

Kentucky Teachers' Retirement System

2015



Actuarial Section

Additional Report on
GASB Statement Number 67



Cavanaugh Macdonald
CONSULTING, LLC
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December 4, 2015

Board of Trustees
Teachers' Retirement System
of the State of Kentucky
479 Versailles Road
Frankfort, KY 40601-3800

Members of the Board:

Presented in this report is information to assist the Teachers' Retirement System of the State of Kentucky (KTRS), in meeting the requirements of the Governmental Accounting Standards Board (GASB) Statement No. 67. This report has been prepared as of June 30, 2015 (the Measurement Date) to assist KTRS in better understanding the requirements of GASB 67 and to identify the information to be provided by KTRS's actuary, Cavanaugh Macdonald Consulting (CMC).

The annual actuarial valuation used as a basis for much of the information presented in this report was performed as of June 30, 2014. The valuation was based upon data, furnished by the Executive Secretary and KTRS staff, concerning active, inactive and retired members along with pertinent financial information.

To the best of our knowledge, this report is complete and accurate. The necessary calculations were performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems.

The calculations were prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, and, in our opinion, meet the requirements of GASB 67.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the System, and on actuarial assumptions that are, individually and in the aggregate, internally consistent and reasonably based on the actual experience of the System. In addition, the

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calculations were completed in compliance with the laws governing the System. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

These results are only for financial reporting and may not be appropriate for funding purposes or other types of analysis. Calculations for purposes other than satisfying the requirements of GASB 67 may produce significantly different results. Future actuarial results may differ significantly from the current results presented in this report due to such factors as changes in plan experience or changes in economic or demographic assumptions.

Respectfully submitted,



Edward A. Macdonald, ASA, FCA, MAAA
President



Edward J. Koebel EA, FCA, MAAA
Principal and Consulting Actuary

**REPORT OF THE ANNUAL GASB STATEMENT NO. 67
REQUIRED INFORMATION FOR THE
TEACHERS' RETIREMENT SYSTEM OF THE STATE OF KENTUCKY
PREPARED AS OF JUNE 30, 2015**

Section 1: Introduction

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), "Financial Reporting For Pension Plans", in June 2012. This report, prepared as of June 30, 2015 (the Measurement Date), presents information to assist the Teachers' Retirement System of the State of Kentucky (KTRS), in meeting the requirements of GASB 67. Much of the material provided in this report is based on the data, assumptions and results of the annual actuarial valuation of KTRS as of June 30, 2014. The results of that valuation were detailed in a report dated December 12, 2014.

GASB 67 requires a measurement of the Total Pension Liability (TPL) utilizing the Entry Age Normal actuarial funding method. If the valuation date at which the TPL is determined is before the measurement date, as is the case here, the TPL must be rolled forward to the measurement date. The Net Pension Liability (NPL) is then set equal to the rolled forward TPL minus the System's Fiduciary Net Position (FNP) (basically the market values of assets) as of the Measurement Date. The benefit provisions recognized in the calculation of the TPL are summarized in Schedule B. The development of the roll-forward of the TPL is shown in the table on page 148.

Among the assumptions needed for the liability calculation is a Single Equivalent Interest Rate (SEIR) as described by GASB 67. To determine the SEIR, the FNP must be projected into the future for as long as there are anticipated benefits payable under the plan's provisions applicable to the membership and beneficiaries of the System on the Measurement Date. We have projected future employer contributions to be made based on the amounts required by statute. Although the KTRS Board of Trustees adopted a funding policy, shown in Schedule E, on December 16, 2013, the State has not funded the actuarially determined contributions since 2009. On this basis, if the FNP is not projected to be depleted at any point in the future, the long term expected rate of return on plan investments expected to be used to finance the benefit payments may be used as the SEIR.

