

Arkansas Teacher Retirement System

Annual Actuarial Valuation of
Active and Inactive Members
June 30, 2017



Report of the June 30, 2017 Actuarial Valuation

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December 15, 2017

Board of Trustees
Arkansas Teacher Retirement System
Little Rock, Arkansas

Dear Board Members:

Presented in this report are the results of the ***Annual Actuarial Valuation of non-retired members as of June 30, 2017***. The June 30th annual valuation of retired lives receiving monthly benefits indicates the liabilities for future benefit payments to existing retirees. These liabilities are covered in a separate report. These are also covered briefly in this report on page B-4.

The purposes of the valuation are to measure the System's funding progress and to determine the amortization period that results from the statutory employer and employee rates and the actuarial assumptions that the Board has adopted. This report should not be relied on for any purpose other than the purposes described herein. Financial results associated with the benefits described in this report that are developed for purposes other than those identified above may be significantly different than those in this report.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the Retirement System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The valuation was based upon census data and financial information provided by the System's administrative staff. Preparation of this data requires considerable staff time. The helpful cooperation of the Arkansas Teacher Retirement System staff in furnishing the data is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the data provided by ATRS.

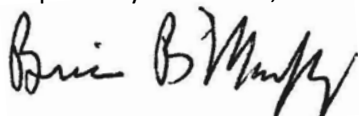
This report was prepared using certain assumptions approved by the Board. The actuarial assumptions used for valuation purposes are summarized in Section G. These assumptions reflect experience during the period July 1, 2010 to June 30, 2015 and expectations for the future.

The findings in this report are based on data and other information through June 30, 2017. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. The scope of an actuarial valuation does not contain an analysis of the potential range of such future measurements.

To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Brian B. Murphy, Judith A. Kermans and Heidi G. Barry are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The actuaries submitting this report are independent of the plan sponsor.

Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Judith A. Kermans, EA, FCA, MAAA



Heidi G. Barry, ASA, FCA, MAAA

BBM/JAK/HGB:sac



SECTION A

EXECUTIVE SUMMARY

Executive Summary

General Financial Objective. Section 24-7-401 (a) of the Arkansas Code provides as follows (emphasis added):

- (1) The financial objective of the Arkansas Teacher Retirement System is to establish and receive contributions that expressed as percentages of active member payroll will **remain approximately level from generation to generation of Arkansas citizens.**
- (2) Contributions received each year shall be sufficient:
 - (A) To **fully cover the costs of benefit commitments** being made to members for their service being rendered **in that year**; and
 - (B) To **make a level payment** that if paid annually over a reasonable period of future years will **fully cover the unfunded costs** of benefit commitments for service previously rendered.

Arkansas Teacher Retirement System Status: Based upon the results of the June 30, 2017 actuarial valuations, **ATRS is satisfying the financial objective of level-contribution-percent financing.**

This report contains the results of the June 30, 2017 valuation. The table below shows a summary of the data used in the valuation. This data was the basis for determining valuation results and recommended employer contribution rates.

| | Number | Average | Type of Average |
|----------------------|----------------|----------|--------------------------|
| Active not in T-DROP | 68,337 | \$37,707 | Pay |
| Active in T-DROP | 3,811 | 62,127 | Pay |
| Deferred Vested | 12,401 | 5,877 | Annual Projected Benefit |
| Retired | 45,092 | 23,169 | Annual Current Benefit |
| Total Members | 129,641 | | |

Included in the 2017 valuation were 3,881 reemployed retirees (included in the Retired data file) with total earnings of \$108.4 million. ATRS receives full employer contributions on these individuals per Arkansas Code Section 24-7-708. The actuarial valuation assumes the number of working members will remain constant at the current level. In recent years the total number of working members has decreased. A decreasing population means less contribution income for the retirement system than expected and can lead to funding difficulty in extreme cases. ATRS has endeavored to get employer contributions on behalf of all working members.

Executive Summary - (Continued)

This valuation was affected by the following assumption changes, contribution rate changes and plan provision changes. The Board adopted these changes during 2017.

Assumption Changes

- (1) Lowered the assumed rate of interest to 7.5% from 8%
- (2) Decreased the assumed rate of price inflation to 2.5%.
- (3) Decreased the assumed rate of payroll growth to 2.75%.
- (4) Changed the post retirement mortality tables to the RP 2014 Healthy Annuitant headcount weighted tables with projection scale MP 2017. Scaled the base rates to ATRS experience.
- (5) Made other miscellaneous changes as described in the separate experience study report.

Contribution Rate Changes

Employer and member contribution rates will change in the future according to the following schedule.

| Fiscal Year | Contribution Rate | |
|--------------------|--------------------------|-----------------|
| | Member | Employer |
| 2018-2019 | 6.00% | 14.00% |
| 2019-2020 | 6.25% | 14.25% |
| 2020-2021 | 6.50% | 14.50% |
| 2021-2022 | 6.75% | 14.75% |
| 2023 and Later | 7.00% | 15.00% |

Plan Provision Changes

- (1) Lowered the noncontributory multiplier from 1.39% to 1.25% beginning in FY 2020.
- (2) Lowered the initial contributory multiplier to 1.75% for the first 10 years of service (FY 2019 and thereafter). Once a contributory person reaches 10 years of service, all contributory years including the first 10, are credited at the standard rate (currently 2.15%). Due to timing issues this provision will be reflected in the June 30, 2018 valuation.
- (3) Lowered the initial non-contributory multiplier to 1% for the first 10 years of service (FY 2019 and thereafter). Once the contributory person reaches 10 years of service, all non-contributory years including the first 10, are credited at the standard rate (1.39% through 2019 and 1.25% beginning in FY 2020). Due to timing issues this provision will be reflected in the June 30, 2018 valuation.
- (4) Increased the final average salary period to 5 years from the current 3 years. However, at the end of fiscal 2018, the 3 year final average salary will be calculated for all members. The final average salary for benefit calculation purposes will be the greater of the 5 year final average salary at retirement and the three year final average salary that was calculated at the end of fiscal 2018.
- (5) Lowered the retiree benefit stipend from \$75 per month to \$50 per month and removed the stipend from the base for purposes of COLA calculations.
- (6) Lowered the TDROP interest rate to a fixed 3% for future crediting. In years when actual ATRS returns are 2% or more above the actuarial assumed rate, the Board may increase the credited interest rate up to 6%.

Executive Summary - (Continued)

- (7) Updated the annuitization factors for TDROP annuity options. The factors will use a static version of the updated mortality table and an interest rate that changes by year as follows. 7.5% in FY 2018, 7% in FY 2019, 6% in FY 2020, 5% in FY 2021, 4% in FY 2022, and 3% from and after FY 2023. The board may adjust the rate to a higher rate, not to exceed the actuarial interest assumption, and considering the interest rate payable on 10 year US treasuries.
- (8) Updated the factors for beneficiary annuity options. The factors will use a static version of the updated mortality table and an assumed interest of 5%.
- (9) Increased the Cash Balance Account (CBA) interest rate. The interest rate will vary by year of participation as follows.

| Fiscal Year of Participation | Crediting Rate |
|---|-----------------------|
| 1 | 2.50% |
| 2 | 2.75% |
| 3 | 3.00% |
| 4 | 3.25% |
| 5 | 3.50% |
| 6 and later | 4.00% |

- (10) Increased the reduction for an early retirement benefit to 10/12ths of 1% per month from 5/12th of 1% per month.

Results of the Valuation

The amortization period this year is 29 years, unchanged from last year's period of 29 years. This result was affected by the assumption changes, benefit changes, and contribution rate changes described on the preceding pages. In particular, it is heavily dependent upon member and employer rates increasing in accordance with the schedule on page A-2. While 29 years is a reasonable period that meets statutory requirements, use of such a period will result in unfunded liabilities that are projected to increase in dollar amount for approximately the next 10 years. This condition is called "negative amortization" and is falling out of favor. The ATRS has targeted 18 years as the threshold in recent legislation.

The Arkansas Teacher Retirement System remains stable with a 79.5% funded position as of June 30, 2017. Unless there is an investment gain in Fiscal Year 2018, the amortization period is likely to increase in the next valuation due to scheduled phase-in of investment losses.

The rate of Investment return was 15.98%[#] this year. Investment gains and losses that occur each year are smoothed in over a 4-year period. After considering smoothing, the recognized return this year was 9.68%, compared to an assumed 8.0% return for Fiscal 2017. The smoothing is expected to introduce upward pressure on the amortization period next year, although as of June 30, 2017, the market value of assets exceeded the actuarial value of assets by approximately \$153 million. (Please refer to page D-3 for details.)

