NORTH DAKOTA RETIREMENT AND INVESTMENT OFFICE
Teachers' Fund for Retirement
State Investment Board

Segal Consulting

North Dakota Teachers' Fund for Retirement

Actuarial Valuation as of July 1, 2013

October 24, 2013

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Discussion Topics

Segal

- Overview of Valuation Process
- Summary of Valuation Highlights
- Membership and Demographics
- Valuation Results and Projections

Purposes of the Actuarial Valuation

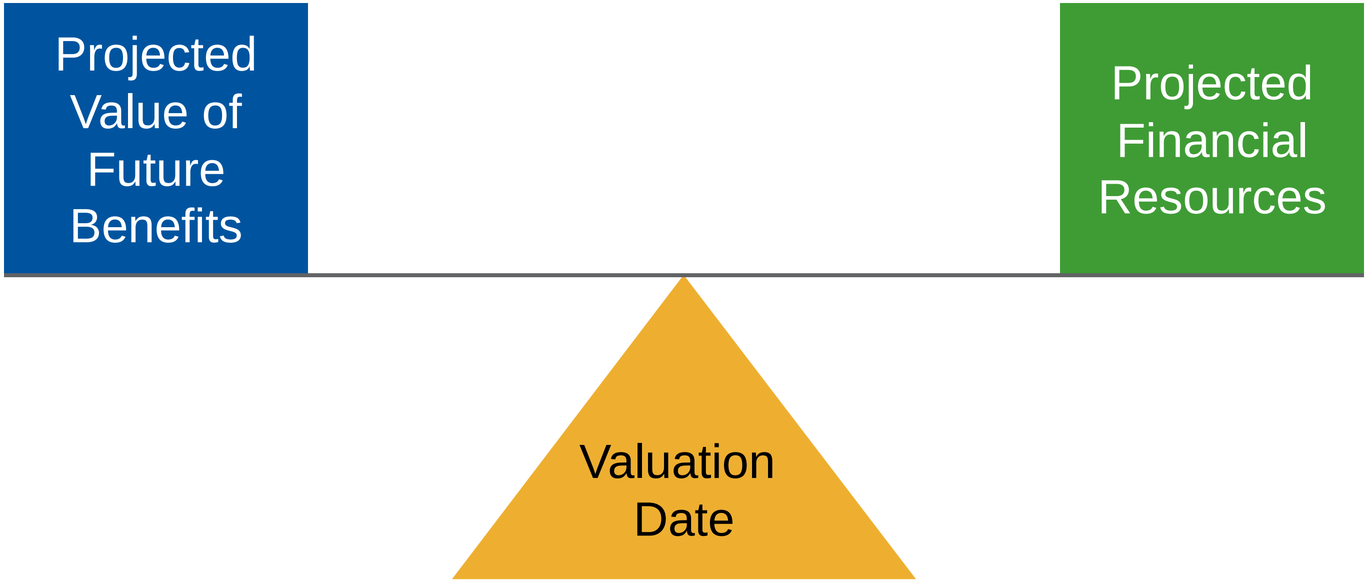
- Report the Fund’s actuarial assets
- Calculate the Fund’s liabilities
- Determine the Annual Required Contribution (ARC) for fiscal year 2014
  - Determine the funding policy Actuarially Determined Contribution (ADC)
- Provide information for annual financial statements
- Identify emerging trends

How is an Actuarial Valuation Performed?

The actuaries will:

- Gather data as of the valuation date
  - Participant data
  - Financial data
- Project a benefit for each member, for each possible benefit
- Apply assumptions about:
  - Economic (investment return, inflation, salary raises)
  - People or demographic (death, disability, retirement, turnover)
- Apply assumptions to benefits to determine a total liability and assign liabilities to service
- Apply the funding policy to determine ARC/ADC
  - Based on actuarial cost method and asset valuation method

Actuarial Balance



Over the life of a pension system,

Benefits + Expenses = Contributions + Investment Return

Contributions = Benefits + Expenses - Investment Return

Actuarial Assumptions

Two types:

Demographic	Economic
• Retirement • Disability • Death in active service • Withdrawal • Death after retirement	• Inflation • Interest rate (return on assets) • Salary increases • Payroll growth

Actuaries make assumptions as to when and why a member will leave active service, and estimate the amount and duration of the pension benefits paid.

Economic Assumptions

Interest Rate

- 8%

Salary Increase Rates

- Based on service
- Ranges from 14.75% for new members to 4.5% for members with 25 or more years of service

Payroll Growth

- 3.25%

Actuarial Methods

➢ Asset valuation method (actuarial value of assets)

- Smoothing of investment gains or losses
- TFFR uses a five-year smoothing method
  - Investment returns above or below the expected return are recognized over five years
- 20% market value corridor is applied (e.g., actuarial value must fall within 80% to 120% of market value)

➢ Cost method

- Allocation of liability between past service and future service
  - TFFR uses the entry age normal cost method
  - Most retirement systems use the entry age normal cost method

➢ Amortization method

- 30-year “closed” period to pay off unfunded actuarial accrued liability
- Based on level percentage of payroll
- Governmental Accounting Standards Board requires 30-year maximum period to determine the Annual Required Contribution

Entry Age Normal Cost Method

Allocates Cost Between Past and Future service

- **Normal Cost:** Cost of annual benefit accrual as a level percent of salary
- **Actuarial Accrued Liability:** Represents accumulated value of past normal costs (or difference between total cost and future normal costs)
- **Unfunded Actuarial Accrued Liability:** Actuarial accrued liability minus actuarial value of assets
- **Annual Required Contribution:**
  - Normal cost plus
  - Amortization payment of unfunded accrued liability over a 30-year closed period as a percent of payroll
    - 30-year closed period began July 1, 2013

Actuarial Accrued Liability and Normal Cost

The **actuarial accrued liability** is the portion of the total liability that is allocated to members' past years of service

Retirees and beneficiaries:

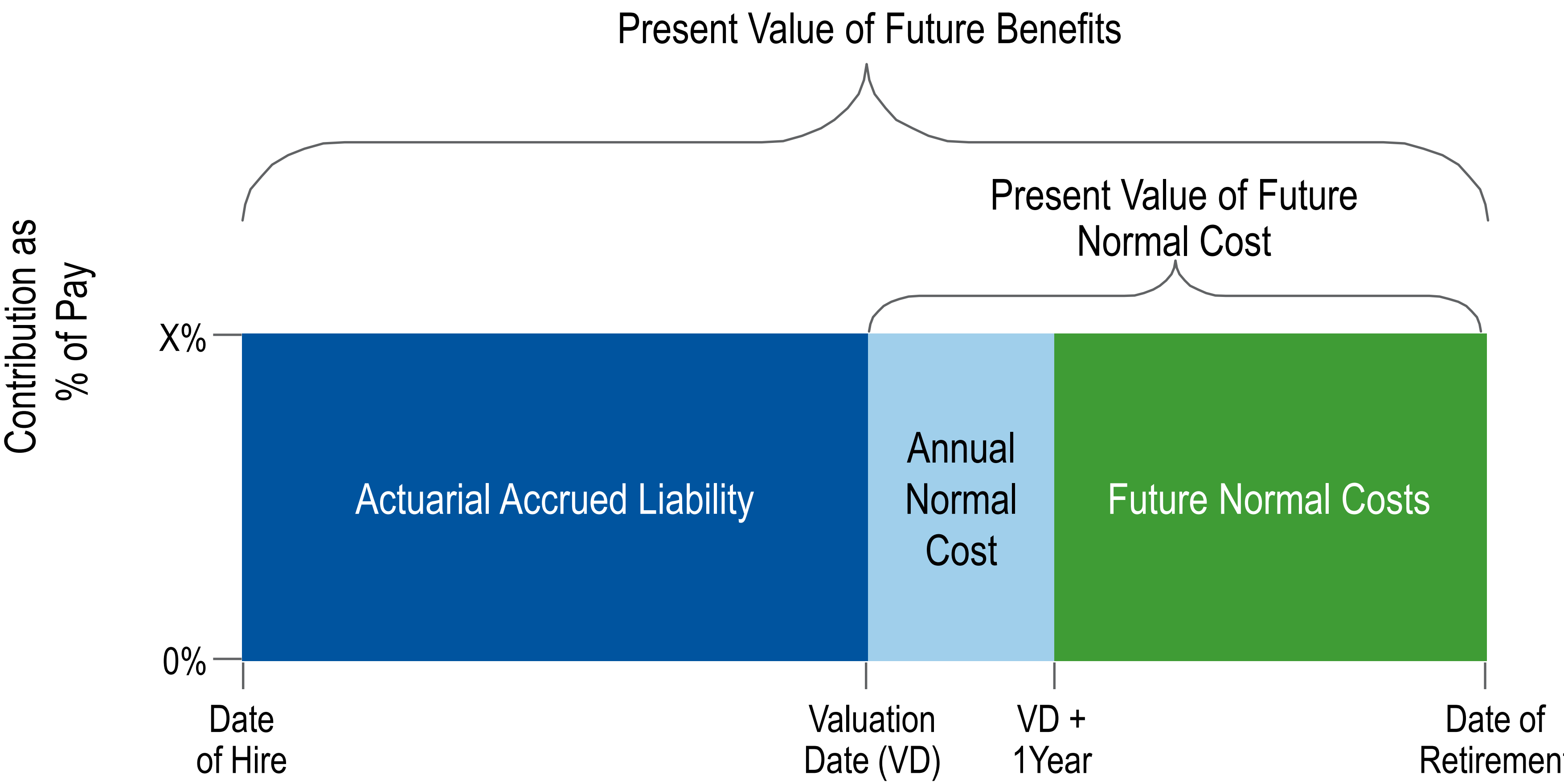
- All years of service are in the past, so the **actuarial accrued liability** is equal to the total liability

