JCPER

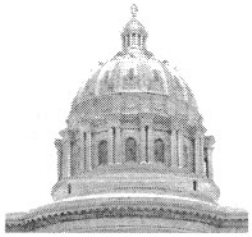
JOINT COMMITTEE ON PUBLIC EMPLOYEE RETIREMENT
FIRST QUARTER MEETING
March 14, 2013

The Joint Committee on Public Employee Retirement held its 1st Quarter Meeting on Thursday, March 14, 2013 at 8:00 am in House Hearing Room 1. With a quorum being established, the meeting was called to order. Joint Committee members in attendance were Senators Keaveny, Kehoe, Lamping and Walsh and Representatives Anders, Bernskoetter, Leara, Pierson, Runions and Wieland. Senators Chappelle-Nadal, and Rupp and were not in attendance.

Absent a returning Chairman or Vice-Chairman, the Executive Director led the committee in the first order of business to elect a new Chairman. Senator Lamping made the motion to elect Representative Leara as Chairman of the Joint Committee with a second by Representative Bernskoetter. The motion passed by acclamation of the committee.. The meeting was then turned over to Chairman Leara. He made a motion to elect Senator Lamping Vice-Chairman with a second by Representative Bernskoetter. The motion passed by acclamation of the committee.

The Chairman turned the meeting over to the Executive Director, Ronda Stegmann. The 2012 Annual Report to the General Assembly was reviewed. It was noted plan year 2011 aggregate actuarial accrued liabilities equaled $70.1 billion, actuarial value of assets equaled $56.8 billion and market value of assets equaled $55.3 billion. The Director explained the difference between the actuarial value and market value of assets. Membership changes, net investment income and plan benefit payments were reviewed. A preliminary plan status for plan year 2012 was provided to the committee.

The 2012 Watch List was presented. This list consists of pension plans with a market value funded ratio under 70%. There were 29 plans on this list with 10 of these plans not receiving the full Annual Required Contribution as (ARC) recommended by the plan's actuary. The Director provided historical information regarding the criteria used for the watch list. The committee discussed modifications to watch list criteria and presentation of such information. The Chairman suggested corresponding with plans on the watch list or those not receiving full ARC. This discussion will be continued at the next quarterly meeting along with reviewing provisions of Chapter 105 governing public pension plans.



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Legislation being tracked relative to pension issues was reviewed. It was noted that 37 bills are being monitored with four plans offering different benefit provisions for new employees.

Quarterly plan reporting was reviewed from the fourth quarter of 2012. Sixty-one plans defined benefit plans participated in this reporting.

Under other business, the Director called the committee's attention to information provided by Mr. Michael Rathbone with the Show-Me Institute. It was indicated Mr. Rathbone requested his testimony and supplemental information be provided to the committee for the record.

No further business being presented, the committee adjourned.

Ronda Stegmann
Executive Director

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JOINT COMMITTEE ON PUBLIC EMPLOYEE RETIREMENT

1st QUARTER MEETING
March 14, 2013
8:00 a.m.
House Hearing Room 1

AGENDA

Roll Call

Election of Chairperson and Vice Chairperson

2013 Annual Report

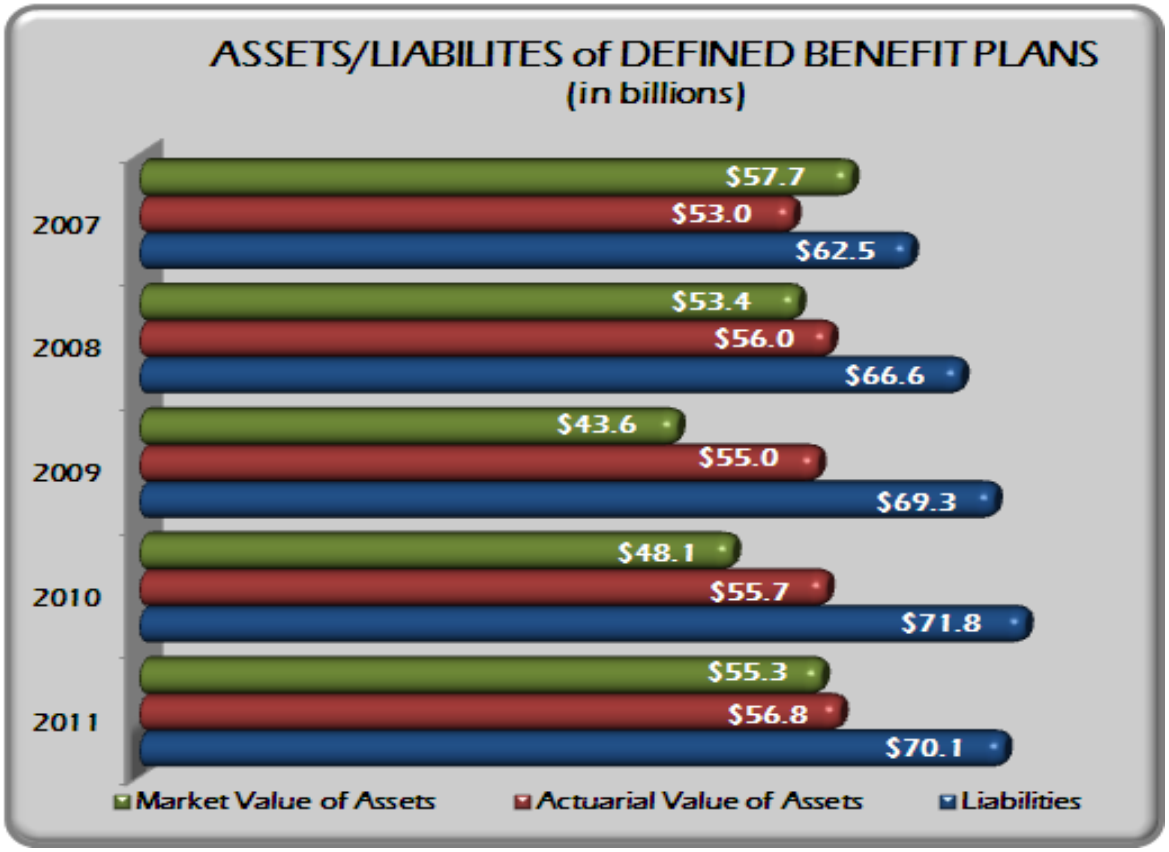
2012 Watch List

Legislation

Quarterly Defined Benefit Plan Reporting

Other Business

2012 JCPER Annual Report Summary
Plan Year 2011 data



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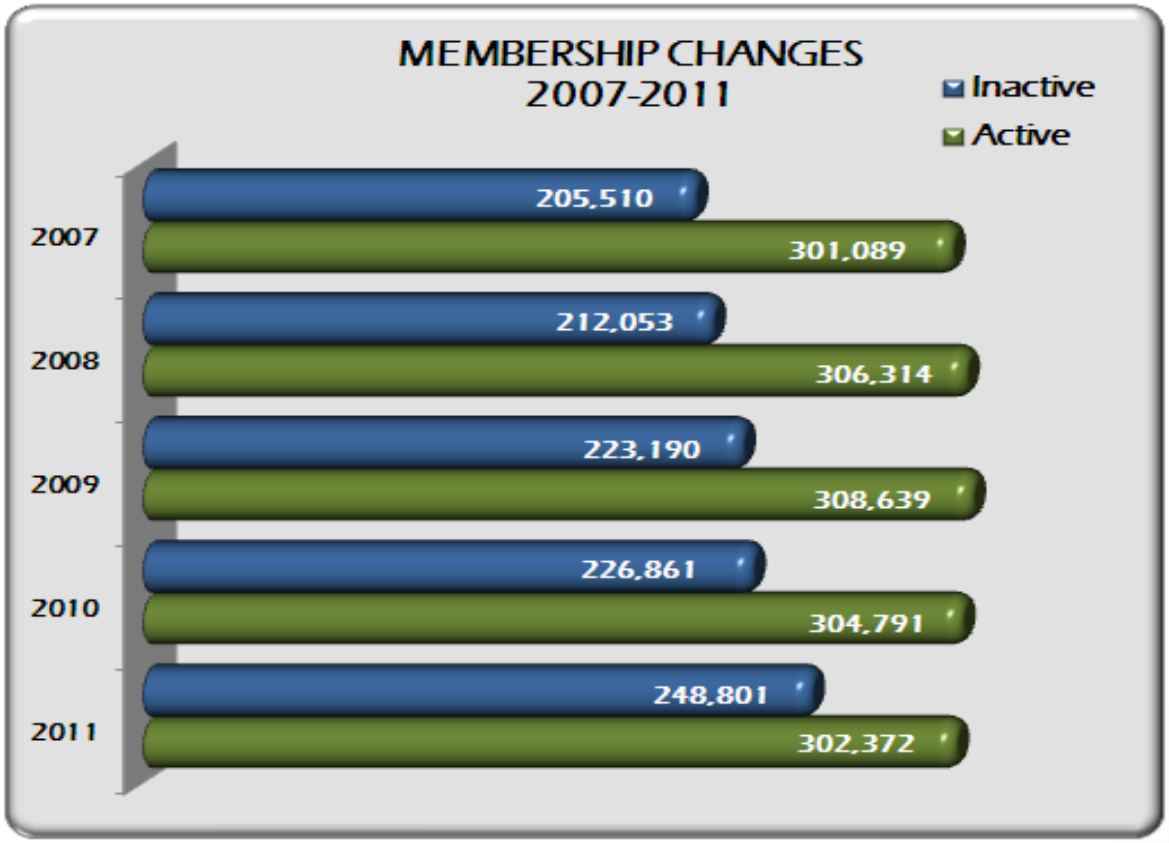

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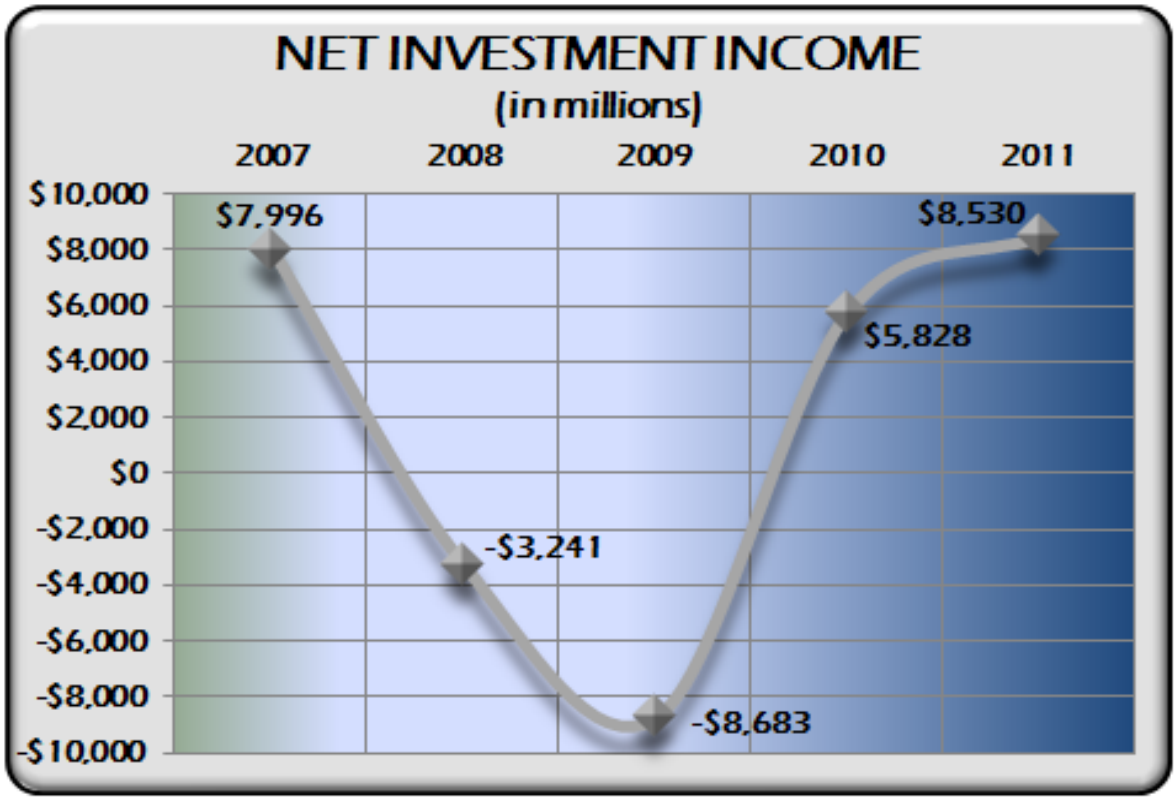
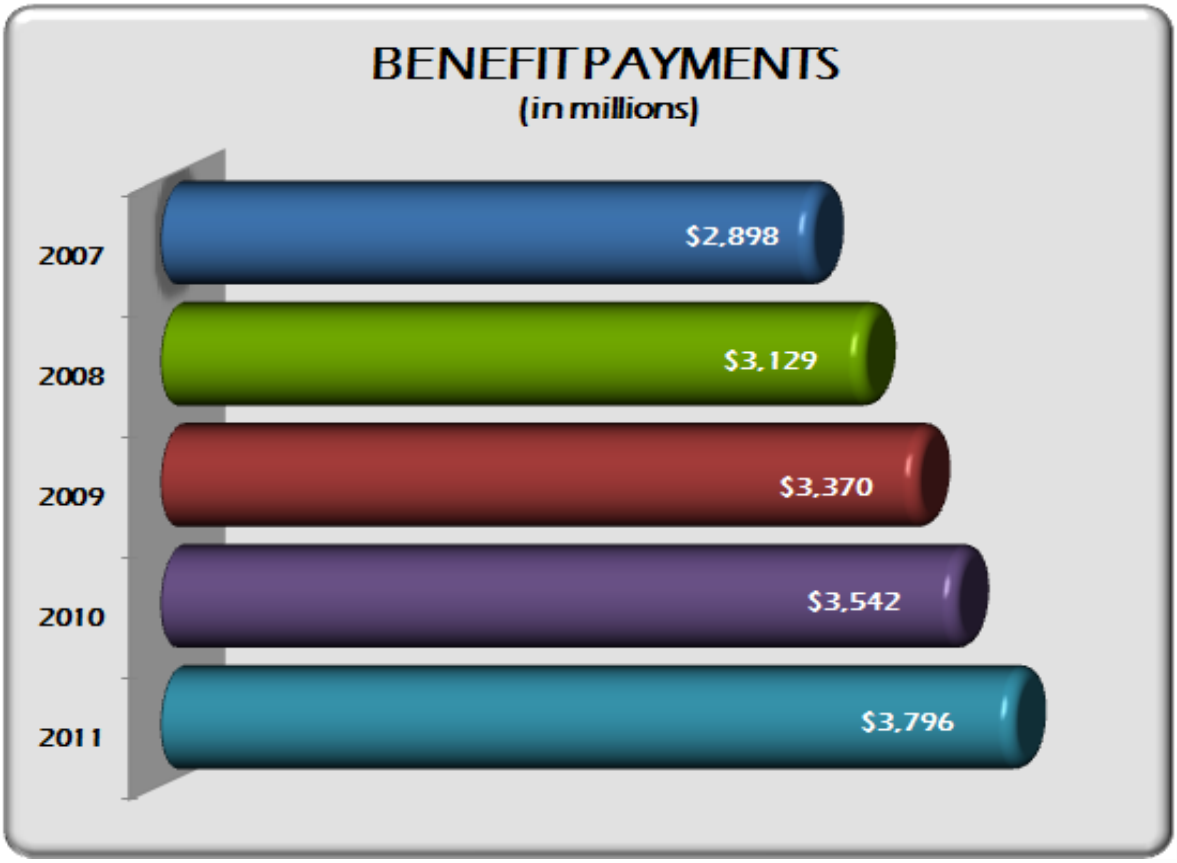

NET INVESTMENT INCOME
(in millions)
2007
2008
2009
2010
2011
$10,000
$8,000
$6,000
$4,000
$2,000
$0
-$2,000
-$4,000
-$6,000
-$8,000
-$10,000
$7,996
-$3,241
-$8,683
$5,828
$8,530


BENEFIT PAYMENTS
(in millions)
2007
2008
2009
2010
2011
$2,898
$3,129
$3,370
$3,542
$3,796

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2013 Annual Report

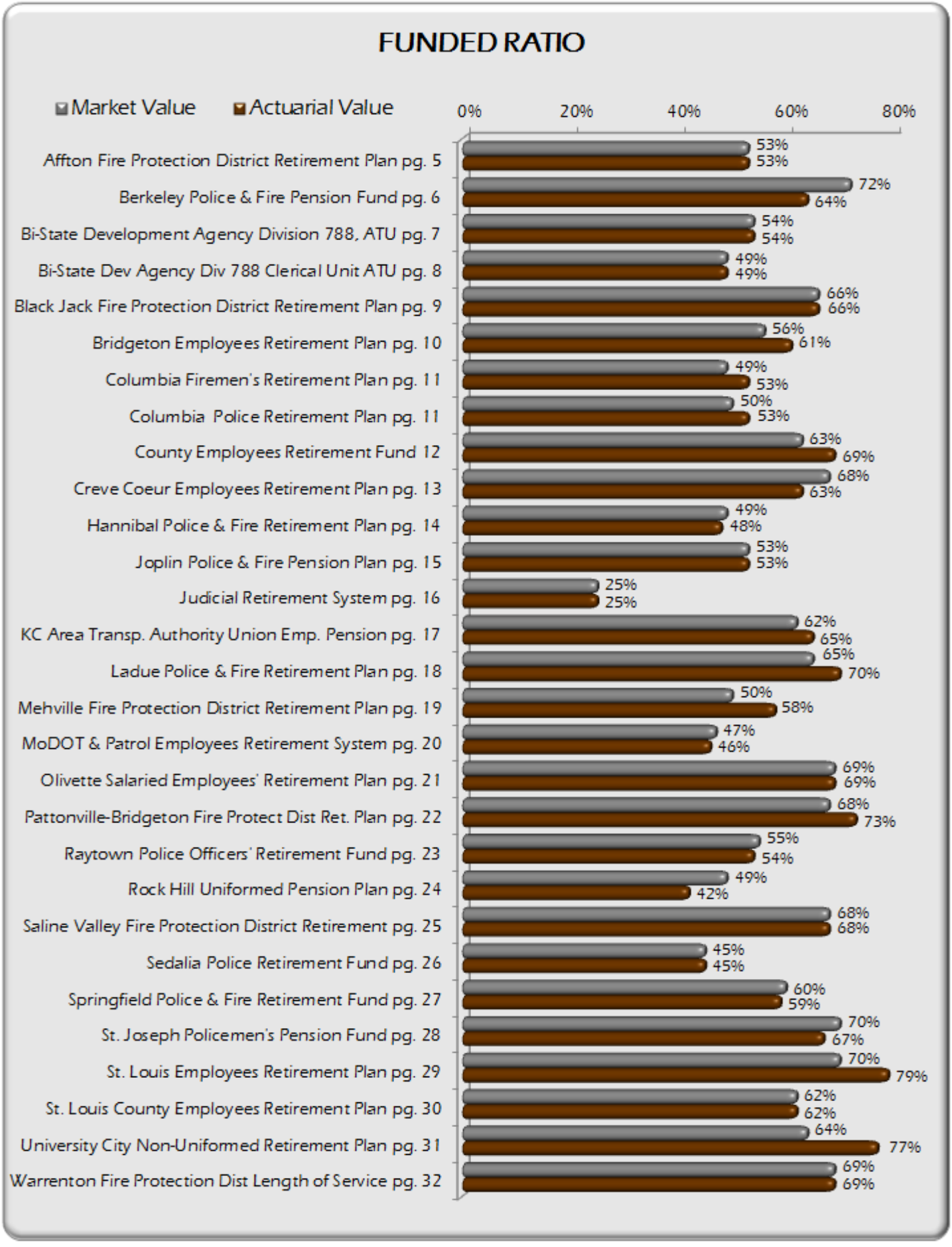
Plan Year 2012 Net Investment Income

Plan	2012	Total Assets (Market Value)	Total Assets (Actuarial Value)	Liabilities	Plan year ended
PSRS	$ 449,821,510	$ 27,816,772,562	$ 29,013,002,242	$ 35,588,030,639	June 30
MOSERS	158,102,123	7,581,882,309	7,897,167,203	10,793,651,577	June 30
LAGERS	166,658,100	4,679,128,010	4,274,440,345	5,120,274,198	Feb 28
PEERS	39,773,794	2,964,557,038	3,090,879,968	3,746,347,306	June 30
MPERS	42,091,564	1,541,403,546	1,531,033,613	3,306,278,671	June 30
KC Employees	6,122,273	864,606,330	847,089,856	1,070,752,440	April 30
KC Police	(3,584,270)	687,870,657	734,375,923	972,127,874	April 30
St. Louis Police	74,372,269	653,862,993	674,080,072	864,762,285	Sept 30
St. Louis Fire	71,064,693	450,160,998	427,123,970	453,529,070	Sept 30
KC Fire	3,698,373	404,505,238	420,336,845	535,215,109	April 30
KC Civilian Police	(613,908)	101,192,338	108,018,073	142,907,530	April 30
Judges	2,061,916	99,837,257	102,266,706	413,332,538	June 30
Total	**$ 1,009,568,437**	**$ 47,845,779,276**	**$ 49,119,814,816**	**$ 63,007,209,237**	
Aggregate Funded Ratio		**75.9%**	**78.0%**		

JOINT COMMITTEE ON PUBLIC EMPLOYEE RETIREMENT

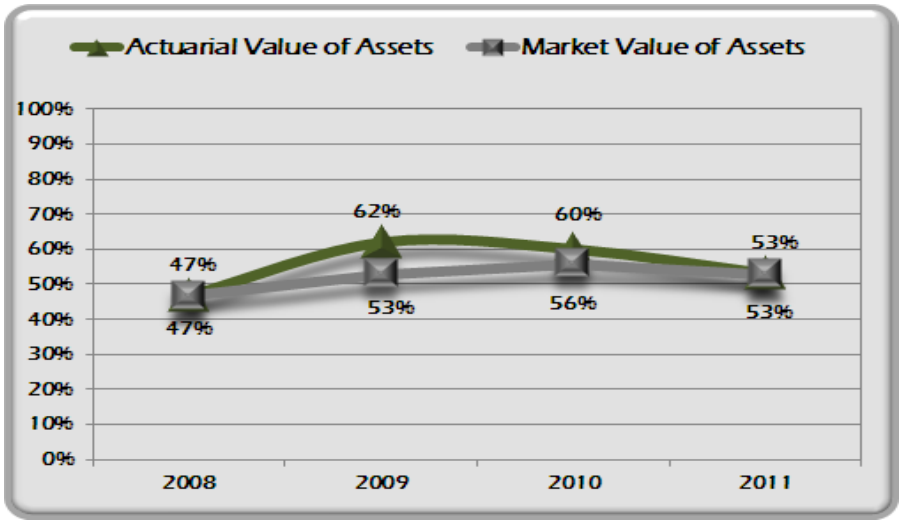
WATCH LIST

2012


FUNDED RATIO
Market Value
Actuarial Value
0%
20%
40%
60%
80%
Affton Fire Protection District Retirement Plan pg. 5
53%
53%
Berkeley Police & Fire Pension Fund pg. 6
72%
64%
Bi-State Development Agency Division 788, ATU pg. 7
54%
54%
Bi-State Dev Agency Div 788 Clerical Unit ATU pg. 8
49%
49%
Black Jack Fire Protection District Retirement Plan pg. 9
66%
66%
Bridgeton Employees Retirement Plan pg. 10
56%
61%
Columbia Firemen's Retirement Plan pg. 11
49%
53%
Columbia Police Retirement Plan pg. 11
50%
53%
County Employees Retirement Fund 12
63%
69%
Creve Coeur Employees Retirement Plan pg. 13
68%
63%
Hannibal Police & Fire Retirement Plan pg. 14
49%
48%
Joplin Police & Fire Pension Plan pg. 15
53%
53%
Judicial Retirement System pg. 16
25%
25%
KC Area Transp. Authority Union Emp. Pension pg. 17
62%
65%
Ladue Police & Fire Retirement Plan pg. 18
65%
70%
Mehville Fire Protection District Retirement Plan pg. 19
50%
58%
MoDOT & Patrol Employees Retirement System pg. 20
47%
46%
Olivette Salaried Employees' Retirement Plan pg. 21
69%
69%
Pattonville-Bridgeton Fire Protect Dist Ret. Plan pg. 22
68%
73%
Raytown Police Officers' Retirement Fund pg. 23
55%
54%
Rock Hill Uniformed Pension Plan pg. 24
49%
42%
Saline Valley Fire Protection District Retirement pg. 25
68%
68%
Sedalia Police Retirement Fund pg. 26
45%
45%
Springfield Police & Fire Retirement Fund pg. 27
60%
59%
St. Joseph Policemen's Pension Fund pg. 28
70%
67%
St. Louis Employees Retirement Plan pg. 29
70%
79%
St. Louis County Employees Retirement Plan pg. 30
62%
62%
University City Non-Uniformed Retirement Plan pg. 31
64%
77%
Warrenton Fire Protection Dist Length of Service pg. 32
69%
69%

AFFTON FIRE PROTECTION DISTRICT RETIREMENT PLAN

- Rate of return on investments equaled –0.89% (Market) and –5.85% (Actuarial) vs. 7.5% assumed.
- Assets are valued at Market Value except 2008 loss which is smoothed over 5 years.
- Unfunded Actuarial Accrued Liabilities are amortized over an open 30 year period.
- Employee contributions were implemented in 2010 at 4% through June 30, 2010 and then 7% thereafter.
- Actuary notes, "*contributions from tax revenue and employee salaries are projected to be about $110,000 less than necessary to support the promised benefits.*"
- Plan provisions have been modified including cessation of lump sum benefit payments.
- While extra contribution payments above the dedicated tax levy proceeds have been contributed to the fund since 2006, the employer contribution continues to not meet the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2011	$395,863	$298,589	75%
2010	$384,986	$284,870	74%
2009	$583,257	$326,225	56%
2008	$476,913	$347,709	73%
2007	$484,424	$345,381	71%

As of 1/1/12

Market Value: $4,870,268
Actuarial Value: $4,931,526
AAL: $9,229,297

MEMBERSHIP:
Active: 30 **Inactive:** 22

Normal Retirement Formula:
65% of compensation
Reduced 3.33% per year less 30 Years
Supplemental Benefit:
$500 monthly to Age 62

Normal Retirement Benefits:
Age 60 with 5 years of service

Social Security Coverage: Yes

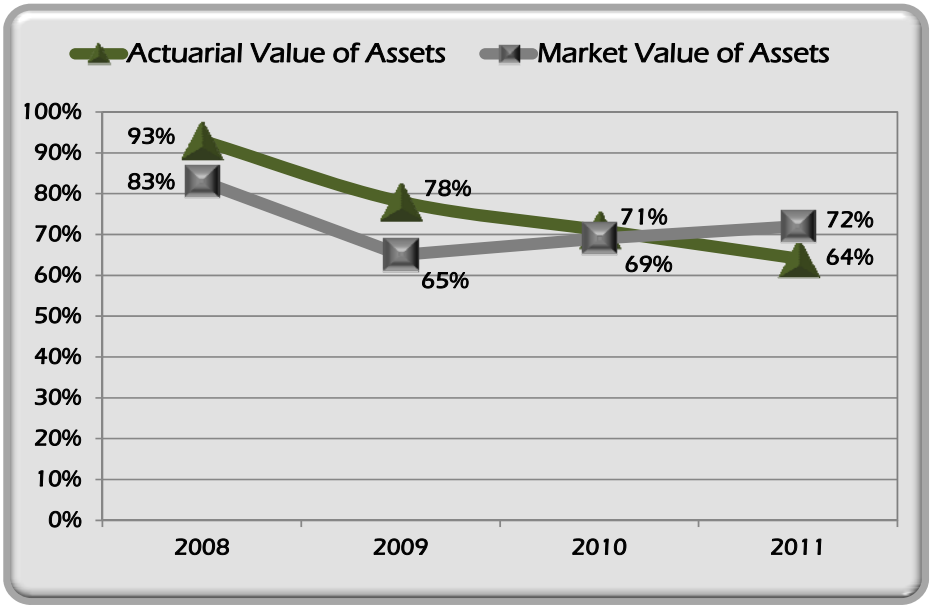
COLA: No COLA

ACTUARIAL ASSUMPTIONS:

Interest: 7.5% **Salary:** 4.5%

BERKELEY POLICE & FIRE PENSION FUND

- Rate of return on investments equaled 19.4% (Market) & 2.6% (Actuarial) vs. 7.5% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Updated mortality tables increased plan liability by $613,624 and the plan contribution by $95,000.
- Actuary notes, *"If the City's current annual contribution rate continues into the future, we project that the funded ratio on a market value basis will continue to deteriorate, dropping below 60% within 5 years and below 50% within 9 years, and the Fund will be on a path toward insolvency that will be difficult to reverse. If plan assets fail to earn at least 7.5% each year, the deterioration will occur even more quickly."*
- The dedicated tax of 11 cents per $100 assessed value is not generating nearly enough revenue to support the existing benefit structure according to plan actuary.
- Employees contribute 6% of pay to this plan.
- The employer has not met the ARC since 2003.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
11/12	$1,245,038	N/A	-
10/11	$976,809	$246,418	25%
09/10	$855,227	$228,800	27%
08/09	$557,893	$211,259	38%
07/08	$349,203	$221,851	64%

As of 6/30/11

Market Value: $12,212,251
Actuarial Value: $10,861,791
AAL: $17,013,674

MEMBERSHIP:
Active: 72 **Inactive:** 49

BENEFITS:
Normal Retirement Formula:
50% of compensation for first 20 years of service plus 1% for next 5 years of service
Maximum: 55% of compensation

Normal Retirement Benefits:
Age 55 with 10 years of service

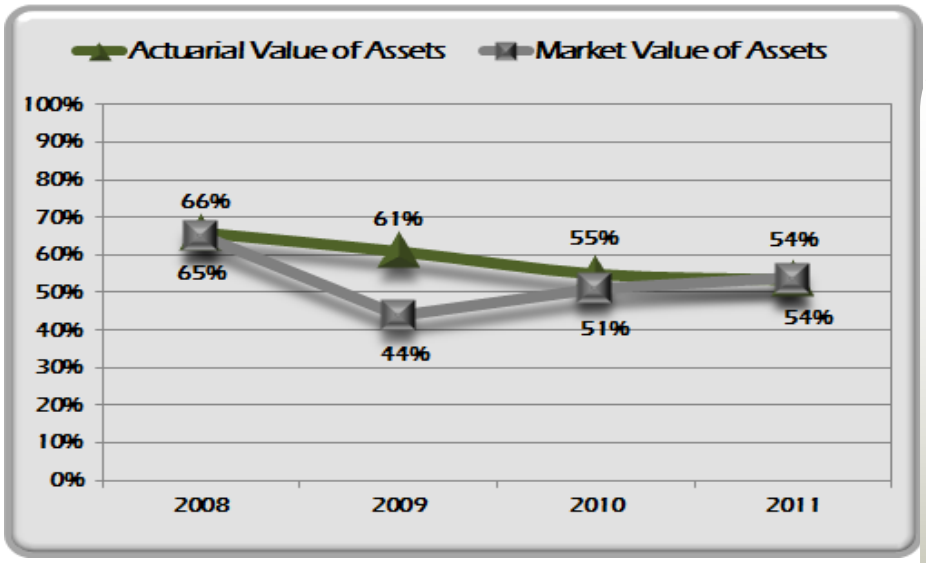
Social Security Coverage: Yes

COLA:
Percent of CPI: 50%
Annual Amount Maximum: 3%

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 4%

BI-STATE DEVELOPMENT AGENCY
DIVISION 788, A.T.U.

