



EMPLOYEES' RETIREMENT SYSTEM OF RHODE ISLAND

The 2011 Actuarial Experience Study

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GRS

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Purpose of Experience Study

- ◆ Assumptions are not static; they should occasionally change to reflect
 - ▶ New information
 - ▶ Mortality improvement
 - ▶ Changing patterns of retirements, terminations, etc.
 - ▶ Changing knowledge
- ◆ Recent experience provides strong guidance for some assumptions (for example, turnover) and weak guidance for others (for example, the investment return rate)
- ◆ Based on results of our experience study:
 - ▶ Actuary recommends revised assumptions
 - ▶ Board considers recommendations for adoption
 - Can accept all recommendations, modify or reject



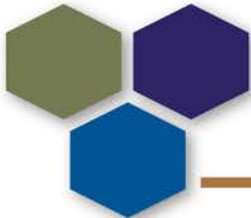
Actuarial Standards of Practice

- ◆ Guidelines for the assumption setting process are set by the Actuarial Standards of Practice
 - ▶ ASOP #4 Measuring Pension Obligations
 - ▶ ASOP #27 Selection of Economic Assumptions
 - There is a new proposed standard that is expected to become effective later in 2011
 - ▶ ASOP #35 Selection of Demographic and Other Noneconomic Assumptions
 - ▶ ASOP #44 Selection and Use of Asset Valuation Methods



Actuarial Standards of Practice

- ◆ Each Individual Assumption must satisfy the Actuarial Standards
- ◆ The Assumption Set as a whole must satisfy the Actuarial Standards
- ◆ The Assumption Set should be internally consistent



We studied all of the Assumptions and Methods

- ◆ Economic assumptions
 - ▶ Price inflation (CPI)
 - ▶ Investment return
 - ▶ Salary increases (for individuals)
 - ▶ Payroll growth rate (for plan as a whole)
 - ▶ Schedule B COLA
- ◆ Demographic assumptions
 - ▶ Mortality (Active Members & Retirees)
 - ▶ Disability
 - ▶ Retirement
 - ▶ Other terminations
- ◆ Actuarial Methods
 - ▶ Funding Method
 - ▶ Asset Smoothing Method



Global vs. Category Specific Assumptions

- ◆ Some assumptions impact all Plans and Categories of Members (Global)
 - ▶ Price inflation (CPI)
 - ▶ Investment return
 - ▶ Wage inflation (salary increases for individuals)
 - ▶ Payroll growth rate (for plan as a whole)
 - ▶ Funding and assets methods
- ◆ Other assumptions will be tailored to the Plan and Member Category (State, Teacher, MERS General, MERS P&F, State Police, Judges)
 - ▶ Step-rate salary increases
 - ▶ Post-retirement mortality
 - ▶ Disability
 - ▶ Retirement
 - ▶ Other terminations



Our General Procedures

- ◆ Our Study will answer the following questions for each assumption
 - ▶ What was the plan's actual experience?
 - ▶ How does that compare with the current assumption?
 - ▶ Is a change warranted?
- ◆ We then measure the impact of the recommended changes on the actuarial liabilities and contributions



Our General Procedures

- ◆ Compare economic assumptions to:
 - ▶ General US price inflation and wage inflation statistics
 - ▶ ERSRI specific salary increases
 - ▶ Expected return using capital market assumptions
 - ▶ Economic assumptions should be consistent
- ◆ Analyze demographic assumptions
 - ▶ Retirement, mortality, disability, other terminations
 - ▶ Compare to ERSRI's actual experience
 - ▶ Use Actual-to-Expected (A/E) Ratio as analysis tool
 - ▶ Look at patterns by age and service
- ◆ If $A/E = 100\%$ at all ages, assumption is “perfect”
 - ▶ Although we may want to build in some margin for conservatism



Data Used

- ◆ We generally used data from the last six years
 - ▶ FY 2005 – FY 2010
 - Used last ten years for salaries and termination due to variability
 - ▶ If period is too short, there may not be sufficient data for analysis, especially for more minor assumptions
 - ▶ If period is too long, trends, such as improvements in mortality or changes in retirement patterns, may not be apparent
 - ▶ Some assumptions are influenced by general economic conditions (salary increases, withdrawal rates) and if period is too short, results may not be representative of full “business cycle”



General Findings

- ◆ The funded ratio has trended down over the last decade
 - ▶ Mostly due to investment performance, but also liability experience
 - ▶ Contribution rates have correspondingly trended up sharply, and are expected to continue to do so
 - ▶ Assumptions have already been strengthened in 2003 and 2006
- ◆ Future economic growth likely to be suppressed compared to historical levels and current assumptions
 - ▶ Current inflation, wage inflation, payroll growth, and investment return rate need to be lowered
- ◆ Retirees are living longer
 - ▶ National trends have turned up
 - ▶ Rhode Island experience confirms this trend
 - ▶ Increases in life expectancy likely to continue
- ◆ Most of the other assumptions continue to be appropriate



Summary of Recommendations

◆ Major Recommendations

- ▶ Lower inflation assumption from 3.00% to 2.75%
- ▶ Lower net real investment return assumption from 5.25% to 4.75%
 - Combination lowers the nominal assumed investment return from 8.25% to 7.50%
- ▶ Increase life expectancy for all groups, adding an explicit provision for continual future mortality improvement

◆ Moderate Recommendations

- ▶ Lower productivity component of wage inflation from 1.50% to 1.25%
 - Nominal decreases from 4.50% to 4.00%
- ▶ Lower payroll growth rate above inflation from 1.25% to 1.00%
 - Nominal decreases from 4.25% to 3.75%

◆ Minor Recommendations

- ▶ Small adjustments or no change to disability incidence, retirement patterns, termination patterns, and step-rate/promotional salary increases



