



Pensions: How We Got Here and Potential Paths Forward

House Committee on Government Operations
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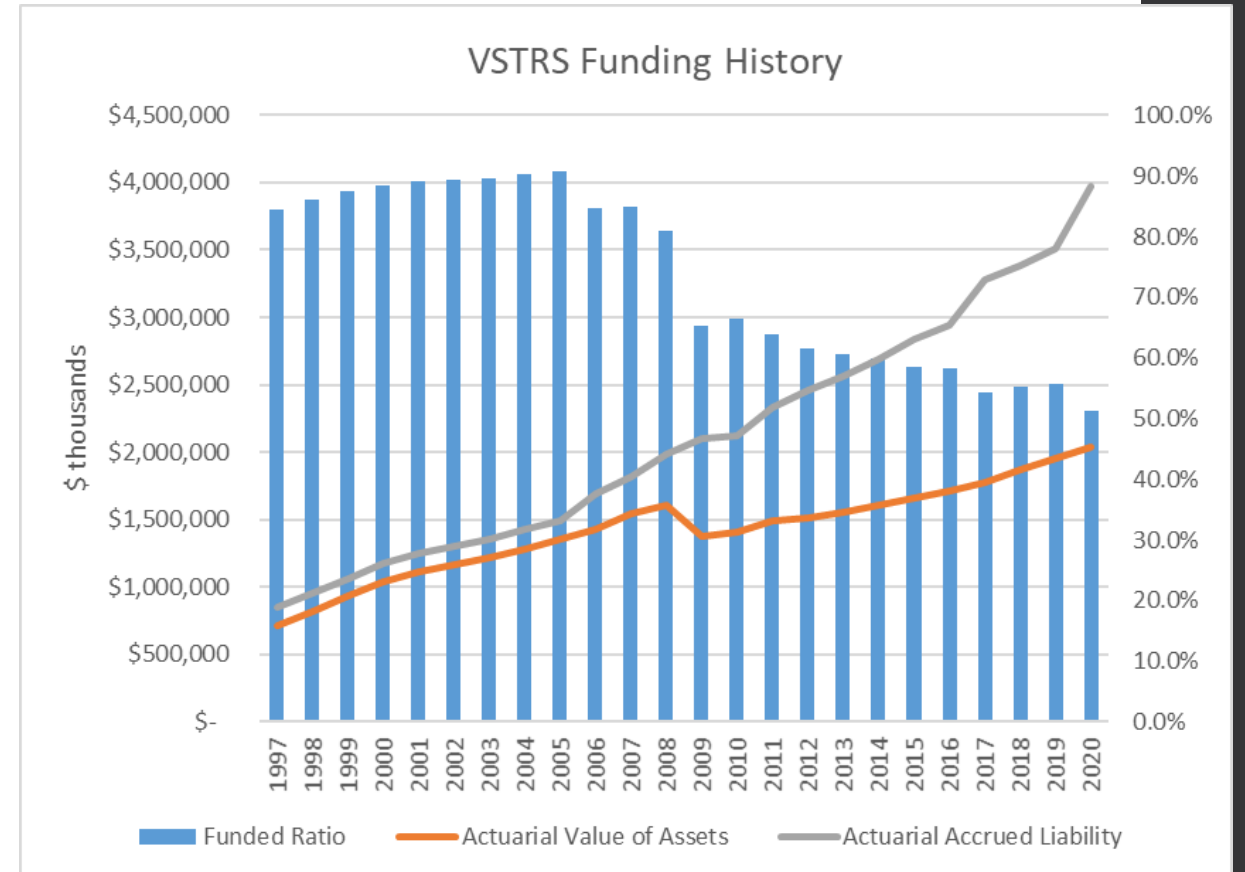
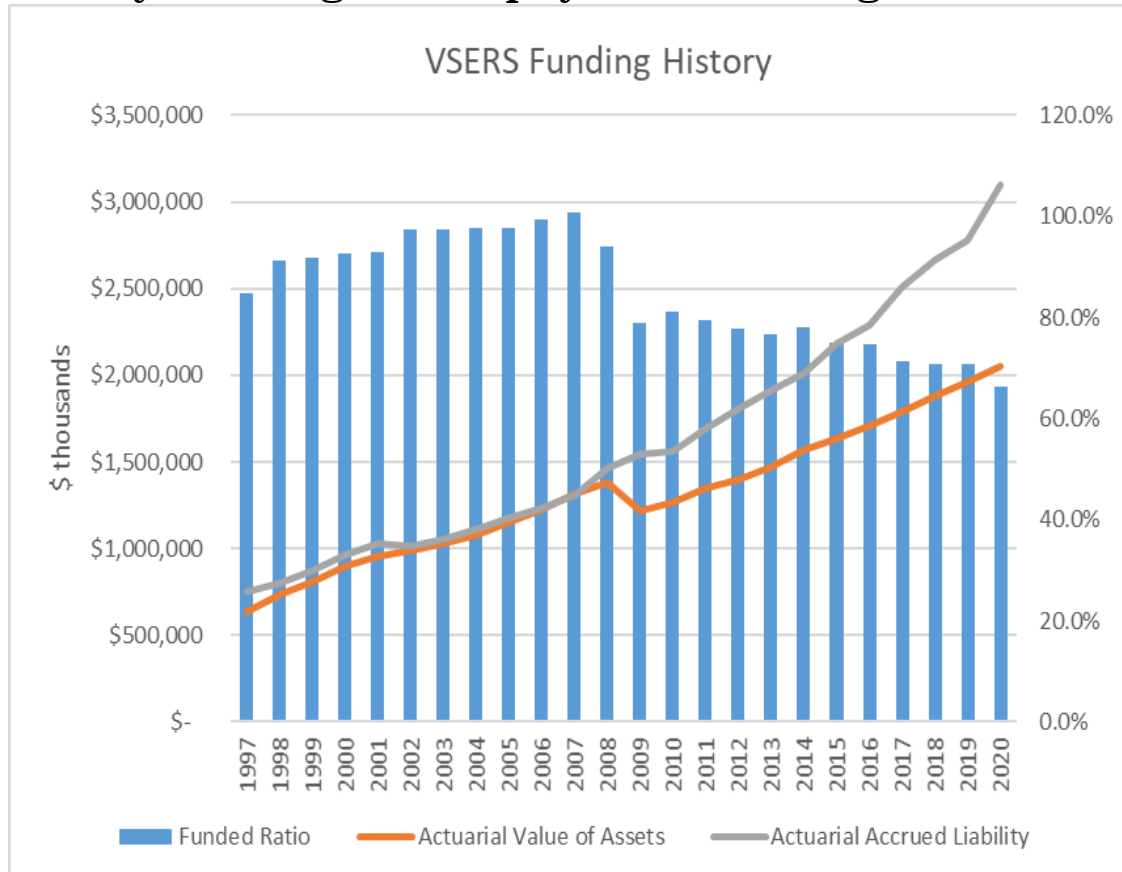
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Funding History

- 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.**



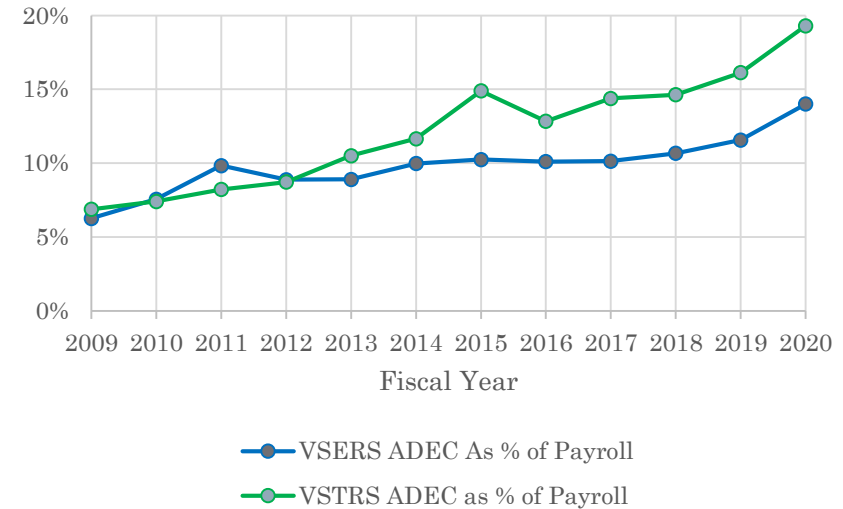
Funding History

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.

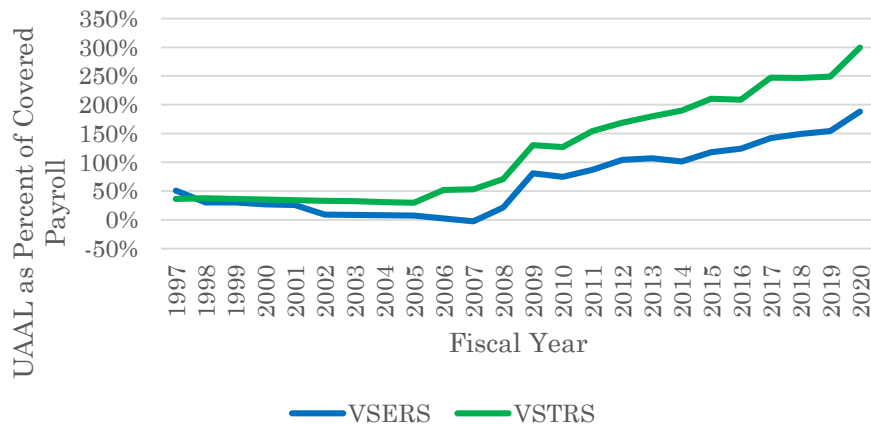
As a result, paying down the growing unfunded liability requires higher annual ADEC payments, which have consumed an increasing portion of the budget.

- 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.

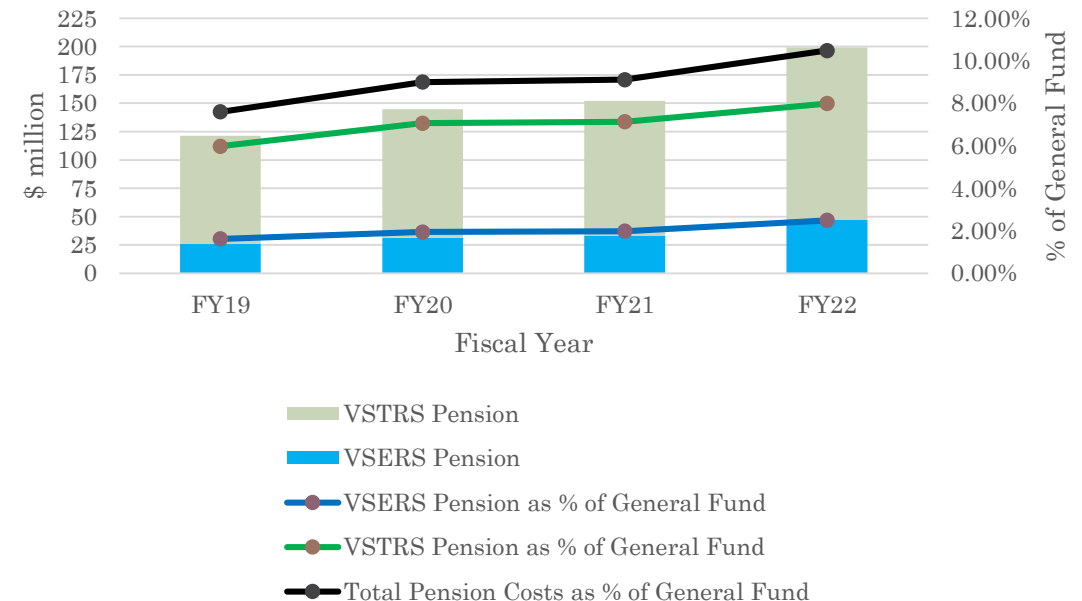
VSERS and VSTRS ADEC Amounts as a Percentage of Active Payroll, FY09-20



Unfunded Actuarial Accrued Liability as a Percent of Covered Payroll, FY97-20



Impact of Pension Payments on General Fund

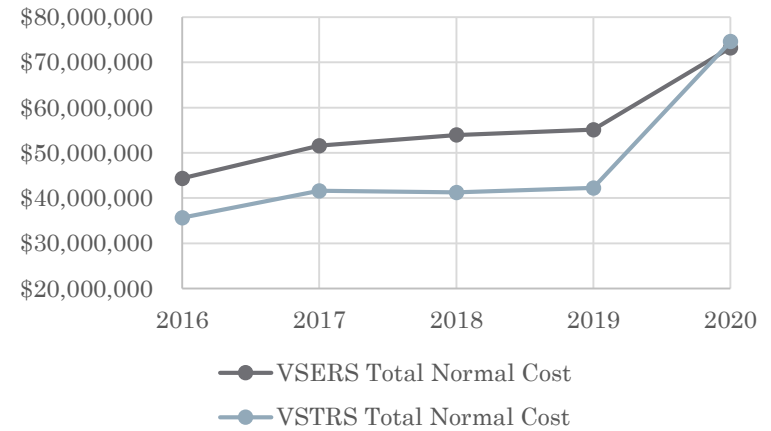


In the last 5 years, pension costs to the employer (the employer normal cost plus UAAL payment) have grown significantly – and at a faster rate than employee contributions.