[#] *The actuary calculated this return figure which may not exactly match the investment consultant's figure.*

Executive Summary (Continued)

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), it is expected that:

- 1) The unfunded actuarial accrued liabilities will be fully amortized after 29 years.
- 2) The funded status of the plan will increase gradually towards a 100% funded ratio.
- 3) The unfunded accrued liability will increase for an extended period before beginning to decline.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

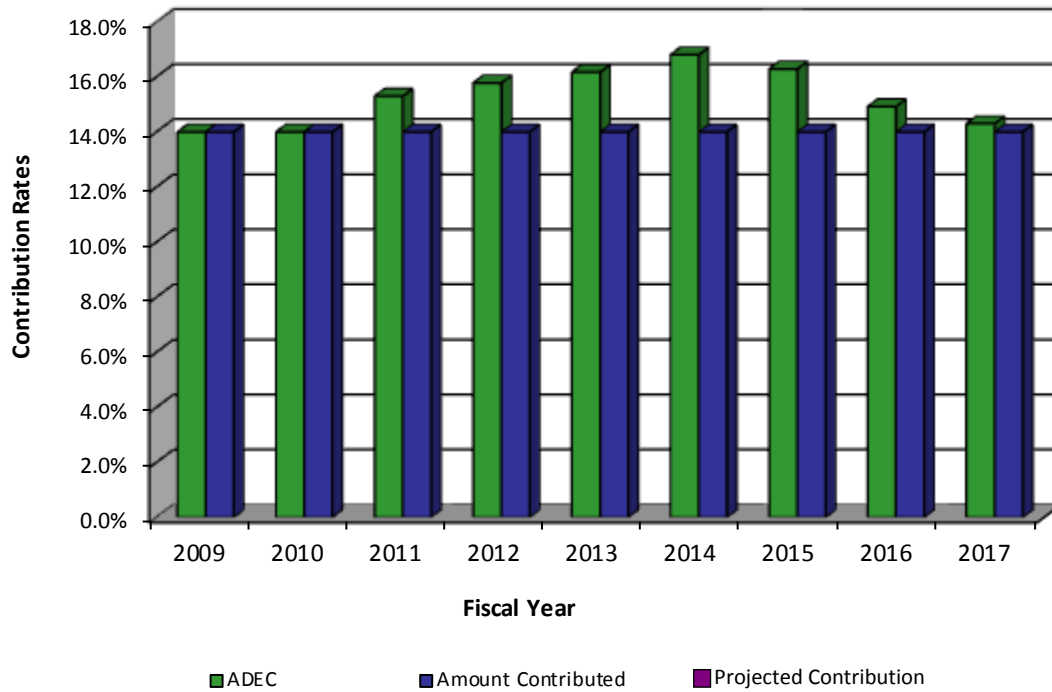
- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- 2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- 3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitations of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Executive Summary - (Concluded)

The following graph shows a history of the amounts contributed vs. the employer contributions, based on a maximum amortization period of 30 years.



Since the amortization period exceeded 30 years in the 2009-2015 valuations, the amount contributed is less than the 30-year contribution in FY 2011-2017. In FY 2009 (June 30, 2007 valuation) and FY 2010 (June 30, 2008 valuation), the amount contributed equaled the 30-year contribution.

SECTION B

VALUATION RESULTS

Determination of Amortization Period

Computed as of June 30, 2017 and June 30, 2016

| Computed Contributions for | Percents of Active Member Payroll | | | |
|--|-----------------------------------|---------|---------------|---------------|
| | June 30, 2017 | | | June 30, 2016 |
| | Teachers | Support | Combined | Combined |
| Normal Cost | | | | |
| Age & Service Annuities | 10.37% | 6.85% | 9.29% | 8.90% |
| Deferred Annuities | 1.18% | 2.07% | 1.45% | 1.77% |
| Survivor Benefits | 0.36% | 0.27% | 0.33% | 0.18% |
| Disability Benefits | 0.48% | 0.37% | 0.45% | 0.46% |
| Refunds of Member Contributions | 0.46% | 1.10% | 0.66% | 0.52% |
| Total | 12.85% | 10.66% | 12.18% | 11.83% |
| Average Member Contributions | 6.41% | 4.90% | 5.94% | 5.05% |
| Net Employer Normal Cost | 6.44% | 5.76% | 6.24% | 6.78% |
| Unfunded Actuarial Accrued Liabilities | | | 8.76% | 7.22% |
| Employer Contribution Rate | | | 15.00% | 14.00% |
| Amortization Years | | | 29 | 29 |

The calculated amortization period of 29 years, is based on anticipated increases in the employer and member contribution rates. The current employer and member contribution rates are 14% and 6%, respectively. The employer and member rates are scheduled to increase by 0.25% increments beginning in Fiscal Year 2020 and ending in Fiscal Year 2023. The ultimate employer and member contribution rates will be 15% and 7%, respectively.

The amortization period is the number of years it will take to pay off the unfunded liability of \$4.2 billion assuming that the employer contribution rate increases to 15% according to the schedule described above. Since 2000, the period has varied from a low of 19 years to a high of over 100 years. Unless there is an investment gain in FY 2018, the amortization period is likely to increase in the next valuation. Please see additional comments regarding the amortization period on page A-3.

Computed Employer Contribution Rates 10-Year Comparative Statement

| Valuation Date June 30 | Active Members in Valuation ** | | Average Annual Pay | | Consumer Price (Inflation) Index | | Employer Contributions | |
|------------------------------|-----------------------------------|-----------------------------------|--------------------|-------|-------------------------------------|----------|--|---------------------------|
| | | Annual Payroll (\$Millions) | | | | | Computed Financing Period (Years) | Total Employer Rate |
| | | | Number | | Amount | % Change | Value | % Change |
| 2008# | 70,172 | \$ 2,268 | \$ 32,319 | 2.1 % | \$ 218.8 | 5.0 % | 21 | 14.0 % |
| 2009 | 70,655 | 2,318 | 32,804 | 1.5 % | 215.7 | (1.4)% | 45 | 14.0 % |
| 2010# | 72,208 | 2,381 | 32,980 | 0.5 % | 218.0 | 1.1 % | 52 | 14.0 % |
| 2011#* | 76,780 | 2,728 | 35,534 | 7.7 % | 225.7 | 3.6 % | 66 | 14.0 % |
| 2012 | 75,627 | 2,714 | 35,891 | 1.0 % | 229.5 | 1.7 % | over 100 | 14.0 % |
| 2013# | 74,925 | 2,727 | 36,400 | 1.4 % | 233.5 | 1.8 % | 70 | 14.0 % |
| 2014 | 74,352 | 2,758 | 37,092 | 1.9 % | 238.3 | 2.1 % | 39 | 14.0 % |
| 2015 | 72,919 | 2,777 | 38,088 | 2.7 % | 238.6 | 0.1 % | 33 | 14.0 % |
| 2016 | 72,232 | 2,785 | 38,557 | 1.2 % | 241.0 | 1.0 % | 29 | 14.0 % |
| 2017#* | 72,148 | 2,814 | 38,997 | 1.1 % | 245.0 | 1.6 % | 29 | 15.0 % |

* Revised assumptions; employer and employee rates scheduled to increase to 15% and 7%, respectively, in 4 steps beginning in FY 2020.

Legislated benefit or contribution rate changes.

** Beginning with the June 30, 2011 valuation, active members include T-DROP members and payroll. ATRS also receives contributions on return to work retirees, but they are not included on this schedule.

Computed Actuarial Liabilities as of June 30, 2017

| Actuarial Present Value of | (1) Total Present Value | Entry Age Actuarial Cost Method | |
|---|----------------------------------|---|---|
| | | (2) Portion Covered by Future Normal Cost Contributions | (3) Actuarial Accrued Liabilities (1)-(2) |
| Age and service retirement allowances based on total service likely to be rendered by present active members. | \$ 8,035,249,926 | \$2,182,371,955 | \$ 5,852,877,971 |
| Age and service retirement allowances based on total service likely to be rendered by present T-DROP members. | 2,214,644,163 | 31,602,868 | 2,183,041,295 |
| Vested Deferred Benefits likely to be paid present active and inactive members. | 1,156,454,706 | 343,142,634 | 813,312,072 |
| Survivor benefits expected to be paid on behalf of present active members. | 212,276,017 | 79,246,103 | 133,029,914 |
| Disability Benefits expected to be paid on behalf of present active members. | 207,864,749 | 102,992,128 | 104,872,621 |
| Refunds of Member contributions expected to be paid on behalf of present active members. | 19,199,225 | 145,112,904 | (125,913,679) |
| Benefits payable to present retirees and beneficiaries. | 11,337,222,705 | 0 | 11,337,222,705 |
| Total | \$23,182,911,491 | \$2,884,468,592 | \$20,298,442,899 |
| Applicable Assets | 16,131,466,927 | 0 | 16,131,466,927 |
| Liabilities to be Covered by Future Contributions | \$ 7,051,444,564 | \$2,884,468,592 | \$ 4,166,975,972 |