- Rate of return on investments equaled 13.1% (Market) and 3.3% (Actuarial) vs. 7.25% assumed.
- Investment gains/losses are smoothed.
- Unfunded Actuarial Accrued Liability are amortized on a closed 30 year period effective April 1, 2003.
- Plan assumption and method changes incorporated in the 4/1/10 valuation include:
  - Decreased interest rate assumption from 8% to 7.25%
  - Mortality assumption changed from 1983 GAMT to RP-2000 mortality tables
- The weekly recommended contribution for plan year 11/12 equals $141.27 per active participant.
- Employees contribute approximately 30% of the weekly contributions.
- The Employer continues to meet the full ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
10/11	$5,393,748	$5,393,748	100%
09/10	$4,953,503	$4,953,503	100%
08/09	$4,854,000	$4,854,000	100%
07/08	$4,671,805	$4,671,805	100%
06/07	$4,689,803	$4,689,803	100%

As of 4/1/11

Market Value: $ 91,395,558
Actuarial Value: $ 91,133,410
AAL: $170,438,165

MEMBERSHIP:
Active: 1,315 **Inactive:** 1,026

BENEFITS:
Normal Retirement Formula:
$40 times years of service for those retiring with less than 25 years of service
$55 times years of service for those retiring with 25 or more years of service

Normal Retirement Benefits:
25 years of service, age 65, or age 55 with 20 years of service

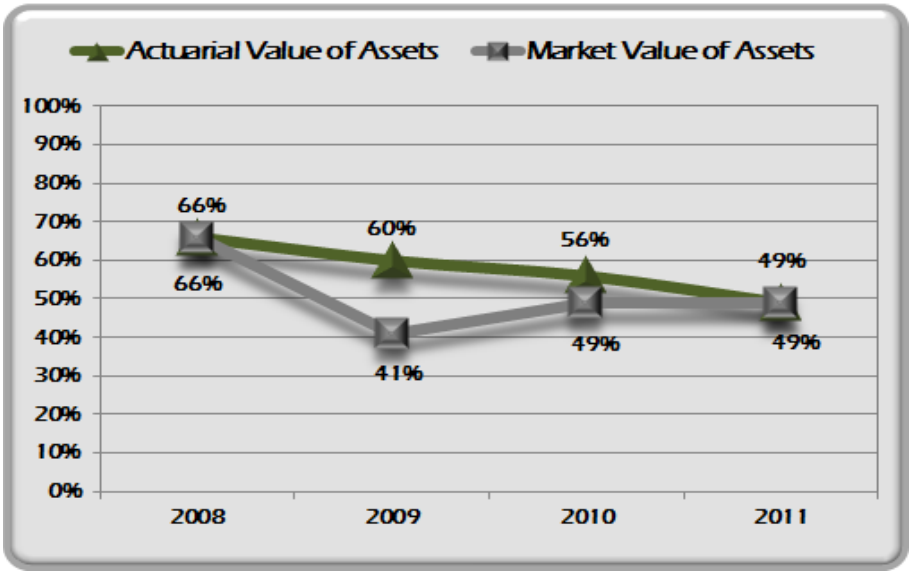
Social Security Coverage: Yes

COLA: Ad Hoc COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.25%

BI-STATE DEVELOPMENT AGENCY
DIVISION 788 CLERICAL UNIT ATU

- Rate of return on investments equaled 14.9% (Market) and 1.8% (Actuarial) vs. 7.25% assumed.
- Investment gains/losses are smoothed.
- Unfunded Actuarial Accrued Liability are amortized on a closed 30 year period effective April 1, 2004.
- Plan assumption and method changes incorporated in the 4/1/10 valuation include:
  - Decreased interest rate assumption from 8% to 7.25%
  - Mortality assumption changed from 1983 GAMT to RP-2000 mortality tables
- The weekly recommended contribution for plan year 11/12 equals $243.97 per active participant.
- Employees contribute approximately 32% of the weekly contributions.
- The Employer continues to meet the full ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
10/11	$241,798	$241,798	100%
09/10	$223,550	$223,550	100%
08/09	$216,471	$216,471	100%
07/08	$229,977	$229,977	100%
06/07	$221,053	$221,053	100%

As of 4/1/11

Market Value: $ 5,517,156
Actuarial Value: $ 5,513,772
AAL: $11,202,257

MEMBERSHIP:
Active: 49 Inactive: 68

BENEFITS:
Normal Retirement Formula:
$40 times years of service for those retiring with less than 25 years of service;
$55 times years of service for those retiring with 25 or more years of service

Normal Retirement Benefits:
25 years of service, or age 65 with 10 years of service

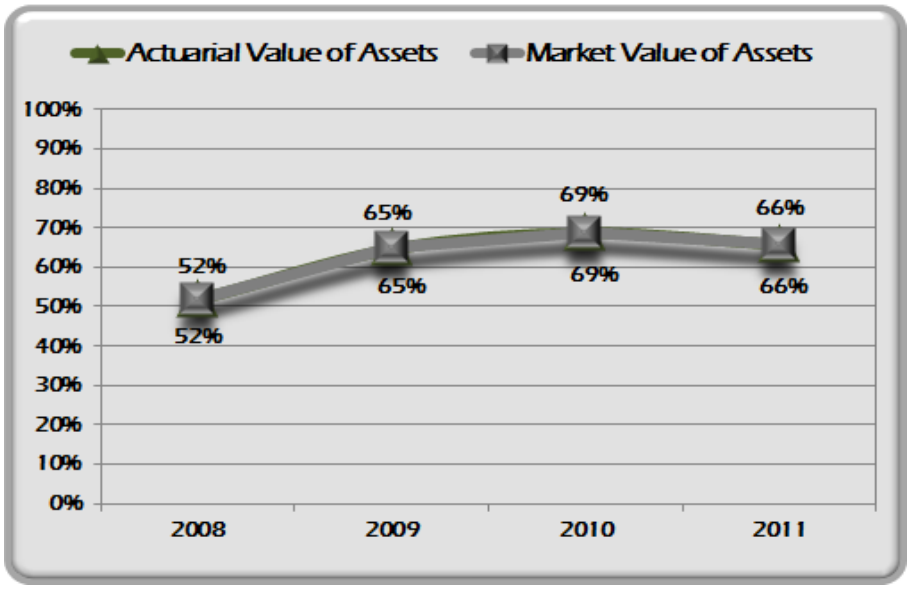
Social Security Coverage: Yes

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.25%

BLACK JACK FIRE PROTECTION DISTRICT RETIREMENT PLAN

- Rate of return on investments equaled –6.15% (Market) vs. 7% assumed.
- Plan does not smooth investment gains/losses.
- The actuary notes, *"The 2012 expected contributions declined due to the substantial decrease in the assessed property valuation offset partially but not fully by the increase on the average pension tax rate."*
- The plan's Social Security supplement (to age 62) and the $20 temporary benefit account for nearly 40% of the total projected liabilities for the active group.
- Employees do not make a payroll contribution to this plan.
- The dedicated tax revenue to the plan equals 10 cents per $100 assessed value (increased from $0.0953.)
- The employer has consistently met or exceeded the ARC with the exception of 2009.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$480,580	N/A	-
2011	$397,271	$535,408	135%
2010	$470,777	$533,662	113%
2009	$702,391	$534,704	76%
2008	$368,516	$531,314	144%

As of 1/1/12

Market Value: $ 7,509,177
Actuarial Value: $ 7,509,177
AAL: $11,411,515

MEMBERSHIP:
Active: 36 **Inactive:** 10

BENEFITS:
Normal Retirement Formula:
Uniformed: $93 times years of service
Non-Uniform: $45 times years of service
Supplemental Benefit for both groups to age 62:
Estimated Social Security Benefit
Additional Uniformed Supplemental Benefit to age 65: $20 times years of service

Normal Retirement Benefits:
Age 60 or 30 years of service

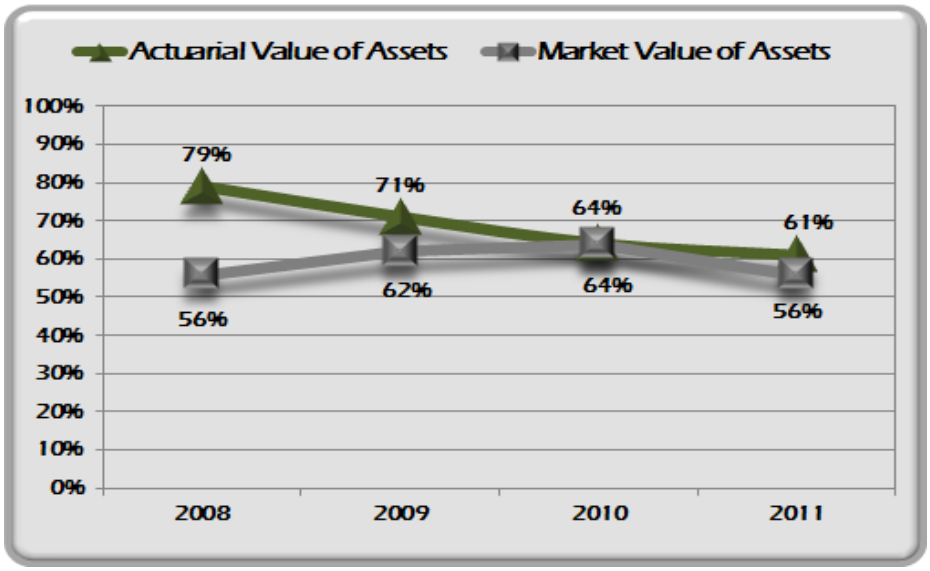
Social Security Coverage: Yes

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7%

BRIDGETON EMPLOYEES RETIREMENT PLAN

- Rate of return on investments equaled 0.1% (Market) and 8.3% (Actuarial) vs. assumed 7.5%
- Investment gains/losses are smoothed over a 3 year period.
- Open 30 year period for amortization of unfunded liabilities
- Actuary notes reasons for increase in contribution requirements are mortality assumption change and *"actual City contributions falling short of target contributions."*
- Employees do not make a payroll contribution to this plan.
- The Employer has not met the ARC since 2008.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$1,745,905	N/A	
2011	$1,529,511	$900,000	59%
2010	$1,400,936	$900,000	64%
2009	$1,165,675	$900,000	77%
2008	$970,865	$971,000	100%

As of 12/31/11

Market Value: $20,075,554
Actuarial Value: $21,771,133
AAL: $35,608,949

MEMBERSHIP:
Active: 131 **Inactive:** 131

BENEFITS:
Normal Retirement Formula:
2% of compensation times years of service

Normal Retirement Benefits:
Age 60 with 5 years of service

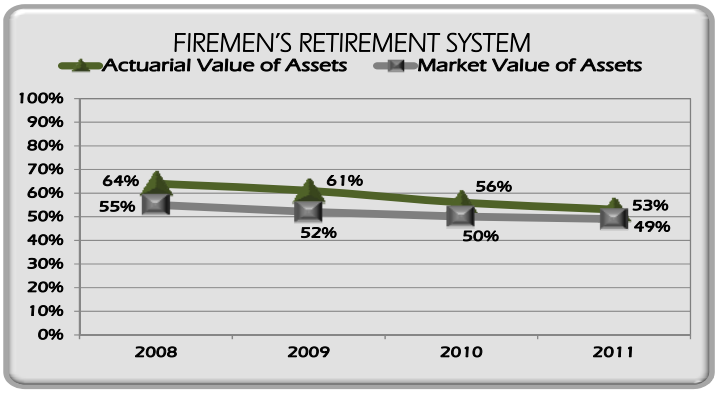
Social Security Coverage: Yes

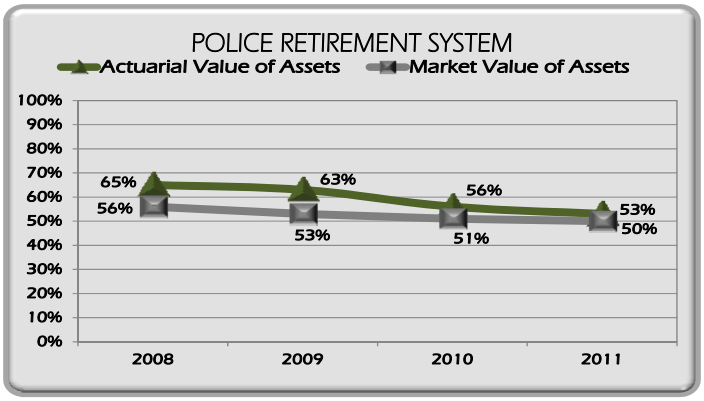
COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 4.5%

COLUMBIA FIREMEN & POLICE RETIREMENT SYSTEMS

- The Fire & Police plans are comingled for investment purposes. Rate of return on investments equaled 1.1% (Market) & -0.8% (Actuarial) vs. 7.5% assumed.
- Investment gains/losses are smoothed over a 4 year period.
- A new tier of provisions were passed for employees hired on or after October 1, 2012. These provisions include, but are not limited to, modified age and service requirements for retirement eligibility, modified benefit multiplier with no retiree COLA, fire member contribution reduced to 4% of pay, and automatic survivor benefit replaced with a survivor option at retirement with member's reduced benefit. New tier provisions estimated to produce in excess of $40 million savings over 20 years.
- Plan assumptions were modified in the 9/30/10 valuation with the assumed investment return reduced to 7.5% (from 8%), the payroll growth reduced to 3.5% (from 4%), the amortization period changed to a closed 30 year period (beginning with 9/30/09 valuation) from closed19 years and a 25% market value corridor was adopted.
- Fire Employees contribute 16.32% of payroll and do not participate in Social Security.
- Police employees contribute between 7.45% & 8.35% of payroll and do participate in Social Security.
- The employer continues to meet the ARC.





	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
10/11	$3,598,322	$3,598,322	100%
09/10	$3,330,409	$3,330,409	100%
08/09	$3,098,617	$3,098,617	100%
07/08	$2,853,109	$2,853,109	100%
06/07	$2,759,165	$2,759,165	100%

	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
10/11	$3,033,164	$3,033,164	100%
09/10	$2,693,152	$2,693,152	100%
08/09	$2,549,967	$2,549,967	100%
07/08	$2,520,373	$2,520,373	100%
06/07	$2,401,908	$2,401,908	100%

Market Value: $ **$49,132,603**
Actuarial Value: **$53,951,012**
AAL: **$101,338,847**

MEMBERSHIP: **Active:** 127 **Inactive:** 128

Normal Retirement Formula:
3.5% of compensation for first 20 years + 2% for next 5 years
Maxi 80% of compensation; 2% of compensation < 20 years

Normal Retirement Benefits:
Age 65 or 20 years of service

COLA:
Annual Amount Max: 2%

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 3.5%

Market Value: **$34,434,113**
Actuarial Value: **$36,776,070**
AAL: **$69,262,789**

MEMBERSHIP: **Active:** 149 **Inactive:** 144

Normal Retirement Formula:
3% of compensation for first 20 years + 2% for next 5 years
Maximum: 70% of compensation

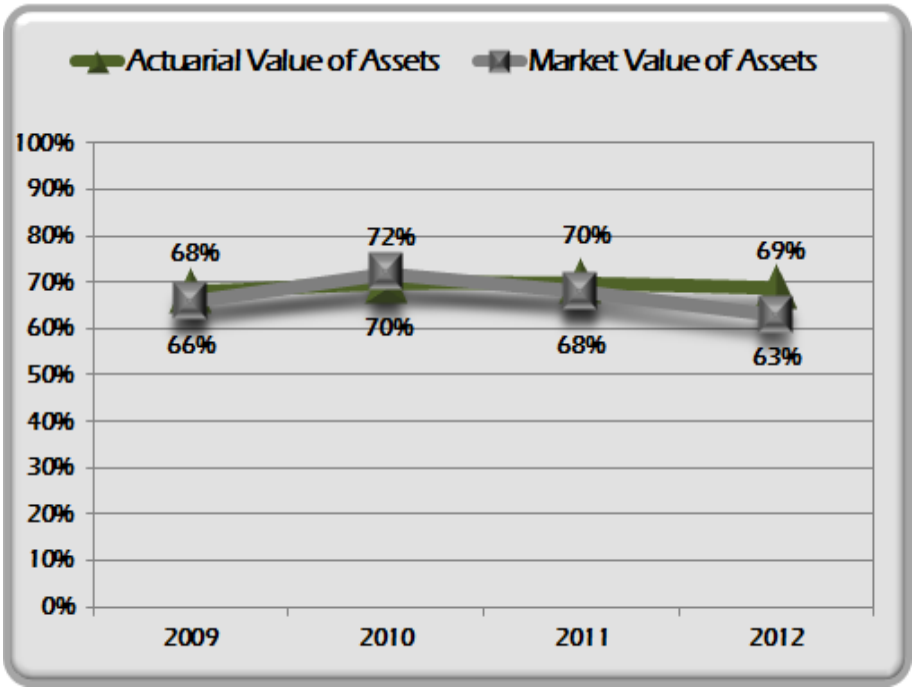
Normal Retirement Benefits:
20 years of service, or age 65

COLA:
Annual Amount Max: 0.6%

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 3.5%

COUNTY EMPLOYEES RETIREMENT FUND

- Rate of return on investments equaled 0.18% (Market) and 2.93% (Actuarial) vs. 8% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Unfunded Actuarial Accrued Liabilities are amortized over a 20 year period as of 7/1/11.
- CERF was established in 1994 and is funded through county contributions of fee and penalty revenue.
- Employees contribute for those members hired on or after February 25, 2002 equal 6% of pay (Non-LAGERS members) and 4% of pay (LAGERS members).
- The actuary notes "the decrease [in the ARC] is due to a fresh start of the amortization of the unfunded actuarial accrued liability over a 20 year period starting 7/1/11."
- Plan year's 1995 and 1998 notwithstanding, the Employer has met or exceeded the ARC with the exception of plan year ending 6/30/11.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
11/12	$18,706,575	N/A	-
11/12	$17,486,046	19,953,174	114%
10/11	$19,872,429	$19,440,212	98%
09/10	$19,095,323	$19,815,866	104%
08/09	$16,011,408	$19,994,180	125%

As of 12/31/11 & 7/1/12

Market Value: $305,724,131
Actuarial Value: $331,189,281
AAL: $482,565,132

MEMBERSHIP:
Active: 10,987 **Inactive:** 5,545

BENEFITS:
Normal Retirement Formula:
$29 times years of service
Greater of Flat Dollar formula, TRR formula-Social Security offset, or Prior Plan formula.

Normal Retirement Benefits:
Age 62 with 8 years of service

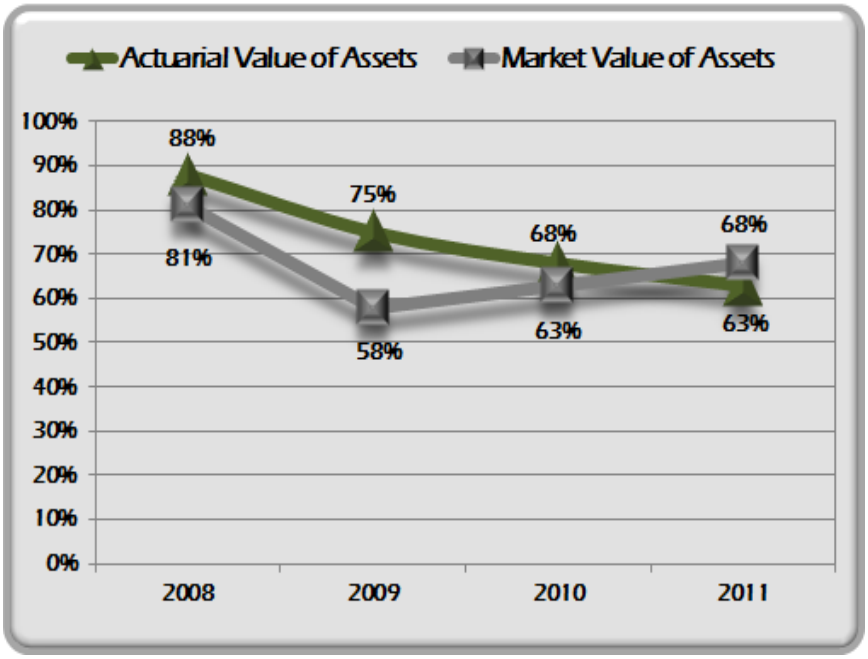
Social Security Coverage: Yes

COLA: Annual Amount Maximum: 1%
'CAP'-Total Maximum: 50%
Percent of CPI: 100%

ACTUARIAL ASSUMPTIONS:
Interest: 8% **Salary:** 3%

CREVE COEUR EMPLOYEES RETIREMENT PLAN

- Rate of return on investments equaled 19.6% (Market) & 2.95% (Actuarial) vs.7.5%assumed.
- Investment gains/losses are smoothed in over a 3 year period.
- Unfunded Actuarial Accrued Liabilities are amortized over an open 15 year period.
- Investment assumption reduced from 8% to 7.5% and salary assumption reduced from 5.5% to 5.0% in 2009.
- Mortality tables updated resulting in approximately $2.1 million increase in plan liability and approximately $260,000 increase to annual cost.
- This plan is closed to new employees hired after June 1, 2006. Those new employees participate in the City's defined contribution plan.
- Employee payroll contributions are being phased in beginning 07/01/11 at 1% with annual increases of .5% until the contribution rate meets 3%.
- Employer has consistently met or exceeded the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$1,339,314	N/A	-
2011	$1,179,145	$1,225,000	104%
2010	$1,004,897	$1,057,900	105%
2009	$675,394	$757,900	112%
2008	$609,164	$642,000	105%

As of 6/30/11

Market Value:	$16,439,756
Actuarial Value:	$15,103,368
AAL:	$24,150,315

MEMBERSHIP:
Active: 66 **Inactive:** 87

BENEFITS:
Normal Retirement Formula:
2% of compensation times years of service; or
1.7% of compensation times years of service, plus
3% employer contribution to DC Plan;
Maximum: 30 years of service

Normal Retirement Benefits:
Age 65 with 8 years of service, or Rule of 85
Uniformed: Age 55

Social Security Coverage: Yes

COLA: Ad Hoc COLA

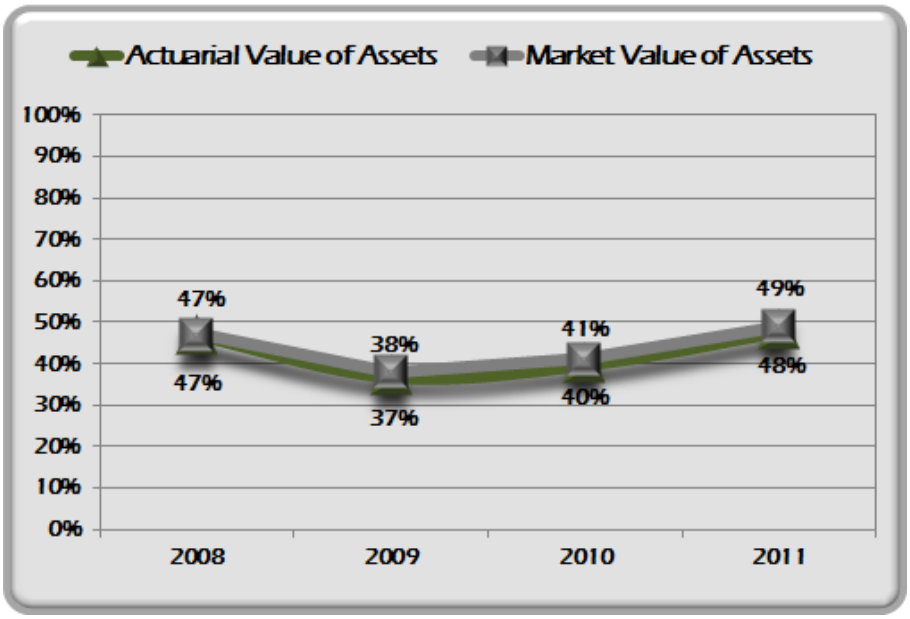
ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 5%

Deferred Retirement Option Plan

Defined Benefit Plan Closed June 2006

HANNIBAL POLICE & FIRE RETIREMENT PLAN

- The plan does not smooth investment gains/losses.
- Open 20 year period for amortization of unfunded liabilities.
- Actuary notes *"In recent years the city has been contributing less than the actuarial recommended contribution. Asset and liability gains have helped increase the funded status. The new policy increasing employee contributions while not decreasing the city's contribution rate will also help the Plan in its recovery. However, any continuation of less than adequate funding could decrease the funded status of the Plan to a point from which it would be impossible to recover."*
- Plan modifications effective 7/1/11 include: Increasing mandatory employee contributions from 9.5% of pay to 12%, 11.4% annual minimum City contribution will be modified to provide that the City's contribution will not be reduced unless the plan is determined to be at least 80% funded.
- Employee contribution of 12% of pay effective with plan year 2011 (from 9.5%). These members do not participate in Social Security.
- The employer has not met the ARC since fiscal year 2004.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$921,124	N/A	-
2011	$1,179,620	$1,101,663	93%
2010	$1,169,397	$935,435	80%
2009	$982,832	$803,329	82%
2008	$856,414	$678,725	79%

As of 6/30/11

Market Value:	$10,961,692
Actuarial Value:	$10,829,346
AAL:	$22,502,976

MEMBERSHIP:
Active: 75 **Inactive:** 63

BENEFITS:
Normal Retirement Formula:
65% of compensation for first 25 years of service, plus 1% for each of the next 5 years of service in excess of 25
Maximum: 70% of compensation

Normal Retirement Benefits:
Age 55, or 25 years of service

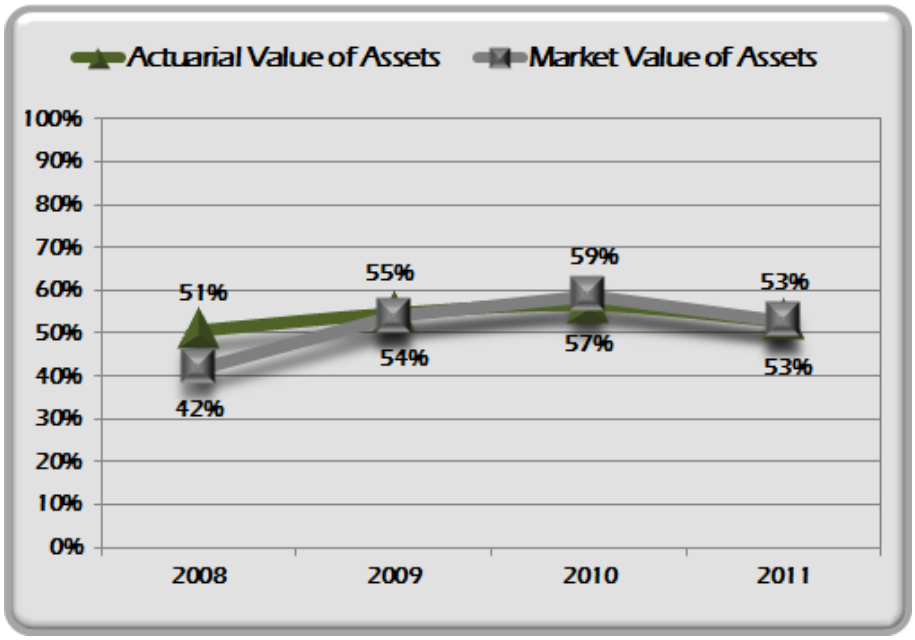
Social Security Coverage: No

COLA: Ad Hoc COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 4%

JOPLIN POLICE & FIRE PENSION PLAN

- Rate of return on investments equaled 2.3% (Market) and 6.7% (Actuarial) vs. 7% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Closed 30 year period as of 11/01/06 for amortization of unfunded liabilities.
- Modified plan assumptions including, but not limited to, mortality, inflation rate and retirement rates resulted in approximately $5 million increase in plan liabilities. These modifications were based on the most recent experience study.
- A new tier was implemented for those hired after 1/31/09 with provisions including normal retirement service of 25 years (from 20) and maximum benefit of 60% of compensation (from 65%).
- Employees contribute 18.08% of pay, which is refunded at retirement. Those hired under new benefit tier contribute10% of pay without refund.
- The City has agreed to make an additional payment of $950,000 and beginning each plan year as of 11/1/11 and after, the City's contribution shall be as calculated by the plan's actuary.
- The City exceeded the ARC in plan year 2011.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
11/12	$2,580,017	N/A	-
10/11	$2,214,118	$2,653,556	120%
09/10	$2,206,690	$1,797,683	81%
08/09	$2,169,744	$2,443,752	113%
07/08	$1,761,639	$1,201,804	68%

As of 10/31/11

Market Value:	$27,053,135
Actuarial Value:	$27,463,741
AAL:	$51,495,365

MEMBERSHIP:
Active: 182 **Inactive:** 144

BENEFITS:
Normal Retirement Formula:
Hired after 1/31/09: 2.2% of compensation for first 25 years of service, plus 1% for each of the next 5 years of service
Maximum: 60% of compensation

Normal Retirement Benefits:
Age 60 or 25 years of service

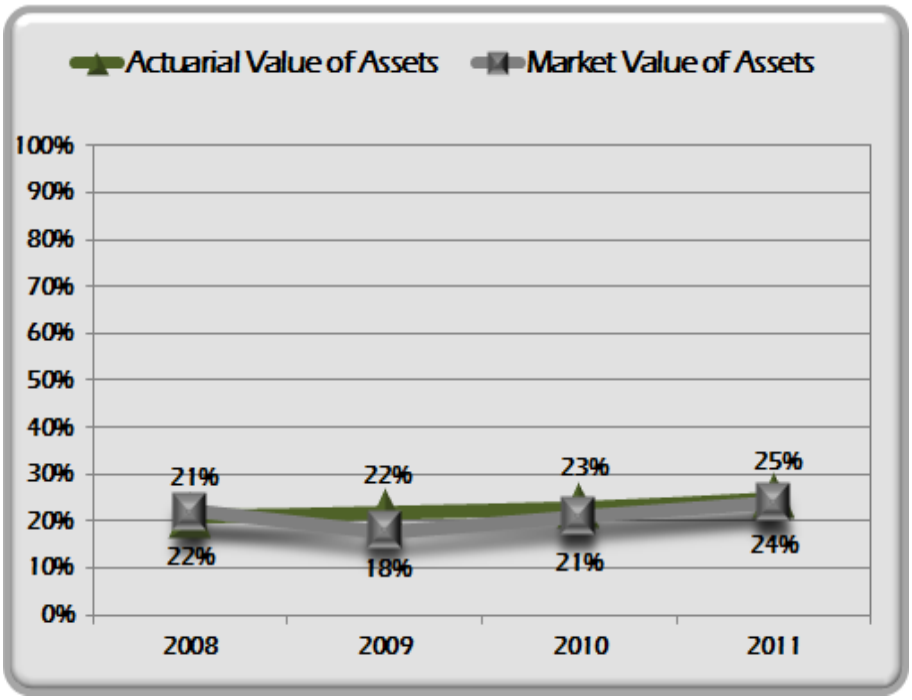
Social Security Coverage: No

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7% **Salary:** 2.5%

JUDICIAL RETIREMENT SYSTEM

- Rate of return on investments equaled 2.11% (Market) and 4.39% (Actuarial) vs. 8.0% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Open 30 year amortization of unfunded liabilities.
- New tier provisions were passed in 2010 requiring increased age and service requirements, as well as employee contributions for judges serving for the first time on or after 01/01/11.
- Modified plan assumptions including, but not limited to, investment return assumption from 8.5% to 8.0% and price inflation from 3.20% to 2.50%. These modifications were based on the most recent experience study.
- Prior to 1998, the plan was funded on a pay-as-you-go basis.
- Judges serving for the first time on or after 1/1/11 make a 4% of pay contribution.
- The Employer continues to meet the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
13/14	$29,000,000 (estimated)	N/A	-
12/13	$27,200,000 (estimated)	N/A	-
11/12	$26,324,526	$26,324,526	100%
10/11	$27,762,640	$27,702,682	100%
09/10	$27,029,198	$27,029,198	100%