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.

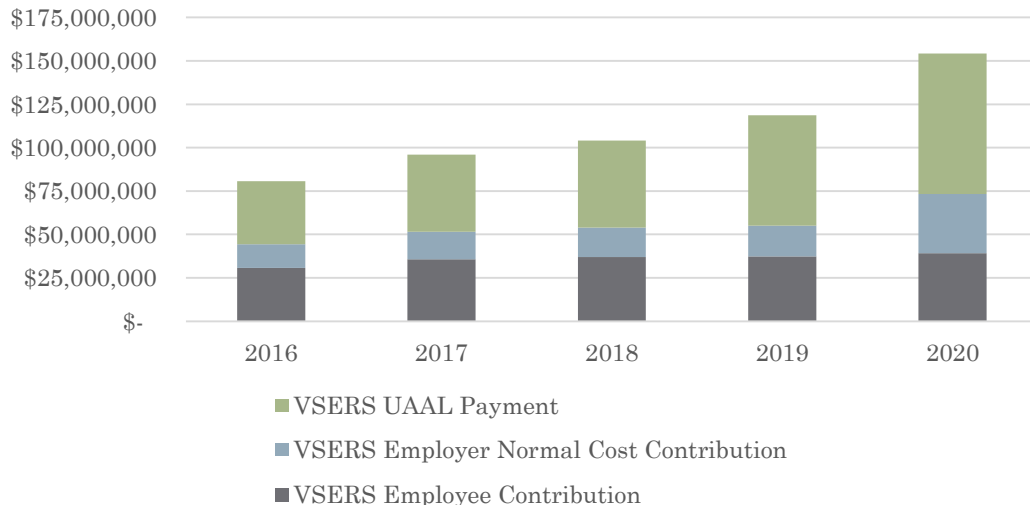
VSTRS Employer Normal Cost now impacts the Education Fund by \$37.6M (+\$30M from FY21).

Total Normal Cost

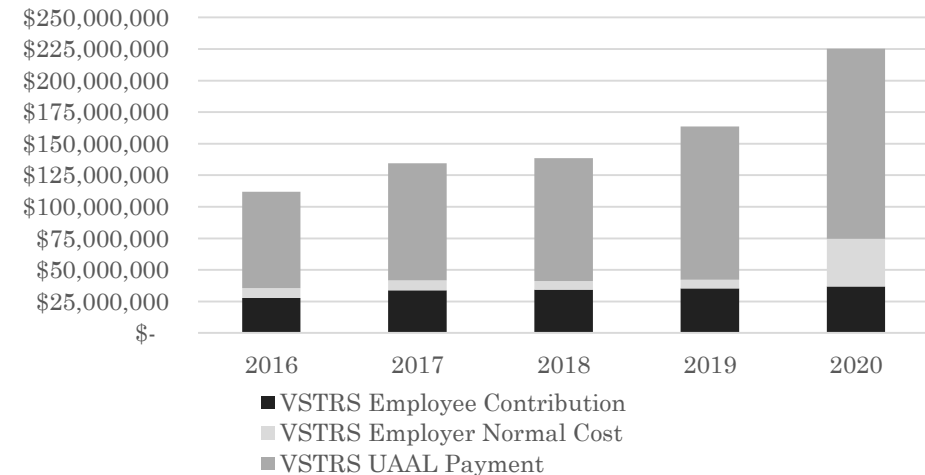


As of July 1 2020, VSERS Total Normal Cost is 12.67% of payroll and 11.02% of payroll for VSTRS.

VSERS Employee and Employer Required Contributions



VSTRS Employee and Employer Required Contributions



Demographic Trends

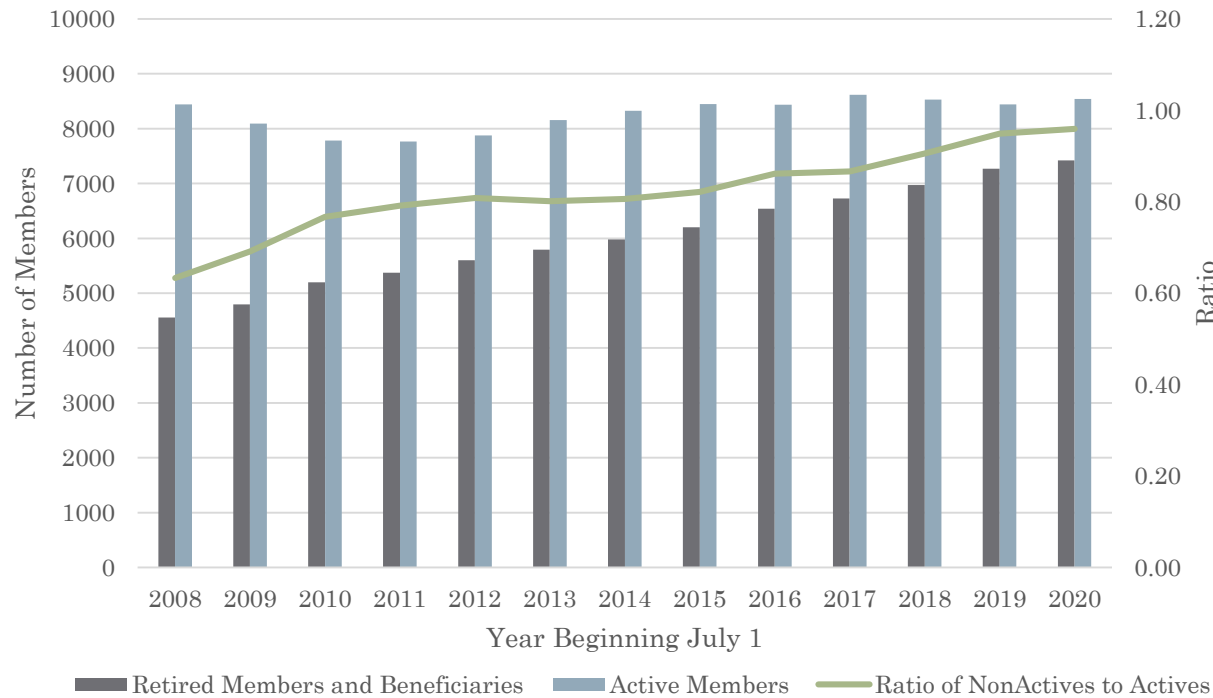
As the two plans have matured, the number of retirees drawing a benefit from the system has significantly increased while the number of active employees paying into the system has not. This dynamic increases the financial risk to active employees and employers if investment returns and member experience 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.

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 Membership Characteristics, 2008-2020



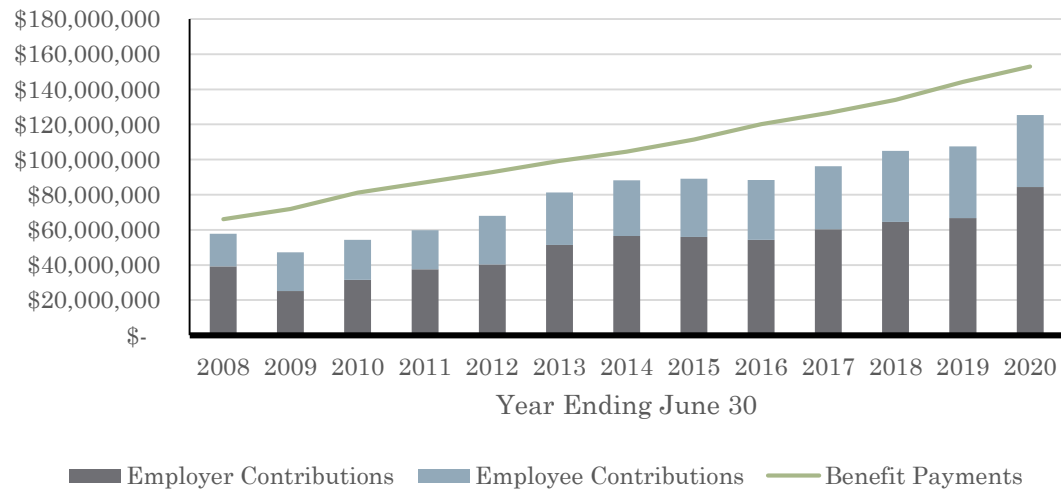
VSERS			
Year Beginning July 1	Active Members	Retirees and Beneficiaries Currently Receiving Benefits	Ratio of Total Non-Active (including deferred) to Active Members
2008	8442	4555	0.63
2009	8095	4797	0.69
2010	7782	5201	0.77
2011	7768	5375	0.79
2012	7878	5600	0.81
2013	8158	5795	0.80
2014	8325	5980	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 Contributions vs. Benefit Payments,
FY08-20

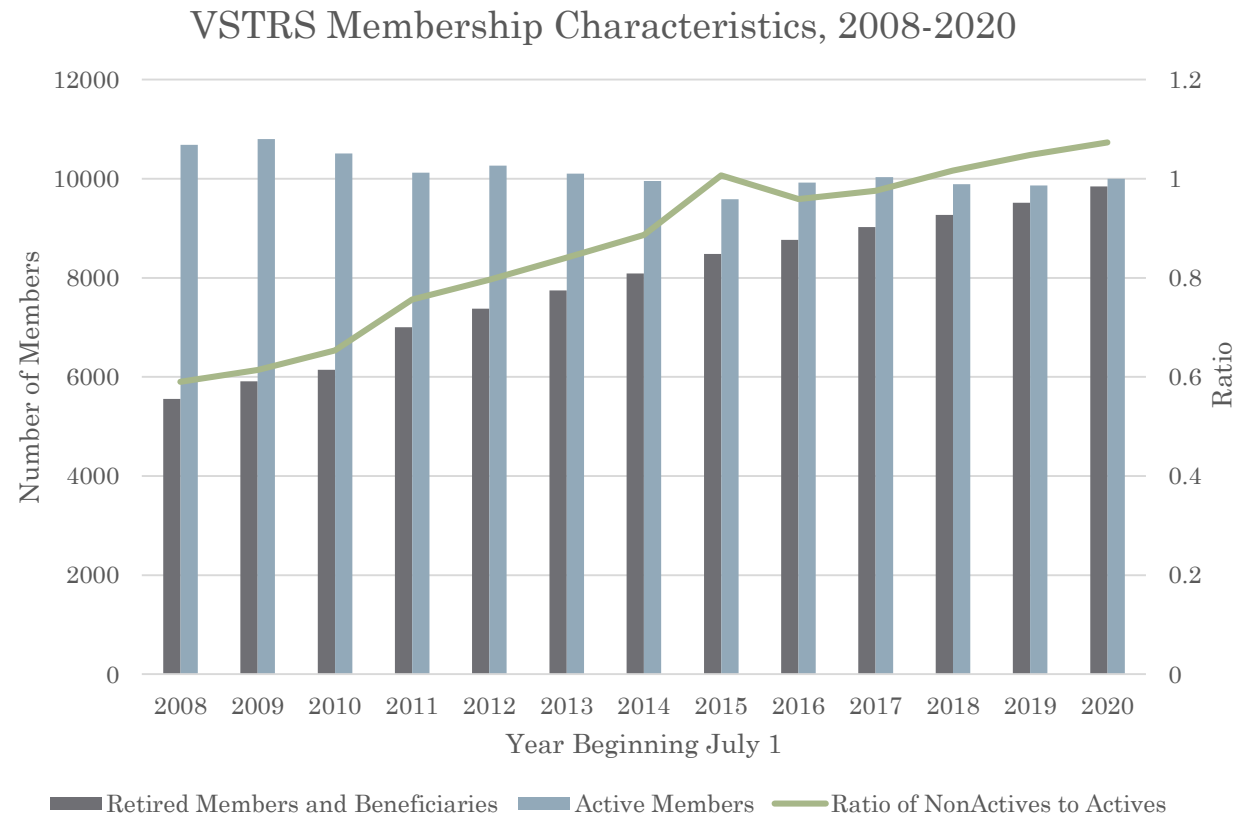


VSERS				
Year Beginning July 1	Employer Contributions	Member Contributions	Benefit Payments	Average Monthly Benefit (Retirees Only)
2008	\$ 39,179,823	\$ 18,614,102	\$ 66,105,953	\$ 1,260
2009	\$ 25,134,235	\$ 22,148,754	\$ 71,925,080	\$ 1,332
2010	\$ 31,468,884	\$ 22,840,354	\$ 81,091,626	\$ 1,348
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.