Active members:

- The **actuarial accrued liability** represents the portion of the total liability that is attributable to the years of service that the members have already worked
- The **normal cost** represents the anticipated growth in the accrued liability in the coming year

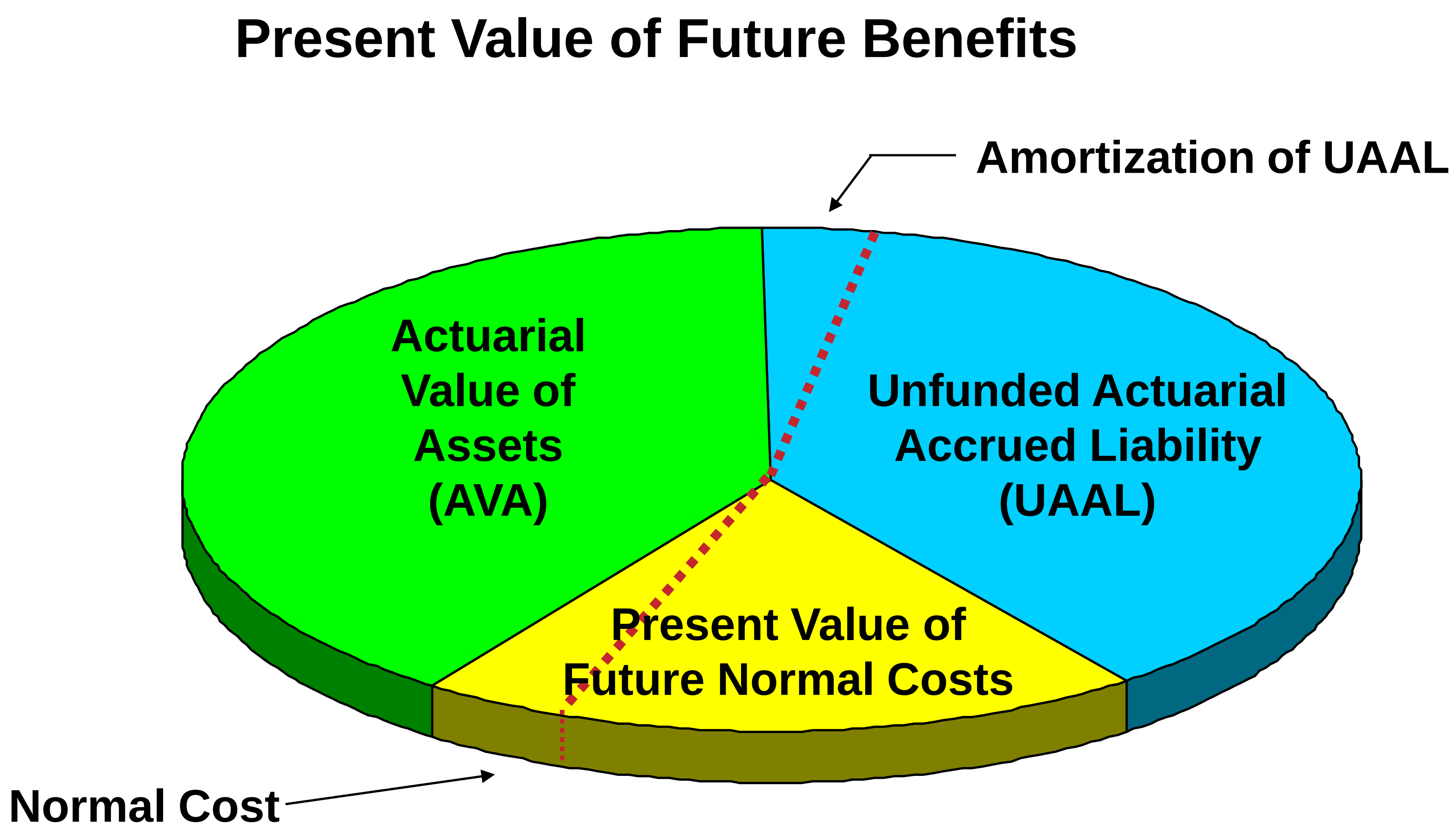
The actuarial accrued liability is compared to the assets as a measure of funding progress.

Funding Process



Actuarial Accrued Liability - Assets = Unfunded Actuarial Accrued Liability

Annual Required Contribution



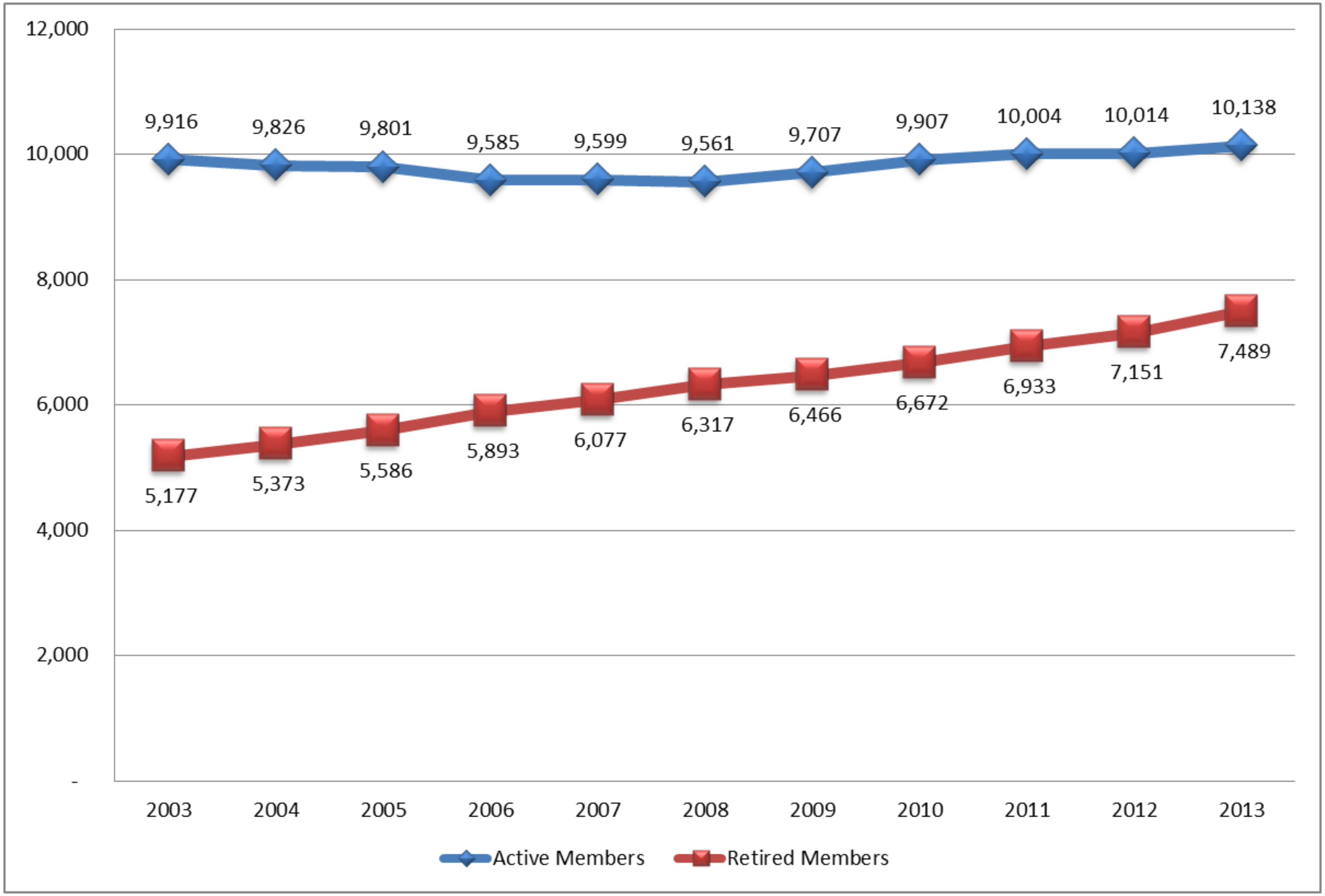
Summary of Valuation Highlights

- Valuation reflects increases in contribution rates contained in HB 1134
  - Member rate will increase from 9.75% to 11.75% on July 1, 2014
  - Employer rate will increase from 10.75% to 12.75% on July 1, 2014
  - Increases will revert to 7.75% for both members and employers once the funded ratio reaches 100% (measured using the actuarial value of assets)
  - ADC and GASB ARC reflect the actuarial present value of the increases as of July 1, 2013
- Market value of assets returned 13.4% for year ending 6/30/13 (Segal calculation)
  - Gradual recognition of deferred losses resulted in 2.7% return on actuarial value of assets
- Net impact on funded ratio was a decrease from 60.9% (as of 7/1/2012) to 58.8% (as of 7/1/2013)
- Effective amortization period increased from 25 years (as of 7/1/2012) to 28 years (as of 7/1/2013)
- Net impact on ARC/ADC was an increase from 9.49% of payroll (FY13) to 10.26% of payroll (FY14)
  - Based on the employer contribution rate for fiscal 2013 of 10.75%, there is a contribution sufficiency of 0.49% of payroll

Membership

	2013	2012	Change
Active:			
• Number	10,138	10,014	+1.2%
• Payroll	$526.7 mil	$505.3 mil	+4.2%
• Average Age	43.2 years	43.7 years	- 0.5 years
• Average Service	13.2 years	13.7 years	- 0.5 years
Retirees and Beneficiaries			
• Number	7,489	7,151	+4.7%
• Total Annual Benefits	$154.8 mil	$142.8 mil	+8.4%
• Average Monthly Benefit	$1,722	$1,664	+3.5%

