



Wisconsin Retirement System

33rd Annual Actuarial
Valuation of Retired Lives
December 31, 2015

GRS

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Operation of the System

	Core Annuities	Variable Annuities
Investment Return Hurdle to Trigger Annuity Adjustment	Returns over/under 5%	Returns over/under 5%
Ratio of Assets to Liabilities	If > 0.5%, dividend may be granted If < -0.5%, prior dividends reduced	If > 2%, variable annuity increased If < -2%, variable annuity decreased
Increase/Decrease Rounding Conventions	Rounded to nearest 0.1%	Truncated, carried to next year
Adjustment Effective Date	April following 12/31 valuation	April following 12/31 valuation



Smoothing Mechanisms - Core

- ◆ Undesirable for retirees to experience wide swings in monthly benefits from year to year (especially downward swings)
- ◆ Mitigated in Core division by asset smoothing process and portfolio mix
- ◆ Asset smoothing has worked well historically, but could not prevent negative dividends in 2009-2013



Smoothing Mechanisms - Variable

- ◆ Variable fund is marked to market each year and subject to wide swings
- ◆ Dropping fractions from the percent is a form of smoothing
- ◆ Usually has very little effect due to the magnitude of the gains and losses



Summary of Results – December 31, 2015

\$ Millions

	Core	Variable
Number of Annuitants	191,795	40,152
Annual Amount	\$ 4,364.9	\$ 387.8
Fund Balance	49,147.0	3,704.8
Actuarial Reserve	48,897.5	3,910.1
Ratio	1.005	0.947

Core published effective earnings rate (MRA) = 6.4%, dividend = 0.5%.
Variable published effective earnings rate (Market Value) = 0%, and the
variable adjustment = -5.0%.



Summary of Results

- ◆ Due to smoothing via Market Recognition account, as of December 31, 2015 there are approximately \$3 billion in unrecognized losses in the Core fund
 - ▶ Will be recognized over the next 4 years
 - ▶ Roughly $\frac{1}{2}$ of loss applies to the annuitant reserve, the other half shared by active members and employers
 - ▶ Will put downward pressure on dividends in the coming years



Experience Study Changes

- ◆ Prior valuation phased into new mortality table over 3 years (0.993, 0.996, 1.000 loads in respective years)
- ◆ Experience study confirmed base Wisconsin mortality table, introduced fully generational improvement scale
 - ▶ Impact spread over 3 years with (approximately 0.57% per year)

By increasing mortality reserves gradually each year, the effect on Core dividends and Variable changes will also be more gradual.



Primary Sources of Core Dividend

	<u>% of APV</u>
1. SWIB published investment return	(0.40)%
2. MRA adjustment	<u>6.80%</u>
3. Published effective earnings rate	6.40%
4. Adjustment to relate earnings to average core annuity fund balance	<u>(0.30)%</u>
5. Earnings rate based on average balance	6.10%
6. Expected dividend before adjustments: 1.061/1.05-1	1.05%
7. Adjustment to relate average asset to ending liability	0.01%
8. Carryover from last year due to timing of dividend accounting adjustments and rounding	0.17%
9. Experience study/mortality reserve adjustment	(0.57)%
10. Experience and other effects	(0.15)%
11. Statutory adjustment to round to nearest one-tenth percent	<u>(0.01)%</u>
12. Computed average dividend rate: (6)+(7)+(8)+(9)+(10)+(11)	0.5%
13. Adjustment for members at or near the statutory floor	0.0%
14. Final maximum computed dividend rate: (12)+(13), if greater than 0.5% of core annuities, otherwise 0%	0.5%



