 31,182,310	2.09%
2013	$ 99,823,830	6.72%	$ 127,041,593	8.70%
2014	$ 125,880,755	8.29%	$ 219,532,643	14.44%
2015	$ 103,064,276	6.50%	$ (1,244,071)	-0.07%
2016	$ 110,878,140	6.79%	$ 24,710,920	1.52%
2017	$ 123,782,547	7.34%	$ 178,144,379	11.20%
2018	$ 122,579,470	7.02%	$ 129,866,264	6.30%
2019	$ 126,427,866	6.87%	$ 113,804,311	6.30%
2020	$ 123,556,188	6.40%	$ 85,703,874	4.55%

Unfunded Liability Drivers (VSERS)

Changes in actuarial assumptions were the largest driver of change in the UAAL (46.6%) since 2007, followed by investment performance not meeting assumptions (30.5%).

Negative numbers represent factors where changes in employee experience or assumptions resulted in lower projected pension benefit costs than previously assumed.

VSERS																	
CATEGORY	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		2007-20	Pct of Total
Beginning FY Unfunded Liability	**$ 9,044,004**	**$ (11,043,959)**	**$ 87,100,468**	**$ 326,506,488**	**$ 293,920,094**	**$ 346,537,738**	**$ 401,824,745**	**$ 445,130,082**	**$ 444,014,328**	**$ 542,558,818**	**$ 582,183,599**	**$ 717,577,722**	**$ 779,804,010**	**$ 815,464,698**		**$ 9,044,004**	
Changes in Actuarial Assumptions	$ (15,744,285)	$ 7,231,106	$ -	$ -	$ 26,425,205	$ 31,587,726	$ 33,541,162	$ 35,135,438	$ 84,606,837	$ 6,099,167	$ 49,130,291	$ -	$ -	$ 222,828,699		$ 480,841,346	46.6%
Changes in System Provisions	$ -	$ 56,389,496	$ (8,946,746)	$ -	$ 22,252	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ 47,465,002	4.6%
Incorporation of Temp Salary Decreases	$ -	$ -	$ -	$ (69,913,212)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ (69,913,212)	-6.8%
Change in Employee Contribution Rate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (2,610,261)	$ -	$ -	$ -	$ -		$ (2,610,261)	-0.3%
All Other Expected Increases/Reductions Excluding Above	$ 2,523,380	$ (1,887,100)	$ 5,158,736	$ 16,450,711	$ 3,408,119	$ (4,722,236)	$ (17,592,939)	$ (18,717,376)	$ (17,086,501)	$ (4,699,308)	$ (8,507,716)	$ (2,213,895)	$ 2,639,467	$ (12,351,185)		$ (57,597,843)	-5.6%
																	0.0%