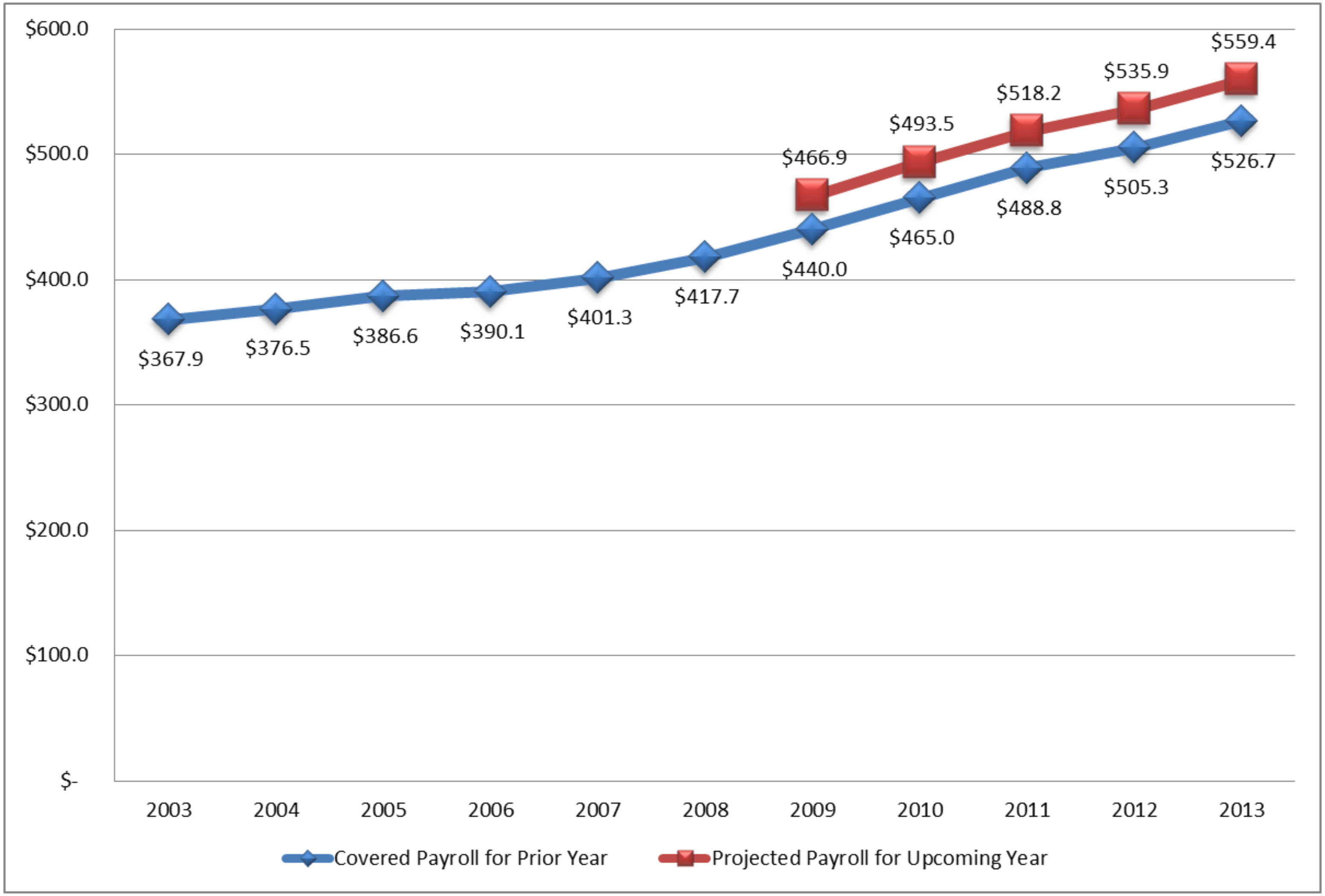
Active and Retired Membership



Since 2003, number of retirees and beneficiaries has increased 3.8% per year on average.