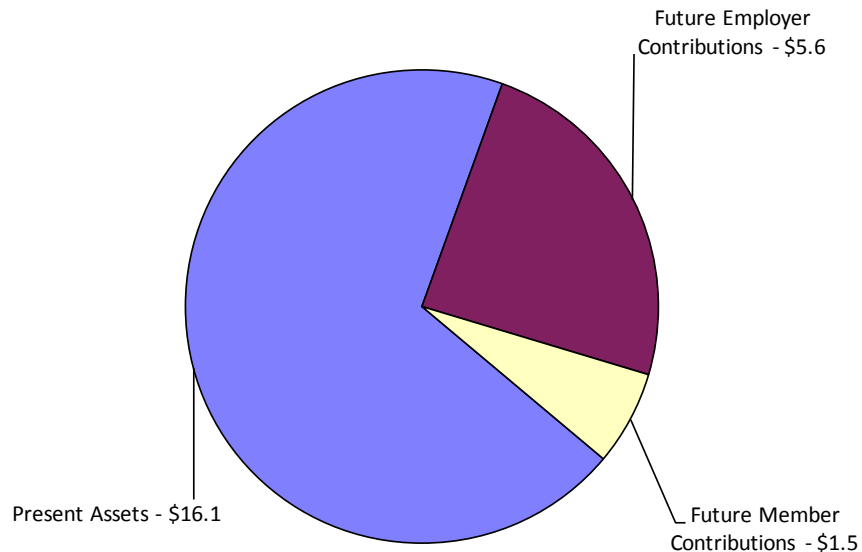
Liabilities for Retirees July 1, 2017

Tabulated by Type of Benefit Being Paid

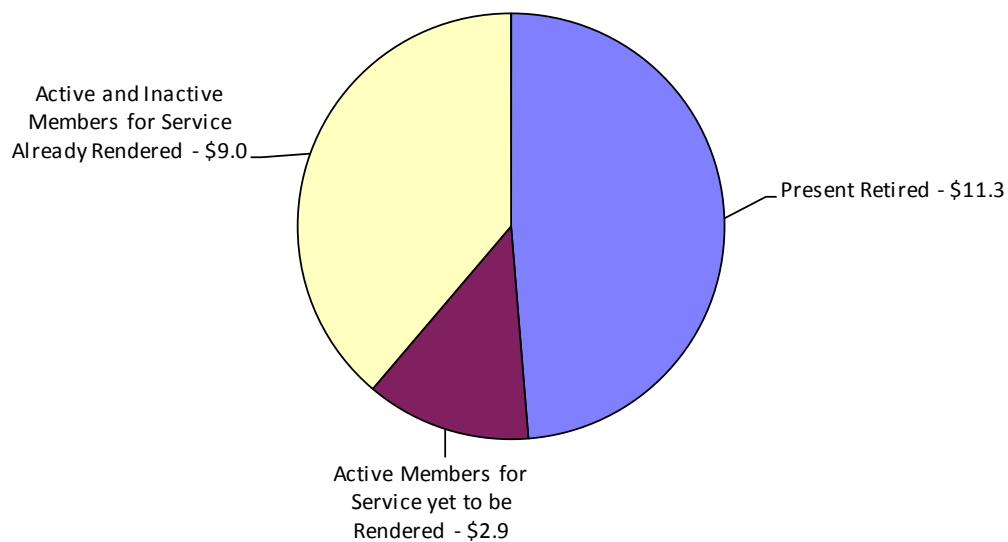
| Type of Annuity | Liabilities July 1, 2017 | | |
|---|--------------------------|------------------|-------------------|
| | Men | Women | Totals |
| RETIREMENT RESERVE ACCOUNT | | | |
| Age & Service Annuities | | | |
| Option 1 (Straight Life) | \$ 1,340,763,380 | \$ 6,269,128,115 | \$ 7,609,891,495 |
| Option A (100% Joint & Survivor) | 790,024,323 | 802,085,824 | 1,592,110,147 |
| Option B (50% Joint & Survivor) | 387,285,607 | 585,640,079 | 972,925,686 |
| Option C (10 Years Certain & Life) | 31,758,126 | 139,577,768 | 171,335,894 |
| Beneficiaries | 47,944,961 | 151,906,605 | 199,851,566 |
| Total Age & Service | 2,597,776,397 | 7,948,338,391 | 10,546,114,788 |
| Disability Annuities | | | |
| Option 1 | 49,047,704 | 265,221,848 | 314,269,552 |
| Option A | 28,297,839 | 41,082,209 | 69,380,048 |
| Option B | 5,818,795 | 11,407,754 | 17,226,549 |
| Option C | 389,801 | 4,192,000 | 4,581,801 |
| Beneficiaries | 20,203,795 | 23,592,077 | 43,795,872 |
| Total Disability | 103,757,934 | 345,495,888 | 449,253,822 |
| Total Retirement Reserve Account | 2,701,534,331 | 8,293,834,279 | 10,995,368,610 |
| SURVIVORS' BENEFIT ACCOUNT | | | |
| Beneficiaries of Deceased Members | \$ 45,907,387 | \$ 58,761,608 | \$ 104,668,995 |
| OTHER LIABILITIES | | | |
| Act 793 | \$ 10,597,479 | \$ 6,041,912 | \$ 16,639,391 |
| Act 808 | 10,582,650 | 3,824,991 | 14,407,641 |
| RETIREMENT SYSTEM TOTALS | | | |
| Total Annuity Liabilities | 2,768,621,847 | 8,362,462,790 | 11,131,084,637 |
| Cash Benefit Account Liabilities | | | 91,084,101 |
| Liabilities for Lump Sum Death Benefits | | | 115,053,967 |
| Total | \$ 2,768,621,847 | \$ 8,362,462,790 | \$ 11,337,222,705 |

Financing \$23.2 Billion of Benefit Promises for Present Active and Retired Members June 30, 2017

**Sources of Funds
(\$ Billions)**



Uses of Funds



Short Condition Test

ATRS' funding objective is to meet long term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will **pay all promised benefits when due -- the ultimate test of financial soundness**. Testing for level contribution rates is the long term test.

A short condition test is one means of checking a system's progress under its funding program. In a short condition test, the plan's present assets (cash and investments) are compared with: 1) Member contributions on deposit; 2) The liabilities for future benefits to present retired lives; 3) The liabilities for service already rendered by members. In a system that has been following the discipline of level percent-of-payroll financing, the liabilities for member contributions on deposit (liability 1) and the liabilities for future benefits to present retired lives (liability 2) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by members (liability 3) will be partially covered by the remainder of present assets. The larger the funded portion of liability 3, the stronger the condition of the system. Liability 3 being fully funded is unusual.

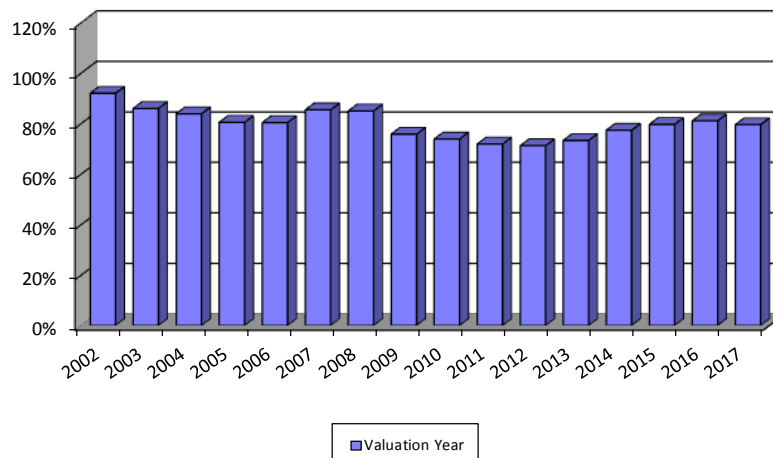
The schedule below illustrates the history of Liability 3 of the System and is indicative of the ATRS objective of following the discipline of level percent-of-payroll financing.

| Val. Date June 30 | (1) Member Contrib. | (2) Retirees and Benef. | (3) Active and Inactive Members (Employer Financed Portion) | Present Valuation Assets | Portion of Present Values Covered by Present Assets | | | |
|-------------------------|---------------------------|----------------------------------|---|--------------------------------|---|------|-----|-------|
| | | | | | (1) | (2) | (3) | Total |
| | | | | | -----\$ Millions----- | | | |
| 2008# | \$ 732 | \$ 5,544 | \$ 7,058 | \$ 11,319 | 100% | 100% | 71% | 85% |
| 2009 | 790 | 6,041 | 7,188 | 10,617 | 100% | 100% | 53% | 76% |
| 2010# | 848 | 6,516 | 7,333 | 10,845 | 100% | 100% | 47% | 74% |
| 2011#* | 929 | 7,132 | 7,460 | 11,146 | 100% | 100% | 41% | 72% |
| 2012 | 981 | 7,649 | 7,509 | 11,484 | 100% | 100% | 38% | 71% |
| 2013# | 1,027 | 8,181 | 7,510 | 12,247 | 100% | 100% | 40% | 73% |
| 2014 | 1,077 | 8,777 | 7,456 | 13,375 | 100% | 100% | 47% | 77% |
| 2015 | 1,128 | 9,778 | 7,230 | 14,434 | 100% | 100% | 49% | 80% |
| 2016 | 1,184 | 10,430 | 7,198 | 15,239 | 100% | 100% | 50% | 81% |
| 2017#* | 1,254 | 11,337 | 7,707 | 16,131 | 100% | 100% | 46% | 79% |

* Revised actuarial assumptions or methods.