Other Expense Gain/Loss	$ -	$ 955,848	$ (2,531,248)	$ 891,478	$ 1,487,355	$ 1,369,818	$ 1,416,950	$ 1,193,828	$ 2,169,411	$ 1,844,878	$ -	$ -	$ -	$ -		$ 8,798,318	0.9%
Salary Experience Gain/Loss	$ (7,261,077)	$ (30,350)	$ (79,064)	$ (105,795)	$ 35,867,925	$ 10,916,553	$ 23,416,670	$ 4,183,550	$ (8,216,692)	$ 4,731,224	$ 14,254,036	$ 7,120,663	$ (344,400)	$ 3,697,977		$ 88,151,220	8.5%
COLA Experience Gain/Loss	$ (252,995)	$ (1,184,450)	$ 8,272,076	$ (19,948,790)	$ (7,391,265)	$ 2,278,408	$ (7,319,398)	$ (6,030,176)	$ (11,711,910)	$ (29,591,395)	$ (15,467,145)	$ 726,790	$ (11,993,826)	$ (23,969,841)		$ (123,583,917)	-12.0%
Net Turnover	$ 1,638,107	$ 13,017,851	$ (819,098)	$ 2,042,729	$ 1,963,014	$ 5,652,331	$ 6,472,581	$ 7,304,431	$ 6,521,689	$ 8,317,659	$ 13,064,871	$ 7,931,592	$ 1,588,998	$ 2,812,974		$ 77,509,729	7.5%
Investments	$ (23,408,590)	$ 23,651,900	$ 242,482,443	$ 18,552,665	$ (13,637,923)	$ 5,767,759	$ (130,930)	$ (22,572,946)	$ 3,052,108	$ 24,616,058	$ 11,338,110	$ 10,076,141	$ 13,757,751	$ 23,939,803		$ 317,484,349	30.8%
Mortality	$ 10,151,465	$ (1,704,255)	$ (1,459,717)	$ (6,662,067)	$ 4,824,200	$ 4,809,926	$ 4,487,254	$ 5,949,161	$ 4,016,775	$ 4,361,697	$ 9,160,867	$ 4,854,533	$ 1,885,105	$ (3,692,473)		$ 40,982,471	4.0%
Retirements	$ 13,164,074	$ 3,106,026	$ (5,165,508)	$ 19,969,509	$ 7,040,422	$ 8,036,027	$ 1,549,045	$ 2,414,112	$ 3,543,687	$ 23,347,399	$ 12,223,344	$ 17,048,638	$ 13,424,864	$ 8,892,489		$ 128,594,128	12.5%
Disability Experience	$ (898,042)	$ 486,572	$ (710,461)	$ 1,355,018	$ (487,913)	$ (312,627)	$ 172,204	$ (735,311)	$ 755,213	$ 1,207,277	$ 1,124,342	$ 491,425	$ (291,792)	$ 434,494		$ 2,590,399	0.3%
Other gain/loss	$ -	$ (1,888,217)	$ 3,204,607	$ 4,781,360	$ (6,903,747)	$ (10,096,678)	$ (2,707,262)	$ (9,240,465)	$ 30,893,873	$ 2,000,386	$ 49,073,123	$ 16,190,401	$ 14,994,521	$ 2,407,484		$ 92,709,386	9.0%
Ending FY Unfunded Liability	**$ (11,043,959)**	**$ 87,100,468**	**$ 326,506,488**	**$ 293,920,094**	**$ 346,537,738**	**$ 401,824,745**	**$ 445,130,082**	**$ 444,014,328**	**$ 542,558,818**	**$ 582,183,599**	**$ 717,577,722**	**$ 779,804,010**	**$ 815,464,698**	**$1,040,465,119**		**$1,040,465,119**	**100.0%**

