



Teachers' and State Employees' Retirement System Principal Results of Actuarial Valuation as of December 31, 2013

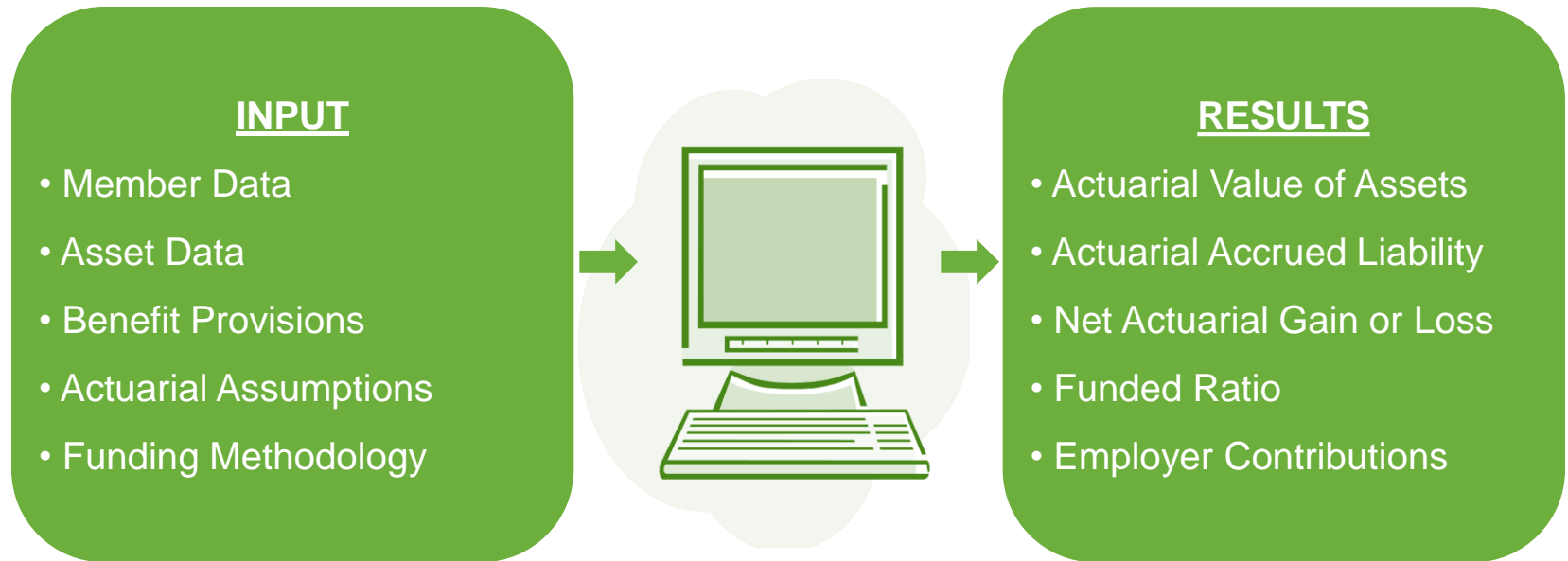
Board of Trustees Meeting
Larry Langer and Mike Ribble
October 23, 2014

Purpose of the Annual Actuarial Valuation

- As of the end of each calendar year:
 - An annual actuarial valuation is performed on TSERS
 - The actuary determines the amount of employer contributions to be made to TSERS during each member's career that, when combined with investment return and member contributions, such contributions are expected to be sufficient to pay for retirement benefits.
- In addition, the annual actuarial valuation is performed to:
 - Determine the progress on funding TSERS,
 - Explore why the results of the current valuation differ from the results of the valuation of the previous year, and
 - Satisfy regulatory and accounting requirements.

The Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process.



A detailed summary of the valuation process and a glossary of actuarial terms are provided in Appendix A of the actuarial report.

Key Takeaways

Key results of the December 31, 2013 valuation as compared to the December 31, 2012 valuation were:

- Market value returns of 12.21% compared to 7.25% assumed
- Increase in covered payroll of 0.5% compared to 3% assumed increase
- Recent legislation signed into law including:
 - 1% cost-of-living adjustment at July 1, 2014
 - Return to five-year vesting for all active members
 - Return of contributions with interest to all members who terminate employment prior to meeting vesting requirements
- No significant changes in actuarial assumptions or funding methodology from the prior year's valuations

When compared to the December 31, 2012 baseline projections, the above resulted in:

- Slightly higher funded ratio as of December 31, 2013 (94.8% in the valuation compared to 93.9% in the baseline projection)
- Lower employer required contribution rate for fiscal year ending June 30, 2016 (8.69% in the valuation compared to 9.15% in the baseline projection)
- Lower projected benefit amounts being accrued by active members



Valuation Input

Valuation Input Membership Data



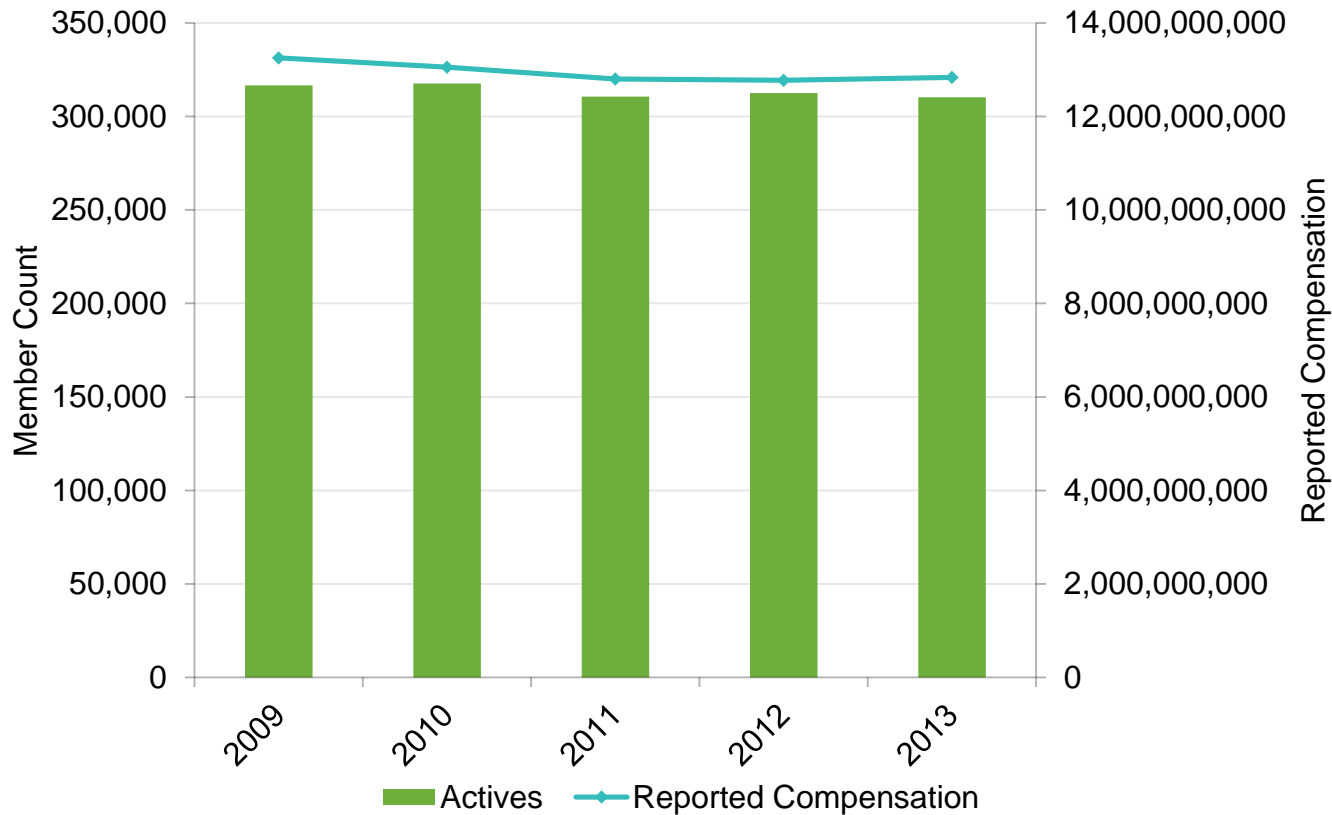
Number as of	December 31, 2013	December 31, 2012
Active members	310,370	312,512
Members currently receiving Disability Income Plan benefits	7,639	7,487
Terminated members and survivors of deceased members entitled to benefits but not yet receiving benefits	125,513	117,489
Retired members and survivors of deceased members currently receiving benefits	<u>187,448</u>	<u>179,908</u>
Total	630,970	617,396

The number of active members decreased by 0.7% from the previous valuation date. The decrease in active members results in less benefits accruing, but also fewer contributions supporting the system.