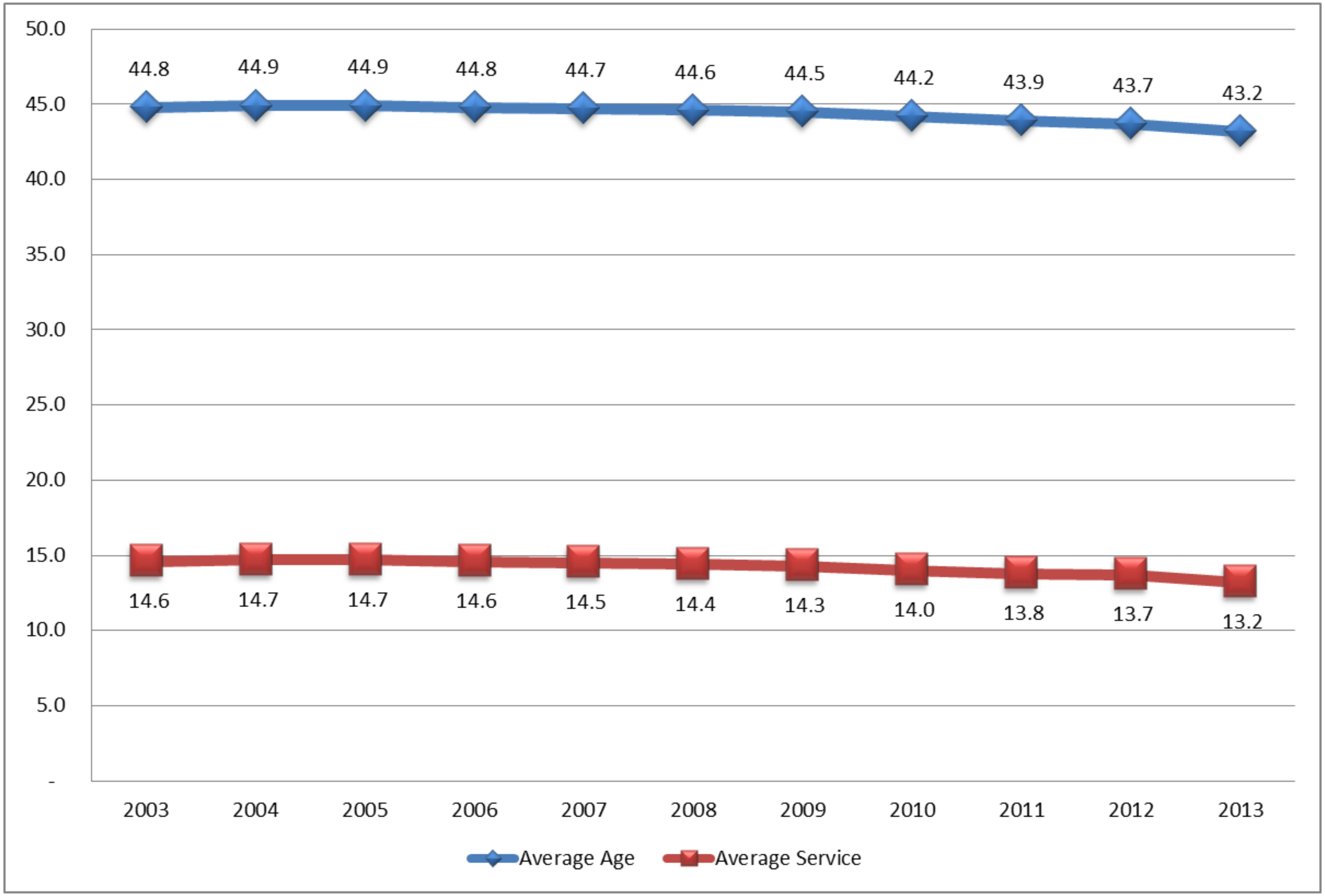
Active Payroll

$ Millions

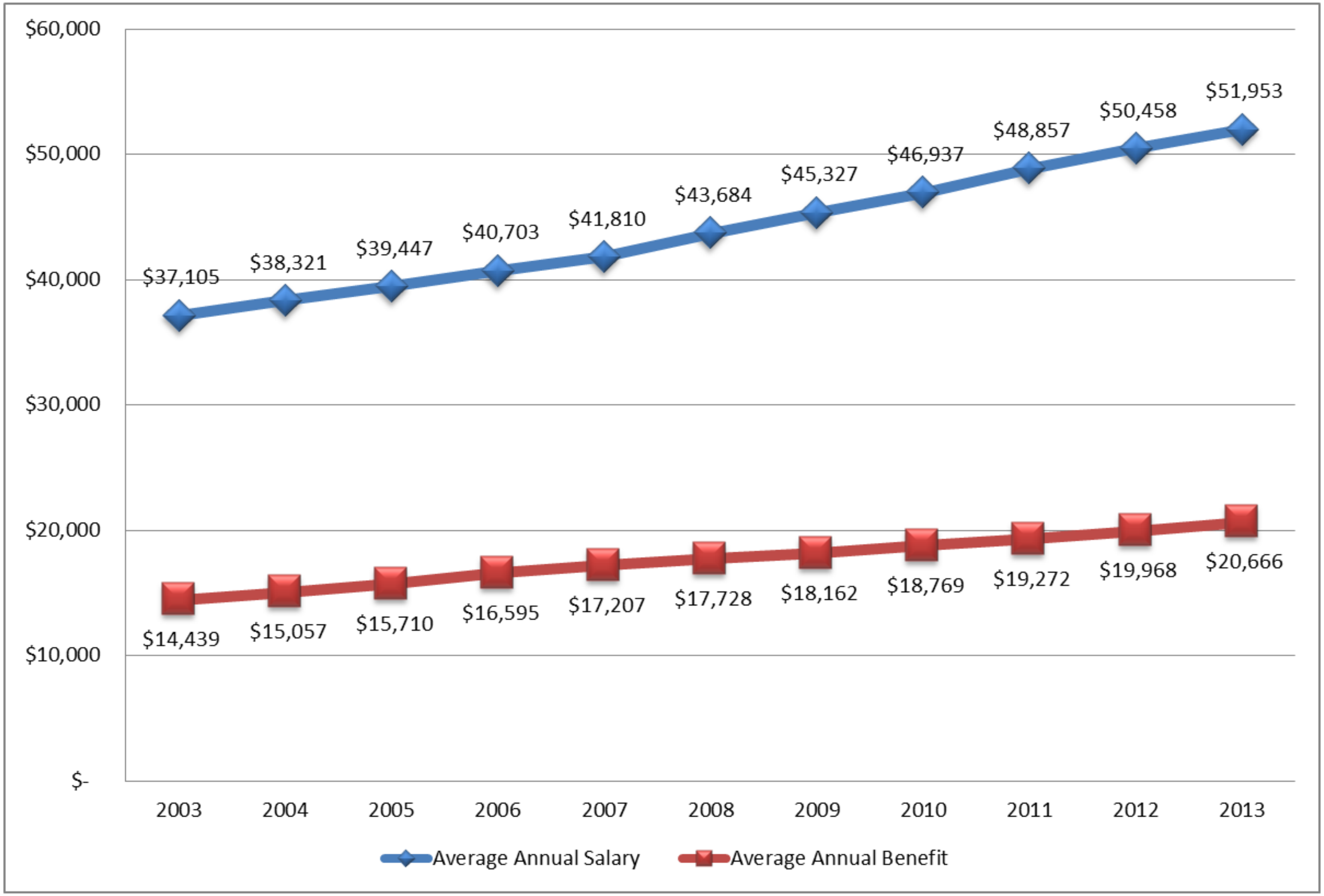


Since 2003, active payroll has increased, on average, 3.7% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2003, average salary has increased, on average, 3.4% per year. Average annual benefit has also increased by 3.7% per year.

Assets

- The market value of assets increased from $1.654 billion (as of June 30, 2012) to $1.839 billion (as of June 30, 2013)
  - Segal determined the investment return was 13.4%, net of investment and administrative expenses
- The actuarial value of assets – which smoothes investment gains and losses over five years – increased from $1.748 billion (as of June 30, 2012) to $1.762 billion (as of June 30, 2013)
  - Investment return of 2.7%, net of investment and administrative expenses
  - Actuarial value is 95.8% of market
  - There is a total of $77 million of deferred net investment gains that will be recognized in future years
- The average annual return on market assets over the past 10 years is 6.6%
  - 20-year average is 6.9%
- The average annual return on actuarial assets over the past 10 years is 4.1%
  - 20-year average is 6.6%

Market Value of Assets ($ in millions)

	Fiscal Year Ending June 30, 2013
Beginning of Year	$1,654
Contributions:	
• Employer	59
• Member	54
• Service Purchases	3
• Total	116
Benefits and Refunds	(149)
Investment Income (net)	218
End of Year	$1,839
Rate of Return	13.4%

Actuarial Value of Assets ($ in millions)

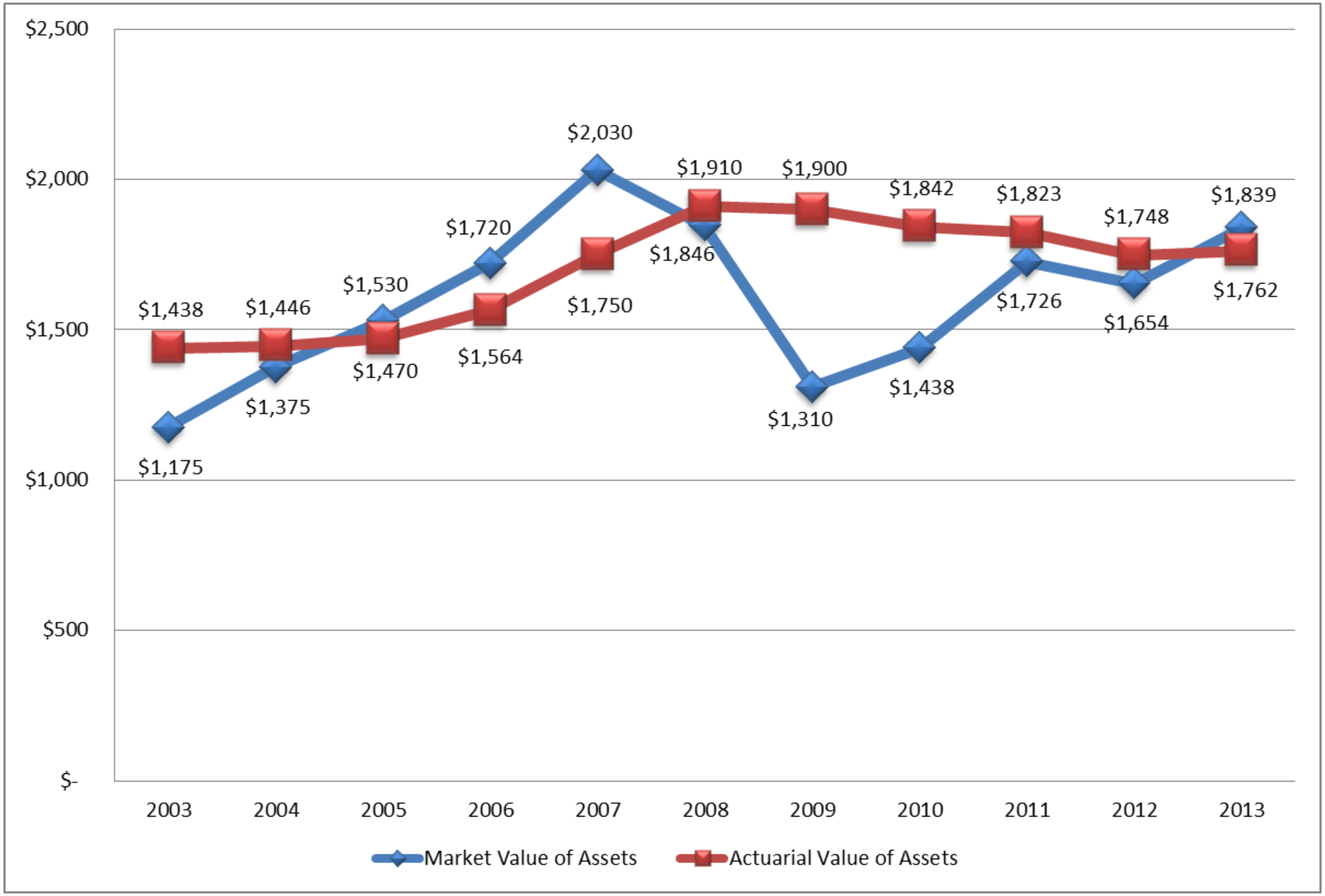
1. Market Value of Assets as of June 30, 2012	$1,654
2. Contributions and Benefits for FYE June 30, 2013	(33)
3. Expected Return	131
4. Expected Market Value of Assets (1) + (2) + (3)	$1,752
5. Actual Market Value of Assets on June 30, 2013	**1,839**
6. Excess/(Shortfall) for FYE June 30, 2013 (5) – (4)	87
Excess/(Shortfall) Returns:	

Year	Initial Amount	Deferral %	Unrecognized Amount
2013	$87	80%	$70
2012	(159)	60%	(96)
2011	220	40%	88
2010	74	20%	15
2009	(640)	0%	0
7. Total			**$77**