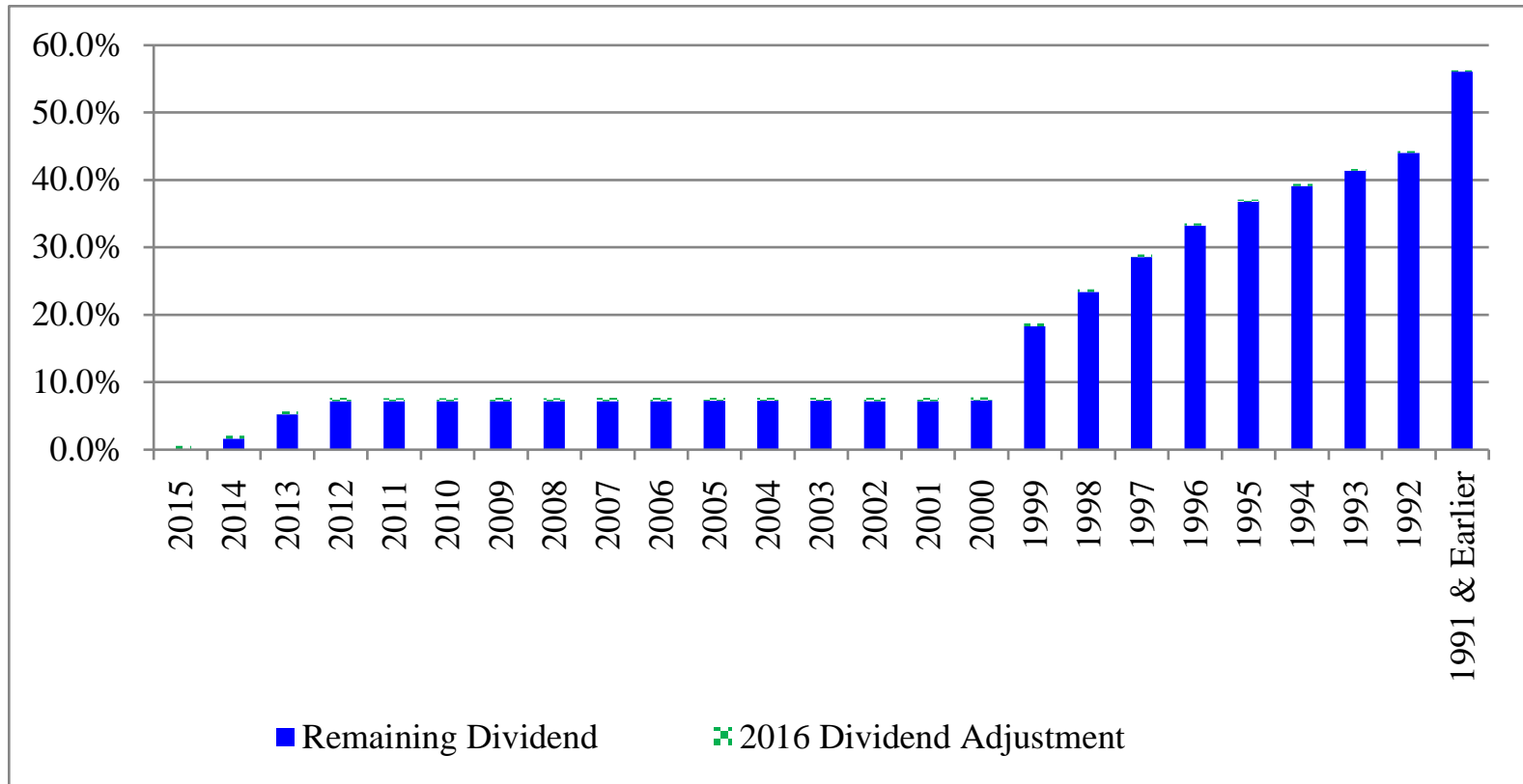
Liability Attributable to Dividends

<u>Valuation</u>	<u>Liability for Dividend Remaining (billions)</u>	<u>Liability for Dividend Adjustment (billions)</u>
12/31/2010	\$7.2	\$(0.3)
12/31/2011	6.4	(1.7)
12/31/2012	4.5	(1.3)
12/31/2013	3.0	2.0
12/31/2014	4.6	1.3
12/31/2015	5.5	0.2
12/31/2016 (est)	5.7	

- ◆ Liability for dividend remaining represents the value of all previously granted dividends
- ◆ If a market event similar to 2008 were to occur, the complete depletion of the dividend could occur
- ◆ Potential implications of such an event continue to be explored