As of 6/30/12

Market Value: $ 99,837,257
Actuarial Value: $102,266.706
AAL: $413,332,538

MEMBERSHIP:
Active: 399 **Inactive:** 531

BENEFITS:
Normal Retirement Formula:
Less than 12 years of service: 4.17% of compensation times years of service; More than 12 years: 50% of compensation

Normal Retirement Benefits:
Age 62 with 12 years of service; Age 60 with 15 years of service; Age 55 with 20 years of service

Serving for first time on or after 01/01/11:
Age 67 with 12 years of service, or
Age 62 with 20 years of service

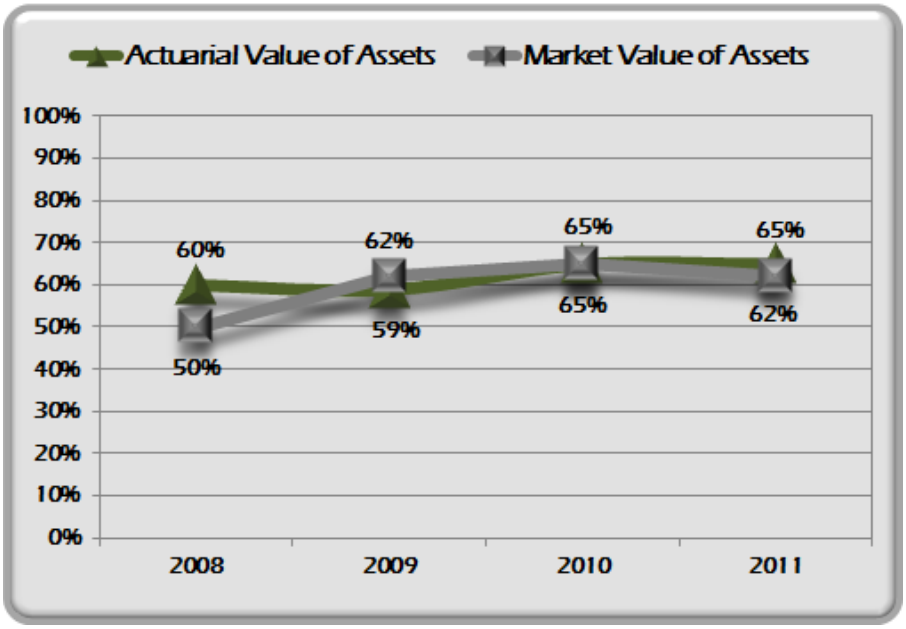
Social Security Coverage: Yes

COLA: Annual Amount Maximum: 5%
Percent of CPI: 80%

ACTUARIAL ASSUMPTIONS:
Interest: 8.5% **Salary:** 4%

KANSAS CITY TRANSPORTATION AUTHORITY UNION EMPLOYEES PENSION PLAN

- Rate of return on investments equaled –1.65% (Market) & 5.67% (Actuarial) vs. 7.5% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Open 30 year amortization of unfunded liabilities.
- Unfunded liability decreased primarily due to experience gain 1% from salary increases being less than assumed (4.25%).
- Employees contribute 3.75% of pay, increased from 3.25% in 2007.
- The Employer contributes 7.5% of pay and met the ARC in 2011.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$2,480,677	N/A	-
2011	$1,938,621	$2,051,349	106%
2010	$2,370,772	$2,073,236	87%
2009	$2,422,138	$2,115,271	87%
2008	$1,803,128	$2,136,311	118%

As of 01/01/12

Market Value:	$35,340,551
Actuarial Value:	$36,766,718
AAL:	$56,743,316

MEMBERSHIP:
Active: 556 **Inactive:** 250

BENEFITS:
Normal Retirement Formula:
1.28% of compensation times years of service

Normal Retirement Benefits:
Age 62 with 10 years of service
Age 60 with 30 years of service

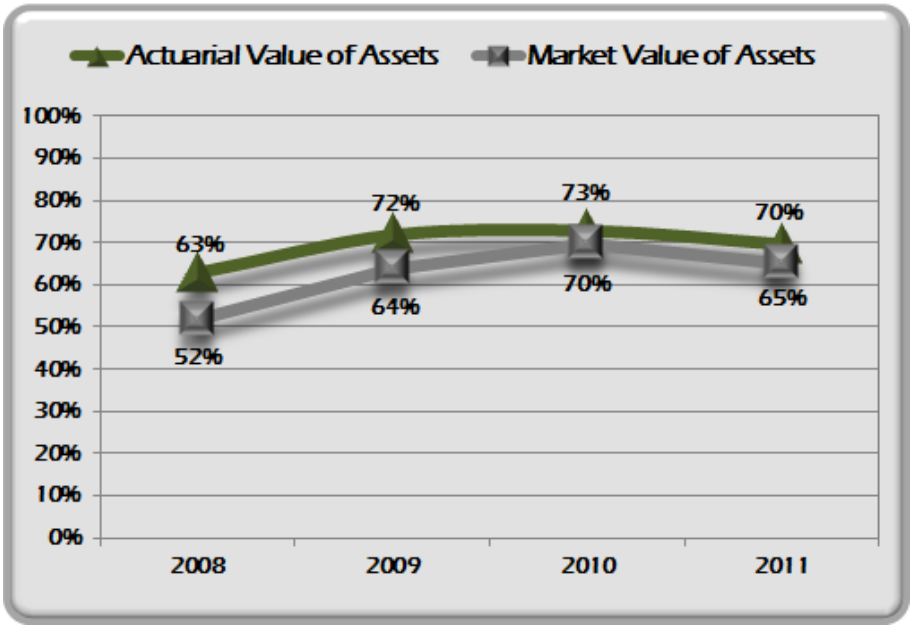
Social Security Coverage: Yes

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 4.25%

LADUE POLICE & FIRE RETIREMENT PLAN

- Rate of return on investments equaled 2.2% (Market) and –0.7% (Actuarial) vs. 7.5% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Open 20 year period amortization of Unfunded Actuarial Accrued Liabilities.
- The plan decreased the assumed investment rate of return assumption from 8.5% in PY01 to 8% in PY02 to 7.75% in PY03 and 7.5% in 2010.
- Proposed modifications to the plan include: Exclusion of lump sum cash-out of unused vacation and sick leave from retirement calculations, reduction of benefit maximum from 65% of compensation to 60% for new members, increase of employee contributions from 3% to 4.5% in 2013 and from 4.5% to 6.0% in 2014.
- Employees contribute 3% of pay. These members do not participate in Social Security.
- The Employer has consistently met or exceeded the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$1,182,728	N/A	=
2011	$1,100,673	$1,100,673	100%
2010	$1,092,786	$1,692,786	155%
2009	$1,255,382	$2,255,382	180%
2008	$1,055,357	$2,240,000	212%

As of 12/31/12

Market Value:	$21,460,433
Actuarial Value:	$22,949,675
AAL:	$32,858,944

MEMBERSHIP:
Active: 57 **Inactive:** 55

BENEFITS:
Normal Retirement Formula:
2% of compensation for first 20 years of service, plus 2.5% for each of the next 10 years of service
Maximum: 65% of compensation

Normal Retirement Benefits:
Age 55 with 10 years of service

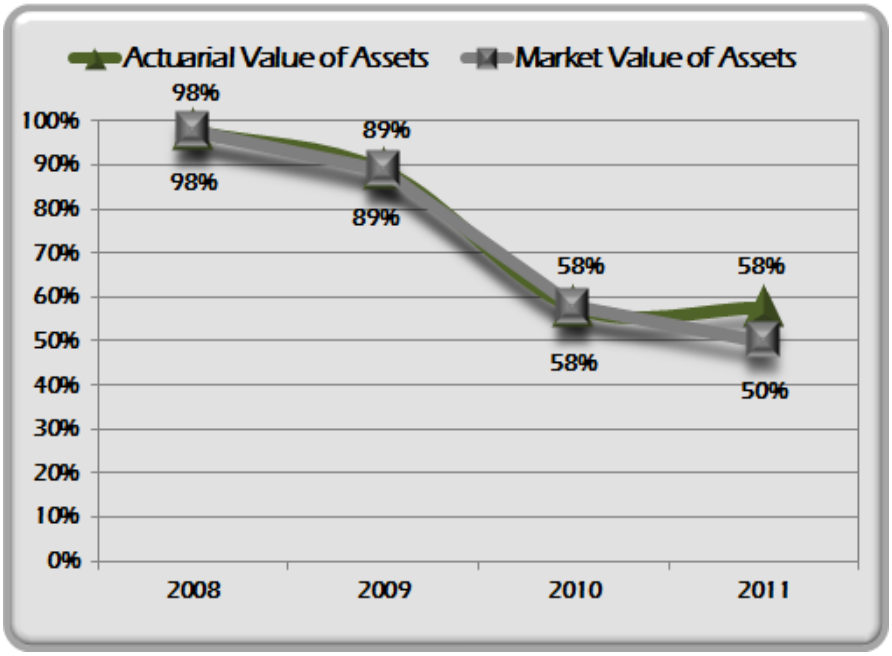
Social Security Coverage: No

COLA: Annual Amount Maximum: 2%
'CAP'-Total Maximum: 20%
Percent of CPI: 100%

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 4.75%

MEHLVILLE FIRE PROTECTION DISTRICT DEFINED BENEFIT PLAN

- Rate of return on investments equaled 0.05% (Market) vs. 5% assumed.
- Plan does not smooth investment gains/losses.
- Plan was closed in 2006 and a defined contribution plan was established for District employees.
- Unfunded Actuarial Accrued Liabilities amortized over a 20 year period as of 2011.
- According to the actuarial valuation, the IRS, in a Determination letter dated June 11, 2010 approved the Plan's termination. The Plan's assets and liabilities have yet to be fully settled as part of that termination as of 1/1/13.
- Interest rate assumption decreased from 7.5% to 5.0% in 2010.
- Biennial Valuation is performed on this plan with another valuation due as of 01/01/13.
- Employees do not make a payroll contribution to this plan.
- The employer has not made a contribution to the plan since 2006.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2011	$426,969	$0	0%
2010	$35,435	$0	0%
2009	$35,435	$0	0%
2008	$110,715	$0	0%
2007	$1,681,820	$0	0%

As of 1/1/11 & 12/31/11

Market Value:	$ 6,644,743
Actuarial Value:	$ 7,786,626
AAL:	$13,373,649

MEMBERSHIP:
Active: 0 **Inactive:** 32

BENEFITS:
Normal Retirement Formula:
2.625% of compensation for each of the first 27 years of service, plus 1% for each additional year
Maximum: 75% of compensation
Temporary Supplemental Benefit: $500 per month from age 58 until Social Security eligibility

Normal Retirement Benefits:
Age 58 with 5 years of service

Social Security Coverage: Yes

COLA: 'CAP'-Total Maximum: 3%

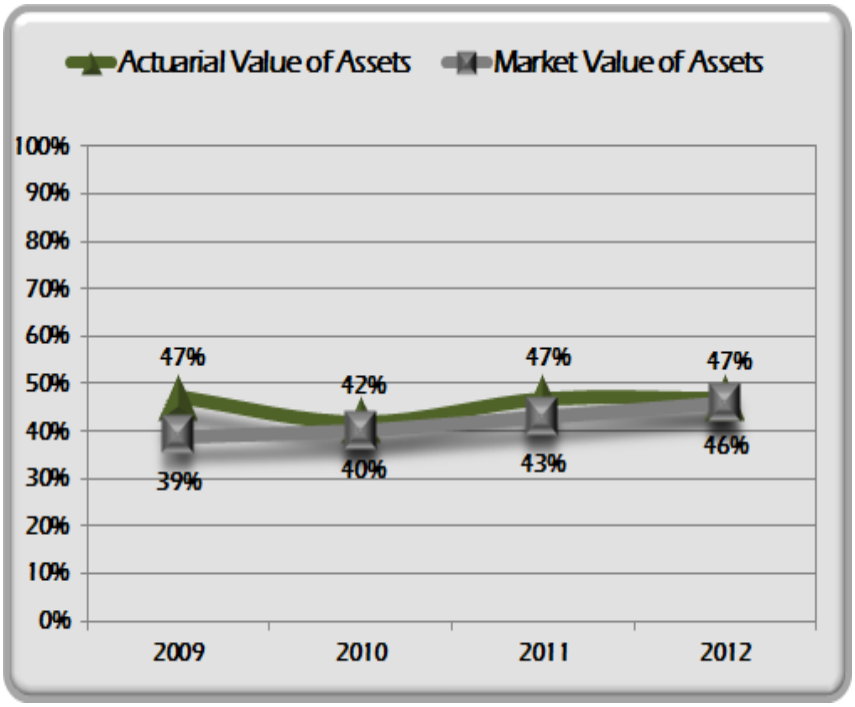
ACTUARIAL ASSUMPTIONS:
Interest: 5.0%

Defined Contribution Plan

Defined Benefit Plan frozen effective 3/31/06

MoDOT & PATROL EMPLOYEES RETIREMENT SYSTEM

- Rate of return on investments equaled 2.82% (Market) and 11.46% (Actuarial) vs. 8.25% assumed.
- Investment gains/losses are smoothed over a 3 year period.
- New tier provisions were passed in 2010 requiring increased age and service requirement, increased vesting period and employee contributions for employees hired for the first time on or after 01/01/11. As of 06/30/12, 178 members were covered under this new 2011 tier.
- Closed 12 year period amortization of unfunded retiree liabilities and closed 27 year period amortization for the remaining unfunded liabilities.
- Provisions passed to address asset transfer associated with reciprocal service provisions between MPERS and MOSERS.
- Employees hired for the first time on or after 1/1/11, contribute 4% of pay.
- The Employer continues to meet the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
13/14	$184,188,191 (estimated)	N/A	-
12/13	$190,985,228 (estimated)	N/A	-
11/12	$164,884,467	$164,884,467	100%
10/11	$149,952,750	$149,952,750	100%
09/10	$124,476,706	$124,476,706	100%

As of 6/30/12

Market Value:	**$1,538,652,956**
Actuarial Value:	**$1,531,033,613**
AAL:	**$3,306,278,671**

MEMBERSHIP:
Active: 7,458 **Inactive:** 10,080

BENEFITS:
Normal Retirement Formula:
MSEP 2000: 1.7% of compensation times years of service, plus .8% to Age 62 (under Rule of 80)

Normal Retirement Benefits:
Age 62 with 5 years service, or Rule of 80 (Age 48)
Uniformed Patrol: Mandatory retirement at Age 60
Hired for first time on or after 01/01/11: Age 67 w 10 years service, or Rule of 90 (Age 55)
Uniformed Patrol: Age 55 with 10 years service

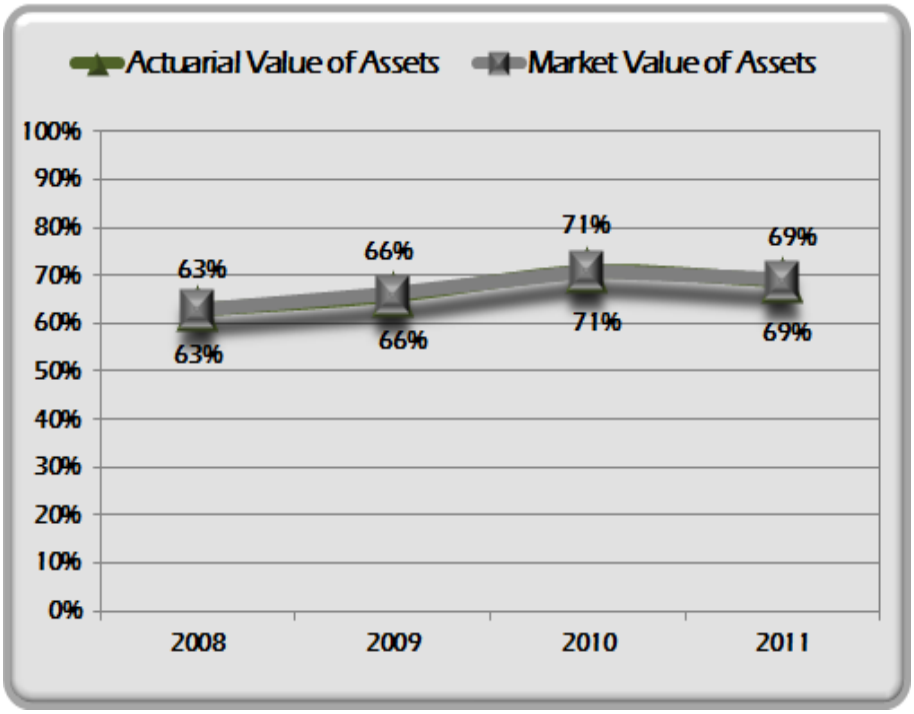
Social Security Coverage: Yes

COLA: Annual Amount Maximum: 5%
Percent of CPI: 80%

ACTUARIAL ASSUMPTIONS:
Interest: 8.25% **Salary:** 3.75%

OLIVETTE SALARIED EMPLOYEES' RETIREMENT

- Rate of return on investments equaled 1.3% (Market) vs 7.25% assumed.
- Investment gains/losses are not smoothed.
- Open 30 year period amortization of Unfunded Actuarial Accrued Liabilities.
- Benefit Multiplier reduced in 2005 from 2.1% to 2%.
- Plan amended to increase the Normal Retirement Age from age 55 to age 58 and to remove COLA for all new retirees effective 01/01/10. Salary assumption was also reduced from 5.25% to 4.50%.
- Actuary notes, "*funds anticipated to be received for 2012 are significantly insufficient to cover the recommended contribution. This makes the Plan very reliant on investment earning, or additional City contributions.*"
- Employees contribute 5% of pay to plan
- The Employer has not met the ARC since 2008.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
12/13	$910,106	N/A	-
11/12	$746,869	$550,099	74%
10/11	$841,972	$678,723	81%
09/10	$937,182	$452,710	48%

As of 6/30/11

Market Value:	$15,737,391
Actuarial Value	$15,737,391
AAL:	$22,846,063

MEMBERSHIP:
Active: 46 **Inactive:** 70

BENEFITS:
Normal Retirement Formula:
2.0% of compensation times years of service

Normal Retirement Benefits:
Age 58 with 5 years of service

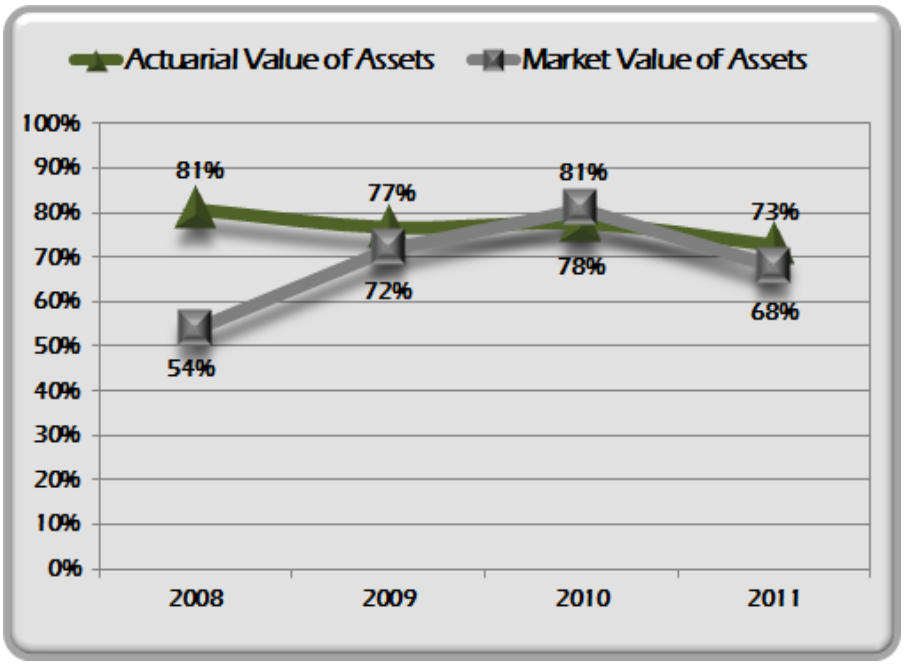
Social Security Coverage: Yes

COLA: Annual Amount Maximum: 2%
'CAP'-Total Maximum: 25%
Retirements after 1/1/10 receive no COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.25% **Salary:** 4.50%

PATTONVILLE-BRIDGETON FIRE PROTECTION DISTRICT RETIREMENT PLAN

- Rate of return on investments equaled –7.36% (Market) vs. 7.75% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- This plan uses the Aggregate Cost Method in which the cost of benefits is equal to the normal cost of the plan. This method does not produce an unfunded liability.
- Plan amended to change normal retirement date from age 55 to age 57. Any member that is age 50 or older as of 01/01/13 will not be impacted by change.
- Employees do not make a payroll contribution to this plan and do participate in Social Security. Plan amendment provides for an employee contribution starting 01/01/13 of 1% and increasing to 2% on 01/01/14.
- The Employer has not met the ARC since 2008.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$1,864,539	N/A	-
2011	$1,508,516	$1,180,000	78%
2010	$1,435,394	$1,357,000	95%
2009	$1,287,891	$955,000	74%
2008	$1,182,140	$1,387,000	117%

As of 1/1/12

Market Value: $20,043,747
Actuarial Value: $21,436,339
AAL: $29,320,624

MEMBERSHIP:
Active: 61 **Inactive:** 28

BENEFITS:
Normal Retirement Formula:
50% of compensation reduced for service less than 20 years (25 years if hired after 11-26-07)Supplemental benefit from 55 to 62: 20% of compensation

Normal Retirement Benefits:
Uniformed: Age 55 with 5 years of service
Non-Uniformed: Age 62 with 5 years of service

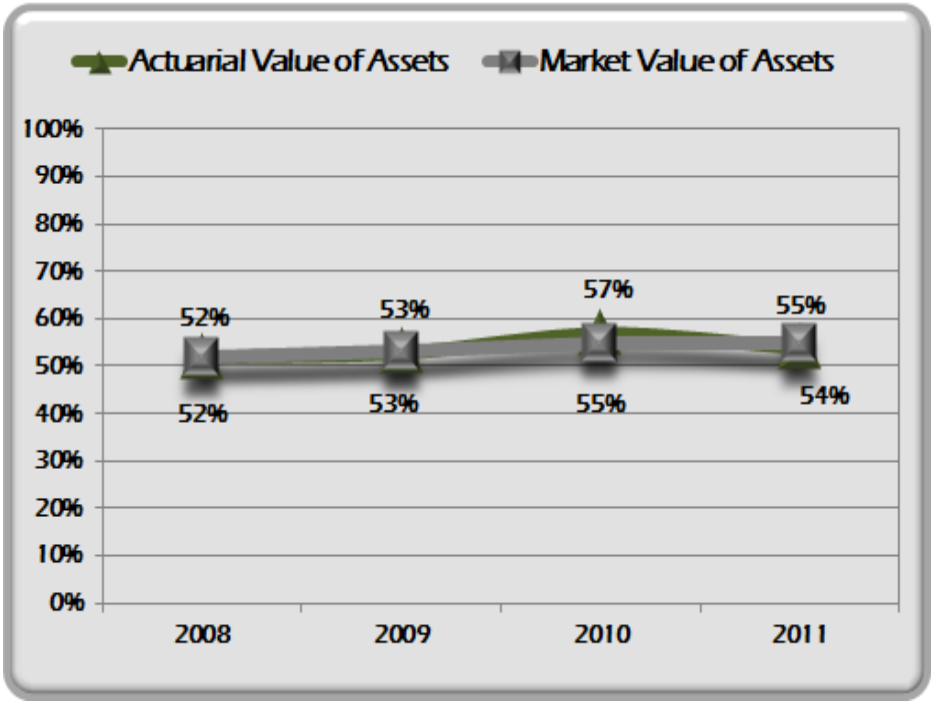
Social Security Coverage: Yes

COLA: Annual Amount Minimum: 1%
Ad Hoc COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.75% **Salary:** 2.5%

RAYTOWN POLICE OFFICERS' RETIREMENT FUND

- Plan experienced a less than favorable than expected plan year due to investment losses.
- Plan does not smooth investment gains/losses.
- Closed 30 year period amortization of Unfunded Actuarial Accrued Liabilities.
- An Employee contribution of 3% of pay was ceased in 2000 when the Plan was 101% funded.
- The actuary notes *"The Plan has been making progress toward a safe funding level. Asset gains in 2009 and 2010 continue to help offset losses from 2008. Losses from 2011 have caused the funded status to drop slightly and the recommended contribution to increase accordingly. The City policy to contribute the recommended contribution will allow the funded status to continue to improve."*
- The City exceeded the ARC for plan year 2011.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$678,787	N/A	-
2011	$616,618	$637,728	103%
2010	$865,591	$614,745	71%
2009	$685,030	$278,854	41%
2008	$501,472	$1,115,415	222%

As of 12/31/11

Market Value: $ 8,910,693
Actuarial Value: $ 8,765,297
AAL: $16,326,706

MEMBERSHIP:
Active: 48 Inactive: 31

BENEFITS:
Normal Retirement Formula:
2.5% of compensation for first 20 years of service, plus 1% for each of the next 10 years of service

Normal Retirement Benefits:
Age 55 with 20 years of service

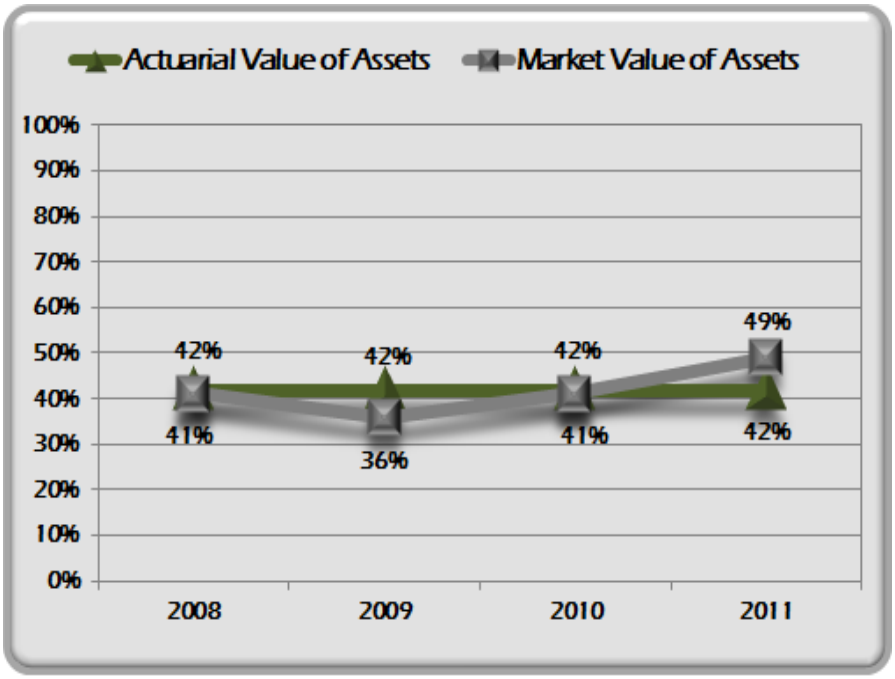
Social Security Coverage: Yes

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% Salary: 4%

ROCK HILL UNIFORMED PENSION PLAN

- This plan was closed to new employees effective May 2003.
- All active participants as well as new hires are members of LAGERS as of 09/2007.
- After multiple years of the employer not making a contribution to this plan, contributions have resumed to this plan. However, contributions for FY08 & FY09 did not meet the ARC.
- Employees do not make a payroll contribution to this plan.
- Plan does not smooth investment gains/losses.
- The employer has not met the ARC since 2007.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2011	$293,522	$213,226	73%
2010	$293,522	$280,000	95%
2009	$260,954	$142,000	54%
2008	$260,954	$237,000	91%

As of 3/31/12 & 5/1/10

Market Value:	$1,659,546
Actuarial Value :	$1,420,031
AAL:	$3,418,536

MEMBERSHIP:
Active: 10 **Inactive:** 20

BENEFITS:
Normal Retirement Formula:
40% or 50% of compensation, reduced by 1/20 for each year less than 20, plus temporary benefit. Percentage based on age and years of service as of 4/30/03.