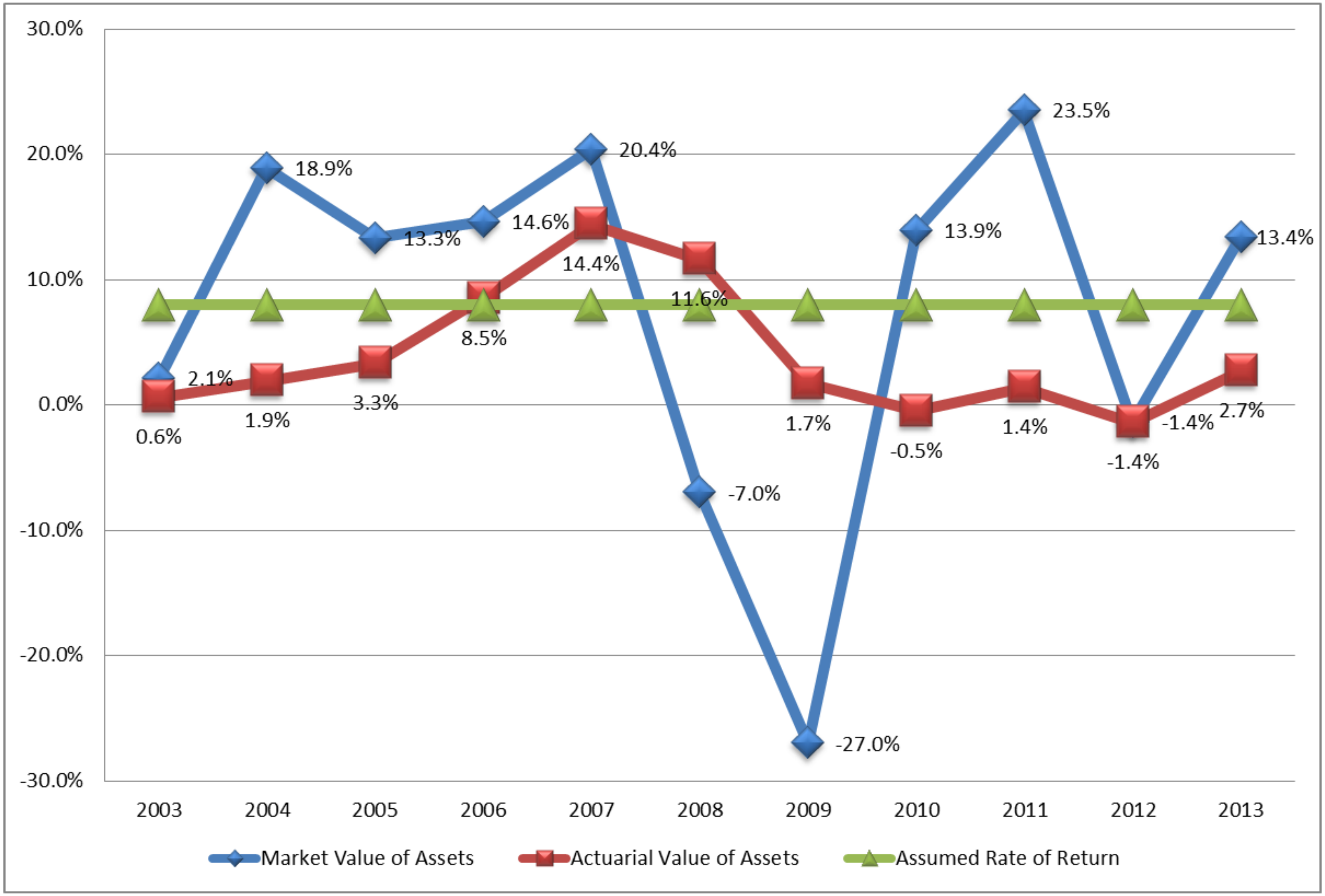
8. Actuarial Value of Assets as of June 30, 2013 (5) - (7)	**$1,762**
9. Actuarial Value of Assets as a % of Market Value of Assets	95.8%

Market and Actuarial Values of Assets

$ Millions



Asset Returns



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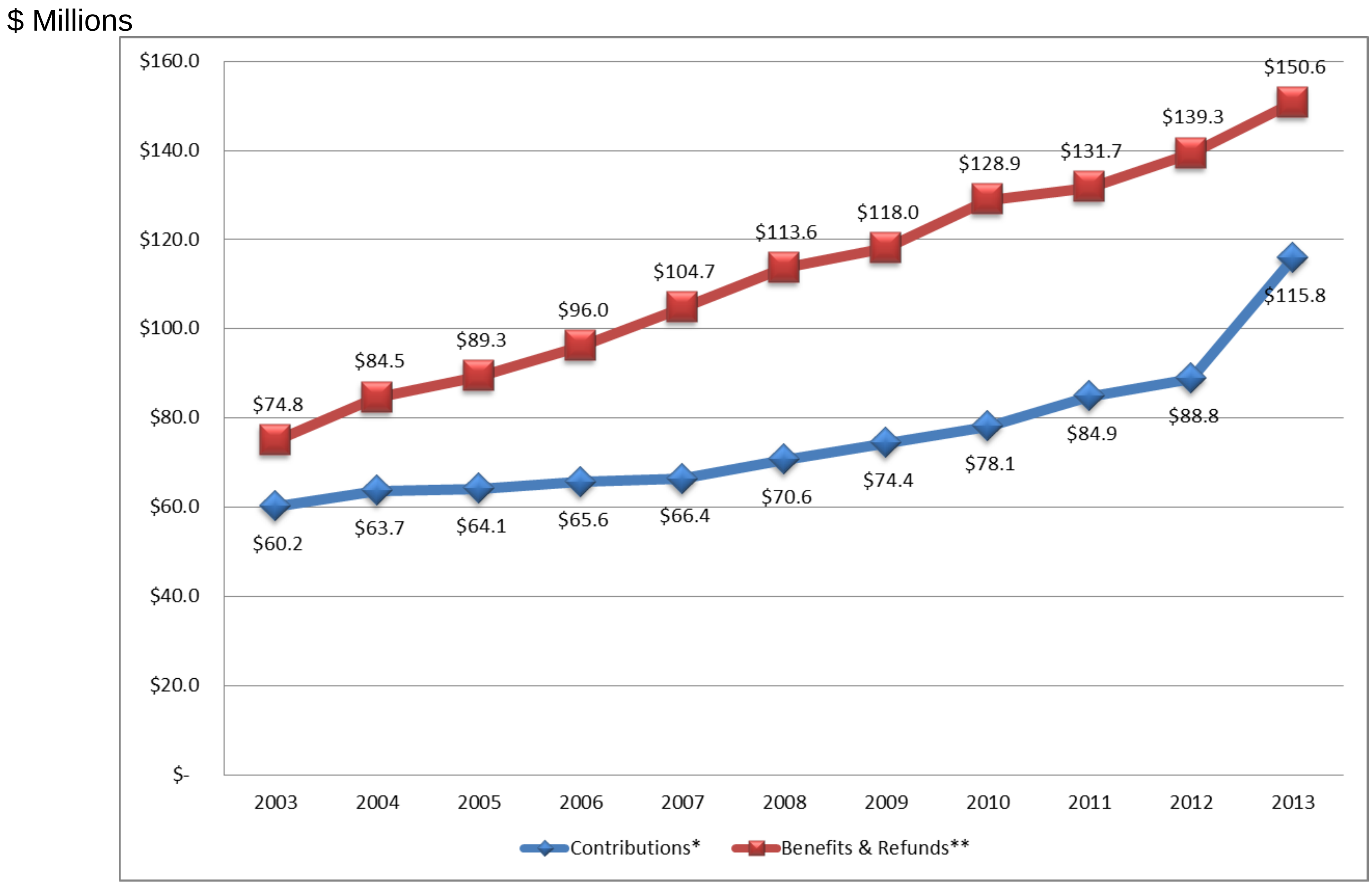
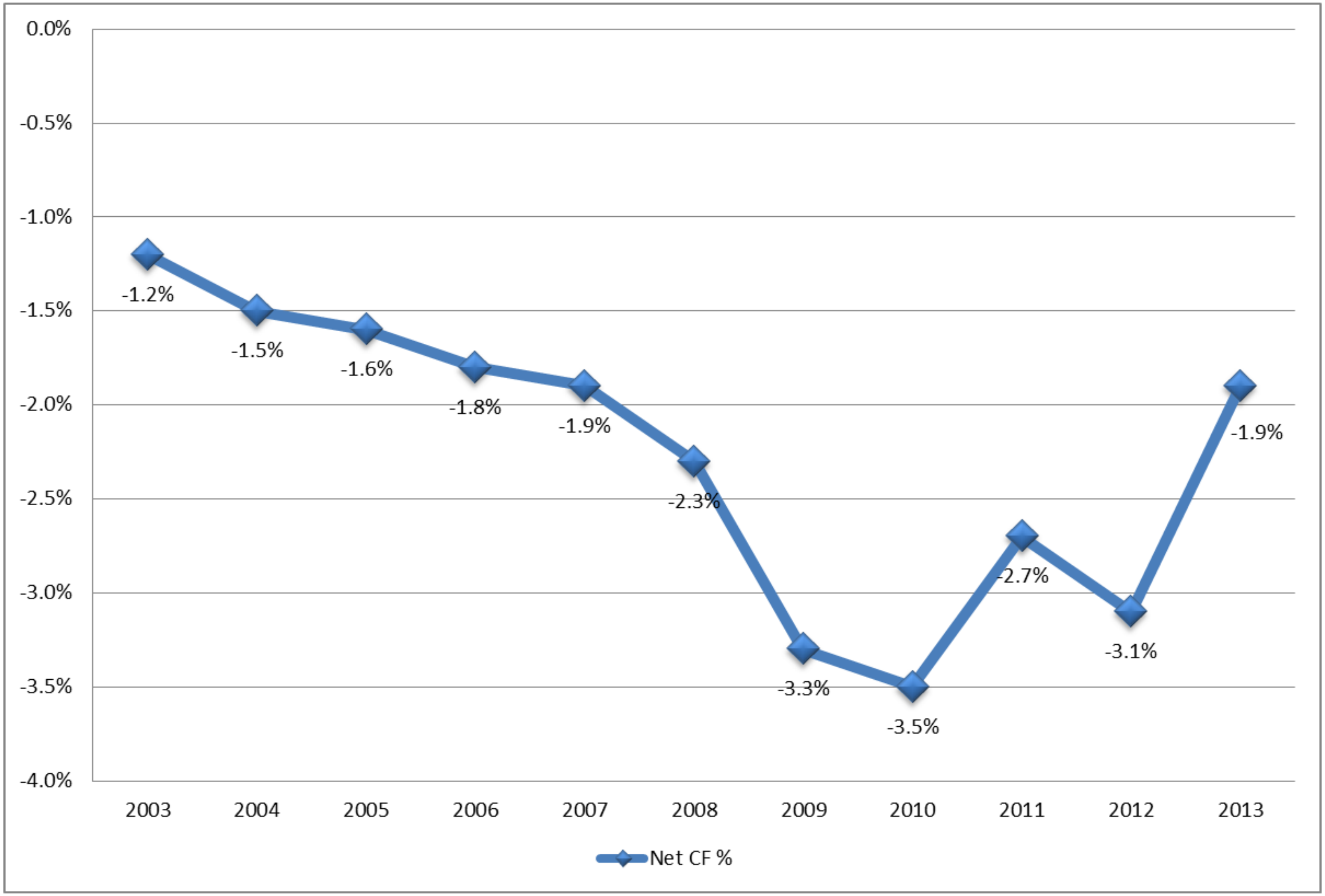
Contributions vs. Benefits and Refunds