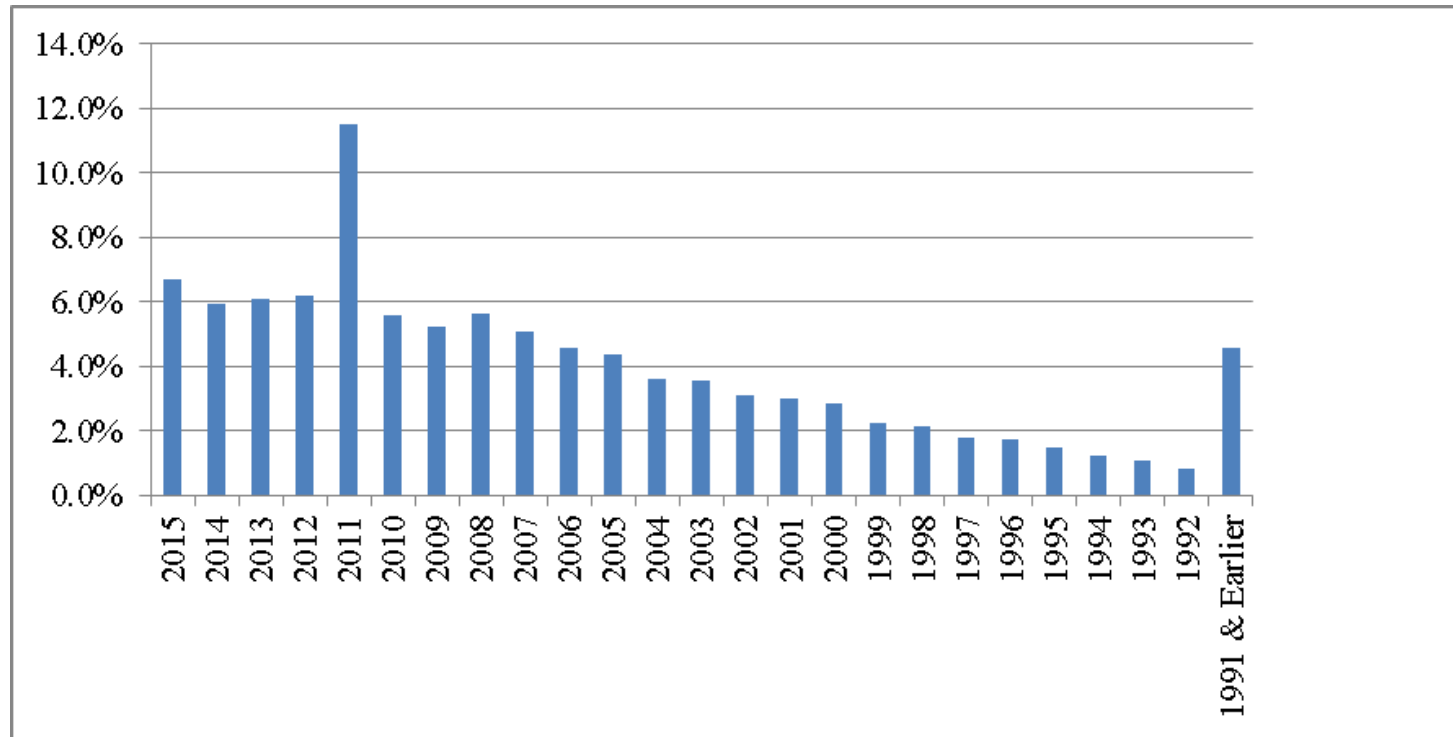


Dividend Remaining (as a Percentage of Total Benefit) by Year of Retirement

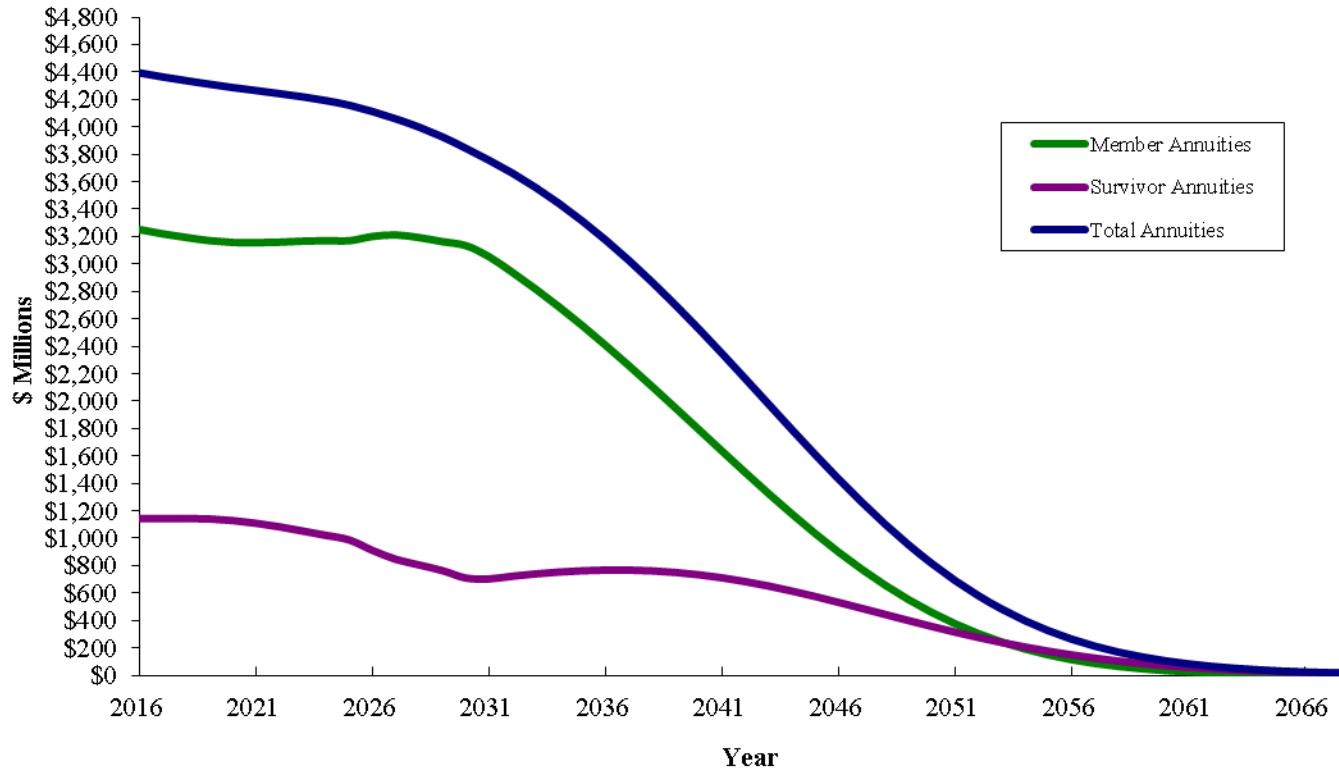




Liabilities (as a Percentage of Total) by Year of Retirement



Projected Future Core Annuities



Total Future Payments	\$114.0 billion
From Present Assets	49.1
From Investment Return	64.9

