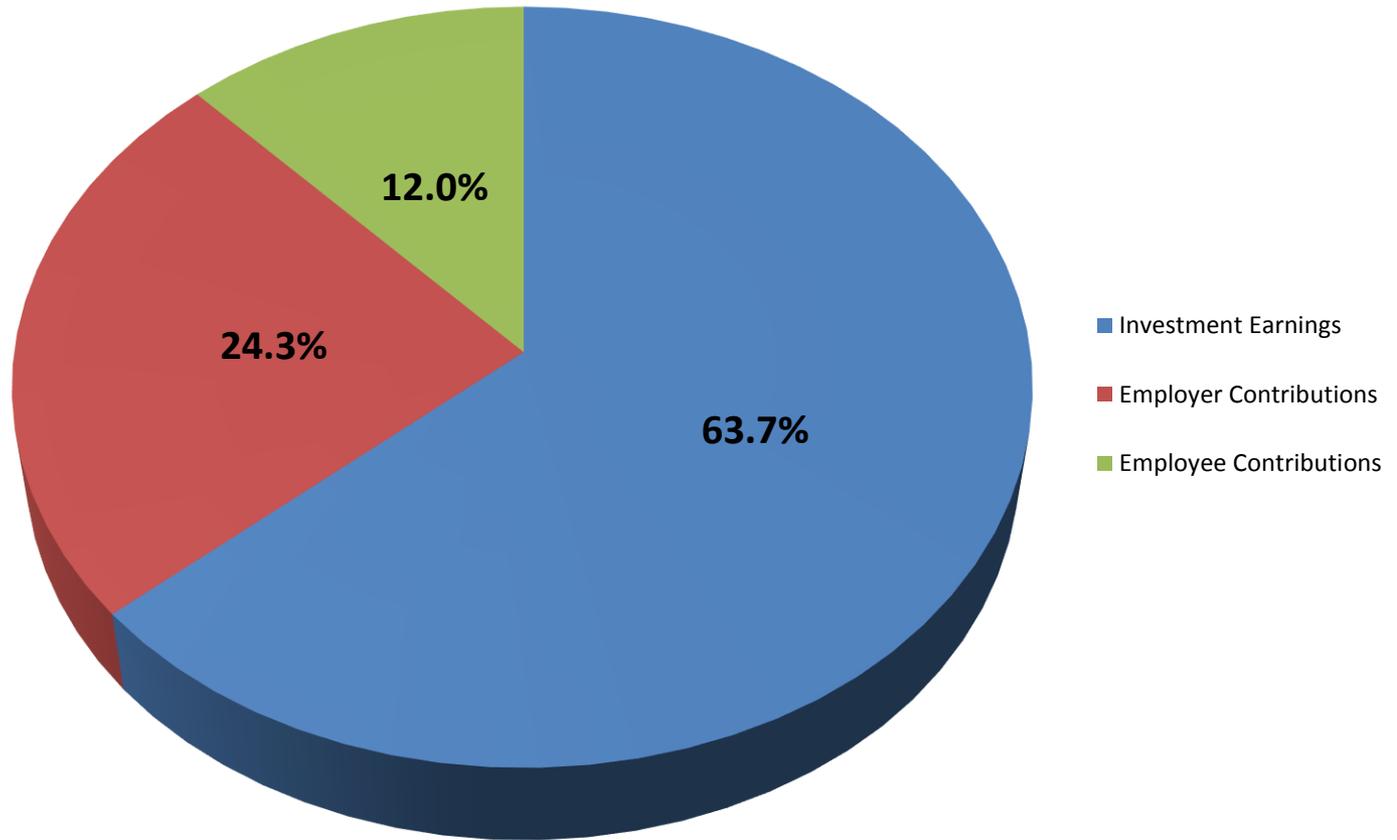


Pension Liabilities and Funding Overview

April 2016



Investment earnings comprise the greatest source of revenue



Source: NASRA, [Key Facts Regarding State and Local Government Defined Benefit Plans](#), January 2007.