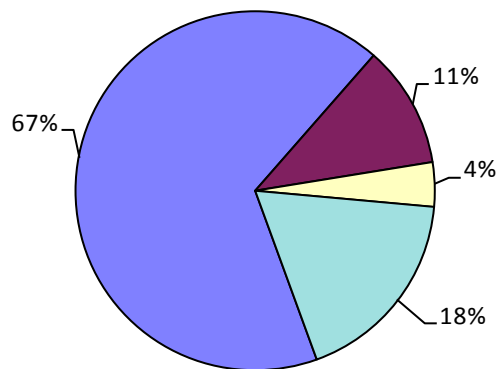
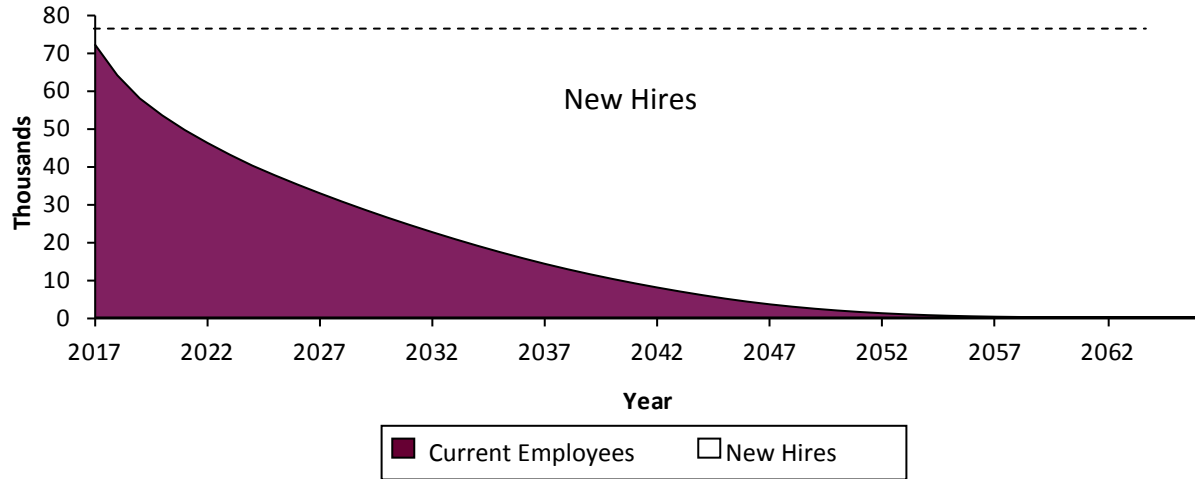
Legislated benefit or contribution rate change.

Actuarial Value of Assets as a Percent of Accrued Liabilities (Funded Ratio)



Expected Development of Present Population June 30, 2017 (Excludes Rehired Retirees)

Population Projection



■ Retirements
 ■ Non-Vested Separations
 ■ Deaths and Disabilities
 ■ Vested Separations

The charts show the expected future development of the present population in simplified terms. The retirement system presently covers 72,148 active members (includes T-DROP). Eventually, 11% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. Approximately 89% of the present population is expected to receive monthly retirement benefits. Approximately 4% of the present population is expected to become eligible for death-in-service or disability benefits. Within 9 years, over half of the covered membership is expected to consist of new hires.

SECTION C

SUMMARY OF BENEFITS

Summary of Provisions

June 30, 2017

1. **Voluntary Retirement – A.C.A. § 24-7-701.** A member may retire at age 60 with 5 or more years of credited service, or after 28 years of credited service regardless of age.
2. **Early Retirement – A.C.A. § 24-7-702.** A member who has more than 25 but less than 28 years of credited service and has not attained age 60 years may retire and receive an immediate early retirement annuity. The early annuity is an age & service annuity reduced by the lesser of (i) and (ii) below:
 - (i) 10/12 of 1% multiplied by the number of months by which early retirement precedes completion of 28 years of service, or
 - (ii) 10/12 of 1% multiplied by the number of months by which early retirement precedes the attainment of age 60 years.

Act 750 of 2017 allows the ATRS Board to set by resolution the early annuity reduction at a rate between 5% and 15% per year, to be prorated monthly if the System's actuary certifies that the amortization period to pay the unfunded liabilities exceeds 18 years. The Board adjusted the reduction to 10% per year beginning August 1, 2017 by Resolution 2017-14 on April 17, 2017.

3. **Deferred Retirement – A.C.A. § 24-7-707.** An inactive member who has 5 or more years of credited ATRS service will be entitled to an age & service annuity beginning at age 60, provided accumulated contributions are left on deposit with the retirement system.
4. **Disability Retirement – A.C.A. § 24-7-704.** An active member, with 5 or more years of actual and reciprocal ATRS service, who becomes totally and permanently disabled may be retired and receive a disability annuity computed in the same manner as an age & service annuity. In order to qualify for disability retirement, the member must exhibit symptoms of physical or mental incapacitation while the member is employed by a system employer as an active member (Act 973 of 2011). A member who is eligible for age and service retirement (age 60 and 5 years of service or 28 years of service at any age) is no longer eligible to apply for disability retirement. Act 219 of 2015 requires an ATRS disability retiree to obtain a Social Security Administration determination letter finding that the retiree is disabled within 36 months of the effective date of disability retirement. If a member cannot provide the SSA determination letter within the 36 month period, benefits will be terminated, the member will be returned to active service, and all member history will be restored. The requirement to qualify for SSA disability shall not apply to a disability retiree who was age 57 or older before July 1, 2015, because that member would qualify for age & service benefits prior to requiring the SSA determination of disability. Additionally, the retiree may apply for an extension of the 36 month deadline if the retiree can demonstrate the SSA determination is in progress. Act 549 of 2017 allows a disabled retiree to return to work for an ATRS covered employer as a part-time employee or in a lesser position than held previously and not be disqualified from disability retirement.

Summary of Provisions

June 30, 2017

4. **Disability Retirement – A.C.A. § 24-7-704 (Cont.)** If a retiree tries to return to full time employment, but cannot hold out to work, the suspended disability benefit will be what it would have been had they not tried to return to work, or a recomputed benefit using the additional service, whichever is higher. Additionally, this act allows that a retiree who was unable to secure a Social Security disability determination letter may seek the ATRS medical committee's review of the case and its findings shall be ruled as a final disposition in the matter.
5. **Final Average Salary (FAS) – A.C.A. § 24-7-736.** A member's final average salary is the average of the annual salaries paid during the period of 3 years of credited service producing the highest annual average. Beginning July 1, 2009, no salary paid in any year which is utilized in the computation of the members' final average salary, shall exceed the percentage increase of the base year, unless the difference in value between the next-highest year and the base year is within the amount of the salary differential (defined below). (Act 611 of 2017). If a member has a break in covered employment for eight years or more between any of the member's highest salary years used in the calculation of final average salary, then anti-spiking checking does not apply to the next highest year in the formula (Act 225 of 2011 – effective date of law July 27, 2011). There will no longer be any stacking of part-time college/teaching work for school district employees (Act 513 of 2011). Act 555 of 2013 limits the use of a reciprocal system's calculation of FAS if the ATRS member's reciprocal service credit is less than the number of years used to calculate the FAS for ATRS. Beginning July 1, 2014, if a member has less than three years of reciprocal service (the number of years used to calculate ATRS' FAS), then ATRS will obtain the salary and service credit from the reciprocal system, and use that salary and service as if it had all been earned in ATRS to calculate a FAS for retirement. Act 720 of 2013 made a minor change to final average salary for members who stop work during their last year of employment immediately before retirement. The Board may adjust the final average salary calculation by board resolution provided that the percentage range is no lower than 105% nor higher than 120% per year; and the salary differential is no lower than \$1,250 nor higher than \$5,000. Act 611 of 2017. The ATRS Board adjusted the percentage to 110% and salary differential allowance to \$5,000 by Resolution 2017-13 on April 17, 2017. **Effective in Fiscal Year 2019, a member's final average salary is the average of the annual salaries paid during the period of 5 years of credited service producing the highest annual average. A benchmark 3-year FAS of as of 6/30/2018 is established as a minimum FAS.**
6. **Age & Service Annuity and Disability Annuity – A.C.A. §§ 24-7-705, 24-7-727 (stipend).** The annuity payable will not be less than the total of: years of contributory service times 2.15% of FAS; plus years of non-contributory service times 1.39% of FAS (through 2019, 1.25% thereafter); plus stipend for all members with 10 or more years of ATRS actual service. Act 966 of 2013 allows the ATRS Board to set the contributory multiplier for service credit earned after June 30, 2013, within a range of 1.75% to 2.15%. The noncontributory multiplier for service credit earned after June 30, 2013, may be set within a range of 0.5% and 1.39%. In addition, this act would allow the Board to set special multiplier rates for the first 10 years of ATRS service earned after June 30, 2013, for both contributory and noncontributory service. This act is dependent upon the actuary's certification that the amortization period is in excess of 18 (Act 551 of 2017) years to pay unfunded liabilities prior to any reduction to the multipliers.