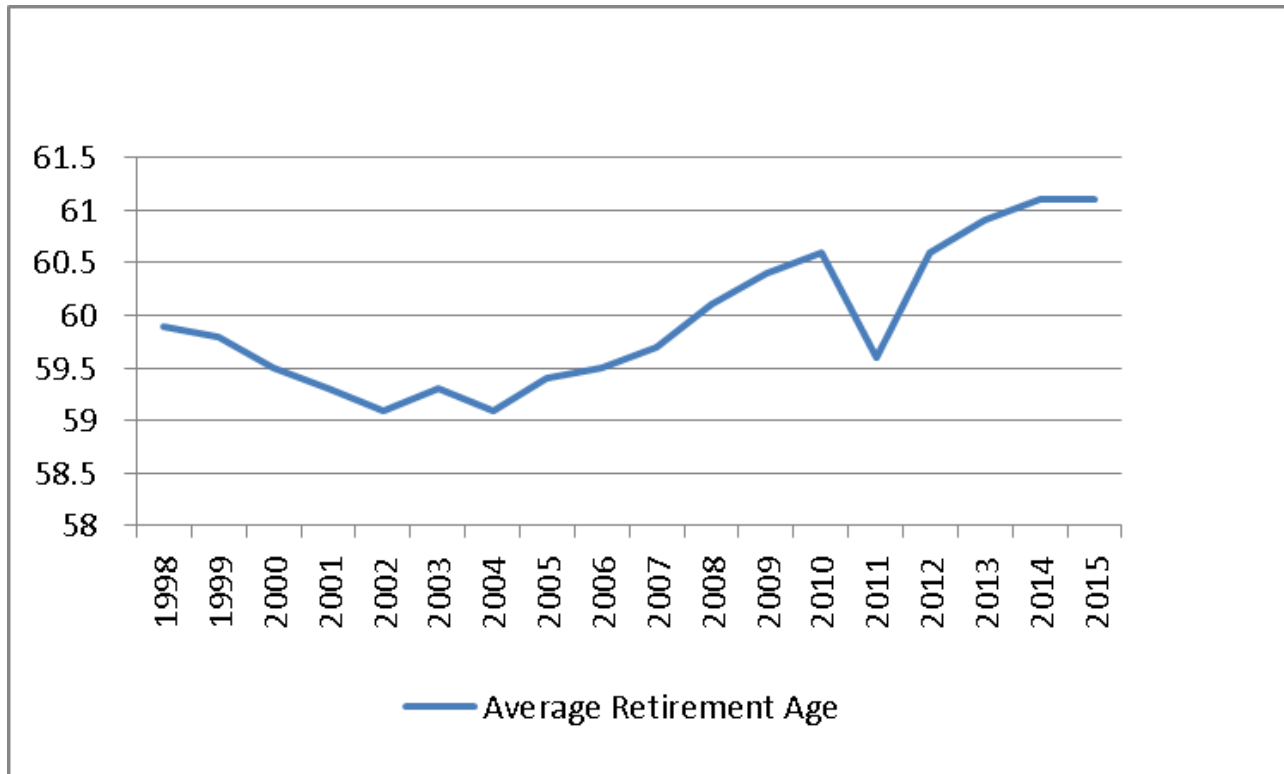


Primary Sources of Variable Adjustment

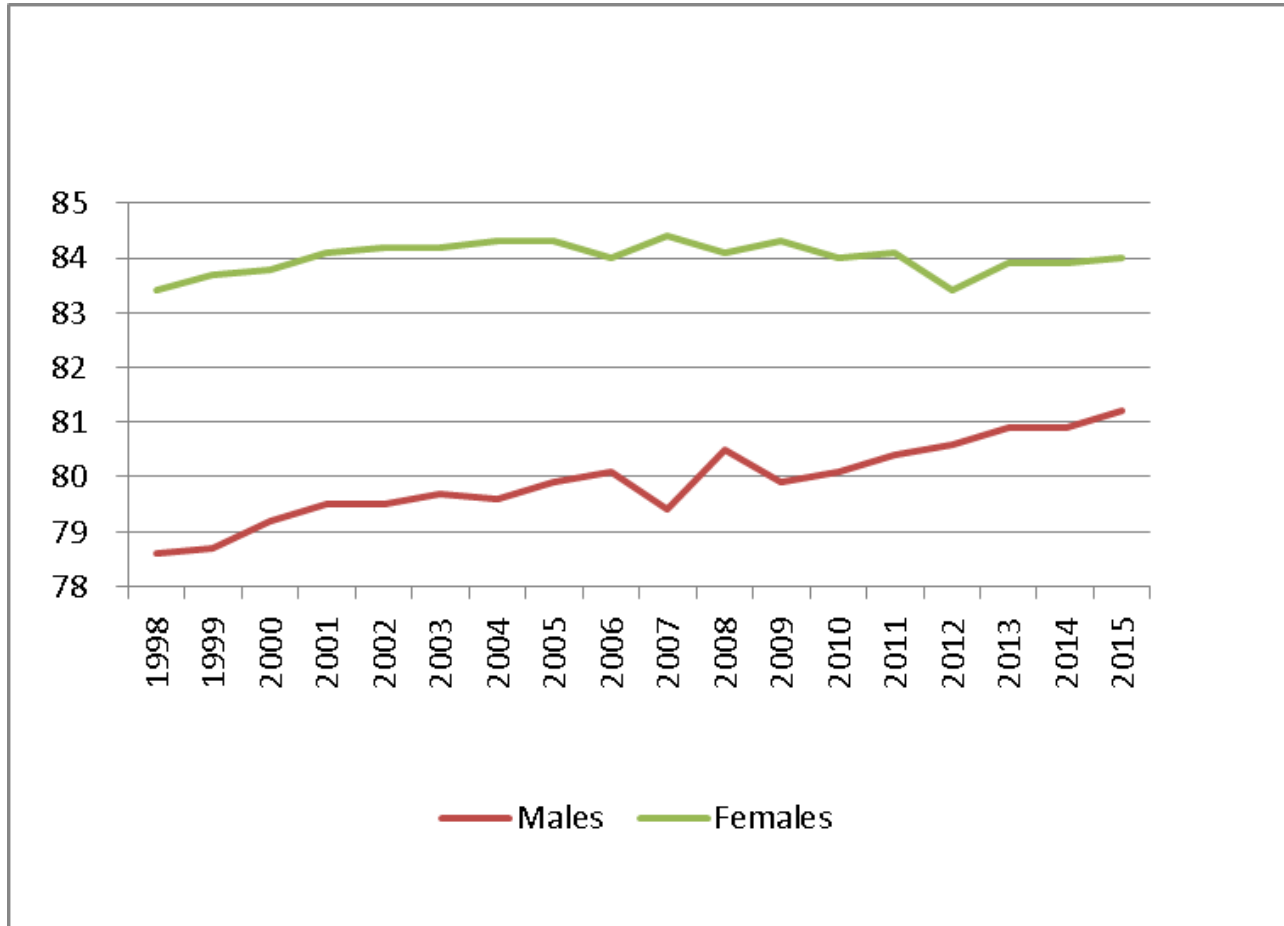
	<u>% of APV</u>
1. SWIB published investment return	(1.2)%
2. Adjustment to published effective rate	<u>1.2%</u>
3. Published effective earnings rate	0.0%
4. Adjustment to relate earnings to average variable annuity fund balance	<u>0.0%</u>
5. Earnings rate based on average balance	0.0%
6. Expected change before adjustments: $1/1.05-1$	(4.8)%
7. Adjustment to relate average asset to ending liability	(0.1)%
8. Carryover from last year due to timing of distribution, accounting adjustments and truncation	0.1%
9. Experience study/mortality reserve adjustment	(0.6)%
11. Experience and other effects	0.1%
12. Statutory adjustment: (truncate to whole percent)	<u>0.3%</u>
13. Variable annuity change: (6)+(7)+(8)+(9)+(10)+(11)+(12)	(5.0)%



Average Retirement Age



Average Age at Death



Average age at death, while an interesting statistic, is not a proper measure of life expectancy, because it does not include people who have not yet died. The expected age at death for a 65 year old is 85.2 for males and 87.8 for females.