If, however, the FNP is projected to be depleted, the SEIR is determined as the single rate that will generate a present value of benefit payments equal to the sum of the present value determined by discounting all projected benefit payments through the date of depletion by the long term expected rate of return, and the present value determined by discounting those benefits after the date of depletion by a 20-year tax-exempt municipal bond (rating AA/Aa or higher) rate. Our calculations indicated that the FNP is projected to be depleted, so a bond rate is used in the determination of the SEIR. On this basis, we have determined that a discount rate of 4.88 percent meets the requirements of GASB 67.

The sections that follow provide the results of all the necessary calculations, presented in the order laid out in GASB 67 for note disclosure and Required Supplementary Information.

Section 2: Financial Statement Notes

The material presented herein will follow the order presented in GASB 67. Paragraph numbers are provided for ease of reference.

Paragraphs 30(a) (1)-(3): The information required is to be supplied by the System.

Paragraph 30(a) (4): The data required regarding the membership of the KTRS were furnished by the System office. The following table summarizes the membership of the System as of June 30, 2014, the actuarial valuation date.

Membership	
	Number
Retirees And Survivors Currently Receiving Benefits	48,576
Terminated Vested Employees Entitled To But Not Yet Receiving Benefits	7,762
Inactive Non-vested Members	27,689
Active Members	73,407
TOTAL	<u>157,434</u>

Paragraphs 30(a)(5)-(6) and Paragraphs 30(b)-(f): The information required is to be supplied by the System.

Paragraphs 31(a) (1)-(4): The information is provided in the following table. As stated on the previous page, the Net Pension Liability (NPL) is equal to the Total Pension Liability (TPL) minus the Fiduciary Net Position (FNP). That result as of June 30, 2015 is presented in the table below (\$ thousands).

	Fiscal Year Ending 6/30/2015
Total Pension Liability (TPL)	\$ 42,476,699
Fiduciary Net Position (FNP)	18,049,131
Net Pension Liability (NPL)	<u>\$ 24,427,568</u>
Ratio of FNP to TPL	42.49%

Paragraph 31(b) (1)(a)-(f): This paragraph requires information regarding the actuarial assumptions used to measure the TPL. The set of actuarial assumptions utilized in developing the TPL are outlined in Schedule C. The total pension liability was determined by an actuarial valuation as of June 30, 2014, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.50 percent
Salary increases	4.00 - 8.20 percent, including inflation
Investment rate of return	7.50 percent, net of pension plan investment expense, including inflation
Municipal Bond Index Rate	3.82%
Single Equivalent Interest Rate	4.88%

Mortality rates were based on the RP-2000 Combined Mortality Table for Males or Females, as appropriate, with adjustments for mortality improvements based on a projection of Scale AA to 2020 with a set back of 1 year for females.

The actuarial assumptions used in the June 30, 2014 valuation were based on the results of an actuarial experience study for the period July 1, 2005 - June 30, 2010 adopted by the Board on December 19, 2011.

The long-term expected rate of return on pension plan investments was determined using a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

The target asset allocation and best estimates of arithmetic real rates of return for each major asset class, as provided by KTRS's investment consultant, are summarized in the following table:

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>
U.S. Equity	45.0%	6.4%
Non U.S. Equity	17.0%	6.5%
Fixed Income	24.0%	1.6%
High Yield Bonds	4.0%	3.1%
Real Estate	4.0%	5.8%
Alternatives	4.0%	6.8%
Cash	2.0%	1.5%
Total	<u>100.0%</u>	

Section 2: Financial Statement Notes continued ...

Discount rate. The discount rate used to measure the total pension liability was 4.88 percent. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rates and that Employer contributions will be made at statutorily required rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members until the 2039 plan year. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments through 2038 and a municipal bond index rate of 3.82 percent was applied to all periods of projected benefit payments after 2038. The Single Equivalent Interest Rate (SEIR) that discounts the entire projected benefit stream to the same amount as the sum of the present values of the two separate benefit payments streams was used to determine the total pension liability.