Summary of Provisions

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6. **Age & Service Annuity and Disability Annuity – A.C.A. §§ 24-7-705, 24-7-727 (stipend) Cont.** The non-contributory multiplier will become 1.25% beginning in FY 2020. Also the contributory multiplier and non-contributory multiplier for the first 10 years of service has been reduced to 1.75% and 1.0% respectively beginning July 1, 2018. Once a member accrues 10 years of service, all service including the first 10 years is then credited at the standard rate in place at the time the service was earned.
7. **T-DROP – ACA § 24-7-1301-1316.** A member with 28 or more years of service may participate in the Teacher Deferred Retirement Option Plan (T-DROP, Act 1096 of 1995). An amount equal to the amount that would have been paid had the member retired, reduced by 1% for each year of contributory, 1% for each year of reciprocal (Act 162 of 2011) and 6/10% for each year of non-contributory service, is deposited into a T-DROP account. **For active participants who enter the T-DROP Plan July 1, 2013 or later, the reduction for contributory, reciprocal, and noncontributory service credit is 1% for each year and fractional year of service credit (Act 605 of 2013).** Members who enter T-DROP with less than 30 years of service are subject to an additional 6% reduction for each year less than 30 years. Act 750 of 2017 allows the Board to adjust the additional T-DROP reduction factor (24-7-1314) between ½% and 1% of the plan benefit for each month the member begins participating in the plan prior to having 30 years of credited service. The annual addition to the T-DROP account is increased each year by 3% of the member's annuity at the initial participation date and the account is credited with 2% less than the system's rate of return (not less than 2%, nor greater than 6% interest on the mean balance) each year. Deposits to T-DROP cease at the earlier of 10 years of T-DROP participation or separation from service. T-DROP participants may continue in covered employment after 10 years of participation, but do not accumulate additional service credit or make member contributions. Beginning July 1, 2010, members who remain in T-DROP for more than 10 years (post 10-year T-DROPers) get interest on T-DROP account balances. The 10-year plus T-DROP interest rate that will be credited to an active members' T-DROP account must be no less than 4% and no greater than 6% as determined by the Board of Trustees. Act 1049 of 2017 allows the ATRS Board to adjust the applicable T-DROP interest rates (24-7-1307). A fixed interest rate may be adopted by board resolution prior to the beginning of the fiscal year and which would apply to subsequent fiscal years unless modified by the Board. Alternatively, a variable interest rate formula that is based on investment returns and other factors may be adopted by Board resolution prior to the beginning of a fiscal year. In addition to the applicable interest rate for the fiscal year, the Board may adopt by Board resolution a T-DROP participation incentive rate during a fiscal year if investment returns justify an incentive rate for the fiscal year. The Board may approve an incentive rate in addition to the 6% if the ATRS rate of return is greater than the ATRS assumed rate of return in the preceding calendar year. The rate may not exceed 7.5%. Upon actual retirement, the member may receive the T-DROP account balance in the form of a lump sum or as an additional annuity. Beginning July 1, 2011, the T-DROP distribution may be a combination of both lump sum and annuity allowing members to take a partial annuity along with a corresponding partial lump sum (Act 162 of 2011). Act 1049 of 2017 allows the interest rate for 10 year plus plan interest rate (24-7-1307) shall be determined appropriate by the Board and adopted by the resolution prior to the beginning of the fiscal year in which the interest rate shall apply. The Board set the regular T-DROP interest rate at a variable 5% for fiscal year 2017-18 by resolution 2017-15 and the post 10 year T-DROP interest rate at a variable 6% by resolution 2017-16, both on April 17, 2017. The Board has set the interest rate at 3% beginning in FY 2019 and later. The T-DROP interest rate may be adjusted above 3% to provide an

Summary of Provisions

June 30, 2017

7. **T-DROP – ACA § 24-7-1301-1316 (Cont).** incentive if the estimated ATRS rate of return is 2% greater than the ATRS actuarial assumed rate of return in the preceding calendar year. The rate may not exceed 6%.
8. **Post-Retirement Increases – A.C.A. § 24-7-713, 24-7-727 (compound COLA).** Each July 1, annuities are adjusted to be equal to the base annuity times 100% plus 3% for each full year in the period from the effective date of the base annuity to the current July 1. The base annuity is the amount of the member's annuity on the later of July 1, 2001 or the effective date of retirement, as re-determined by Acts 396 of 1999 and 992 of 1997. The July 1, 2009 cost of living adjustment for retirees was compounded. The annuity was adjusted by multiplying 3% times the June 30, 2009 retirement benefit amount. After it was calculated on July 1, 2009, the base amount was reset to be the July 1, 2009 benefit amount. Future cost of living raises will be established by the new updated base amount. Future cost of living adjustments will be evaluated on an annual basis to determine if a simple or compound cost of living increase will be given, depending on the financial condition of the System. Act 967 of 2013 gives the ATRS Board authority to reverse the compounding of a benefit and reset the base amount to the pre-compounding amount. If this reversal were to occur, it would include participants in the T-DROP plan. The future benefits of a member would not be reduced to recover any benefits paid to a member as a result of the compounding. In addition, the member's benefit on the date of the reversal would not be impacted, but future COLA's would be based upon the reset base amount. *This act is dependent upon the actuary's certification that the amortization period is in excess of 30 years to pay unfunded liabilities prior to any reversal of the compounding of the COLA.* Act 780 of 2017 allows the right to reverse the 2009 compound COLA when unfunded liabilities exceed an 18 year amortization. The act also allows a phase in of the change during months in which a COLA raise is given to prevent any retiree or option beneficiary from having an actual reduction in monthly benefit payments.
9. **Survivor Benefits – A.C.A. § 24-7-710.** Upon the death of an active member, who has 5 or more years of actual and reciprocal service, the following annuities are payable:
 - (a) The surviving spouse receives an annuity computed in the same manner as if the member had (i) retired the date of his death with entitlement to an annuity, (ii) elected Option A - 100% Survivor Annuity, and (iii) nominated the spouse as joint beneficiary. If the member has attained age 60 and has acquired 5 years of credited service or has acquired 25 years of credited service regardless of age, the annuity begins immediately; otherwise the annuity begins the month following the date the member would have attained age 60. Under certain circumstances, a lump sum distribution may be made to the beneficiary(ies) of the deceased member.
 - (b) A surviving child's benefit is prorated to an amount equal to 1% of the member's highest salary year for each quarter of a year credited as actual service in the system, up to 20% or up to a maximum of \$20,000 per year. If there is more than 1 surviving dependent, the benefits are capped to the lesser of 60% of the member highest salary or \$60,000 per year to be divided equally among the dependents. Act 505 of 2017. A child is dependent until the child's death, marriage, or attainment of age 18 (age 23 if the child is a full-time student).

Summary of Provisions

June 30, 2017

9. Survivor Benefits – A.C.A. § 24-7-710 (Cont).

- (b) Beginning July 1, 2013, survivors have three months to file an application for benefits if the benefits are to begin the month of the member's death. Otherwise, the benefits will begin the month that the survivor application is filed with the system (Act 571 of 2013).

10. **Lump Sum Death Benefit – A.C.A. § 24-7-720.** Beneficiaries of deceased active members or retirees with 10 or more years of ATRS credited service are eligible to receive a lump sum death benefit of up to \$10,000 (\$6,667 for non-contributory service-benefit). The amount will be prorated for members who have both contributory service and non-contributory service. Members with 15 or more years of contributory service will receive the full \$10,000 (Act 977 of 2011).

