



Looking Ahead to 2011

Actuarial Presentation

June 21, 2010

Mark Randall

GRS

Gabriel Roeder Smith & Company
Consultants & Actuaries
www.gabrielroeder.com



What is an actuary?

An **actuary** is a person, who passes as an expert on the basis of a prolific ability to produce an infinite variety of incomprehensible figures calculated with micrometric precision from the vaguest of assumptions based on debatable evidence from inconclusive data derived by persons of questionable reliability for the sole purpose of confusing an already hopelessly befuddled group of persons who never read the statistics anyway.



What are we going to talk about today?

The past and the future:

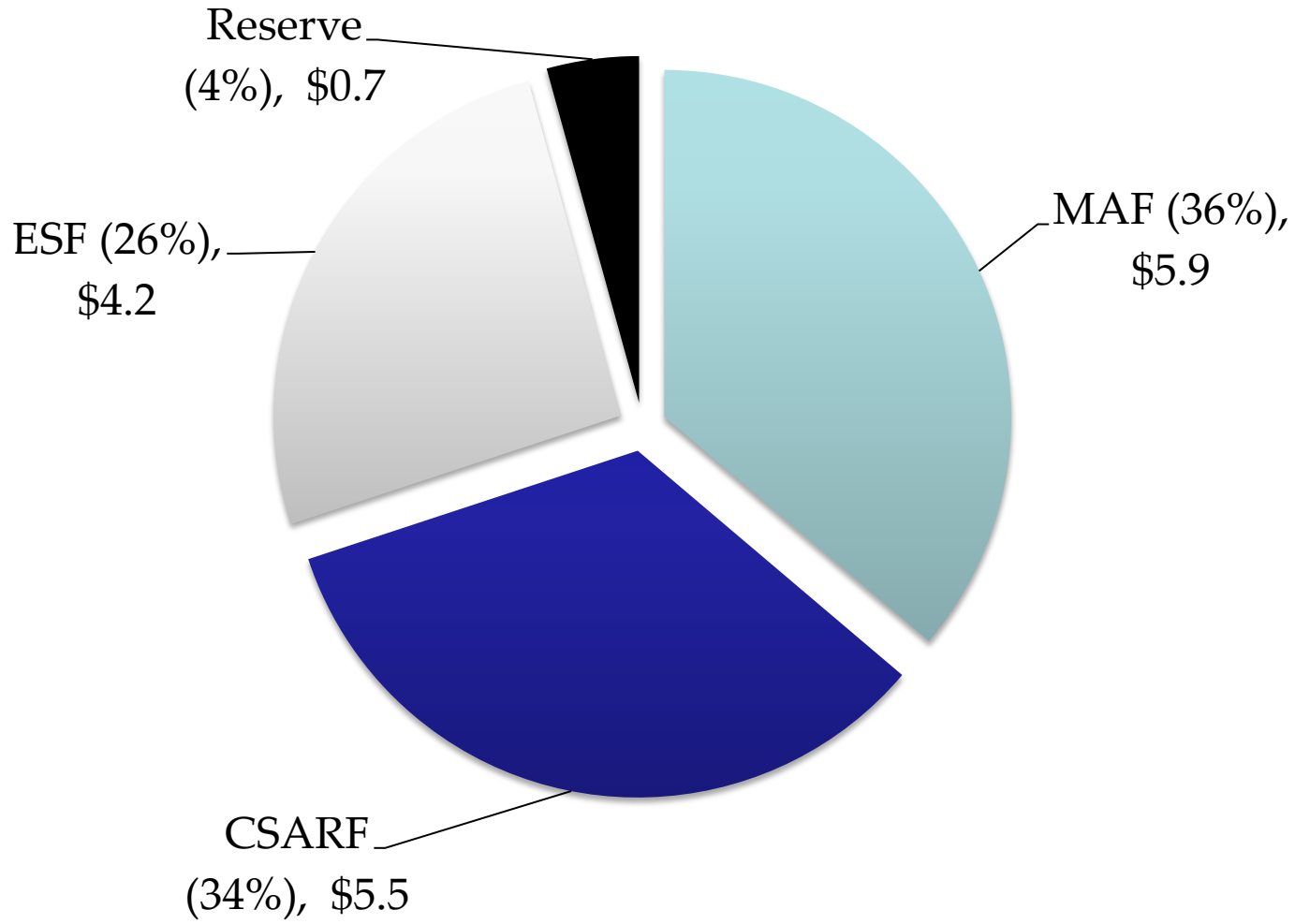
1. Quick summary of the recently completed actuarial valuation of TMRS
2. Potential future “Restructuring” of the TMRS Fund



December 31, 2009 (2011 rates) Actuarial Valuation Summary

- ◆ System-wide Funded Ratio increased
- ◆ Overall, results close to expectations
 - ▶ Turnover and retirement lower than expected
- ◆ Phase-In Adjustments Continue
 - ▶ Many cities not yet paying the Full Rate
 - ▶ 20 Cities decreased benefits last year
- ◆ CSARF continues to grow
 - ▶ Increases the need for a robust Reserve

Individual TMRS Funds (% of Total)