Funding Progress of the Retirement Systems

State (VSERS)

(amounts in thousands)

	Year ending June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)
VSERS	2015	\$ 1,636,268	\$ 2,178,827	\$ 542,559	75.1%	\$ 462,057
	2014	1,566,076	2,010,090	444,014	77.9%	437,676
	2013	1,469,170	1,914,300	445,130	76.8%	416,766
	2012	1,400,779	1,802,604	401,825	77.7%	385,526
	2011	1,348,763	1,695,301	346,538	79.6%	398,264
	2010	1,265,404	1,559,324	293,920	81.2%	393,829
	2009	1,217,638	1,544,144	326,506	78.9%	404,516
	2008	1,377,101	1,464,202	87,101	94.1%	404,593
	2007	1,318,687	1,307,643	(11,044)	100.8%	386,917
	2006	1,223,323	1,232,367	9,044	99.3%	369,310
	2005	1,148,908	1,174,796	25,888	97.8%	349,258
	2004	1,081,359	1,107,634	26,275	97.6%	336,615
	2003	1,025,469	1,052,004	26,535	97.5%	319,855
	2002	990,450	1,017,129	26,679	97.4%	300,994
	2001	954,821	1,026,993	72,172	93.0%	278,507
	2000	895,151	967,064	71,913	92.6%	266,519
	1999	804,970	876,412	71,442	91.8%	238,281
	1998	733,716	804,501	70,785	91.2%	235,956
	1997	639,128	753,883	114,755	84.8%	227,000

Funding Progress of the Retirement Systems

Teachers (VSTRS)

(amounts in thousands)

	Year ending June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)
VSTRS	2015	\$ 1,662,346	\$ 2,837,375	\$ 1,175,029	58.6%	\$ 576,394
	2014	1,610,286	2,687,049	\$ 1,076,764	59.9%	567,074
	2013	1,552,924	2,566,834	1,013,910	60.5%	563,623
	2012	1,517,410	2,462,913	945,503	61.6%	561,179
	2011	1,486,698	2,331,806	845,108	63.8%	547,748
	2010	1,410,368	2,122,191	711,823	66.5%	562,150
	2009	1,374,079	2,101,838	727,759	65.4%	561,588
	2008	1,605,462	1,984,967	379,505	80.9%	535,807
	2007	1,541,860	1,816,650	274,790	84.9%	515,573
	2006	1,427,393	1,686,502	259,109	84.6%	499,044
	2005	1,354,006	1,492,150	138,144	90.7%	468,858
	2004	1,284,833	1,424,661	139,828	90.2%	453,517
	2003	1,218,001	1,358,822	140,821	89.6%	437,239
	2002	1,169,294	1,307,202	137,908	89.5%	418,904
	2001	1,116,846	1,254,341	137,495	89.0%	403,258
	2000	1,037,466	1,174,087	136,621	88.4%	387,999
	1999	931,056	1,065,754	134,698	87.4%	372,299
	1998	821,977	955,694	133,717	86.0%	357,899
	1997	717,396	849,179	131,783	84.5%	364,695

Funding Progress of the Retirement Systems **Municipal (VMERS)** *(amounts in thousands)*

	Year ending June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)
VMERS	2015	-----Data Pending-----				
	2014	\$ 500,558	\$ 580,972	\$ 80,414	86.2%	\$ 230,969
	2013	446,236	528,426	82,190	84.4%	220,372
	2012	417,443	488,572	71,129	85.4%	215,075
	2011	402,550	436,229	33,679	92.3%	205,589
	2010	376,153	409,022	32,869	92.0%	202,405
	2009	331,407	366,973	35,566	90.3%	191,521
	2008	348,740	343,685	(5,055)	101.5%	175,894
	2007	325,774	309,853	(15,921)	105.1%	162,321
	2006	288,347	276,552	(11,795)	104.3%	148,815
	2005	259,076	248,140	(10,936)	104.4%	146,190
	2004	232,890	225,092	(7,798)	103.5%	135,351
	2003	222,854	218,533	(4,321)	102.0%	126,216
	2002	193,278	176,109	(17,169)	109.7%	106,986
	2001	177,928	158,786	(19,142)	112.1%	101,873
	2000	161,900	138,697	(23,203)	116.7%	87,147
	1999	137,454	114,481	(22,973)	120.1%	70,808
	1998	113,678	102,005	(11,673)	111.4%	87,328
	1997	96,196	85,686	(10,510)	112.3%	70,800

