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

NORTH DAKOTA TEACHERS' FUND FOR RETIREMENT

Actuarial Valuation as of July 1, 2012

Discussion of Valuation Results and Projections

October 25, 2012

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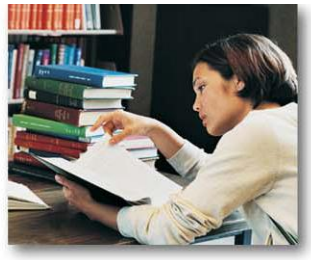

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Discussion Topics

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

Purposes of the Actuarial Valuation

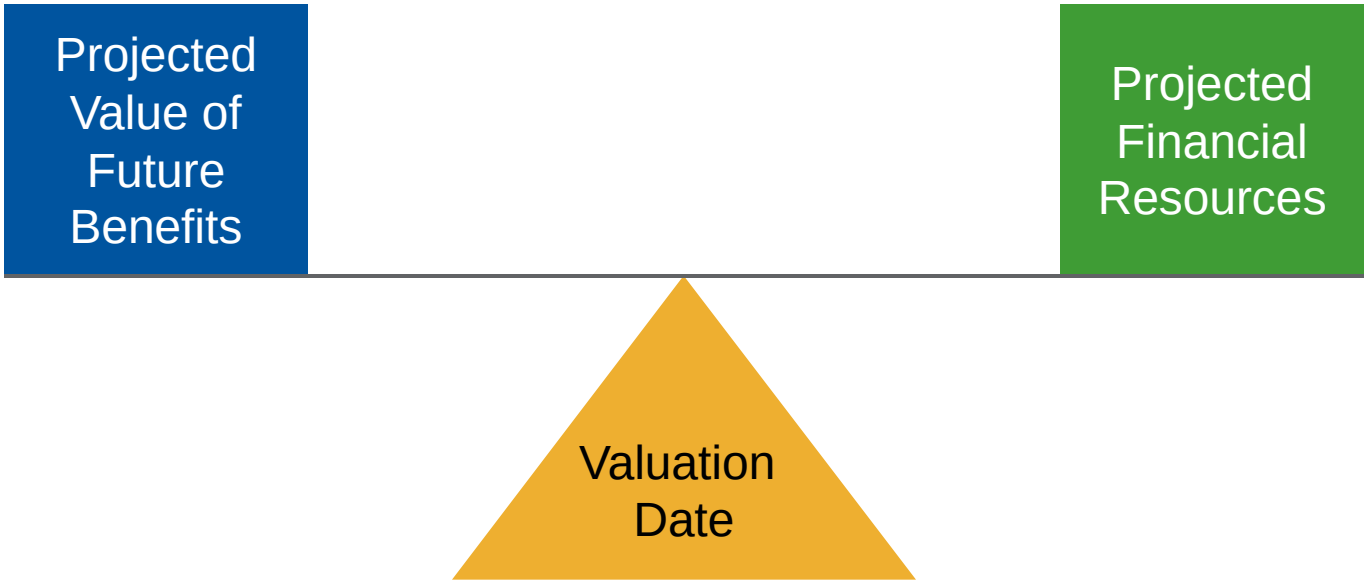
- Report the Fund's assets
- Estimate the Fund's liabilities
- Determine the Annual Required Contribution for fiscal year 2013
- Provide information for annual financial statements
- Identify emerging trends

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 Annual Required Contribution
  - 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
- No 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 “open” 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 period as a percent of payroll

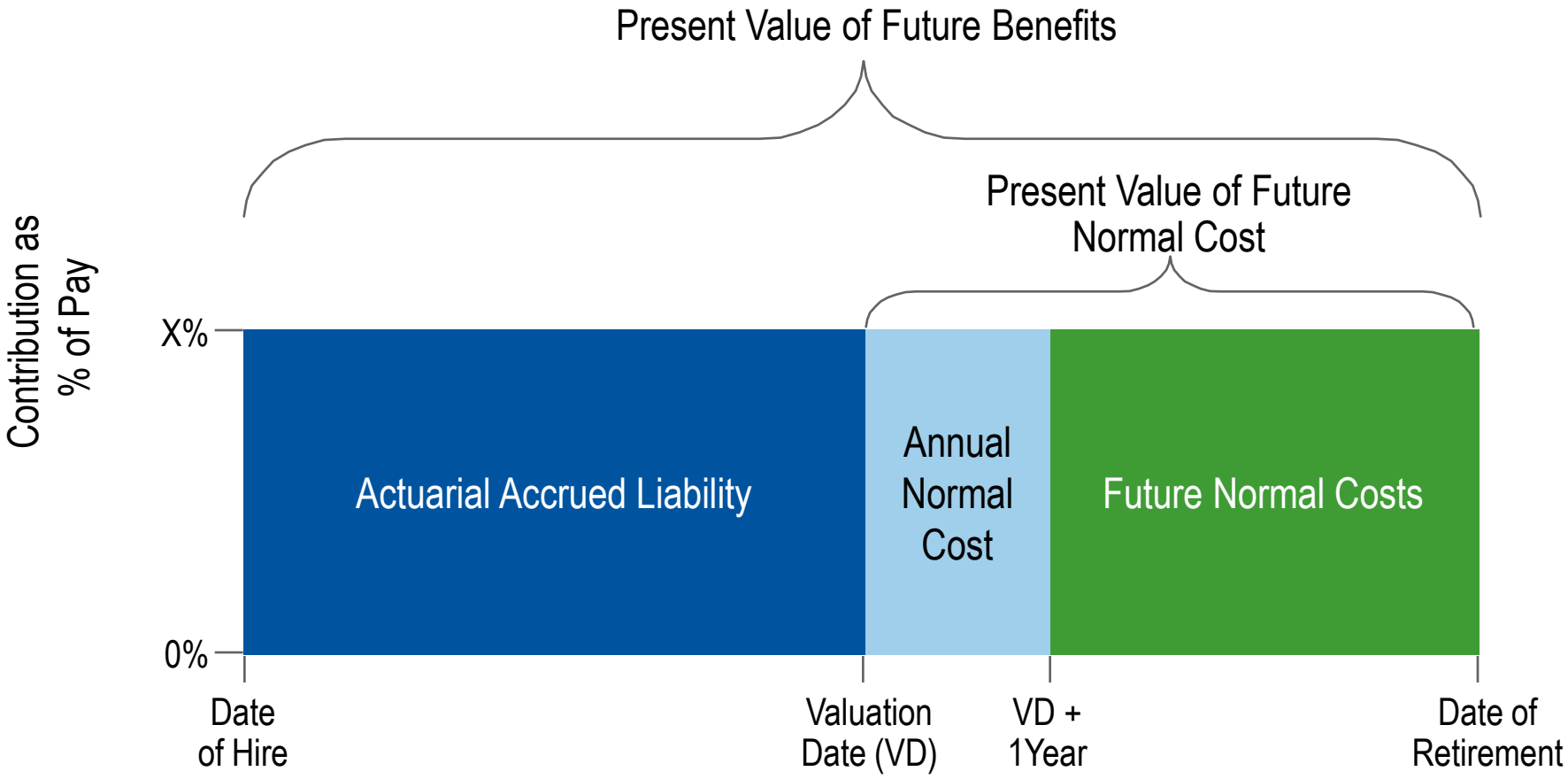
Actuarial Accrued Liability and Normal Cost

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.