Comparative Statement - Core

Valuation Date	Number	\$ Millions				Ratio	Change in		
		Annual Annuities	Fund Balance	Actuarial Reserve	Ratio		Annuities		CPI*
						Average	Maximum		
2006	137,117	2,843.6	31,180.5	30,273.9	1.030	3.0 %		2.6 %	
2007	142,906	3,075.3	35,050.1	32,877.5	1.066	6.6 %		4.1 %	
2008	144,033	3,399.3	35,798.1	36,551.5	0.979	(2.1)%	(2.1)%	0.1 %	
2009	150,671	3,449.3	36,655.8	37,072.7	0.989	(1.1)%	(1.3)%	2.7 %	
2010	155,775	3,532.4	37,798.4	38,148.5	0.991	(0.9)%	(1.2)%	1.5 %	
2011	167,453	3,842.0	40,411.5	42,078.3	0.960	(4.0)%	(7.0)%	3.0 %	
2012	173,655	3,806.3	40,591.6	41,852.4	0.970	(3.0)%	(9.6)%	1.7 %	
2013	180,056	3,800.7	44,273.2	42,300.5	1.047	4.7 %	4.7 %	1.5 %	
2014	185,605	4,102.3	47,135.7	45,790.7	1.029	2.9 %	2.9 %	0.8 %	
2015	191,795	4,364.9	49,147.0	48,897.5	1.005	0.5 %	0.5 %	0.7 %	
33-Year Average						4.0 %		2.7 %	
10-Year Average						0.6 %		1.9 %	