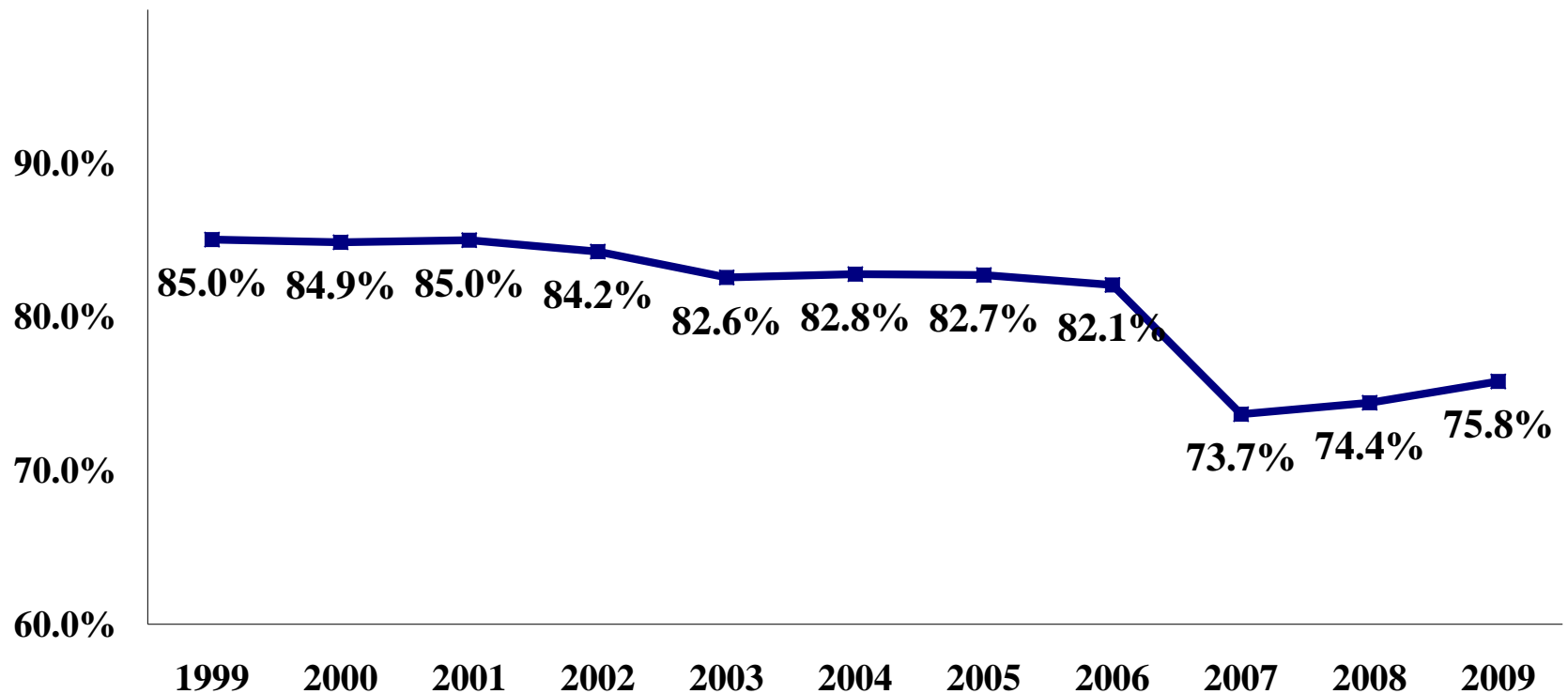


Above \$ amounts are in Billions as of December 31, 2009

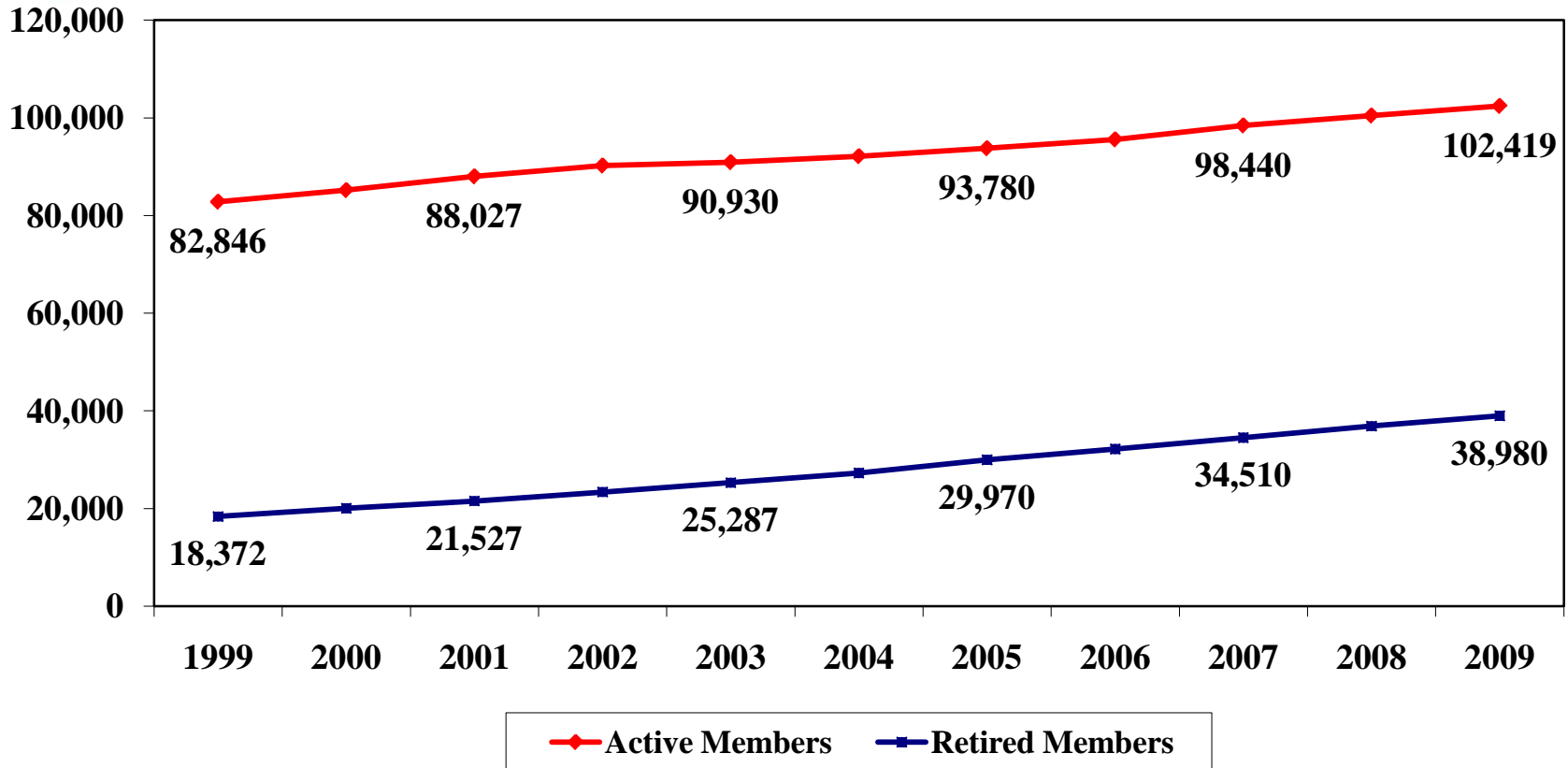


Funded Ratio Percentages

**The System-wide Funded Ratio has increased
2 years in a row**

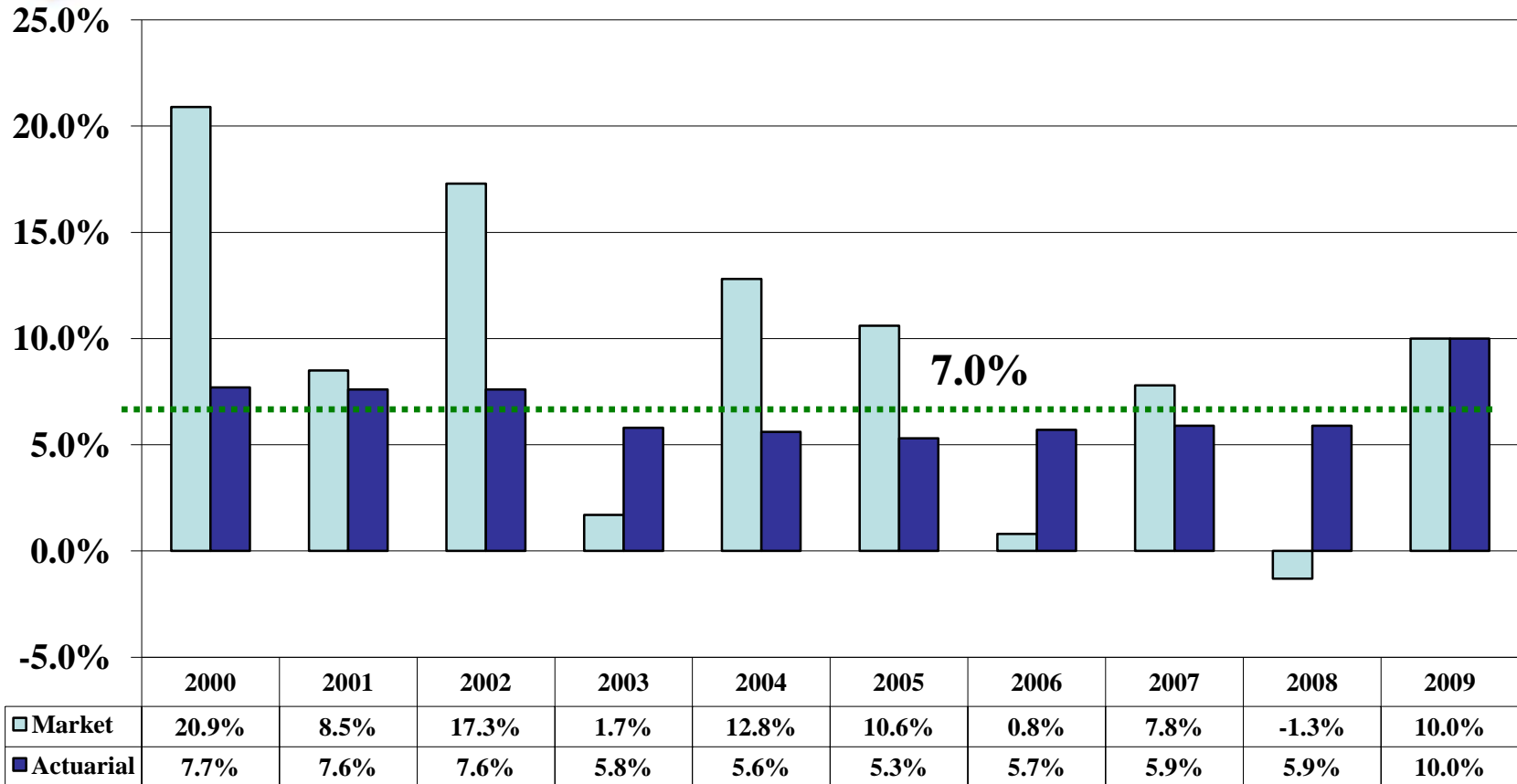


Active Members and Retired Members



2.1% average increase in active members since 1999; 2.0% increase in 2009
7.8% average increase in retired members since 1999; 5.7% increase in 2009
There are currently 2.7 actives for every retiree, down from 4.5 in 1999

Estimated Yields Based on Actuarial (Book) and Market Value of Assets