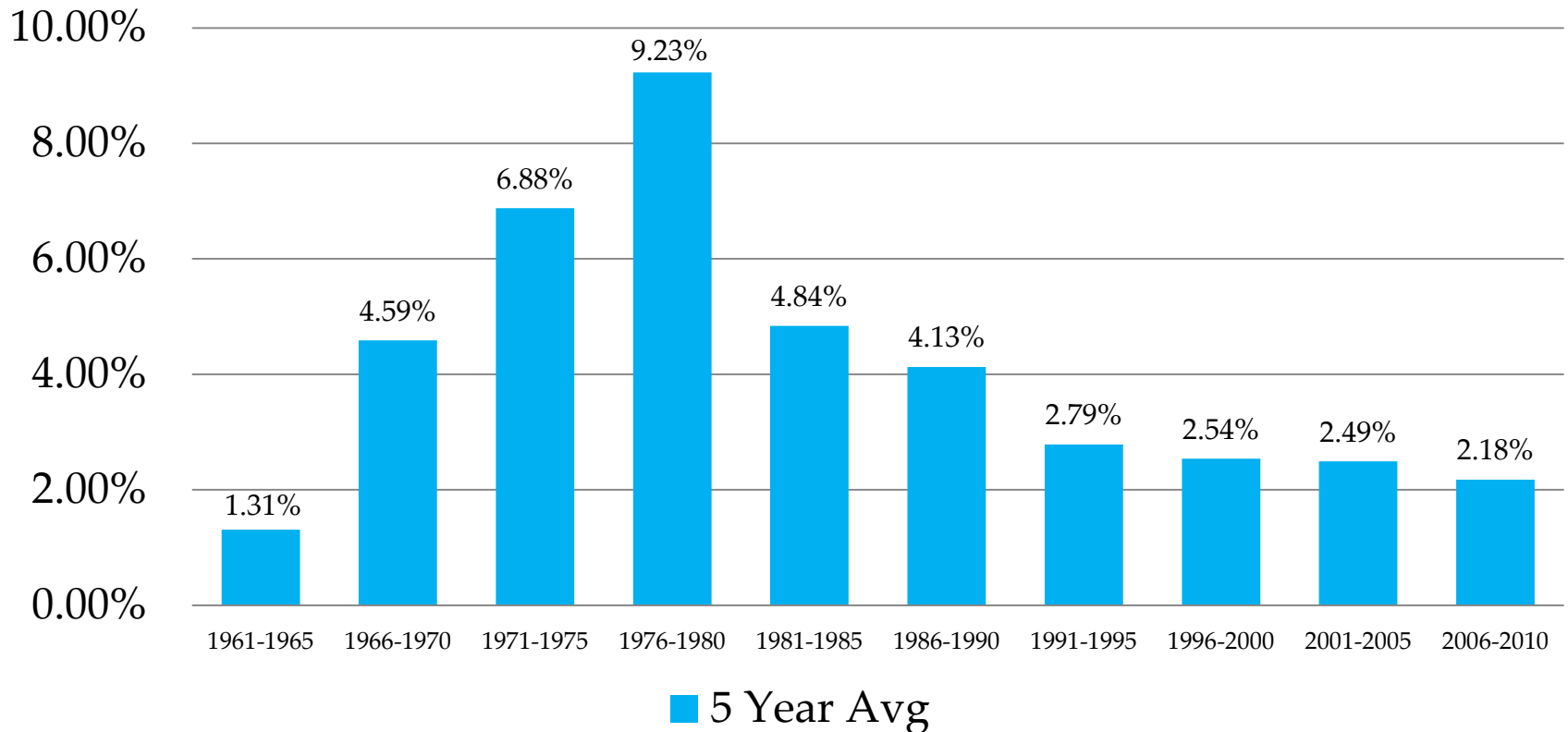
Inflation

- ◆ The assumed inflation rate (currently 3.00% per year) is not used directly in the actuarial valuation, but it impacts the development of:
 - ▶ Investment return assumption
 - ▶ Salary increase assumptions
 - ▶ Payroll growth rate
- ◆ Actual inflation measured by the CPI-U during:
 - ▶ Last 5 years: 2.18%
 - ▶ Last 10 years: 2.34%
 - ▶ Last 25 years: 2.82%
 - ▶ Since 1913: 3.23%



Historical Inflation

Average Annual Inflation
CPI-U, Five Calendar Year Averages



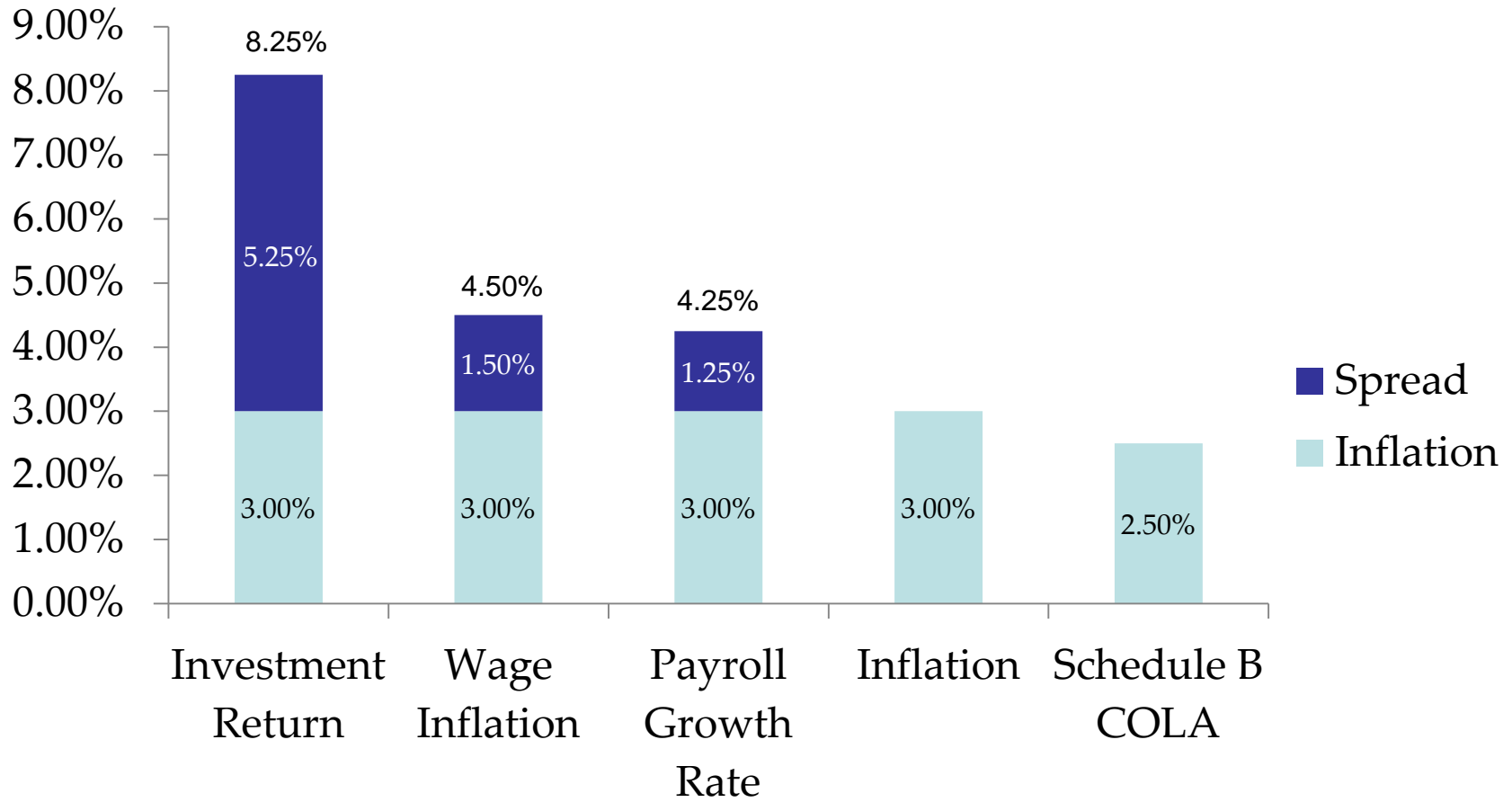


Inflation

- ◆ We looked at several indicators
 - ▶ Investment firms: 2.30% - 3.00%
 - ▶ Social Security Trustee's Report: 2.80% (intermediate)
 - ▶ TIPs vs. Nominal US Treasuries: 2.54% (but known issues with this estimate)
 - ▶ Professional forecasters: 2.30%-2.50%
 - ▶ Public Funds Survey: 3.50%
- ◆ We recommend lowering this assumption to 2.75%
 - ▶ Closer to recent levels (2.82% over last 25 years)
 - ▶ Closer to levels expected in the bond market
 - ▶ Closer to investment consultants and professional forecaster estimates