Paragraph 31(b) (1) (g): This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the System, calculated using the discount rate of 4.88 percent, as well as what the System's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (3.88 percent) or 1-percentage-point higher (5.88 percent) than the current rate (\$ thousands):

<i>(in thousands)</i>	1% Decrease (3.88%)	Current Discount Rate (4.88%)	1% Increase (5.88%)
System's net pension liability	\$ 30,402,796	\$ 24,427,568	\$ 19,482,972

Paragraph 31(c): June 30, 2014 is the actuarial valuation date upon which the TPL is based. The TPL as of June 30, 2014 was determined using a discount rate of 4.88% which was based on a municipal bond index rate as of that date equal to 3.82%. An expected TPL is determined as of June 30, 2015 using standard roll forward techniques. The roll forward calculation adds the annual normal cost (also called the service cost), subtracts the actual benefit payments and refunds for the plan year and then applies the assumed interest rate (SEIR) for the year. This procedure is shown in the following table:

TPL Roll-Forward <i>(in thousands)</i>	
(a) TPL based on June 30, 2014 Valuation (4.88%)	\$ 41,167,140
(b) Entry Age Normal Cost for the Year July 1, 2014 - June 30, 2015 (4.88%)	1,108,145
(c) Actual Benefit Payments (including refunds) for the Year July 1, 2014 - June 30, 2015	1,764,489
(d) TPL as of June 30, 2015 = [(a) × (1.0488)] + (b) - [(c) × (1.0244)]	<u>\$ 42,476,699</u>

The following shows the development of the difference between expected and actual experience:

Determination of Experience Gain/(Loss) <i>(in thousands)</i>	
(a) TPL as of June 30, 2014 (5.23%)	\$ 39,684,776
(b) Entry Age Normal Cost for the Year July 1, 2014 - June 30, 2015 (5.23%)	1,015,080
(c) Actual Benefit Payments (including refunds) for the Year July 1, 2014 - June 30, 2015	1,764,489
(d) Expected TPL as of June 30, 2015 = [(a) × (1.0523)] + (b) - [(c) × (1.02615)]	\$ 40,964,739
(e) Actual TPL as of June 30, 2015 (4.88%)	\$ 42,476,699
(f) Difference between expected and actual Experience as of June 30, 2015 = (d) - (e)	<u>\$ (1,511,960)</u>

Section 3: Required Supplementary Information

There are several tables of Required Supplementary Information (RSI) that need to be included in the System's financial statements:

Paragraphs 32(a)-(c): The required tables are provided in Schedule A.

Paragraph 32(d): The money-weighted rates of return required are to be supplied by the System.

Paragraph 34: In addition the following should be noted regarding the RSI:

Changes of benefit terms. None

Changes of assumptions. In the 2011 valuation and later, the expectation of retired life mortality was changed to the RP-2000 Mortality Tables rather than the 1994 Group Annuity Mortality Table, which was used prior to 2011. In the 2011 valuation, rates of withdrawal, retirement, disability and mortality were adjusted to more closely reflect actual experience. In the 2011 valuation, the Board adopted an interest smoothing methodology to calculate liabilities for purposes of determining the actuarially determined contributions.

Methods and assumptions used in calculations of actuarially determined contributions. The actuarially determined contribution rates in the schedule of employer contributions are calculated as of June 30, three years prior to the end of the fiscal year in which contributions are reported (as of June 30, 2012 for the fiscal year 2015 contributions). The following actuarial methods and assumptions were used to determine contribution rates reported in the most recent year of that schedule:

<u>Actuarial Cost Method</u>	<u>Amortization Method</u>	<u>Remaining Amortization Period</u>	<u>Asset Valuation Method</u>	<u>Inflation</u>	<u>Salary Increase</u>	<u>Ultimate Investment Rate of Return*</u>
Entry Age	Level percent of pay, open	30 years	5-year smoothed market	3.50%	4.00 to 8.20 percent, including inflation	7.50 percent, net of pension plan investment expense, including inflation

* The actuarially determined contribution rates are determined using the interest smoothing methodology adopted by the Board.