6.5% average compound return (on market value) over last 10 years

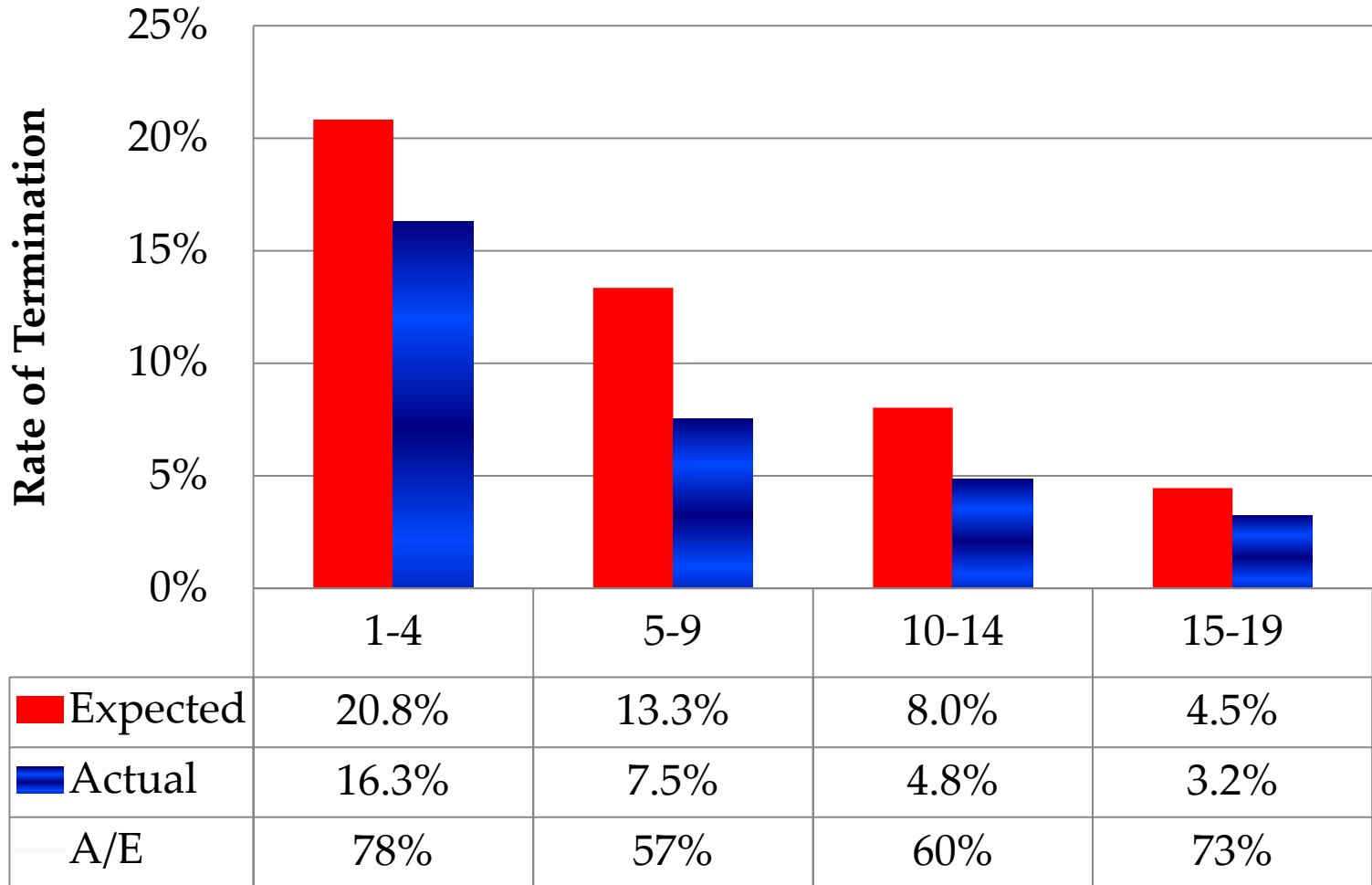


Demographic Experience

- ◆ Very low turnover and retirement experience
- ◆ For active employees:
 - ▶ Average age increased from 42.32 to 42.58 (+0.26)
 - ▶ Average service increased from 9.91 to 10.16 (+0.25)
 - ▶ Typical increase would be closer to 0.10 years
- ◆ This means that many cities had 2 to 3 years worth of aging in their current service cost recognized in 1 year
- ◆ Also means more members are expected to reach retirement in the future than originally anticipated, this creates an actuarial loss