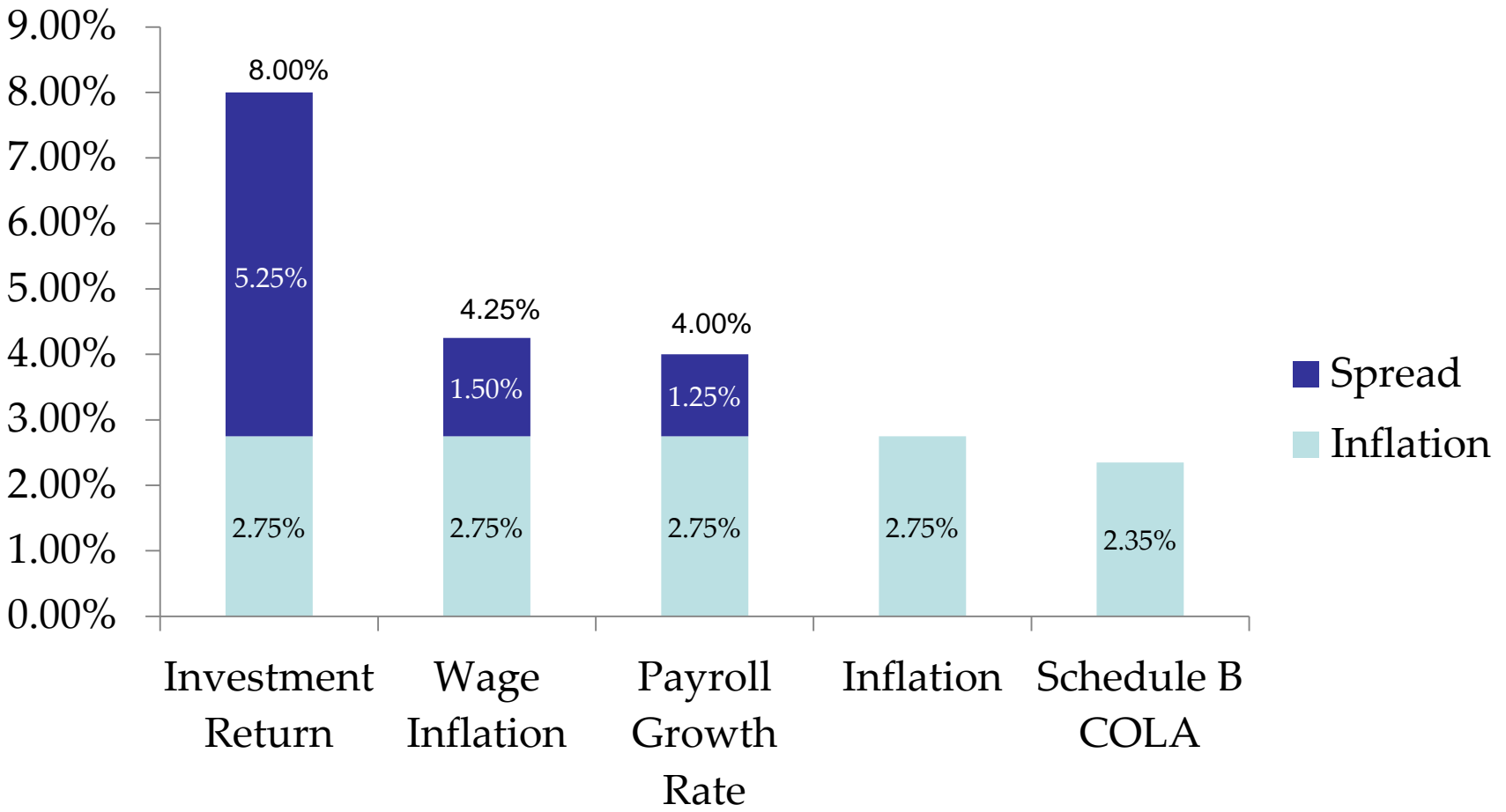


Inflation is the first building block for other economic assumptions





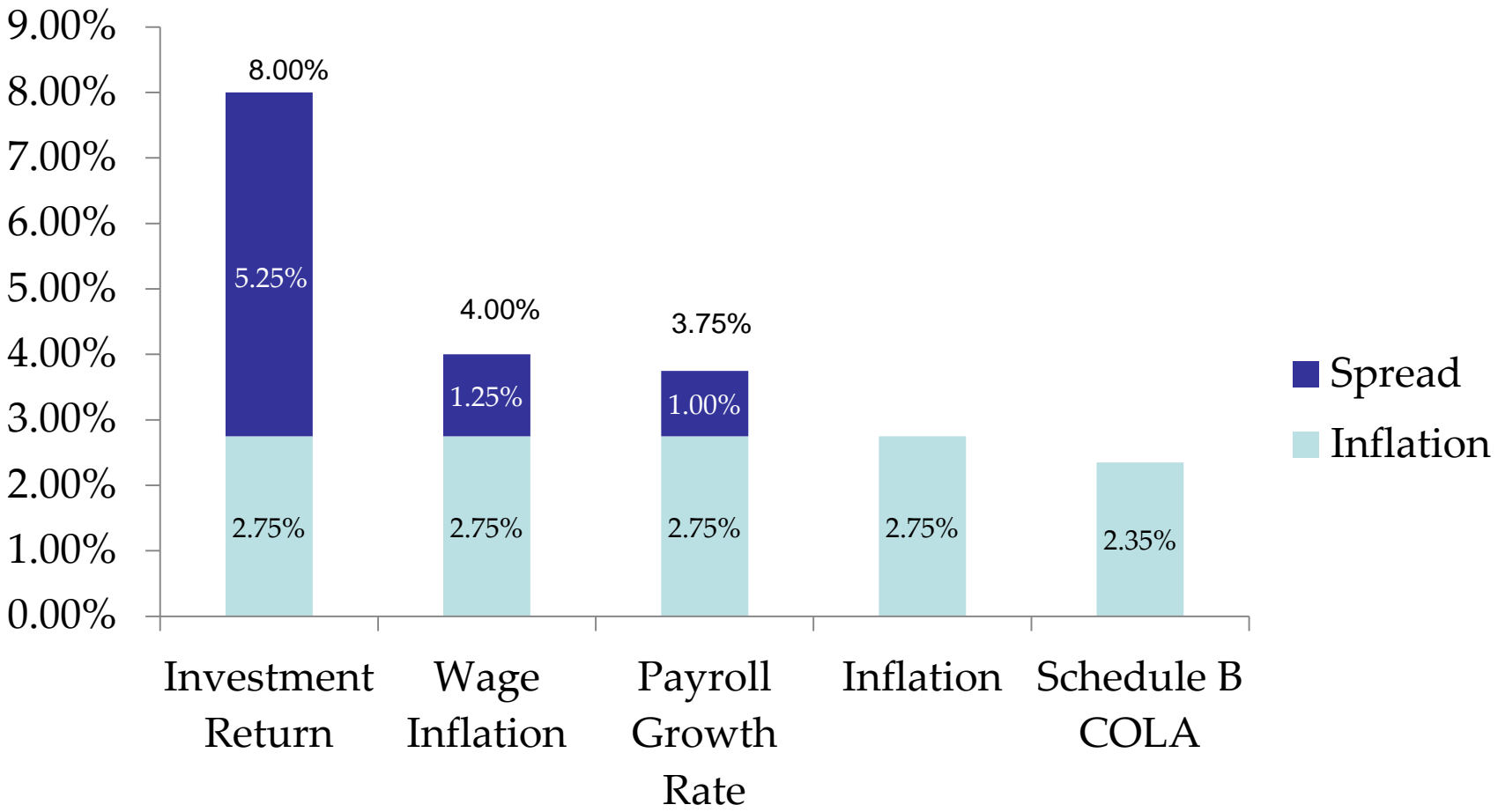
Lowering inflation lowers the nominal value of the other economic assumptions



16 Lower projected benefits, contribution streams, and investment earnings



We have also recommended lower spreads on wage inflation and overall payroll growth