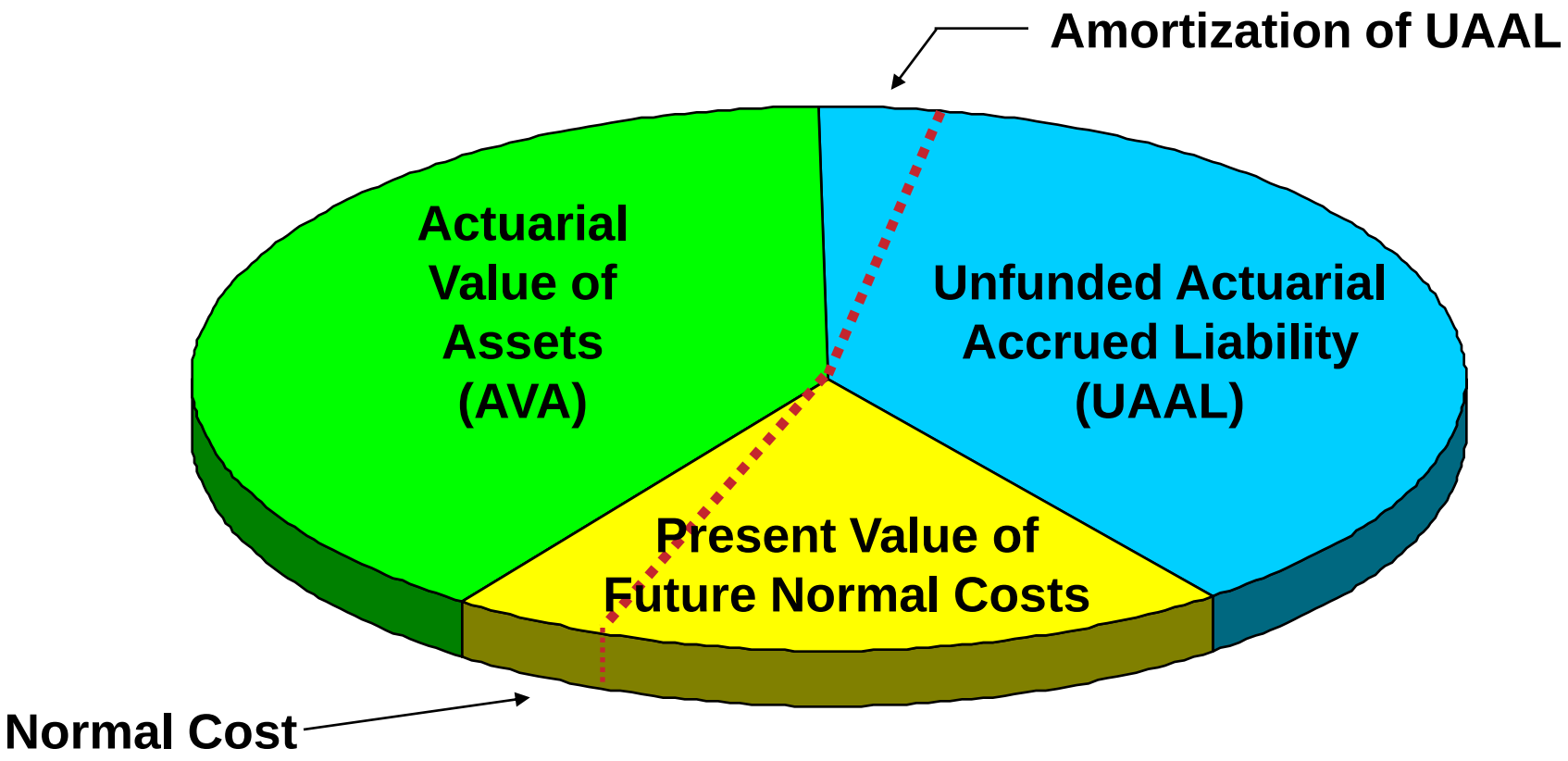
Funding Process



Actuarial Accrued Liability - Assets = Unfunded Actuarial Accrued Liability

Annual Required Contribution

Present Value of Future Benefits



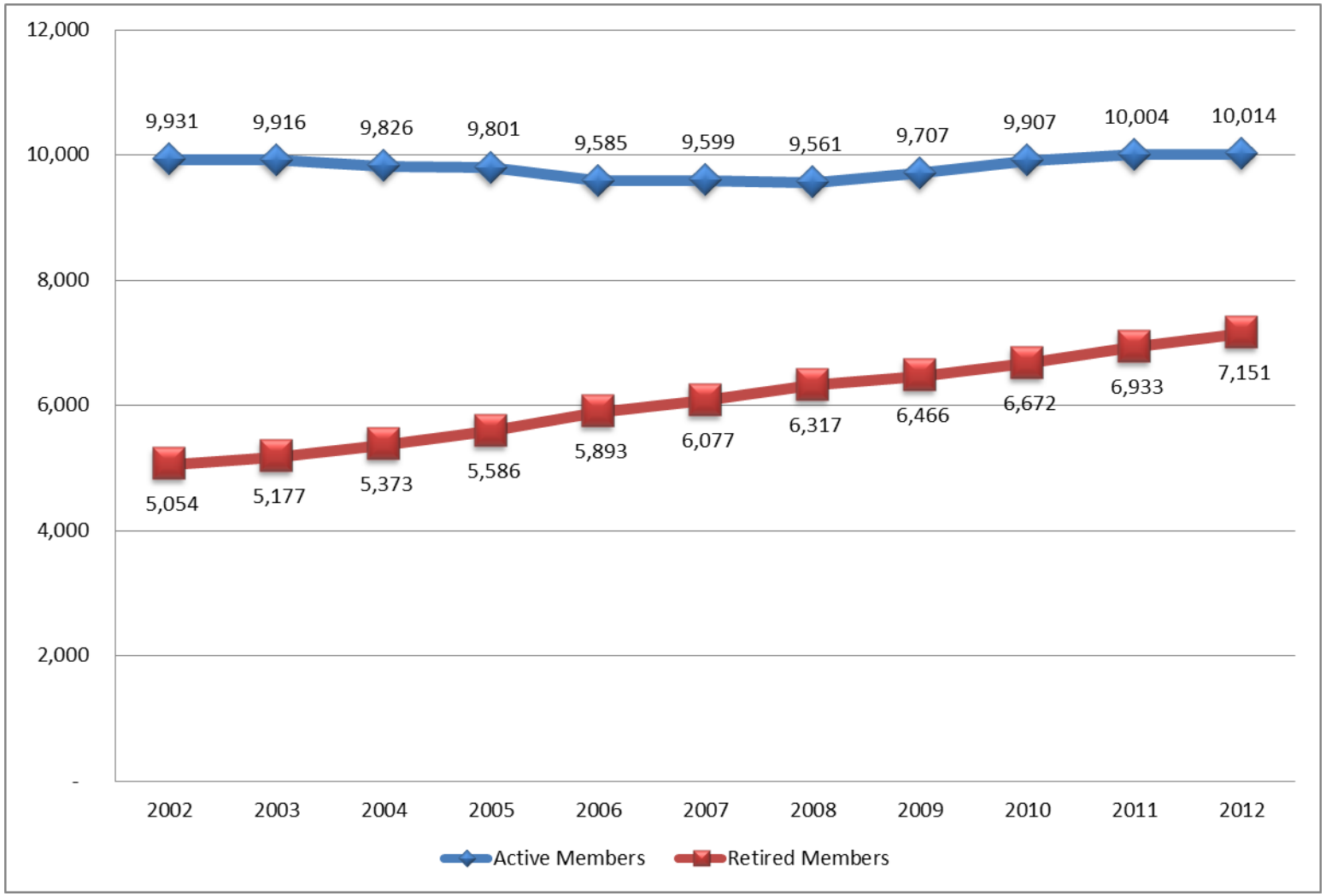
Summary of Valuation Highlights

- Valuation reflects increases in contribution rates (4% for both members and employers) contained in HB 1134
  - Member rate increased from 7.75% in FY12 to 9.75% for FY13 and FY14 and increases to 11.75% for FY15 and thereafter
  - Employer rate increased from 8.75% in FY12 to 10.75% for FY13 and FY14 and increases to 12.75% for FY15 and thereafter
  - Increases would revert to 7.75% for both members and employers once the funded ratio reaches 90% (measured using the actuarial value of assets)
- Market value of assets returned -1.4% for year ending 6/30/12 (Segal calculation)
  - Gradual recognition of deferred losses resulted in -1.4% return on actuarial assets
  - Unrecognized investment losses represent about 6% of market assets
- Net impact on funded ratio was a decrease from 66.3% (as of 7/1/2011) to 60.9% (as of 7/1/2012)
- Net impact on GASB 25 Annual Required Contribution (ARC) was a decrease from 13.16% of payroll (FY12) to 13.02% of payroll (FY13)
  - Based on the employer contribution rate for fiscal 2013 of 10.75%, there is a contribution deficiency of 2.27% of payroll
    - Additional contribution rate increases from HB 1134 (effective 7/1/2014) will address this deficiency

Membership

	2012	2011	Change
Active:			
• Number	10,014	10,004	+0.1%
• Payroll	$505.3 mil	$488.8 mil	+3.4%
• Average Age	43.7 years	43.9 years	- 0.2 years
• Average Service	13.7 years	13.8 years	- 0.1 years
Retirees and Beneficiaries			
• Number	7,151	6,933	+3.1%
• Total Annual Benefits	$ 142.8 mil	$ 133.6 mil	+6.9%
• Average Monthly Benefit	$1,664	$1,606	+3.6%