* Includes member and employer contributions, and service purchases

** Includes administrative expenses

Net Cash Flow as a % of Market Value



Valuation Results ($ in millions)

	July 1, 2013	July 1, 2012
Actuarial Accrued Liability:		
• Active Members	$1,371	$1,373
• Inactive Members	74	70
• Retirees and Beneficiaries	1,552	1,429
Total	**$2,997**	**$2,872**
Actuarial Assets	1,762	1,748
Unfunded Accrued Liability	$1,235	$1,124
Funded Ratio	58.8%	60.9%

Annual Required Contribution

	July 1, 2013	July 1, 2012
Normal Cost Rate	10.15%	9.83%
Member Rate	9.75%	9.75%
Employer Normal Cost Rate	0.40%	0.08%
Adjusted for Timing	0.41%	0.08%
Amortization of UAAL*	9.85%	9.41%
Annual Required Contribution	10.26%	9.49%
Employer Rate	10.75%	10.75%
Contribution Sufficiency/(Deficiency)	0.49%	1.26%

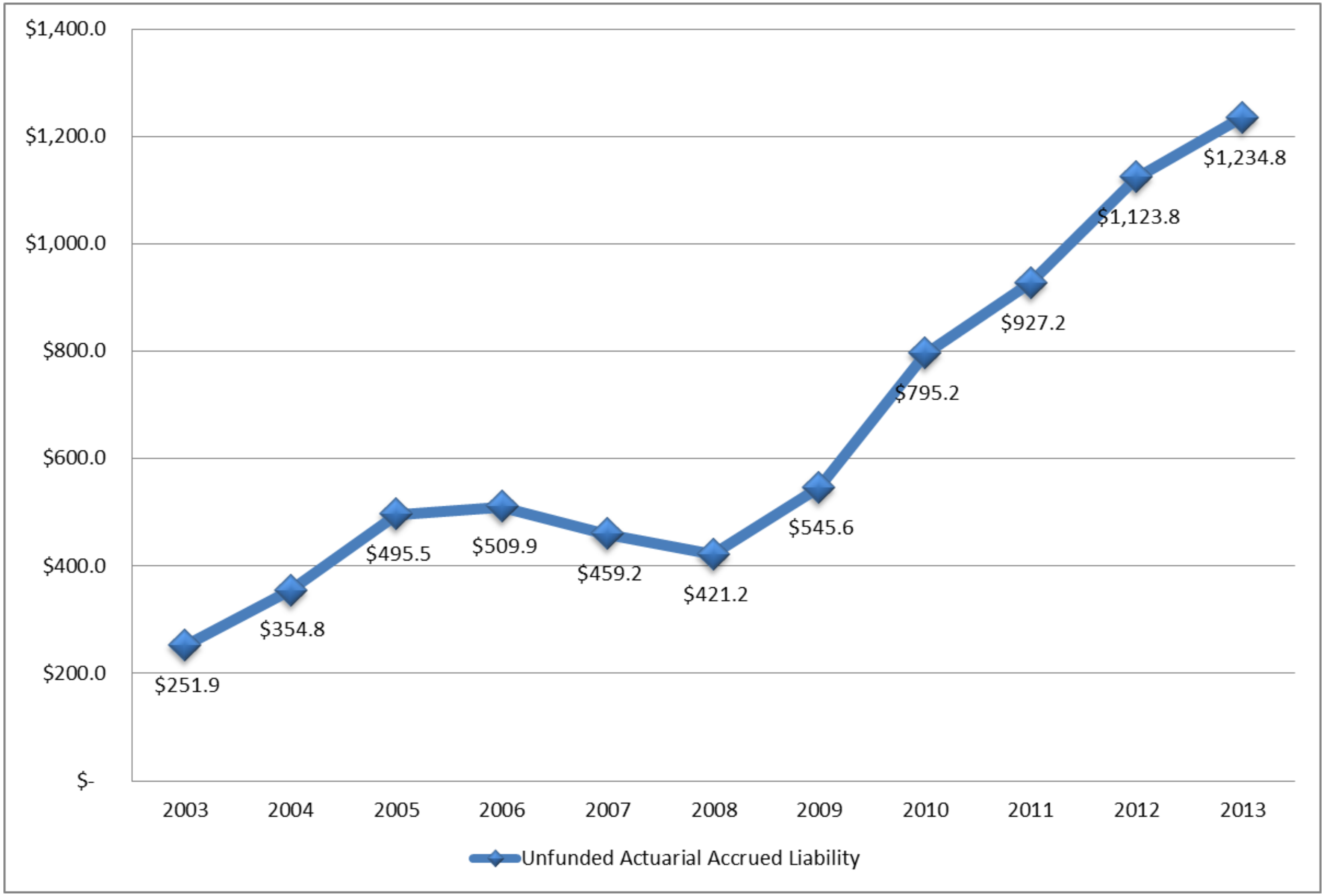
** Reflects the actuarial present value of the increased statutory contributions scheduled to occur July 1, 2014. The amount for 2012 has been restated from last year's valuation.*

Valuation Results - Comments

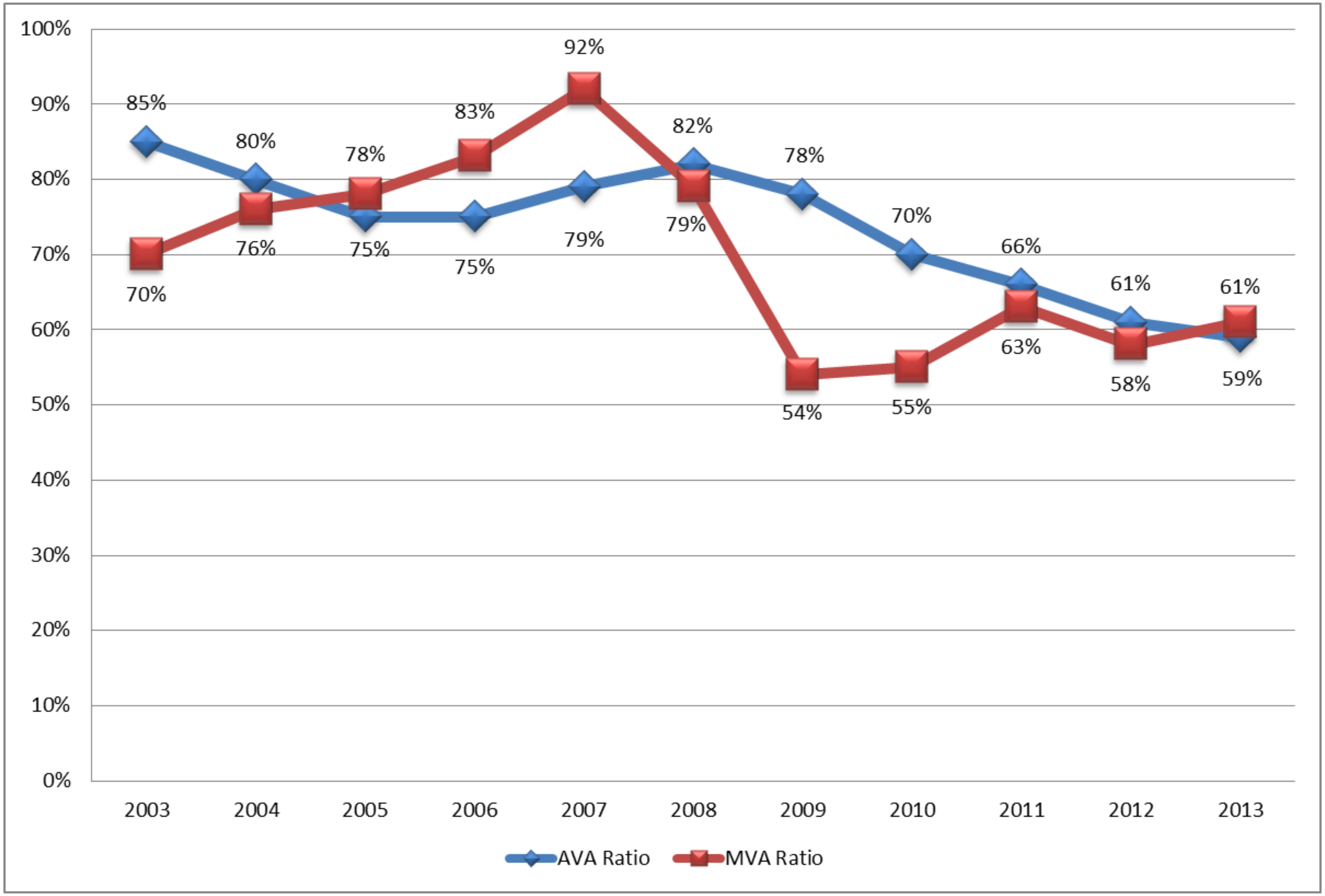
- The actuarial accrued liability increased from $2.872 billion (as of June 30, 2012) to $2.997 billion (as of June 30, 2013)
- The unfunded actuarial accrued liability (UAAL) increased from $1.124 billion to $1.235 billion
- The funded ratio on an AVA basis decreased from 61% to 59%
  - On a market value basis, the funded ratio increased from 58% to 61%
- The Annual Required Contribution (ARC) increased from 9.49% of payroll to 10.26% of payroll
  - Going forward, this will be referred to as the Actuarially Determined Contribution (ADC)
  - Compared to 10.75% employer contribution, results in a contribution sufficiency of 0.49%
  - The effective amortization period is 28 years