Schedule A
 Required Supplementary Information
 Schedule of Changes in the Net Pension Liability
GASB 67 Paragraph 32(a)
 (In Thousands)

	2015	2014
Total Pension Liability		
Service Cost	\$ 1,015,080	\$ 1,002,338
Interest	2,029,372	1,956,610
Benefit Changes	0	0
Difference Between Expected and Actual Experience	1,511,960	0
Changes of Assumptions	0	(353,043)
Benefit Payments	(1,741,456)	(1,654,376)
Refunds of Contributions	<u>(23,033)</u>	<u>(25,462)</u>
Net Change in Total Pension Liability	2,791,923	926,067
Total Pension Liability- Beginning	<u>39,684,776</u>	<u>38,758,709</u>
Total Pension Liability- Ending (a)	<u>\$ 42,476,699</u>	<u>\$ 39,684,776</u>
 Plan Net Position		
Contributions-State of KY	\$ 480,073	\$ 483,330
Contributions-Other Employers	79,506	79,996
Contributions-Member	308,160	304,982
Net Investment Income	862,179	2,803,249
Benefit Payments	(1,741,456)	(1,654,376)
Administrative Expense	(8,869)	(7,956)
Refunds of Contributions	(23,033)	(25,462)
Other	<u>0</u>	<u>0</u>
Net Change in Plan Net Position	(43,440)	1,983,763
Plan Net Position - Beginning	<u>18,092,571</u>	<u>16,108,808</u>
Plan Net Position - Ending (b)	<u>\$ 18,049,131</u>	<u>\$ 18,092,571</u>
Employers' Net Pension Liability - Ending (a) - (b)	<u>\$ 24,427,568</u>	<u>\$ 21,592,205</u>

Schedule A: Required Supplementary Information continued ...

Schedule A
Required Supplementary Information
Schedule of Net Pension Liability
GASB 67 Paragraph 32(b)
(In Thousands)

	2015	2014*
Total Pension Liability	\$ 42,476,699	\$ 39,684,776
Plan Net Position	<u>18,049,131</u>	<u>18,092,571</u>
Net Pension Liability	\$ 24,427,568	\$ 21,592,205
Ratio of Plan Net Position to Total Pension Liability	42.49%	45.59%
Covered-Employee Payroll	\$ 3,455,008	\$ 3,317,422
Net Pension Liability as a Percentage of Covered-Employee Payroll	707.02%	650.87%

* Revised from previous year to reflect actual covered-employee payroll.

Schedule A
Required Supplementary Information
Schedule of Employer Contributions
GASB 67 Paragraph 32(c)
(In Thousands)

	2015	2014*	2013	2012	2011	2010	2009	2008	2007	2006
Covered-Employee Payroll	\$ 3,455,008	\$ 3,317,422	\$ 3,310,710	\$ 3,310,176	\$ 3,283,749	\$ 3,321,614	\$ 3,253,077	\$ 3,190,332	\$ 2,975,289	\$ 2,859,477
Actual Employer Contributions	\$ 559,579	\$ 563,326	\$ 568,233	\$ 557,340	\$ 1,037,936	\$ 479,805	\$ 442,550	\$ 466,248	\$ 434,890	\$ 406,107
Actuarially Determined Employer Contributions	913,654	823,446	802,985	757,822	678,741	633,938	600,283	563,789	494,565	406,107
Annual Contribution Excess (Deficiency)	<u>\$ (354,075)</u>	<u>\$ (260,120)</u>	<u>\$ (234,752)</u>	<u>\$ (200,482)</u>	<u>\$ 359,195</u>	<u>\$ (154,133)</u>	<u>\$ (157,733)</u>	<u>\$ (97,541)</u>	<u>\$ (59,675)</u>	<u>\$ 0</u>
Actual Contributions as a Percentage of Covered-Employee Payroll	16.20%	16.98%	17.16%	16.84%	31.61%	14.44%	13.60%	14.61%	14.62%	14.20%

* Revised from previous year to reflect actual covered-employee payroll.