Annual Required Contribution

- Method by which UAL is eventually paid off (assuming it is funded)
- Annual Required Contribution (ARC):
 - A measure of needed plan funding
 - The actuarially determined pension fund contribution in a single year
- The ARC has two parts:
 1. The Normal Cost
 - The normal cost generally represents the portion of the cost of projected benefits allocated to the current plan year.
 - The employer normal cost equals the total normal cost of the plan reduced by employee contributions.
 2. Amortization, which is the annual amount needed to eliminate the unfunded liability over the plan's amortization period

Upward Budget Pressures on Funding of the ARC

- Historical
 - Great Recession Impact
 - Lack of Funding of the ARC in past years
- Demographic/Experience and Economic Assumptions vs. Actual
- Experience Study
 - Interest Rate Assumption
 - Mortality
 - Other
- Retirement Incentive
- Teacher Retirements

FY 2015 VSERS Valuation Results

- Incorporates an FY 2017 ARC recommendation of **\$48,503,358**
 - Normal \$ 14,181,091
 - Accrued Liability Amortization \$ 34,322,267
- Increase from prior year of **\$2.3 million**
- the July experience study incorporated upward pressures due to the change from the select-and-ultimate rate of return assumption to the lower single rate return assumption of 7.95%, and new mortality assumptions. The Board wanted to undertake a further review of the components of the workforce as they related to mortality as well as salary increase assumptions. As a result two major changes were reflected in the valuation:
 - The mortality tables were adjusted to reflect a blended collar (blue collar, general collar) mix consistent with an analysis of the job titles in the active population
 - Mortality assumptions within the actuarial industry are continuing to evolve and the Treasurer's Office concurs with the Actuary's recommendation to conduct an annual review
 - Long term rates of salary increases were adjusted downward based on data supplied by HR and TRE staff

FY 2015 VSTRS Valuation Results

- Incorporates an FY 2017 ARC recommendation of **\$82,659,576**
 - Normal \$ 8,327,249
 - Accrued Liability Amortization \$ 74,332,327
- Increase from prior year of **\$6.6 million**
- The major upward cost drivers are the change from the select-and-ultimate rate of return assumption to the slightly lower single rate return assumption of 7.95%, and updated mortality assumptions
- Increasing amortization payments have greater impact on VSTRS
- Increase in retirements, local workforce changes
- Overall, the number of active teachers continues to decline