Budgetary pressures, slower economic growth and higher ERSRI costs should lead to lower wage increases

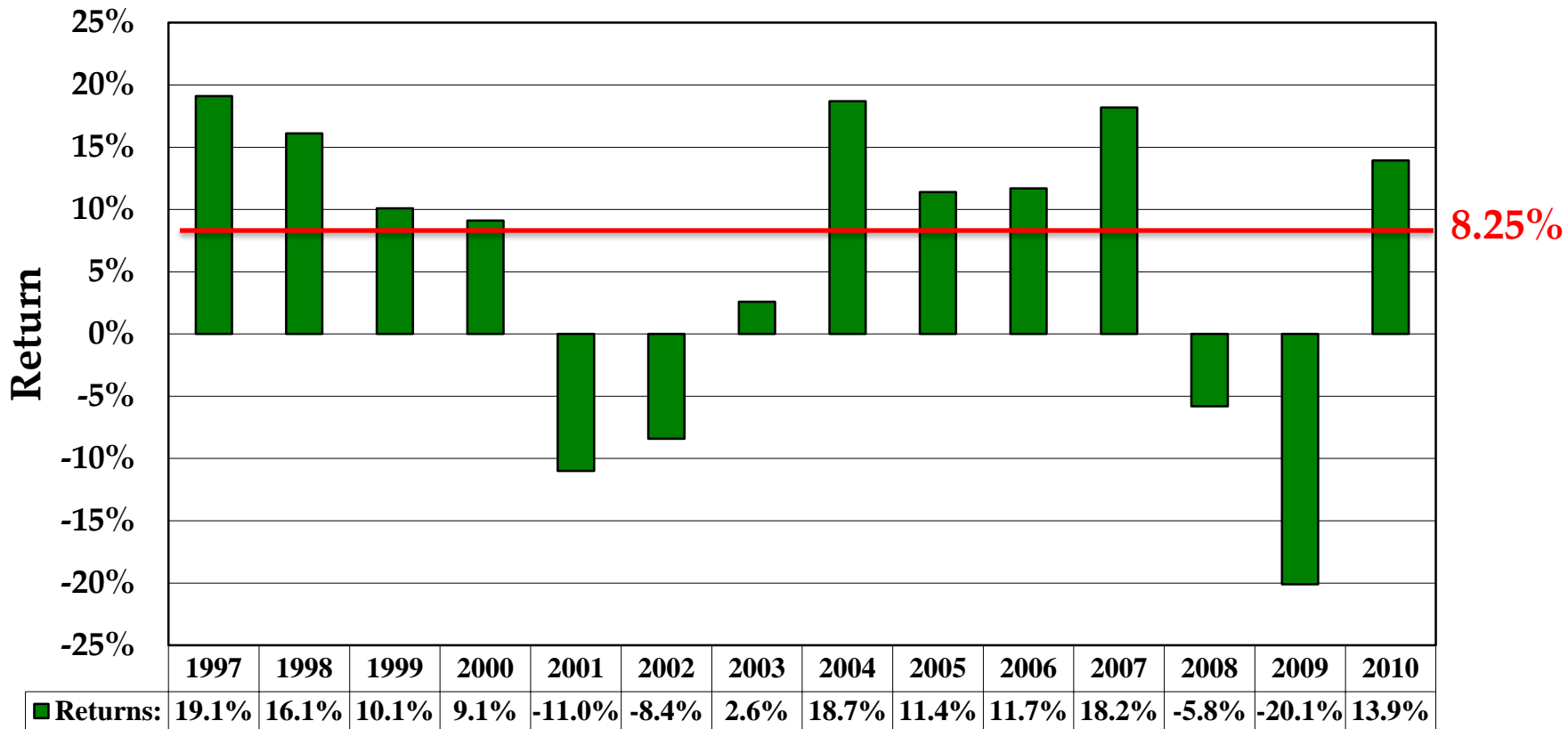


Investment Return Assumption

- ◆ The current assumption is 8.25%
 - ▶ Represents the return, net of all administrative and investment expenses
 - ▶ Current assumption equals 3.00% inflation plus 5.70% real return (8.70% gross), less 0.45% for investment and administrative expenses
- ◆ Recommended change in inflation lowers nominal assumption to 8.00% before any adjustments to real return assumption
 - ▶ 2.75% + 5.25% (net of expenses)
- ◆ Recommended change in real return reduces nominal assumption to 7.50%
 - ▶ 2.75% + 4.75% (net of expenses)



History of Market Returns (Net)



Returns are measured for each fiscal year ending June 30

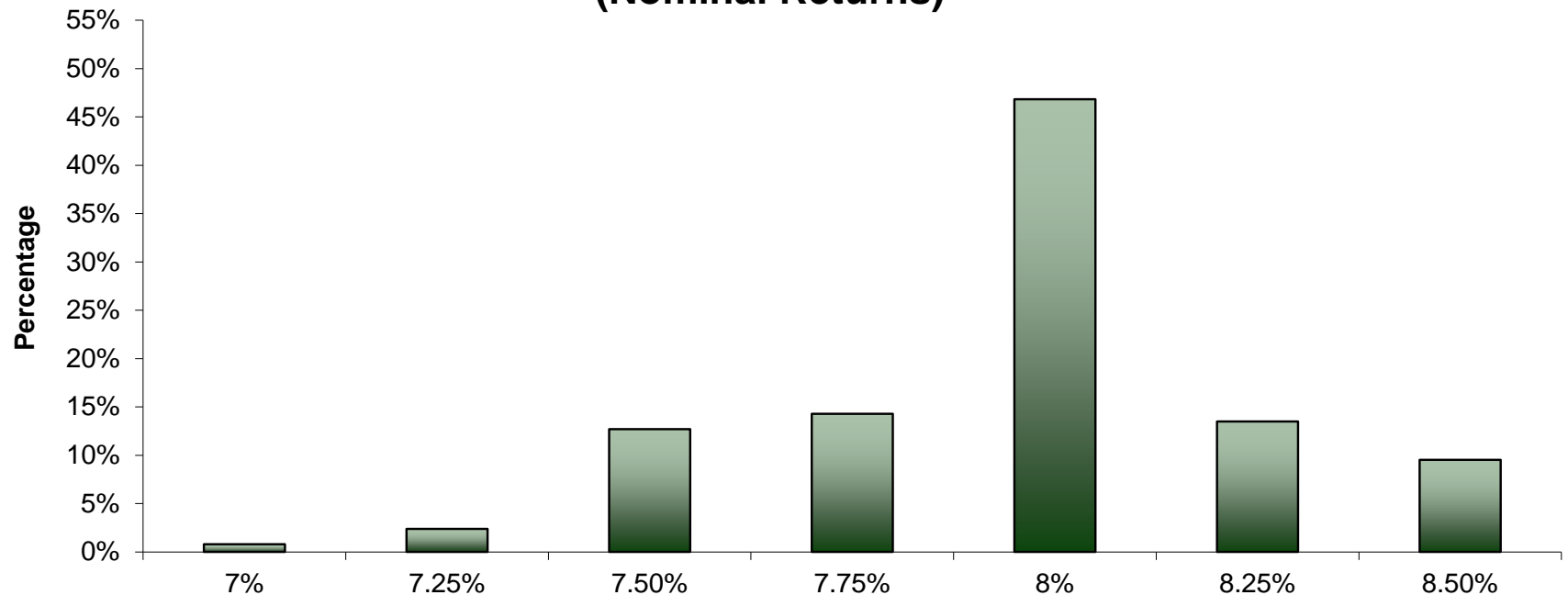
10-year arithmetic average: 3.12%

10-year geometric average: 2.27%

Gross return since 1984: 9.21%

Comparison to Other Systems

Investment Return Assumptions of Other Large Pension Systems (Nominal Returns)