The number of retired members and survivors of deceased members currently receiving benefits increased by 4.2% from the previous valuation. The increase in retiree population is consistent with expectations.

A detailed summary of the membership data used in this valuation is provided in Section 3 and Appendix B of the actuarial report.

Membership Data: Active Members

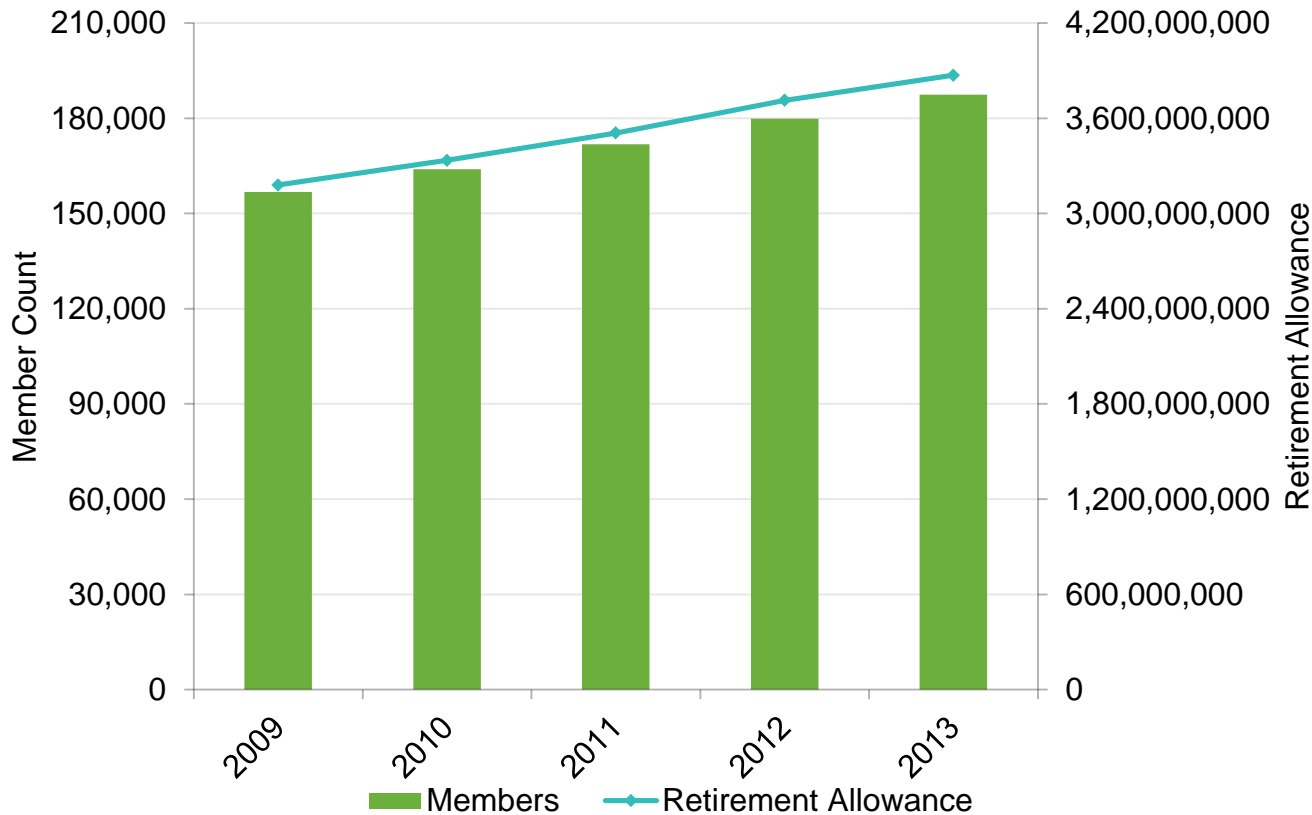


Reported compensation has increased by 0.5% after decreasing slightly in previous years. The valuation assumes covered payroll will increase by 3% annually in the future.

Payroll that is not increasing as fast as we assume results in less benefits accruing than we anticipate, but also fewer contributions supporting the system.

A detailed summary of the membership data used in this valuation is provided in Section 3 and Appendix B of the actuarial report.

Membership Data: Retired Members and Survivors of Deceased Members



The number of retired members and survivors of deceased members and the benefits paid to these members has been increasing steadily, as expected based on plan assumptions.

A detailed summary of the membership data used in this valuation is provided in Section 3 and Appendix B of the actuarial report.

Asset Data: Market Value of Assets

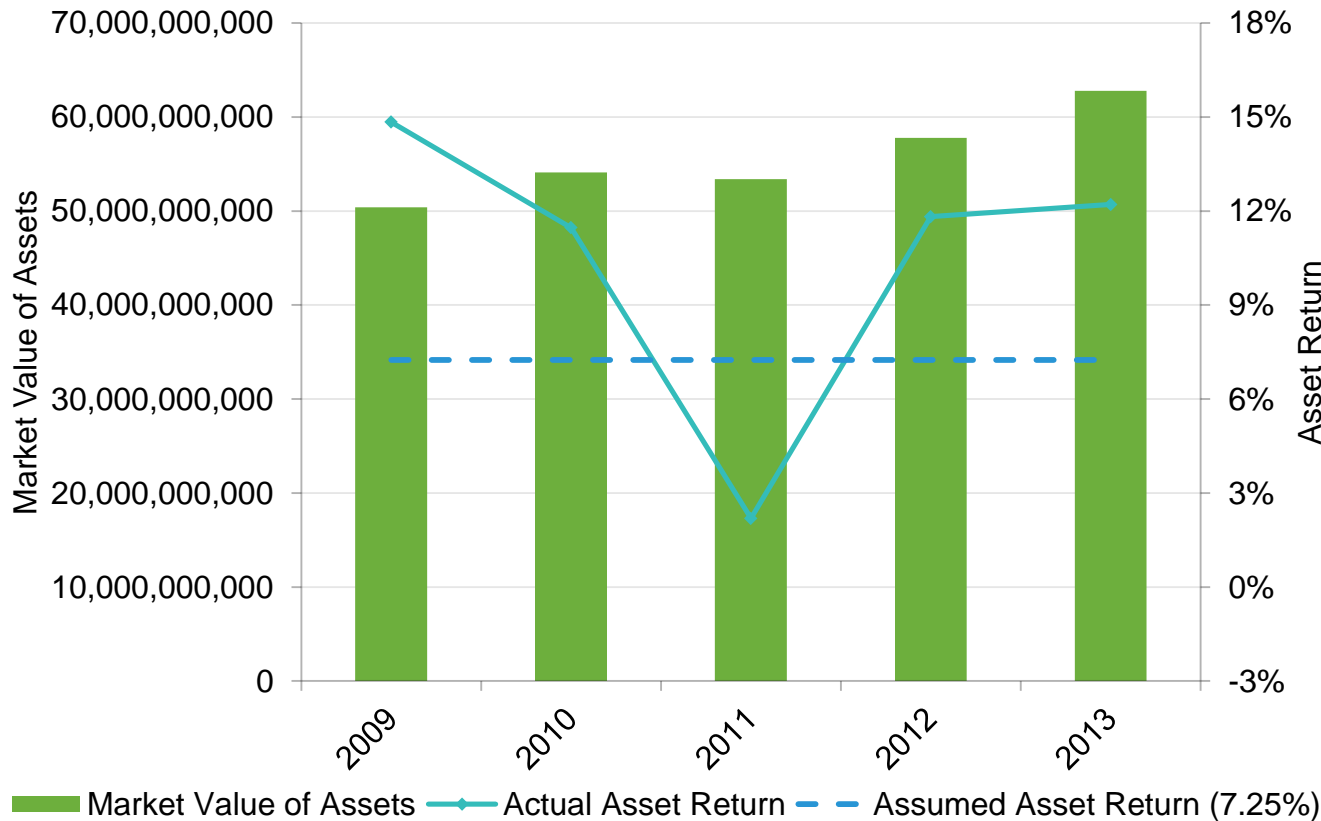


Asset Data as of	December 31, 2013	December 31, 2012
Beginning of Year Market Value of Assets	\$57,780,471,482	\$53,402,204,951
Contributions	1,985,865,560	1,897,179,772
Benefit Payments	(3,914,014,907)	(3,725,310,777)
Investment Income	<u>6,937,129,059</u>	<u>6,206,397,536</u>
Net Increase/(Decrease)	5,008,979,712	4,378,266,531
End of Year Market Value of Assets	\$62,789,451,194	\$57,780,471,482
Estimated Net Investment Return on Market Value	12.21%	11.82%

The Market Value of Assets is \$62.8 billion as of December 31, 2013 and \$57.8 billion as of December 31, 2012. The investment return for the market value of assets for calendar year 2013 was 12.21%.