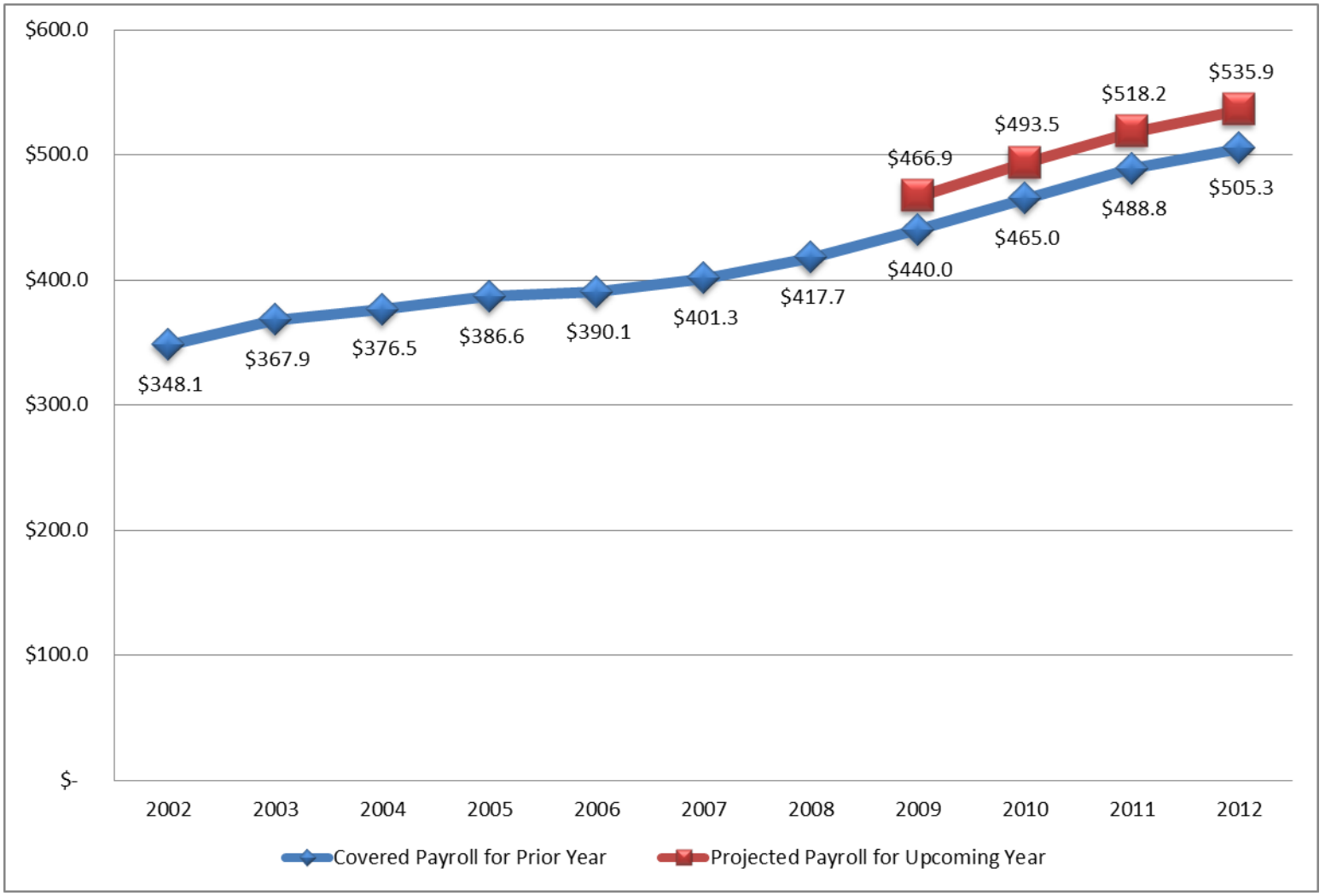
Active and Retired Membership



Since 2002, number of retirees and beneficiaries has increased 3.5% per year on average.

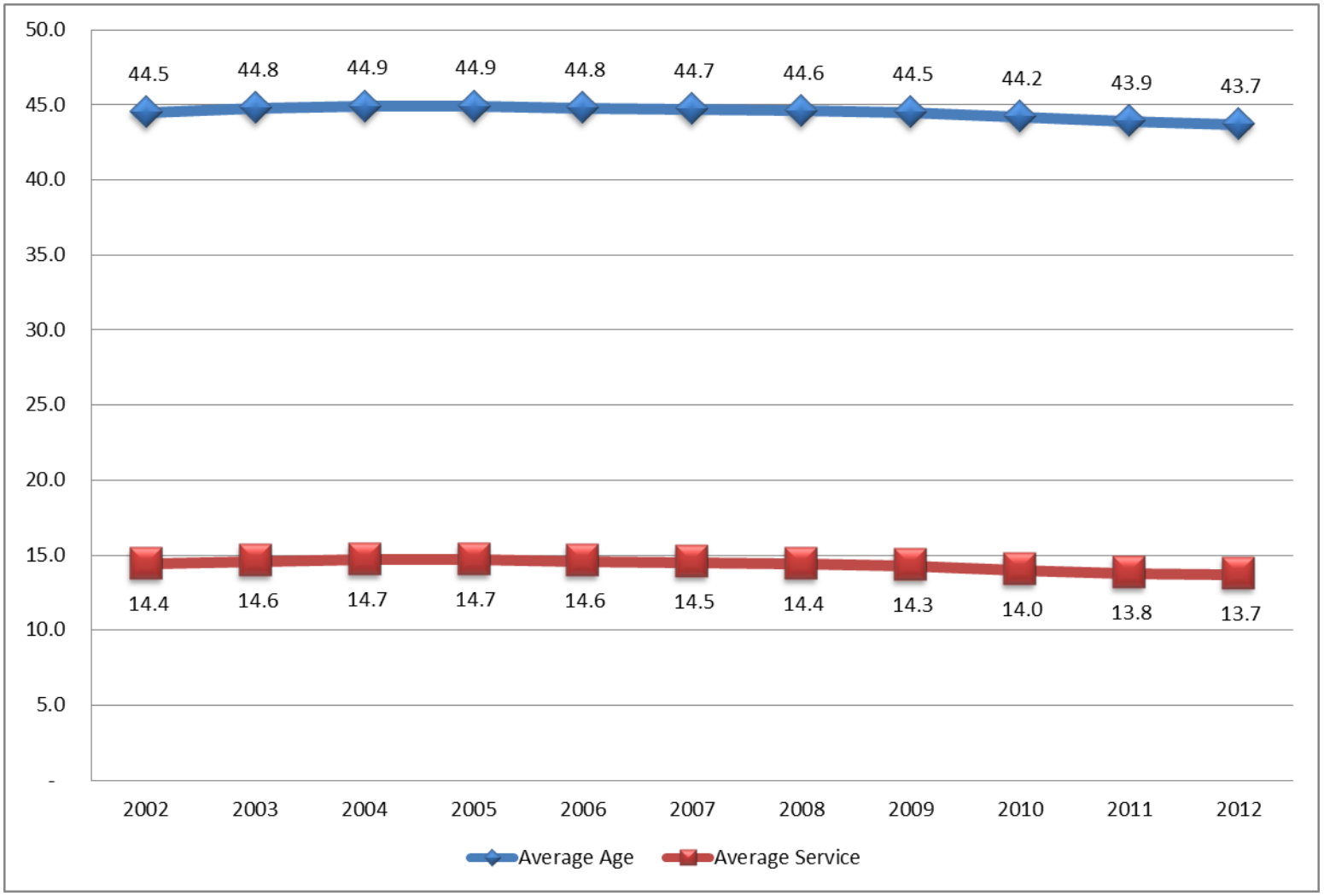
Active Payroll

$ Millions

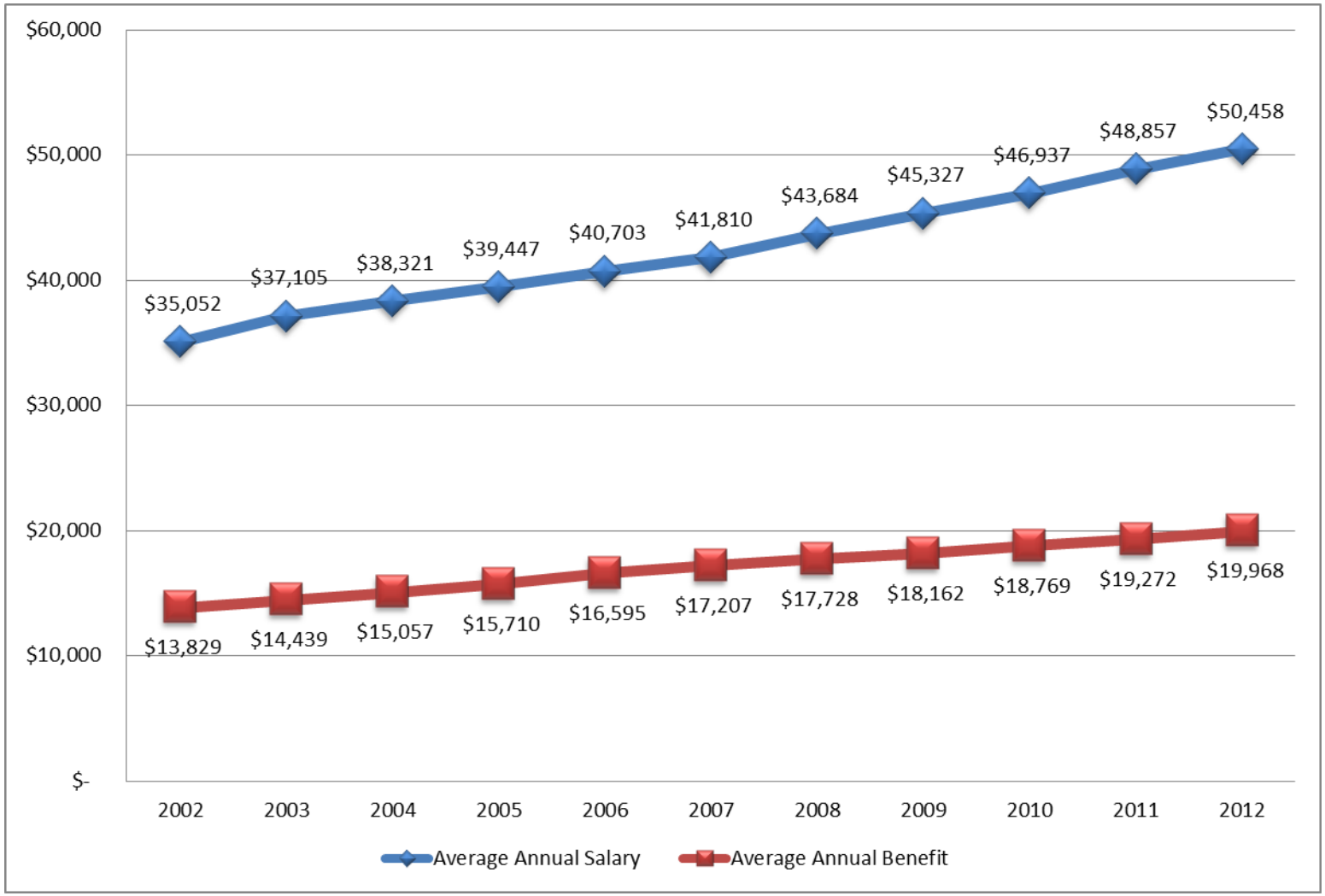


Since 2002, active payroll has increased, on average, 3.8% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2002, average salary has increased, on average, 3.7% per year. Average annual benefit has also increased by 3.7% per year.