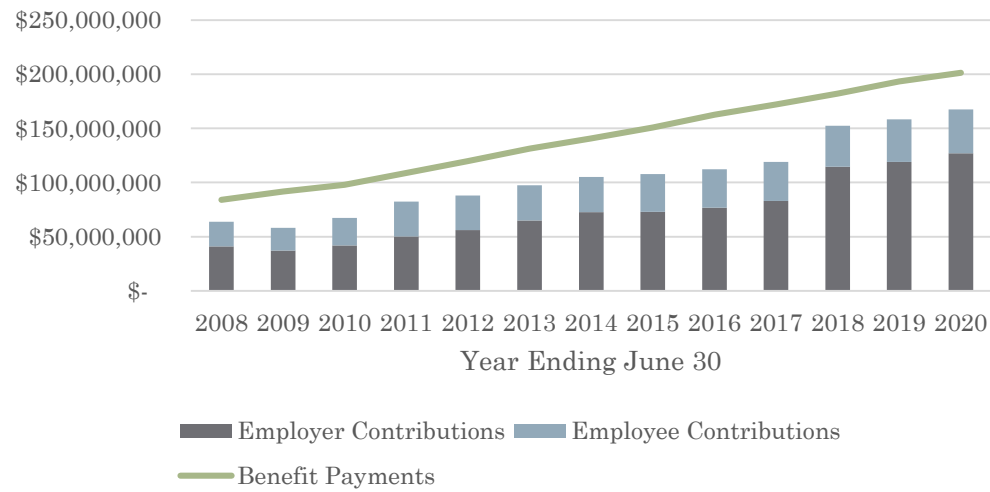
VSTRS	Active Members	Retirees and Beneficiaries Currently Receiving Benefits	Ratio of Total Non-Active (including deferred) to Active Members
Year Beginning July 1			
2008	10685	5555	0.59
2009	10799	5910	0.61
2010	10509	6146	0.65
2011	10123	7005	0.76
2012	10262	7376	0.80
2013	10101	7743	0.84
2014	9952	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 Contributions vs. Benefit Payments,
FY08-20



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

VSERS ADEC Funding

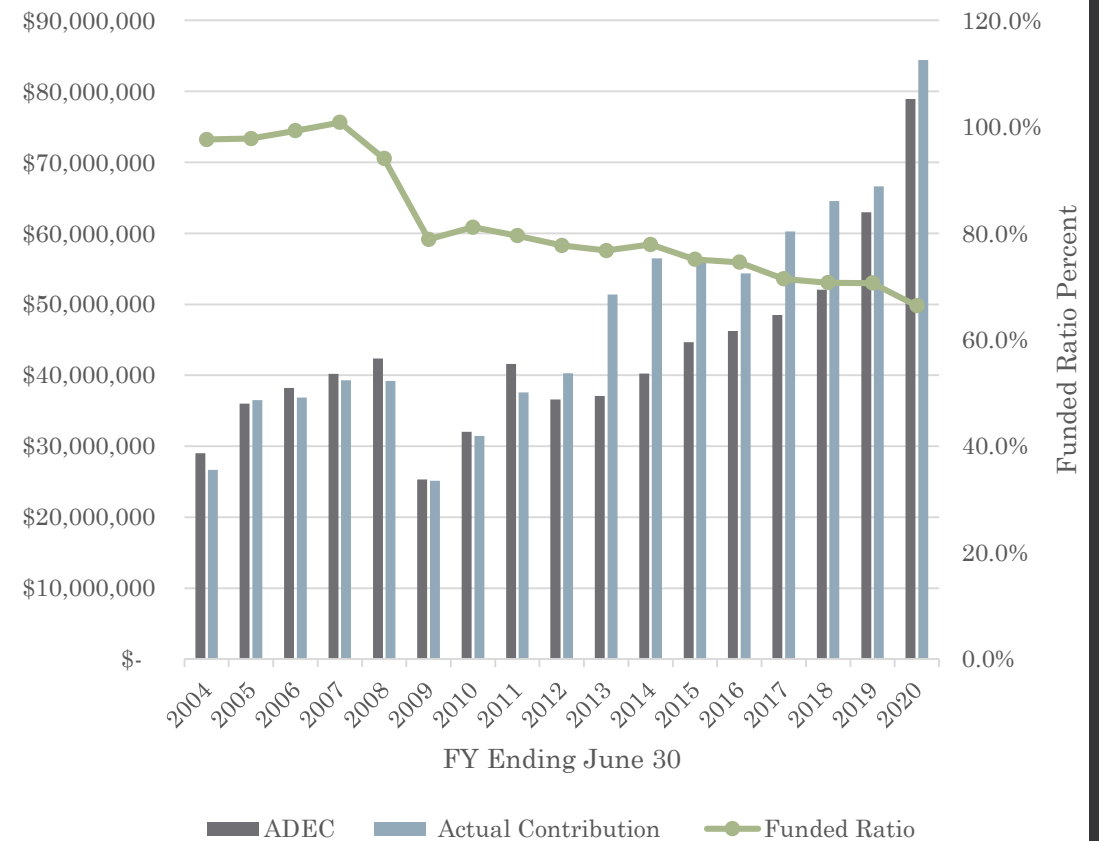
Since 2004, the employer has made a VSERS contribution in excess of the ADEC amount most (but not all) years. In some years, the actual contribution significantly exceeded the ADEC.

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.

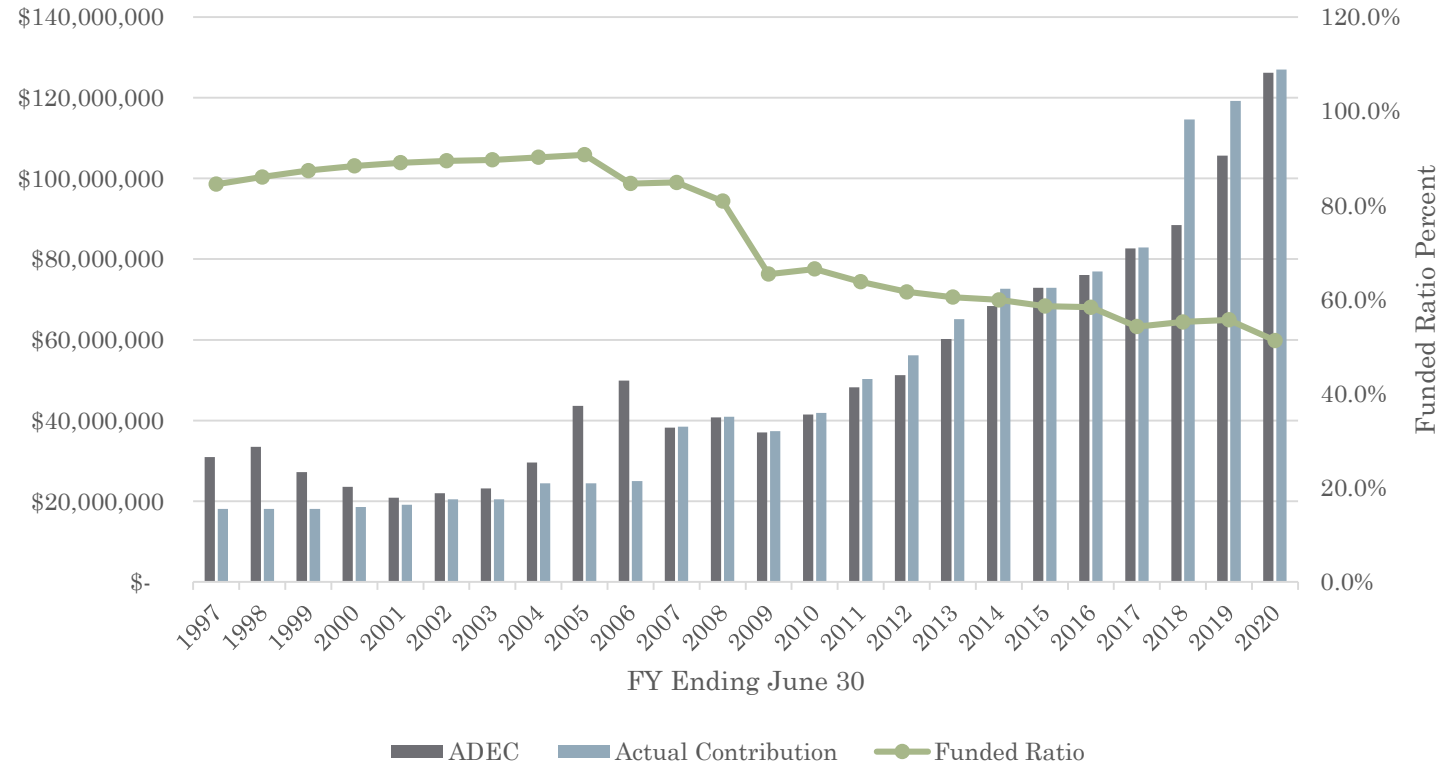
VSERS ADEC vs. Actual Funding, FY04-20



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.

VSTRS ADEC vs. Actual Funding, FY97-20



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.**

Assumed Rate of Return

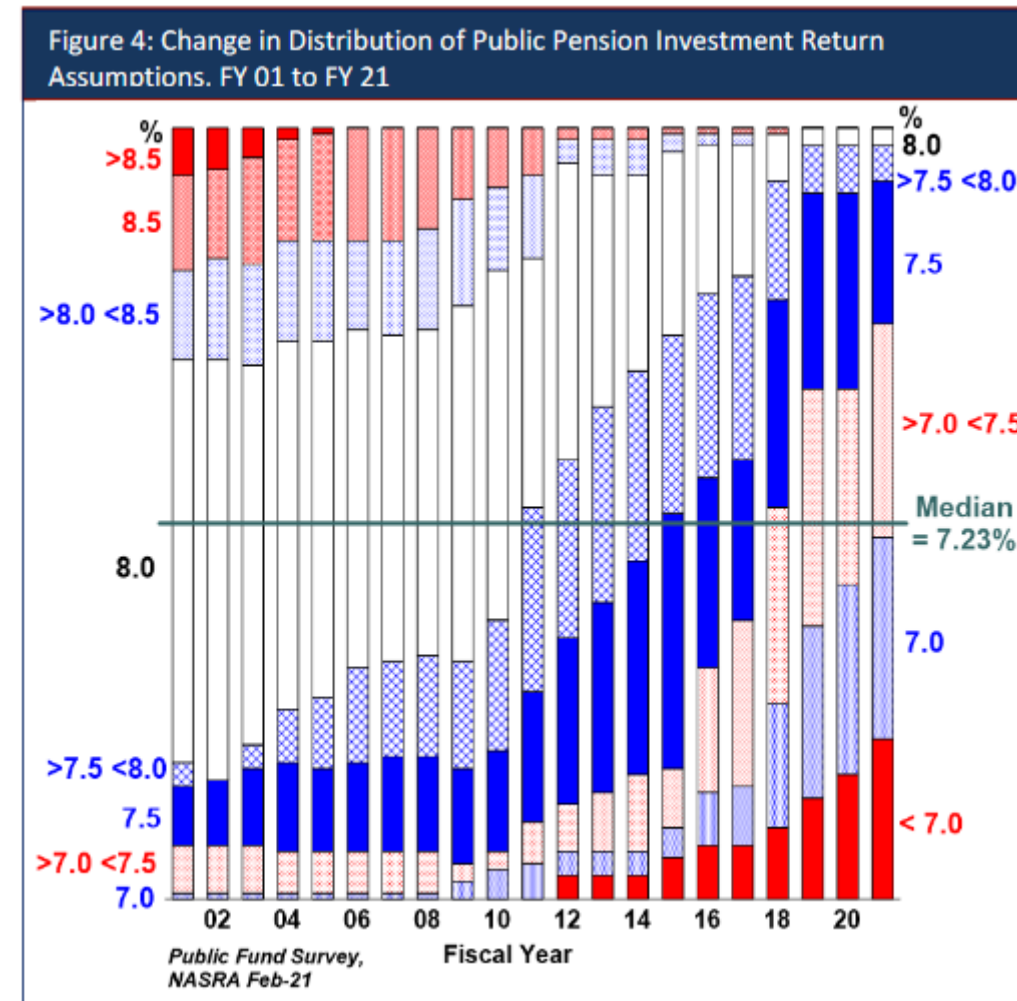
- In recent years, many pension plans have adopted lower assumed rates of return to more realistically match future anticipated investment experience.
- For FY2012-15, Vermont adopted a “select-and-ultimate” assumed rate of return system. In this system, different short-term and longer-term investment 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.