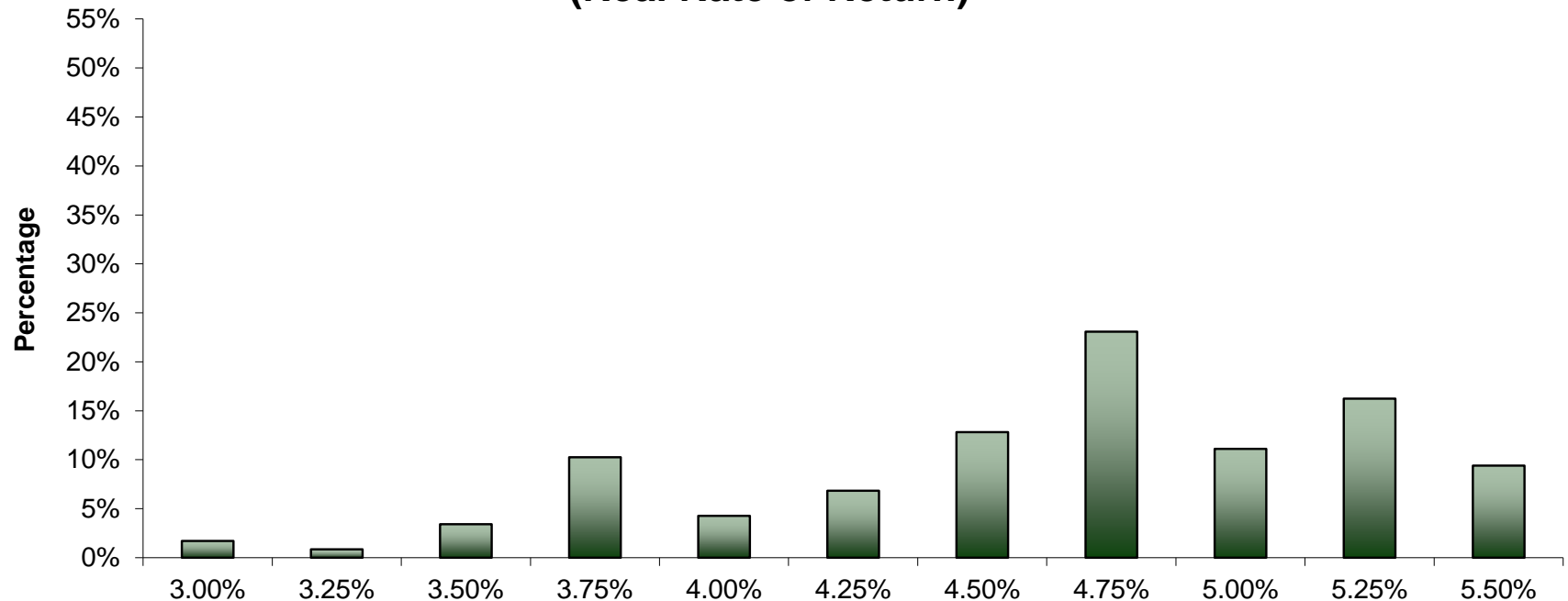
Source: Public Funds Survey Summary of Findings (available data as of March 2011)

Mean: 7.94%, Median: 8.00%, Mode: 8.00%

ERSRI Current Assumption: 8.25%

Comparison to Other Systems

Investment Return Assumptions of Other Large Pension Systems (Real Rate of Return)



Source: Public Funds Survey Summary of Findings (available data as of March 2011)

Mean: 4.45%, Median: 4.50%, Mode: 4.50%

ERSRI Current Assumption: 5.25%

GRS recommended Assumption: 4.75%



Other Systems

- ◆ Several other States and other large plans have recently lowered their assumption
 - ▶ Many more are currently considering it

Plan	Prior	New	Change
Virginia	7.50%	7.00%	-0.50%
Pennsylvania	8.50%	8.00%	-0.50%
Colorado	8.50%	8.00%	-0.50%
California STRS	8.00%	7.75%	-0.25%
New York	8.00%	7.50%	-0.50%
Illinois	8.50%	7.75%	-0.75%
Indiana	7.25%	7.00%	-0.25%



Taft-Hartley Funds

- ◆ “For traditionally invested funds, we typically use an investment return assumption (which is also the discount rate) of between 7.0% and 7.5%.”

Segal Company, David Shock, April, 2011

Taft-Hartley Fund

Investment Return Assumption

LIUNA National Industrial

7.5%

SEIU National

7.5%

TEAMSTERS Construction and Misc.

7.25%



Expenses

- ◆ The investment return assumption should be reduced for investment and administrative expenses that are expected to be paid from the plan

Annual Expenses Expressed as a Percentage Assets			
Fiscal Year	Administrative	Investment	Total
2010	0.13%	0.22%	0.35%
2009	0.11%	0.26%	0.37%
2008	0.10%	0.34%	0.44%
2007	0.10%	0.35%	0.45%
2006	0.10%	0.45%	0.55%
2005	0.10%	0.36%	0.46%
Average	0.11%	0.32%	0.43%

- ◆ Recommend decreasing adjustment for expenses from 0.45% to 0.40% to reflect the plan's increased utilization of a passive investment strategy and to be closer to recent experience (0.37% for FY2009 and 0.35% for FY2010)



Real Return (Above Inflation)

- ◆ To analyze the expected real return, we combine:
 - ▶ The plan's target asset allocation with
 - ▶ Economic capital market expectations
- ◆ We used the most recent capital market return assumptions developed by seven investment consulting firms:

Callan	PCA (ERSRI's consultant)
JP Morgan	Hewitt Ennis Knupp
R. V. Kuhns	Towers Watson
NEPC	

Real Return (Above Inflation)

- Below is ERSRI's current target asset allocation as well as the plan's target allocation in effect during the prior assumption review

Asset Category	2010 Target Asset Allocation	2006 Target Asset Allocation	Change	PCA Expected Return for Asset Class	Impact on Total Fund Expected Return
Domestic Equities	36.0%	42.5%	-6.5%	8.75%	-0.57%
International Equities	17.5%	20.0%	-2.5%	9.00%	-0.23%
Domestic Fixed Income	22.0%	25.0%	-3.0%	3.30%	-0.10%
Real Estate	5.0%	5.0%	0.0%	7.00%	0.00%
Alternative (Private Equity)	7.5%	7.5%	0.0%	12.00%	0.00%
Real Return	10.0%	0.0%	10.0%	6.50%	0.65%
Cash and Cash Equivalent	2.0%	0.0%	2.0%	3.00%	0.06%
Total	100.0%	100.0%	0.0%	7.41%	-0.19%

- Since 2006, there has been a shift in funds from equity to a real return asset class
 - This shift lowered the total expected return of the fund by 0.19%
 - Lowered the standard deviation of the fund by 1.40% from 13.0% to 11.7%



Real Return (Above Inflation)

- ◆ Average net real return for the assumptions from the seven consulting firms is 4.84%

Investment Consultant	1	2	3	4	5	6	7	Avg.
Real Return	4.66%	4.90%	5.08%	5.33%	5.37%	5.52%	5.84%	5.24%
Expected Plan Expenses	<u>(0.40%)</u>	<u>(0.40%)</u>	<u>(0.40%)</u>	<u>(0.40%)</u>	<u>(0.40%)</u>	<u>(0.40%)</u>	<u>(0.40%)</u>	<u>(0.40%)</u>
Net Real Return	4.26%	4.50%	4.68%	4.93%	4.97%	5.12%	5.44%	4.84%
Anticipated Inflation	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>
Net Investment Return	7.01%	7.25%	7.43%	7.68%	7.72%	7.87%	8.19%	7.59%

Current 5.25% real return assumption only supported by one assumption set
 Current 8.25% nominal assumption not supported by any of the assumption sets

Note: Returns represent arithmetic averages.