11. **Members' Contributions – A.C.A. § 24-7-406.** Through FY 2019, contributory members contribute 6% of their salaries. If a member leaves service prior to becoming eligible to retire, the accumulated contributions are returned upon request. No interest is credited to a member's contributions for the first year of membership; after 1 year, interest credits are 1%. Effective July 1, 1986, a non-contributory plan was created. Effective July 1, 1999 the default choice for new members is contributory. Effective July 1, 1997, all future member contributions are tax-deferred in accordance with §414(h) of the Internal Revenue Code of the United States. Effective July 1, 2005, all non-contributory members whose status changes from support to teacher (contracted for more than 181 days), will become contributory. Each July 1, members who previously elected to be non-contributory may elect to change to contributory status under Act 385 of 2005. The election is irrevocable. Employer contributions are collected at a rate of 14% on active members, T-DROP participants (even those who work beyond the 10-year participation period), and working retirees (Act 743 of 2009). Act 602 of 2013 allows the ATRS Board to set the member contribution rate between 6% and 7% of salary. Act 550 of 2017 allows the ATRS Board to increase the employee contribution rate if the amortization period to pay the unfunded liabilities of the system exceeds 18 years. **The contribution rate for FY 2017-2019 remains at 6%. The rates are 6.25%, 6.50%, 6.75% and 7.00% for FY 2020, FY 2021, FY 2022 and FY 2023 & thereafter, respectively.**

12. **Act 808 Retirement – A.C.A. § 24-4-732.** Any employee of a state agency who was an active member of the Arkansas Teacher Retirement System on April 8, 1987, and who qualified for retirement before January 1, 1988, could become a member of the Arkansas Public Employees Retirement System and retire from that system. All credited service was transferred to that system but the member's contributions were retained by the Arkansas Teacher Retirement System and the benefit amount is transferred monthly to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).

13. **Act 793 Retirement – A.C.A. § 24-4-522.** Any employee who was a member of the rehabilitation services in 1977 was permitted to become a member of the Arkansas Public Employees Retirement System. Liabilities associated with prior service earned through June 30, 1978 remain in the Arkansas Teacher Retirement System. Future service is allocated to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).

Summary of Provisions

June 30, 2017

14. **Retiree Health Stipend – A.C.A. § 24-7-713.** Each retired member as of June 30, 2008, with 5 or more years of ATRS credited service receives \$75 per month toward retiree health care premiums. Members in T-DROP do not receive the \$75 per month until actual retirement. For all members retiring on or after July 1, 2008, a minimum of 10 years of ATRS credited service is required to receive the \$75 per month stipend. Act 603 of 2013 allows the ATRS Board to increase or decrease the stipend to a minimum of \$1 per month and a maximum of \$75 per month. This act is dependent upon the actuary's certification that the amortization period is in excess of 18 years to pay unfunded liabilities prior to any reduction in the current stipend. The stipend for fiscal year 2018 remains at \$75 per month. **By Board resolution, for members retiring on or after May 1, 2017, the benefit stipend will not be in the member's base benefits. It will be removed from the base benefit for all retirees in Fiscal Year 2019. Beginning in Fiscal Year 2020 the benefit stipend for all retirees will be \$50 per month. The Board enacted a "hold harmless" provision that prevents the lowering of the stipend from actually reducing the total monthly benefit. This would only affect retirees when the COLA is less than \$25 per month.**

15. **Optional Forms of Benefits – A.C.A. § 24-7-706:**

Option 1 (Straight Life Annuity)

A member will receive the maximum monthly benefit for which he/she qualifies, throughout his/her lifetime. No monthly benefits will be paid to his/her beneficiary after the member's death. Should a member die before he/she has drawn in benefits an amount equal to his/her contributions plus earned interest, the balance will be paid to a designated beneficiary. The designated beneficiary may be anyone chosen by the member.

Option A (100% Survivor Annuity)

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive the same annuity for the balance of his/her lifetime.

Option B (50% Survivor Annuity)

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive one-half (1/2) of this annuity for the balance of his/her lifetime.

Option C (Annuity for Ten Years Certain and Life Thereafter)

A reduced monthly benefit payable for 120 months. After that time, a member's monthly allowance will revert to the amount he/she would have received under the regular plan and continue for life. If the member dies before receiving 120 payments, the designated beneficiary will receive a monthly benefit in the same amount until monthly benefits to both the member and the beneficiary equal 120 monthly payments. No further benefits are then payable to the beneficiary.

Option Factors are based upon a 5.0% interest rate and the RP 2014/MP2017 tables (static) adjusted with a 50% unisex mix.

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June 30, 2017

16. **Refund of Member Contributions – A.C.A. § 24-7-711.** Any termination refund made to a member or a lump sum payout made to a surviving spouse after July 1, 2011, cancels all service credit, including noncontributory service credit (Act 976 of 2011); any repurchase of refunded service will be as contributory years at actuarial cost (Act 69 of 2011). Act 140 of 2013 specifies that all membership rights (including noncontributory service credit) and beneficiary designations to the ATRS are cancelled when a member gets a refund of his or her contributions.
17. **Contract Buyout – A.C.A. § 24-7-735.** During periods of contract buyout/litigation/termination, members will not receive service credit if no on-call service or on site work is performed. ATRS will not allow the purchase of the time between actual work and the settlement (Act 163 of 2011).
18. **Actuarial Cost of Service – A.C.A. §§ 24-1-107, 24-2-502, 24-7-202, 24-7-406, 24-7-501, 24-7-502, 24-7-612, 24-7-602, 24-7-603, 24-7-604, 24-7-606, 24-7-607, 24-7-610, 24-7-611.** Effective July 1, 2011, all service purchases will be at actuarial cost (Act 69 of 2011).
19. **Deceased Member Refund of Contributions – § 24-7-711.** Effective July 1, 2011, if a beneficiary is not eligible for survivor benefits, or if a surviving spouse is eligible and chooses a contribution refund, the interest on the refund stops the July 1 following the member's death (Act 136 of 2011).
20. **Limit Lookback to Five Years – A.C.A. §§ 24-7-202, 24-7-205.** Effective July 1, 2011, absent intentional nondisclosure, fraud, misrepresentation, or criminal act, members can no longer establish old service previously unreported (Act 138 of 2011). Act 241 of 2017 allows ATRS to correct an understated service credit error upon which all required contributions have been paid, even if beyond the 5-year look-back period.
21. **Service Credit Requirements – A.C.A. §§ 24-7-501, 24-7-502, 24-7-601, 24-7-603, 24-7-604, 24-7-606, 24-7-607, 24-7-611.** Effective July 1, 2011, members must receive 160 days of service to be credited with a year of service credit (Act 974 of 2011).
22. **T-DROP Cash Balance Account.** Effective July 1, 2012, a T-DROP cash balance account was established that allows members exiting (retiring) from T-DROP to place all or a portion of their T-DROP proceeds into a Cash Balance Account (CBA) at ATRS. The interest rate credited will be between 2.5% and 4.0%, increasing 25 basis points for each year on deposit through the 5th year, and then 4% for the 6th and subsequent years.
23. **Delinquent Member Contributions – A.C.A. § 24-7-205.** Act 336 of 2013 allows members to forfeit service credit for any contributory fiscal year for which there is a balance due to the system.
24. **Purchase of Air Time as a Result of Wrongful Termination – A.C.A. §§ 24-7-702, 24-7-735, 6-17-413.** Act 521 of 2013 allows a member to purchase service credit under a settlement agreement or court order to resolve a claim of wrong termination if the service credit is purchased from the date of termination by an ATRS employer to the date of the resolution of the dispute. This service credit would be purchased at actuarial cost.