Termination Experience for Active Members Distributed by Years of Service

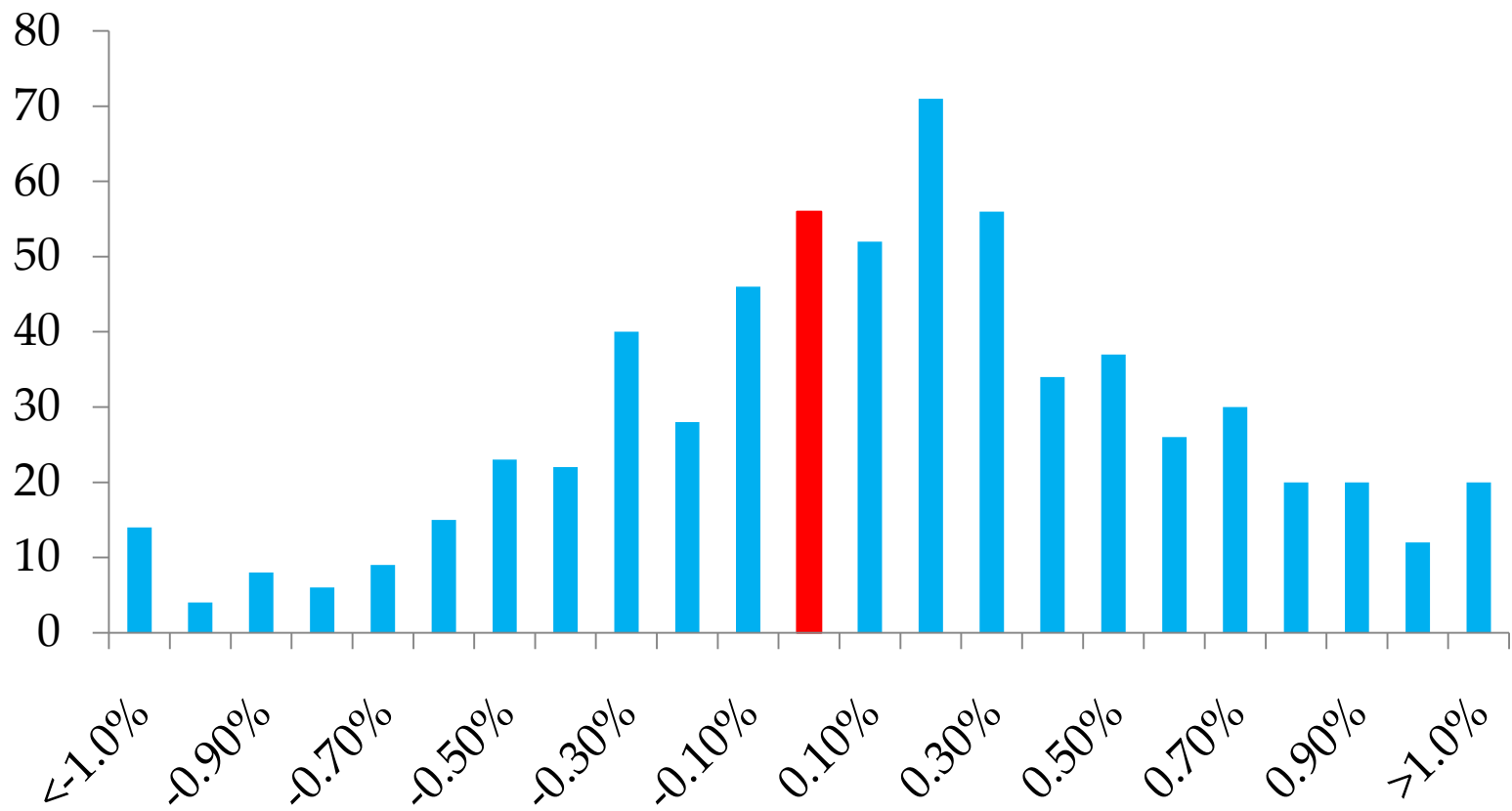


The A/E ratio is used to measure the deviation from the assumptions.
 A 100% A/E ratio would be a perfect match.



Distribution of Rate Changes for 2011 (Cities with more than 10 members)

Total Change



The red highlight represents +/- 0.0%



Discussion of “Restructuring”

- ◆ Under the proposed TMRS Fund Restructuring, both the CSARF and the ESF would be folded into the MAF of each member city to more resemble a typical pension fund structure
- ◆ ESF would still be paid guaranteed 5% return within the MAF



Reserve Levels

- ◆ The CSARF will continue to grow and become a larger and larger portion of the total TMRS Fund
 - ▶ Increases leverage to MAF
 - ▶ Increases volatility of rates
- ◆ Result:
 - ▶ Increases need for higher Reserve Levels
 - ▶ Reserves will be built by future earnings, meaning increased contribution rates



MAF Crediting Rate vs. Total Fund Return

Total Return	Est. Total Earnings (\$ millions)	CSARF (5%) (\$ millions)	ESF (5%) (\$ millions)	Earnings available to credit to MAF (2) – (3) – (4)	Effective Crediting rate to MAF
(1)	(2)	(3)	(4)	(5)	(6)
-10%	(\$1,422)	\$262	\$189	(\$1,873)	(36.4%)
-1%	(\$142)	\$262	\$189	(\$593)	(11.4%)
2%	\$285	\$262	\$189	(\$167)	(3.2%)
5%	\$711	\$262	\$189	\$260	5.0%
7%	\$996	\$262	\$189	\$545	10.9%

Elimination of above leverage:

Under a restructured fund, a 2% return results in a 2% return to the MAF



Main reason for Fund Restructuring

- ◆ Reduce current volatility and leverage
 - ▶ Protects the MAF from the downside risk
 - ▶ Redistribution of CSARF reduces leverage significantly and inclusion of ESF eliminates leverage
 - ▶ Volatility is reduced to the level of a typical pension fund
- ◆ Potential contribution rate reduction is an additional benefit



Question:

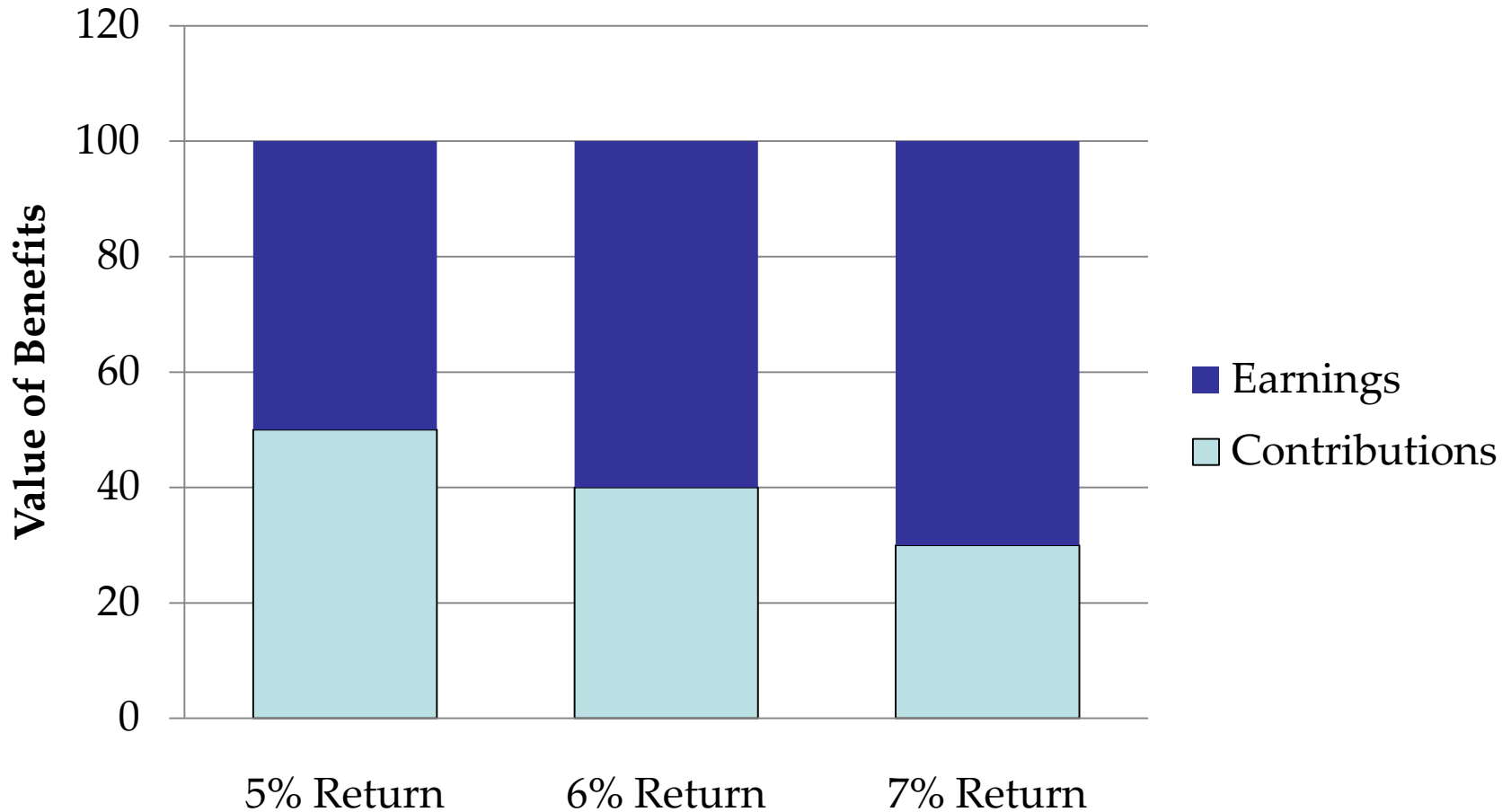
- ◆ Why does Restructuring decrease future contribution requirements for employers?



Compound Interest Example

- ◆ \$100 payment to be made in 10 years
- ◆ Investment to be made today in order to earn interest for 10 years
- ◆ Today's investment is based on the amount of interest (**I**) to be earned per year
 - ▶ If **I** is 5%, must invest \$61.39
 - ▶ If **I** is 6%, must invest \$55.84
 - ▶ If **I** is 7%, must invest \$50.83

How does this impact pension funding?



The more earnings generated from assets, the less contributions are needed to provide a given level of benefits



Restructuring's impact on TMRS funding

- ◆ The following slides breakdown the distribution of earnings amongst the TMRS funds
- ◆ Even though the Fund is expected to earn 7.00% in total, notice that only 5.78% is needed to credit 5% to the CSARF, 5% to the ESF, and 7.5% to the MAF
- ◆ Basically, the annual valuation is using a net 5.78% investment return assumption



Target crediting rates for 2010

(\$ in millions)

Fund	Estimated Crediting Balance for 2010	Crediting Rate	Interest Credit
CSARF	\$5,515	5.0%	\$276
ESF	4,204	5.0%	210
MAF	5,904	7.5%	443
Supplemental	28	5.0%	1
Administration Budget	14	N/A	14
Reserve	<u>668</u>	<u>N/A</u>	<u>0</u>
Total	\$16,333	5.78%	\$944

If the assumption is that the total Fund will earn 7%, where does the additional 1.22% of earnings go?



Why can't we assume it all goes back to each MAF immediately?

Fund	Estimated Crediting Balance for 2010	Crediting Rate	Interest Credit
CSARF	\$5,515	5.0%	\$276
ESF	4,204	5.0%	210
MAF	5,904	10.9%	642
Supplemental	28	5.0%	1
Administration Budget	14	N/A	14
Reserve	<u>668</u>	<u>N/A</u>	<u>0</u>
Total	\$16,333	7.00%	\$1,143

Based on a zero-sum calculation, if no reserve was kept and if all earnings were paid out each year, it appears we could use a discount rate as high as 10.9%



Restructuring's impact on TMRS funding

- ◆ Why can't we use all of the 7.00% in the annual valuation?
 - ▶ Why can't we use an MAF discount rate of 10.90%?
- ◆ First, as discussed earlier, the CSARF creates the need for a Reserve
 - ▶ The Reserve has to be created from investment earnings
 - ▶ We are assuming that earnings of 1% each year are being used to build the Reserve over the next 20 years



The need for a Reserve takes the first 1% off the top

Fund	Estimated Crediting Balance for 2010	Crediting Rate	Interest Credit
CSARF	\$5,515	5.0%	\$276
ESF	4,204	5.0%	210
MAF	5,904	8.1%	479
Supplemental	28	5.0%	1
Administration Budget	14	N/A	14
Reserve	<u>668</u>	<u>N/A</u>	<u>163</u>
Total	\$16,333	7.00%	\$1,143