Real Return (Above Inflation)

- Investment returns are uncertain and volatile. Therefore, it is also important to review the expected distribution of returns based on the capital market assumptions
- Below is a table with the 25th to 75th percentile range of the expected long-term return, the best estimate range.

Return Components	Return Percentile		
	25th	50th	75th
(1)	(2)	(3)	(4)
Real Return	2.73%	4.54%	6.37%
Plan Expenses	-0.40%	-0.40%	-0.40%
<u>Expected Inflation</u>	<u>2.75%</u>	<u>2.75%</u>	<u>2.75%</u>
Net Investment Return	5.08%	6.89%	8.72%

Note: Return percentiles are the averages for the seven firms of the returns compounded over 20 years

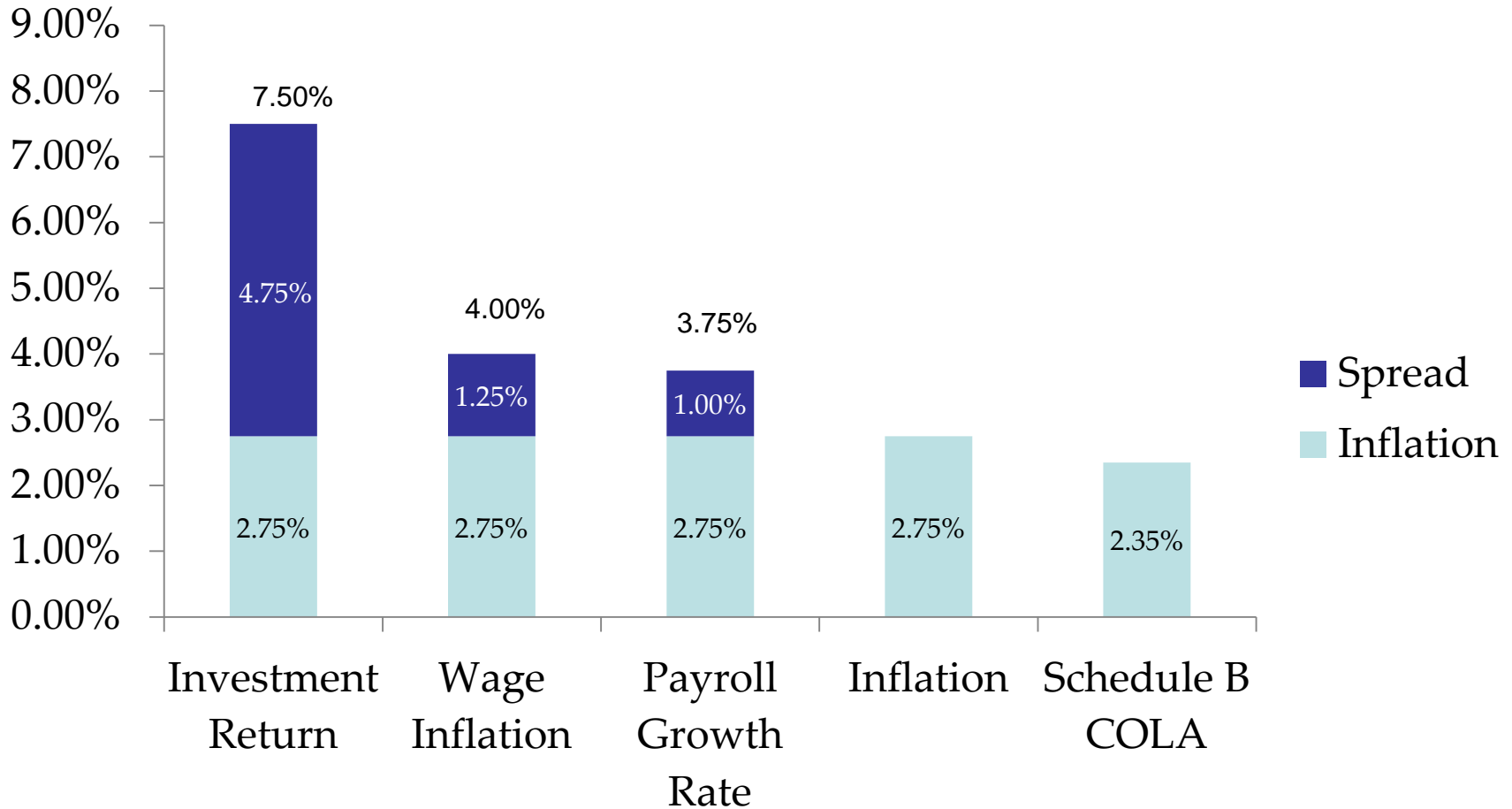
- The probability of exceeding an average return of 8.25% over a 20-year period is only 31%.



Actuary' Recommendation

- ◆ GRS recommends to the ERSRI Board to decrease the current net investment return assumption to 7.50%
 - ▶ We no longer believe an investment return assumption of 8.25% is in what we believe is the range of possible reasonable assumptions
 - ▶ Decreasing the assumption will both increase the probability that actual returns will exceed the assumption and decrease the amount of the investment losses incurred when the assumption is not met
 - ▶ Change from Inflation (0.25%)
 - ▶ Change in Asset Allocation (0.19%)
 - ▶ Change in Expenses 0.05%
 - ▶ Change in Return Expectations (0.36%)
 - ▶ Total Change (0.75%)

Complete Proposed Economic Assumption Set





Post-retirement mortality

- ◆ We analyzed non-disabled retirees, comparing actual number of deaths with expected. If the actual-to-expected ratio (A/E ratio) is below 100%, retirees will live longer than expected and the current liabilities are understated.
- ◆ Traditionally for this assumption, setting an A/E between 110% and 120% was preferred to allow for future increases in life expectancy
- ◆ Life expectancy in Rhode Island are among the longest in the country
- ◆ State employees were combined with MERS for this analysis
 - ▶ Separate assumption for Teachers