**Based on December CPI-U67 index.*



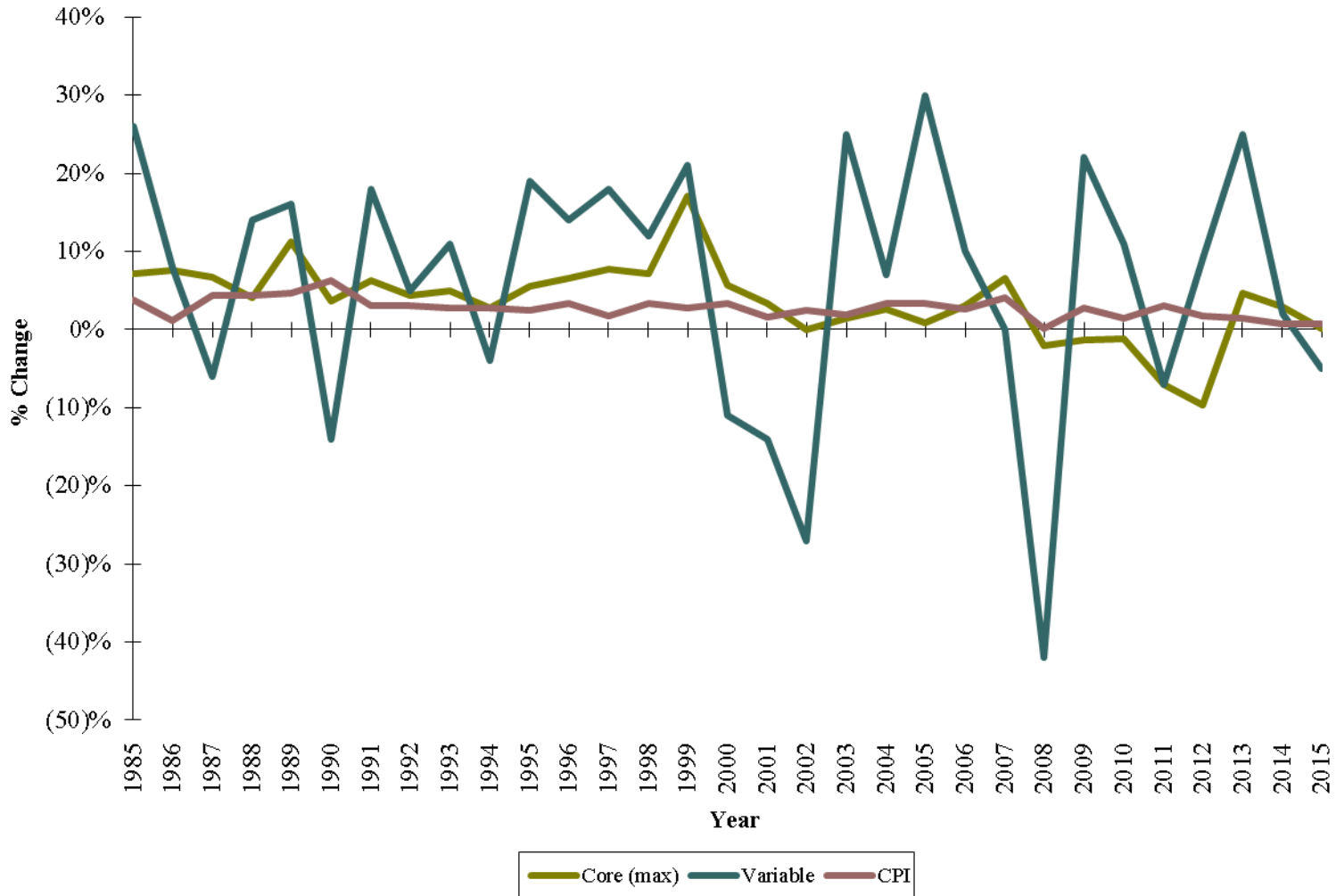
Comparative Statement - Variable

Valuation Date	Number	\$ Millions				Change in	
		Annual Annuities	Fund Balance	Actuarial Reserve	Ratio	Annuities	CPI*
2006	32,683	391.8	4,594.2	4,145.2	1.108	10.0 %	2.6 %
2007	33,880	432.6	4,625.0	4,563.7	1.013	0.0 %	4.1 %
2008	34,927	427.0	2,574.5	4,491.0	0.573	(42.0)%	0.1 %
2009	34,836	240.3	3,078.4	2,512.7	1.225	22.0 %	2.7 %
2010	35,866	288.4	3,340.6	3,005.4	1.111	11.0 %	1.5 %
2011	38,949	330.3	3,197.9	3,462.9	0.924	(7.0)%	3.0 %
2012	39,873	304.6	3,463.9	3,169.6	1.093	9.0 %	1.7 %
2013	40,317	324.5	4,187.3	3,347.0	1.251	25.0 %	1.5 %
2014	39,420	386.5	3,995.4	3,917.1	1.020	2.0 %	0.8 %
2015	40,152	387.8	3,704.6	3,914.6	0.946	(5.0)%	0.7 %
33-Year Average						4.3 %	2.7 %
10-Year Average						0.6 %	1.9 %

**Based on December CPI-U67 index.*



History of % Changes





Looking Ahead

- ◆ As of the December 31, 2015 valuation, there are about \$3 billion in unrecognized asset losses in the Core fund
 - ▶ recognized over the next four years, about half of which will be applied to the annuitant reserve
- ◆ A few more years of positive dividends for all annuitants is needed to decrease the probability of leveraged negative dividends that occurred between 2008 and 2012



Current Events



National Trends

- ◆ At September 30, 2015, state and local government retirement systems assets = \$3.56 trillion¹
- ◆ Moody's report: Recent market volatility could result in
 - higher unfunded U.S. public pension liabilities in fiscal year 2016 and
 - erase funding improvements seen in fiscal years 2013 and 2014

¹ Federal Reserve, *Flow of Funds Accounts of U.S.*, 3rd Quarter 2015, Table L.120