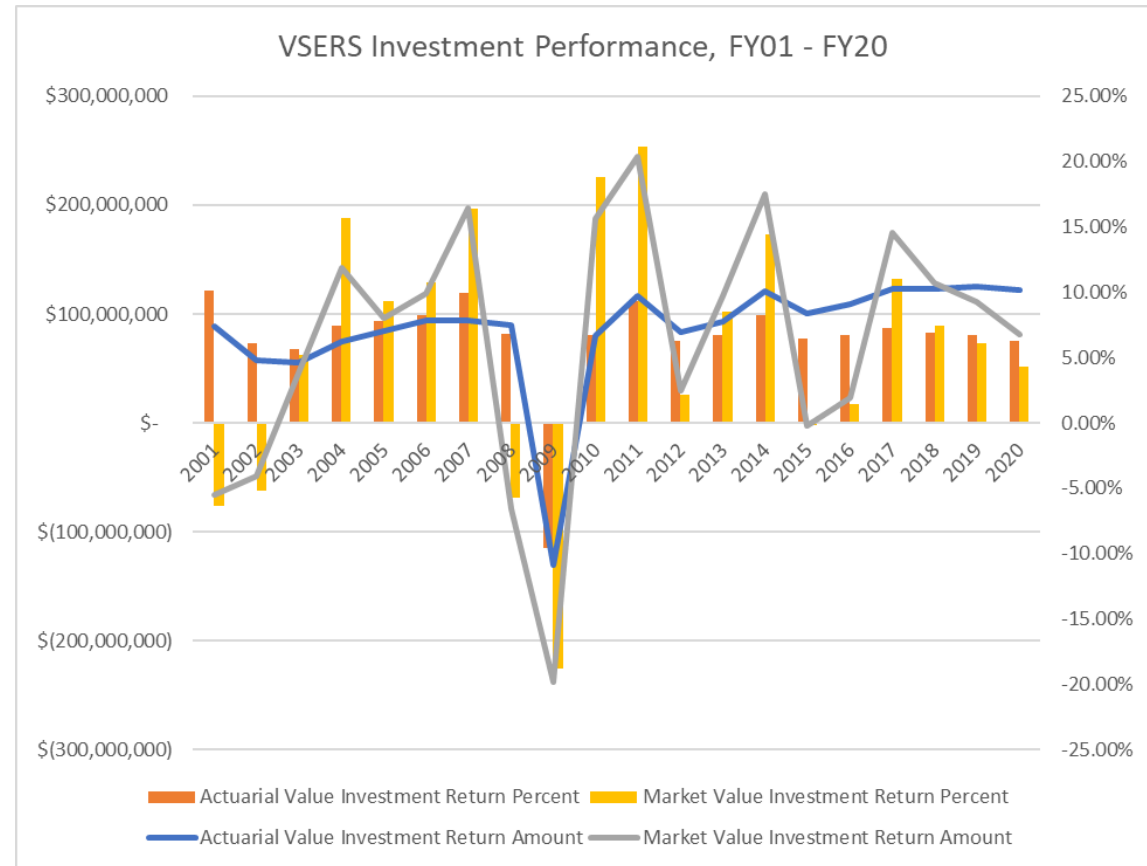
VSERS Investment Performance

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.



As Of FY	VSERS Most Recent Average Returns							
	AVA				MVA			
	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%

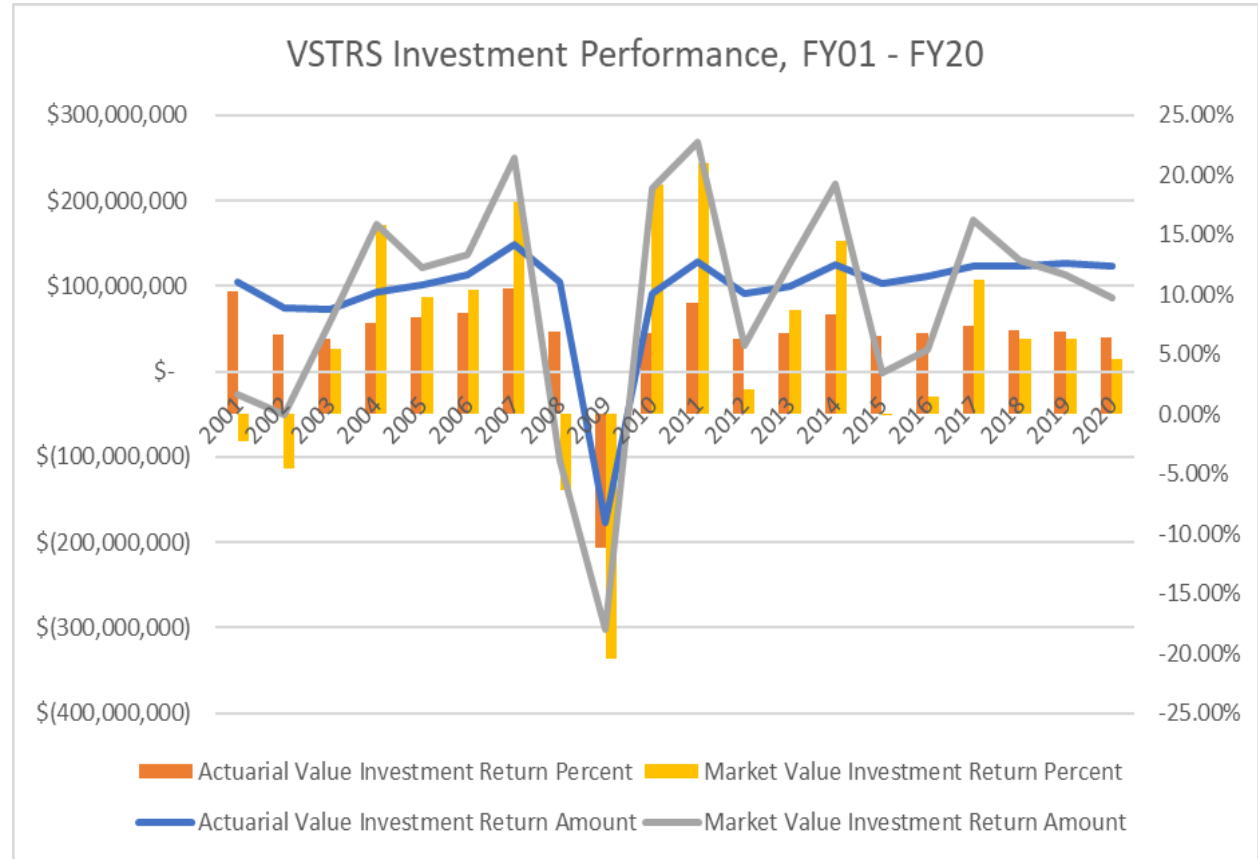
VSTRS Investment Performance

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								
As Of FY	AVA				MVA			
	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%

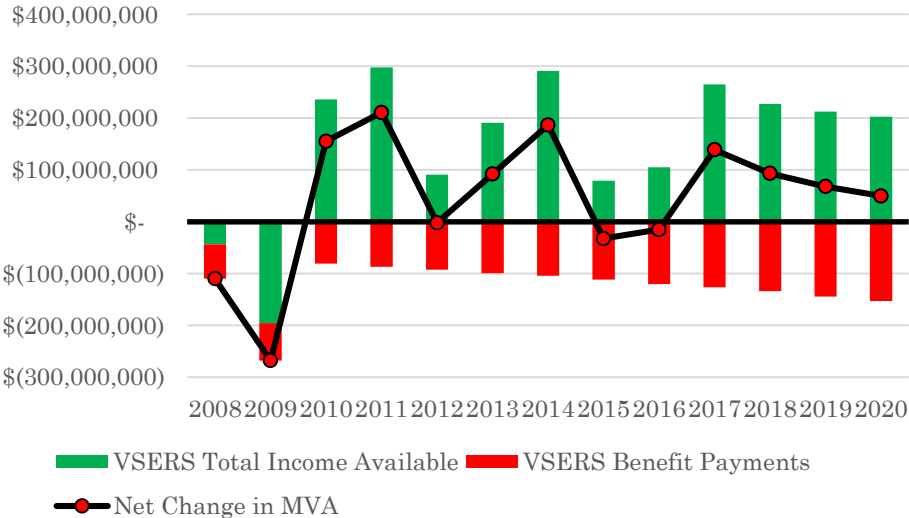
Change in MVA

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.

VSERS Change in Market Value of Assets



VSTRS Change in Market Value of Assets



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.**

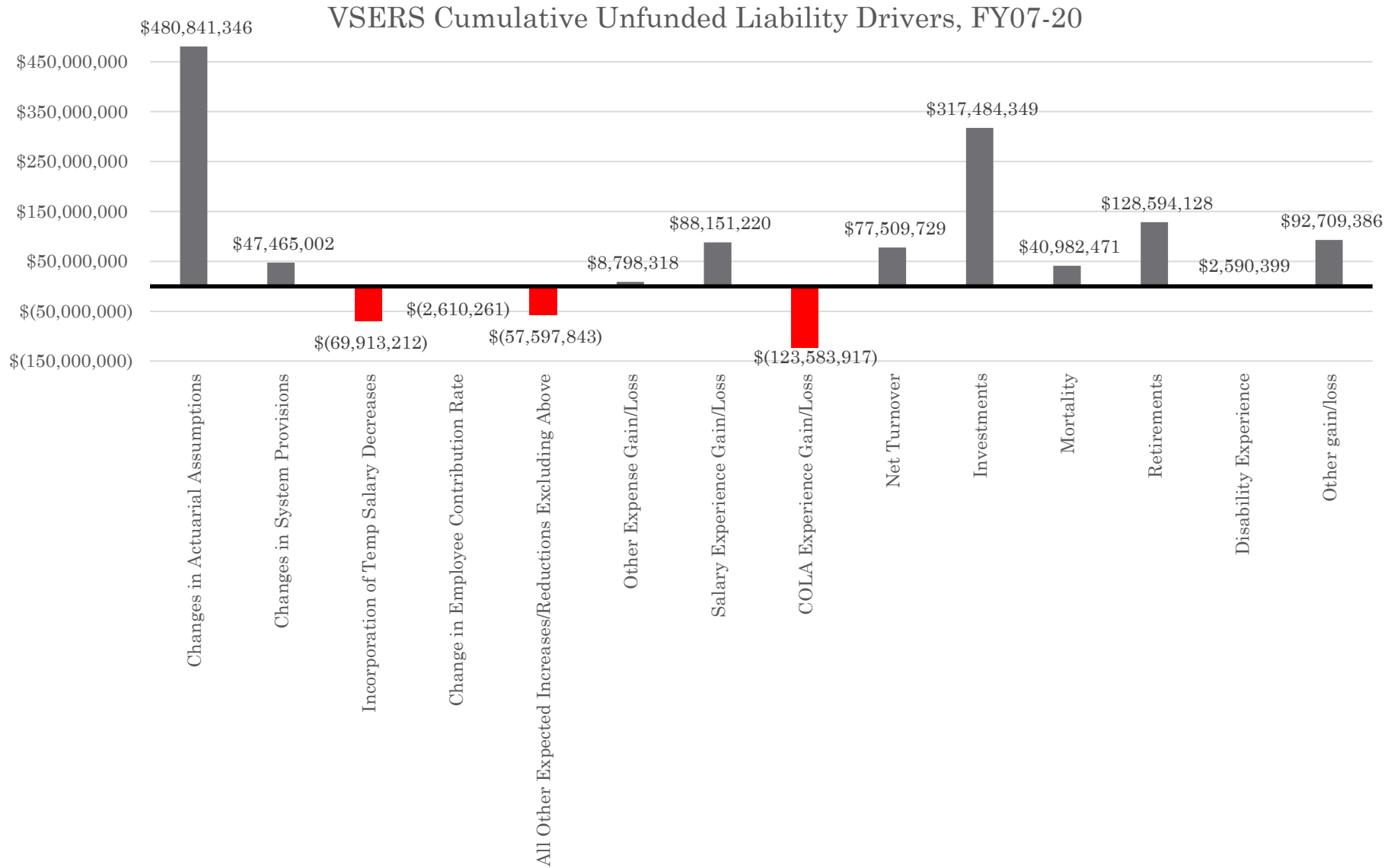
Scope of Changes for Each Fund		
	VSERS	VSTRS
UAAL 2019 Valuation for FY21 Budget	\$815.5 million	\$1,554.0 million
UAAL 2020 Valuation for FY22 Budget	\$1,040.5 million	\$1,933.0 million
Change in UAAL	\$225.0 million (+27.6%)	\$379.0 million (+24.4%)
ADEC FY21	\$83.9 million	\$135.6 million
ADEC FY22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

Changes FY21-FY22 (VSEERS)

- For the VSEERS 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
<i>Cumulative Change</i>		<i>+ \$216.8 million</i>	<i>+ \$225.0 million</i>
ADEC	\$83.9 million	\$113.6 million	\$119.9 million
<i>Cumulative Change</i>		<i>+\$29.7 million</i>	<i>\$36.0 million</i>

Unfunded Liability Drivers (VSEERS)