Assets

- The market value of assets decreased from $1.726 billion (as of June 30, 2011) to $1.654 billion (as of June 30, 2012)
  - Segal determined the investment return was -1.4%, net of investment and administrative expenses
- The actuarial value of assets – which smoothes investment gains and losses over five years – decreased from $1.823 billion (as of June 30, 2011) to $1.748 billion (as of June 30, 2012)
  - Investment return of -1.4%, net of investment and administrative expenses
  - Actuarial value is 105.7% of market
  - There is a total of $94 million of deferred investment losses that will be recognized in future years
- The average annual return on market assets over the past 10 years is 5.5%
  - 20-year average is 7.0%
- The average annual return on actuarial assets over the past 10 years is 4.0%
  - 20-year average is 6.9%

Market Value of Assets ($ in millions)

Fiscal Year Ending June 30, 2012	
Beginning of Year	$1,726
Contributions:	
• Employer	46
• Member	41
• Service Purchases	2
• Total	89
Benefits and Refunds	(138)
Investment Income (net)	(23)
End of Year	$1,654
Rate of Return	-1.4%

Actuarial Value of Assets ($ in millions)

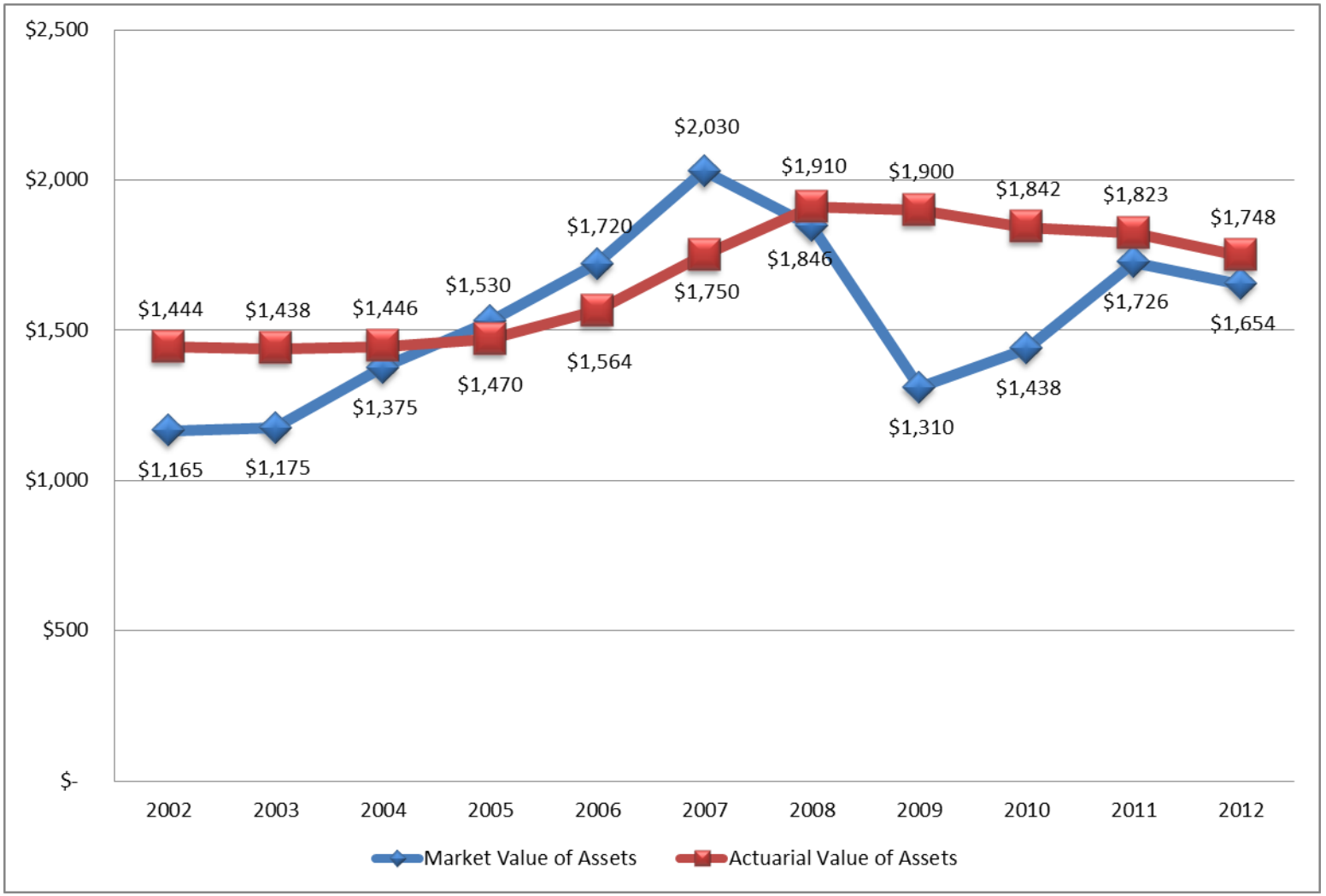
1. Market Value of Assets as of June 30, 2011	$1,726
2. Contributions and Benefits for FYE June 30, 2012	(49)
3. Expected Return	136
4. Expected Market Value of Assets (1) + (2) + (3)	$1,813
5. Actual Market Value of Assets on June 30, 2012	**1,654**
6. Excess/(Shortfall) for FYE June 30, 2012 (5) – (4)	(159)
Excess/(Shortfall) Returns:	

Year	Initial Amount	Deferral %	Unrecognized Amount
2012	($159)	80%	($128)
2011	220	60%	132
2010	74	40%	30
2009	(640)	20%	(128)
2008	(303)	0%	0
7. Total			**($94)**

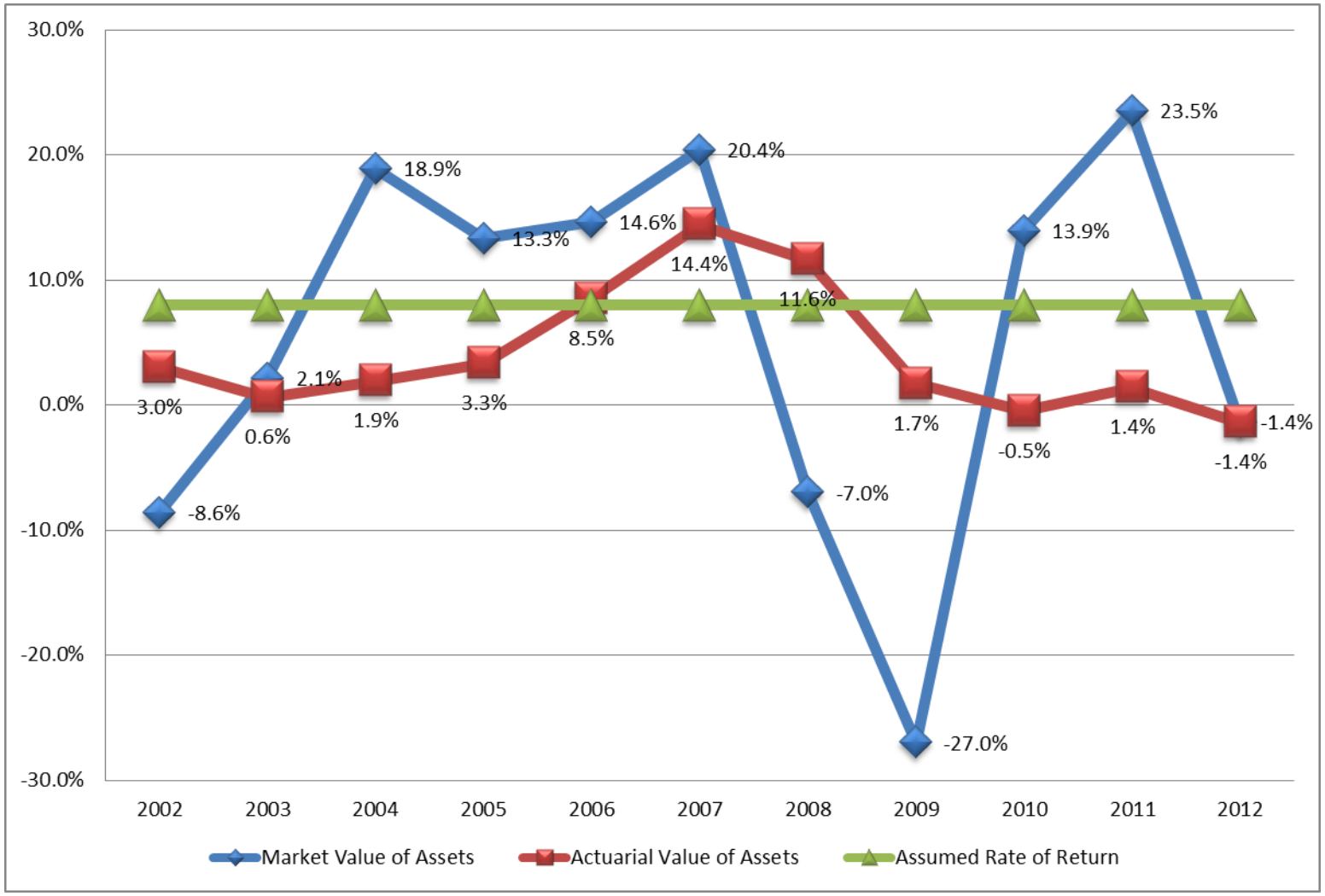
8. Actuarial Value of Assets as of June 30, 2012 (5) - (7)	**$1,748**
9. Actuarial Value of Assets as a % of Market Value of Assets	106%