Schedule B

Summary of Main Benefit Provisions

The Teachers' Retirement System of the State of Kentucky was established on July 1, 1940. The valuation took into account amendments to the System effective through June 30, 2014. The following summary describes the main benefit and contribution provisions of the System as interpreted for the valuation.

1 - DEFINITIONS

"Final average salary" means the average of the five highest annual salaries which the member has received for service in a covered position and on which the member has made contributions or on which the public board, institution or agency has picked up the member contributions. For a member who retires after attaining age 55 with 27 years of service, "final average salary" means the average of the three highest annual salaries.

2 - BENEFITS

Service Retirement Allowance for Members Before 7/1/2008

Condition for Retirement

- Completion of 27 years of service or attainment of age 55 and 5 years of service.

Amount of Allowance

- The annual retirement allowance for non-university members is equal to:
 - (a) 2.0% of final average salary multiplied by service before July 1, 1983, plus
 - (b) 2.5% of final average salary multiplied by service after July 1, 1983.
 - (c) For individuals who become members of the Retirement System on or after July 1, 2002 and have less than 10 years of service at retirement, the retirement allowance is 2.0% of final average salary multiplied by service. If, however, they have 10 or more years, they receive a benefit percentage of 2.5% for all years of service up to 30 years.
 - (d) For members retiring on or after July 1, 2004, the retirement allowance formula is 3.0% of final average salary for each year of service credit earned in excess of 30 years.

The annual retirement allowance for university members is equal to 2.0% of final average salary multiplied by all years of service.

For all members, the annual allowance is reduced by 5% per year from the earlier of age 60 or the date the member would have completed 27 years of service.

The minimum annual service allowance for all members is \$440 multiplied by credited service.

Service Retirement Allowance for Members on and after 7/1/2008

Condition for Retirement

- Completion of 27 years of service, attainment of age 60 and 5 years of service or attainment of age 55 and 10 years of service.

Amount of Allowance

- 1.7% of final average salary if service is 10 years or less.
- 2.0% of final average salary if service is greater than 10 years and no more than 20 years.
- 2.3% of final average salary if service is greater than 20 years but no more than 26 years.
- 2.5% of final average salary if service is greater than 26 years but no more than 30 years.
- 3.0% of final average salary for years of service greater than 30 years.

The annual retirement allowance for university members is equal to:

- 1.5% of final average salary if service is 10 years or less.
- 1.7% of final average salary if service is greater than 10 years and no more than 20 years.
- 1.85% of final average salary if service is greater than 20 years but less than 27 years.
- 2.0% of final average salary if service is greater than or equal to 27 years.

For all members, the annual allowance is reduced by 6% per year from the earlier of age 60 or the date the member would have completed 27 years of service.

Section B: Summary of Main Benefit Provisions continued ...

Disability Retirement Allowance

Condition for Retirement

- Totally and permanently incapable of being employed as a teacher and under age 60 but after completing 5 years of service.

Amount of Allowance

- The disability allowance is equal to the greater of the service retirement allowance or 60% of the member's final average salary. The disability allowance is payable over an entitlement period equal to 25% of the service credited to the member at the date of disability or five years, whichever is longer. After the disability entitlement period has expired and if the member remains disabled, he will be retired under service retirement. The service retirement allowance will be computed with service credit given for the period of disability retirement. The allowance will not be less than \$6,000 per year. The service retirement allowance will not be reduced for commencement of the allowance before age 60 or the completion of 27 years of service.