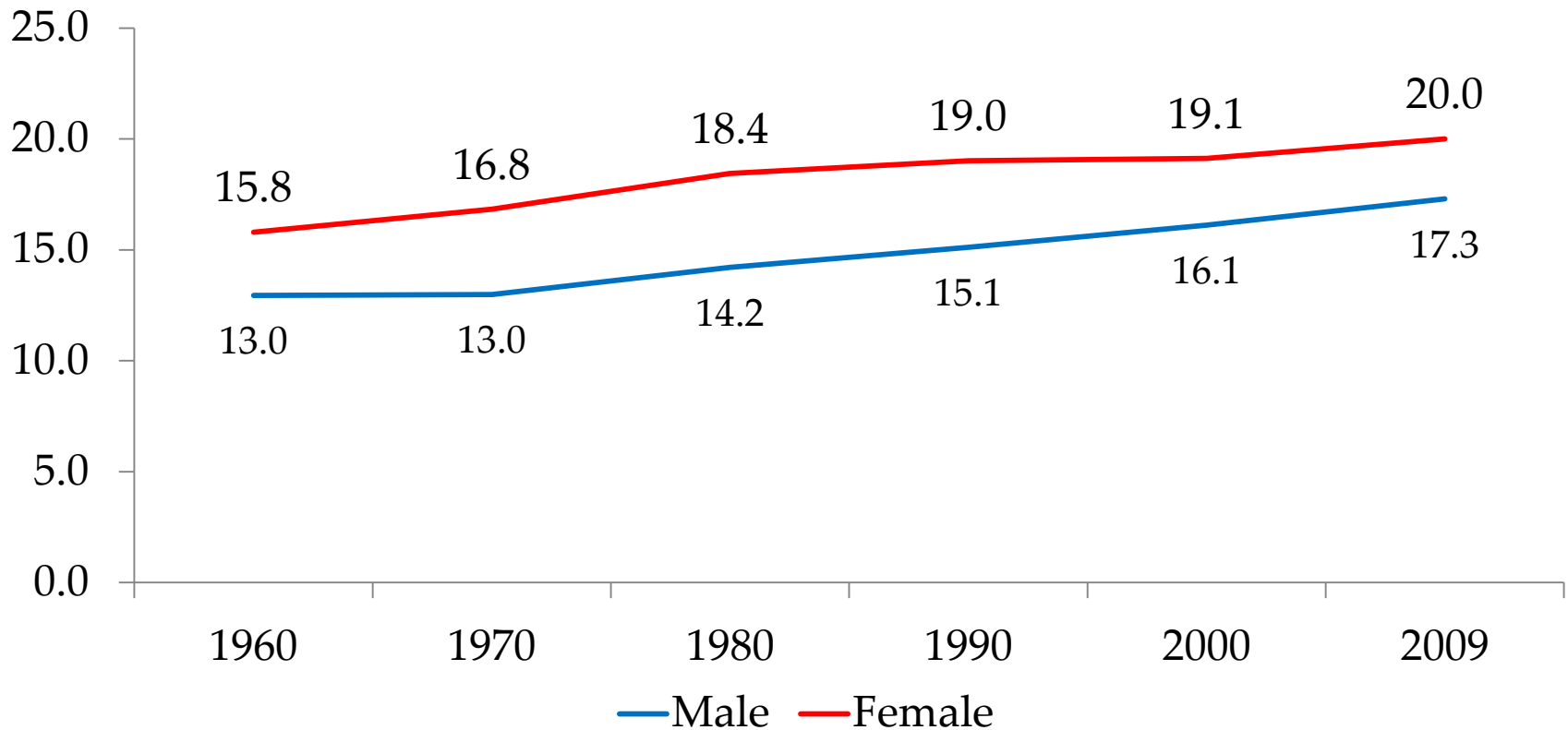
Post-retirement mortality

- ◆ Current assumption for State Employees and MERS based on 1994 Group Annuity Mortality Table
 - ▶ Male rates were set forward one year
 - ▶ Female rates are unadjusted
- ◆ Current assumption for Teachers based on a GRS developed table specific to teachers
 - ▶ Male rates are unadjusted
 - ▶ Female rates are multiplied by 95%
- ◆ Overall, experience has overtaken all current margin for future improvement in life expectancy (A/E's below 100%)
 - ▶ Assumptions in prior experience study included a 10% margin
- ◆ This trend has been consistent across most of our clients and in recent national surveys
- ◆ It is becoming more widely accepted that the trend of ever-increasing life expectancies is likely to continue



National Historical Trends: Updated through 2009

Life Expectancy in Years, Current Age 65



National Vital Statistics Reports, Vol 58, No 21, June 2010

National Vital Statistics Reports, Vol 59, No 4, March 2011

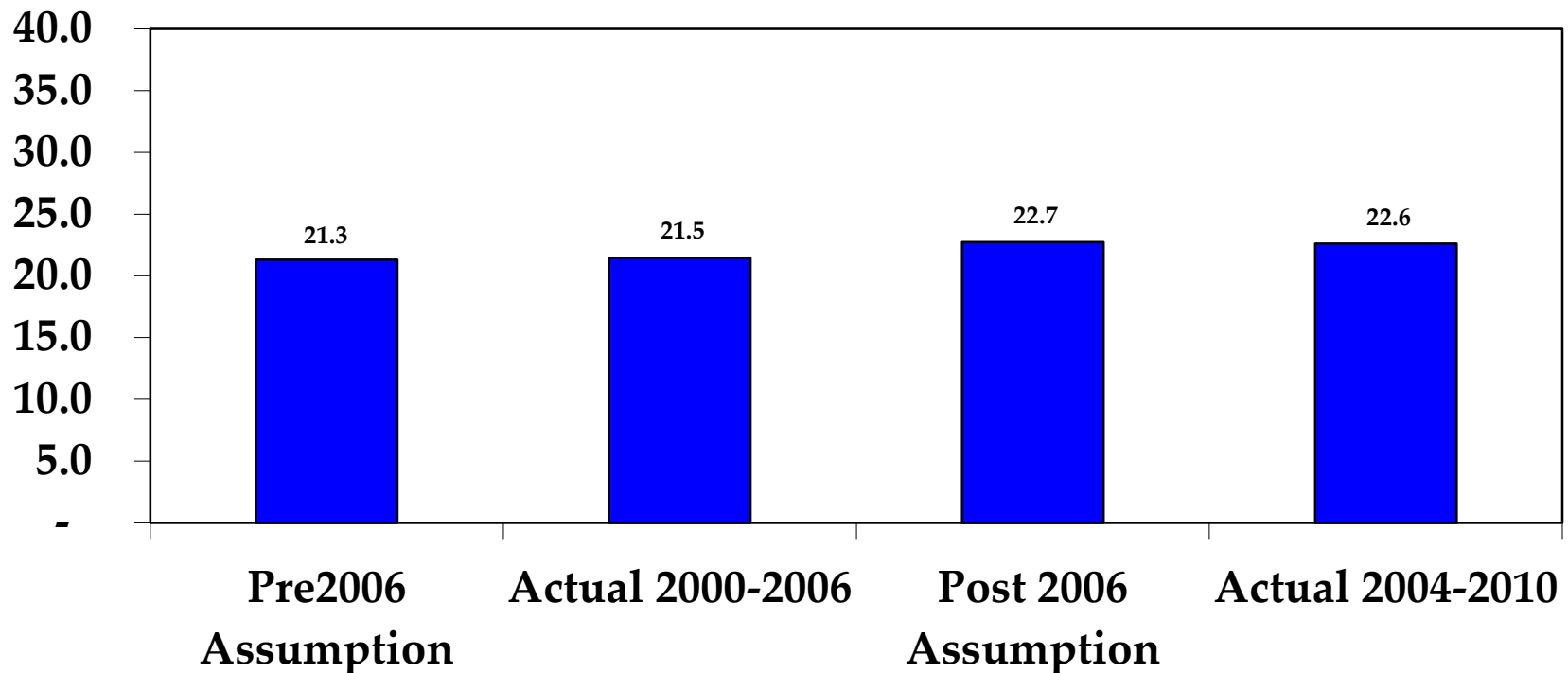
RI data as of this report: Male State 18.0, Female State 21.2, Male Teacher 20.1, Female Teacher 22.6



Post Retirement Mortality

With Actual 2004-2010 ERSRI Experience for Female Teachers

- ◆ Average Life Expectancy in Years from Current Age 65



Improvement in actual experience for all groups:

Male State +1.6 from 16.4 to 18.0, Female State +1.0 from 20.2 to 21.2,

Male Teacher +1.2 from 18.9 to 20.1, Female Teacher +1.1 from 21.5 to 22.6



Healthy Post-retirement mortality: Recommendation

◆ State Employees and MERS

- ▶ Update to the RP2000 Combined mortality table with white collar adjustment
 - Male rates multiplied by 115%
 - Female rates multiplied by 95%