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25. **Buyout of Inactive Members—A.C.A. § 24-7-505.** Act 606 of 2013 allows the ATRS Board to create a voluntary "buyout plan" for inactive vested members. The System will make a one-time lump sum payment to a member, a surviving spouse, or an alternate payee in exchange for a member, surviving spouse, or alternate payee's cancellation of membership and retirement benefit rights. The buyout plan will be established by Board rules. The rule is 16-1 Cash and Savings Help Program for Members (CASH). This particular plan offering ended June 30, 2015. Depending upon the success of the plan, it may be extended by the Board. Act 647 of 2017 allows the buyout plan to be extended, modified, or expanded by board resolution. The ATRS Board expanded the CASH program to include all inactive vested members, regardless of service type by Resolution 2017-18 on May 10, 2017.
26. **Private School Service—A.C.A. § 24-7-607.** Prior to Act 90 of 2015, private school service had to be recognized by the Arkansas Department of Education as positions that required the issuance of teaching licenses. The certification of this service credit was performed by one employee of the Arkansas Department of Education, and that one employee retired. Upon that employee's retirement, the Arkansas Department of Education no longer certified private school service credit. ATRS went for approximately a year until legislation could be passed to allow ATRS to make this determination. In addition, a distinction was made between certified and noncertified private school service credit. Certified private school service (basically administrative and teaching) could be purchased at actuarial cost, up to 15 years. Noncertified private school service could be purchased at actuarial cost, up to 5 years.
27. **Military Service Credit—A.C.A. § 24-7-602.** Act 301 of 2015 was for technical corrections to the laws. In the military service credit section, ATRS was not in compliance with a state law that was passed in 2009, Act 295, which deleted the requirement for free military service credit to be granted only if the service was not credited under any other plan except Social Security and the requirement that receipt of a pension from the federal military retirement system paid solely for disability shall not be considered as having service with another retirement plan. The military technical corrections bill raised questions by some of the legislators, and Act 558 of 2015 was passed to further clarify military service credit. Compulsory military service was changed throughout the law to read: "federal military draft". The word "honorable" was inserted before discharge in order for the member to obtain free military service credit throughout the law.
28. **Lump-Sum Payment of Reserve Value of Small Annuity—A.C.A. 24-7-716.** Prior to passage of Act 225 of 2015, ATRS would pay out a reserve value to a member whose monthly benefit was less than \$20 per month. This was optional for the member. The reserve value was calculated by multiplying the annual annuity by the reserve factor for the member's age. Act 225 of 2015 repealed this law.
29. **Pension Advance Prohibition – A.C.A. § 24-7-715.** Prohibits a pension advance company from obtaining a retiree's benefit to repay a loan. Act 199 of 2017.
30. **Accrued Sick Leave – A.C.A. § 24-7-601.** Allows unused accrued sick leave, whether paid or unpaid, to count as service credit to determine retirement eligibility for survivor benefits and lump sum death benefits. One day of service shall be added to the service credit for the fiscal year of the member's death. This does not include catastrophic leave and other unused donated leave. Act 200 of 2017.

Summary of Provisions

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31. **Spousal Survivor Benefit – A.C.A. § 24-7-710.** Members may direct an alternative residual beneficiary to receive a lump sum payment of the member's residue amount or T-DROP balance. No spousal survivor benefits will be payable if an alternative beneficiary is designated by the member. Act 243 of 2017.
32. **Settlement Agreements – A.C.A. § 24-7-202, § 24-7-735.** Salary or service credit may be purchased as part of a settlement agreement between a member and his/her employer. Salary will be added to the salary at the time of purchase and will be determined using the same factors used to calculate an additional monthly benefit in the annuitization of a T-DROP distribution. It is assumed the member would have retired immediately at the time of the purchase. Act 436 of 2017.
33. **Outsourcing – A.C.A. § 24-7-506.** This Act defines outsourcing to mean employment for an ATRS covered employer through a third party, private employer, independent contractor, or other contractual relationship. This Act defines that a person who performs services that are necessary for the normal daily operation for an ATRS covered employer is considered an Embedded Employee. This Act gives the ATRS covered employer a one-time decision to choose between two options for handling their Embedded Employees. The decision must be made within 60 days after the effective date of this Act or that first outsourcing. The first option for the ATRS covered employer is to become a participating employer and make embedded employees participating members of ATRS. The second option for the ATRS covered employer is to become a Surcharge Employer and opt to pay a surcharge on the Embedded Employee's salary to ATRS to help cover the actuarial cost. The surcharge starts at ½% the first year and slowly rises to 3% over 4 years with a hard cap of 4%. The Embedded Employees of a Surcharge Employer will not be members of ATRS. The services necessary for normal daily operations include: substitute teaching, teacher's aides, food service, transportation service, custodial service, security services, and school nursing. Only those working on the premises are subject to the surcharge. The surcharge is ONLY on SALARY of embedded employees. All salary is reported in the aggregate with the contractor's salary amount being the final word unless it is clearly in error. The Division of Youth Services shall be a participating Employer and may designate any or all Embedded Employees as members of ATRS. The law shall not apply to post-secondary higher education institutions. Act 575 of 2017.
34. **Concurrent Reciprocal Service Credit – A.C.A. § 24-7-601.** This act allows ATRS members with the option of waiving their ATRS service in the event the member had concurrent service in two (2) state-supported retirement systems. This Act gives the member the option to choose ATRS service or the reciprocal plan service to surrender. If a member worked full time under a reciprocal retirement system and only part-time under ATRS, this Act will allow the member to waive the ATRS service to obtain a higher benefit based upon the full time service in the other system. This act will allow concurrent reciprocal members the option to voluntarily elect to waive service in ATRS. The member's employer-accrued contributions and employee-accrued contributions in the system remain with the system. Act 612 of 2017.

Summary of Provisions

June 30, 2017

35. **Employer Contribution Rate – A.C.A. § 24-7-401.** For the fiscal year beginning July 1, 2018, the Board may modify the employer contribution rate for future fiscal years above 14% in increments of .25% per fiscal year provided the system has a greater than 18 year amortization period to pay unfunded liabilities without an employer contribution rate of more than 14% limited to a maximum employer contribution rate of 15%. Act 821 of 2017. The employer contribution rate for fiscal year 2017-18 remains at 14%. It will increase in steps of 0.25% beginning in FY 2020 until it reaches 15%.
36. **Forfeiture of Benefits by Certain Persons – A.C.A. §§ 24-1-301, 302, 303, 304, 305.** Act 756 of 2017 provides for a beneficiary's forfeiture of benefits under a public retirement system when the beneficiary unlawfully kills a member or retirant.

Sample Benefit Computations for a Member Retiring June 30, 2017

The data for the Example member is shown below.

| | | |
|----|-----------------|--|
| A. | <u>\$35,000</u> | Final Average Compensation |
| B. | <u>32</u> | Total Service Credit |
| C. | <u>27</u> | Contributory Service Credit |
| D. | <u>60</u> | Age of Retiree |
| E. | <u>55</u> | Age of Spouse |
| F. | <u>100%</u> | Percentage of Retirement Allowance to Continue to Spouse after Retiree's Death (Retiree Chooses this Percentage) |

The computations that would be made for this case are:

| | <u>Annual</u> |
|--|---------------|
| G. Non-Contributory Base: $1.39\% \times A \times B$ | \$15,568 |
| H. Extra for Contributory: $0.76\% \times A \times C$ | <u>7,182</u> |
| I. Subtotal Benefit: G + H | 22,750 |
| J. Health Stipend | <u>900</u> |
| K. Total Benefit: I + J | 23,650 |
| L. Adjustment for Line F election: $(1 - 0.78571) \times I$ | <u>4,875</u> |
| M. Annual Amount Payable | \$18,775 |

Projected Benefits, taking into account increases after retirement would be:

| <u>Year Ended June 30</u> | <u>Annual Amount</u> |
|---------------------------|--------------------------|
| 2018 | \$18,775 |
| 2019 | 19,311 |
| 2020 | 19,847 |
| 2021 | 20,383 |
| 2022 | 20,919 |

Thereafter, the amount would increase by \$536 annually for life.

Sample T-DROP Benefit Computations for a Member Entering T-DROP June 30, 2017

The data for the Example member is shown below.

| | | |
|----|----------|-----------------------------|
| A. | \$35,000 | Final Average Compensation |
| B. | 28 | Total Service Credit |
| C. | 28 | Contributory Service Credit |
| D. | 55 | Age of Retiree |

The computations that would be made for this case are:

| | <u>Annual Amount</u> |
|--|----------------------|
| E. Non-Contributory Base: $1.39\% \times A \times B$ | \$13,622 |
| F. Extra for Contributory: $0.76\% \times A \times C$ | 7,448 |
| G. Reduction for T-DROP Plan: (1% for each year of contributory service) $0.28 \times (E+F)$ | 5,900 |
| H. Reduction for Entering T-DROP with less than 30 years of service (6% for each year less than 30): $0.12 \times (E + F - G)$ | <u>1,820</u> |
| I. Annual Deposit $E + F - G - H$ | \$13,350 |

Projected Deposits, taking into account increases after DROP, and 5 years duration would be:

| <u>Year Ended June 30</u> | <u>Amount Deposited</u> |
|---------------------------|-------------------------|
| 2018 | \$13,350 |
| 2019 | 13,751 |
| 2020 | 14,151 |
| 2021 | 14,552 |
| 2022 | <u>14,952</u> |
| Total | \$70,756 |

The amount deposited, **plus** credited interest, can be paid as a lump sum or as an annuity. A portion of the deposits can also be placed into a Cash Balance account.

SECTION D

FINANCIAL INFORMATION

This information is presented in draft form for review by the System's auditor. Please let us know if there are any items the auditor changes so that we may maintain consistency with the System's financial statements.

Asset Valuation Method

An essential step in the valuation process is comparing valuation assets with computed liabilities. Valuation assets are those assets that are recognized for funding purposes.

Asset valuation methods are distinguished by the timing of the recognition of investment income. Total investment income is the sum of ordinary income and capital value changes. Under a pure market value approach, ordinary investment income and all capital value changes would be recognized immediately. Because of market volatility, use of pure market values in retirement funding can result in volatile contribution rates and unstable financial ratios, contrary to ATRS objectives.