Benefits Payable on Separation from Service

- Any member who ceases to be in service is entitled to receive his contributions with allowable interest. A member who has completed 5 years of creditable service and leaves his contributions with the System may be continued in the membership of the System after separation from service, and file application for service retirement after the attainment of age 60.

Life Insurance

- A separate Life Insurance fund has been created as of June 30, 2000 to pay benefits on behalf of deceased KTRS active and retired members.

Death Benefits

A surviving spouse of an active member with less than 10 years of service may elect to receive an annual allowance of \$2,880 except that if income from other sources exceeds \$6,600 per year the annual allowance will be \$2,160.

A surviving spouse of an active member with 10 or more years of service may elect to receive an allowance which is the actuarial equivalent of the allowance the deceased member would have received upon retirement. The allowance will commence on the date the deceased member would have been eligible for service retirement and will be payable during the life of the spouse.

If the deceased member is survived by unmarried children under age 18 the following schedule of annual allowances applies:

Number of Children	Annual Allowance
1	\$ 2,400
2	4,080
3	4,800
4 or more	5,280

The allowances are payable until a child attains age 18, or age 23 if a full-time student.

If the member has no eligible survivor, a refund of his accumulated contributions is payable to his estate.

Options

In lieu of the regular Option 1, a retirement allowance payable in the form of a life annuity with refundable balance, any member before retirement may elect to receive a reduced allowance which is actuarially equivalent to the full allowance, in one of the following forms:

Option 2. A single life annuity payable during the member's lifetime with payments for 10 years certain.

Option 3. At the death of the member his allowance is continued throughout the life of his beneficiary.

Option 3(a). At the death of the beneficiary designated by the member under Option 3, the member's benefit will revert to what would have been paid had he not selected an option.

Option 4. At the death of the member one half of his allowance is continued throughout the life of his beneficiary.

Option 4(a). At the death of the beneficiary designated by the member under Option 4, the member's benefit will revert to what would have been paid had he not selected an option.

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Section B: Summary of Main Benefit Provisions continued ...

Post-Retirement Adjustments

The retirement allowance of each retired member and of each beneficiary shall be increased by 1.50% each July 1.

3- CONTRIBUTIONS

Member Contributions

University members contribute 7.625% of salary to the Retirement System. Non-university members contribute 9.105% of salary to the Retirement System. Member contributions are picked up by the employer.

Schedule C

Statement of Actuarial Assumptions and Methods

Investment Rate of Return: 7.50% per annum, compounded annually.

Salary Increases: Representative values of the assumed annual rates of future salary increases are as follows and include inflation at 3.50% per annum:

Age	20	25	30	35	40	45	50	55	60	65
Annual Rate	8.10%	7.20%	6.20%	5.50%	5.00%	4.60%	4.50%	4.30%	4.20%	4.00%

Separations From Service: : Representative values of the assumed annual rates of death, disability, withdrawal, service retirement and early retirement are as follows:

MALES: Annual Rate of ...

AGE	DEATH	DISABILITY	WITHDRAWAL			RETIREMENT	
			SERVICE			Before 27 Years of Service	After 27 Years of Service*
			0 - 4	5 - 9	10+		
20	0.012%	0.01%	9.00%				
25	0.015	0.01	9.00	3.00%			
30	0.020	0.02	9.00	3.00	3.00%		
35	0.035	0.05	10.00	3.25	1.75		
40	0.046	0.09	10.00	4.00	1.40		
45	0.058	0.18	11.00	4.00	1.50		17.0%
50	0.074	0.33	9.00	4.00	2.00		17.0
55	0.124	0.55	12.00	3.50	2.50	5.5%	35.0
60	0.244	0.70	12.00	3.50	2.50	13.0	24.0
62	0.324	0.70	12.00	3.50	2.50	15.0	25.0
65	0.480	0.70	12.00	3.50	2.50	21.0	26.0
70	0.821	0.70	0.00	0.00	0.00	100.0	100.0

*Plus 10% in year when first eligible for unreduced retirement with 27 years of service.