Market and Actuarial Values of Assets

$ Millions

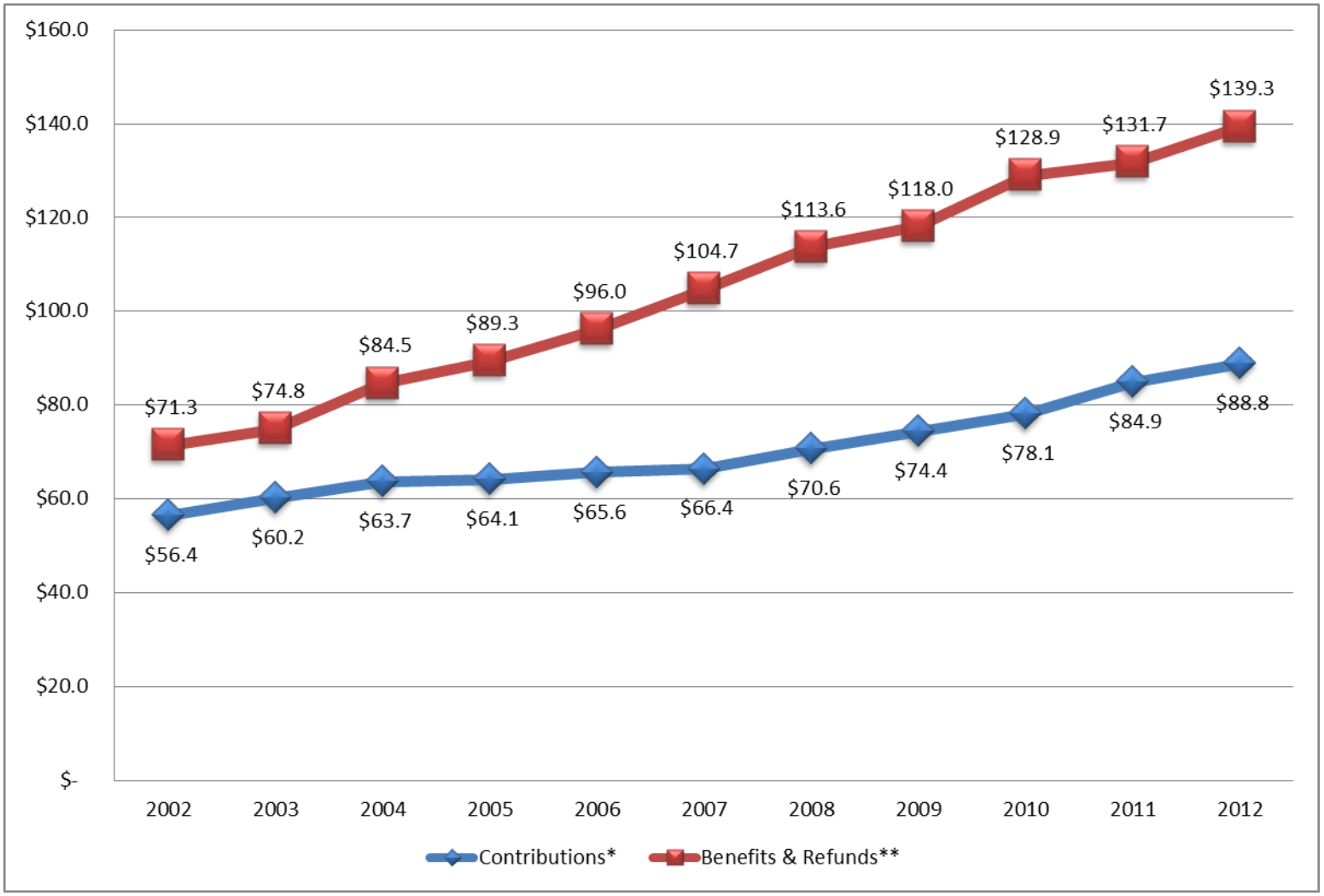


Asset Returns



Contributions vs. Benefits and Refunds

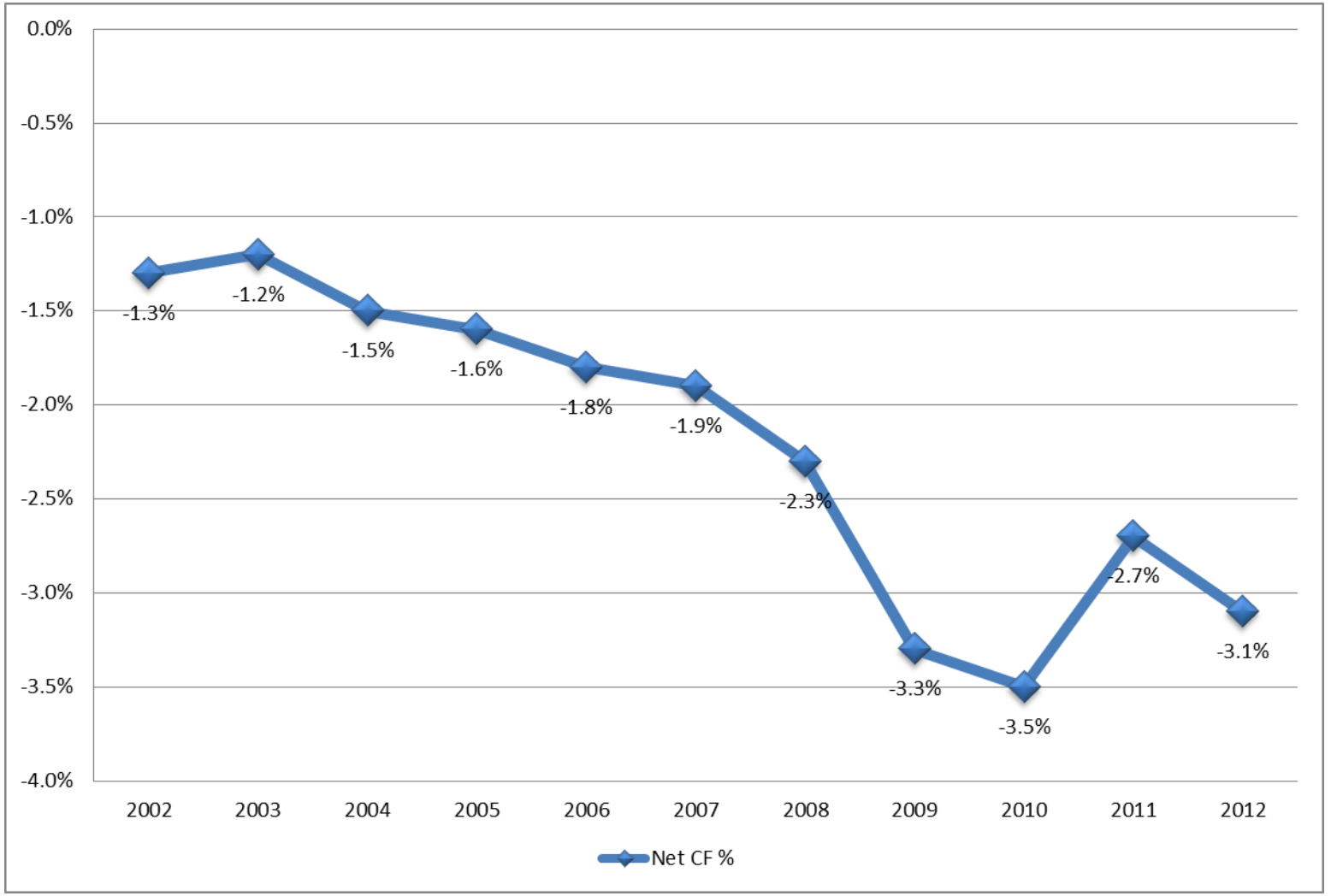
$ Millions



* 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, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	$1,373	$1,352
• Inactive Members	70	66
• Retirees and Beneficiaries	1,429	1,332
Total	**$2,872**	**$2,750**
Actuarial Assets	1,748	1,823
Unfunded Accrued Liability	$1,124	$ 927
Funded Ratio	60.9%	66.3%