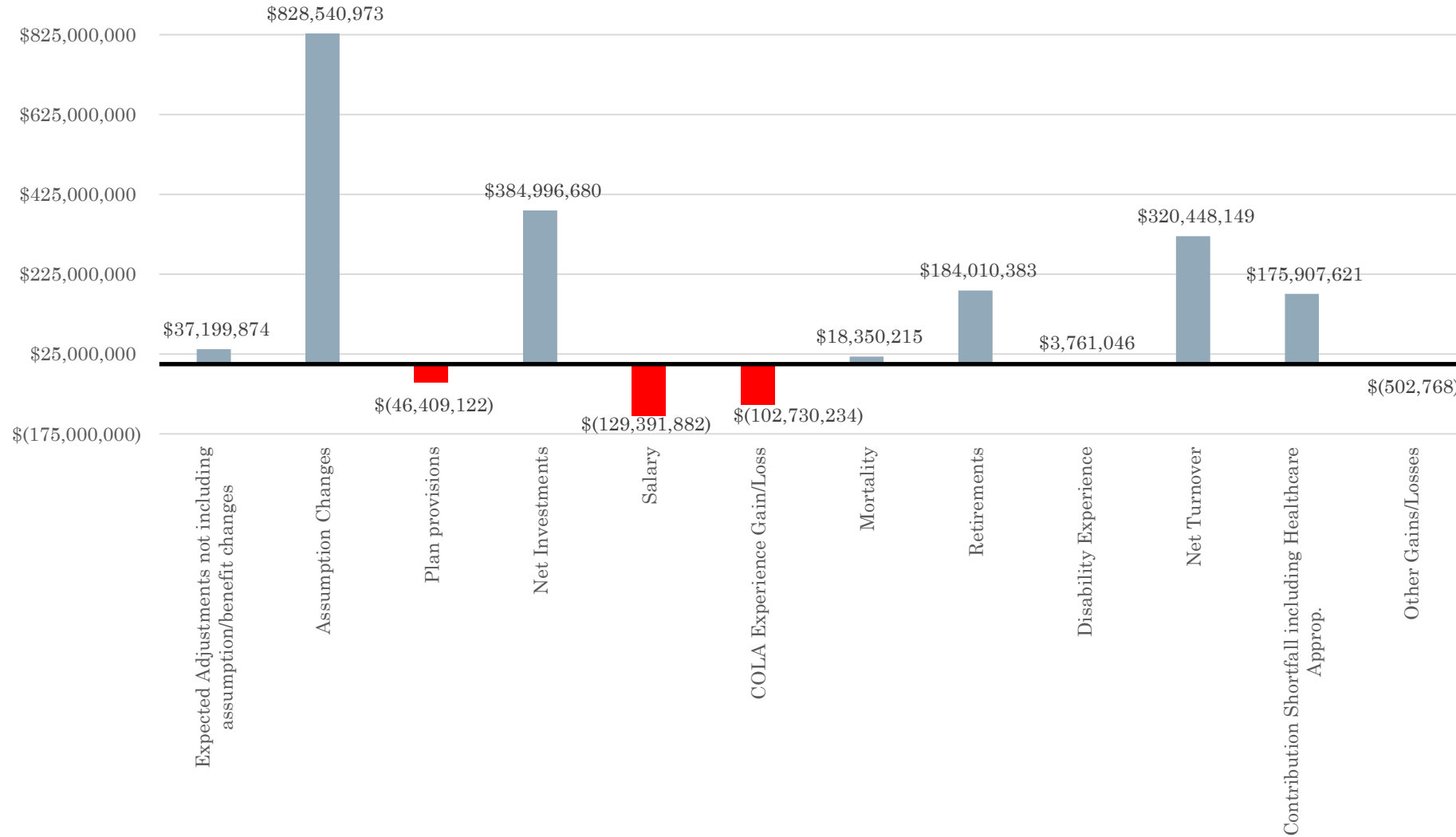
Changes FY21-FY22 (VSTRS)

- 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
<i>Cumulative Change</i>		<i>+ \$326.2 million</i>	<i>+ \$379.0 million</i>
ADEC	\$135.6 million	\$186.4 million	\$196.2 million
<i>Cumulative Change</i>		<i>+\$50.8 million</i>	<i>\$60.6 million</i>

Unfunded Liability Drivers (VSTRS)

VSTRS Cumulative Unfunded Liability Drivers, FY07-20



Investment and demographic experience deviating from assumptions is responsible for \$671.7 million of the total unfunded liability increase across both systems since 2010 – 34.1% of the \$1.968 billion increase.

Fiscal Year	VSERS		VSTRS		COMBINED		
	Investment Actuarial Gain/(Loss)	Other Experience Actuarial Gain/(Loss)	Investment Actuarial Gain/(Loss)	Other Experience Actuarial Gain/(Loss)	Investment Actuarial Gain/(Loss)	Other Experience Actuarial Gain/(Loss)	Total Combined Actuarial Gain/(Loss)
2020	\$ (23,939,803)	\$ 9,416,896	\$ (21,306,965)	\$ (37,111,741)	\$ (45,246,768)	\$ (27,694,845)	\$ (72,941,613)
2019	\$ (13,757,751)	\$ (19,263,470)	\$ (11,592,854)	\$ (37,339,658)	\$ (25,350,605)	\$ (56,603,128)	\$ (81,953,733)
2018	\$ (10,076,141)	\$ (54,364,042)	\$ (8,436,965)	\$ (42,911,895)	\$ (18,513,106)	\$ (97,275,937)	\$ (115,789,043)
2017	\$ (11,338,110)	\$ (83,433,438)	\$ (10,258,663)	\$ (52,414,767)	\$ (21,596,773)	\$ (135,848,205)	\$ (157,444,978)
2016	\$ (24,616,058)	\$ (14,374,247)	\$ (24,080,857)	\$ (11,600,879)	\$ (48,696,915)	\$ (25,975,126)	\$ (74,672,041)
2015	\$ (3,052,108)	\$ (25,802,635)	\$ (2,526,059)	\$ (3,871,358)	\$ (5,578,167)	\$ (29,673,993)	\$ (35,252,160)
2014	\$ 22,572,946	\$ (3,845,302)	\$ 23,737,319	\$ (20,188,705)	\$ 46,310,265	\$ (24,034,007)	\$ 22,276,258
2013	\$ 130,930	\$ (26,071,094)	\$ 356,798	\$ (1,834,559)	\$ 487,728	\$ (27,905,653)	\$ (27,417,925)
2012	\$ (5,767,759)	\$ (21,283,940)	\$ (6,447,642)	\$ (28,363,380)	\$ (12,215,401)	\$ (49,647,320)	\$ (61,862,721)
2011	\$ 13,637,923	\$ (34,912,636)	\$ 8,517,121	\$ (54,839,768)	\$ 22,155,044	\$ (89,752,404)	\$ (67,597,360)
2010	\$ (18,552,665)	\$ (1,431,964)	\$ (26,279,596)	\$ 47,179,890	\$ (44,832,261)	\$ 45,747,926	\$ 915,665
Total	\$ (74,758,596)	\$ (275,365,872)	\$ (78,318,363)	\$ (243,296,820)	\$ (153,076,959)	\$ (518,662,692)	\$ (671,739,651)
2009	\$ (242,482,443)	\$ (3,242,835)	\$ (312,726,392)	\$ (11,017,421)	\$ (555,208,835)	\$ (14,260,256)	\$ (569,469,091)
2008	\$ (23,651,900)	\$ (11,803,177)	\$ (26,035,387)	\$ (13,988,889)	\$ (49,687,287)	\$ (25,792,066)	\$ (75,479,353)
	\$ (340,892,939)	\$ (290,411,884)	\$ (417,080,142)	\$ (268,303,130)	\$ (757,973,081)	\$ (558,715,014)	\$ (1,316,688,095)

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 an 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.

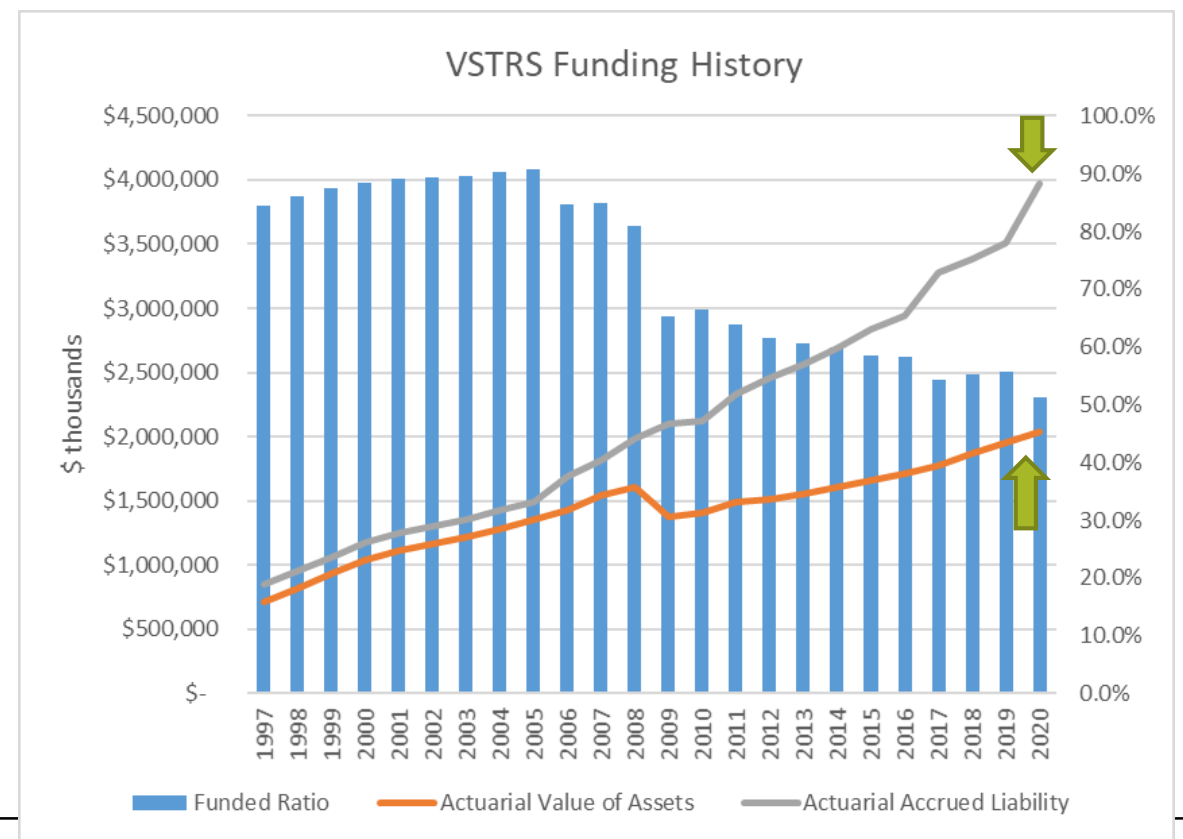
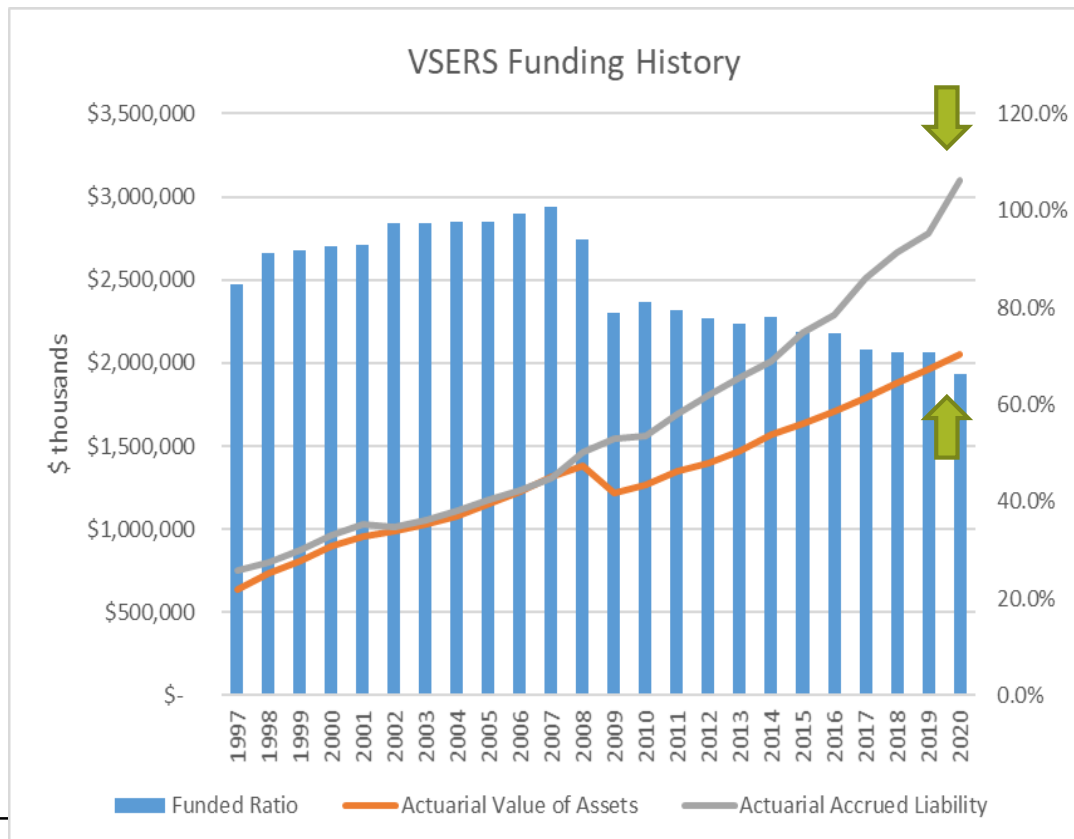
What Can Be Done?