The market value of assets is provided in Section 4 of the actuarial report.

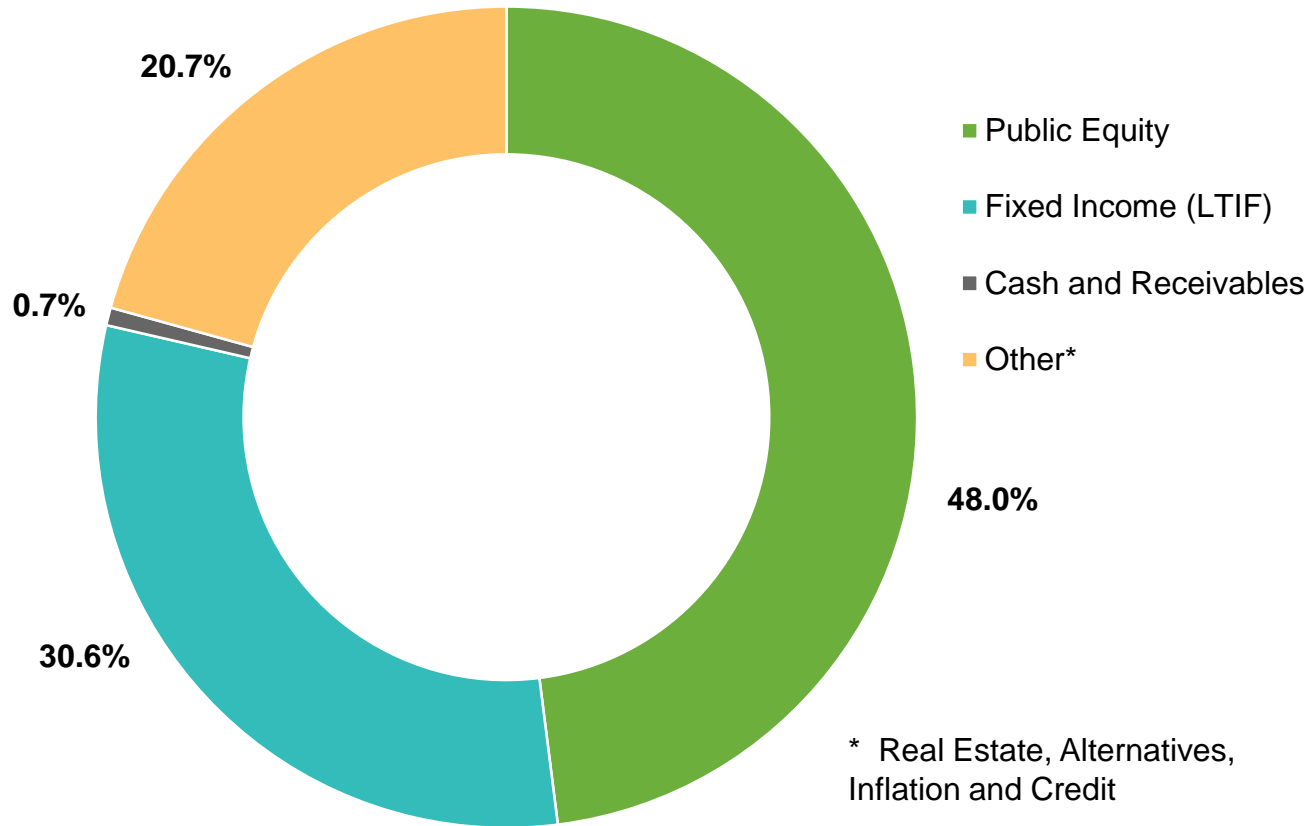
Asset Data: Market Value of Assets and Asset Returns



Returns were more than the 7.25% assumed rate of return, resulting in lower contributions and higher funded ratio than anticipated as of December 31, 2012 based on the baseline projections presented at the January 2014 Board meeting.

A detailed summary of the market value of assets is provided in Section 4 of the actuarial report.

Asset Data: Allocation of Investments by Category



Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, as reviewed in the last experience study, the 7.25% discount rate used in this valuation is reasonable and appropriate.

The discount rate will be reviewed at the next experience study to be presented to the Board in October 2015.

A detailed summary of the market value of assets is provided in Section 4 of the actuarial report.

Valuation Input Benefit Provisions



Benefit provisions are described in North Carolina General Statutes, Chapter 135.

Significant changes in benefit provisions from the prior year's valuation were:

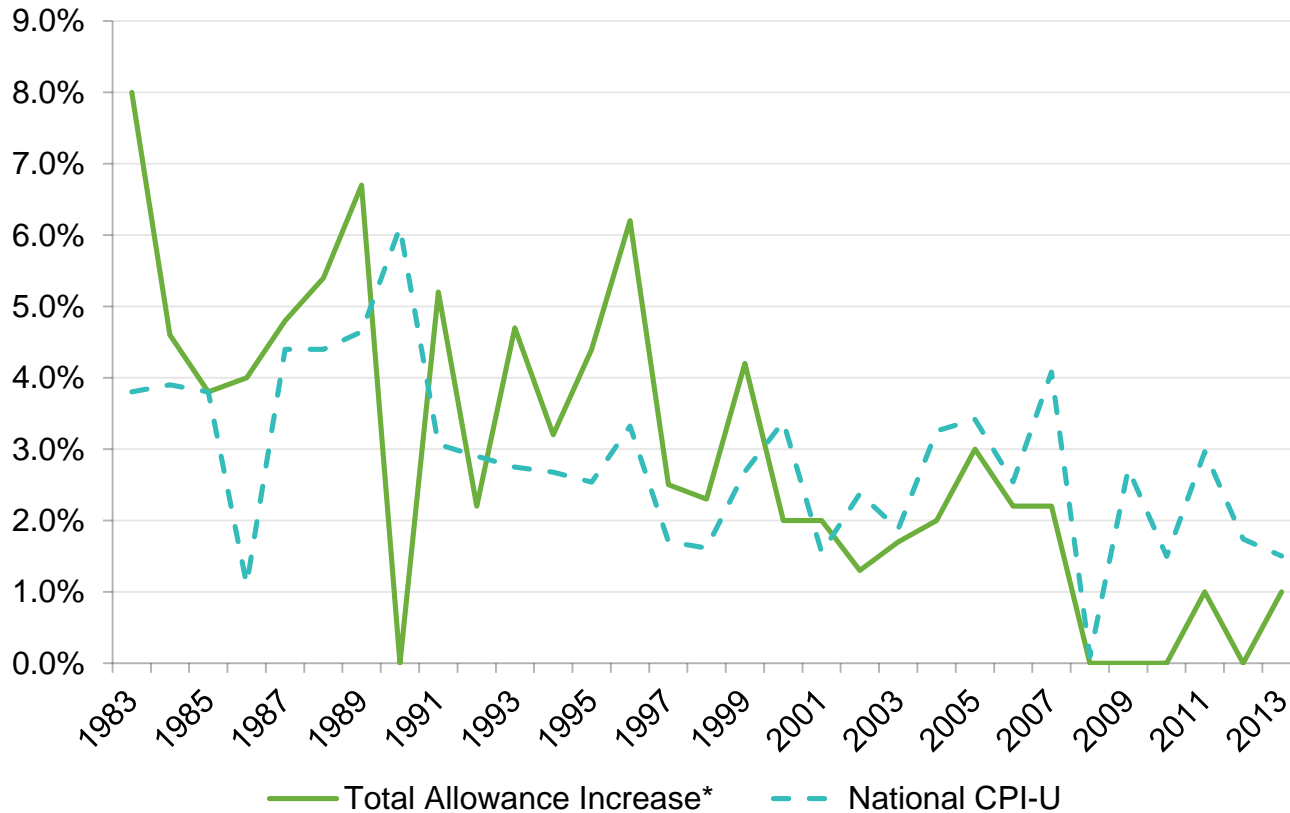
- 1% cost-of-living adjustment at July 1, 2014
- Return to five-year vesting for all active members
- Return of contributions with interest to all members prior to meeting vesting requirements

Most Public Sector Retirement Systems in the United States have undergone pension reform where the benefits of members (current retirees and active or future members) have been reduced

Because of the well-funded status of TSERS due to the legislature contributing the actuarially required contribution, benefit cuts have not been needed in North Carolina. Instead, we have seen a modest expansion of benefits this past year based on sound plan design.