VSTRS- Funding History

Year	Total VSTRS Payroll	Recommended Contribution For Budget Based on Actuarial Projection	Actual Contribution	\$ Difference: Act vs. Rec. (Uses Budget Beginning 1996)	Percentage of Request	Actual Contribution as a Percentage of Payroll
1979	96,725,620	7,806,825	4,825,155	2,981,670	61.8%	5.0%
1980	104,521,888	8,944,090	8,471,960	472,130	94.7%	8.1%
1981	112,811,389	9,862,861	8,830,900	1,031,961	89.5%	7.8%
1982	126,748,398	10,200,209	7,822,760	2,377,449	76.7%	6.2%
1983	139,085,342	10,721,814	10,929,355	(207,541)	101.9%	7.9%
1984	153,329,729	12,341,069	11,592,100	748,969	93.9%	7.6%
1985	169,219,652	13,475,181	12,567,866	907,315	93.3%	7.4%
1986	187,834,677	14,668,095	14,461,148	206,947	98.6%	7.7%
1987	206,728,650	15,925,452	16,239,416	(313,964)	102.0%	7.9%
1988	230,430,153	16,294,346	17,186,259	(891,913)	105.5%	7.5%
1989	261,596,990	18,072,172	19,000,000	(927,828)	105.1%	7.3%
1990	273,951,188	21,320,155	19,561,000	1,759,155	91.7%	7.1%
1991	298,104,184	25,013,437	15,000,000	10,013,437	60.0%	5.0%
1992	312,346,750	28,595,220	14,618,992	13,976,228	51.1%	4.7%
1993	324,536,824	28,819,875	19,890,048	8,929,827	69.0%	6.1%
1994	335,155,405	25,805,408	20,580,000	5,225,408	79.8%	6.1%
1995	346,975,007	27,451,926	18,080,000	9,371,926	65.9%	5.2%
1996	355,894,809	29,884,559	11,480,000	18,404,559	38.4%	3.2%
1997	364,695,370	30,954,237	18,080,000	12,874,237	58.4%	5.0%
1998	357,899,112	33,519,949	18,106,581	15,413,368	54.0%	5.1%
1999	372,298,852	27,232,542	18,080,000	9,152,542	66.4%	4.9%
2000	387,998,959	23,573,184	18,586,240	4,986,944	78.8%	4.8%
2001	403,258,305	20,882,521	19,143,827	1,738,694	91.7%	4.7%
2002	418,904,021	21,965,322	20,446,282	1,519,040	93.1%	4.9%
2003	437,238,543	23,197,088	20,446,282	2,750,806	88.1%	4.7%
2004	453,517,153	29,608,892	24,446,282	5,162,610	82.6%	5.4%
2005	486,857,658	43,592,332	24,446,282	19,146,050	56.1%	5.0%
2006	499,044,327	49,923,599	24,985,506	24,938,093	50.0%	5.0%
2007	515,572,694	38,200,000	38,496,410	(296,410)	100.8%	7.5%
2008	535,807,012	40,749,097	40,955,566	(206,469)	100.5%	7.6%
2009	561,588,013	37,077,050	37,349,818	(272,768)	100.7%	6.7%
2010	562,149,916	41,503,002	41,920,603	(417,601)	101.0%	7.5%
2011	547,748,405	48,233,006	50,268,131	(2,035,125)	104.2%	9.2%
2012	561,179,272	51,241,932	56,152,011	(4,910,079)	109.6%	10.0%
2013	563,623,421	60,182,755	65,086,320	(4,903,565)	108.1%	11.5%
2014	567,073,601	68,352,825	72,668,412	(4,315,587)	106.3%	12.8%
2015	576,393,699	72,857,863	72,908,805	(50,942)	100.1%	12.6%

Amortization

- The amortization period is the expected period of time for UAAL to be paid-in-full
- Amortization payment (of unfunded actuarial accrued liability) : That portion of the ARC plan contribution which is designed to pay interest on and to amortize the UAAL
- Three methods for public plans:
 1. Open amortization period: A period that begins again each time a new actuarial valuation is performed. This is analogous to getting a new 30 year mortgage every year for the unpaid balance of the mortgage started the previous year
 2. Closed amortization period: A specific number of years that is counted from one date and decreases by one each year. This is analogous to a 30 year mortgage (with no re-financing)
 3. Recalculated amortization period: A period that is recalculated each time a new actuarial valuation is performed. This type of amortization commonly applies to plans with a fixed contribution rate (e.g., set in statute)
 - Source: PRB, Understanding the Basics of Actuarial Methods, April 2013

Amortization Schedule:

- While the State has a date set in statute, 2038, to pay down the unfunded liability, the payment schedule increases in 5% increments each year
- This has the effect of increasing interest costs associated with the payment of these liabilities
- Leveling out the payment schedule would:
 - increase ARC payments in the short-term but have the effect of saving the taxpayers millions of dollars over the long-term
 - more rapid reduction of the unfunded liability
- Changes to amortization schedule can be phased-in to cushion budgetary impact
- Treasurer's Office staff have proposed statutory changes phasing in a payment schedule with increases at 3% increments each year, closer to the rate of inflation. Interest savings through 2038 estimated at, \$165 million to \$213 million, depending on phase-in period.