Normal Retirement Benefits:
Age 60 with 5 years of service

Social Security Coverage: Yes

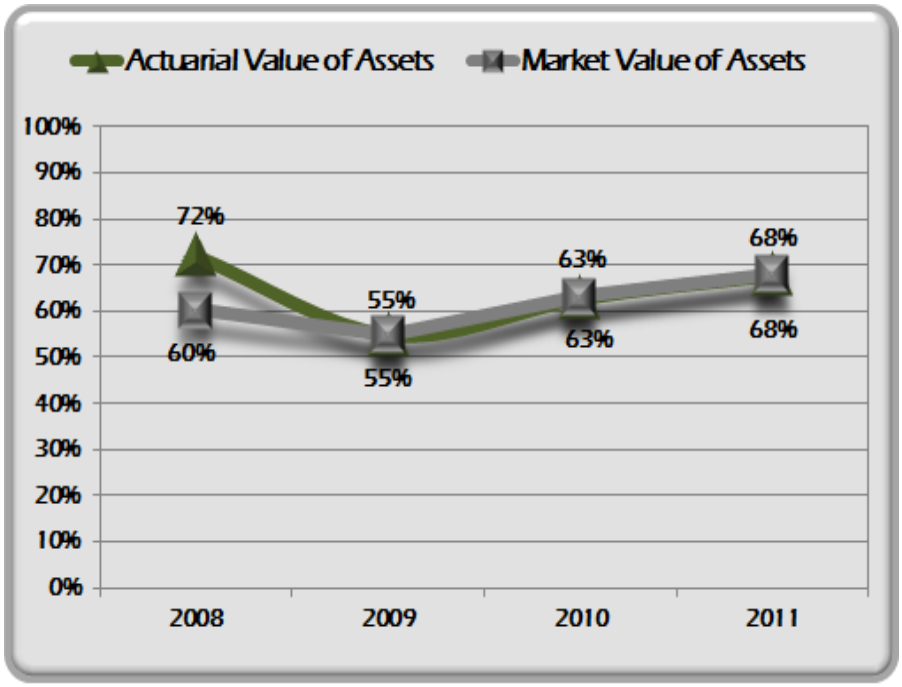
COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 6.0% **Salary:** 2.5%

Closed Plan effective October 2003

SALINE VALLEY FIRE PROTECTION DISTRICT RETIREMENT PLAN

- Rate of return on investments equaled –2.62% (Market) vs. 7.0% assumed.
- Plan does not smooth investment gains/losses.
- Lump sum option was removed from plan in 2010.
- This plan is a result of a merger between the Springdale FPD & Shady Valley FPD.
- The District also maintains a defined contribution for its employees.
- Employees do not make a payroll contribution to this plan.
- The Employer has met or exceeded the ARC since 2009.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$123,649	N/A	-
2011	$127,202	$184,430	145%
2010	$138,816	$203,305	146%
2009	$150,010	$152,569	102%
2008	$66,557	$63,000	95%

As of 12/31/11

Market Value:	$1,032,893
Actuarial Value:	$1,032,893
AAL:	$1,522,478

MEMBERSHIP:
Active: 30 **Inactive:** 10

BENEFITS:
Normal Retirement Formula:
$90 per month times years of service
Maximum: 25 years

Normal Retirement Benefits:
Age 60 with 7 years of service

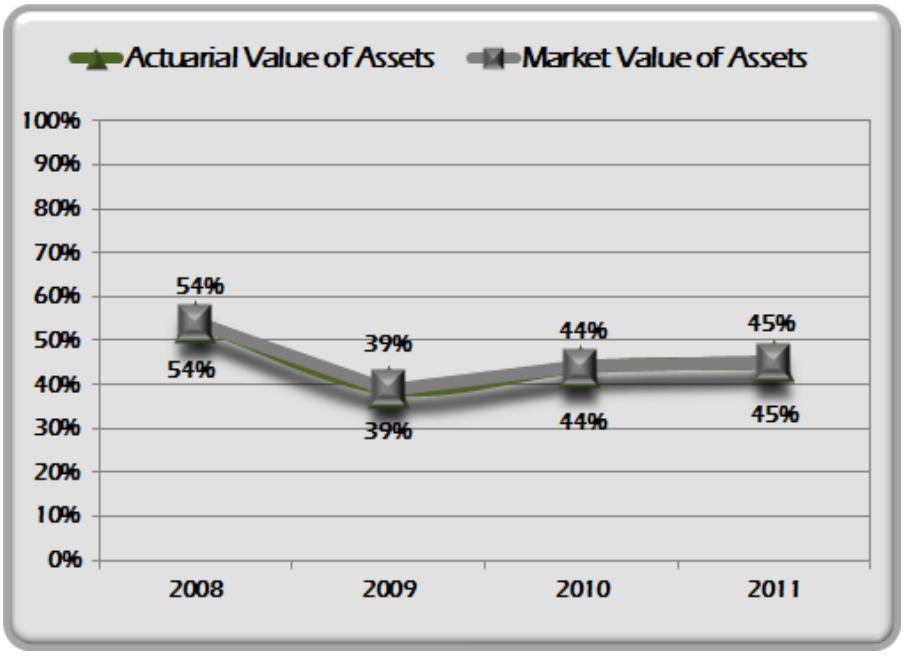
Social Security Coverage: Yes

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 7%

SEDALIA POLICE RETIREMENT FUND

- Rate of return on investments equaled 1.47% (Market) vs. 7.5% assumed.
- Plan does not smooth investment gains/losses.
- Unfunded Actuarial Accrued Liabilities amortized over a 28 year period as of 2011.
- Plan was frozen as of April 1, 2010, with no additional benefit accruals.
- Existing and new employees moved to LAGERS.
- Effective 4/1/10, Employee payroll contributions are not required.
- The employer continues to be deficient in meeting the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$364,705	$231,860	64%
2011	$429,331*	$222,527	52%
2010	$597,847	$221,579	37%
2009	$476,644	$213,378	45%
2008	$324,570	$186,446	57%

* estimate

As of 7/31/11 & 8/1/11

Market Value: $3,448,056
Actuarial Value: $3,448,056
AAL: $7,720,777

MEMBERSHIP:
Active: 36 **Inactive:** 40

BENEFITS:
Normal Retirement Formula:
2% of compensation times years of service
Maximum: 30 years

Normal Retirement Benefits:
Age 52 with 15 years of service

Social Security Coverage: Yes

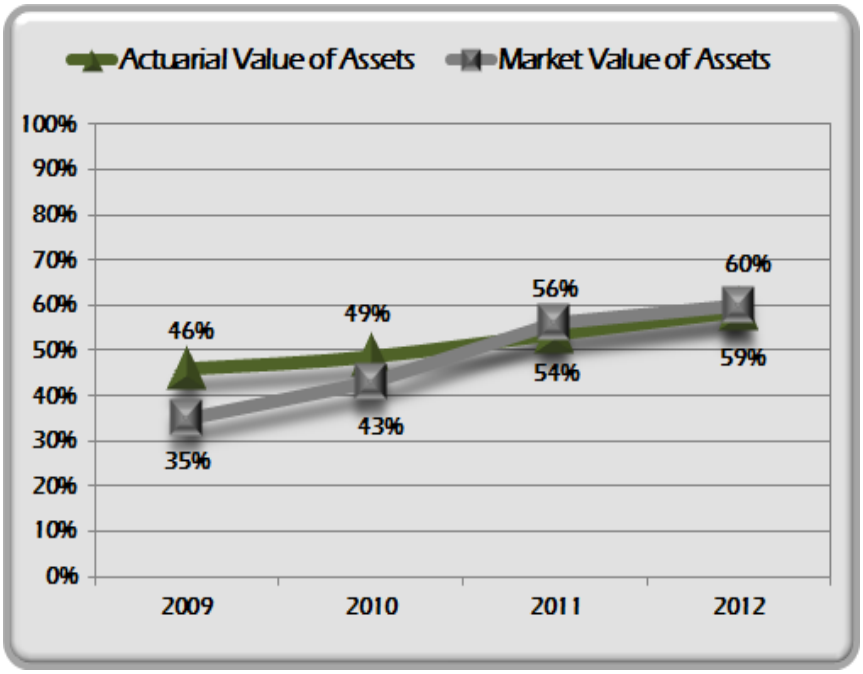
COLA: Annual Amount Maximum: 2%

ACTUARIAL ASSUMPTIONS:
Interest: 7.5%

Plan Frozen April 2010

SPRINGFIELD POLICE & FIRE RETIREMENT FUND

- Rate of return on investments equaled 0.6% (Market) and 4.3% (Actuarial) vs. 7.5% assumed.
- Investment gains/losses are smoothed over a 4 year period.
- A 3/4 cent sales tax passed in November 2009. Tax proceeds contributed $27.8 million to the plan for PYE 06/30/12 in addition to the City's contribution of 35% of pay. A renewal vote for this sales tax will be held in 2014.
- Plan is closed to new employees. Tier 2 members (hired after June 2006) and new employees were moved to LAGERS in 2010.
- Employees make a 13.35% payroll contribution to the plan.
- The Employer has exceeded the ARC since PYE 06/30/09.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
12/13	$17,900,638 (estimated)	N/A	-
11/12	$20,881,652	$35,726,586	171%
10/11	$12,972,229	$34,141,863	263%
09/10	$13,137,104	$31,916,852	243%
08/09	$13,273,246	$23,979,519	181%

As of 6/30/12

Market Value: $211,909,842
Actuarial Value: $211,406,045
AAL: $356,339,821

MEMBERSHIP:
Active: 373 **Inactive:** 506

BENEFITS:
Normal Retirement Formula:
2.8% of compensation times years of service;
Maximum: 70% of compensation

Normal Retirement Benefits:
Age 50 with 20 years of service, Age 60, or 25 years of service

Social Security Coverage: No

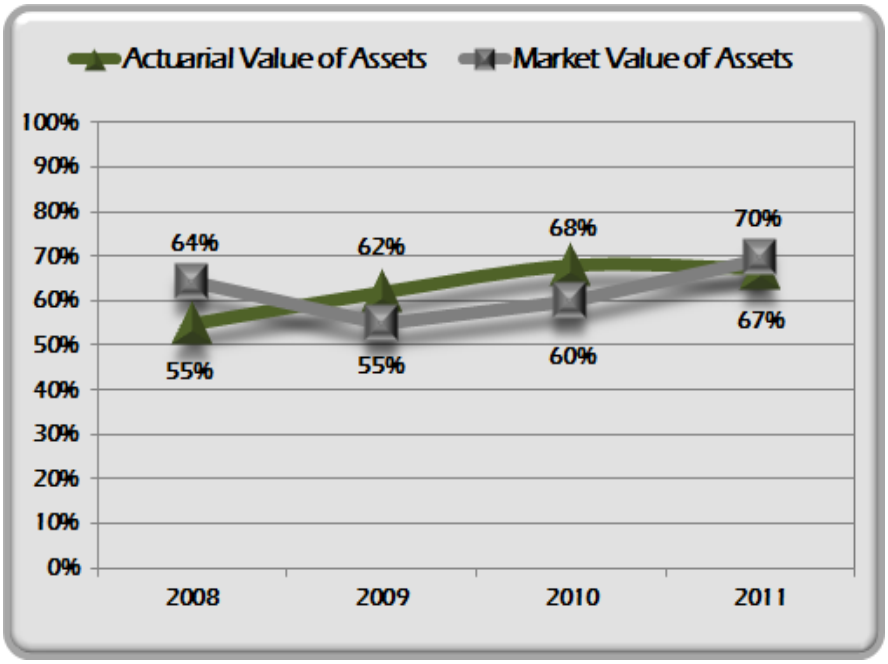
COLA: Annual Amount Maximum: 3%
Ad Hoc COLA if hired after 6/01/06

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** varies

Plan Closed January 31, 2010
Active members hired after 06/01/06 and new hires moved to LAGERS

ST. JOSEPH POLICEMEN'S PENSION FUND

- *"Overall experience during the year ending December 31, 2011, was less favorable than expected due mainly to investment losses. The plan experienced an asset loss of approximately $1,420,000. A liability gain of approximately $511,000 due mainly to salaries that were lower than expected slightly offset the asset loss for a net loss of $910,424 for the year ending December 31, 2011."*
- Plan does not smooth investment gains/losses.
- Open 20 year period amortization of Unfunded Actuarial Accrued Liabilities.
- Actuary notes, "*The Plan has been making progress toward a safe funding level. Asset and liability gains in 2009 and 2010 help offset losses from 2008, but the loss in the past year has created another small setback. The City policy to contribute the recommended contribution will allow the funded status to continue to improve.*"
- Employees contribute 4% of pay to this plan and do not participate in Social Security.
- The employer continues to meet the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
12/13	$1,695,008	N/A	-
11/12	$1,654,033	$1,766,672	107%
10/11	$1,780,276	$1,909,286	107%
09/10	$1,897,553	$1,742,423	92%
08/09	$1,444,388	$1,550,095	107%

As of 6/30/11 & 1/1/12

Market Value:	$27,991,972
Actuarial Value:	$27,093,193
AAL:	$40,267,507

MEMBERSHIP:
Active: 111 **Inactive:** 95

BENEFITS:
Normal Retirement Formula:
40% of compensation for first 20 years of service, plus 2% for each of the next 15 years
Maximum: 70% of compensation

Normal Retirement Benefits:
20 years of service

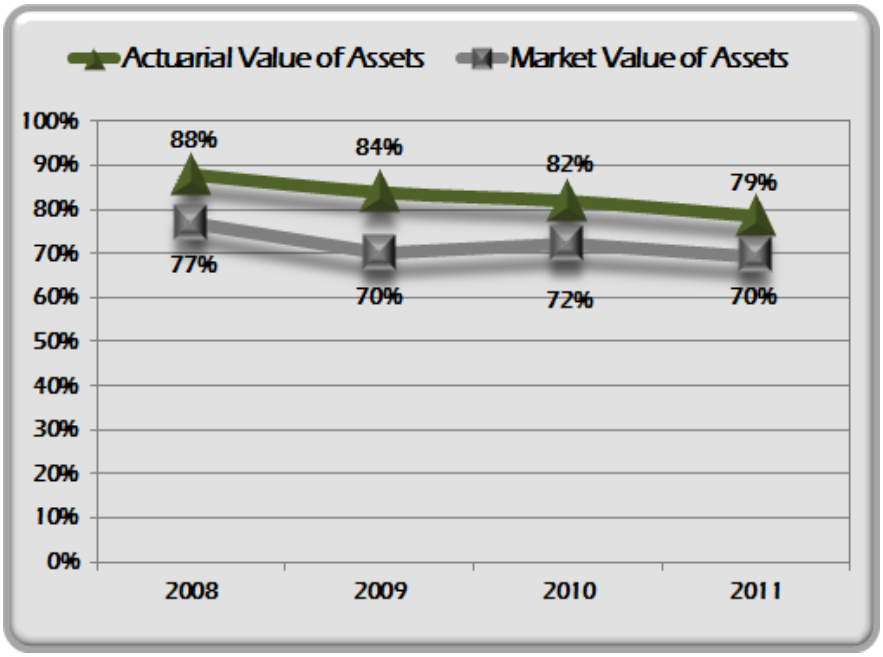
Social Security Coverage: No

COLA: Annual Amount Maximum: 4%
Percent of CPI: 50%

ACTUARIAL ASSUMPTIONS:
Interest: 7.5% **Salary:** 4%

ST. LOUIS EMPLOYEES RETIREMENT SYSTEM

- Rate of return on investments equaled 1.79% (Market) and 1.25% (Actuarial) vs. 8% assumed.
- Investment gains/losses are smoothed over a 5 year period.
- Open 30 year period amortization of unfunded actuarial accrued liabilities.
- A $12.7 million total gain was experienced on the liability side due to salary increases being less than expected, inactive mortality being lower than expected and participants not receiving the expected COLA.
- Employees do not make a payroll contribution to this plan. Employees participate in Social Security.
- The Employer has met or exceeded the ARC in plan years 2007 through 2009, otherwise the ARC has not been met.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$31,839,522	N/A	-
2011	$29,498,116	$29,293,854	99%
2010	$28,498,534	$27,116,763	95%
2009	$26,072,575	$27,252,035	105%
2008	$25,297,801	$30,350,011	120%

As of 9/30/11

Market Value: $585,586,728
Actuarial Value: $661,932,240
AAL: $841,763,321

MEMBERSHIP:
Active: 5,293 **Inactive:** 6,504

BENEFITS:
Normal Retirement Formula:
1.3% of compensation times years of service up to $59,268, plus 2.05% of compensation times years of service above $59,268

Normal Retirement Benefits:
Age 65 with 5 years of service, or Rule of 85

Social Security Coverage: Yes

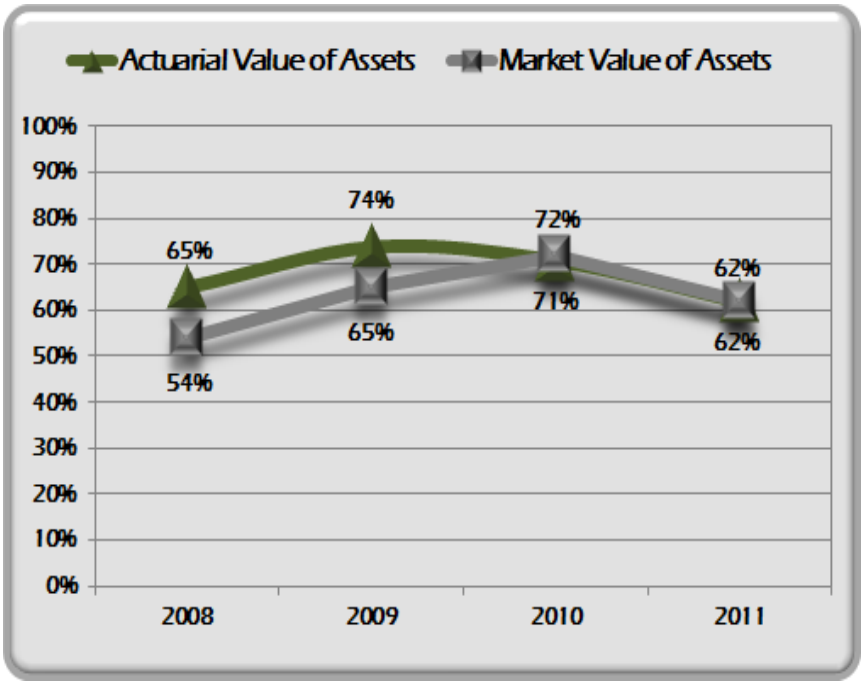
COLA: Annual Amount Maximum: 5%
'CAP'-Total Maximum: 25%
Percent of CPI: 100%

ACTUARIAL ASSUMPTIONS:
Interest: 8% **Salary:** varied

Deferred Retirement Option Plan (DROP)

ST. LOUIS COUNTY EMPLOYEES RETIREMENT PLAN

- Rate of return on investments equaled –0.6% (Market) and 0.3% (Actuarial) vs, 8% assumed.
- Investment gains/losses are smoothed over a 4 year period.
- Open 30 year period amortization of unfunded actuarial accrued liabilities.
- This plan maintains both uniformed and non-uniformed components.
- Mortality tables were updated, termination and retirement assumptions were modified in accordance with a 2012 study.
- Employees do not make a payroll contribution to this plan. Employees participate in Social Security.
- The Employer continues to meet the ARC.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$38,959,667	N/A	
2011	$30,949,913	$30,949,913	100%
2010	$29,106,006	$29,106,006	100%
2009	$32,848,970	$32,848,970	100%
2008	$27,245,017	$27,245,017	100%

As of 12/31/11

Market Value: $442,525,067
Actuarial Value: $446,677,546
AAL: $718,940,025

MEMBERSHIP:
Active: 3,881 **Inactive:** 3,656

BENEFITS:
Normal Retirement Formula:
General Employees: 1.5% of compensation times years of service, plus $15 per month times years of service
Uniformed: 1.6% of compensation times years of service, plus $30 per month times years of service to age 65, plus $5 per month times years of service

Normal Retirement Benefits:
General Employees: Age 65 with 3 years of service
Uniformed: Age 60 with 10 years of service, age 65 with 3 years of service, or Rule of 80

Social Security Coverage: Yes

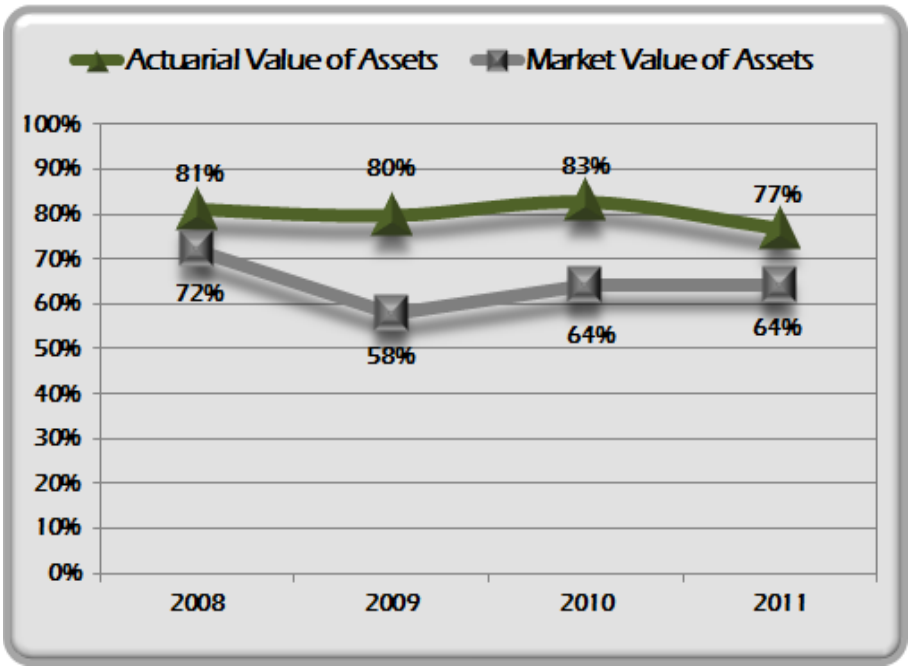
COLA: Ad Hoc COLA

ACTUARIAL ASSUMPTIONS:
Interest: 8% **Salary:** 4.5%

Partial Lump Sum Option

UNIVERSITY CITY NON-UNIFORMED EMPLOYEES RETIREMENT PLAN

- Rate of return on investments equaled 0.69% (Market) and 3.66% (Actuarial) vs. 6.5% assumed.
- Plan investment gains/losses utilize a smoothing period.
- Open 30 year period amortization of unfunded actuarial accrued liabilities.
- Mortality tables were updated increasing plan liabilities by approximately $725,000.
- Actuary notes, *"Unless the rate of return on the market value of assets exceeds the 6.5% assumed rate, the annual costs will continue to increase over the next few years."*
- Employees make a 3% payroll contribution to plan.
- The employer continues to make the ARC with the exception of 2009.



	RECOMMENDED CONTRIBUTION*	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2012	$645,975	N/A	-
2011	$568,943	$619,832	100%
2010	$591,057	$592,681	92%
2009	$524,594	$481,184	112%
2008	$500,477	$562,138	135%

Per City's 6/30/10 CAFR

As of 06/30/11 & 1/1/12

Market Value: $14,202,938
Actuarial Value: $17,114,841
AAL: $22,115,047

MEMBERSHIP:
Active: 135 **Inactive:** 90

BENEFITS:
Normal Retirement Formula:
1.6% of compensation times years of service, plus .50% above $41,000
Maximum: 35 years of service

Normal Retirement Benefits:
Age 65 with 10 years of service, or age 62 with 30 years of service

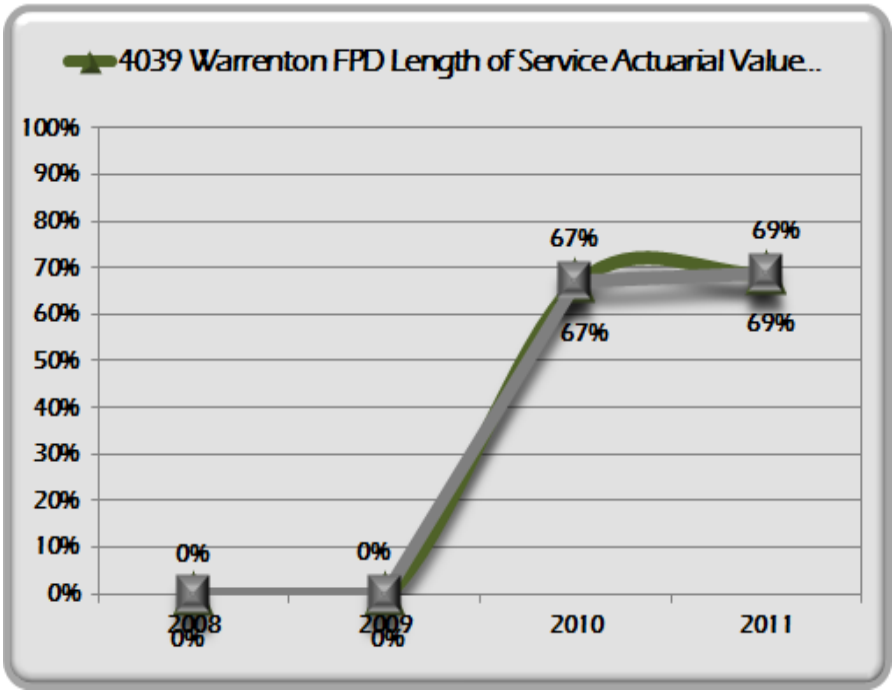
Social Security Coverage: Yes

COLA: Ad Hoc COLA

ACTUARIAL ASSUMPTIONS:
Interest: 6.5% **Salary:** 3%

WARRENTON FIRE PROTECTION DISTRICT
LENGTH OF SERVICE AWARDS PROGRAM

- This plan provides a pension benefit for volunteer members of the fire protection district.
- Plan was established in 1988.
- Plan began reporting to JCPER in 2011.
- Active members do not make a monetary contribution to the plan.
- District has made the full contribution in 2010 and 2011.



	RECOMMENDED CONTRIBUTION	ACTUAL CONTRIBUTION	PERCENT CONTRIBUTED
2011	$30,668	$32,064	105%
2010	$27,510	$28,850	105%

As of 12/31/11

Market Value:	$136,128
Actuarial Value:	$136,128
AAL:	$197,855

MEMBERSHIP:
Active: 25 **Inactive:** 8

BENEFITS:
Normal Retirement Formula:
$10 per month times years of service;
Maximum: $200 per month
Life annuity guaranteed for 10 years

Normal Retirement Benefits:
Age 65 with 1 year of service

Social Security Coverage: Yes

COLA: No COLA

ACTUARIAL ASSUMPTIONS:
Interest: 4.75%

Special Report

Reversal of Fortune: The Rising Cost of Public Sector Pensions and Other Post-Employment Benefits

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This report was prepared with the research assistance of Sahil Khera.

This report examines the potential credit impact of increasing defined-benefit pension funding requirements on governmental plan sponsors in the U.S. Included also is a discussion of the historical, legal, and accounting contexts for public sector pensions. Other post-employment benefit liabilities are getting attention in light of evolving accounting standards and this topic will also be addressed.

■ Outlook

Public sector sponsors of defined-benefit pension plans have reason to be concerned. The worst three years of domestic equity market performance since World War II have cut deeply into plan funding ratios, in many cases leading to substantial increases to contributions at a time when budgets are already stretched thin. The actuarial practice of smoothing gains and losses on invested assets, usually over a five-year period, takes some of the sting out of the recent market slide because actuaries are still factoring in the great returns earned prior to 2000. However, unless the equity markets quickly revert to late 1990s form, pension expense for state and local governments can be expected to rise sharply over the next several years. Defined-benefit pension plans are estimated to cover 90% of state and local government employees.

Pension funding is an important element of credit analysis because pension expense has a direct effect on current budgets and a long-term impact on overall financial flexibility. Contractually obligated pension expenditures, along with debt service commitments, are amongst a governmental entity's fixed-cost burden, pulling resources from other essential programs. Significant increases in pension expense will further challenge governments already reeling from weak revenue growth and rising costs in areas such as employee health care and social services programs. As economic conditions improve and revenue growth returns, pension costs will compete with other governmental priorities, like restoring programs that were eliminated to save money or rebuilding reserves. Fitch Ratings expects few, if any, downgrades to occur solely as a result of rising pension costs. However, increasing pension expenses can contribute to or exacerbate declines in liquidity and financial flexibility that may lead to downgrades in the absence of corrective action.

Pension funding issues received less attention during the latter half of the 1990s as a buoyant stock market boosted pension plan returns and restored the average funding ratio to 104% in 2000 from 81% in 1990 according to a study by the Public Pension Coordinating Council. From its June 1, 1996 price of 6,677, the Wilshire 5000 Total Market Index, widely considered the broadest measure of U.S. equity performance, rose 121% to 14,752 on March 24, 2000, a period of less than four years. These tremendous gains allowed many governments to take "funding holidays" — dramatically reducing or, in some cases, even eliminating annual pension payments. Also during this period, the widening spread between municipal bond yields and achieved rates of plan returns enticed many governments to issue pension obligation bonds (POBs). As the selloff in equities has demonstrated, reaching

fully funded status through sale of a POB does not guaranty that a plan will stay fully funded. Some governments may now have to pay both the pension bond debt service and new unfunded liabilities.

Beyond market volatility, several other factors are affecting the fiscal health of pension plans and their sponsors. First, is the fact that many governments were tempted by the strong plan valuations of the late 1990s to enhance member benefits. Many of those overfunded plans are now underfunded, even before the costs of the enhanced benefits are considered. Second, budget shortfalls have led many governments to defer pension contributions or reduce payrolls by offering early retirement incentives, rationalizing that the pension systems are healthy enough in the short-term to meet these obligations. Lastly, accounting and actuarial standards require pension plans to assume rates of return having some relationship to actual investment return experience based on given asset allocations. It now appears likely that some plans may have to reduce their investment return assumptions, which would further increase annual pension expense.

A related issue lurking in the wings is an exposure draft by the Governmental Accounting Standards Board (GASB) that calls for other post-employment benefits (OPEB), consisting principally of retiree health care, to be treated similarly to pensions from an accounting standpoint. Most OPEB benefits are paid from current budgetary resources, but the accounting change could cause annual contributions to explode since new, presumably unfunded liabilities would have to be amortized.

Despite the likelihood of increasing pension costs for plan sponsors, the plans themselves are, on the whole, in good condition at the present time. A recent survey of state and teachers retirement systems showed that these plans averaged a 92.9% funding ratio on an actuarial basis. It should be noted that the average incorporates a wide variance among plans, with many overfunded and some less than 50% funded. The average funding ratio decline from 2001–2002 was a relatively modest 4.2%. However, as the poor investment returns of 2000–2002 work their way into subsequent plan valuations, the average funding ratio may decline more rapidly; some experts predict the average will fall below 80%.

Credit Considerations

Fitch analyzes pension liabilities in conjunction with the analysis of an issuer's debt profile and future borrowing plans. Pension liabilities are similar to bonded debt in that both are considered long-term liabilities on the balance sheet. However, unlike fixed debt costs, pension liabilities can be altered through changes to plan assumptions or to valuation methods, making direct comparisons difficult. For this reason, pension liabilities are not included in the long-term debt ratios. Moreover, unlike bonded debt, which must be repaid on time and in full, pension payments can be reduced or deferred.

Fitch analysts begin to evaluate pension plan status by reviewing the overall funded ratio, the size of the annually required contribution (ARC) relative to the sponsor's overall budget, and the sponsor's net pension obligation (NPO). Generally, a current funding ratio of 70%–80% or better is considered by Fitch to be adequately funded from a credit perspective. However, in cases where actuarial assumptions are clearly aggressive and outside current norms, this range may be insufficient. Conversely, a lower funding ratio may be acceptable if actuarial assumptions are notably conservative. Below this 70%–80% threshold, the pension plan could be considered to have a potentially significant impact on the sponsor's budget and additional analysis is warranted. This is particularly true in cases where the ARC is a significant and growing part of the sponsor's budget. Similarly, a rising NPO usually reflects a deferral of required pension payments, and the reasons for such a deferral will be explored. *(See later sections for a discussion of key accounting and actuarial concepts related to pension plans.)*

Generally, pension funding status affects rating outcomes at the margins, or only in the more severe cases of underfunding. For example, during the assignment of an initial rating, a low funding ratio and the presence of a large NPO can have a negative impact on the rating outcome, keeping a rating below where other factors might suggest it should be. On the other hand, a fully funded pension plan would not typically result in a higher rating assignment or a rating upgrade since it simply represents the fulfillment of a contractual obligation.

Deferrals of minimum required pension payments can, in some cases, affect a plan sponsor's credit rating over time, depending on the current and

historical funding level of the plan, the reason for the deferrals, and the overall credit profile of the plan sponsor. At a minimum, Fitch considers the deferral of pension expense as a significant indicator of fiscal stress and one that merits closer scrutiny. In some states, annual pension expense payment amounts and deferral rules are governed by constitutional or statutory considerations, which must be factored into the analysis.

The current weakness of the equities markets is causing many pension plan funding ratios to decline, although these market-related swings are normal and are to be expected over the long-run time horizon associated with pension funding. After all, plans that appeared poorly funded in the early 1990s benefited greatly from the strong equities market in the latter half of the decade; a decline from those levels is to be expected. Fitch analysts will work with plan sponsors to gain a complete understanding of the impact on operating budgets of increasing ARCs. Plan sponsors that exhibit a steady history of meeting their pension commitments should not experience rating pressure due to market-driven declines in funding ratios unless it becomes clear that pension expense will have to be significantly deferred.

Economic and demographic assumptions are also reviewed given their direct impact on the aforementioned benchmarks. Aggressive investment return or salary assumptions could inflate a plan's funding ratio. Changes to the benefit structure since the last plan valuation, such as an ad hoc cost of living adjustment for retirees, can also affect plan liabilities. Fitch analysts will work with plan sponsors to gain an understanding of how such assumptions and benefit changes will affect the direction of plan funding ratios and ARCs. If significant unfunded liabilities are present or anticipated, the government's plans for addressing the liability will be reviewed. The current or potential magnitude of pension expenses on the sponsor's cash flow will be factored into the rating analysis.