A detailed summary of the benefit provisions is provided in Appendix C of the actuarial report.

Benefit Provisions: Cost-of-Living Allowance Increase and CPI-U History



* Allowance increases are effective July 1 of the following year.

Generally the ad-hoc retirement allowance increase policy has helped retirees maintain purchasing power while helping to moderate contribution increases during times of down markets.

A detailed summary of the benefit provisions is provided in Appendix C of the actuarial report.

Valuation Input Actuarial Assumptions

- Demographic (future events that relate to people)
 - Retirement
 - Termination
 - Disability
 - Death
- Economic (future events that relate to money)
 - Interest rate – 7.25% per year
 - Salary increase (individual, varies by service)
 - Inflation – 3.00%
 - Real wage growth – 0.50%
- There were no significant changes in actuarial assumptions from the prior year's valuation.



The latest assumptions were adopted for use with the December 31, 2009 actuarial valuation, based on the experience study prepared as of December 31, 2009 and adopted by the Board of Trustees on October 21, 2010.

The next experience study will be prepared as of December 31, 2014 and presented to the Board in October 2015. This policy of reviewing assumptions every five years is a best practice.

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of the actuarial report.

Valuation Input Funding Methodology



The Funding Methodology is the payment plan for the TSERS and is composed of the following three components:

- Actuarial Cost Methods allocate costs to the actuarial accrued liability (i.e. the amount of money that should be in the fund) for past service and normal cost (i.e. the cost of benefits accruing during the year) for current service.
 - The Board of Trustees has adopted Entry Age Normal as its actuarial cost method
 - Develops normal costs that stays level as a percent of payroll
- Asset Valuation Methods smooth or average the market value returns over time to alleviate contribution volatility that results from market returns.
 - 20% of market value plus 80% of the expected actuarial value
 - Assets corridor: not greater than 120% of market value and not less than 80% of market value

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of the actuarial report.

Funding Methodology (continued)



- Amortization Methods determine the payment schedule for unfunded actuarial accrued liability (i.e. the difference between the actuarial accrued liability and actuarial value of assets)
 - Payment level: the payment is determined as a level dollar amount, similar to a mortgage payment
 - Payment period: a 12-year closed amortization period was adopted for fiscal year ending 2012. A new amortization base is created each year based on the prior years' experience.
- There were no significant changes in funding methodology from the prior year's valuation.

When compared to other Public Sector Retirement Systems in the United States, the funding policy for TSERS is quite aggressive in that the policy pays down the pension debt over a much shorter period of time (12 years) compared to the national average of around 24 years. As such it is a best practice in the industry.

A detailed summary of the actuarial assumptions and methods is provided in Appendix D of the actuarial report.



Valuation Results

Valuation Results

Actuarial Value of Assets



Asset Data as of	December 31, 2013
(a) Beginning of Year Actuarial Value of Assets	\$59,911,833,028
(b) Contributions	1,985,865,560
(c) Benefit Payments	<u>(3,914,014,907)</u>
(d) Net Cash Flow: (b) + (c)	(1,928,149,347)
(e) Expected Investment Return: [(a) x 7.25%] + [(d) x 3.625%]	4,273,712,481
(f) Expected End of Year Actuarial Value of Assets: (a) + (d) + (e)	62,257,396,162
(g) End of Year Market Value of Assets	62,789,451,194
(h) Excess of Market Value over Expected Actuarial Value of Assets: (g) – (f)	532,055,032
(i) 20% Adjustment toward Market Value of Assets: (h) x 20%	106,411,006
(j) Preliminary End of Year Actuarial Value of Assets: (f) + (i)	62,363,807,168
(k) Final End of Year Actuarial Value of Assets: (j) not less than 80% of (g) and not greater than 120% of (g)	62,363,807,168
(l) Estimated Net Investment Return on Actuarial Value	7.43%

The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution.

Higher than expected returns in 2009, 2010, 2012 and 2013 resulted in a \$106 million asset gain recognition this year (item (i)).

The Actuarial Value of Assets is provided in Section 4 of the actuarial report.

Valuation Results

Historical Asset Returns



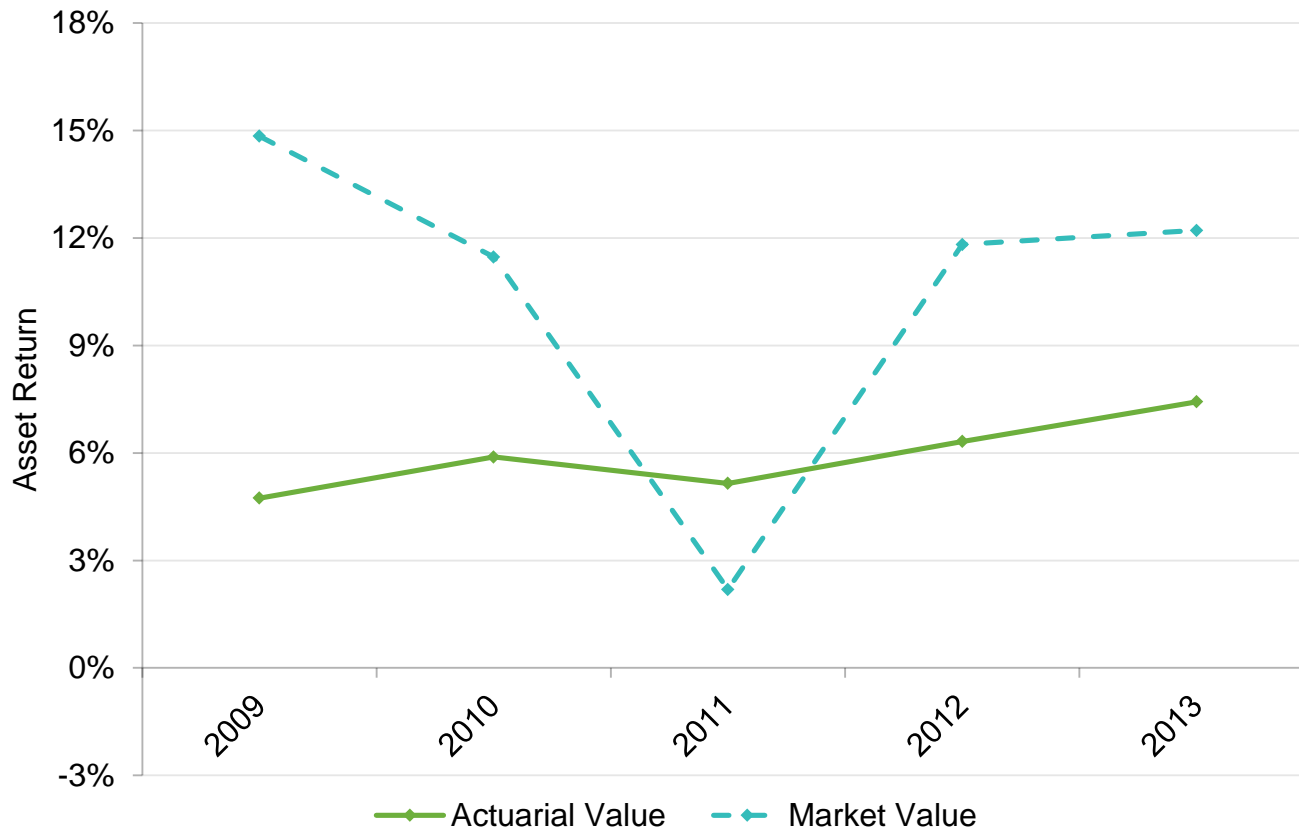
Calendar Year	Actuarial Value of Asset Return	Market Value of Asset Return
2006	8.94%	11.41%
2007	8.87%	8.38%
2008	2.89%	(19.50)%
2009	4.74%	14.84%
2010	5.89%	11.47%
2011	5.15%	2.19%
2012	6.32%	11.82%
2013	7.43%	12.21%
Average	6.26%	6.01%
Range	6.05%	34.34%

The average investment return recognized for purposes of determining the annual change in contribution each year is the actuarial value of assets return.