Annual Required Contribution

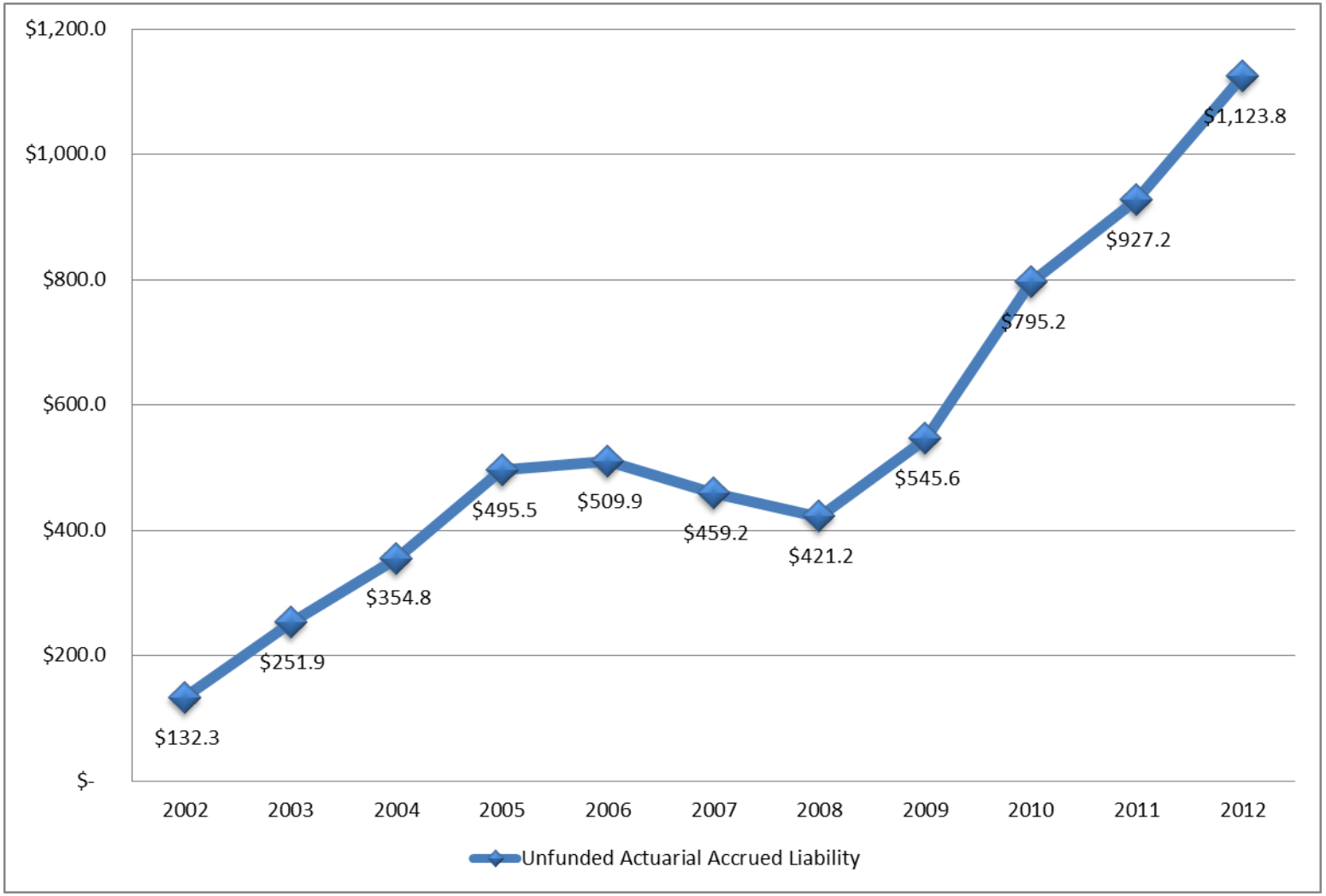
	July 1, 2012	July 1, 2011
Normal Cost Rate	9.83%	9.80%
Member Rate	9.75%	7.75%
Employer Normal Cost Rate	0.08%	2.05%
Adjusted for Timing	0.08%	2.12%
Amortization of UAAL	12.94%	11.04%
Annual Required Contribution	13.02%	13.16%
Employer Rate	10.75%	8.75%
Contribution Sufficiency/(Deficiency)	(2.27%)	(4.41%)

Valuation Results - Comments

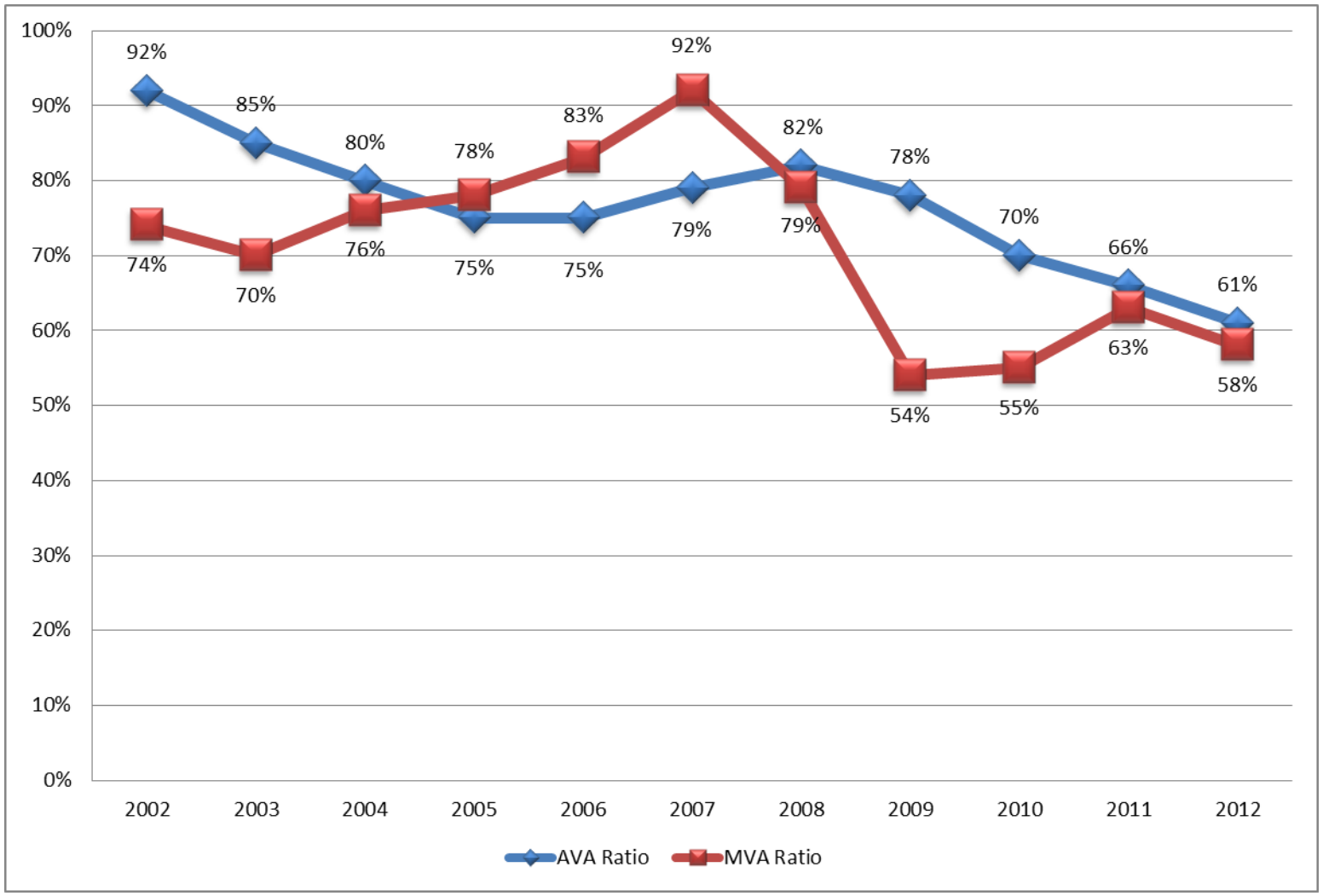
- The actuarial accrued liability increased from $2.750 billion (as of June 30, 2011) to $2.872 billion (as of June 30, 2012)
- The unfunded actuarial accrued liability (UAAL) increased from $927 million to $1,124 million
  - UAAL is 222% of active payroll supplied by System
- The funded ratio on an AVA basis decreased from 66% to 61%
  - On a market value basis, the funded ratio decreased from 63% to 58%
- The Annual Required Contribution (ARC) decreased from 13.16% of payroll to 13.02% of payroll
  - Compared to 10.75% employer contribution, results in a contribution shortfall of 2.27%
  - The funding period based on the 10.75% statutory rate is 51 years
  - Reflecting the additional 4% increase in total contribution rate would result in a funding period of 23 years