◆ Teachers

- ▶ Continued use of GRS Teacher specific table
 - Male rates multiplied by 97% (currently 100%)
 - Female rates multiplied by 92% (currently 95%)

◆ For both Groups

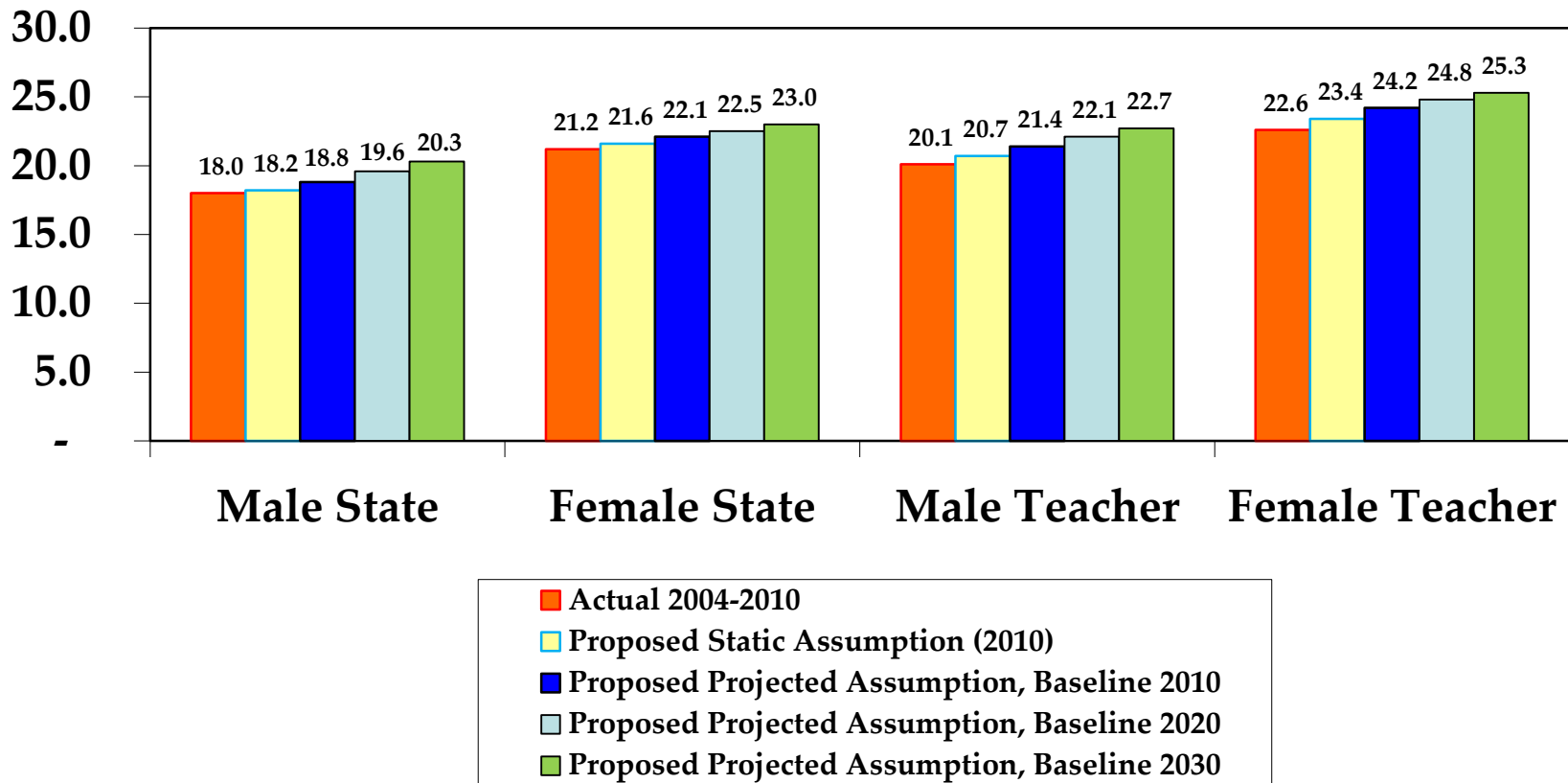
- ▶ Apply full generational projections using scale AA
- ▶ Most common projection table used in the industry
- ▶ Assumes life expectancy will continue to improve every year going forward
- ▶ Becoming more of an industry standard to assume continued increases in life expectancy

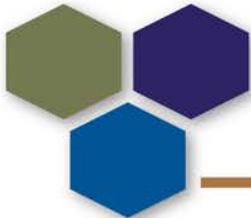
◆ The changes to the mortality assumptions has a large impact on the liabilities and contribution requirements

- ▶ However, if traditional method had been continued and the life expectancy did continue to increase, there would have been a smaller increase now but continued increases in future experience studies

Post Retirement Mortality

Average Life Expectancy in Years from Current Age 65





Actuarial Impact – State Employees

Draft Valuation Results as of June 30, 2010			
Scenario	Current	Proposed	Change
Normal cost	9.35%	11.39%	2.04%
Unfunded actuarial accrued liability (UAAL)	\$2,119	\$2,700	\$581
Funded ratio	54.4%	48.4%	-6.0%
GASB 25 Annual Required Contribution for FY2013			
Percent of payroll	26.55%	36.34%	9.79%
Dollar amount	\$182.5	\$246.5	\$64.0

\$ in millions

FY2012 contribution rate for State Employees: 22.98%



Actuarial Impact – Teachers

Draft Valuation Results as of June 30, 2010			
Scenario	Current	Proposed	Change
Normal cost	10.00%	11.82%	1.82%
Unfunded actuarial accrued liability (UAAL)	\$3,278	\$4,133	\$855
Funded ratio	54.2%	48.4%	-5.8%
GASB 25 Annual Required Contribution			
Percent of payroll	26.21%	35.25%	9.04%
Dollar amount	\$282.8	\$375.3	\$92.5

\$ in millions

FY2012 contribution rate for Teachers 22.32%



Change by Source

Item	State Employees		Teachers	
	UAAL (millions)	ARC (% of payroll)	UAAL (millions)	ARC (% of payroll)
Current Assumptions	\$2,119	26.55%	\$3,278	26.21%
Increase/(decrease) due to:				
Inflation	93	1.53%	151	1.61%
Payroll growth rate	0	0.61%	0	0.60%
Life expectancy	230	4.13%	295	3.35%
Investment return rate	269	3.64%	441	4.04%
All other changes	<u>(10)</u>	<u>(0.12%)</u>	<u>(32)</u>	<u>(0.55%)</u>
All changes reflected	\$2,700	36.34%	\$4,133	35.25%

\$ in millions



Actuarial Impact – MERS in aggregate

Draft Valuation Results as of June 30, 2010			
Scenario	Current	Proposed	Change
Normal cost	14.86%	17.70%	2.84%
Unfunded actuarial accrued liability (UAAL)	\$237.2	\$430.6	\$193.4
Funded ratio	83.4%	73.5%	-9.9%
GASB 25 Annual Required Contribution			
Percent of payroll	13.43%	21.76%	8.33%
Dollar amount	\$41.1	\$66.6	\$25.5

\$ in millions

FY2012 contribution rate for MERS: 11.48%



Actuary's Qualifications

- ◆ The study was conducted in accordance with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board
- ◆ All three signing actuaries meet the Qualification Standards of the American Academy of Actuaries