Needing a reserve pulls the first 1% out of the earnings, but it appears we could still use an 8.1% discount rate

However, while this may work for one year, there is inequity amongst employers in that the distribution of the MAF balances will change over time, creating varying degrees of leverage based on benefit provisions and population growth rates

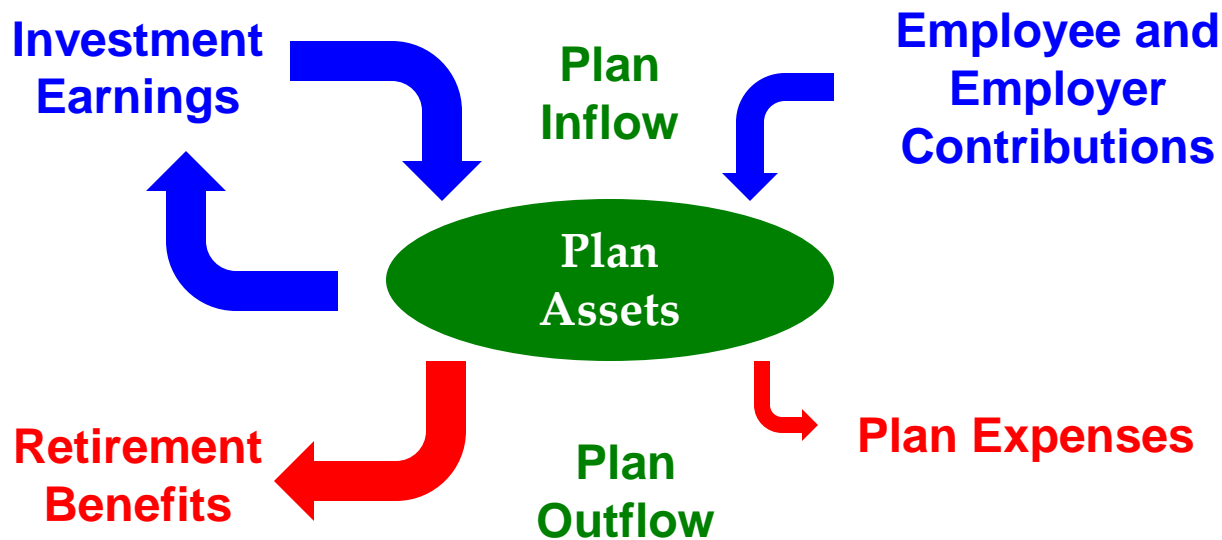


Restructuring's impact on TMRS funding

- ◆ Why can't we use an 8.10% discount rate in the annual MAF valuations?
- ◆ As the next few slides show, several variables make it very difficult to apply a single discount rate to each individual valuation
 - ▶ Different matching ratios
 - ▶ Population growth rates
 - ▶ COLA provisions
 - ▶ Number of retirees
- ◆ Therefore, we need some added conservatism and assume 7.50% vs. the 8.10% MAF Crediting Rate

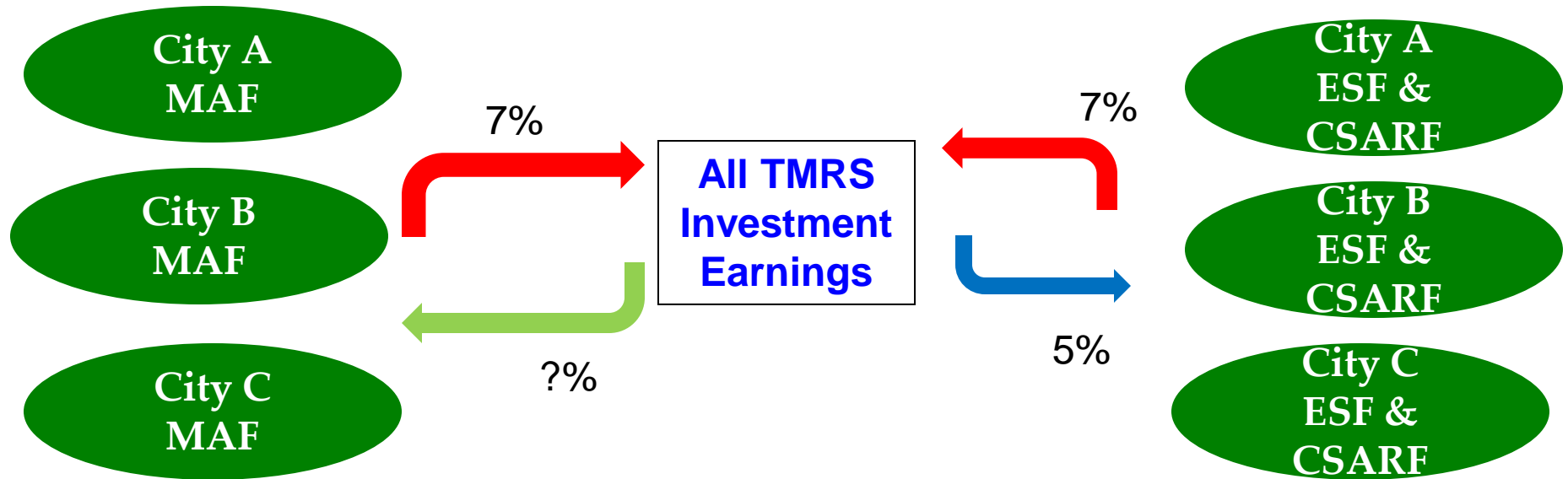
Typical Cash Flow and Expectations

- ◆ In a single employer pension trust, all investment earnings based on that employer's membership are directly reallocated back to that specific employer's assets, so all future investment earnings can be included in the funding calculation



TMRS Cash Flow and Expectations

- For TMRS employers, the earnings on employee contributions and on CSARF assets are not directly allocated back to the specific employer, but instead are allocated based on the proportionate MAF balances of all employers





TMRS Cash Flow and Expectations

- ◆ While the decision to have the CSARF and the risk pooling is more of a policy decision, actuarially it makes it difficult to estimate how future earnings will be allocated amongst TMRS employers
- ◆ Therefore, we can't assume every employer will receive an effective 8.1% of earnings on its current membership, as this will change over time
 - ▶ Once a retiree moves into the CSARF, there is no guarantee the earnings based on that retiree's assets will get back to that employer