Unfunded Actuarial Accrued Liability

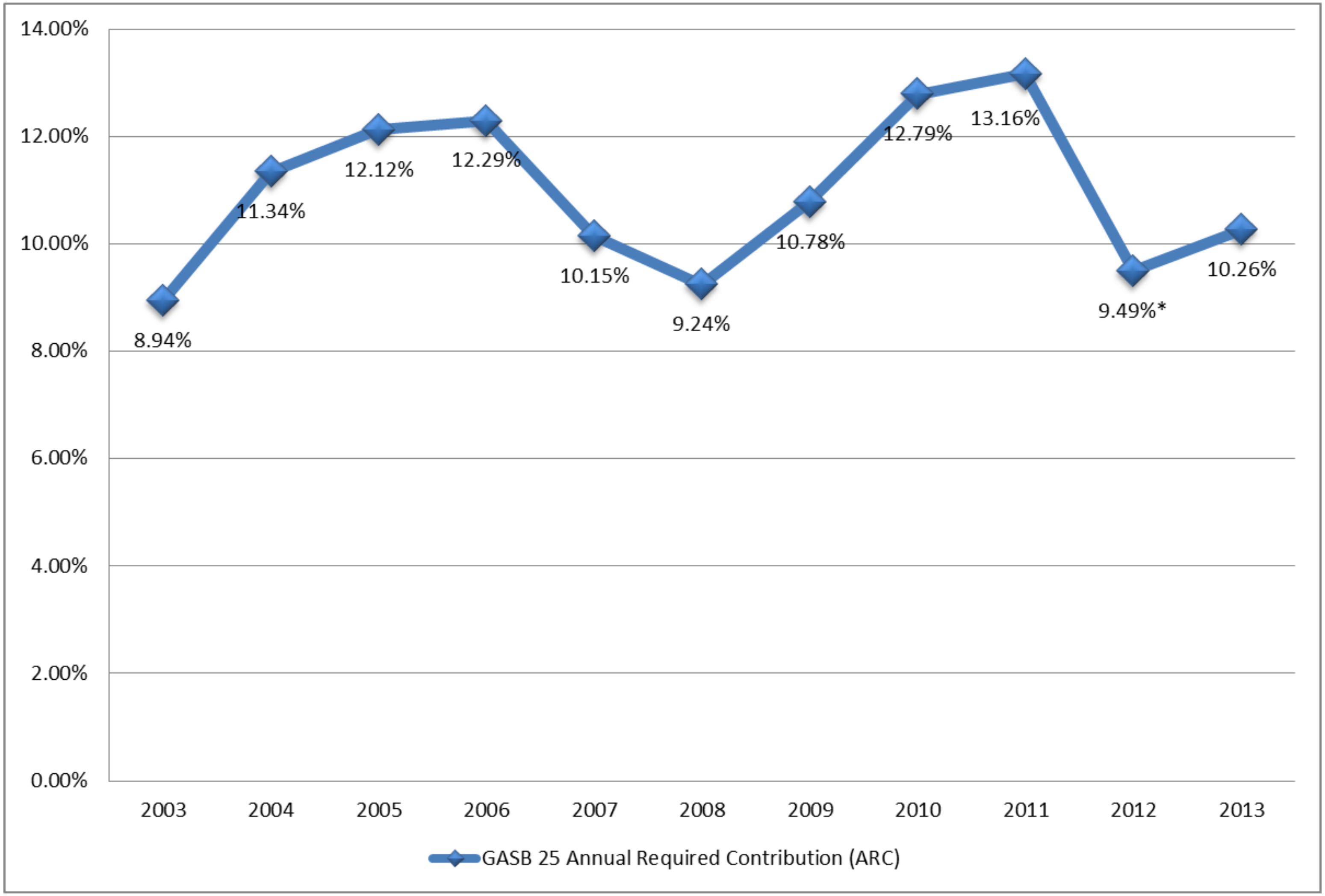
$ Millions



Funded Ratios



GASB 25 Annual Required Contribution (ARC)



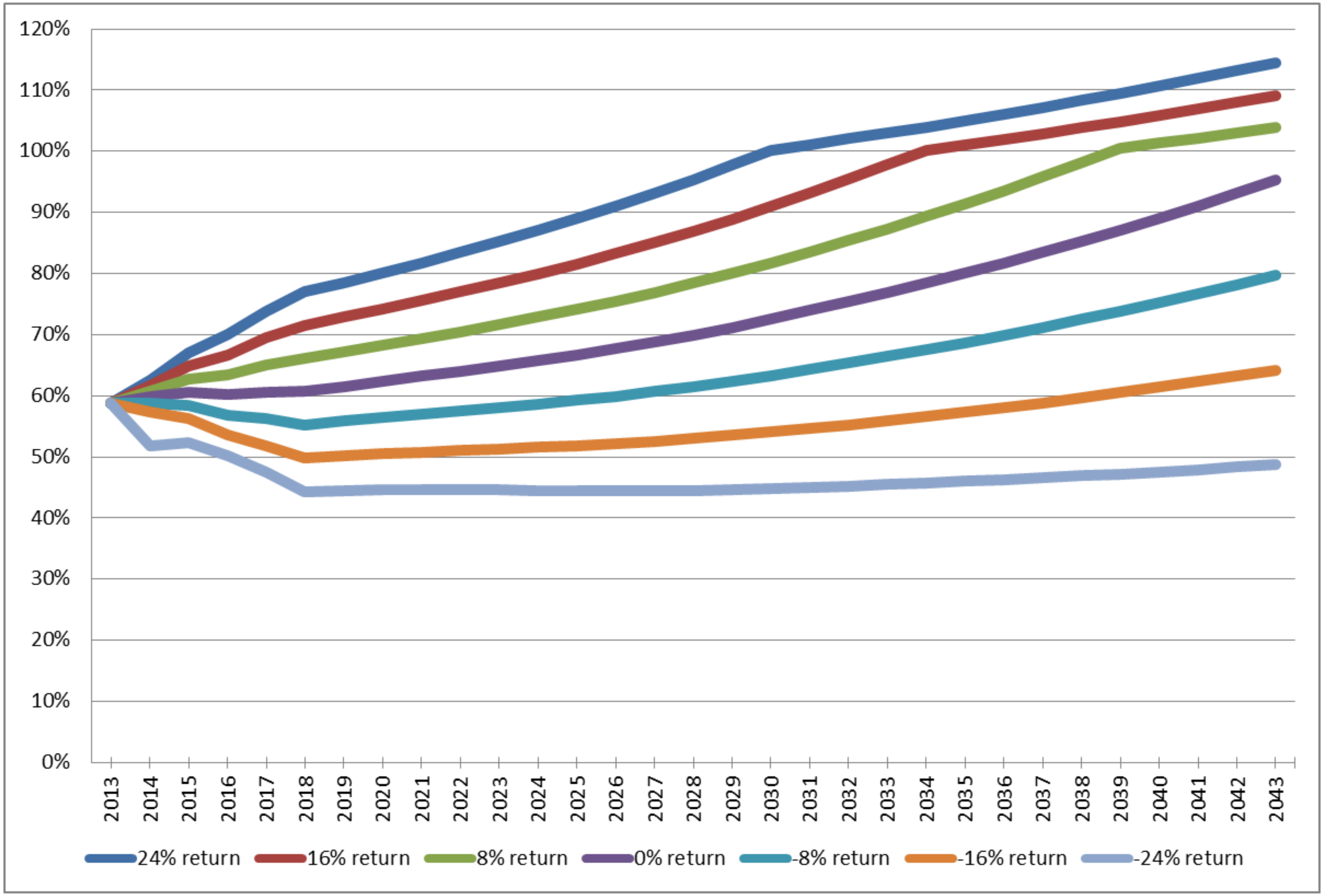
- Prior to 2005, the ARC calculation was based on a 20-year open amortization period.
- From 2005 - 2012, the calculation of the ARC was based on a 30-year open level percentage of payroll amortization.
- Beginning in 2013, the period is 30-year closed.

* Restated from last year's valuation to reflect the actuarial present value of contribution increases effective July 1, 2014.

Projections

- Projections of estimated funded ratios for 30 years
  - Based on FY14 investment return scenarios ranging from -24% to +24%
  - Assumes Fund earns 8% per year in FY15 and each year thereafter
  - Additional projections assuming Fund earns 7% or 9% per year every year
  - All other experience is assumed to emerge as expected
- Includes contribution rate increases from HB 1134
  - Member rate is 9.75% for FY14 and increases to 11.75% for FY15 and thereafter
  - Employer rate is 10.75% for FY14 and increases to 12.75% for FY15 and thereafter
  - Increases “sunset” back to 7.75% once the funded ratio reaches 100% (based on actuarial assets)