Strategies to Reduce ADEC Pressures

Unfunded liabilities represent the “gap” between the accrued liabilities and the actuarial value of assets.

Unfunded liabilities must be paid off through higher ADEC payments when all else is held equal. In the conventional pension model, the employer bears the cost of these higher ADEC payments.

Reducing ADEC pressures requires you to take steps to make the asset and liability lines come closer together.



Strategies to Reduce ADEC Pressures

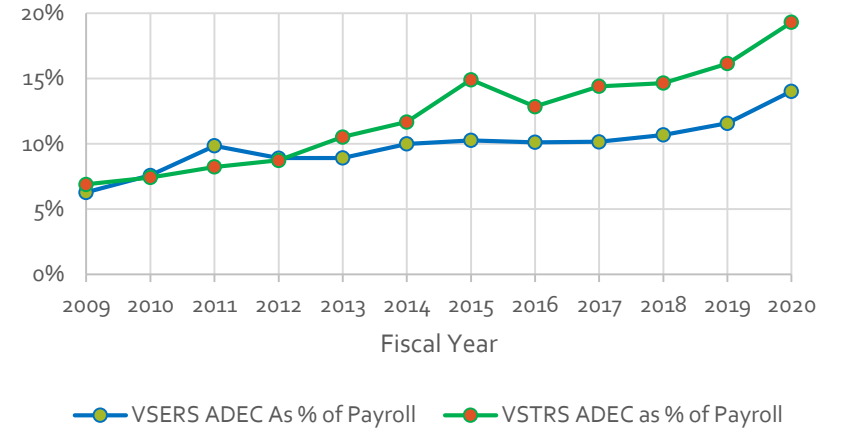
For FY22:

VSERS Total ADEC: **\$119.97 million**
 VSERS General Fund ADEC: \$47.44 million

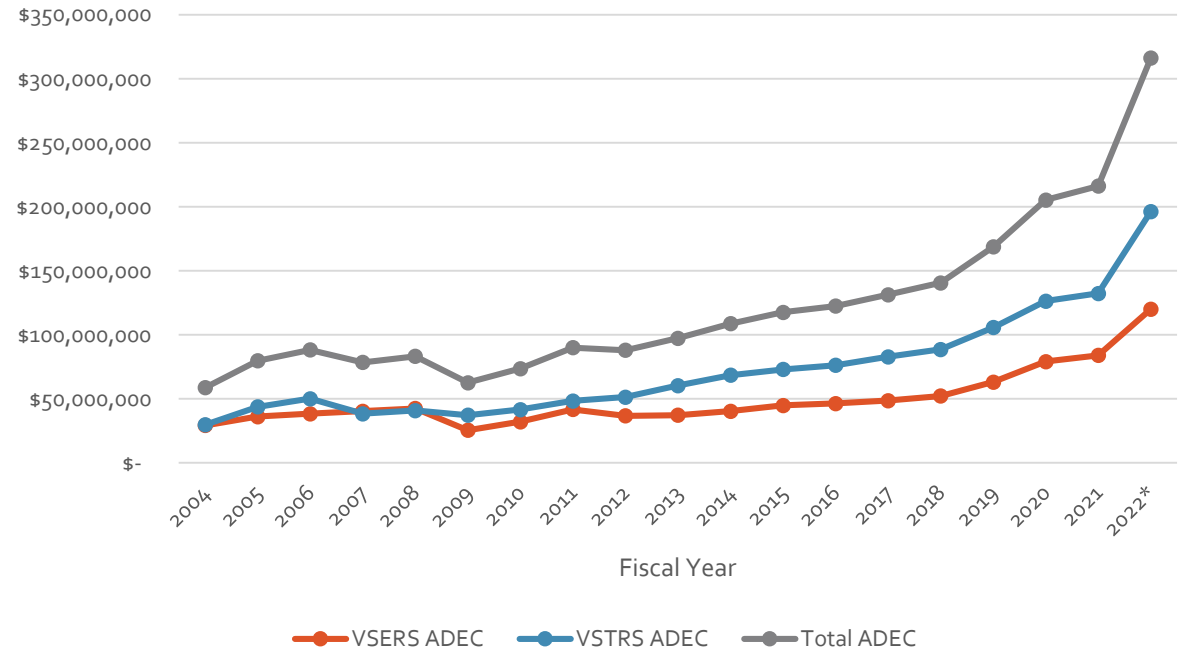
VSTRS Total ADEC: **\$196.21 million**
 VSTRS General Fund ADEC: \$152.05 million
 VSTRS Ed Fund ADEC: \$37.60 million
 VSTRS Local ADEC: \$6.60 million

Employers will pay a total of approximately **\$316.17 million** for pension obligations in FY22 for both systems.

VSERS and VSTRS ADEC Amounts as a Percentage of Active Payroll, FY09-20



ADEC Amounts, FY04-22



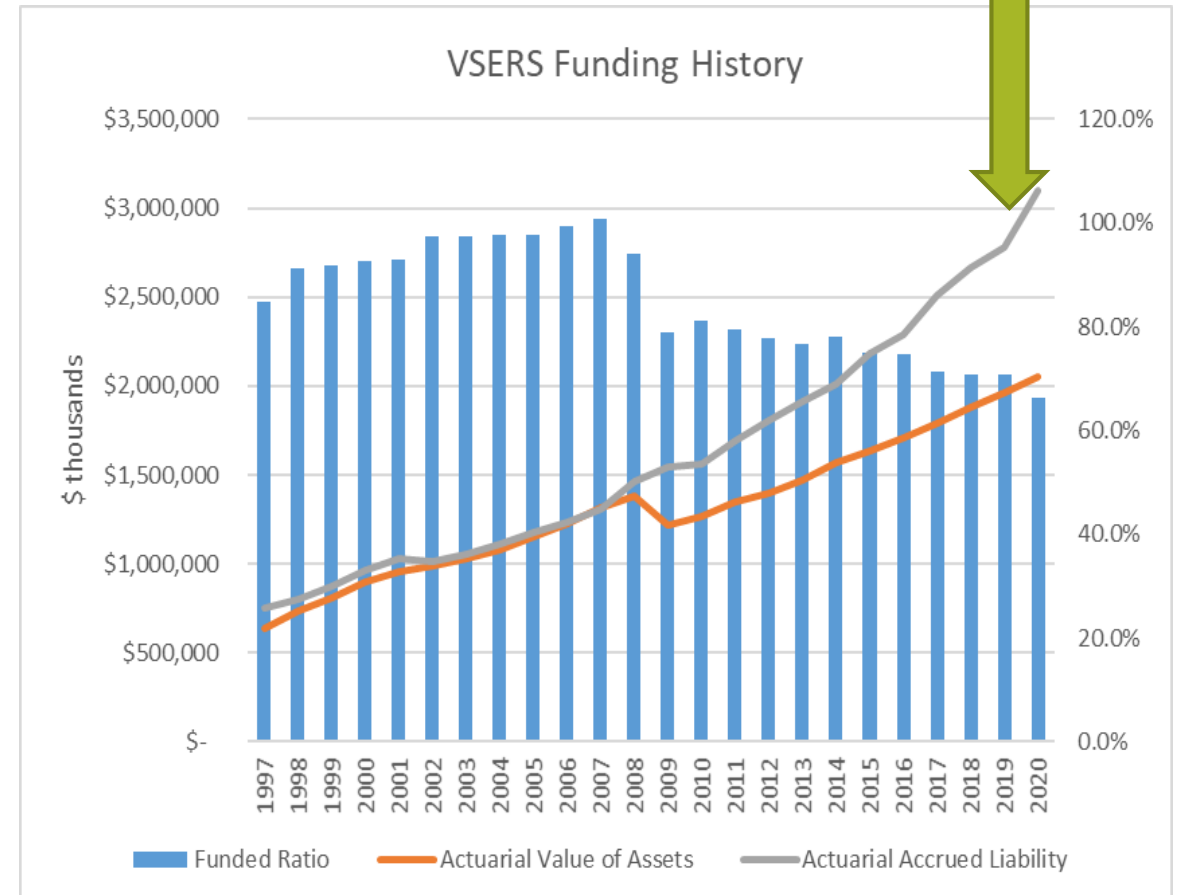
Strategies to Reduce Liabilities

Both the ADEC and Normal Cost can be lowered by making changes to plan design to lower the cost of future pension benefits.

Lowering the cost of future pension benefits has the effect of slightly “flattening” the steepness of the Actuarial Accrued Liability line:

- Gap between liabilities and assets (the unfunded liability) gets smaller.
- As unfunded liability gets smaller, so does the ADEC payment.
- Plan funding ratio improves when unfunded liability decreases.

As long as the pension system is open to new participants, the liability line will likely have an upward slope. The goal is to have the asset and liability lines converge by the end of the amortization period.



Strategies to Reduce Liabilities

- On January 15th, the State Treasurer released a [report](#) that provided preliminary cost impacts for making a range of changes to plan design to reduce liabilities and the ADEC for both VSERS and VSTRS.
- Cost savings and revenue enhancements were both analyzed. Changes would not impact retirees.
- The next few slides will present summaries of the options that were reviewed in the January report to provide you with context. Scenarios that involve implementing multiple options must be costed out as a package because different factors influence one another. The sum of the parts do not equal the whole.
- This presentation does not aim to endorse or reject any option.

Scope of Challenge 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	\$379.0 million
ADEC FY21	\$83.9 million	\$135.6 million
ADEC FY22	\$119.9 million	\$196.2 million
Change to ADEC	\$36.0 million	\$60.6 million

Strategies to Reduce Liabilities

Modify the COLA Formula

- Cost of Living Adjustments are pegged to the CPI and help retirement benefits keep pace with inflation. They also represent a significant cost over time to the pension systems.
- A range of options could be implemented to lower these costs:
 - Remove COLAs for some or all active employees
 - Apply a COLA threshold (e.g. annual retirement benefit amounts above the threshold would not be subject to the COLA)
 - Only apply COLAs once an employee has been retired for a minimum period of time.

VSERS

Description (\$ mil)	2020 Valuation Assumptions	Remove COLA for all actives	Remove COLA for all actives except those within 5 yrs of retirement	Remove COLA for all non-vested actives	Remove COLA for all actives except those within 10 yrs of retirement	COLA Threshold – COLAs on first \$24,000 of annual benefit
Accrued Liability	\$3,095.3 Change	\$2,856.6 (\$238.8)	\$2,978.6 (\$116.7)	\$3,083.3 (\$12.0)	\$3,025.1 (\$70.2)	\$2,960.8 (\$134.5)
Unfunded Liability	\$1,040.5 Change	\$801.7 (\$238.8)	\$923.8 (\$116.7)	\$1,028.4 (\$12.0)	\$970.3 (\$70.2)	\$905.9 (\$134.5)
Funded %	66.4% Change	71.9% 5.5%	69.0% 2.6%	66.6% 0.3%	67.9% 1.5%	69.4% 3.0%
Normal Cost	\$70.8 Change	\$57.2 (\$13.6)	\$61.3 (\$9.5)	\$67.0 (\$3.8)	\$63.7 (\$7.1)	\$64.1 (\$6.7)
ADEC for FY22	\$120.0 Change	\$84.7 (\$35.3)	\$99.7 (\$20.3)	\$114.8 (\$5.1)	\$106.3 (\$13.7)	\$101.2 (\$18.8)

VSTRS

Description (\$ mil)	2020 Valuation Assumptions	Remove COLA for all actives	Remove COLA for all actives except those within 5 yrs of retirement	Remove COLA for all non-vested actives	Remove COLA for all actives except those within 10 yrs of retirement	COLA Threshold – COLAs on first \$24,000 of annual benefit	COLA Threshold – COLAs on first \$20,000 of annual benefit	COLA Threshold – COLAs on first \$15,000 of annual benefit
Accrued Liability	\$3,969.0 Change	\$3,803.9 (\$165.1)	\$3,866.9 (\$102.1)	\$3,964.7 (\$4.3)	\$3,904.8 (\$64.2)	\$3,875.1 (\$93.9)	\$3,864.5 (\$104.5)	\$3,850.2 (\$118.8)
Unfunded Liability	\$1,933.3 Change	\$1,768.2 (\$165.1)	\$1,831.2 (\$102.1)	\$1,929.0 (\$4.3)	\$1,869.1 (\$64.2)	\$1,839.4 (\$93.9)	\$1,828.8 (\$104.5)	\$1,814.5 (\$118.8)
Funded %	51.3% Change	53.5% 2.2%	52.6% 1.4%	51.3% 0.1%	52.1% 0.8%	52.5% 1.2%	52.7% 1.4%	52.9% 1.6%
Normal Cost	\$72.1 Change	\$64.5 (\$7.7)	\$65.9 (\$6.2)	\$70.5 (\$1.6)	\$67.2 (\$4.9)	\$68.0 (\$4.1)	\$67.6 (\$4.5)	\$67.0 (\$5.1)
ADEC for FY22	\$196.2 Change	\$173.7 (\$22.5)	\$180.7 (\$15.5)	\$194.1 (\$2.1)	\$185.4 (\$10.8)	\$183.7 (\$12.5)	\$182.3 (\$13.9)	\$180.4 (\$15.8)

Strategies to Reduce Liabilities

Modify the AFC Formula

- An employee's Average Final Compensation (AFC) is used to determine their pension benefit.
- Most (but not all) VT members have their AFC calculated by averaging their 3 highest consecutive years of salary.
- Increasing the number of years considered when determining AFC has the potential to lower liabilities by reducing any impacts from unusual salary increases in final years of employment and providing an AFC that is more broadly reflective of the employee's overall salary history.