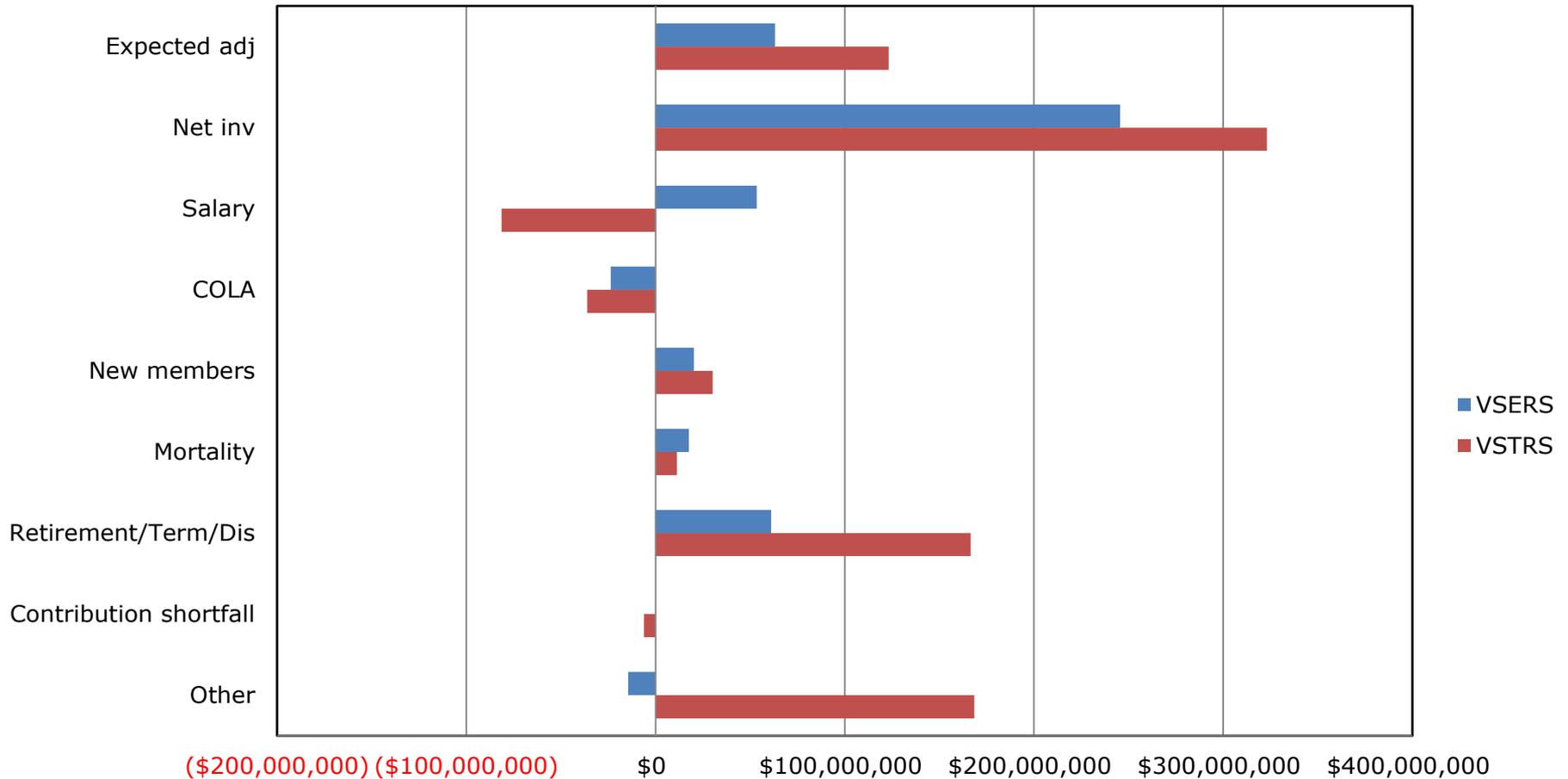
Actuarial Gains or Losses

- A pension plan has actuarial gains or losses each year because the actual events during the year (“experience”) do not exactly match the long-term assumptions previously made
- Economic Gains/Losses: Gains or losses on plan assets occur because the actual investment returns were higher or lower than anticipated
- Experience and Demographic Gains or losses: Can occur because long-term assumptions (e.g., mortality, salary increases, termination, retirement) were not met
- An experience study is completed to reset assumptions