Currently, the average actuarial return of 6.26% tracks average market return of 6.01% rather well. But the range of returns is markedly less – 6.05% versus 34.34%. This results in much lower employer contribution volatility using the actuarial value of assets versus market, while ensuring that the actuarial needs of TSERS are met.

The valuation assumes that the funds will earn a 7.25% asset return. This table provides a history of the Actuarial Value and Market Value of Asset returns.

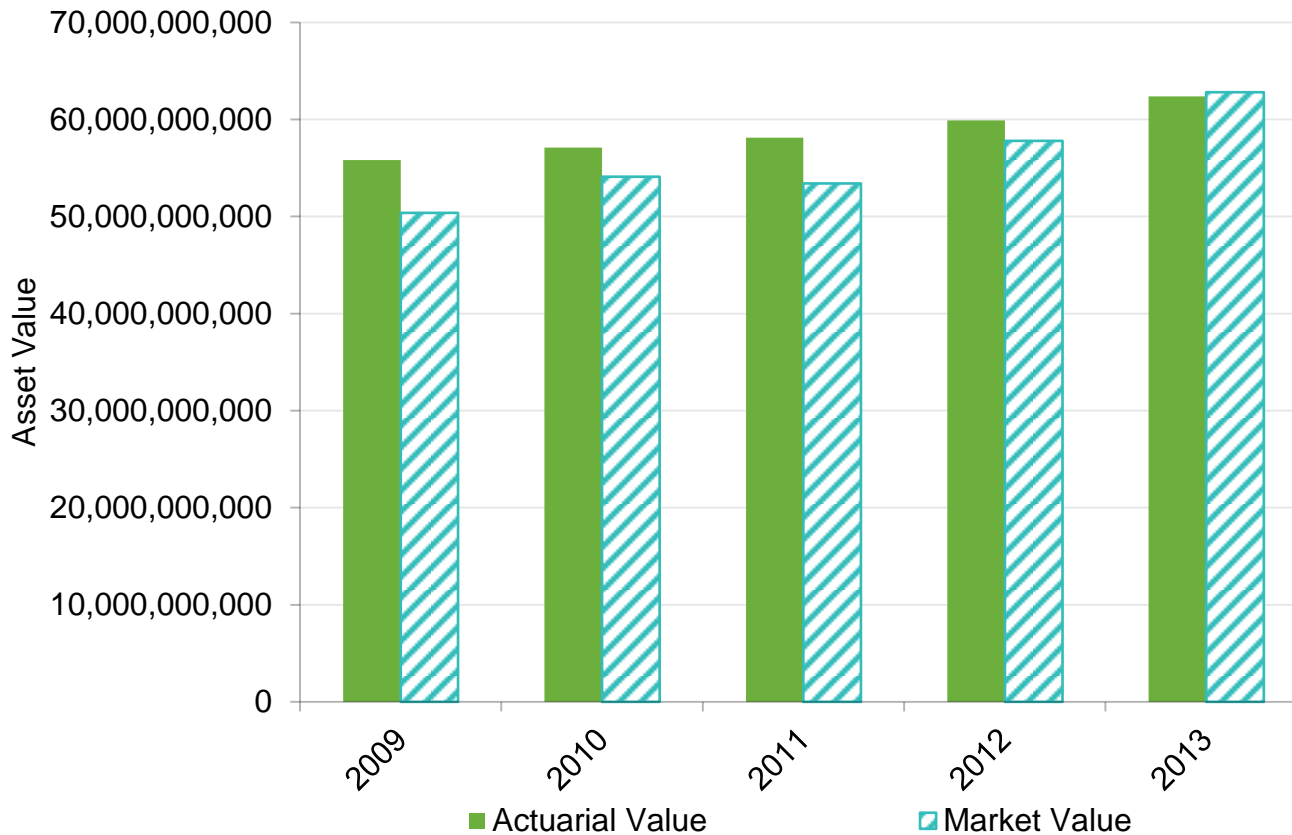
Asset Returns: Actuarial Value and Market Value



The actuarial value of assets smooths investment gains and losses.

A detailed summary of the Actuarial Value of Assets is provided in Section 4 of the actuarial report.

Actuarial Value of Assets: Compared to Market Value



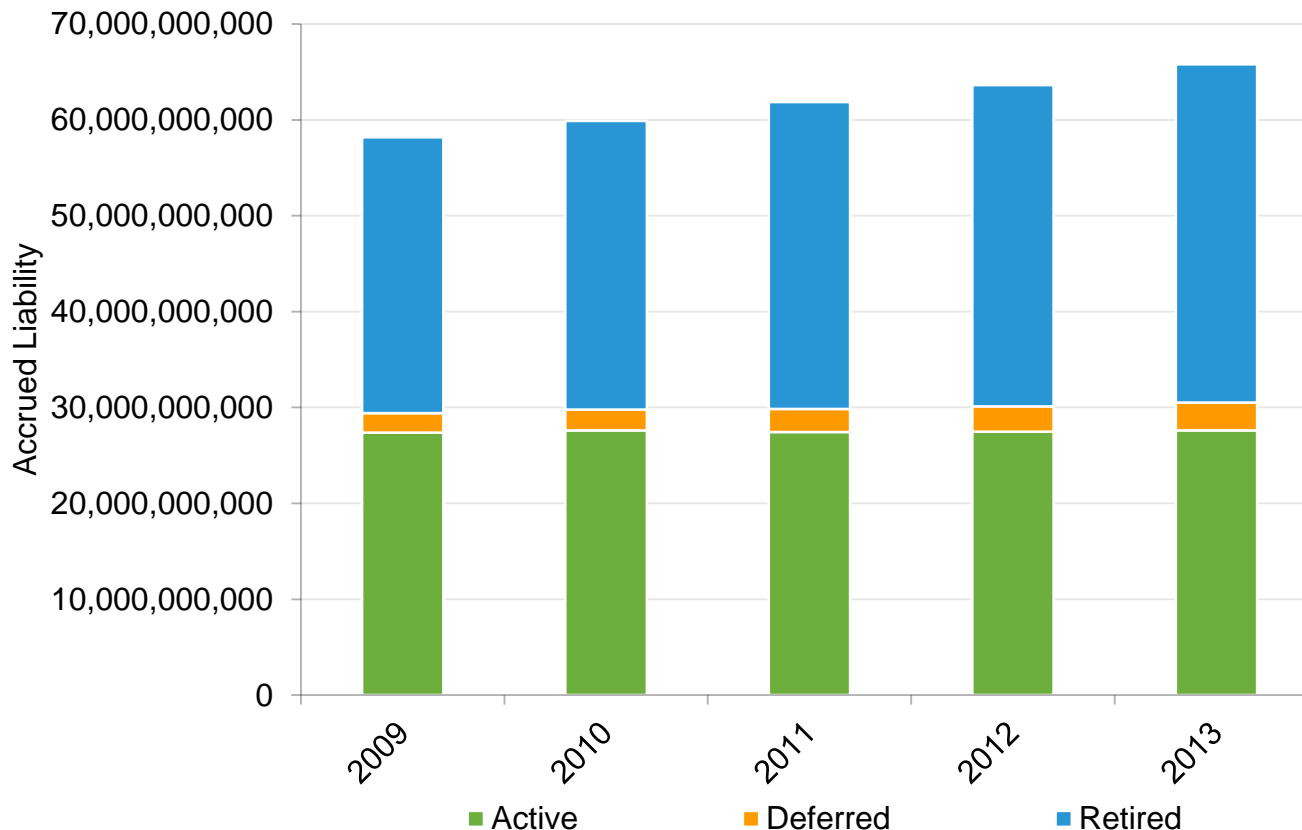
For the first time in several years, the market value of assets is higher than the actuarial value of assets, which is used to determine employer contributions. This indicates that there are unrecognized asset returns to be recognized in future valuations, which will mitigate the impact of asset returns that are less than the assumed return of 7.25%.

As a result, the upward pressure on contributions that we have seen since the Great Recession has been reversed, as seen in the projections of potentially higher funded ratios and lower employer contributions later in this presentation.

A detailed summary of the Actuarial Value of Assets is provided in Section 4 of the actuarial report.