VRSERS

Description (\$ mil)	2020 Valuation Assumptions	Revised AFC – Add 2 Years	Revised AFC – Add 4 Years	Revised AFC – Highest 5 Consecutive for All Members	Revised AFC – Highest 7 Consecutive for All Members
Accrued Liability	\$3,095.3 Change	\$3,056.1 (\$39.2)	\$3,013.8 (\$81.5)	\$3,048.0 (\$47.3)	\$3,006.0 (\$89.3)
Unfunded Liability	\$1,040.5 Change	\$1,001.3 (\$39.2)	\$959.0 (\$81.5)	\$993.2 (\$47.3)	\$951.2 (\$89.3)
Funded %	66.4% Change	67.2% 0.9%	68.2% 1.8%	67.4% 1.0%	68.4% 2.0%
Normal Cost	\$70.8 Change	\$68.3 (\$2.5)	\$65.8 (\$5.0)	\$67.8 (\$3.0)	\$65.3 (\$5.5)
ADEC for FY22	\$120.0 Change	\$113.9 (\$6.0)	\$107.5 (\$12.4)	\$112.7 (\$7.3)	\$106.3 (\$13.6)

VSTRS

Description (\$ mil)	2020 Valuation Assumptions	Revised AFC – 5 Years	Revised AFC – 7 Years
Accrued Liability	\$3,969.0 Change	\$3,921.7 (\$47.3)	\$3,876.5 (\$92.5)
Unfunded Liability	\$1,933.3 Change	\$1,886.0 (\$47.3)	\$1,840.8 (\$92.5)
Funded %	51.3% Change	51.9% 0.6%	52.5% 1.2%
Normal Cost	\$72.1 Change	\$69.7 (\$2.4)	\$67.4 (\$4.7)
ADEC for FY22	\$196.2 Change	\$189.5 (\$6.7)	\$183.2 (\$13.0)

Strategies to Reduce Liabilities

Modify the Vesting Schedule

- An employee must accrue a minimum number of service credit years in order to qualify for a retirement benefit. This time period is called the vesting period.
- Most VT members must accrue 5 years of service in order to vest.
- The most common vesting periods nationwide are either 5 or 10 years.
- **Minimal savings from lengthening the vesting period compared to other options.**

VSERS

Description (\$ mil)	2020 Valuation Assumptions	Revised Vesting – 7 Years	Revised Vesting – 10 Years
Accrued Liability	\$3,095.3 Change	\$3,095.6 \$0.3	\$3,096.0 \$0.8
Unfunded Liability	\$1,040.5 Change	\$1,040.8 \$0.3	\$1,041.2 \$0.8
Funded %	66.4% Change	66.4% 0.0%	66.4% 0.0%
Normal Cost	\$70.8 Change	\$70.8 \$0.0	\$70.8 \$0.0
ADEC for FY22	\$120.0 Change	\$119.4 (\$0.6)	\$119.2 (\$0.8)

VSTRS

Description (\$ mil)	2020 Valuation Assumptions	Revised Vesting – 7 Years	Revised Vesting – 10 Years
Accrued Liability	\$3,969.0 Change	\$3,969.6 \$0.6	\$3,970.1 \$1.1
Unfunded Liability	\$1,933.3 Change	\$1,933.8 \$0.6	\$1,934.4 \$1.1
Funded %	51.3% Change	51.3% 0.0%	51.3% 0.0%
Normal Cost	\$72.1 Change	\$72.1 \$0.0	\$72.1 \$0.0
ADEC for FY22	\$196.2 Change	\$196.2 (\$0.1)	\$196.1 (\$0.1)

Strategies to Reduce Liabilities

Modify the Normal Retirement Eligibility

- To qualify for normal retirement, an employee must reach a minimum age or combination of age and years of service (Rule of x) – whichever comes first. For example, an employee covered by a Rule of 90 is eligible to retire if their age plus years of service total 90.
- Terms vary by plan (see appendix) but most newer employees must reach either age 65 or a Rule of 87 (VSERS), or age 65 or a Rule of 90 (VSTRS) for normal retirement.
- More seasoned active employees may be allowed to retire at a younger age, or upon reaching a minimum number of years of service. Applying the retirement eligibility rules that are in place for newer hires to these cohorts has the potential to reduce pension liabilities – particularly for VSERS.
- Some pension plans nationwide require all actives to reach a minimum age with no Rule of x option.
- A Rule of x can advantage employees who began their service earlier in their careers but can result in higher pension costs due to longer retirement periods.
- Social Security has modified the normal retirement age (now 67) as people live longer into retirement.

VSERS

Description (\$ mil)	2020 Valuation Assumptions	Update all pre-Rule of 87 Retirement Eligibility Requirements to Rule of 87	Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90
Accrued Liability	\$3,095.3 Change	\$3,042.6 (\$52.7)	\$3,029.1 (\$66.2)
Unfunded Liability	\$1,040.5 Change	\$987.8 (\$52.7)	\$974.3 (\$66.2)
Funded %	66.4% Change	67.5% 1.1%	67.8% 1.5%
Normal Cost	\$70.8 Change	\$68.3 (\$2.5)	\$67.7 (\$3.1)
ADEC for FY22	\$120.0 Change	\$112.8 (\$7.2)	\$110.9 (\$9.1)

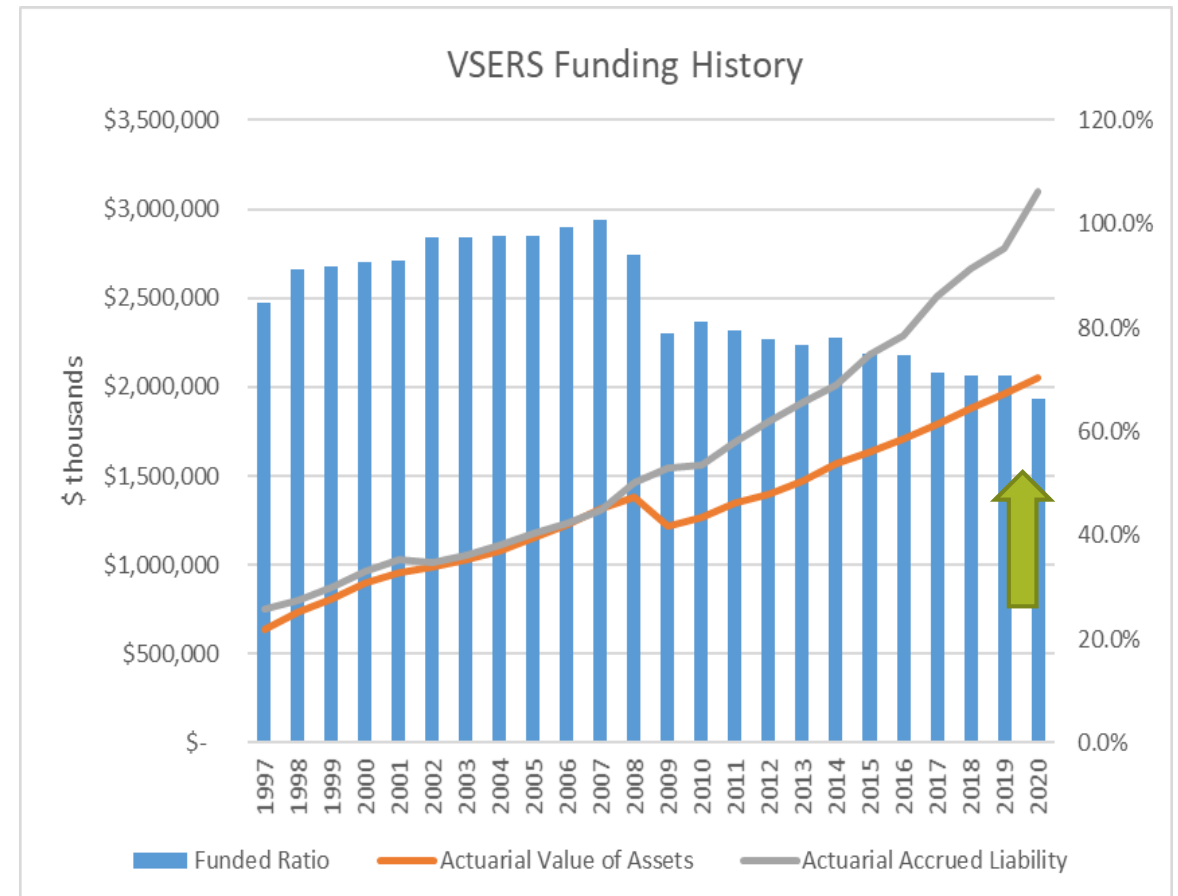
VSTRS

Description (\$ mil)	2020 Valuation Assumptions	Update all pre-Rule of 87 Retirement Eligibility Requirements to Rule of 87	Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90
Accrued Liability	\$3,969.0 Change	\$3,960.2 (\$8.8)	\$3,960.4 (\$8.6)
Unfunded Liability	\$1,933.3 Change	\$1,924.5 (\$8.8)	\$1,924.7 (\$8.6)
Funded %	51.3% Change	51.4% 0.1%	51.4% 0.1%
Normal Cost	\$72.1 Change	\$72.2 \$0.1	\$72.2 \$0.0
ADEC for FY22	\$196.2 Change	\$195.5 (\$0.7)	\$195.5 (\$0.7)

Strategies to Increase Assets

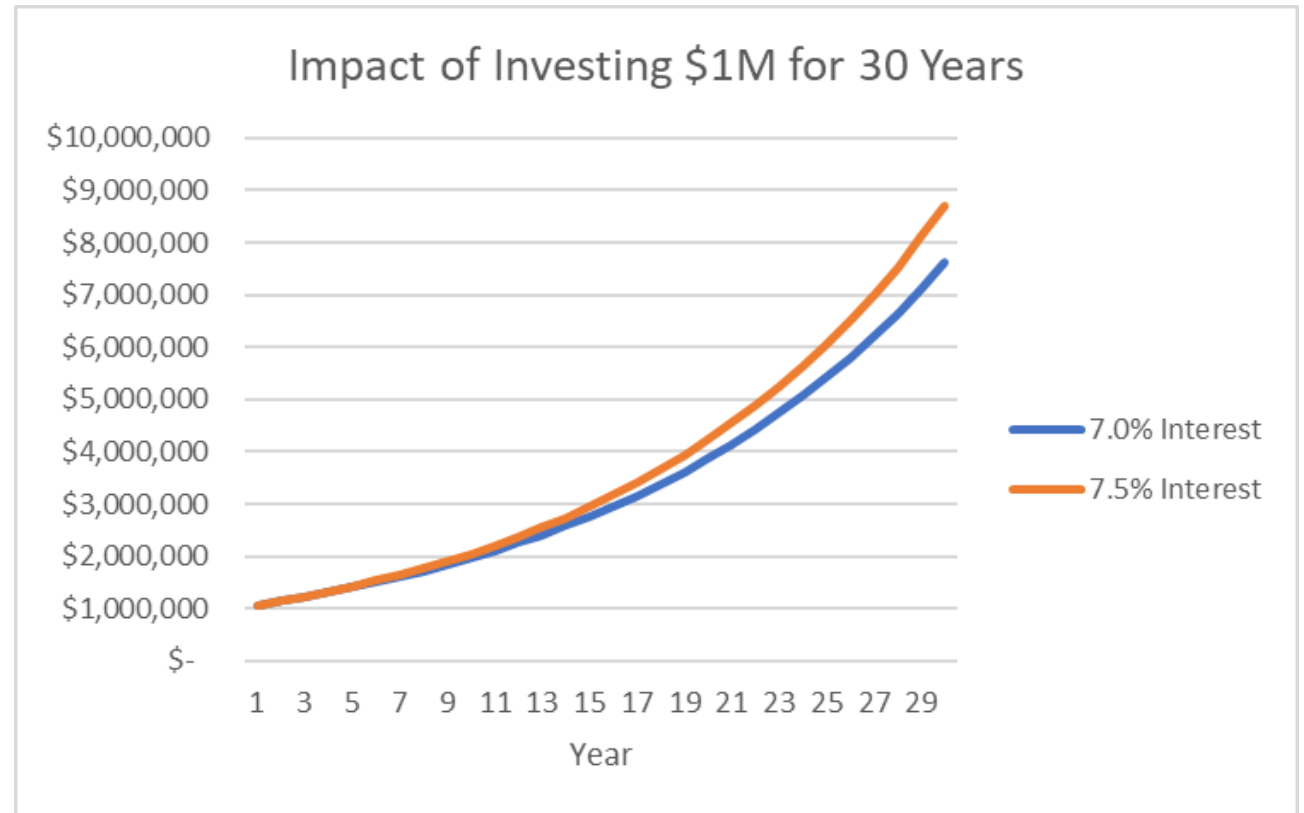
In addition to strategies aimed at lowering liabilities, strategies can be pursued to increase the plan's assets:

- Constant focus on investment managers to ensure the fund is receiving strong performance at minimal expense is important. Hit the assumed rate of return over time!
 - *Remember – Pension plans invest differently than individuals! More focused on diversification, less tolerance for risk and volatility.*
- Find ways to put more money into the fund:
 - Invest one-time funds toward paying down long-term liabilities.
 - Additional dedicated revenue sources
 - Employee contribution rates



Strategies to Increase Assets

- Invest one-time revenues toward paying down the unfunded pension liabilities.
 - Remember the power of compound interest over time!
 - The more you invest now, the greater the gain in the future. Time is your friend!
 - \$1M invested at 7% grows to \$7.6M in 30 years.
- Dedicating revenue sources to paying down pension liabilities can help relieve budgetary pressure from ADEC payments – particularly if they are new revenue sources.
- Use some unanticipated revenue to fund a reserve account to help offset year-to-year volatility in ADEC payments. Doing so can help ensure the ADEC payment is always fully made – particularly if the ADEC increases significantly due to market performance or experience, or the state is facing a budget shortfall. **BUT** – funds would likely earn a higher rate of return if they were invested directly in the pension portfolio instead.
- Increase or restructure employee contribution rates.