Drivers of Changes in the Unfunded Liability

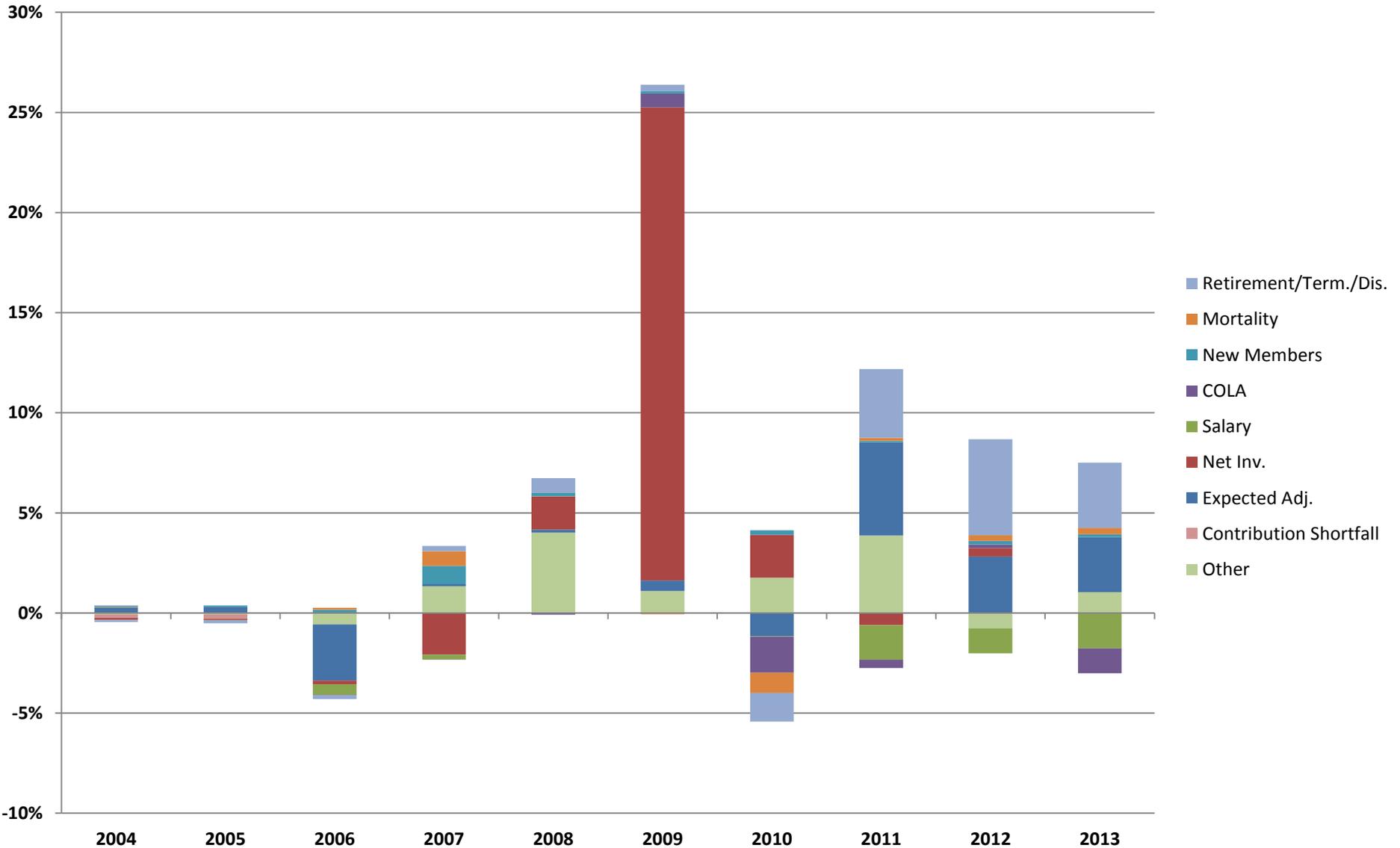
Cumulative impacts on unfunded liability 2003 – 2013

(Positive Numbers Reflect Negative Experience that Increased the Liability)