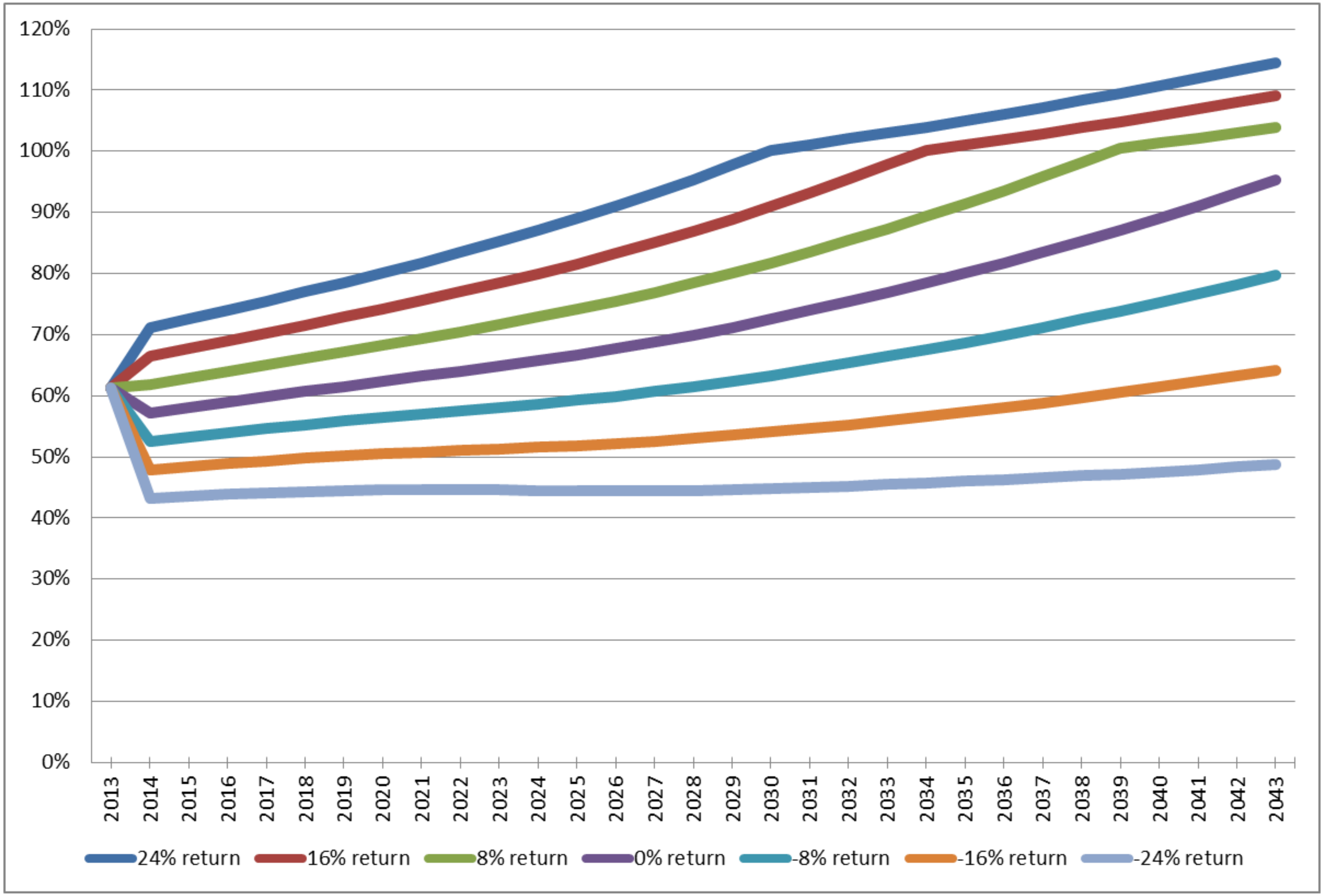
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2014	16% for FY2014	8% for FY2014	0% for FY2014	-8% for FY2014	-16% for FY2014	-24% for FY2014
2013	59%	59%	59%	59%	59%	59%	59%
2014	63%	62%	61%	60%	59%	57%	52%
2015	67%	65%	63%	61%	58%	56%	52%
2016	70%	67%	63%	60%	57%	54%	50%
2017	74%	69%	65%	61%	56%	52%	47%
2018	77%	72%	66%	61%	55%	50%	44%
2023	85%	78%	72%	65%	58%	51%	45%
2028	95%	87%	78%	70%	61%	53%	45%
2033	103%	98%	87%	77%	66%	56%	45%
2038	108%	104%	98%	85%	72%	60%	47%
2043	114%	109%	104%	95%	80%	64%	49%

Projected Funded Ratios (MVA Basis)



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Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2014	16% for FY2014	8% for FY2014	0% for FY2014	-8% for FY2014	-16% for FY2014	-24% for FY2014
2013	61%	61%	61%	61%	61%	61%	61%
2014	71%	66%	62%	57%	52%	48%	43%
2015	73%	68%	63%	58%	53%	48%	44%
2016	74%	69%	64%	59%	54%	49%	44%
2017	75%	70%	65%	60%	55%	49%	44%
2018	77%	72%	66%	61%	55%	50%	44%
2023	85%	78%	72%	65%	58%	51%	45%
2028	95%	87%	78%	70%	61%	53%	45%
2033	103%	98%	87%	77%	66%	56%	45%
2038	108%	104%	98%	85%	72%	60%	47%
2043	114%	109%	104%	95%	80%	64%	49%

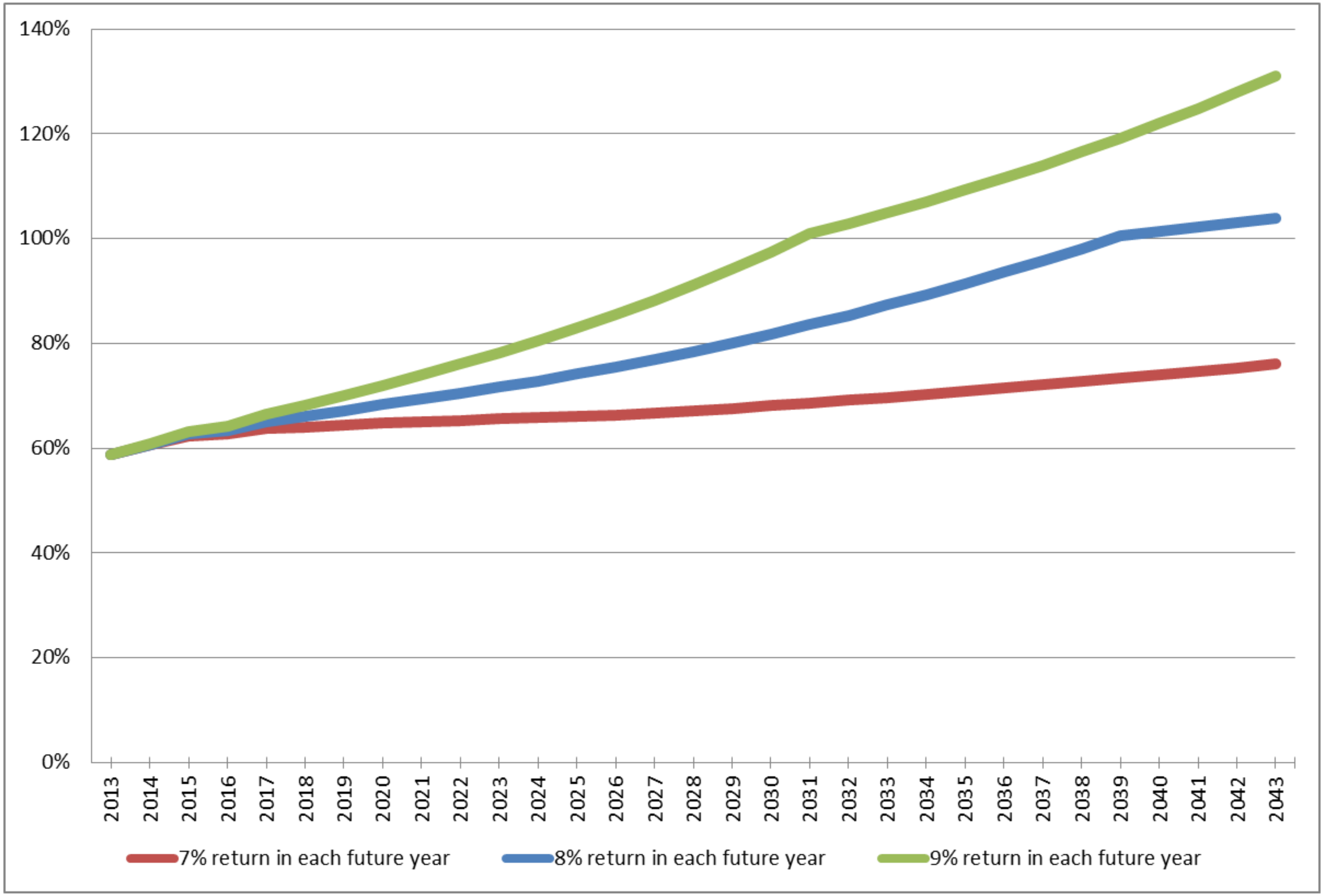
Projected Margin (AVA Basis)

Valuation Year	24% for FY2014	16% for FY2014	8% for FY2014	0% for FY2014	-8% for FY2014	-16% for FY2014	-24% for FY2014
2013	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%
2014	1.78%	1.47%	1.15%	0.84%	0.52%	0.03%	-1.86%
2015	3.01%	2.26%	1.52%	0.77%	0.03%	-0.72%	-2.13%
2016	3.76%	2.59%	1.41%	0.24%	-0.93%	-2.11%	-3.28%
2017	4.86%	3.26%	1.66%	0.06%	-1.54%	-3.14%	-4.75%
2018	5.79%	3.76%	1.73%	-0.31%	-2.34%	-4.37%	-6.40%
2023	7.99%	5.11%	2.23%	-0.65%	-3.53%	-6.41%	-9.29%
2028	11.91%	7.64%	3.38%	-0.89%	-5.15%	-9.42%	-13.68%
2033	5.98%	12.62%	5.47%	-1.68%	-8.83%	-15.97%	-23.12%
2038	7.70%	6.19%	12.70%	3.78%	-5.14%	-14.06%	-22.98%
2043	9.88%	7.99%	6.19%	10.54%	-0.64%	-11.82%	-23.00%

* The projected margin is based on a 30-year closed period starting July 1, 2013. Once the period declines to 10 years remaining, the projected margin is based on a 10-year open period.

** If an overfunding exists, the surplus is amortized over a 30-year open period.

Projected Funded Ratios (AVA Basis)
Actual Returns +1% or -1% of Assumed



Questions?

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