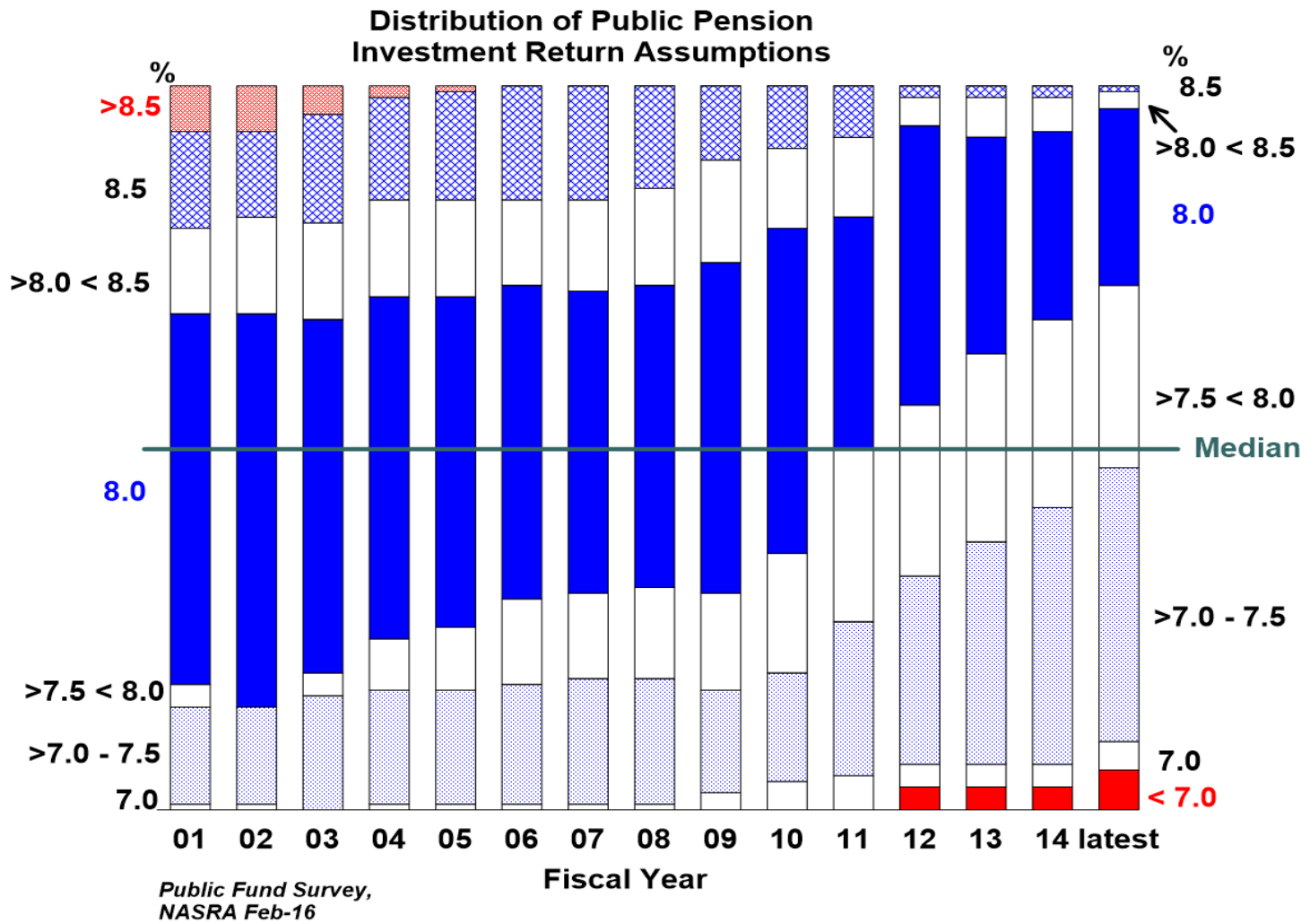


National Trends

- ◆ Wilshire report: State pension plan funding falls 3 percentage points to an estimated 74% in fiscal 2015
- ◆ Milliman report: Retirees outnumber active employees in Public Pension plans for first time



National Trends -- Evolving Investment Return Assumptions





State/City Current Events

- ◆ Wisconsin municipal employees will have more choices in retirement programs
- ◆ 2016 Plan Sponsors of the Year - Illinois Municipal Retirement Fund
- ◆ Connecticut at forefront of pension innovation
- ◆ City of South Tucson may soon become the 10th local government in the US to file for bankruptcy since 2010



The Nature of Retirement

- ◆ Normal Retirement Age regulations for Public Plans finally proposed
- ◆ Society of Actuaries (SOA) report, 2015 *Risks and Process of Retirement Survey*
 - ▶ Retirees underestimate average life expectancy
 - ▶ ~ 68% of pre-retirees expect to work in retirement or to postpone retirement;
 - only 30% of retirees reported working in retirement and only 12% have tried to postpone retirement



The Nature of Retirement

◆ SOA report (*cont'd*)

- ▶ ~ 50% of pre-retirees expect to postpone taking Social Security (13% of retirees do)
- ▶ Most retirees have experienced at least one major financial shock in retirement (e.g., major repairs, medical or dental expenses, etc.)
 - 32% have experienced three or more



The Nature of Retirement

◆ SOA report (*cont'd*)

- ▶ Pre-retirees expect to retire at median age 65
 - retirees report having retired at median age 60
 - both pre-retirees and retirees would prefer to retire at a median age of 62
- ▶ Reasons for postponed retirement
 - not having enough money;
 - wanting to build their assets; and
 - keeping employer-provided health benefits.



- ◆ This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- ◆ This presentation is intended to be used in conjunction with the actuarial valuation report for retired lives issued on March 12, 2016. This presentation should not be relied on for any purpose other than the purpose described in the valuation report.