Unfunded Actuarial Accrued Liability

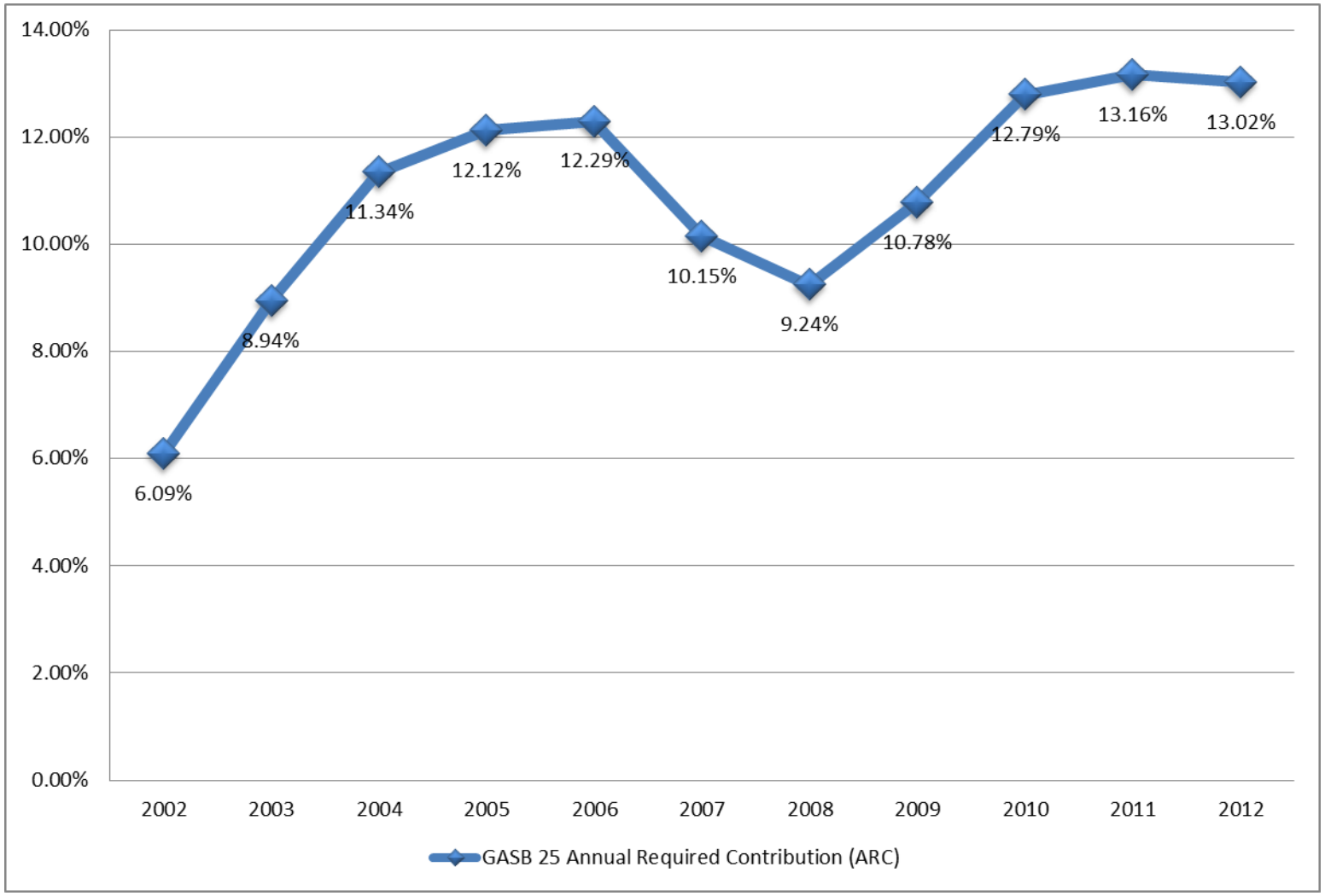
$ Millions



Funded Ratios



GASB 25 Annual Required Contribution (ARC)



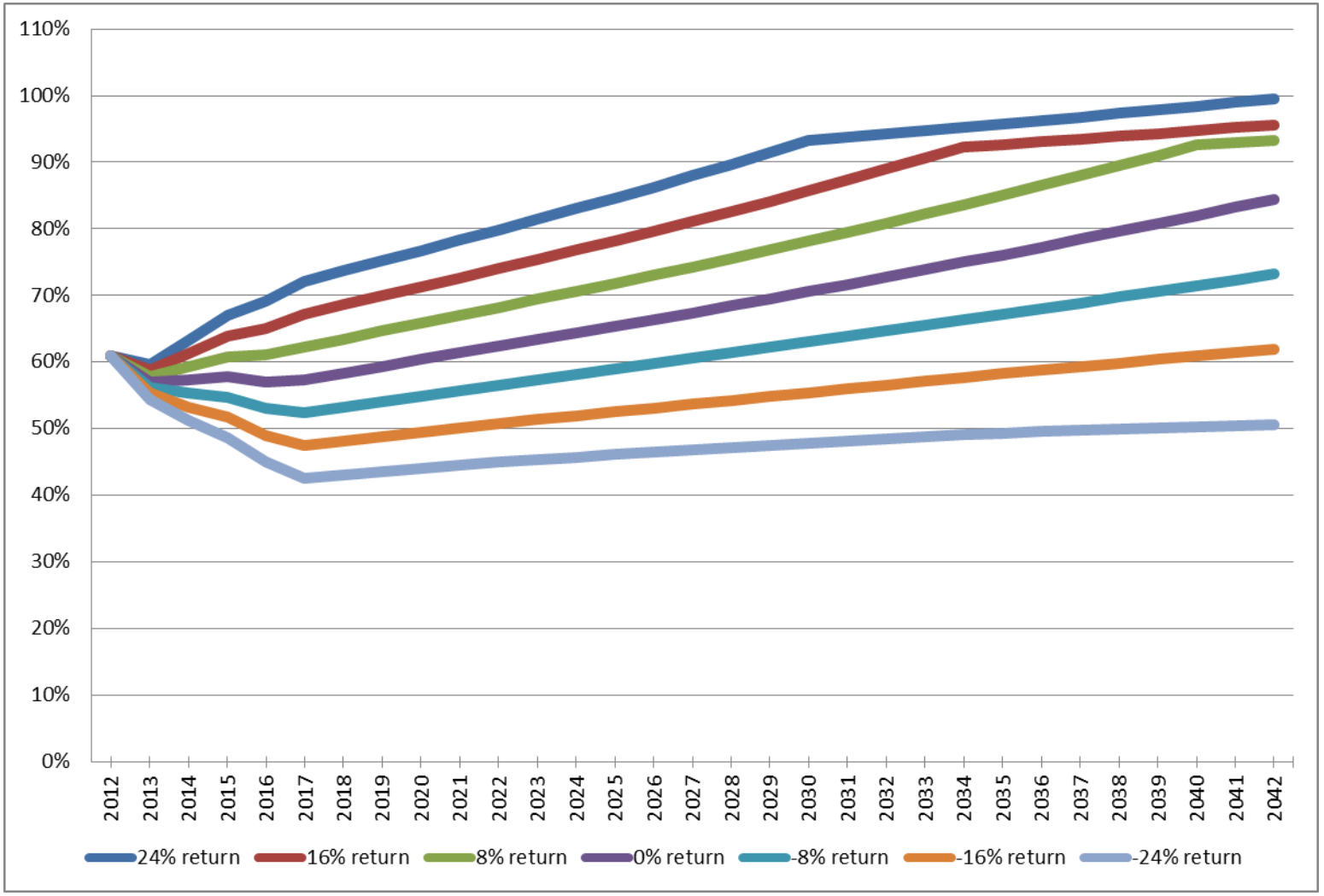
Since 2005, the calculation of the ARC is based on 30-year level percentage of payroll amortization.

Prior to 2005, the ARC calculation was based on a 20-year amortization period.

Projections

- Projections of estimated funded ratios for 30 years
  - Based on FY13 investment return scenarios ranging from -24% to +24%
  - Assumes Fund earns 8% per year in FY14 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 FY13 and FY14 and increases to 11.75% for FY15 and thereafter
  - Employer rate is 10.75% for FY13 and FY14 and increases to 12.75% for FY15 and thereafter
  - Increases “sunset” back to 7.75% once the funded ratio reaches 90% (based on actuarial assets)