The analysis will differ somewhat for governments that do not sponsor a pension plan but rather participate in a cost-sharing multiple employer plan. In such cases, information about the cost-sharing pension plan is often not readily obtainable from a participant's financial reports. In these cases, Fitch analysts will look to see that the issuer has been paying 100% of the amount billed by the cost-sharing retirement system. As circumstances warrant, additional information about the cost-sharing plan may be requested to determine the likely future direction of bills sent to participants.

History of Public Sector Pensions

Public sector pensions originated as disability benefits granted to soldiers as an incentive to join armies. Such benefits have been used throughout recorded history and were first granted in the U.S. by the Plymouth Colony in 1636.

Pensions for public sector civilian employees did not appear until the 1850s and were largely confined to big cities. Plans were first offered only to public safety personnel as additional compensation for hazardous duty. Some cities extended benefits to teachers; other municipal workers were generally not covered. Benefits typically consisted of a disability payment only, with some plans offering a survivor benefit. Retirement benefits were rarely offered except for "forced savings" plans, which invested the employees' own contributions for future payout.

Widespread coverage of all classes of public sector employees did not begin until the early 20th century, with many workers not receiving coverage until after World War I. The first state retirement system was created by the Commonwealth of Massachusetts in 1911. Still, public sector workers were far more likely to receive some retirement benefit than their private sector counterparts, who did not significantly expand coverage until after World War II.

Even the earliest of public sector plans typically required some contribution from the employee, a practice that continues today. By contrast, most private sector defined-benefit plans are entirely employer funded, probably due to favorable tax treatment afforded employer contributions.

The historical information in the above section was derived from a book entitled "A History of Public Sector Pensions in the United States," by R. Clark, L Craig, and J. Wilson.

Modern Public Sector Pensions

Public pensions developed unevenly over a long period of time without any significant regulatory oversight. As a result, the modern public pension system is a patchwork of plan types that entails different benefits, different valuation and funding methods, and varying intergovernmental relationships between the states and their subunits. This diversity complicates comparative analysis and heightens the

need for analysts and municipal bond investors to focus on the unique facts of each pension plan and plan sponsor.

The lack of centralized oversight of public pensions reflects both the remoteness of governmental bankruptcy and the unique taxing power of public entities. Governments generally do not go out of business, and their power to tax citizens historically provided, at least in theory, an almost limitless source of revenue to meet pension obligations. However, over the past 25 years, tax limitation measures and anti-tax sentiment have become widespread, dramatically altering the latter point.

In contrast, private sector pensions are highly regulated by the federal government under the Employee Retirement Income Security Act of 1974 (ERISA). Moreover, corporate pension plans are guaranteed by the Pension Benefit Guaranty Corporation, a government enterprise created by ERISA and funded by premiums from covered companies. No such guaranty exists for public sector pension plans.

The vast majority of modern day public sector pension plans are defined benefit plans. A defined benefit plan is one that pays a specific amount to retirees, usually based on a formula that considers length of service and average wages during the final years of employment. Another type of plan that is growing in use is the defined contribution plan. Defined contribution plans invest employee and, in some cases, employer contributions in individual accounts for the benefit of the employee. The chief difference between defined benefit and defined contribution plans is that in the former, the plan sponsor/employer assumes the investment risk, whereas with defined contribution plans, the employee is at risk for investment returns.

■ Accounting for Public Pensions

Public sector pension accounting and financial reporting are dictated by Statements 25 and 27 of the GASB. Statement 25 governs financial reporting standards for plan sponsors, including required supplemental information. Statement 27 establishes rules for valuing pension assets and liabilities and determining annual contributions.

There are three types of plans covered by GASB accounting standards. Single-employer plans are administered directly by state and local governments for their own employees. Agent multiple-employer plans aggregate single-employer plans and pool investment and administration functions. Actuarial valuations are done for each plan and funds are segregated. Cost-sharing multiple-employer plans aggregate the contributions of all participating employers and bill those jurisdictions for pension contributions based on the overall performance of the plan. Most state retirement systems include at least one cost-sharing multiple-employer plan.

Local government financial statements may include data or references to all three plan types. A local unit may have its own plan for certain of its employees, typically public safety personnel, while general employees and teachers may participate in agent or cost-sharing multiple-employer plans. Plan organization varies around the U.S. with the differences primarily reflecting either legislative initiative or collective bargaining between employee unions and plan sponsors.

Analysts and investors should note a key distinction made by the GASB between the accounting treatment of pensions and the actuarial valuation of pensions. GASB 25 sets forth financial reporting requirements for retirement systems and pension trust funds of individual plan sponsors that call for the valuation of assets at fair market value and the reporting of current liabilities. The difference, known as net assets held in trust for pension benefits, is not a true reflection of the actuarial funding status of the plan. The actuarial funding status information, along with the sponsor's required contributions and the compliance with the contribution requirements, is contained in the supplemental reporting information of the financial statement.

■ Measurement of Defined-Benefit Pension Costs

Pension accounting includes both a short- and a long-term focus, but in either case is heavily reliant on actuarial assumptions. Over the short term, the focus is on determining annual pension expense and the extent to which the government is meeting its minimal funding requirements. The longer term view seeks to establish the overall funding status of a pension plan — will actuarially valued assets be sufficient to pay for actuarially accrued liabilities?

As mentioned, actuarial assumptions play a critical role in determining a plan's funding status. The purpose of using actuarial funding methods is to

promote the consistent accumulation of assets over time while limiting year-to-year volatility in contribution levels. However, actual plan experience as it relates to actuarial assumptions, including investment return, the level of contributions by the plan sponsor, and employment and wage trends, affect plan performance over time and assumptions must be periodically adjusted.

GASB pronouncements require that all actuarial assumptions used in plan valuation and the related determination of funding requirements be chosen in accordance with the Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations as promulgated by the Actuarial Standards Board (ASB) in 1990. Subsequent to the adoption of GASB Statements 25 and 27 in 1994, the ASB promulgated ASOPs 27 and 35 to provide additional guidance to actuaries in selecting appropriate economic and demographic assumptions, respectively.

Three key metrics may be considered benchmarks of public pension plan analysis: the funded ratio, the ARC, and the NPO.

Funded Ratio: The funded ratio is the actuarial value of assets (AVA), expressed as a percentage of the actuarially accrued liabilities. GASB requires the asset valuation method to be market related, not necessarily equivalent to market value. Asset valuations are typically smoothed over a period of five years to reduce short-term volatility related to investment returns. GASB requires the calculation of actuarial costs (liabilities) to be made with one of six methods, each of which yields somewhat different results. The actuarial cost method must be consistent with the method used to value assets.

ARC: The ARC is the actuarially determined amount a government must contribute to its pension plan each year. The ARC consists of two components, the normal cost — that portion of future benefits allocated to the current year — and an amount sufficient to amortize any actuarially accrued liability. The ARC will move inversely with respect to the funding ratio. A decline in the funding ratio, by definition, means that either the normal cost has increased due to benefit enhancements or a change in assumptions, or there is a larger amount of unfunded liability to amortize due to reduced asset values, or both.

NPO: The NPO is the sum of the any shortfall in pension contributions existing on the effective date of GASB 27 and any cumulative differences between actual sponsor contributions and the ARCs since the effective date of GASB 27. Any shortfalls in contributions are added to the NPO, along with interest accrued at the discount rate. The NPO attempts to measure how reliably a plan sponsor has kept up with its pension payment obligations.

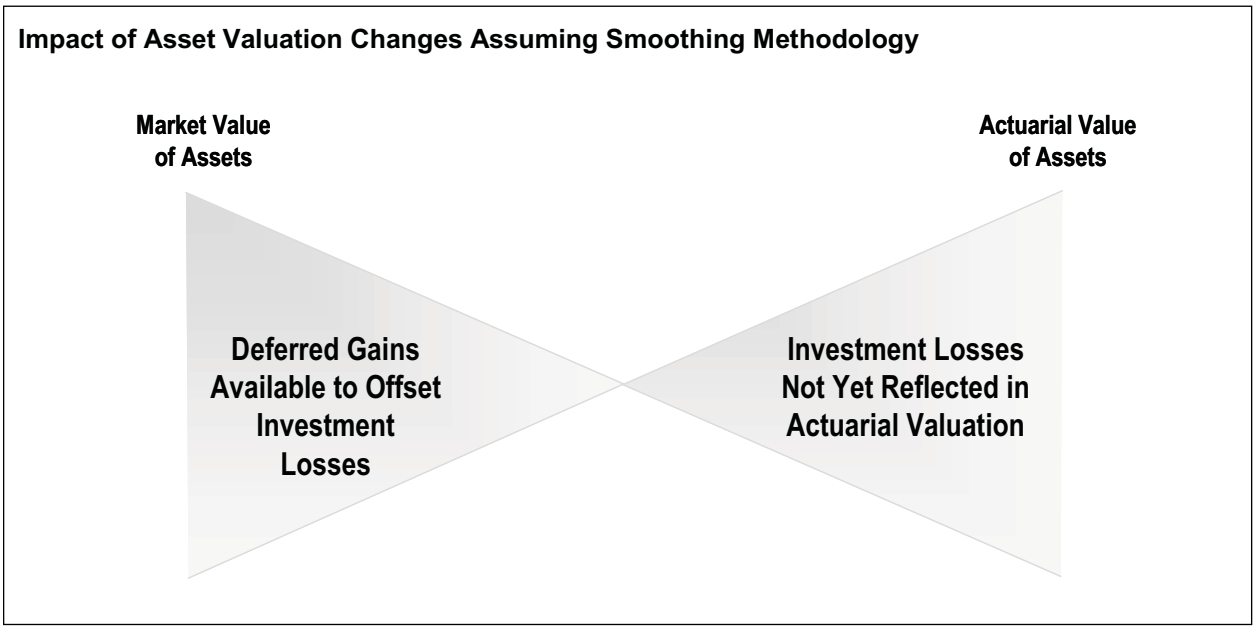
Because most defined-benefit plans use an asset smoothing methodology, actuarial valuations of plan assets tend the lag market valuations. When the market value of assets (MVA) grows due to strong investment returns, the AVA increases at a slower pace because the market returns are gradually phased into the valuation. Accordingly, annual pension costs do not fall in direct correspondence to the rise in asset values due to the smoothing practice. Conversely, in a down market such as the current environment, the AVA will tend to exceed the MVA because investment losses are phased-in over time. In this environment, pension expenses will rise more slowly than if they were correlated directly with market losses; although they will rise as the losses are realized *(see chart, page 6)*.

■ Actuarial Assumptions

Economic Assumptions: The two primary economic assumptions are the investment return/discount rate and the salary scale.

By far the more important assumption is the investment return/discount rate. This rate is used to discount the aggregate value of all future plan benefit payments to present value. Actuarial standards of practice require a number of factors to be considered in selecting the appropriate rate, including the existing allocation of plan assets between equities and fixed-income securities, actual plan return experience, and likely future returns.

The selection of a discount rate that is on the high end of the range that would be considered reasonable could substantially reduce the present value of future liabilities. Obviously, this would reduce the amount of assets needed to meet those future liabilities and the ARC would be lower. While most plans assume discount rates that may be deemed moderate or conservative (the average is about 8%), there are clearly some retirement systems that may have to reduce their discount rates, opening up additional liabilities.



The salary scale assumption attempts to incorporate future wage increases granted to plan beneficiaries. Implicit in the overall assumption is a component related to cost of living (inflation) and one related to bargained step increases or expected merit pay increases.

Demographic Assumptions: Major non-economic assumptions in plan valuations include those regarding the pace of retirements from active service, life expectancy, separation rates, disability, and administrative expenses. Life expectancy is emerging as a key assumption due to advances in medical science that allow people to live longer. Implementation of new mortality tables reflecting longer life expectancy will increase future liabilities. The assumption regarding the rate of retirement can also have a short-term impact on some plans as discussed below.

External Factors

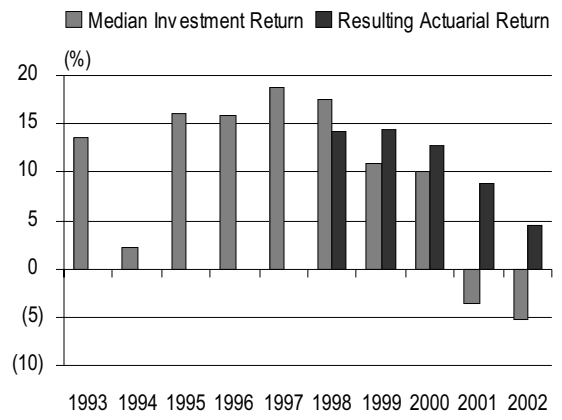
Once a defined benefit plan's assumptions are established, the plan should be largely self regulating given sponsor compliance in meeting its annual cost. The ARC will adjust based on investment performance, and the amortization of unfunded liability will, over time, allow the plan to reach full funding. However, assumptions are never completely accurate and plan sponsors frequently take actions that must be incorporated in the valuation.

Pension Deferral: Governments may reduce or defer entirely their ARC for a given year, usually for budget relief. While such actions do provide short-term budget savings, the unpaid ARC is added to the NPO and must be made up at some point in the future.

Benefit Changes: Benefits may be adjusted as part of the collective bargaining process or to achieve some budgetary goal of the sponsor. Extra retirement benefits are sometimes granted to employees when plans appear well funded, or if resource limitations preclude larger wage increases. During times of fiscal stress, governments often establish early retirement programs to reduce payrolls; these programs usually entail some extra retirement benefit. Also, cost of living adjustments are periodically granted to retirees, some of which may not have been part of the original plan valuation.

Assumption Changes: Actuaries are required to apply a reasonableness test to all of their assumptions, which should generally have some basis in market performance or actual experience. Plan sponsors occasionally run experience studies to test the accuracy of assumptions. These studies can result in changes to assumptions that can dramatically alter a plan's funded ratio, to the good or bad. For example, the inflation rate has remained at or below 3% for an extended period, a level below most plans' assumption. Among other possible effects, a reduction in the inflation rate could mean that cost of living adjustments for active and retired beneficiaries will be less, thereby reducing future liabilities.

Median Public Fund Returns and Resulting Actuarial Valuations Based on Five-Year Asset Smoothing



Source: Public Fund Survey, August 2003.

■ Pension Obligation Bonds

The current low interest rate environment is attractive to pension plan sponsors who may be considering an issuance of POBs. POBs are typically secured by the issuer's general obligation pledge — debt service on POBs is not an obligation of the pension plan receiving the bond proceeds. POBs are an arbitrage play that attempts to take advantage of the interest rate differential between taxable municipal bonds and the assumed investment return on plan assets. Bonds are issued to fund all, or a portion of, a sponsor's unfunded pension liability, with the hope that the debt service on the bonds will be less than what the sponsor would otherwise have to pay in annual pension costs over the long term.

If the invested proceeds of the POBs do not realize a rate of return in excess of the cost of capital, new unfunded liabilities could arise. Similarly, if a plan is brought to full funding status by virtue of a POB issuance, there may be a temptation on the part of elected officials to sweeten pension benefits (increase liabilities), particularly in areas where there is significant labor pressure.

Fitch believes that POBs, if used moderately and in conjunction with a prudent approach to investing the proceeds and other pension assets, can be a useful tool in asset-liability management. However, a failure to follow balanced and prudent investment practices with respect to POB proceeds could expose the sponsor to market losses.

Because a sponsor's unfunded pension liability is already factored into the rating, the issuance of POBs simply moves the obligation from one part of the balance sheet to another. However, Fitch notes that POBs create a true debt, one which must be paid on time and in full, rather than a softer pension liability that can be deferred or rescheduled from time to time during periods of fiscal stress. Consequently, POBs can have a significant effect on financial flexibility over time.

The use of POBs to provide near term budget relief can, as one factor considered in the total rating analysis, have a negative impact on credit. Using POB proceeds to pay current and subsequent year pension contributions is considered by Fitch to be a type of deficit financing — the use of borrowing funds to pay for an annually recurring expense.

■ Other Post-Employment Benefits

In February 2003, the GASB issued an exposure draft of a new accounting standard that would require governments to account for those post-employment benefits granted to retirees that go beyond simple retirement benefits as if they were pensions. In GASB's view, the accounting change is needed because present accounting rules do not capture the cost of benefits earned by current employees. Rather, employers are only required to book cash outlays actually paid in a given year for OPEB on behalf of existing retirees.

OPEB consists primarily of health care benefits such as hospitalization, prescription drugs, and dental and vision benefits, but can also include such benefits as life insurance or estate planning services. In most instances, the government granting OPEB pays for them on a pay-as-you-go basis, either on a direct billing basis or through payment of insurance premiums. Cost sharing of health care premiums with retirees is considered an implicit rate subsidy and an OPEB expense. If retirees pay 100% of the premium, there is no OPEB expense to the government.

GASB's exposure draft presumes that many governments either already have or will establish defined-benefit plans for OPEB. These plans would be required to determine actuarial assets and liabilities for OPEB every two years, the same timetable as pension benefits. The actuarial standards applied to pension plan valuations would also be applied to OPEB. Fitch anticipates that the new accounting standard will generate a number of new

methods for funding OPEB, including defined-benefit plans, but also new defined-contribution or other arrangements. The magnitude of the cost associated with funding a defined-benefit OPEB plan may force government employers to look at funding arrangements that significantly increase employee contributions.

When the GASB adopts new standards, it typically provides guidance regarding transition from an old accounting practice to the new rules. In the transition to the new OPEB standard, it is expected that governments with defined-benefit plans will have to account for some prior service credit for OPEB benefits already earned by current employees. This will contribute to an unfunded liability at transition for many governments, which they must begin amortizing. However, unlike the GASB 27 pension rules, employers will not be required to "look back" to determine if they have a net OPEB obligation at the time they transition to the new OPEB standard. At transition, the net OPEB obligation will be zero and will change over time as governments either meet or fail to meet their annually required OPEB costs.

This new accounting standard can be expected to apply significant budgetary pressure in coming years for a number of reasons. First, the requirement to begin amortizing unfunded OPEB liabilities will likely boost OPEB expenses above current pay-as-you-go expenses. Second, the governmental workforce is dominated by the baby boom generation, meaning it will start consuming benefits over the medium term. Since most defined-benefit OPEB plans are unfunded, this will result in higher cash outlays for benefits. As a result, plan sponsors will have to keep a disproportionately large amount of plan assets in shorter term, more liquid assets to meet current benefits, thereby lowering the assumed rate of investment return on assets. Third, the cost of health care continues to rise above the level of general inflation. Fitch expects annually required contributions to OPEB will be significantly pressured by health care cost inflation.

If adopted, GASB would have the standard implemented by governments with revenues of $100 million or more beginning with the fiscal year starting after June 15, 2006. Governments with revenues between $10 million–$100 million would implement one year later, and those with less than $10 million in revenue would implement for the fiscal year beginning after June 15, 2008.

2013 RETIREMENT LEGISLATION

SENATE BILLS			SENATE ACTION						HOUSE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
SB 65 (HB 543)	All Public Plans	Allows the State Auditor to audit all public employee retirement systems. >> Fiscal Note	Dixon	Financial & Governmental Organizations and Elections	Hearing 2/11/13 2 pm Senate Lounge	DP w/SCS 2/25/13	On Perfection calendar							
SB 86	All Public Plans	Clarifies funded ratio requirement for plan benefit increases and exempts Federal conformance modifications. >> Fiscal Note	Keaveny	Seniors, Families & Pensions	Hearing 1/29/13 8:15 am SCR 1	DP w/SCS 2/5/13	02/12/13	2/14/13						
SB 100 (HB 447)	Bankruptcy Exemption	Adds interest in health savings plan and inherited accounts to exemption list. >> Fiscal Note	Keaveny	Seniors, Families & Pensions	Hearing 2/5/13 8:15 am SCR 1	DP 2/12/13	02/20/13	2/26/13						
SB 107	St. Louis Firemen's	Creates a new benefit tier for members hired on or after 8/29/13.	Lamping	Seniors, Families & Pensions										
SB 215 (HB 418)	KC Police & Civilian Employees	Creates a new benefit tier for members hired on or after 8/28/13. >>Fiscal Note	Silvey	Seniors, Families & Pensions	Hearing 3/5/13 8:15 am SCR 1									

2013 RETIREMENT LEGISLATION

SENATE BILLS			SENATE ACTION						HOUSE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
SB 221	PSRS/ PEERS	Requires matching contribution rates to be fixed at 2011/2012 school year levels, COLA to be set at 2% with exceptions and a closed 30 year amortization period used until plans are 100% funded.	Lamping	Seniors, Families & Pensions										
SB 223	KC PSRS	Creates a new benefit tier for members hired on or after 01/01/14. Modifies employer/employee contribution rates.	Curls	Seniors, Families & Pensions	Hearing 3/12/13 8:30 am SCR 1 - HEARING CANCELLED									
SB 232 (HB 313)	PSRS/ PEERS	Permanently extends "25 & out" (PSRS/PEERS) and "2.55% multiplier with 31+ YOS" (PSRS).	Wallingford	Seniors, Families & Pensions										
SB 279 (HB 233)	MOSERS/ MPERS/ Judges	Provisions and clarification relative to MOSERS/MPERS statutory provisions. >>Fiscal Note	Kehoe	Seniors, Families & Pensions										
SB 288 (HB 353)	MOSERS	Effective 7/1/14, modifies provisions relating to the defined contribution plan for employees of certain higher education institutions.	Lamping	Seniors, Families & Pensions										

2013 RETIREMENT LEGISLATION

SENATE BILLS			SENATE ACTION						HOUSE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
SB 312	MOSERS/ MPERS/ Judges	Suspends retired state employees and retired judges benefit payments when employed full-time with a certain political subdivision in Missouri.	LeVota	Seniors, Families & Pensions										
SB 355 (HB 424)	Sheriffs' Retirement System	Modifies the system's funding mechanism.	Munzlinger	Seniors, Families & Pensions										
SB 475	All Statutory Plans	Requires plans to be 100% funded in 5 years.	Lamping											
SB 476	PSRS	Requires new employees hired on or after 7/1/14 to participate in a defined contribution plan.	Lamping											
SB 477	MOSERS/ MPERS/ Judges	Requires new employees hired on or after 1/1/14 to participate in a defined contribution plan.	Lamping											

2013 RETIREMENT LEGISLATION

HOUSE BILLS			HOUSE ACTION						SENATE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
HB 93	MOSERS	Beginning 1/1/14, General Assembly members will not accrue credited service under the MSEP 2000 plan.	Lichtenegger											
HB 129	MOSERS	Establishes a State Employee Retirement Incentive and modifies state holidays.	Gatschenberger	Retirement	Hearing 3/14/13 9 am HHR 1									
HB 169	PACARS	Adds interest in health savings plan and inherited accounts to exemption list. >> Fiscal Note	Diehl	Retirement	Hearing 1/29/13 5 pm HHR 1	DP w/HCS 1/29/13 Rules DP 2/7/13	On Perfection Calendar							
HB 233 (SB 279)	MOSERS/ MPERS/ Judges	Provisions and clarification relative to MOSERS/MPERS statutory provisions. >>Fiscal Note	Leara	Retirement	Hearing 1/29/13 5 pm HHR 1	DP w/HCS consent 1/29/13 Rules DP Consent 2/7/13	3/6/13	3rd Read Consent Calendar						
HB 254	City of North Kansas City	Allows the City of North Kansas City to submit to voters a retail sales tax of up to .5% for Public Safety use.	Swearingen	Local Government										
HB 313 (SB 232)	PSRS/ PEERS	Permanently extends "25 & out" (PSRS/PEERS) and "2.55% multiplier with 31+ YOS" (PSRS).	Thomson	Retirement	Hearing 3/14/13 9 am HHR 1									
HB 325	MOSERS/ CERF	Modifies composition of judicial circuits.	Elmer	Judiciary										

2013 RETIREMENT LEGISLATION

HOUSE BILLS			HOUSE ACTION						SENATE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
HB 335	City of North Kansas City	Public Safety proposal includes: Allowing the City of North Kansas City to submit to voters a retail sales tax of up to .5% for Public Safety use. >> Fiscal Note	Hinson	Crime Prevention & Public Safety	Hearing 2/18/13 1 pm HHR 6	DP w/HCS 2/18/13 Rules DP 2/28/13								
HB 353 (SB 288)	MOSERS	Effective 7/1/14, modifies provisions relating to the defined contribution plan for employees of certain higher education institutions.	Leara	Retirement	Hearing 3/14/13 9 am HHR 1									
HB 418 (SB 215)	KC Police & Civilian Employees	Creates a new benefit tier for members hired on or after 8/28/13.	Neth	Retirement	Hearing 3/14/13 9 am HHR 1									
HB 424 (SB 355)	Sheriffs' Retirement System	Modifies the system's funding mechanism.	C. Jones	General Laws	Hearing 3/12/13 12 pm HHR 4									
HB 447 (SB 100)	Bankruptcy Exemption	Exemption from attachment and execution of a person's interest in inherited retirement accounts and health savings plans. >>Fiscal Note	Diehl	Judiciary	Hearing 3/6/13 12 pm or upon morning adjournment HHR 1									
HB 464	Sheriffs' Retirement System	Establishes the "Sheriff Salary Supplementation Fund".	Higdon	General Laws										
HB 475	MOSERS	Requires any General Assembly serving for the first time on or after 1/1/14 to participate in a defined contribution retirement plan.	Brattin											

2013 RETIREMENT LEGISLATION

HOUSE BILLS			HOUSE ACTION						SENATE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
HB 543 (SB 65)	All Public Plans	Allows the State Auditor to audit all public employee retirement systems.	Hoskins	General Laws										
HB 636	MOSERS/ MPERS	State employees salary increases equal to increase in health insurance premiums.	Fitzwater											
HB 637	MOSERS	Minimum salary requirements for corrections officers and supervisors.	Fitzwater											
HB 722	St. Louis Police	Reduces service requirement associated with disability from 10 to 5 years.	Leara	Retirement	Hearing 3/14/13 9 am HHR 1									
HB 737	SLPSRS	Incrementally increases employee contributions from 5% of pay to 7.5% by 1/1/18 and modifies Rule of 85 to Rule of 80 for normal retirement eligibility.	Leara	Retirement										
HB 772	MOSERS	Beginning 1/1/15, General Assembly members will not accrue credited service under the MSEP 2000 plan.	Haahr											
HB 782	PSRS/ PEERS	Prohibits membership for employees of any nonprofit educational association or organization after 7/1/14.	Spencer	Retirement										

2013 RETIREMENT LEGISLATION

HOUSE BILLS			HOUSE ACTION						SENATE ACTION				OTHER ACTION	
Bill Number	System Affected	Description	Sponsor	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Perfected	Passed 3rd Read	Committee Assigned	Date/ Time Hearing Rm	Committee Action	Passed 3rd Read	Notes	Governor Action
HB 820	MOSERS	General Assembly members and Statewide Elected officials serving on or after 1/1/14 shall participate in a defined contribution retirement plan.	Koenig											

Joint Committee on Public Employee Retirement
Quarterly Reports
2012 Fourth Quarter

Plan Name	Beg. Market Value	End. Market Value	ROR 12 mos.	ROR 36 mos.	ROR 60 mos.
Affton FPD Retirement Plan	$4,850,535	$4,987,266	11.59% (Net)	7.03% (Net)	8.10% (Net)
Arnold Police Pension Plan	$7,749,428	$7,941,009	9.8% (Net)	7.1% (Net)	4.6% (Net)
Bi-state Dev Agency Division 788, A.T.U.	$92,068,247	$92,238,856	N/A% (Net)	N/A% (Net)	N/A% (Net)
Bi-state Development Agency Local 2 I.B.E.W.	$2,278,672	$2,333,470	N/A% (Net)	N/A% (Net)	N/A% (Net)
Bi-state Division 788 Clerical Unit ATU	$4,974,281	$4,856,418	N/A% (Net)	N/A% (Net)	N/A% (Net)
Bi-state Salaried Employees	$46,072,987	$46,361,814	N/A% (Net)	N/A% (Net)	N/A% (Net)
Bothwell Regional Health Center Retirement Plan	$41,099,475	$41,506,533	13.2% (Net)	9.2% (Net)	3.8% (Net)
Brentwood Police & Firemen's Retirement Fund	$25,891,070	$26,252,733	NA% (Gross)	NA% (Gross)	NA% (Gross)
Bridgeton Employees Retirement Plan	$22,021,327	$22,089,366	13.15% (Gross)	8.38% (Gross)	0.91% (Gross)
Carthage Policemen's & Firemen's Pension Plan	$5,718,421	$5,665,560	6.89% (Net)	6.30% (Net)	2.43% (Net)
Cedar Hill Fire Protection District Length of Service Awards Program	$68,057	$32,016	NA% (Gross)	NA% (Gross)	NA% (Gross)
Clayton Non-uniformed Employee Pension Plan	$11,094,441	$11,399,081	12.68% (Gross)	9.73% (Gross)	3.10% (Gross)
Clayton Uniformed Employees Pension Plan	$31,391,771	$32,406,287	11.66% (Gross)	9.22% (Gross)	3.65% (Gross)
Columbia Firemens' Retirement Plan	$95,210,841	$96,311,976	9.27% (Net)	9.02% (Net)	6.30% (Net)
County Employees Retirement Fund	$342,680,000	$348,378,000	13.6% (Gross)	9.2% (Gross)	4.4% (Gross)
Creve Coeur FPD Retirement Plan	$8,743,866	$8,636,045	N/A% (Gross)	N/A% (Gross)	N/A% (Gross)
Eureka FPD Retirement Plan	$7,777,613	$8,008,295	1% (Gross)	1% (Gross)	1% (Gross)
Fenton FPD Retirement Plan	$21,473,235	$21,662,171	11.44% (Net)	6.64% (Net)	2.19% (Net)
Florissant Employees Pension Plan	$10,364,866	$10,952,949	6.07% (Net)	4.81% (Net)	4.81% (Net)
Florissant Valley FPD Retirement Plan	$18,707,212	$19,177,644	n/a% (Net)	n/a% (Net)	n/a% (Net)
Glendale Pension Plan	$4,730,384	$4,751,217	12.80% (Gross)	8.70% (Gross)	N/A% (Gross)
Hannibal Police & Fire Retirement Plan	$11,677,285	$11,742,288	8.9% (Gross)	24.0% (Gross)	17.1% (Gross)
Hazelwood Retirement Plan	$27,556,150	$27,486,694	19.5% (Net)	9.92% (Net)	.95% (Net)

Please be aware information provided in this report may contain unaudited data.