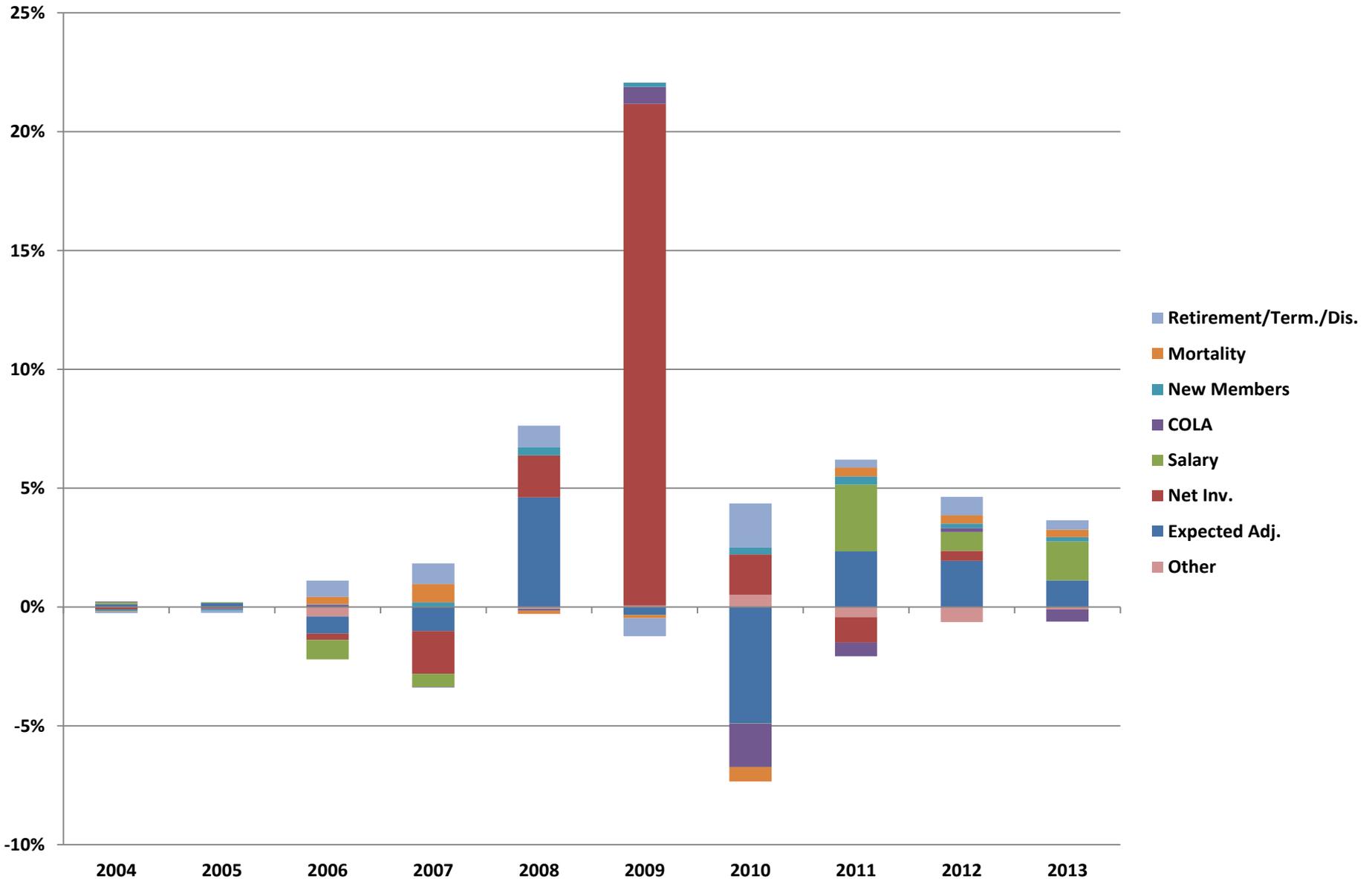
VSTRS - Breakdown of Yearly Change in Unfunded Liabilities

(Positive Numbers Reflect Negative Experience that Increased the Liability; % of avg AUM)