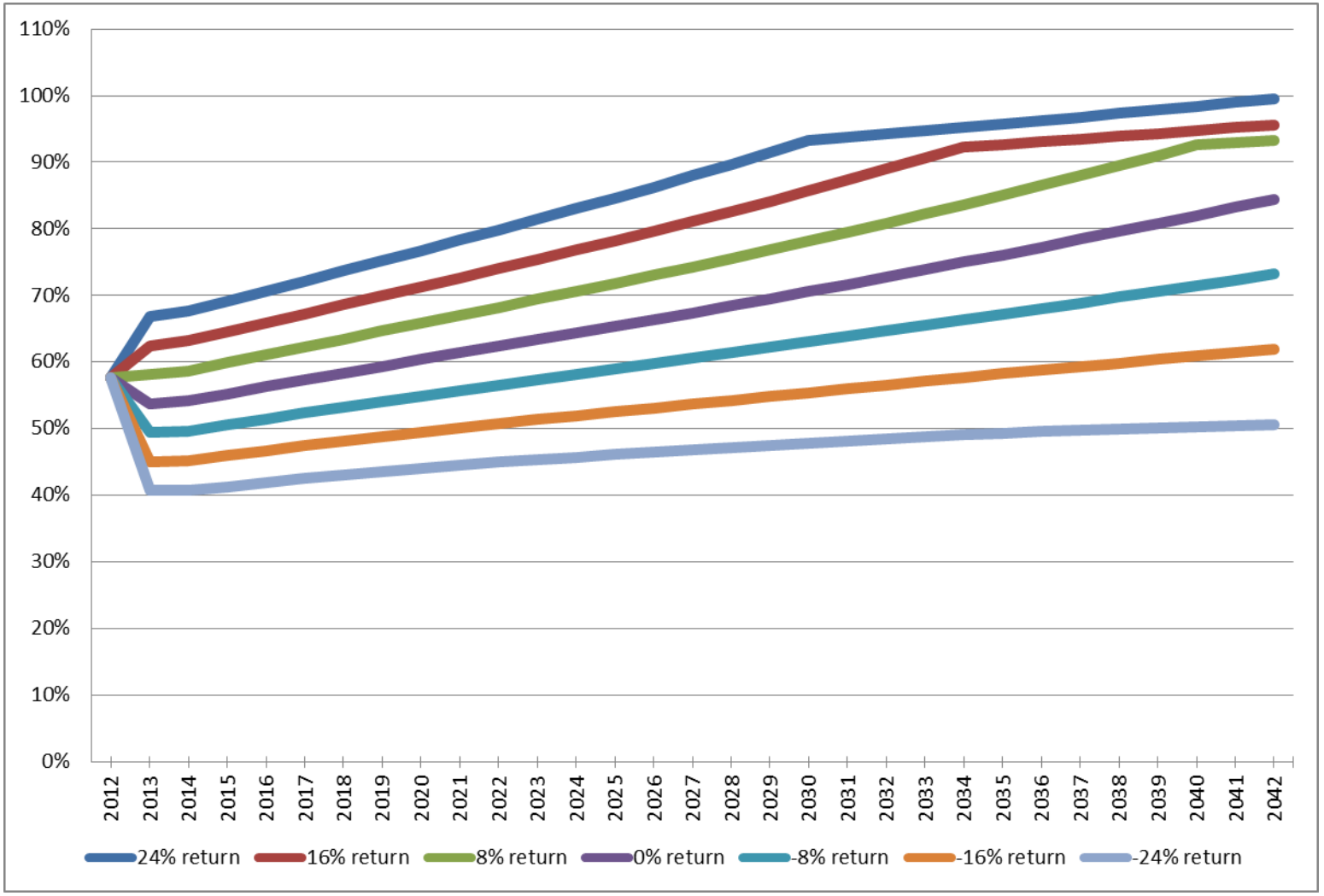
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2013	16% for FY2013	8% for FY2013	0% for FY2013	-8% for FY2013	-16% for FY2013	-24% for FY2013
2012	61%	61%	61%	61%	61%	61%	61%
2013	60%	59%	58%	57%	56%	55%	54%
2014	63%	61%	59%	57%	55%	53%	51%
2015	67%	64%	61%	58%	55%	52%	49%
2016	69%	65%	61%	57%	53%	49%	45%
2017	72%	67%	62%	57%	52%	47%	42%
2022	80%	74%	68%	62%	57%	51%	45%
2027	88%	81%	74%	67%	61%	54%	47%
2032	94%	89%	81%	73%	65%	57%	49%
2037	97%	94%	88%	78%	69%	59%	50%
2042	100%	96%	93%	84%	73%	62%	51%

Projected Funded Ratios (MVA Basis)



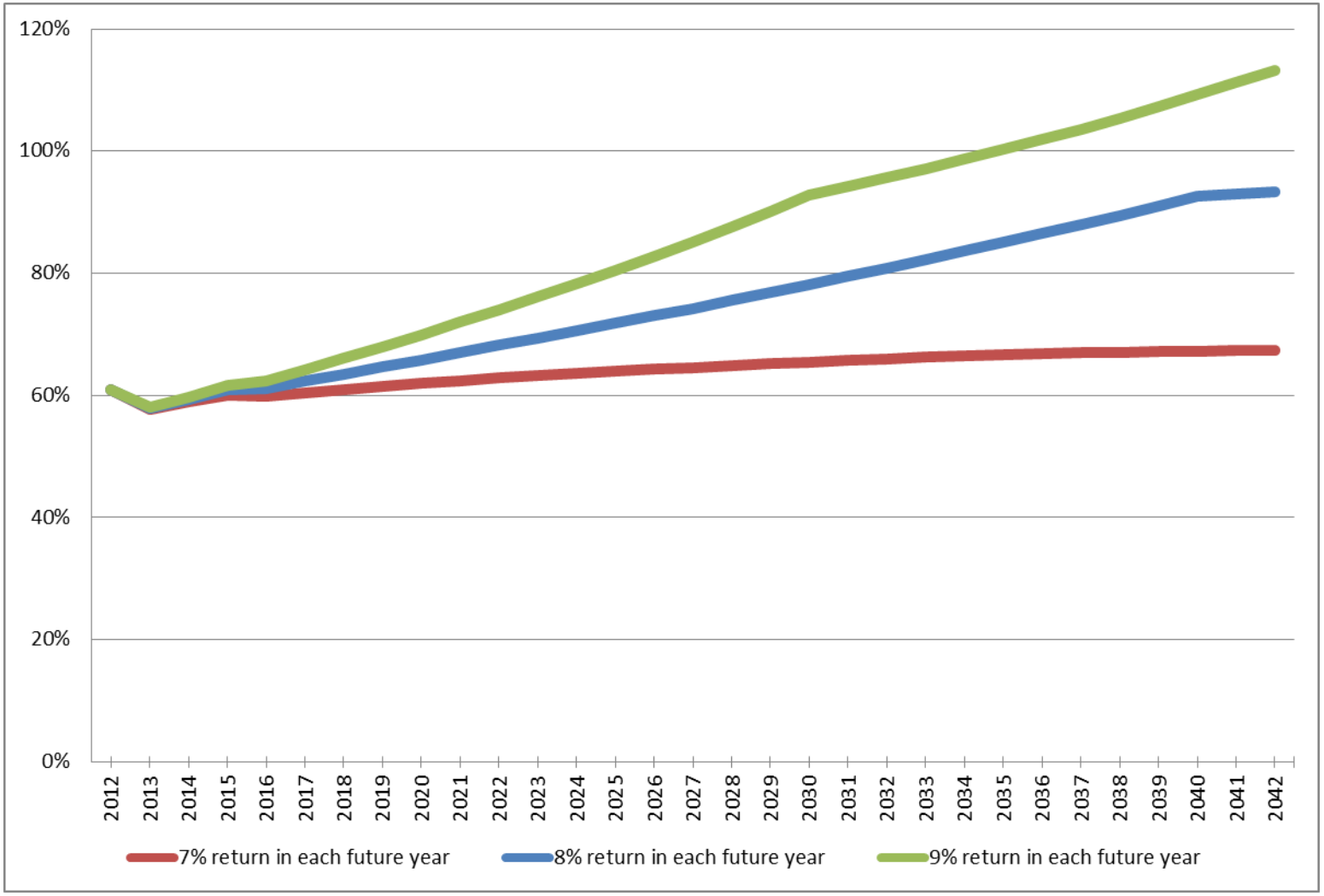
Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2013	16% for FY2013	8% for FY2013	0% for FY2013	-8% for FY2013	-16% for FY2013	-24% for FY2013
2012	58%	58%	58%	58%	58%	58%	58%
2013	67%	63%	58%	54%	49%	45%	41%
2014	68%	63%	59%	54%	50%	45%	41%
2015	69%	65%	60%	55%	51%	46%	41%
2016	71%	66%	61%	56%	52%	47%	42%
2017	72%	67%	62%	57%	52%	47%	42%
2022	80%	74%	68%	62%	57%	51%	45%
2027	88%	81%	74%	67%	61%	54%	47%
2032	94%	89%	81%	73%	65%	57%	49%
2037	97%	94%	88%	78%	69%	59%	50%
2042	100%	96%	93%	84%	73%	62%	51%

Projected Margin (AVA Basis)

Valuation Year	24% for FY2013	16% for FY2013	8% for FY2013	0% for FY2013	-8% for FY2013	-16% for FY2013	-24% for FY2013
2012	-2.27%	-2.27%	-2.27%	-2.27%	-2.27%	-2.27%	-2.27%
2013	-0.94%	-1.24%	-1.53%	-1.82%	-2.11%	-2.41%	-2.70%
2014	2.12%	1.44%	0.76%	0.08%	-0.60%	-1.28%	-1.96%
2015	3.16%	2.10%	1.05%	-0.01%	-1.06%	-2.11%	-3.17%
2016	3.72%	2.31%	0.90%	-0.52%	-1.93%	-3.34%	-4.75%
2017	4.61%	2.85%	1.09%	-0.66%	-2.42%	-4.18%	-5.94%
2022	6.67%	4.48%	2.28%	0.08%	-2.12%	-4.31%	-6.51%
2027	9.41%	6.71%	4.00%	1.29%	-1.41%	-4.12%	-6.82%
2032	2.53%	9.50%	6.16%	2.83%	-0.50%	-3.84%	-7.17%
2037	3.40%	1.97%	8.73%	4.58%	0.42%	-3.73%	-7.89%
2042	4.49%	2.70%	1.62%	6.73%	1.54%	-3.65%	-8.84%

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



Questions?

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