Plan Name	Beg. Market Value	End. Market Value	ROR 12 mos.	ROR 36 mos.	ROR 60 mos.
High Ridge Fire Protection District Pension Plan	$5,926,931	$6,016,248	11.72% (Net)	7.22% (Net)	11.76% (Net)
Jackson County Employees Pension Plan	$189,269,377	$195,600,273	14.6% (Gross)	8.7% (Gross)	3.3% (Gross)
Joplin Police & Fire Pension Plan	$28,272,282	$29,139,744	11.00% (Net)	6.83% (Net)	2.98% (Net)
Kansas City Civilian Police Employees' Retirement System	$102,953,000	$103,794,000	9.8% (Gross)	7.1% (Gross)	1.7% (Gross)
Kansas City Employees' Retirement System	$879,310,857	$888,077,665	12.5% (Net)	8.3% (Net)	2.1% (Net)
Kansas City Firefighter's Pension System	$406,887,000	$411,613,000	13% (Net)	9.8% (Net)	2.0% (Net)
Kansas City Police Retirement System	$691,681,000	$692,505,000	9.8% (Gross)	7.2% (Gross)	2.0% (Gross)
Kansas City Public School Retirement System	$680,286,758	$690,847,374	13.03% (Gross)	9.03% (Gross)	2.80% (Gross)
Kansas City Supplemental Retirement Plan	$1,501,036	$1,507,964	NA% (Gross)	NA% (Gross)	NA% (Gross)
KC Area Transportation Authority Salaried Employees Pension Plan	$12,549,849	$13,436,303	10.30% (Gross)	7.84% (Gross)	2.25% (Gross)
KC Trans. Auth. Union Employees Pension Plan	$38,102,706	$37,862,426	14.33% (Net)	8.65% (Net)	2.10% (Net)
Ladue Non-uniformed Employees Retirement Plan	$3,732,093	$3,732,856	11.03% (Net)	7.80% (Net)	2.73% (Net)
Ladue Police & Fire Pension Plan	$23,380,450	$23,241,352	11.17% (Net)	7.89% (Net)	2.74% (Net)
LAGERS Staff Retirement Plan	$6,769,965	$6,943,793	12.91% (Gross)	7.56% (Gross)	2.55% (Gross)
Little River Drainage Dist Retirement Plan	$1,074,661	$1,103,624	-2.3% (Net)	3.27% (Net)	3.12% (Net)
Local Government Employees Retirement System	$4,890,311,823	$4,986,413,287	15.18% (Net)	10.77% (Net)	4.09% (Net)
Metro St. Louis Sewer Dist Employees Pension Plan	$216,680,553	$223,825,557	12.8% (Gross)	8.8% (Gross)	4.5% (Gross)
Metro West FPD Retirement Plan	$34,403,490	$34,680,691	7.83% (Net)	5.55% (Net)	1.84% (Net)
Missouri State Employees Retirement System	$7,961,241,084	$8,081,251,802	13.5837% (Net)	10.4499% (Net)	3.9680% (Net)
MoDOT & Highway Patrol Employees' Retirement System	$1,572,598,521	$1,609,395,545	12.90% (Net)	10.31% (Net)	1.90% (Net)
North Kansas City Hospital Retirement Plan	$202,960,734	$212,626,242	13.10% (Net)	9.05% (Net)	3.75% (Net)
North Kansas City Policemen's & Firemen's Retirement Fund	$34,514,560	$36,411,560	0.81 % (Gross)	13.08 % (Gross)	2.75 % (Gross)
Overland Non-uniform Pension Fund	$8,453,564	$8,700,460	11.9% (Net)	7.1% (Net)	4.4% (Net)
Overland Police Retirement Fund	$12,088,452	$12,259,604	11.9% (Net)	6.9% (Net)	3.7% (Net)
Prosecuting Attorneys' Retirement System	$30,511,689	$30,767,018	10.4% (Net)	6.6% (Net)	2.8% (Net)
Public Education Employees' Retirement System	$3,057,368,318	$3,109,470,661	12.0% (Net)	8.8% (Net)	2.3% (Net)

Please be aware information provided in this report may contain unaudited data.

Plan Name	Beg. Market Value	End. Market Value	ROR 12 mos.	ROR 36 mos.	ROR 60 mos.
Public School Retirement System	$28,450,650,997	$28,734,441,812	12.2% (Net)	9.2% (Net)	2.4% (Net)
Raytown Policemen's Retirement Fund	$9,132,296	$9,269,263	8.87% (Gross)	6.69% (Gross)	0.00% (Gross)
Richmond Heights Police & Fire Retirement Plan	$37,022,228	$37,534,587	11.78% (Net)	9.53% (Net)	4.99% (Net)
Rock Community FPD Retirement Plan	$10,030,787	$10,096,274	12.18% (Net)	8.27% (Net)	3.51% (Net)
Rock Hill Police & Firemen's Pension Plan	$1,672,288	$1,777,192	1.59% (Net)	1.59% (Net)	1.59% (Net)
Saline Valley Fire Protection District Retirement Plan	$1,332,348	$1,360,155	10.90% (Net)	7.13% (Net)	12.34% (Net)
Sheriff's Retirement System	$31,483,730	$31,822,328	14.060% (Gross)	9.161% (Gross)	6.937% (Gross)
St. Joseph Policemen's Pension Fund	$29,438,024	$29,521,020	9.1% (Gross)	22.6% (Gross)	17.7% (Gross)
St. Louis County Employees Retirement Plan	$493,922,915	$500,379,497	15.03% (Gross)	10.07% (Gross)	3.07% (Gross)
St. Louis Employees Retirement System	$663,245,436	$674,690,737	14.03% (Gross)	9.95% (Gross)	3.18% (Gross)
St. Louis Public School Retirement System	$869,389,387	$885,773,511	12.4% (Net)	8.9% (Net)	3.2% (Net)
Valley Park FPD Retirement Plan	$3,774,286	$3,789,802	12.10% (Net)	N/A% (Net)	N/A % (Net)
	$52,538,125,639	$53,226,857,915			

Michael Rathbone

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Joint Committee on Public Employee Retirement

State Capitol, Room 219-A

Jefferson City, MO 65101

(573) 522-7990

www.jcper.org

To the Honorable Members of the Committee,

My name is Michael Rathbone. I am a policy researcher for the Show-Me Institute, a nonprofit, nonpartisan, Missouri-based think tank that supports free-market based solutions for state policy. I am submitting testimony to this committee detailing research we have conducted regarding Missouri's public pension system. I respectfully request that it be entered into the record. I have also included a copy of a recent policy study that we have released that examines this subject more in depth. Thank you for your time.

Sincerely,

Michael Rathbone

SHOW-ME INSTITUTE
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TESTIMONY

March 14, 2013

MISSOURI'S PUBLIC PENSIONS: WORSE THAN THEY APPEAR

By Michael Rathbone

Testimony Before the Joint Committee on Public Employee Retirement

The unfunded liabilities of the state's public pensions are an economic ticking time bomb, which the state is obligated to honor.

Michael Rathbone is a policy researcher at the Show-Me Institute, which promotes market solutions for Missouri public policy.

To the Honorable Members of This Committee:

My name is Michael Rathbone and I am a policy researcher for the Show-Me Institute, a nonprofit, nonpartisan Missouri-based think tank that supports free-market based solutions for state policy. The ideas presented here are my own. This testimony is intended to summarize research performed for the Show-Me Institute that analyzes the financial state of Missouri's public pensions.

The unfunded liabilities of the state's public pensions are an economic ticking time bomb, which the state is obligated to honor. By incorrectly assessing the risk of not being able to meet future liabilities, these pensions significantly underestimate the amount of additional funding they need in order to be financially secure. A new policy study for the Show-Me Institute shows that if these public employee pensions use a more appropriate discount rate, they pose a real threat to the state's finances.

If left unaddressed, the state faces a significant risk and policymakers will be forced to make drastic cuts to services or significantly raise taxes in order to meet the liabilities. The risk posed to Missourians' quality of life is a real and serious one. The study estimates that the liability equals nearly $9,000 for every Missourian.

Reforms to public pensions must begin with better economic accounting for risk and improved retirement plans that reduce taxpayer exposures to bad surprises in the future. Taxpayers, state officials, and public employees have all expressed concern about the financial health of Missouri's public pension plans for state employees. These plans' funding health has declined in recent years and current annual required contributions have increased.

Most Missouri public employees participate in one of five retirement plans:

- Missouri State Employees Retirement System

Reforms to public pensions must begin with better economic accounting for risk and improved retirement plans that reduce taxpayer exposures to bad surprises in the future.

(MOSERS)

- Highway and Transportation Employees' and Highway Patrol Retirement System (MPERS)
- Missouri Local Government Employees Retirement System (MOLAGERS)
- Public School Retirement System of Missouri (PSRS)
- Public Education Employee Retirement System of Missouri (PEERS)

Combined, these plans report unfunded liabilities as of 2012 of $11.1 billion and a funding ratio of 81 percent.

However, this official amount vastly underestimates the true liability of these pensions. In "Public Employee Pensions In Missouri: A Looming Crisis," a new policy study for the Show-Me Institute, Andrew G. Biggs finds that the real amount of unfunded liabilities is closer to $54 billion – which translates to nearly $9,000 for every man, woman, and child in the state.

Why is the value of these unfunded liabilities **five** times larger than official reports indicate?

According to Biggs, these public pensions are allowed to use a discount rate to calculate the present value of their plans' liabilities that is different from one that economic scholars such as Biggs use.

A discount rate is basically compound interest acting in reverse. If, for instance, I owed someone $10,000 five years from now, the discount rate tells me how much I would need to invest to ensure I can make that payment. The higher the rate, the lower the amount I need to invest. Assuming I could get a robust 12 percent annual return on my money, I would need to invest only $3,200 to repay my loan. However, if I believed I would only get an annual 4 percent return on my money, I would need to invest $6,800.

The state's public pension plans use discount rates between 7.25-8.25 percent. This enables them to assume their current assets will be worth more in order to pay off their liabilities. Biggs uses a lower rate that better accounts for the risks inherent in a portfolio with risky assets and guaranteed liabilities.

Missouri public pensions expect returns between 7.25-8.25 percent on their portfolios but their actual returns can be much higher or much lower than expected. This volatility brings with it an added risk: a major down year can have an adverse impact on the portfolio's assets. If, for instance, the state pensions had a 10 percent loss one year and a 10 percent gain the next year, they would still have suffered a net loss.

There is nearly universal support among economists for using low discount rates to value public pension liabilities. In October 2012, the University of Chicago's Booth School of Business surveyed a group of elite economists from varying fields of expertise and ideological outlooks. Ninety-eight percent of them agreed that public pension discount rates are too high. Biggs cites other research, from the Congressional Budget Office, the Federal Reserve, academic economists, and others, that all points to the same conclusion: the high discount rates that Missouri pensions use substantially underestimate the true value of these plans' benefit liabilities and overstate their funding health.

Currently, the state's largest public pensions are defined benefit (DB) plans. The state promises to pay its retirees a pre-determined monthly amount based on a variety of factors, including final salary, age, and tenure. To contain the growth of public pension liabilities, Biggs suggests that these plans might shift to a defined contribution (DC) structure similar to private sector 401(k)s.[1] By shifting away from DB plans and toward DC plans, the state can prevent the creation of new liabilities. With a DC

plan, employers promise employees a fixed contribution and once they make that contribution, the employers have fulfilled their obligation. Biggs contends that doing so will give state and local governments breathing room to address the unfunded liabilities already on their books. In addition to shifting to a DC plan, Biggs has suggested other methods to deal with the pension shortfalls, including ways to compensate for any surpluses/shortfalls that a pension might encounter.

The state's public pensions are not in good financial health. Even according to the overly optimistic calculations of the state's pensions, these plans still face a financial shortfall. According to Biggs' more realistic analysis, their total unfunded liability is much larger than their official financial statements would indicate. These are liabilities that the taxpayers are responsible for meeting. In order to protect taxpayers from significantly increased future burdens, the state should take preemptive steps to ensure these pensions can meet their obligations. These steps include (1) using a more realistic discount rate to accurately gauge the state's true pension obligations and (2) shifting away from defined benefit plans toward defined contribution plans. These steps will help to ensure that the state has a better picture of its pensions' financial conditions and prevent the accrual of additional liabilities.

NOTE

[1] I realize that there might be legal and political difficulties in making a transition to a defined contribution plan. This testimony is not intended to address these difficulties. It only highlights the desirability of making the transition.

Andrew G. Biggs finds that the real amount of unfunded liabilities is closer to $54 billion – which translates to nearly $9,000 for every man, woman, and child in the state.

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POLICY STUDY

NUMBER 36 MARCH 2013

PUBLIC EMPLOYEE PENSIONS IN MISSOURI:

A LOOMING CRISIS

By Andrew G. Biggs

Public Employee Pensions in Missouri: A Looming Crisis

By Andrew G. Biggs

Resident Scholar
American Enterprise Institute

INTRODUCTION

In Missouri and around the country, elected officials, taxpayers, and financial markets have expressed concerns about the financial health of defined benefit pension plans for state and local government workers. Public employees also are concerned, as many rely heavily upon these plans for income in retirement.

These pension plans have come under increased scrutiny as funding levels have dropped and required contributions have risen. According to standard actuarial accounting, the average public pension funding fell to about 75 percent in 2011, versus 103 percent in 2000.[1] The Annual Required Contributions that state and local governments make to public pensions have more than doubled in nominal terms since 2001, a period in which prices rose by only about 25 percent.[2] Public sector pensions, as of mid-2011, were underfunded by approximately $885 billion, based on accounting rules that the Governmental Accounting Standards Board established and applied to a large sample of plans from the Public Plans Database.[3]

A similar pattern holds for the Missouri public employee pensions, which serve state and local government employees. Annual required contributions have risen and measured funding health has declined. Most Missouri public employees participate in one of five retirement plans:

- Missouri State Employees Retirement System (MOSERS)
- Highway and Transportation Employees' and Highway Patrol Retirement System (MPERS)
- Missouri Local Government Employees Retirement System (MOLAGERS)

According to standard actuarial accounting, the average public pension funding fell to about 75 percent in 2011, versus 103 percent in 2000.

- Public School Retirement System of Missouri (PSRS)
- Public Education Employee Retirement System of Missouri (PEERS)

Together, they report unfunded liabilities as of 2012 of $11.1 billion and a combined funding ratio of 81 percent.

However, reports from academic economists and nonpartisan government agencies imply that the true state of public sector pension funding is far worse than suggested in official plan disclosures.[4] The accounting rules U.S. public sector pensions follow are more forgiving than those required for private sector pensions or public sector plans in other countries. So-called "fair market valuation" more fully reveals the value of public sector plan liabilities and shows that public employee plans are far less well-funded than commonly understood. In Missouri, the market valuation approach shows combined public employee plans to be only 46 percent funded, with unfunded liabilities approaching $54 billion.

While state and local governments around the country have enacted reforms to public sector pension plans — including contribution increases, less generous benefits for newly hired employees, and in some cases, reductions in cost of living adjustments (COLAs) for current beneficiaries — accurate accounting of public employee pension liabilities shows that elected officials must do much more to make these plans financially sustainable. Even if policymakers change the terms upon which future benefits are earned — a step which is both politically and legally problematic — the fact that existing pension liabilities are all but guaranteed implies that their true value is significantly higher than reported in public pension financial statements.

This paper describes how public employee pensions currently measure their financial health; discusses the consensus among economists that current accounting rules significantly understate pension liabilities and overstate pension funding levels; and describes how pension financing would appear using accounting rules similar to those required for private sector pensions or for public employee plans in other countries. Following that is discussion of objections to fair market valuation. Finally, we discuss the costs and benefits of potential reforms, including shifting to defined contribution or cash balance pension structures.

BACKGROUND ON PUBLIC EMPLOYEE PENSION PLANS

Most state and local governments provide a defined benefit pension plan for public employees as part of their overall compensation. These plans generally provide for retirement, disability, and survivors' benefits, and may either supplement or substitute for Social Security benefits. Defined benefit (DB) plans base retirement benefits upon a formula deriving from the employee's earnings and years of service; the plan sponsor bears any investment risk. DB pensions differ from the "defined contribution" (DC) 401(k)-type plans predominant in the private sector. In a DC plan, the employee is not guaranteed a fixed benefit at retirement. Rather, the employer contributes to the employee's

retirement account and the employee accepts any market risk associated with his investments.

Missouri's state and local pensions operate similarly to defined benefit pensions in the private sector. Once vested — usually after five years in Missouri — an employee becomes entitled to a benefit based upon a percentage of final salary. For MOSERS, for instance, "final salary" actually equals the average of the highest 36 consecutive months of compensation. This percentage of final salary is multiplied by the employees' number of years of service. Public pensions typically pay benefits equal to about 2 percent of final earnings per year of employment, although these replacement factors can differ from place to place, in particular, based upon whether the employee also participates in Social Security. In Missouri, teachers do not pay into Social Security so their replacement factor is higher, at 2.5 percent. Other Missouri plans in which workers do participate in Social Security receive a lower replacement of final salary, generally 1.6 percent to 1.7 percent.[5]

One important difference between public sector and private sector defined benefit pensions is that adjustment for inflation is virtually absent in private plans but common in public sector programs. Provisions for inflation adjustment vary significantly from plan to plan. In some cases, such as Missouri, adjustments to changes in the Consumer Price Index (CPI) are automatic. MOSERS, for instance, pays an annual COLA equal to 80 percent of the change in the CPI; the COLA is capped at 5 percent, and it cannot be negative even if prices fall. In some other states, post-retirement benefit increases are based on different formulas, and in others, they are discretionary or based on plan funding health.

Public sector pensions generally allow earlier retirement than in the private sector, in particular for public safety officers. Reductions in benefits for early retirement are usually smaller than actuarially fair, meaning that early retirees tend to receive higher total lifetime benefits over the course of their retirements.[6] As a result, public sector employees tend to retire at a younger age than private sector workers. In 2012, the average age of new retirees in MOSERS was 59.9 years, which is fairly typical of public plans across the country.[7] The typical age for first claiming Social Security benefits, by contrast, is closer to 63.

Public sector pensions are financed through a combination of employee and employer contributions and investment earnings. Nationwide, the average employee contribution rate as of 2009 was 6.4 percent of wages, according to the Public Plans Database, although contributions vary significantly from place to place. In Missouri, most non-education employees contribute relatively little toward their pensions. For instance, for many local employees, MOLAGERS is entirely non-contributory, while others pay about 4 percent of wages into the program. Newer MPERS employees hired since 2010 must contribute 4 percent of their pay, although MOSERS's actuarial report notes that rebates lowered the net employee contribution rate to 2.76 percent of pay.[8] Older MPERS employees do not contribute. Missouri teachers, by contrast, contribute

Reports from academic economists and nonpartisan government agencies imply that the true state of public sector pension funding is far worse than suggested in official plan disclosures.

14.5 percent of their pay toward pensions. In addition, state employees contribute 6.2 percent of pay to Social Security alongside a similar match from their employers.

Employer and employee contributions are invested in a range of assets, which are used as needed to fund benefits. The MOSERS portfolio consists of 45 percent stocks (equities), 30 percent fixed income investments, and 25 percent "alternative investment." This latter class consists of private equity, commodities, real estate, and other types of investments that generally produce higher returns than equities, though with greater risk.[9]

HOW PENSIONS VALUE THEIR LIABILITIES

Pensions compare their assets to their liabilities to calculate their financial health; that is, the investments they hold today relative to the benefits they must pay in the future. Using these figures, they calculate the funding ratio — that is, assets divided by liabilities — and the plan's unfunded liability, which is the net of assets and liabilities.

The key question for pension valuation is how to assign a value today to benefit liabilities that will be paid years or decades in the future. Because investments can earn interest, it is not necessary to contribute a full dollar today to fund each dollar of future liabilities. Without such a so-called "present value" it is impossible to accurately compare a pension's liabilities to the assets the plan holds today and thereby determine how well-funded it is.

The present value of a plan's liabilities is calculated using a method known as discounting, which is equivalent to compound interest in reverse. While compound interest involves taking a current dollar amount and adding interest each year, discounting begins with the future dollar amount and subtracts interest each year until a present value is determined.

The present value of a future dollar amount depends crucially upon the interest rate at which the liability is discounted. For instance, consider a debt of $1 to be paid 20 years from now. Assuming an 8 percent discount rate produces a present value of only 21 cents. At a 4 percent discount rate, however, the present value more than doubles to 46 cents.

Under current pension accounting rules, which the Governmental Accounting Standards Board establishes, a public pension plan discounts its liabilities using the rate of return the plan assumes will be generated by the portfolio of assets it holds. The average expected return on assets used in such valuations is close to 8 percent, with a range from 6 percent to 8.5 percent. Until recently, MOSERS assumed an 8.5 percent annual return, but today assumes a value of 8 percent. Missouri teachers and public school employees also assume 8 percent returns, while the Missouri Local employees' plan utilizes a 7.25 percent discount rate.

The discounted value of plan liabilities is then compared to the value of assets to calculate the plan's funding ratio (assets divided by liabilities) and its unfunded liability (assets minus liabilities). Table 1 uses figures from

In Missouri, the market valuation approach shows combined public employee plans to be only 46 percent funded, with unfunded liabilities approaching $54 billion.

the MOSERS 2012 actuarial valuation. The plan's liabilities, calculated using an 8 percent discount rate, equal approximately $10.8 billion. Its assets, by contrast, are worth only about $7.9 billion. This leaves an unfunded liability of nearly $2.9 billion and a funding ratio of slightly more than 73 percent.

Discount rates are also used to calculate the plan's Annual Required Contribution (ARC). The ARC consists of two separate costs: the "normal cost," which represents the cost of benefits accruing in a given year, and the cost of amortizing (or paying off) unfunded liabilities from prior years. Again, assuming an 8 percent discount rate, MOSERS has a total normal cost of 8.04 percent of employee payroll, 0.66 percentage points of which is offset by employee contributions. In addition, the cost of amortizing unfunded liabilities equals 9.60 percent of payroll, for a total employer contribution rate, or ARC, of 16.98 percent of pay.

Employer contributions to MOSERS have risen significantly over the past decade, from 9.35 percent of payroll in 2002 to 12.84 percent of payroll in 2006 to nearly 14 percent in 2011-12. While the contribution rate is calculated to be constant over time, it is likely contribution rates will increase to almost 17 percent in the 2013-14 fiscal year. The reason is that most plans, including Missouri's, calculate their funding ratios and the contributions necessary to reach full funding using a measure known as "actuarial assets." This measure "smooths" investment returns from year to year to produce a less volatile measure of plan financing. For instance, currently, the actuarial value of MOSERS assets exceeds the market value of those assets by about 4 percent, according to the plan's actuarial valuation. Over the next several years, the actuarial value of assets should be brought into line with the market value; this process should increase required contribution rates somewhat.

Even if policymakers change the terms upon which future benefits are earned — a step which is both politically and legally problematic — the fact that existing pension liabilities are all but guaranteed implies that their true value is significantly higher than reported in public pension financial statements.

TABLE 1

SUMMARY FINANCING INFORMATION FOR MOSERS AS OF JUNE 2012

Total Actuarial Accrued Liability	**$10,793,651,577**
Actuarial Value Of Assets	**$7,897,167,203**
Unfunded Actuarial Accrued Liability	**$2,896,484,374**
Funded Ratio	**73.20%**

Source: 2012 Actuarial Valuation

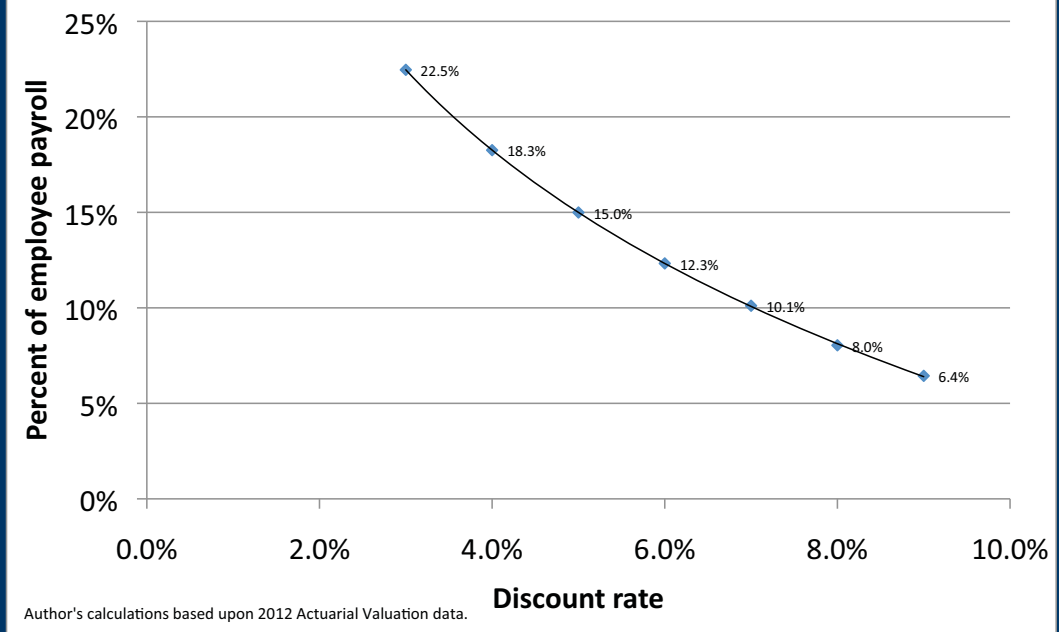
Most state and local governments provide a defined benefit pension plan for public employees as part of their overall compensation. These plans generally provide for retirement, disability, and survivors' benefits, and may either supplement or substitute for Social Security benefits.

As noted previously, the reported funding health of a plan is extremely sensitive to the discount rate chosen. Figure 1 shows estimates of the variation in normal costs along with the discount rate, based upon a limited sensitivity analysis contained in the MOSERS 2012 actuarial valuation. As Figure 1 shows, the total normal cost of the plan rises rapidly as the discount rate falls. At the assumed return of 8 percent, the normal cost equals 8.04 percent of employee pay, all but 0.66 percentages of which the employer bears. At a 6 percent rate, the normal cost rises to 12.3 percent of pay; at a 4 percent rate, it reaches 18.3 percent of wages.[10]

Amortization costs also would increase, though by a slightly smaller rate than the employer's normal costs. This difference occurs for two reasons. First, because the employee contribution toward normal costs is generally fixed, the employer is responsible for all increases in the total normal cost, not merely the proportionate share that it ordinarily pays. Second, the effect of the discount rate depends upon the duration of the plan's liabilities. New benefits earned this year have a longer average duration than unfunded benefits that already have been earned, so the effects of changes in the discount rate are slightly smaller.

The MOSERS and other Missouri pension reports do not provide data to easily estimate the effect of a changing discount rate on amortization costs. For that reason, I turn to an analysis of the Florida Retirement System (FRS), which its actuaries conducted on behalf of the program. In that analysis, the FRS actuaries calculated normal costs and amortization costs for the various FRS plans using a wide range of discount rates.[11] On average, normal costs in the FRS increased by about 30 percent

FIGURE 1: Total Normal Cost of MOSERS at Different Discount Rates



Author's calculations based upon 2012 Actuarial Valuation data.

for each percentage point the discount rate was reduced. This pattern is similar across the FRS plans, as well as similar to calculations that actuaries conducted for plans in the states of Washington, California, and Colorado. While the applicability of the Florida simulations to MOSERS depends upon the specifics of the plans, the average age of active employees is almost identical in both plans. Other factors may differ, however. With those caveats in mind, lowering the discount rate from 8 percent to 4 percent would raise annual amortization costs from 9.6 percent of total employee wages to approximately 68 percent of pay. Under GASB's newly issued Rules 67 and 68, beginning in 2013, pensions will be required to publish actuarial figures using discount rates 1 percentage point above and 1 percentage point below the plan's chosen rate. Thus, Missouri plans soon may be publishing similar calculations themselves. The variation in the plan's costs as the discount rate changes illustrates the degree to which a plan's funding health depends upon the higher returns generated by risky investments.

Combining the effects on normal costs and amortization costs, a lower discount rate or investment return could easily make Missouri pension plans appear unaffordable to the taxpayer. Thus, the importance of a seemingly arcane debate about the proper pension discount rate should not be underestimated.

THE FAIR MARKET VALUATION CRITIQUE

At first glance, the current approach to measuring pension liabilities that GASB established makes perfect sense: if you expect plan assets to appreciate 8 percent per year, then discounting the plan's liabilities at 8 percent will tell you the exact assets the plan would need to hold today in order to meet its liabilities in the future. If the plan is underfunded, it will tell you the extra contributions you must make in order to bring the plan back to full funding. In this way, the current GASB rules may appear to be more "realistic" than alternative approaches.

For this reason, many — including many pension actuaries and plan managers — are puzzled that financial economists believe the discount rate applied to a benefit liability should have *nothing* to do with how the plan's assets are invested. Pension insiders often are surprised to hear that this is how the vast majority of economists view the valuation argument, and it is also how private financial markets assign values to liabilities. This section discusses why that is the case.

To economists, the discount rate you apply to a liability should be based on the risk of the liability itself, *not* of any assets used to fund the liability.[12] If public pension benefits are guaranteed — as they are intended to be, and as legal rulings and state constitutions have determined them to be — then they should be discounted using the interest rates that the markets pay on guaranteed investments, such as U.S. Treasury securities.[13] Even if the Missouri government were capable of changing the terms on which future benefits are accrued — a step which is politically difficult and in many cases legally problematic — benefits that already have been earned are effectively guaranteed under contract provisions of the Missouri Constitution. These accrued benefits constitute the liabilities that pension valuations seek to quantify.

Defined benefit (DB) plans base retirement benefits upon a formula deriving from the employee's earnings and years of service; the plan sponsor bears any investment risk.

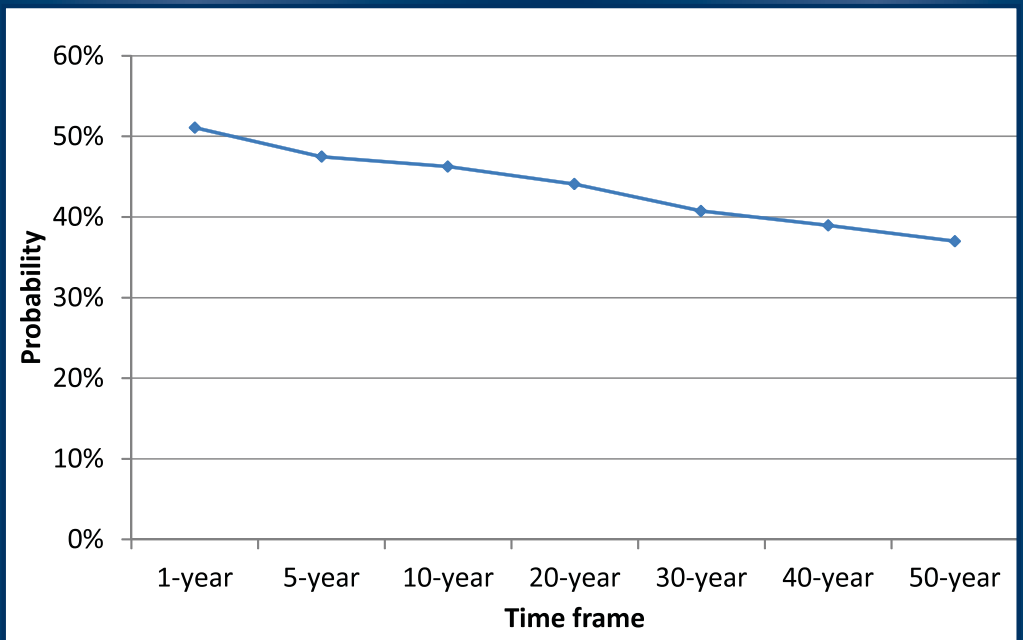
In a DC (defined contribution) plan, the employee is not guaranteed a fixed benefit at retirement. Rather, the employer contributes to the employee's retirement account and the employee accepts any market risk associated with his investments.

While stocks, bonds, and alternative investments have high expected returns, they also can be very risky. In fact, their high expected returns are nothing other than compensation for the fact that, while these returns may be *expected*, they are not guaranteed. An analysis of MOSERS investments easily demonstrates this fact.

MOSERS assumes an 8 percent annual return on its investment portfolio. While there are reasons to believe this assumption may be over-optimistic, for these purposes we will take it as a given.[14] This portfolio, according to a 2009 analysis for MOSERS by the Summit Strategy Group, has an expected standard deviation of annual returns of 10.4 percent. The standard deviation is a measure of risk of how far year-to-year returns tend to vary from the long-term average return. Using these assumptions, it is possible to simulate how MOSERS investments will fare over certain periods of time.