Restructuring's impact on TMRS funding

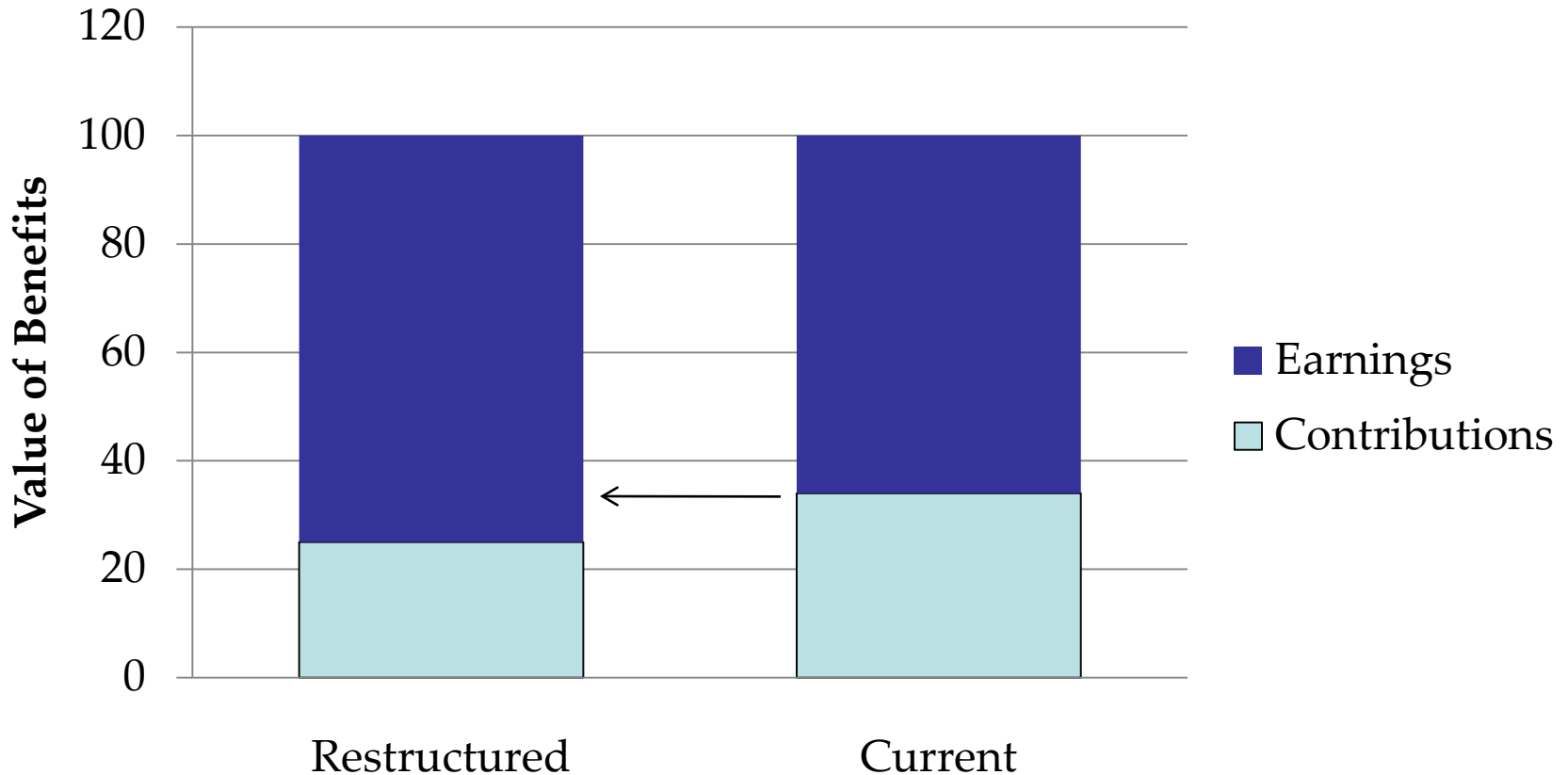
- ◆ Therefore, Restructuring the Fund reduces contribution requirements because:
 - ▶ The need for a Reserve is reduced dramatically, adding an additional 1% of earnings into the funding calculation
 - ▶ Each employer will be responsible for its own ESF and CSARF assets so earnings on the assets tied to the actives and retirees of each City can be directly applied to that City's funding calculation



Restructuring's impact on TMRS funding

- ◆ Based on this compound interest example, and the use of essentially a 5.78% discount rate for our actuarial valuation of TMRS, contributions under the current structure must be higher to provide the same level of benefits
- ◆ Value of \$100 payable at retirement in 10 years:
 - ▶ Typical Structure (7.00%): \$50.83
 - ▶ TMRS Structure (5.78%): \$57.01

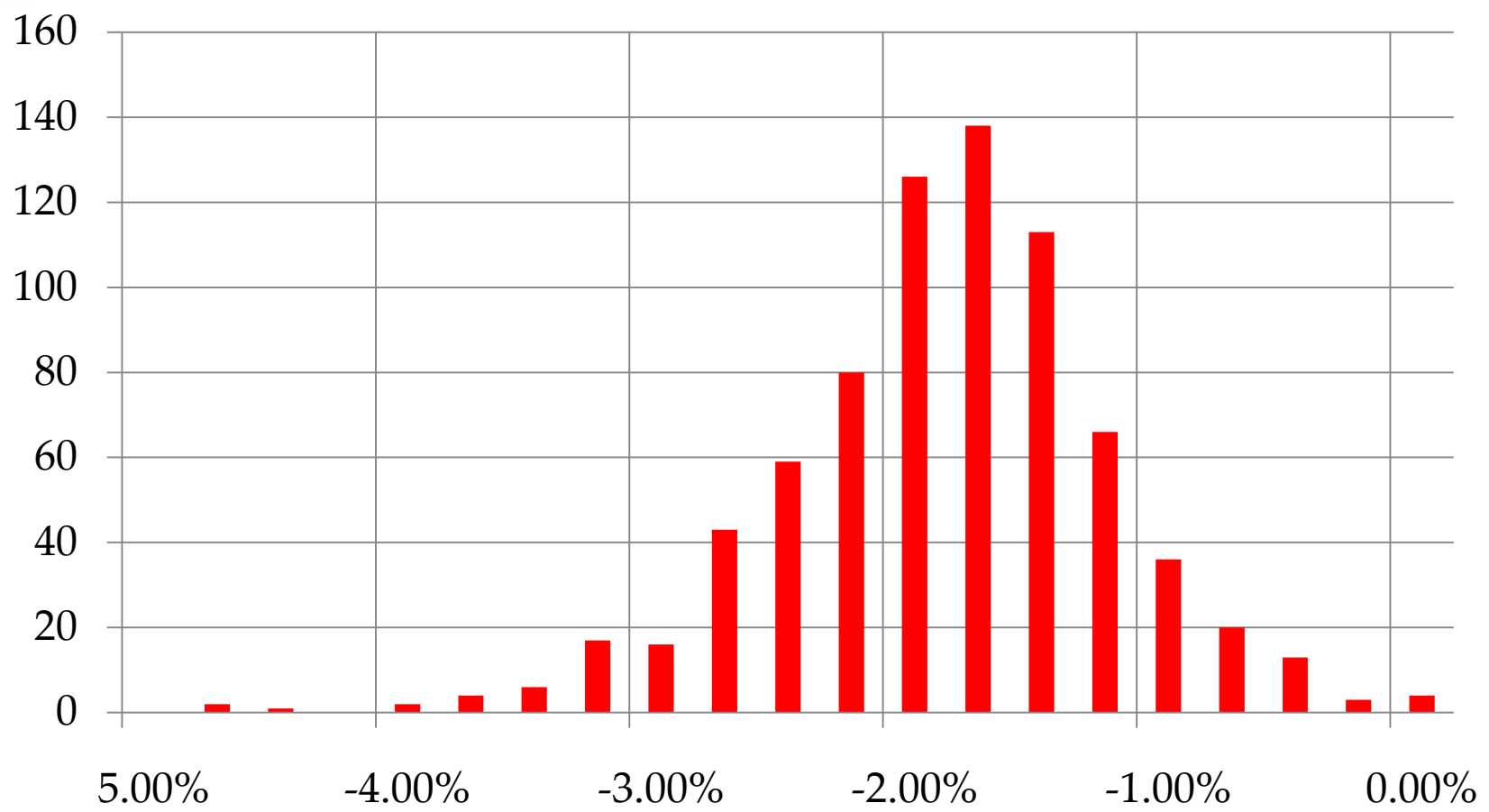
How does this impact TMRS funding?