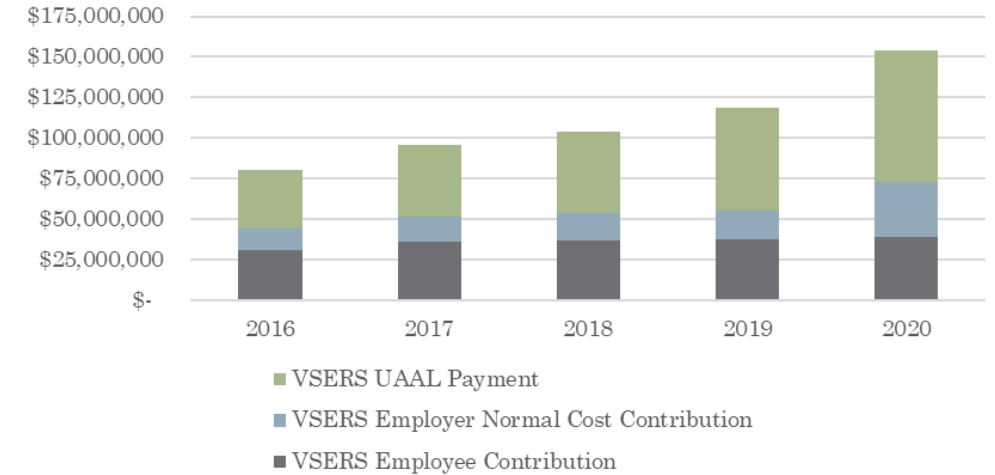
Strategies to Increase Assets

Increase or Restructure Employee Contribution Rates

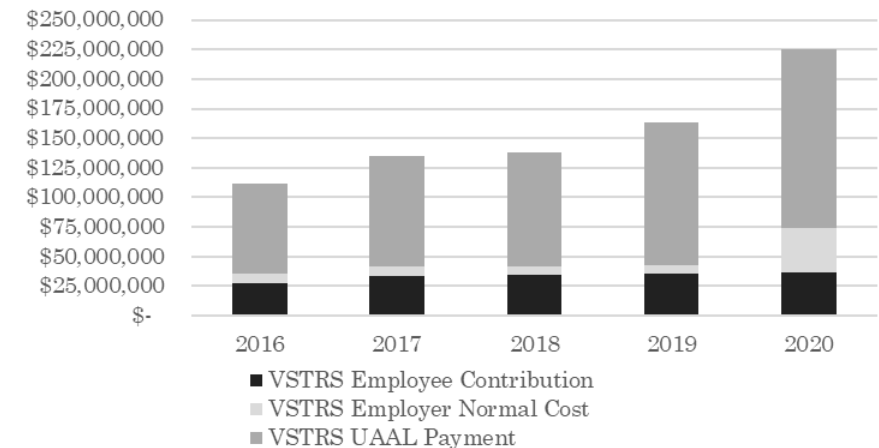
- Employees now pay a fixed percentage contribution rate regardless of how well the pension fund is doing. Most VSERS active employees currently pay 6.65% of gross salary (Group C: 8.53%). Most VSTRS active employees currently pay 5-6% of gross salary.
- Over time, employee contributions have represented a smaller share of the total amount paid into the pension fund each year.
- Employee contributions pay a smaller share of the normal cost than they once did – they do not fully pay for the cost of the retirement benefits accrued by the workforce in a given year, and the rest of that cost (along with the payment on the unfunded liability) is paid by employer through the ADEC.
- As of FY21, VSERS employee contributions cover 53.5% of the normal cost and 25.4% of the total annual payment to the pension fund. VSTRS employee contributions cover 49.4% of the normal cost and 16.4% of the total annual payment into the pension fund.

Year Beginning July 1	VSERS – Employee % of Total Contribution	VSERS – Employer % of Total Contribution	VSTRS – Employee % of Total Contribution	VSTRS – Employer % of Total Contribution
2016	38.2%	61.8%	24.9%	75.1%
2017	37.2%	62.8%	25.1%	74.9%
2018	35.5%	64.5%	24.8%	75.2%
2019	31.5%	68.5%	21.6%	78.4%
2020	25.4%	74.6%	16.4%	83.6%

VSERS Employee and Employer Required Contributions



VSTRS Employee and Employer Required Contributions



Strategies to Increase Assets

Increase or Restructure Employee Contribution Rates

- Employee contribution rates can be structured different ways:
 - Flat across-the-board contribution rates
 - Tiered/progressive rates – the more you earn, the more you pay.
 - Fixed vs. variable rates
 - Tie contribution rates to a percentage of normal cost.
 - Supplemental surcharges on top of regular contribution rates that are triggered by pension health metrics (achieving a certain funding ratio, ARR, etc).
- Additional employee contributions in isolation will not lower the pension liability, but they can lower the cost to the employer through lower ADEC payments.

VSERS

Description (\$ mil)	2020 Valuation Assumptions	Increase Employee Contribution Rates by 0.35%	Increase Employee Contribution Rates by 0.60%	Increase Employee Contribution Rates by 0.85%	Increase Employee Contribution Rates by 1.10%	Increase Employee Contribution Rates by 1.35%
ADEC for FY22	\$120.0 Change	\$117.9 (\$2.1)	\$116.5 (\$3.5)	\$115.0 (\$5.0)	\$113.5 (\$6.5)	\$112.0 (\$8.0)
PV of Add'l Employee Contribution from FY22-FY39	N/A	\$23.1	\$39.7	\$56.2	\$72.8	\$89.3

Description (\$ mil)	2020 Valuation Assumptions	7.4% on salary up to \$54,000 8% on salary between \$54,000-\$65,800 9% on salary between \$65,800 - \$81,000 10% on salary above \$81,000	7.4% on salary up to \$40,000 8% on salary between \$40,000-\$60,000 9% on salary between \$60,000 - \$80,000 10% on salary above \$80,000
ADEC for FY22	\$120.0 Change	\$113.8 (\$6.2)	\$113.0 (\$7.0)
Effective Member Contribution Rate for Salary of \$60,000	6.65%	7.46%	7.60%
Effective Member Contribution Rate for Salary of \$100,000	6.65%	8.21%	8.36%

VSTRS

Description (\$ mil)	2020 Valuation Assumptions	6.75% on salary up to \$56,000 7.75% on salary between \$56,000 - \$66,800 8.75% on salary between \$66,800 - \$78,000 10% on salary above \$78,000		6.75% on salary up to \$45,000 7.75% on salary between \$45,000 - \$60,000 8.75% on salary between \$60,000 - \$75,000 10% on salary above \$75,000	
		Member rates for those currently at 5% contribution level are 1% lower than rates shown above	Those currently at 5% contribution level increase to levels shown above	Member rates for those currently at 5% contribution level are 1% lower than rates shown above	Those currently at 5% contribution level increase to levels shown above
ADEC for FY22	\$196.2 Change	\$189.3 (\$6.9)	\$185.7 (\$10.5)	\$188.0 (\$8.2)	\$184.5 (\$11.7)
Effective Member Contribution Rate for Salary of \$60,000	5.00% 6.00%	5.82% 6.82%	6.82%	6.00% 7.00%	7.00%
Effective Member Contribution Rate for Salary of \$100,000	5.00% 6.00%	6.80% 7.80%	7.80%	7.01% 8.01%	8.01%

Description (\$ mil)	2020 Valuation Assumptions	Increase Employee Contribution Rates to 7.0%	Increase Employee Contribution Rates by 0.60%	Increase Employee Contribution Rates by 0.85%	Increase Employee Contribution Rates by 1.10%	Increase Employee Contribution Rates by 1.35%
ADEC for FY22	\$196.2 Change	\$185.6 (\$10.6)	\$183.9 (\$12.3)	\$182.1 (\$14.1)	\$180.4 (\$15.8)	\$178.7 (\$17.5)
PV of Add'l Employee Contribution from FY22-FY39	N/A	\$106.4	\$126.2	\$146.1	\$166.0	\$185.8

Other Retirement Models

- Some states have explored alternative plan models (other than traditional DBs) – primarily for new hires. But despite much conversation, few states have abandoned DB models entirely. Most states now offer a DC plan as an option. There are pro's and con's to all models and much depends on the details of how they work.
- More commonly, new DB plans have been designed with features to share more risk with employees and reduce risk to employers:
 - New DB plans may have less generous benefit calculations and/or require higher employee contribution rates.
 - Plans may assess higher employee contributions and/or structure their COLAs in a manner that's tied to the overall health of the pension fund.
 - Higher employee contributions if the fund misses its investment assumption or falls below a funded ratio.
 - COLAs tied to similar metrics rather than automatic
 - Hybrid models – May include both a DB plan plus a DC plan with an employer match in parallel for all employees. May also include a DB-only plan for employees up to a certain income, with an employer-matched DC plan “stacked” above that income threshold for higher earning employees.
- Generally, creating new/alternative plans for new hires has a long benefit horizon. Advantages accrue over time with attrition. Taking the long view is always important with pensions, but new plans only for new hires will provide limited relief from the immediate-term budgetary pressures caused by the ADEC and existing unfunded liability from the benefits earned already.

A Few Cautionary Notes

You can only bend down the liability cost curve so far. Pension benefits for existing retirees have a high level of legal protection so it is very difficult to lower or avoid the liabilities associated with current retirees. **The opportunities to make changes primarily involve the active workforce and future hires.**

Any changes to retirement benefits for active workers who are (or are close to) normal retirement eligibility may influence the behavior and decisions of those workers in ways that could impact both the pension system and business operations. **Unintended consequences should be understood and mitigated.**

It's important to have assumptions that are realistic and achievable. Experience deviating from assumptions is the major driver of risk. In a closed amortization system, deviations between experience and assumptions can lead to greater risk of higher fluctuations in year-to-year ADEC costs as you move through the amortization period because the investment horizon to make up for losses shrinks and there are fewer years to spread any unfunded liability payments across.

Questions?

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Thank you!



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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)
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)
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%
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%

VSERS GROUP COMPARISONS

VSERS GROUP COMPARISONS	GROUP A	GROUP C	GROUP D	GROUP F <i>Hired before 7/1/08</i>	GROUP F <i>Hired on or after 7/1/08</i>												
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	<table border="1" style="font-size: small;"> <thead> <tr> <th>Ser. Years</th> <th>Monthly Red.</th> </tr> </thead> <tbody> <tr> <td>35+</td> <td>1/8th of 1%</td> </tr> <tr> <td>30-34</td> <td>1/4th of 1%</td> </tr> <tr> <td>25-29</td> <td>1/3rd of 1%</td> </tr> <tr> <td>20-24</td> <td>5/12th of 1%</td> </tr> <tr> <td>< 20</td> <td>5/9th of 1%</td> </tr> </tbody> </table>	Ser. Years	Monthly Red.	35+	1/8 th of 1%	30-34	1/4 th of 1%	25-29	1/3 rd of 1%	20-24	5/12 th of 1%	< 20	5/9 th of 1%
Ser. Years	Monthly Red.																
35+	1/8 th of 1%																
30-34	1/4 th of 1%																
25-29	1/3 rd of 1%																
20-24	5/12 th of 1%																
< 20	5/9 th 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.