Section C: Statement of Actuarial Assumptions and Methods continued ...

FEMALES: Annual Rate of ...

AGE	DEATH	DISABILITY	WITHDRAWAL			RETIREMENT	
			0 - 4	5 - 9	10+	Before 27 Years of Service	After 27 Years of Service*
20	0.007%	0.01%	7.00%				
25	0.008	0.02	8.50	4.00%			
30	0.010	0.04	9.00	4.00	1.65%		
35	0.017	0.08	9.00	3.75	1.85		
40	0.024	0.14	8.50	3.25	1.50		
45	0.037	0.32	7.50	3.25	1.25		15.0%
50	0.055	0.42	9.50	3.50	1.75		15.0
55	0.103	0.56	11.00	4.00	2.00	6.0%	35.0
60	0.201	0.85	11.00	4.00	2.00	14.0	30.0
62	0.263	0.85	11.00	4.00	2.00	12.0	25.0
65	0.390	0.85	11.00	4.00	2.00	22.0	30.0
70	0.672	0.85	0.00	0.00	0.00	100.0	100.0

*Plus 10% in year when first eligible for unreduced retirement with 27 years of service.

Deaths After Retirement: The RP-2000 Combined Mortality Table projected to 2020 using scale AA (set back one year for females) is used for death after service retirement and beneficiaries. The RP-2000 Disabled Mortality Table (set back seven years for males and set forward five years for females) is used for death after disability retirement. Mortality improvement is anticipated under these assumptions as recent mortality experience shows actual deaths are approximately 4% greater for healthy lives and 5% greater for disabled lives than expected under the selected tables. Representative values of the assumed annual rates of death after service retirement and after disability retirement are shown below:

Annual Rate of Death After ...

AGE	SERVICE RETIREMENT		DISABILITY RETIREMENT	
	MALE	FEMALE	MALE	FEMALE
45	0.1161%	0.0745%	2.2571%	1.1535%
50	0.1487	0.1100	2.2571	1.6544
55	0.2469	0.2064	2.6404	2.1839
60	0.4887	0.4017	3.2859	2.8026
65	0.9607	0.7797	3.9334	3.7635
70	1.6413	1.3443	4.6584	5.2230
75	2.8538	2.1680	5.6909	7.2312
80	5.2647	3.6066	7.3292	10.0203
85	9.6240	6.1634	9.7640	14.0049
90	16.9280	11.2205	12.8343	19.4509
95	25.6992	17.5624	16.2186	23.7467

ASSETS: Market Value

EXPENSE LOAD: None.

PERCENT MARRIED: 100%, with females 3 years younger than males.

LOADS: Unused sick leave: 2% of active liability

Schedule D

Actuarial Cost Method

1. The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future, of each active member's expected benefit at retirement or death is determined, based on his age, service, sex and compensation. The calculations take into account the probability of a member's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service, disability or survivor's benefit. Future salary increases and post-retirement cost-of-living adjustments are also anticipated. The present value of the expected benefits payable on account of the active members is added to the present value of the expected future payments to retired members and beneficiaries and inactive members to obtain the present value of all expected benefits payable from the System on account of the present group of members and beneficiaries.
2. The employer contributions required to support the benefits of the System are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.
4. The unfunded accrued liability is determined by subtracting the present value of prospective employer normal contributions and member contributions, together with the current actuarial value of assets held, from the present value of expected benefits to be paid from the System.

Schedule E

Board Funding Policy

Introduction

Pursuant to the provisions of KRS 161.250, the Board of Trustees ("Board") of the Kentucky Teachers' Retirement Systems ("KTRS") is vested with the responsibility for the general administration and management of the retirement system. The Board may adopt procedures necessary to conduct the business of the retirement system as needed. The applicable provisions of the Kentucky Revised Statutes ("state law") shall control if any inconsistency exists between state law and this policy.