For instance, what is the probability that MOSERS will achieve its projected 8 percent return over the next 10 years? 20 years? 50 years? The results illustrated in Figure 2 show that the plan has an almost 50-50 chance of earning 8 percent returns over a single year — that result is essentially by definition — but over longer time periods, the chance of meeting or exceeding 8 percent average returns falls well below 50 percent. Over 20 years, the probability is only 44 percent and over 50 years, it is 37 percent. These results should not be in dispute, because they closely mimic those of the 2009 Summit report. They occur because the 8 percent return that Missouri pensions assume is an "arithmetic mean," which denotes a simple average of a number of annual

FIGURE 2: Probability of MOSERS Portfolio Achieving 8% Return Over Varying Time Periods



Based on 5,000 simulations with mean return of 8% and standard deviation of returns 10.4%.

returns. An 8 percent discount rate applied to pension liabilities, by contrast, is a "geometric mean" or "compound return" that abstracts from the volatility of year-to-year returns. So long as annual returns are volatile, the arithmetic mean will be below the geometric mean. This demonstrates the degree to which public pension accounting ignores risk. Under GASB rules, a Missouri public pension could call itself "fully funded" even if it had a less than 50 percent probability of being able to meet its current obligations with the assets it has on hand.

Yet, while MOSERS has a less than 50 percent probability of meeting its projected investment returns, it nevertheless has a 100 percent legal *obligation* to pay the benefits that those returns finance. Missouri courts have ruled that vested pension benefits are protected by constitutional protections for contracts.[15] As the Summit investment report notes, "Because the benefit is a legal obligation of the state, any shortfall must be paid for by higher future investment returns [and/or] higher contributions."

The mismatch between the high risk of the pension portfolio and the low risk of the pension's benefits creates a *contingent liability* to pay full benefits even if the pension's investments do not produce the expected returns. This obligation represents an additional cost to the taxpayer over and above the cost of current contributions. The fair market valuation approach is designed to capture the value of benefits not simply expected to be paid, but *guaranteed* to be paid. Current pension accounting standards ignore the value of this contingent liability.

The way to calculate the full value of public pension liabilities is through a risk-adjusted discount rate; that is, an interest rate derived from investments that have approximately the same risk as the liability to which the discount rate is being applied.

UNDERSTANDING MARKET RISK AND CONTINGENT LIABILITIES

Economists agree that a risk-adjusted discount rate is the best way to capture the true value of public pension liabilities. But why? The following section illustrates one way of understanding this issue.

Consider a pension that owes a guaranteed lump sum payment of $1 million in 15 years' time. Under GASB accounting rules, if the plan invests $301,194 today — the current value of $1 million discounted at an 8 percent interest rate[16] — it can call itself fully funded. This investment path is illustrated using the blue line in Figure 3.

But according to market valuation, if this payment is indeed riskless, it should be discounted at a riskless interest rate. If the riskless return is 4 percent, the true value of the liability is $548,812, almost twice as much up front as is required under the actuarial approach. This is represented as the red line in Figure 3. This illustration should demonstrate why most pension interests — governments, public employees, plan managers, and so on — prefer the actuarial approach.

If the pension's assets have an expected return of 8 percent, then investing $301,194 today will deliver an *expected* payoff of $1 million in 15 years.

Changing plan structures, to either a defined contribution or cash balance approach, will not eliminate existing unfunded liabilities.

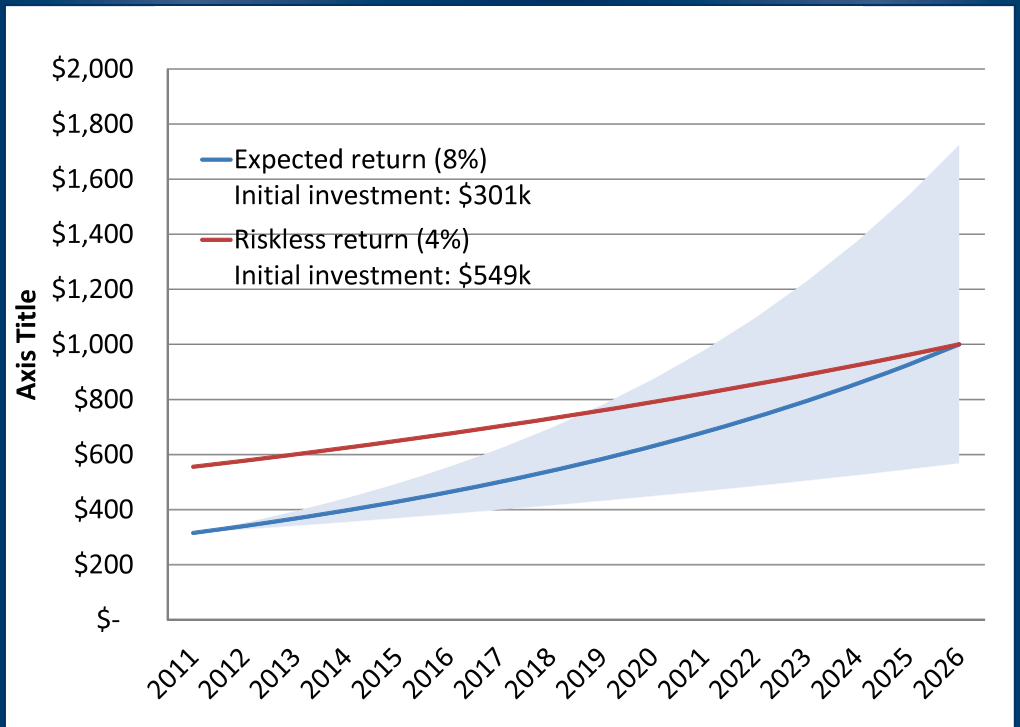
One important difference between public sector and private sector defined benefit pensions is that adjustment for inflation is virtually absent in private plans but common in public sector programs.

The problem is that assets with an expected return of 8 percent cannot produce such a return with certainty, meaning that the portfolio's value after 15 years will almost certainly end up being higher or lower than the desired $1 million. In other words, rather than a single blue line in Figure 3 representing investment in risky assets, a better representation is through an area (shown in light blue) illustrating a range of possible outcomes — approximately half of which exceed the $1 million goal, with the remaining half falling short.[17] No matter how well a pension plan manages its investments, it cannot generate 8 percent returns with certainty. The actual return the plan receives is based on the luck of the draw. Given that the benefits must be paid 100 percent of the time, a plan that has, at best, a 50 percent chance of being able to meet its obligations is not "fully funded" in the way that most laymen or policymakers would interpret the term.

In reality, a plan seeks neither to overshoot nor undershoot. If the plan's investments exceed their projected return, that means the initial contribution could have been smaller. Alternately, if the investments come up short of their goal, the plan will not be able to pay what it owes and must turn to the taxpayer for additional funds.

However, there are financial products — called "options" — that provide a solution. A "call option" allows the pension plan to sell off any surplus if the plan's investment turns out to be worth more than $1 million. A plan that sells a call option can use the proceeds to offset the cost of the initial

FIGURE 3: Illustrating Fair Market Valuation of Liabilities



investment, thereby eliminating the costs of overshooting the pension's goal.

Likewise, a "put option" can be purchased to top up the difference between the assets' actual value and $1 million if the investment comes up short. The put option protects against outcomes in which the plan's investments fall short. So, barring some catastrophic collapse of financial markets, the plan will *always* be able to pay *exactly* the promised $1 million, with no wasted money, if it invests $301,194 in safe assets and sells a call option to dispose of any surplus *and* purchases a put option to cover any shortfall.

This means that the cost of truly fully funding the $1 million future liability — meaning, funding it so that it is guaranteed to be paid without recourse to a taxpayer bailout and without any wasted surplus — is the $301,194 initial investment *minus* the $11,436 proceeds from selling the call option, *plus* the $259,053 cost of purchasing the put option. The net cost is $548,812, precisely the same as if the liability had been discounted and funded using the 4 percent riskless rate of return.[18]

The net cost of the put and call options represents the value of the contingent liabilities that have been placed upon future taxpayers based upon funding decisions made today. This cost is *not* a worst-case scenario, as some believe. Rather, it represents the price that future taxpayers would willingly pay to rid themselves of the *risk* of being called on to made good on promises that were made, and should have been paid for, by today's taxpayers.

This example also helps explain a number of points that are raised in the debate about pension valuation. First, the total cost of the liability will always be the same regardless of how the plan chooses to invest. A more conservative pension might invest larger amounts in more conservative assets, increasing costs for current taxpayers but leaving smaller contingent liabilities on future generations. Alternately, a more aggressive plan might make smaller upfront contributions but invest them in riskier assets. This reduces costs today, but generates a matching increase in the value of the contingent liability on future taxpayers. It is not a result unique to the plan investing in a portfolio with an 8 percent expected return. Investing in portfolios with greater or lesser risk will change the values of the initial contribution and of the put and call options, but the total liability cost will not change. Importantly, the total liability will have the same value regardless of how the pension plan chooses to invest.[19]

Second, this example illustrates that fair market valuation is not an academic exercise with no relevance to the actual investments public pensions make. The cost of the put and call options is determined in the market and is based upon the riskless return available in the market and upon the risk of the investments the plan holds. In other words, it makes sense to discount riskless pension liabilities using a riskless interest rate.

In Missouri, most non-education employees contribute relatively little toward their pensions.

HOW DOES MISSOURI PENSION FINANCING LOOK UNDER FAIR MARKET VALUATION?

The first step to determining an accurate estimate of public pension liabilities is to choose the appropriate discount rate. We know from the previous discussion that discounting guaranteed benefit liabilities using an interest rate derived from risky portfolio investments is incorrect. We also know that the discount rate used to value government guaranteed benefits should be derived from an investment whose risk matches that of the pension liabilities being valued. Thus, while there is little disagreement among economists regarding how to choose an appropriate discount rate, there is some controversy among economists regarding a specific interest rate to use.

Perhaps the simplest approach is to use bond yields from the government sponsoring the pension plan. After all, both pension benefits and bond payments represent future payments of cash, which the same government guarantees. Currently, Missouri municipal bonds with a duration of 15 years — about the average for public pension liabilities — have a yield of about 2.8 percent.[28] If you consider Missouri pension benefits to have

WHAT DO EXPERTS SAY ABOUT GASB PENSION ACCOUNTING RULES?

The preceding sections summarize the economic argument against the current GASB pension accounting rules and how they disguise the value of public employee compensation. It is worth noting that the vast majority of academic economists and nonpartisan government agencies take the same position regarding how to value public pension liabilities.

Donald Kohn, then-vice chairman of the Federal Reserve Board, declared in 2008:

> While economists are famous for disagreeing with each other on virtually every other conceivable issue, when it comes to this one there is no professional disagreement: The only appropriate way to calculate the present value of a very-low-risk liability is to use a very-low-risk discount rate.[20]

Similarly, the Fed's director of research and statistics, David W. Wilcox, testified in 2008 that:

> These [public pension benefits] happen to be really simple cash flows to value. They're free of credit risk. There's only one conceptually right answer to how you discount those cash flows. You use discount rates that are free of credit risk. This is one of those things where it just really is that simple.[21]

In a 2009 research paper, two economists from the federal Bureau of Economic Analysis (BEA) noted:

> If the assets of a defined-benefit plan are insufficient to pay promised benefits, the plan sponsor must cover the shortfall. This obligation represents an additional source of pension wealth for participants in an underfunded plan.[22]

Based on this logic, the BEA recently stated that, "Contributions aren't always a good approximation for the value of benefits accrued through service."[23]

Beginning in 2013, the national income and product accounts, which are the official "books" of the United States economy, will measure public pension liabilities using a market-based tool that captures the value of benefit guarantees to employees. This means that liabilities that the pension plans report will now be inconsistent with those same liabilities as reported in the official ledger books of the United States.

In 2011, the Congressional Budget Office issued a report that was widely taken as a confirmation of the market valuation approach:

> By using the expected return on a pension plan's assets to discount future payments to beneficiaries, the guidelines issued by the Government Accounting Standards Board (GASB) implicitly reflect an assumption that the risk to workers that states and localities will fail to pay future retirement benefits is the same as

about the same risk as explicit debt that Missouri governments issue, this is the appropriate discount rate to use.[29]

It is worth noting, however, that the discount rate appropriate to value pension benefits is time-specific: that is, if bond rates rise or fall in the future, then the appropriate discount rate — and the value of liabilities and the cost of funding accruing benefits — will shift up or down as well, and by a significant margin. This is sometimes portrayed as a failing of market valuation. This objection is incorrect for several reasons. First, any year-to-year fluctuation in liabilities based on changing interest rates is real: if you wish to guarantee payment of some given dollar amount in the future, it actually is cheaper to do it when interest rates are high instead of when they are low — just as it actually *is* cheaper to purchase a house when mortgage interest rates are low. Pretending otherwise does not make sense. Alternately, to put it in the context of a pension's current investment policy of attempting to target an 8 percent annual return, it is easier to do so — meaning, it can be done with less risk — when interest rates on low-risk assets are high rather than when they are low.

> the risk that expected returns on the plan's assets will not be realized. In fact, because the risk to future payments to beneficiaries is generally much less than the risk to the returns on typical assets held by pension plans, standard financial principles of valuation suggest that future benefit payments be discounted at a lower rate than under GASB's guidelines… By accounting for the different risks associated with investment returns and benefit payments, the fair-value approach provides a more complete and transparent measure of the costs of pension obligations…[24]

In October 2012, the IGM Forum at the University of Chicago's Booth School of Business surveyed 39 professional economists with regard to public pension discount rates. This group of highly respected economists represents differing areas of expertise and a wide variety of outlooks on the role of government. They were asked to express their agreement or disagreement with the following statement:

> By discounting pension liabilities at high interest rates under government accounting standards, many U.S. state and local governments understate their pension liabilities and the costs of providing pensions to public-sector workers.

Ninety-eight percent of the economists surveyed agreed with this proposition, with 49 percent agreeing strongly. None of the economists surveyed disagreed (a small percentage were unsure).[25]

Also in 2012, the Moody's Investor Services announced that its ratings of state and local government debt would no longer incorporate pension liabilities as measured under GASB rules. Instead, Moody's would discount pension liabilities using a corporate bond yield, similar to the way in which private pension liabilities are measured.

Indeed, in response to criticism of its standards methods, GASB recently announced revisions to its rules that would lower the discount rate applied to public pension liabilities, albeit not nearly so far as most independent analysts would advocate. Under these new rules, pensions could apply the expected rate of return on assets only to liabilities that could be expected to be funded by those assets. Liabilities taking place in years after which assets are expected to be depleted would be discounted using a municipal bond rate.

GASB's proposed revisions have both theoretical and practical flaws.[26] The State Budget Crisis Taskforce, co-chaired by former New York State Lieutenant Governor Richard Ravitch and former Federal Reserve Board Chairman Paul Volker, stated that even GASB's proposed rules would "fall far short of what finance experts argue is appropriate and reported unfunded liabilities will not increase anywhere near as much as they would under a pure finance approach."[27]

Pensions compare their assets to their liabilities to calculate their financial health; that is, the investments they hold today relative to the benefits they must pay in the future. Using these figures, they calculate the funding ratio — that is, assets divided by liabilities — and the plan's unfunded liability, which is the net of assets and liabilities.

Second, plans can easily hedge against interest rate risks by holding low-risk bonds in their investment portfolios; if interest rates on newly issued bonds fell, thereby increasing the value of the plan's liabilities, a portfolio of existing bonds would rise in value due to their higher prices, keeping plan funding levels about constant. The fact that public pensions choose not to hedge their interest rate risk is not a reason for accounting rules to cover it up. Finally, a central point of fair market valuation is that how a plan is funded is distinct from the value of its liabilities. If a plan chooses to fund its liabilities on a smoothed basis to avoid year-to-year fluctuations in contribution rates, that is a policy decision distinct from the value of those liabilities at any given time.

While municipal bonds may appear to be the appropriate source for pension discount rates, Brown and Wilcox (2009) point out that in practice, accrued public pension liabilities have proven to be safer than explicit state/local government debt.[30] Even when localities have effectively defaulted on their obligations, such as with New York City in the 1970s or Orange County, Calif., in the 1990s, pension benefits continued to be paid. Thus, Brown and Wilcox argue that a derivative of U.S. Treasury yields is the most appropriate.[31]

For simplicity, the calculations in Table 2 are based upon a 4 percent discount rate. This rate is above current Treasury or Missouri municipal yields, but might be thought of as approximating rates over a longer period of time.

In all cases, funding ratios decline and unfunded liabilities grow. For instance, MOSERS falls from a funding ratio of 73 percent to only 42 percent, while unfunded liabilities rise from $2.9 billion to $11.1 billion. Under fair market valuation, MPERS is particularly poorly funded; it began with a GASB funding ratio of only 43 percent, itself based upon an aggressive 8.25 percent discount rate. Under fair market valuation, MPERS's funding ratio falls to below 24 percent.

While all plans suffer, the effects of fair market valuation on unfunded liabilities and funding ratios are smaller for the Missouri local plan than the others, because MOLAGERS's 7.25 percent assumed return is lower than the 8 to 8.25 percent rates that other plans assumed. In other words, MOLAGERS depends less upon market risk to derive its baseline GASB funding results, so it suffers less from a shift to fair market valuation.

Overall, the five Missouri pensions together are 46 percent funded using a risk-adjusted 4 percent discount rate. Unfunded liabilities total nearly $54 billion, far above the $11 billion figure calculated using GASB assumptions. The difference between the two represents the degree to which Missouri pension plans depend upon an investment risk premium to make their financing viable. This difference also represents the size of the contingent liabilities imposed on future taxpayers.

WHY DOES IT COST SO MUCH TO GUARANTEE FUTURE PENSIONS?

The results already presented may strike some as counterintuitive. Yes, the idea of contingent liabilities makes sense, and guaranteeing against them presumably

increases the cost of pension funding. But does it double the cost? Why are these results so extreme?

We first point out that these results are not derived simply from theory, or from how much some academic says a fully funded pension "should" cost. These results are consistent with the choices investors make every day as they buy and sell risk in financial markets. So there should not be much question that they are true. Rather, it is a question of understanding why individuals value risk the way they do.

The answer is that uncertainty regarding pension financing poses significant costs for the taxpayer. Not simply because they cannot plan ahead, nor because they would rather pay a single constant contribution rate rather than high rates in some years and low rates in others. It is because stock prices are correlated with the state of the economy. This means that plans will become underfunded during bad economic times. Contributions to pensions will need to rise at the same time that tax revenues are low, unemployment is high, and taxpayers have already seen their own 401(k) balance hit. As the state of Washington's actuary has written with regard to its own plans' experiences, "Weak economic environments were correlated with weak investment returns. Lower investment returns created the need for increased contributions at a time when employers and members could least afford them."[32]

This has been the experience around the country: amidst a recession, scarce government resources have been reallocated to pension funding, demanding either higher taxes or reduced expenditures on other government programs. This helps illustrate why a market valuation approach

Under current pension accounting rules, which the Governmental Accounting Standards Board establishes, a public pension plan discounts its liabilities using the rate of return the plan assumes will be generated by the portfolio of assets it holds.

TABLE 2: Missouri Pension Financing Under GASB Accounting and Fair Market Valuation

	MOSERS	MOLAGERS	MPERS	PSRS	PEERS	Total
Expected return	8%	7.25%	8.25%	8%	8%	8%
Liabilities	$10,793,651,577	$5,120,274,198	$3,297,589,869	$34,383,430,575	$3,549,348,463	$57,144,294,682
Assets	$7,897,167,203	$4,274,440,345	$1,427,290,718	$29,387,486,429	$3,028,757,171	$46,015,141,866
UAAL	$2,896,484,374	$845,833,853	$1,870,299,151	$4,995,944,146	$520,591,292	$11,129,152,816
Funding ratio	73.2%	83.5%	43.3%	85.5%	85.3%	80.5%
Risk-adjusted discount rate	4%	4%	4%	4%	4%	4%
Liabilities	$19,011,861,315	$8,123,676,900	$6,013,331,223	$60,562,730,689	$6,251,797,203	$99,963,397,330
UAAL	$11,114,694,112	$3,849,236,555	$4,586,040,505	$31,175,244,260	$3,223,040,032	$53,948,255,464
Funding ratio	41.5%	52.6%	23.7%	48.5%	48.4%	46.0%

Source: Author's calculations from most recent plan CAFRs and actuarial valuations.

[T]he reported funding health of a plan is extremely sensitive to the discount rate chosen.

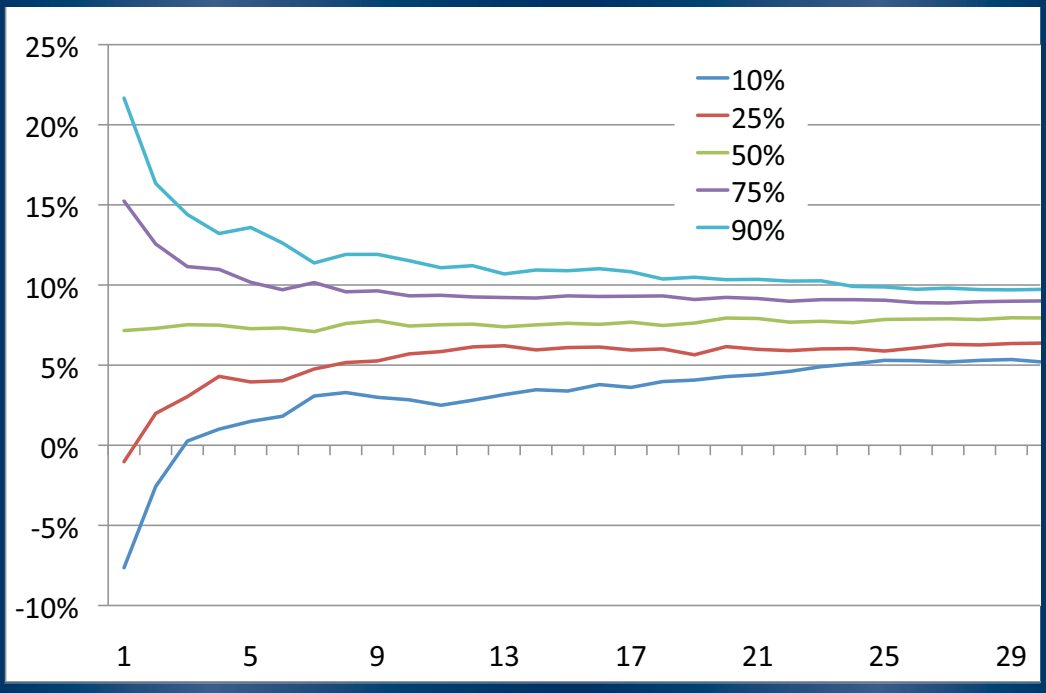
makes sense: it is not "the government" that bears the risk of pension funding. As the Congressional Budget Office points out, "The government does not have a capacity to bear risk on its own."[33] Rather, government *transfers* risk between different stakeholders, who include taxpayers, public employees, bondholders, and those who receive funds from the government. Thus, it makes sense to value that risk as these stakeholders do, using market prices that reflect how much individuals demand in order to bear risk and how much they are willing to pay to part with it.

In order to avoid such risk, taxpayers would be willing to pay a single constant pension contribution rate through good times and bad, even if that rate were significantly higher than the average of the varying rates paid using investment returns that were high but uncertain. How do we know this? Through the behavior of investors in financial markets every day. Millions of knowledgeable investors around the world hold safe investments such as long-term U.S. Treasury securities, with durations up to 30 years, instead of riskier but higher-yielding investments such as stocks. The low yields offered on such safe investments reflect the returns investors are willing to forgo in order to receive protection against the small — but *not* zero —chance of doing even worse. Thus, while some have mistakenly interpreted a riskless discount rate as a "worst-case scenario,"[34] a moment's reflection shows why this cannot be the case.

OBJECTION: LONG TIME HORIZONS

The behavior of investors belies that claim from public pensions that the "long-term" nature of their investing allows them to effectively ignore risk.

FIGURE 4: Distribution of Mean Returns Over Varying Holding Periods



This claim is based on the idea of "time diversification," which holds that the risk of investments, like stocks, declines over longer holding periods. If the government is perpetual, then it can focus on the long term and ignore shorter-term risk. The problem is that most financial economists believe that such ideas about "diversifying over time" are wrong. Indeed, a simple Internet search on that phrase "time diversification" will often pair it with the words "fallacy," "myth," and other such hints that caution should be used in applying the theory to multi-billion dollar investments. Even the investment firm Vanguard — well-known as an advocate of buy-and-hold investing — states that "there is little evidence to support the notion that time moderates the perceived volatility inherent in risky assets."[35]

Why is this the case? To illustrate, Figure 4 simulates the distribution of investment returns over different holding periods, assuming an 8 percent mean return and a standard deviation of returns of 10.4 percent. In the first year, returns vary significantly: 10 percent of returns are above 22 percent and another 10 percent are losses greater than -8 percent. But as the holding period increases, the distribution of average returns narrows. After 30 years, for instance, the 10th-90th percentile values have fallen to 10 percent and 5 percent, respectively. These figures appear to support the view that long-term investors need not worry about risk.

But now consider an alternate illustration based on the same underlying data. Instead of looking at rates of return, we look at actual dollar amounts. Using the same returns, we calculate the end value of $1 invested and held over varying lengths of time (Figure 5). While average returns appear to grow less risky over time, the opposite is the case for the actual dollar amounts invested. For instance, after a single year of investment, the median value is $1.06 and 80 percent of outcomes lie between 95 cents and $1.19, a gap difference of about 10 percent on the high and the low sides. After 10 years, however, the worst 10 percent of outcomes are worth 30 percent less than the typical outcome; after 20 years, the gap is 49 percent and after 30 years, 53 percent. A similar pattern holds for returns lying above the mean.

The simulation demonstrates an ever-widening distribution of investment outcomes and this distribution never narrows, no matter how long the investment is held. How are these two results consistent? It is because the effect of compounding over long time periods trumps the effects of a narrower distribution of average returns. And public pensions do not pay benefits with average rates of return; they pay them with dollars of investment income. The risk to that investment income does *not* shrink over time. This explains why guarantees against low market returns — which should be less expensive over long periods, if the time diversification argument is correct — actually grow *more* expensive over time.[36]

As Nobel Laureate Paul Samuelson put it:

> Invest for the long term, the theory goes, and the risk lessens. Is the dogma true as told? Alas, no. … Most of the time the buy-and-hold common stock investors do beat their more cautious

Under GASB's newly issued Rules 67 and 68, beginning in 2013, pensions will be required to publish actuarial figures using discount rates 1 percentage point above and 1 percentage point below the plan's chosen rate.

If public pension benefits are guaranteed — as they are intended to be, and as legal rulings and state constitutions have determined them to be — then they should be discounted using the interest rates that the markets pay on guaranteed investments, such as U.S. Treasury securities.

> neighbors; and, as the time horizon becomes larger, the odds do grow that the bold holders of stock will win the duel. But it is also true that a longer time horizon brings bigger losses when an inevitable loss does occur. … Ask yourself: Will stepping down toward a poverty level, when that rarely but inevitably does happen, outweigh for me the pleasures that occur in those likely outcomes when my equity nest egg does increase?[37]

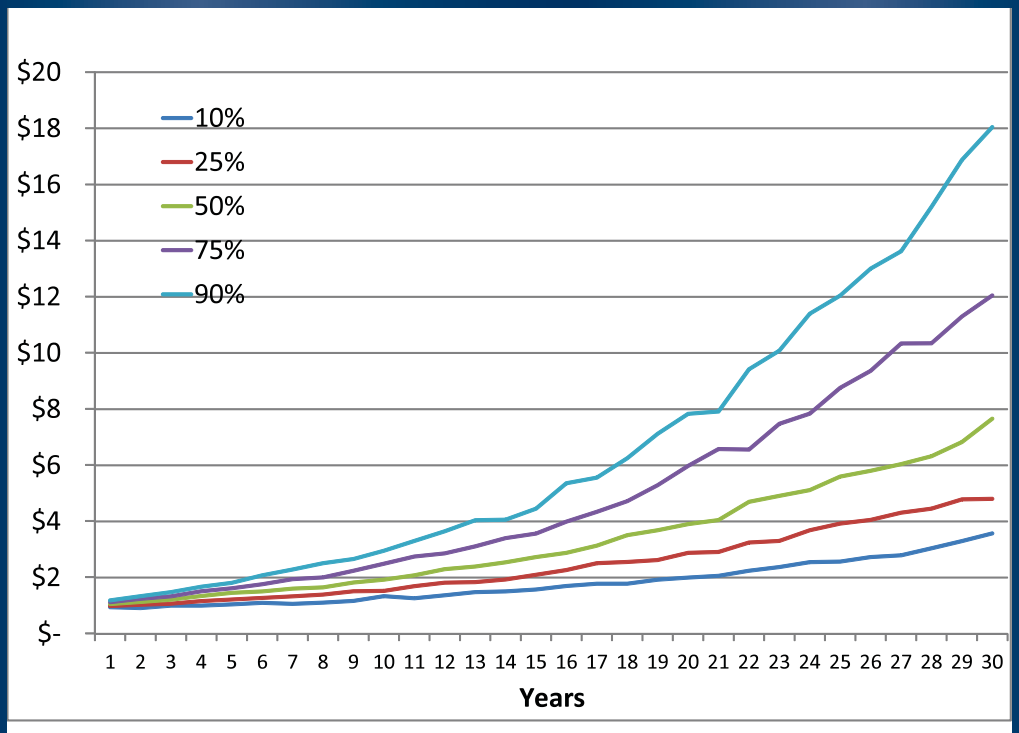
Thus, the claim that the long time horizons for public pension financing allow the plans to ignore market risk lacks support among experts in the field.

HOW DO OTHER PENSION PLANS MEASURE THEIR FINANCING?

It is worth noting that pension plans in other sectors value their liabilities differently than U.S. public plans. Private sector corporate DB pensions are required to value their liabilities using the yield on a portfolio of high quality corporate bonds. As of November 2012, the yield in the Citibank Liability Index was 3.9 percent.

Discounting corporate pension liabilities using a corporate bond rate makes sense: the yield on corporate bonds is based upon the low, but not zero, probability that the corporation will go bankrupt and default on its payments. In such a case, the corporation also would likely default on its pension benefits (in reality, the plan would be passed off to the Pension Benefit Guaranty Corporation, which, up to a limit, insures most benefits against loss. Employer contributions finance this coverage and thus the coverage is distinct from the discount rate to be applied to the plan's

FIGURE 5: Distribution of Values of $1 Initial Investment



liabilities.) In other words, the risk of the discount rate roughly matches the risk of the benefit liabilities. Public employee pensions are safer than corporate pensions in that their benefits generally are guaranteed in full by law and the plan sponsor — the government — has the power to tax. This indicates that the public pension discount rate should be *lower* than the corporate rate, not more than 4 percentage points higher.

The common response when discount rates for private DB plans are raised is that private plans should use low rates because, unlike public plans, there is the chance that a private pension could be discontinued. A public plan, it is said, is perpetual and therefore different rules should apply. In fact, because public plans are assumed not to go out of business, it also should be assumed they will continue to pay benefits in full. If so, a public plan's liabilities should be considered more binding than those of a private pension and thus a *lower*, not a higher, discount rate should be used.