Valuation Results

Actuarial Accrued Liability (AAL)



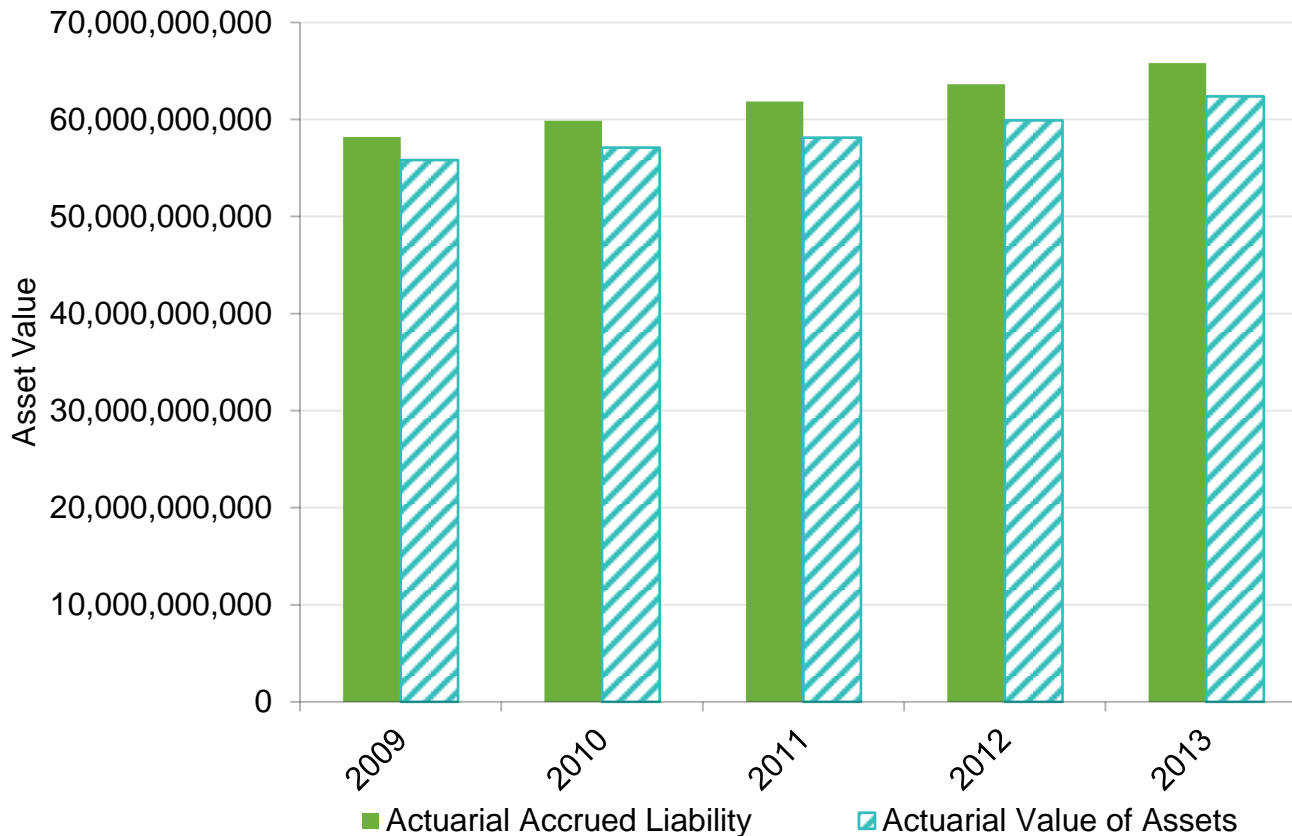
The AAL increased from \$63.6 billion to \$65.8 billion during 2013. TSERS is an open plan, which means that new members enter the plan each year. In an open plan, liabilities are expected to grow from one year to next as more benefits accrue and the membership approaches retirement.

The AAL prior to legislative changes was \$370 million lower than expected, which resulted in a demographic gain of \$370 million during 2013. Legislation increased the AAL by \$361 million.

A detailed summary of the AAL is provided in Section 5 of the actuarial report.

Valuation Results

Actuarial Accrued Liability (AAL) and Actuarial Value of Assets (AVA)

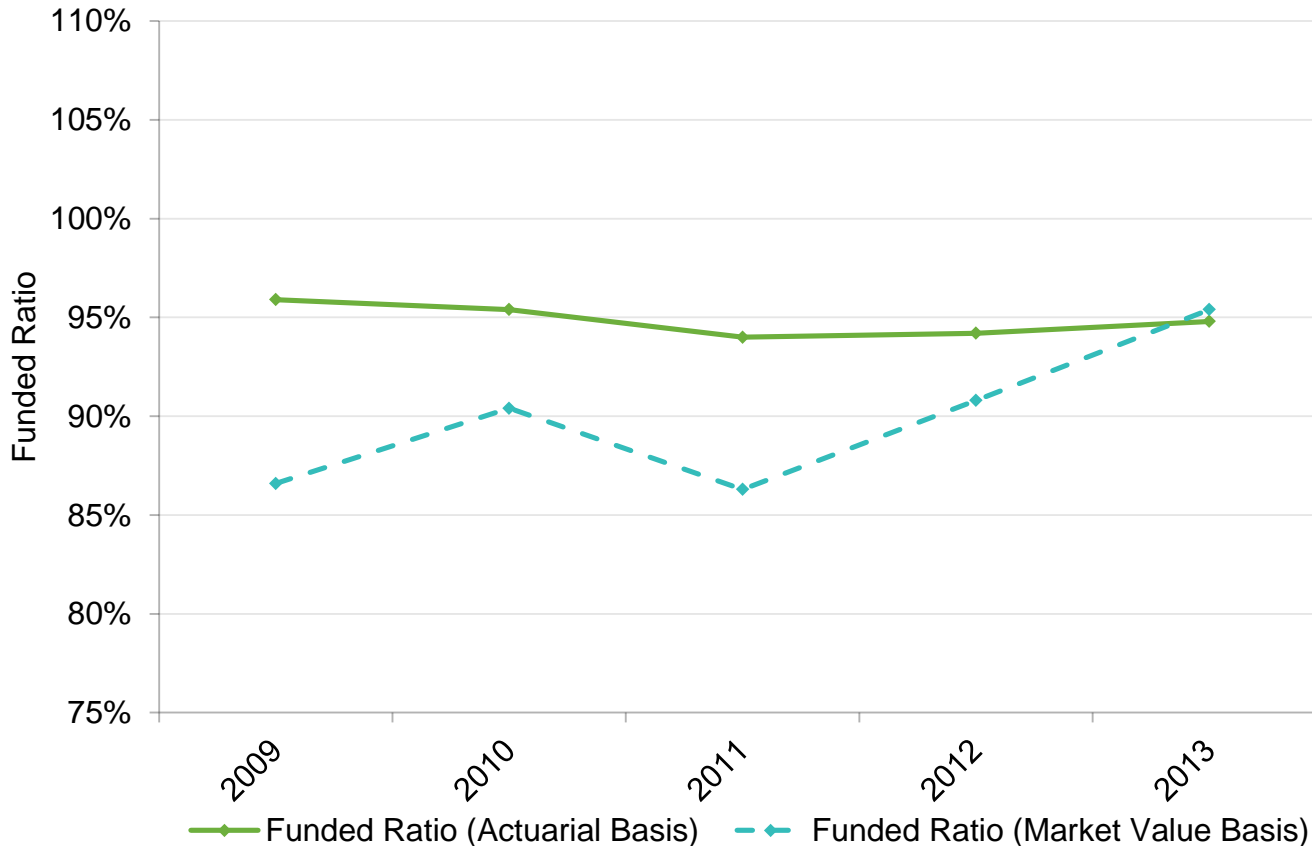


AVA is the basis used for computing contributions to alleviate contribution volatility.

The difference in the AAL and the AVA is the amount of pension debt (to be paid off in 12 years).

A detailed summary of the AVA is provided in Section 4 of the actuarial report, and a detailed summary of the AAL is provided in Section 5 of the actuarial report.

Funded Ratio: AAL Divided by AVA



The ratio of assets to liabilities shows the health of the plan on an accrued basis.

The funded ratio on an actuarial basis increased from 94.2% at December 31, 2012 to 94.8% at December 31, 2013.

Valuation Results

Net Actuarial Gain or Loss



Reconciliation of Unfunded Actuarial Accrued Liability Since the Prior Valuation (in Millions)

Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2012	\$ 3,718
Normal Cost during 2013	1,517
Reduction due to Actual Contributions during 2013	(1,986)
Interest on UAAL, Normal Cost, and Contributions	308
Asset (Gain)/Loss	(106)
Actuarial Accrued Liability (Gain)/Loss	(370)
Impact of Legislative Changes	<u>361</u>
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2013	\$ 3,442

The accrued liability gain of \$370 million means that the unfunded actuarial accrued liability was \$370 million lower than we would have expected based on the assumptions.