Background

State law provides that the retirement benefits promised to members of KTRS are "...an inviolable contract of the Commonwealth..." (KRS 161.714.) To satisfy this solemn commitment, the Commonwealth of Kentucky ("state") is required to pay annual retirement appropriations necessary to fund the benefit requirements of members of the retirement system. All employers participating in KTRS are responsible for paying the fixed employer contribution rate set forth in state law. However, the state-as plan guarantor-is solely responsible for paying the additional annual retirement appropriations necessary to keep the retirement system actuarially sound and able to satisfy the contract with members to provide promised benefits. (KRS 161.550(6).)

Since fiscal year 2008, the state has not paid the recommended annual retirement appropriations necessary to pre-fund the benefit requirements of members of the retirement system as determined by the actuary. Over this period of time, because of the failure to fund, the state's annual retirement appropriations have grown significantly from \$60.5 million (Fiscal Year 2009) to \$520 million (Fiscal Year 2017). The following schedule details the growth of the annual retirement appropriations payable by the state:

Section E: Board Funding Policy continued ...

	Cumulative Increase as a % of Payroll	Cumulative Increase of Annual Retirement Appropriations Payable by the State	
2009	1.88	\$ 60,499,800	<i>(Source: KTRS Report of the Actuary on the Annual Valuation Prepared as of June 30, 2014).</i>
2010	2.46	82,331,200	
2011	3.59	121,457,000	
2012	5.81	208,649,000	
2013	7.27	260,980,000	
2014	8.02	299,420,000	
2015	10.42	386,400,000	
2016	12.97	487,400,000	
2017	13.80	520,372,000	

The Board has always taken action as required by state law and recommended annual retirement appropriations payable by the state that would ensure that the state meets the contractual obligations to members. This policy confirms the Board's process for recommending annual retirement appropriations payable by the state and the primary actuarial assumptions and methodologies associated with calculating the annual retirement appropriations. Other related actuarial assumptions and methodologies not listed in this policy are reported in annual valuations, the most recent experience study, or resolutions adopted by the Board.

1. **Annual Retirement Appropriations Payable by the State:** In each biennial budget request, the Board will recommend annual retirement appropriations payable by the state to meet the benefit requirements of the members of the retirement system. The annual retirement appropriations payable by the state are the sum of the fixed employer contribution rate set by state law and the additional annual retirement appropriations necessary to fund the benefit requirements of members of the retirement system. (KRS 161.550.) The recommended additional annual retirement appropriations payable by the state are calculated by the Board's actuary based upon the results of an annual valuation preceding the beginning of each biennium. (KRS 161.400.)
2. **Calculation of Annual Retirement Appropriations Payable by the State:** The Board will recommend annual retirement appropriations payable by the state, which-if paid-will meet the benefit requirements of the members of the retirement system consistent with generally accepted actuarial principles. Based upon technical advice from the Board's actuary, the Board hereby adopts the following principles for calculating the recommended annual retirement appropriations payable by the state:
 - Use the Entry Age Normal actuarial cost method;
 - Use a five-year asset smoothing method;
 - Use a thirty-year closed period to amortize legacy unfunded liability ("legacy unfunded liability" is that unfunded liability recognized as of the valuation prepared for June 30, 2014);
 - Use a twenty-year closed period to amortize new sources of unfunded liability ("new sources of unfunded liability" is that unfunded liability consisting of all benefit changes, assumption and method changes, and experience gains and/or losses that have occurred since the previous valuation); and
 - Reach a 100 percent minimum funded ratio within the thirty-year closed amortization period.

The Board also recognizes that, from time to time, the state may desire to contribute lump sum payments toward satisfaction of unfunded liability rather than amortization of the debt. Total unfunded liability is published in every annual valuation of the retirement system and KTRS will work with the state to develop reasonable and appropriate plans for receipt of lump sum payments toward the satisfaction of unfunded liability.

This policy will be reviewed regularly and amended or revised as necessary.

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