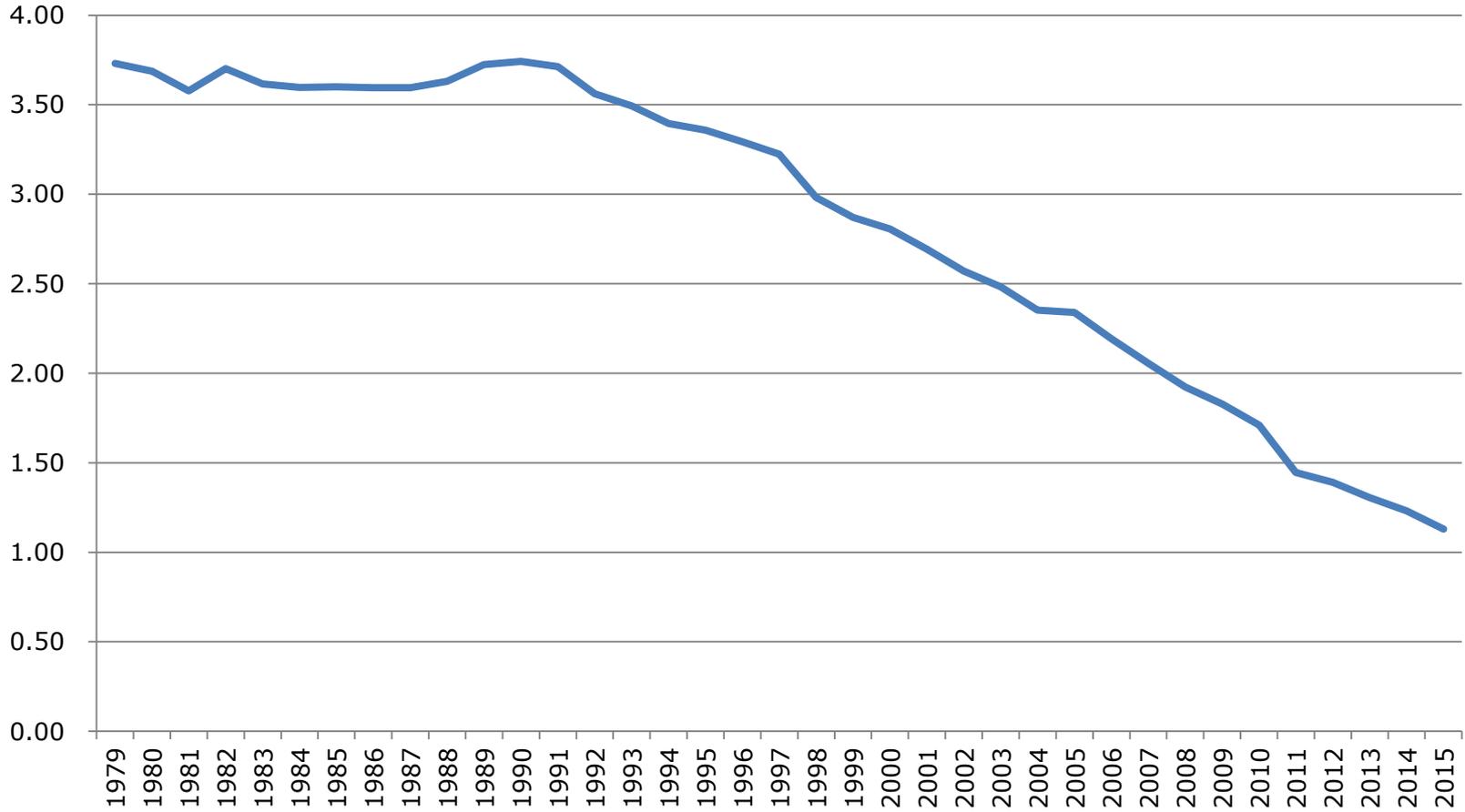


VSERS - Breakdown of Yearly Change in Unfunded Liability

(Positive Numbers Reflect Negative Experience that Increased the Liability; % of avg AUM)



VSTRS Active to Retiree Ratio



Issues related to Active to Retiree Ratio

- Unlike a “pay-as-you-go” plan such as Social Security, the actuary takes this in account when developing models to prefund benefits.
- The increasing trend may get ahead of actuarial demographic assumptions, creating actuarial losses.
- Trends are indicative of a maturing plan and can make it more difficult to achieve the objectives of full funding.
- Potentially creates more volatility in employer contribution rates.
- As more funds are needed for benefit payments, the system has a greater negative cash flow (benefit payments exceed contributions), requiring more liquid assets to fund these payments.
- Impacts asset allocation strategy over time. May have VPIC impacts.