The contribution requirement to provide the same ultimate benefit under the TMRS structure is 10%-20% higher than a more typical pension plan



Distribution of Est. Rate Reductions Nearest +/- 0.25%



Only includes TMRS cities with more than 4 active employees



TMRS City Rate Groups

- ◆ **Group 1:** 1 to 1 Employer Match, No repeating COLA
- ◆ **Group 2:** 1.5 to 1 Employer Match, No repeating COLA
- ◆ **Group 3:** 2 to 1 Employer Match, No repeating COLA
- ◆ **Group 4:** 1 to 1 Employer Match, Repeating COLA
- ◆ **Group 5:** 1.5 to 1 Employer Match, Repeating COLA
- ◆ **Group 6:** 2 to 1 Employer Match, Repeating COLA



Est. Actuarial Results - Aggregate

Group 1

	<u>Current</u> (1)	<u>Restructure</u> (2)	<u>Difference</u> (2) - (1)
1. a. Actives & Inactives	\$ 81,884,556	\$ 75,113,044	\$ (6,771,512)
b. Annuitants	<u>12,713,453</u>	<u>32,258,945</u>	<u>19,545,492</u>
2. Total actuarial accrued liability (a + b)	\$ 94,598,009	\$ 107,371,989	\$ 12,773,980
3. Actuarial value of assets	<u>77,582,814</u>	<u>96,507,676</u>	<u>18,924,862</u>
4. (UAAL) (2 - 3)	\$ 17,015,195	\$ 10,864,313	\$ (6,150,882)
5. Funded ratio (2 / 3)	82.0%	89.9%	7.9%
6. UAAL/Payroll	18.4%	11.7%	-6.6%
<hr/> Contribution Rate for TMRS Plan Year: <hr/>			
7. Full retirement rate			
a. Normal cost	3.15%	1.61%	-1.54%
b. Prior service	<u>1.20%</u>	<u>0.79%</u>	<u>-0.42%</u>
c. Full retirement rate	4.36%	2.40%	-1.96%
8. Estimated Contributions	\$ 4,036,117	\$ 2,223,495	\$ (1,812,622)



Est. Actuarial Results - Aggregate

Group 3

	<u>Current</u> (1)	<u>Restructure</u> (2)	<u>Difference</u> (2) - (1)
1. a. Actives & Inactives	\$ 2,716,227,891	\$ 2,384,988,122	\$ (331,239,769)
b. Annuitants	<u>373,868,048</u>	<u>1,638,474,245</u>	<u>1,264,606,197</u>
2. Total actuarial accrued liability (a + b)	\$ 3,090,095,939	\$ 4,023,462,367	\$ 933,366,428
3. Actuarial value of assets	<u>2,384,647,832</u>	<u>3,636,948,135</u>	<u>1,252,300,303</u>
4. (UAAL) (2 - 3)	\$ 705,448,107	\$ 386,514,232	\$ (318,933,875)
5. Funded ratio (2 / 3)	77.2%	90.4%	13.2%
6. UAAL/Payroll	65.5%	35.9%	-29.6%
<hr/> Contribution Rate for TMRS Plan Year: <hr/>			
7. Full retirement rate			
a. Normal cost	8.57%	7.59%	-0.98%
b. Prior service	<u>4.17%</u>	<u>2.16%</u>	<u>-2.00%</u>
c. Full retirement rate	12.73%	9.75%	-2.98%
8. Estimated Contributions	\$ 137,191,323	\$ 105,037,420	\$ (32,153,903)



Est. Actuarial Results - Aggregate

Group 6

	<u>Current</u> (1)	<u>Restructure</u> (2)	<u>Difference</u> (2) - (1)
1. a. Actives & Inactives	\$ 9,549,435,567	\$ 8,637,837,048	\$ (911,598,519)
b. Annuitants	<u>1,838,178,794</u>	<u>5,204,152,865</u>	<u>3,365,974,071</u>
2. Total actuarial accrued liability (a + b)	\$ 11,387,614,361	\$ 13,841,989,913	\$ 2,454,375,552
3. Actuarial value of assets	<u>7,178,918,633</u>	<u>10,456,584,478</u>	<u>3,277,665,845</u>
4. (UAAL) (2 - 3)	\$ 4,208,695,728	\$ 3,385,405,435	\$ (823,290,293)
5. Funded ratio (2 / 3)	63.0%	75.5%	12.5%
6. UAAL/Payroll	125.0%	100.5%	-24.5%
<hr/> Contribution Rate for TMRS Plan Year: <hr/>			
7. Full retirement rate			
a. Normal cost	10.83%	10.46%	-0.38%
b. Prior service	<u>7.75%</u>	<u>5.93%</u>	<u>-1.82%</u>
c. Full retirement rate	18.58%	16.39%	-2.20%
8. Estimated Contributions	\$ 625,788,066	\$ 551,792,765	\$ (73,995,301)



- ◆ Circular 230 Notice: Pursuant to regulations issued by the IRS, to the extent this presentation concerns tax matters, it is not intended or written to be used, and cannot be used, for the purpose of (i) avoiding tax-related penalties under the Internal Revenue Code or (ii) marketing or recommending to another party any tax-related matter addressed within. Each taxpayer should seek advice based on the individual's circumstances from an independent tax advisor.
- ◆ This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- ◆ Readers are cautioned to examine original source materials and to consult with subject matter experts before making decisions related to the subject matter of this presentation.
- ◆ This presentation expresses the views of the author and does not necessarily express the views of Gabriel, Roeder, Smith & Company.