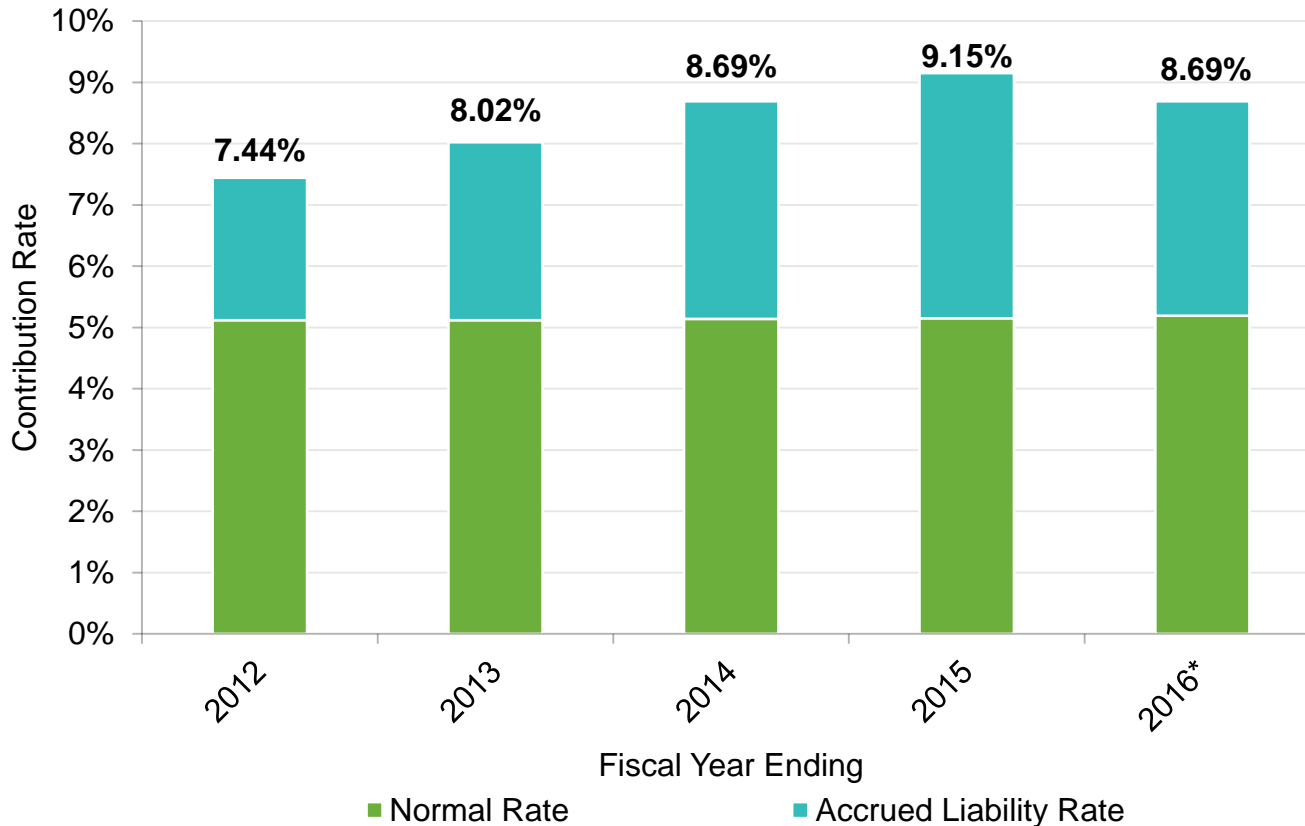
The primary source of the accrued liability gain was lower reported compensation than assumed based on the prior valuation.

The asset gain of \$106 million means that the asset valuation method resulted in a recognition of \$106 million of deferred asset gains from 2009, 2010, 2012 and 2013.

The net actuarial gain/(loss) is provided in Section 5 of the actuarial report.

Valuation Results

Employer Required Contributions



* Subject to the impact of future legislative changes effective during that fiscal year.

The employer required contribution rate is the amount needed to pay for the cost of the benefits accruing and to pay off the pension debt over 12 years, offset for the 6% of pay contribution the members make.

The 12-year period is a short period for Public Sector Retirement Systems in the United States, with most Systems using a period of 30 years or more to pay off the pension debt. The shorter period results in higher contributions and more benefit security.

A detailed summary of the employer required contribution rates is provided in Section 6 of the actuarial report.

Employer Required Contribution Rates



Valuation Date	Fiscal Year Ending	Normal Rate	Accrued Liability Rate	Change Due to Legislation	Final ARC	Appropriated Rate
12/31/13	6/30/16	5.19%	3.50%	N/A	N/A	N/A
12/31/12	6/30/15	5.15%	3.61%	0.39%	9.15%	9.15%
12/31/11	6/30/14	5.14%	3.55%	0.00%	8.69%	8.69%
12/31/10	6/30/13	5.12%	2.57%	0.33%	8.02%	8.33%
12/31/09	6/30/12	5.12%	2.82%	(0.50)%	7.44%	7.44%

The current appropriation rate for fiscal year ending 2015 is 9.15%. This rate would result in an undistributed gain of 0.46%.

Each 1% COLA is equivalent to 0.39% of payroll and each 0.01% increase in benefit rate is equal to 0.42% of payroll.

The employer required contribution rates are provided in Section 6 of the actuarial report.

Reconciliation of the Change in the Annual Required Contribution



Fiscal year ending June 30, 2015 Preliminary ARC (based on December 31, 2012 valuation)	8.76%
Impact of Legislative Changes	<u>0.39%</u>
Fiscal year ending June 30, 2015 Final ARC	9.15%
Change Due to Demographic (Gain)/Loss	(0.32)%
Change Due to Investment (Gain)/Loss	(0.10)%
Change Due to Contributions Greater than ARC	<u>(0.04)%</u>
Fiscal year ending June 30, 2016 Preliminary ARC (based on December 31, 2013 valuation)	8.69%

Demographic gain primarily due to salary increases less than assumed

Investment gain is a recognition of deferred asset gains from 2009, 2010, 2012 and 2013.

A detailed summary of the employer required contribution rates is provided in Section 6 of the actuarial report.