If GASB-type accounting rules were the most appropriate for public employee plans, one would expect that public employee plans in other countries would follow similar accounting practices as U.S. public plans. In fact, most do not. In Canada, public employee pensions must follow similar rules to U.S private plans. In the Netherlands, public funds discount their liabilities using the riskless rate of return, such as from U.S. Treasury securities, which currently yield about 1.75 percent over 10 years and 2.5 percent over 20 years. In the United Kingdom, public plans discount their liabilities at 3 percent, the expected growth rate of gross domestic product.[38]

In addition, standards established by the International Public Sector Accounting Standards Board (IPSASB) — essentially the international version of GASB — dictate that the discount rate should not incorporate a risk premium. The standards also say that they should be based upon government bonds or high-quality corporate bonds, not, as is the case for U.S public pensions, on the expected return on stocks, private equity, or hedge funds.

Thus, the accounting rules for U.S. public pensions are at odds with how similar pensions are regulated both here and abroad. Finally, as pointed out earlier, almost no government agency other than GASB accepts the "government is special" argument. Beginning in 2013, the National Income and Product Accounts calculated by the federal Bureau of Economic Analysis will measure pension obligations using fair market valuation techniques. That is to say, pension liabilities that the plans report will now be inconsistent with those same liabilities as reported in the official ledger book of the United States economy.[39]

HOW DO PENSION ACCOUNTING RULES AFFECT RISK-TAKING?

The debate about pension accounting rules is not merely an argument about valuation of liabilities, important as that may be. Because investments with higher risk have higher expected returns, current actuarial standards incorrectly imply that a pension plan that takes more risk immediately becomes better funded as a result. For instance, if pension plans across the country shift from portfolios with an expected return of 8 percent

The way to calculate the full value of public pension liabilities is through a risk-adjusted discount rate; that is, an interest rate derived from investments that have approximately the same risk as the liability to which the discount rate is being applied.

Overall, the five Missouri pensions together are 46 percent funded using a risk-adjusted 4 percent discount rate. Unfunded liabilities total nearly $54 billion, far above the $11 billion figure calculated using GASB assumptions.

to riskier investments with expected returns of 8.5 percent, the value of their liabilities — under GASB accounting rules, at least — would immediately decline by about 10 percent, before a single penny of higher returns is earned.

The effect of discounting at the expected return on a risky investment portfolio is so powerful that a pension could improve its financial health — again, according to GASB rules — by literally *burning* any safe assets in its portfolio.[40] Destroying cash or Treasury bonds would reduce the plan's assets, but would shift the overall portfolio toward higher risk and higher expected returns, which allows for a higher discount rate to be applied to liabilities. The fact that it is better to assume high returns for the future than to actually have money today illustrates the absurdity of GASB's accounting rules. Robert Merton, winner of the Nobel Prize in economics, warns:

> Because a larger expected return on assets generally implies that the assets have greater risk, the pension fund that invests in riskier assets will have a lower actuarial valuation of its pension liabilities and thus a lower required contribution rate. This process not only distorts the economic valuation of pension liabilities, it creates incentives for more risk taking in the pension fund.[41]

Empirical research has borne out Merton's concerns that GASB accounting rules encourage excessive risk-taking. For instance, Biggs (2011) shows that, since the financial crisis, public plans are actually taking *more* investment risk than before.[42] This suggests that at least some pensions are "doubling down" on risk to restore their weakened finances.

Likewise, economists Aleksandar Andonov and Rob Bauer, of Maastricht University, and Martijn Cremers, of the University of Notre Dame, compared how public and private sector pensions in the U.S., Canada, and Europe manage their investments.[43] They point out that, according to economic theory, as a pension plan's population ages — meaning there are greater numbers of retirees relative to workers — and as interest rates on government bonds fall, a pension should take a more conservative investment approach and assume a lower discount rate for its liabilities. Private sector pensions and public plans outside the U.S. follow this logic, according to data the authors examined. U.S. public sector plans, by contrast, have taken on *greater* investment risk, because doing so allows them to lower the accounting value of their liabilities and put off difficult decisions such as raising contributions or lowering benefits. The problem with this strategy, of course, is that this investment risk is shifted onto future taxpayers. These accounting-driven choices by public sector pensions, the authors say, "have large economic effects and could have potentially severe future consequences."

MARKET VALUATION MYTHS

Fair-market valuation has a lot to say about public pensions, about how well-financed they are and what strategies would — and would not — help make them better funded going into the future. But it is important to note certain things the market valuation approach does not say – even though many public pension advocates claim it does.

For instance, some people assert that the market valuation critique claims that public pensions will earn no more than the riskless rate of return on their investments. Monique Morrissey of the Economic Policy Institute states that "… the critics contend that when pensions calculate the amount of money they need to set aside today to make promised payments to retirees in the future, they should assume that pension investments will earn rates equivalent to those of Treasury bonds and similarly low-risk to no-risk assets."[44] Similarly, columnist Gerard Miller writes, "Pension funds are not going to invest their entire portfolio in 3 percent Treasury bonds right now — or ever — so the risk-free model is not even descriptive of reality and has little normative value."[45]

In fact, economists say nothing of the sort. The issue is not whether pensions can achieve 8 percent returns "in expectation." In expectation, they can achieve almost any return they wish by taking sufficient risk. For instance, there are mutual funds that double the expected returns on the S&P 500 index — of course, by doubling the risk. Economists argue simply that pensions cannot achieve 8 percent returns without taking risk — something which is unquestionably true — and that this risk should not be interpreted as a benefit to taxpayers without any cost. As the examples here have shown, it is not necessary to assume that pensions earn the riskless return on their investments in order to justify market valuation. You need only show that (a) benefits are guaranteed, and (b) there is a cost to guaranteeing them. This cost is best reflected in the prices that participants are charged and pay in financial markets, where similar sorts of guarantees are traded every day.

The use of a risk-adjusted discount rate captures the value of taxpayers' obligation to make good on benefit promises even if pension investments do not achieve their assumed returns. This obligation has legal, political, and moral force alongside a significant monetary value. While GASB acknowledges that this obligation exists, current GASB pension accounting rules entirely ignore its value.[46]

RECENT EVENTS: REVISED GASB RULES

The issue of public pension valuation has been evolving quickly. On June 25, 2012, GASB released Statements 67 and 68, which revise earlier accounting guidelines for public sector pensions.[47] These revisions make two important changes to help pensions value their assets and their liabilities.

First, when pensions compare assets to liabilities, they must rely on the market value of assets, rather than an actuarial value that smoothes investment returns over five to 10 years. Smoothing means that investment losses or gains this year would not be fully incorporated into a plan's funding disclosures until at least 2016. Eliminating smoothing would reduce current funding ratios by about 10 percentage points. More importantly, eliminating smoothing would show the true volatility of plan funding and the degree to which even supposedly healthy plans depend upon risky investments.

Second, the discount rate used to value plan liabilities would change. Instead of

[U]ncertainty regarding pension financing poses significant costs for the taxpayer.

Contributions to pensions will need to rise at the same time that tax revenues are low, unemployment is high, and taxpayers have already seen their own 401(k) balance hit.

applying an 8 percent discount rate to all liabilities, under the new rules, this rate could be applied to benefits only through the period in which the plan's assets are expected to last. Following the exhaustion of plan assets, any remaining liabilities must be valued using a lower municipal bond rate. This split discount rate approach would reduce pension funding ratios further, by 10 percentage points or so.

Any step toward reality would seemingly be welcome. But GASB's new approach to discounting is, if anything, even less economically coherent than the current rules. To the degree there is any insecurity to public pension benefits, it is due to plan underfunding. Because benefits that are backed by assets are presumably more secure, they would be discounted using a lower interest rate. Likewise, if benefit liabilities that are not backed by assets are less secure, they might be valued using a higher discount rate. Even if you accept the idea of a bifurcated discount rate, the new GASB rules have economic logic precisely backward.[48]

But the dangers of GASB's discounting rules are far from merely academic. Like the current rules, the new regulations cement in place the flawed notion that boosting investment risk makes a pension better funded, before a dime of higher returns has been realized. Under the current rules, a pension that shifts to riskier investments can discount its liabilities using a higher interest rate. Under the new rules, a plan that takes greater investment risk can assume its trust funds will last longer and therefore fewer years of benefits would be discounted using lower municipal bond rates. The incentives to take greater investment risk, particularly at a time when state and local governments would be hard-pressed to increase pension funding, are obvious. And, as shown already, these incentives have real effects on the amount of risk public sector pensions choose to take.

GASB's revised pension accounting rules may have been designed to placate critics of their current approach without excessively angering public pension administrators, who are effectively GASB's "customers." However, these changes neither accurately measure the value of unfunded public pension liabilities nor eliminate incentives for pensions to take excessive investment risk.

OPTIONS FOR REFORM

This paper analyzed the accounting for DB pension liabilities, finding the plans to be significantly more expensive than is reported under current GASB accounting rules. Funding public employee pensions under current benefit structures implies taxpayer costs that far exceed private employer costs for 401(k)s and other DC pensions. This cost difference both stretches state and local government budgets and generates inequities in compensation between public and private employees.

DC and cash balance (CB) pension plans also offer advantages in the area of human resources, in terms of attracting and retaining desired employees. A cash balance plan is a form of defined benefit pensions in which benefits are based on a notional investment account rather than final salary and years of service. To an employee, the retirement benefits earned in a given year are an important part of

their overall compensation, along with salary, health coverage, and other fringe benefits. The advantages to DC and CB plans stem from the way in which pension benefits accumulate over time.

Under DB plans, benefit accruals follow an unusual pattern. An employee may accumulate very little pension benefits over the first two decades of employment. Costrell and Podgursky (2009) show that an employee with a DB pension would have accrued only about 15 percent of their total future benefits by the time he or she is in his or her mid-40s.[49] In the following decade, however, benefit accruals skyrocket. For a Missouri teacher, Costrell and Podgursky show, net pension accumulations of less than $100,000 as of age 45 rise to approximately $650,000 by age 55. But what happens after that? Net benefit accruals actually decline, meaning that the amount of additional benefits earned each year is less than the amount the employee must contribute to the program. From age 55 to 65, they show, a Missouri teacher's "pension wealth" falls by about $125,000.

What do these benefit accrual patterns mean for attracting and retaining employees? First, it means that the DB pensions carry very little value for employees who do not plan on remaining in government service over a full career. To such workers, a DB pension plan adds essentially nothing to their compensation, making public employment less attractive. Moreover, public employees who are not covered by Social Security — in Missouri, principally teachers — could leave government after 10 to 20 years of service with very little in the way of future retirement benefits. While DB pension may be very generous for full-career employees, they provide much less for the majority of workers who spend only a partial career in government service. A recent report from the Maine Unified Retirement Plan Taskforce highlighted issues regarding career length. The report pointed out that while a full-career employee does very well under traditional DB pension plans, the majority of public employees who fail to work a full career receive much lower benefits.[50]

To illustrate the effects of shorter job tenures, consider an employee who retires after 32 years in MOSERS, receiving a replacement rate of about 41 percent of final earnings. But an employee who began work at the same time but retired after half that job tenure — 16 years of service — would not receive half that replacement rate, 20 percent of earnings. Rather, his replacement rate would be about *10 percent* of earnings just prior to retirement, meaning that to avoid an inadequate income in retirement, he must save at extraordinary rates later in his career to meet the 70-80 percent replacement rate that financial advisors recommend. Assuming a DC pension account earned the same 8 percent return MOSERS projects for its own investments, a half-career employee with a DC plan would receive a replacement rate at retirement of about 30 percent. A government employer may wish to attract young, mobile employees who carry valuable skills but plan on staying in government for only a decade or so. For these employees, a DB pension does little to make government employment more attractive.

Now consider a mid-career employee who has become "burned out." He

[A]midst a recession, scarce government resources have been reallocated to pension funding, demanding either higher taxes or reduced expenditures on other government programs.

Public employee pensions are safer than corporate pensions in that their benefits generally are guaranteed in full by law and the plan sponsor — the government — has the power to tax. This indicates that the public pension discount rate should be lower than the corporate rate, not more than 4 percentage points higher.

might wish to change jobs and his employer might also wish him to do so. Yet a 45-year-old employee who exits government leaves literally hundreds of thousands of dollars of pension benefits on the table relative to staying through age 55, because he would be leaving at precisely the time in which pension accumulations are most rapid. Regardless of his own or his employer's desires, it would be extremely difficult for this employee to quit government service.

Finally, consider a 55-year-old employee who is a top performer, one who is good at his job, and would wish to remain in it. By doing so, however, he potentially sacrifices $100,000 or more in net pension benefits, because the annual contributions exceed the additional benefits he will earn. Not surprisingly, most employees will quit at this point, even if both they and their employers might wish them to stay.

In all three scenarios, the incentives embedded in DB pensions work contrary to reasonable human resources goals of state and local governments.

Under DC plans, by contrast, employees accumulate future pension benefits on a steady basis, with approximately the same amount (as a percentage of salary) earned each year. For instance, if an employer makes a DC contribution equal to 5 percent of salary, that amount is accumulated each year regardless of age. These smoother accrual patterns eliminate the "push and pull" incentives embedded in typical DB plan structures.

Costrell and McGee simulate a DC/CB-type reform in which benefit accumulation rates are constant by age/tenure.[51] They find that it raises employee retention among younger workers, increases voluntary turnover among mid-career workers, and lowers retirement rates for employees with long job tenure. That is, a DC- or CB-type pension reform could address some of the major human resources shortcomings of current DB pension systems.

The preferred type of reform depends upon the preferences of the sponsoring employer and the circumstances of the employees who would participate in the plan. For instance, Missouri teachers lack Social Security coverage, while most other Missouri public employees are covered by Social Security. This should not be seen as an overall disadvantage for teachers, as Social Security generally offers low benefits relative to contributions. However, without Social Security — which offers a DB benefit structure — teachers might prefer a hybrid DB/DC approach or, preferably, a CB plan. A CB plan offers the labor supply incentives of a DC plan, but with a guaranteed benefit similar to that of a DB pension. On the other hand, as other Missouri public employees already have a DB pension through Social Security, reforms for them might include a greater DC component.

However, it is important to remember that, in terms of financial accounting, CB plans are a subset of the DB pension universe and subscribe to the same accounting principles. One might think that because CB plans generally offer guaranteed returns of well less than 8 percent that they are not subject to the same accounting issues as conventional DB plans. However, the CB plan's accounting — which determines the level

of annual taxpayer contributions — is determined by the assumed return on the plan's investments, not the guaranteed return offered to participants on their virtual retirement accounts. For instance, the state of Nebraska runs a CB plan for its employees. The plan itself offers a guaranteed return of at least 5 percent on credits to employees' accounts, but assumes a 7.75 percent return on the plan's underlying investments and uses this return to calculate annual required contributions to the plan.

TRANSITION COSTS FOR DC PENSIONS

One essential difference between DB pensions and DC plans is that DC plans cannot generate unfunded liabilities. Under a DB plan, the employer promises employees a fixed retirement benefit regardless of how the plan's investments fare. In a DC plan, by contrast, employers promise employees a fixed contribution, say, 5 percent of salary. Once that contribution is made, the employer's obligation is fulfilled.

While DC plans cannot generate new unfunded liabilities, shifting to a DC pension plan does not alter unfunded liabilities from the existing DB plan. It does not eliminate them, as some DC reformers might wish to see. Those unfunded liabilities are effectively debts of the governments and must be honored. Nor, however, does shifting to DC plans increase costs, as some critics of DC plans contend. The idea that there are "transition costs" involved with shifting to DC pensions is widespread, but incorrect.

Pension advocates rely on financial disclosure rules that the Government Accounting Standards Board (GASB) generates regarding how quickly a DB plan must pay down — or "amortize" — its unfunded liabilities. A plan that is open to new employees may amortize its shortfalls over a longer period of about 30 years, while a closed plan must amortize its unfunded liabilities sooner.[52] This faster payoff means a temporary period of higher pension amortization costs, which is termed the "transition cost."

This creates a seemingly illogical conclusion: the bigger the plan's unfunded liabilities, the tougher it is to move to a DC plan that will not create more unfunded liabilities.

However, Costrell (2012) shows that these transition costs are largely a myth.[53] Pension advocates such as the National Institute for Retirement Security claim that "accounting rules can require pension costs to accelerate in the wake of a freeze." Costrell points out that GASB rules require nothing of the sort. GASB rules do not determine plan funding, they dictate only accounting figures that pensions must disclose. State and local governments set funding policy and regularly violate GASB rules, sometimes paying more than GASB requires and — too often — paying less. If a government wished to follow its current amortization schedule even as it shifts to a DC plan, nothing prevents the agency from doing so. And, as Costrell points out, some states that have moved to DC pensions have done exactly that.

Moreover, if a DC plan is made available as a new tier within the *existing* DB pension — as was done in Utah's pension reforms — then these amortization rules

[E]conomists and other policy analysts agree that the accounting rules that public pensions use significantly understate the funding shortfalls facing these plans.

do not apply. Because employee payroll under the overall plan is unchanged, GASB amortization payments also do not change.

More broadly, there is no strong policy reason that amortization payments should change even if the DC plan is set up separately. Total employee payroll has not changed. Plan sponsors, not participants, nearly always make amortization payments, so it makes little difference under which plan employee payroll is assigned. Finally, a pension's unfunded liability is a debt of the government that legally has to be paid off, regardless of how many or few new employees enter a DB pension plan. Having new employees participate in a new DC pension makes no difference to what the old DB plan owes. Costrell shows that pension plans and their actuaries will acknowledge all this, although it is often hidden in the footnotes of their reports headlining massive "transition costs."

Even after a DC reform, governments may continue to amortize unfunded liabilities as they previously have. There is no legal, economic, or policy reason to do otherwise, and states that have adopted DC pensions have not had to deal with transition costs.

CONCLUSION

Around the country, Americans in many capacities are concerned about the funding of public employee retirement plans. In recent years, plans have suffered from poor investment returns and insufficient funding, even as the Baby Boom wave of public employees begins to retire. Moreover, economists and other policy analysts agree that the accounting rules that public pensions use significantly understate the funding shortfalls facing these plans. These rules, which differ significantly from those that private plans and public employee pensions in other countries use, inappropriately use the expected return on a risky portfolio of investments to value future benefit liabilities that the law guarantees. Using a risk-adjusted discount rate, which is consistent with both economic theory and the way in which private markets value liabilities, shows public employee pensions nationwide suffer from multi-trillion dollar funding shortfalls.

The story in Missouri is no different. The five Missouri plans examined here have varying states of funding health under current GASB accounting rules. Using accurate accounting for plan liabilities, their measured financing suffers significantly. On average, the Missouri plans are only 46 percent funded and face unfunded liabilities topping $50 billion. Some plans, such as Missouri teachers, are very poorly funded. Current pension accounting standards also encourage pensions to take excessive investment risk, risk that is not disclosed or valued as part of pension accounting reports.

Reforms to public pensions must begin with better accounting. Accurate accounting will show the extent of public plan underfunding. It also will show, however, that taking more investment risk — that is, assuming a higher rate of return on plan investments — will do nothing to make unfunded liabilities smaller. A better

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understanding of how large pension funding problems are and what policies will — and will not — address these problems is more likely to lead to constructive policy solutions.

Changing plan structures, to either a defined contribution or cash balance approach, will not eliminate existing unfunded liabilities. But these alternate approaches may reduce or eliminate the accumulation of additional unfunded liabilities, giving state and local governments breathing room to determine how to fund shortfalls in existing DB plans. Moreover, DC and CB plans are likely superior to current DB pension structures in terms of attracting and retaining quality employees.

The appropriate reforms to enact may differ by plan and worker type. Missouri workers who have Social Security benefits may desire a different plan structure than Missouri teachers, who currently do not have Social Security coverage. In all cases, though, reforms can help make public employee plans more financially sustainable while eliminating large, contingent liabilities to the taxpayer.

ABOUT THE AUTHOR

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In all cases, reforms can help make public employee plans more financially sustainable while eliminating large, contingent liabilities to the taxpayer.

NOTES

[1] Munnell, Alicia H., Jean-Pierre Aubry, Josh Hurwitz, Madeline Medenica, and Laura Quinby. "The Funding Of State And Local Pensions: 2011-2015." Center for Retirement Research, Boston College. May 2012.

[2] Author's calculations from Public Plans Database.

[3] The database is available at: http://pubplans.bc.edu.

[4] Academic discussions of pension accounting include Novy-Marx, Robert, and Joshua Rauh, 2009. "The Liabilities and Risks of State-Sponsored Pension Plans." *Journal of Economic Perspectives* 23(4), 191-210; and Biggs, Andrew G. "An Options Pricing Method for Calculating the Market Price of Public Sector Pension Liabilities." *Public Budgeting and Finance*, Fall 2011.

[5] For individuals spending part of their careers in public employment not covered by Social Security and part under Social Security-covered employment, the Government Pension Offset and Windfall Elimination Provision may affect the Social Security benefits they or their spouses are eligible to receive.

[6] Actuarial fairness in claiming ages implies that individuals receive approximately the same total lifetime benefits regardless of the age at which they retire. Early retirees receive lower benefits but for a longer period, while later retirees receive higher benefits for fewer years. Social Security reduces benefits by almost 7 percent for each year of early claiming a rate that is close to actuarially fair. Most public plans, including MOSERS, reduce benefits by about 6 percent for each year the individual claims prior to the full retirement age. This implies that early retirees tend to receive higher lifetime benefits. As a result, employees may retire earlier under such rules.

[7] The average age of retirement in the Public Plans Database as of 2009 was 60, although only a small number of plans report ages of benefit claiming. The typical new retiree had almost 24 years of government service.

[8] Missouri State Employees Retirement System Annual Actuarial Valuation, June 30, 2012. Conducted by Gabriel, Roeder, Smith & Company, Actuarial Consultants.

[9] MOSERS's allocation to alternatives is high relative to other plans nationwide, where the average allocation reported in the Public Funds Survey is 11 percent. However, MOSERS has somewhat below-average allocations to stocks and above-average allocations to bonds, so the plan's overall risk cannot easily be compared to that of other programs. While historical risk can be compared using past returns, if asset allocations change, which is occurring throughout the pension world, historical risk may not represent risk going forward.

[10] These figures assume that the normal cost varies with the natural log of the discount rate, which in other instances has provided a good fit.

[11] See DuZebe, Robert S. "Study Reflecting Impact to the FRS of Changing the Investment Return Assumption to one of the following: 7.5 percent, 7.0 percent, 6.0 percent, 5.0 percent, 4.0 percent and 3.0 percent." Milliman. March 11, 2011. A similar analysis was conducted in Jones, Norman L., Brian B. Murphy, and Paul Zorn. "Actuarial Methods and Public Pension Funding Objectives: An Empirical Examination." Presented at Society of Actuaries Public Pension Finance Symposium. May 2009, and Office of the State Actuary. "Washington State 2009 Actuarial Valuation Report." October 2010; and Office of the State Actuary. "2010 Risk Assessment: Moving Beyond Expectations." August 31, 2010.

[12] This view derives from the Modigliani-Miller theorem of corporate finance, which holds that (under certain conditions) the value of an asset or liability is independent of how it is financed. See Modigliani, F.; Miller, M. (1958). "The Cost of Capital, Corporation Finance and the Theory of Investment." *American Economic Review*, 48 (3): 261–297.

[13] Brown and Wilcox discuss legal protections for accrued pension benefits in Brown, Jeffrey R., and David W. Wilcox. "Discounting State and Local Pension Liabilities," *American Economic Review*, vol. 99, May 2009.

[14] As of 2009, MOSERS's projected return assumed 1.4 percentage points of "alpha," meaning a return generated by active portfolio management that is in excess of that provided merely as compensation for the risk of the portfolio. In other words, the portfolio alone would have an expected return of 7.1 percent while active management would raise the return to 8.5 percent. However, there is little evidence that MOSERS or any other Missouri pensions have been capable of generating excess returns at this level. See Howe, John S. "A Comparison of Missouri Pension Plans." Show-Me Institute Policy Study No. 34, December 2012.

[15] The relevant case is Firemen's Retirement System v. City of St. Louis, 2006 WL 2403955 (Mo.App. E.D. Aug 22, 2006).

[16] Throughout the example, I calculate present values using continuous discounting. The present value equals the size of the future payment divided by the exponential of (r*n), where r is the annual discount rate and n is the number of years until the future payment will be made.

[17] The shaded blue area is stylized for illustrative purposes; in fact, outcomes either above or below the bounds of the blue shaded area are possible.

[18] The listed numbers contain a $1 discrepancy, reflecting rounding error.

[19] This result is based on a principal known as "put-call parity." See Stoll, H.R. 1969. "The Relationship Between Put and Call Option Prices." *The Journal of Finance* 24 (December): 801-824.

[20] Kohn, Donald L. "Statement at the National Conference on Public Employee Retirement Systems Annual Conference." New Orleans, La., May 20, 2008.

[21] Wilcox, David. Testimony before the Public Interest Committee Forum sponsored by the American Academy of Actuaries, September 4, 2008. Novy-Marx and Rauh present a similar argument; see Novy-Marx, Robert, and Joshua Rauh. "The Liabilities and Risks of State-Sponsored Pension Plans." *Journal of Economic Perspectives*, vol. 23, no. 4 (Fall 2009), pp. 191–210. In analyzing federal employee pensions, the CBO used a discount rate 1 percentage point above the Treasury rate. However, the CBO explicitly noted that this was because federal pensions lack the legal protections that state pension plans such as the WRS are entitled to.

[22] Reinsdorf, Marshall B., and David G. Lenze. "Defined Benefit Pensions and Household Income and Wealth." Bureau of Economic Analysis. *Research Spotlight*. August 2009. Also see Lenze, David G. "Accrual Measures of Pension-Related Compensation and Wealth of State and Local Government Workers." Bureau of Economic Analysis. April 2009.

[23] Reinsdorf, Marshall. "Actuarial Measures of Defined Benefit Pension Plans for the National Accounts." Presentation to BEA Advisory Committee Meeting, May 11, 2012.

[24] Congressional Budget Office. "The Underfunding of State and Local Pension Plans." May, 2011.

[25] For details, see: http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_87dlrlXQvZkFB1r.

[26] Biggs, Andrew G. "Proposed GASB Rules Show Why Only Market Valuation Fully Captures Public Pension Liabilities." *Financial Analysts Journal*, March/April 2011, Vol. 67, No. 2: 18–22.

[27] "Report of the State Budget Crisis Task Force." July 2012. Available online at: http://www.statebudgetcrisis.org.

[28] View online at: http://missouri.municipalbonds.com/bonds/yield_curve/.

[29] Even this approach may result in too high a discount rate. State and local government debt carries a yield premium over federal debt, in part because of the higher perceived risk of default. Applying a discount rate that incorporates a default premium to a benefit that is intended to be riskless understates the cost of providing that riskless benefit.

[30] Brown, Jeffrey R., and David W. Wilcox. "Discounting State and Local Pension Liabilities," *American Economic Review* 99 (May 2009): 538-42.

[31] Even within Treasuries, however, disagreements loom. For instance, some economists point out that yields on U.S. Treasury securities — which are free from credit risk — are low in part because they are highly liquid and freely tradable, an attribute that pension liabilities neither share nor need. See Munnell, Alicia H., Richard W. Kopcke, Jean-Pierre Aubry, and Laura Quinby. 2010. "Valuing Liabilities in State and Local Plans." Issue in Brief SLP-11. Chestnut Hill, Mass.: Center for Retirement Research at Boston College. On the other hand, most public pension benefits are at least partially protected against inflation, which U.S. Treasury securities are not. Economists Joshua Rauh, of Northwestern University, and Robert Novy-Marx, of the University of Rochester, assume that these two effects are roughly offsetting and therefore use Treasury interest rates to value public pension liabilities. They discount pension liabilities at the yield on Treasury Inflation Protected Securities (TIPS) plus market expectations of inflation.

[32] Office of the State Actuary. "Washington State 2009 Actuarial Valuation Report." October 2010; and Office of the State Actuary. "2010 Risk Assessment: Moving Beyond Expectations." August 31, 2010.

[33] Congressional Budget Office, "Estimating the Value of Subsidies for Federal Loans and Loan Guarantees," August 2004.

[34] For instance, see California Legislative Analysts Office. "Summary of LAO Findings and Recommendations on the 2011-12 Budget." January 24, 2011. View online here: http://www.lao.ca.gov/laoapp/budgetlist/PublicSearch.aspx?Yr=2011&KeyCol=305.

[35] Vanguard Investment Counseling & Research. "Time Diversification and Horizon-Based Asset Allocations." 2008.

[36] For more detail on this argument, see Bodie, Zvi. "On the Risk of Stocks in the Long Run," *Financial Analysts Journal*, May-June 1995.

[37] Samuelson, Paul. "Dogma of the Day," *Bloomberg Personal Finance*, 1997.

[38] Andonov, Aleksandar, Rob Bauer, and Martijn Cremers. "Pension Fund Asset Allocation and Liability Discount Rates: Camouflage and Reckless Risk Taking by U.S. Public Plans?" (May 1, 2012).

[39] For background, see Reinsdorf, Marshall B., and David G. Lenze. "Defined Benefit Pensions and Household Income and Wealth." Bureau of Economic Analysis. Research Spotlight. August 2009. Also see Lenze, David G.. "Accrual Measures of Pension-Related Compensation and Wealth of State and Local Government Workers." Bureau of Economic Analysis. April 2009.

[40] Novy-Marx (2011): "Logical Implications of GASB's Methodology for Valuing Pension Liabilities," Working Paper, University of Rochester and NBER.

[41] Merton, Robert C. Introduction to Pension Finance, by M. Barton Waring. *Wiley Finance*. 2012.

[42] Biggs, Andrew G. "How Have Public Sector Pensions Responded to the Financial Crisis?" Pension Research Council. Working paper WP2011-18. 2011.

[43] Andonov, Aleksandar, Bauer, Rob, and Cremers, Martijn. "Pension Fund Asset Allocation and Liability Discount Rates: Camouflage and Reckless Risk Taking by U.S. Public Plans?" (May 1, 2012).

[44] Morrissey, Monique. "Discounting Public Pensions: Reports of trillions in shortfalls ignore expected returns on assets," Economic Policy Institute, April 14, 2011.

[45] Miller, Gerard. "Pension Puffery." *Governing Magazine*. January 5, 2012.

[46] Biggs, Andrew G. "Proposed GASB Rules Show Why Only Market Valuation Fully Captures Public Pension Liabilities." *Financial Analysts Journal*, March/April 2011.

[47] See Governmental Accounting Standards Board. "News Release: Adjustments to US State and Local Government Reported Pension Data." June 25, 2010.

[48] Biggs, Andrew G. "Proposed GASB Rules Show Why Only Market Valuation Fully Captures Public Pension Liabilities." *Financial Analysts Journal*, March/April 2011.

[49] Costrell, Robert M., and Michael Podgursky. 2009. "Peak, Cliffs, and Valleys: The Peculiar Incentives in Teacher Retirement Systems and Their Consequences for School Staffing." *Education Finance and Policy*. 4 (2): 175-211.

[50] State of Maine Unified Retirement Plan Task Force. 2010. Task Force Study and Report: Maine State Employee and Teacher Unified Retirement Plan. Augusta, Maine.

[51] Costrell, Robert M., and Joshua McGee. 2010. "Teacher Pension Incentives, Retirement Behavior, and Potential for Reform in Arkansas." *Education Finance and Policy*, Fall.

[52] Ongoing plans may amortize unfunded liabilities as a level percentage of employee payroll; because this tends to rise, initial amortization payments are lower. A closed plan, by contrast, has shrinking employee payroll. GASB reasons that amortizing as a level percentage of a shrinking payroll base would excessively backload amortization payments. Thus, closed pension plans should amortize unfunded liabilities more quickly, generally on a "level dollar" method that increases initial payments.

[53] Costrell, Robert M. "GASB Won't Let Me." Linda & John Arnold Foundation. May 2012.

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