Unfunded Liability Drivers (VSTRS)

Changes in actuarial assumptions were the largest driver of change in the UAAL (49.5%) since 2007, followed by investment performance not meeting assumptions (23.0%).

Negative numbers represent factors where changes in employee experience or assumptions resulted in lower projected pension benefit costs than previously assumed.

VSTRS																
CATEGORY	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2007-20	Pct of Total
Beginning FY Unfunded Liability	**$ 259,108,435**	**$ 274,790,333**	**$ 379,505,069**	**$ 727,758,506**	**$ 711,823,061**	**$ 845,107,880**	**$ 945,502,316**	**$ 1,013,910,285**	**$ 1,076,763,810**	**$ 1,175,029,030**	**$ 1,225,727,845**	**$ 1,502,453,387**	**$ 1,513,433,335**	**$1,554,459,287**	**$ 259,108,435**	
Expected Adjustments not including assumption/benefit changes	$ 1,550,581	$ 2,390,471	$ 6,838,674	$ 32,206,808	$ 11,653,535	$ (550,458)	$ (16,549,988)	$ (7,108,974)	$ (5,728,960)	$ 12,768,859	$ 23,259,148	$ (1,769,543)	$ (7,906,560)	$ (13,853,719)	$ 37,199,874	2.2%
Assumption Changes	$ -	$ 45,302,660	$ -	$ -	$ 54,067,732	$ 43,012,727	$ 58,378,429	$ 46,354,354	$ 94,966,380	$ -	$ 190,792,964	$ (38,599,369)	$ -	$ 334,265,096	$ 828,540,973	49.5%
Plan provisions	$ -	$ 120,335	$ -	$ (46,529,457)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (46,409,122)	-2.8%
Net Investments	$ (32,083,462)	$ 26,035,387	$ 312,726,392	$ 26,279,596	$ (8,517,121)	$ 6,447,642	$ (356,798)	$ (23,737,319)	$ 2,526,059	$ 24,080,857	$ 10,258,663	$ 8,436,965	$ 11,592,854	$ 21,306,965	$ 384,996,680	23.0%
Salary	$ (3,581,940)	$ 167,082	$ 16,569	$ (213,758)	$ (24,546,383)	$ (18,940,673)	$ (26,621,253)	$ (2,246,986)	$ (8,024)	$ (11,832,939)	$ (10,257,198)	$ (10,510,812)	$ (10,407,130)	$ (10,408,437)	$ (129,391,882)	-7.7%
COLA Experience Gain/Loss	$ (217,412)	$ (1,312,463)	$ 9,112,436	$ (22,127,398)	$ (5,771,530)	$ 2,591,239	$ (18,895,595)	$ (7,796,599)	$ (8,375,695)	$ (25,808,649)	$ (8,993,747)	$ 1,386,560	$ (7,683,366)	$ (8,838,015)	$ (102,730,234)	-6.1%
Mortality	$ 11,249,513	$ 47,304	$ (751,028)	$ (12,196,378)	$ 2,167,726	$ 4,238,443	$ 4,851,424	$ 2,503,288	$ (12,663,974)	$ 8,795,806	$ 4,776,996	$ (747,793)	$ 2,743,845	$ 3,335,043	$ 18,350,215	1.1%
Retirements	$ 50,324,971	$ (7,984,293)	$ (7,834,716)	$ (13,027,972)	$ 16,297,444	$ 16,962,996	$ 10,034,162	$ 7,255,861	$ 20,398,024	$ 16,650,803	$ 14,888,756	$ 15,053,147	$ 20,019,165	$ 24,972,035	$ 184,010,383	11.0%
Disability Experience	$ -	$ 723,288	$ 819,381	$ (452,396)	$ 517,915	$ 1,034,926	$ 698,282	$ 128,073	$ (83,400)	$ 138,601	$ 18,161	$ 36,314	$ 128,020	$ 53,881	$ 3,761,046	0.2%
Net Turnover	$ (32,133,353)	$ 21,437,443	$ 12,736,566	$ (1,493,927)	$ 32,780,627	$ 56,985,971	$ 40,978,113	$ 34,812,142	$ 20,849,237	$ 27,649,895	$ 33,675,285	$ 29,368,302	$ 21,031,002	$ 21,770,846	$ 320,448,149	19.1%
Contribution Shortfall including Healthcare Approp.	$ 20,573,000	$ 16,876,994	$ 17,670,950	$ 19,287,498	$ 21,240,905	$ 23,121,145	$ 25,101,767	$ 27,156,759	$ 2,630,383	$ 2,248,220	$ -	$ -	$ -	$ -	$ 175,907,621	10.5%
Other Gains/Losses	$ -	$ 910,528	$ (3,081,787)	$ 2,331,939	$ 33,393,969	$ (34,509,522)	$ (9,210,574)	$ (14,467,074)	$ (16,244,810)	$ (3,992,638)	$ 18,306,514	$ 8,326,177	$ 11,508,122	$ 6,226,388	$ (502,768)	0.0%
Ending FY Unfunded Liability	**$ 274,790,333**	**$ 379,505,069**	**$ 727,758,506**	**$ 711,823,061**	**$ 845,107,880**	**$ 945,502,316**	**$ 1,013,910,285**	**$ 1,076,763,810**	**$ 1,175,029,030**	**$ 1,225,727,845**	**$ 1,502,453,387**	**$ 1,513,433,335**	**$ 1,554,459,287**	**$1,933,289,370**	**$1,933,289,370**	100.0%