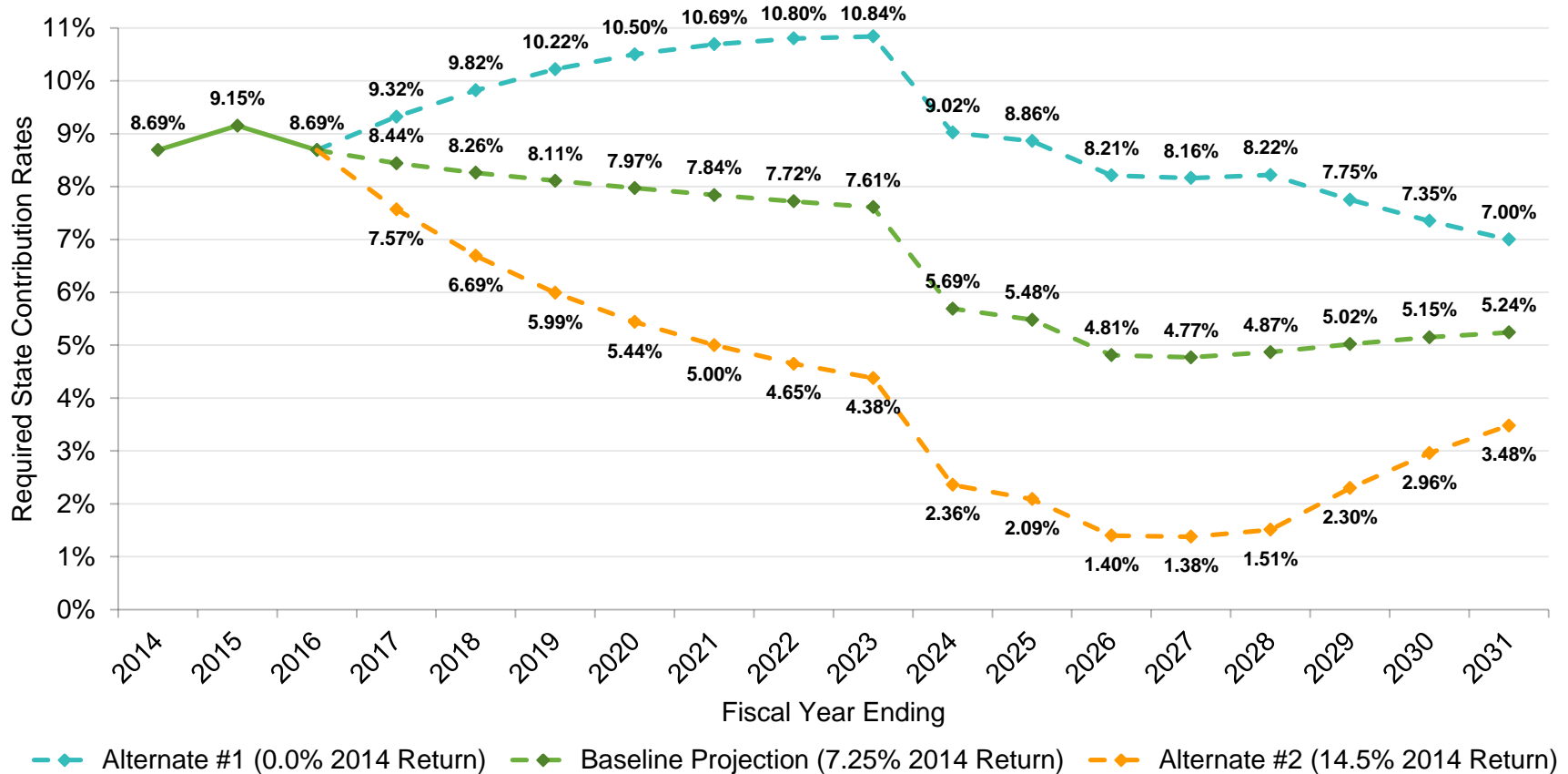


Projections

Projections: Employer Contribution Rates and Funded Status

- Projections of employer contribution requirements and funded status into the future can be helpful planning tools for stakeholders.
- Projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future.
- Baseline deterministic projection is based on:
 - December 31, 2013 valuation results
 - December 31, 2013 valuation assumptions to project future valuation results, including:
 - Valuation interest rate of 7.25% for all years
 - No cost-of-living adjustments granted
 - Assumes future pay increases based on long-term valuation
- Two alternate deterministic projections based on the same assumptions as the baseline deterministic projection, except
 - First alternate deterministic projection assumes a 0.0% asset return for calendar year 2014.
 - Second alternate deterministic projection assumes a 14.5% asset return for calendar year 2014.

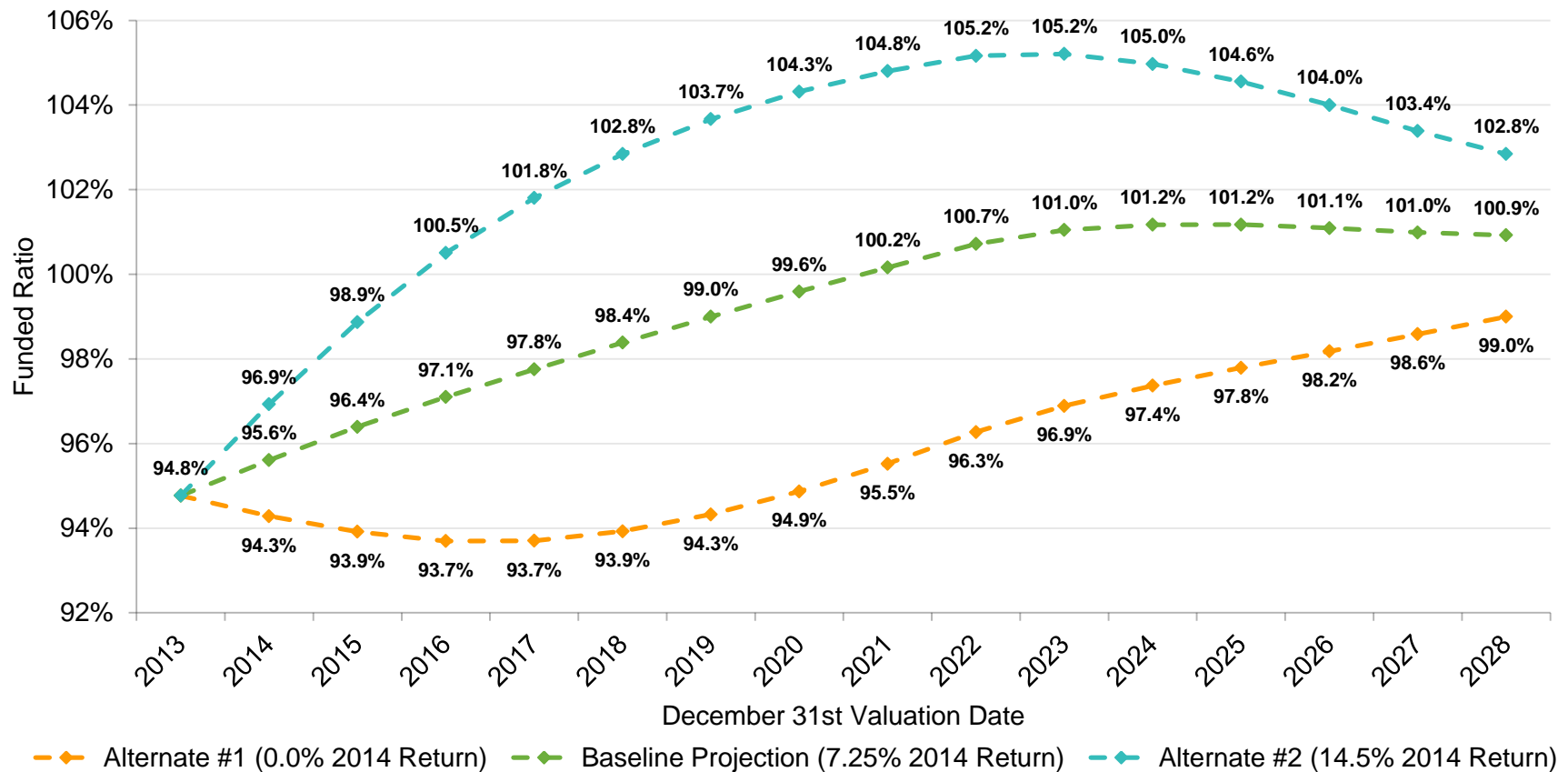
Projections: Projected Employer Required Contribution Rates



The Employer Required Contribution Rate trends to around 5%, which is the level of the cost of benefits accrued, or the long term employer cost of TSERS when there is no pension debt.

A detailed summary of the deterministic projections is provided in Section 9 of the actuarial report.

Projections: Projected Funded Ratio



Note that if the 7.25% return under the Baseline Projection is achieved, the funded ratio reaches the long term target of 100% within 15 years. This is a direct result of using a 12 year period to pay off the pension debt.

A detailed summary of the deterministic projections is provided in Section 9 of the actuarial report.

Key Takeaways

Key results of the December 31, 2013 valuation as compared to the December 31, 2012 valuation were:

- Market value returns of 12.21% compared to 7.25% assumed
- Increase in covered payroll of 0.5% compared to 3% assumed increase
- Recent legislation signed into law including:
 - 1% cost-of-living adjustment at July 1, 2014
 - Return to five-year vesting for all active members
 - Return of contributions with interest to all members who terminate employment prior to meeting vesting requirements
- No significant changes in actuarial assumptions or funding methodology from the prior year's valuations

When compared to the December 31, 2012 baseline projections, the above resulted in:

- Slightly higher funded ratio as of December 31, 2013 (94.8% in the valuation compared to 93.9% in the baseline projection)
- Lower employer required contribution rate for fiscal year ending June 30, 2016 (8.69% in the valuation compared to 9.15% in the baseline projection)
- Lower projected benefit amounts being accrued by active members

Key Takeaways

TSERS is well funded compared to its peers. This is due to:

- Stakeholders working together to keep TSERS well-funded since inception
- A history of appropriating and contributing the recommended contribution requirements
- Assumptions that in aggregate are more conservative than peers
- A funding policy that aggressively pays down unfunded liability over a 12-year period
- An ad hoc cost-of-living adjustment, which typically only provides benefit increases when certain financial conditions are met, supports the health of the system
- Modest changes in benefits when compared to peers

As has been done over the past 70 years, continued focus on these measures will be needed to maintain the solid status of TSERS well into the future.

Certification

The results were prepared under the direction of Michael Ribble and Larry Langer who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about them.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

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Questions?

THANK YOU