Under the ATRS asset valuation method (see page D-3), assumed investment return is recognized fully each year. Differences between actual and assumed investment return are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, the funding value will tend to be less than the market value. Conversely, during periods when investment performance is less than the assumed rate, funding value will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

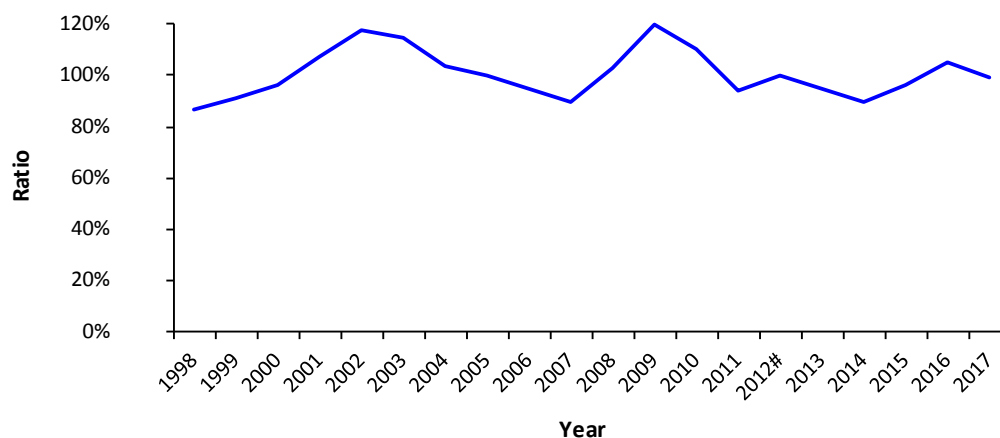
A multi-year comparison of market value to funding (actuarial) value is on the following page.

Asset Valuation Method

| Valuation Date June 30 | Market Value of Assets (1) | Actuarial Value of Assets (2) | Ratio of AV to MV (2) / (1) |
|---------------------------|-------------------------------|----------------------------------|--------------------------------|
| 1998 | \$ 6,656 | \$ 5,815 | 87% |
| 1999 | 7,403 | 6,740 | 91% |
| 2000 | 7,978 | 7,620 | 96% |
| 2001 | 7,643 | 8,166 | 107% |
| 2002 | 7,084 | 8,328 | 118% |
| 2003 | 7,050 | 8,113 | 115% |
| 2004 | 8,122 | 8,424 | 104% |
| 2005 | 8,811 | 8,817 | 100% |
| 2006 | 9,868 | 9,332 | 95% |
| 2007 | 11,637 | 10,519 | 90% |
| 2008 | 11,018 | 11,319 | 103% |
| 2009 | 8,847 | 10,617 | 120% |
| 2010 | 9,884 | 10,845 | 110% |
| 2011 | 11,895 | 11,146 | 94% |
| 2012# | 11,484 | 11,484 | 100% |
| 2013 | 12,830 | 12,247 | 95% |
| 2014 | 14,856 | 13,375 | 90% |
| 2015 | 15,036 | 14,434 | 96% |
| 2016 | 14,559 | 15,239 | 105% |
| 2017 | 16,285 | 16,131 | 99% |

Actuarial Value set equal to Market Value.

Ratio of Actuarial Value to Market Value



This year the market value of assets is greater than the actuarial value (see page A-3 for a more detailed explanation). To prevent unreasonably large differences between market value and funding value, there is a requirement that the recognized assets must always be between 80% and 120% of the market value (see page D-3).

Development of Funding Value of Assets

| Year Ended June 30: | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|----------------|----------------|----------------|
| A. Funding Value Beginning of Year | \$ 12,246,805,197 | \$ 13,374,765,500 | \$ 14,433,823,989 | \$ 15,238,522,015 | | | |
| B. Market Value End of Year | 14,856,276,668 | 15,035,701,313 | 14,558,576,729 | 16,284,808,245 | | | |
| C. Market Value Beginning of Year | 12,829,565,578 | 14,856,276,668 | 15,035,701,313 | 14,558,576,729 | | | |
| D. Non-Investment Net Cash Flow | (394,588,772) | (444,707,451) | (504,645,210) | (555,761,481) | | | |
| E. Investment Return | | | | | | | |
| E1. Market Total: B - C - D | 2,421,299,862 | 624,132,096 | 27,520,626 | 2,281,992,997 | | | |
| E2. Assumed Rate | 8.00% | 8.00% | 8.00% | 8.00% | 7.50% | 7.50% | 7.50% |
| E3. Amount for Immediate Recognition | 963,960,865 | 1,052,192,942 | 1,134,520,111 | 1,196,851,302 | | | |
| E4. Amount for Phased-In Recognition: E1-E3 | 1,457,338,997 | (428,060,846) | (1,106,999,485) | 1,085,141,695 | | | |
| F. Phased-In Recognition of Investment Return | | | | | | | |
| F1. Current Year: 0.25 x E4 | 364,334,749 | (107,015,212) | (276,749,871) | 271,285,424 | Unknown | Unknown | Unknown |
| F2. First Prior Year | 194,253,461 | 364,334,749 | (107,015,212) | (276,749,871) | \$ 271,285,424 | Unknown | Unknown |
| F3. Second Prior Year | - | 194,253,461 | 364,334,749 | (107,015,212) | (276,749,871) | \$ 271,285,424 | Unknown |
| F4. Third Prior Year | - | - | 194,253,459 | 364,334,750 | (107,015,210) | (276,749,872) | \$ 271,285,423 |
| F5. Total Recognized Investment Gain | 558,588,210 | 451,572,998 | 174,823,125 | 251,855,091 | (112,479,657) | (5,464,448) | 271,285,423 |
| G. Funding Value End of Year: | | | | | | | |
| G1. Preliminary Funding Value End of Year: A+D+E2+F6 | 13,374,765,500 | 14,433,823,989 | 15,238,522,015 | 16,131,466,927 | | | |
| G2. Upper Corridor Limit: 120% x B | 17,827,532,002 | 18,042,841,576 | 17,470,292,075 | 19,541,769,894 | | | |
| G3. Lower Corridor Limit: 80% x B | 11,885,021,335 | 12,028,561,050 | 11,646,861,383 | 13,027,846,596 | | | |
| G4. Funding Value End of Year | 13,374,765,500 | 14,433,823,989 | 15,238,522,015 | 16,131,466,927 | | | |
| H. Actual/Projected Difference between Market and Funding Value | 1,481,511,168 | 601,877,324 | (679,945,286) | 153,341,318 | 265,820,975 | 271,285,423 | - |
| I. Market Rate of Return | 19.17 % | 4.26 % | 0.19 % | 15.98 % | | | |
| J. Funding Rate of Return | 12.64 % | 11.43 % | 9.23 % | 9.68 % | | | |
| K. Ratio of Funding Value to Market Value | 90.03 % | 96.00 % | 104.67 % | 99.06 % | | | |

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. ***The Funding Value of Assets is unbiased with respect to Market Value.*** At any time it may be either greater or less than Market Value. If assumed rates are exactly realized for 3 consecutive years, it will become equal to Market Value.

The assets of the Retirement System, as of June 30, 2017, were reported to your actuary to be \$16,284,808,245. This amount, together with a market value adjustment of \$153,341,318 this year, is used to finance the Retirement System liability.

| Accounts | Assets at June 30 | |
|------------------------------------|-------------------|-------------------|
| | 2017 | 2016 |
| Regular Accounts | | |
| Members' Deposit Accounts | | |
| Contributions | \$ 1,229,715,817 | \$ 1,159,759,877 |
| Interest | 8,648,950,788 | 7,150,581,061 |
| Total | 9,878,666,605 | 8,310,340,938 |
| T-Drop Member Deposit Accounts | | |
| Contributions | 24,594,867 | 24,074,666 |
| Interest | 31,995,573 | 37,090,183 |
| Total | 56,590,440 | 61,164,849 |
| Cash Balance Account | 91,084,101 | 69,976,233 |
| Employer's Accumulation Account | (4,840,656,333) | (3,985,107,737) |
| Retirement Reserve Account | 10,545,265,390 | 9,533,653,119 |
| Act 808 Retirement Reserve Account | 13,986,693 | 14,894,565 |
| T-Lump Payable | 430,583,531 | 454,943,811 |
| Survivors Benefit Account | 99,931,749 | 88,768,471 |
| Total Regular Accounts | 16,275,452,176 | 14,548,634,249 |
| Other Accounts | | |
| Income Expense Account | 9,356,069 | 9,942,480 |
| Other Special Reserves | - | - |
| Miscellaneous | - | - |
| Total Other Accounts | 9,356,069 | 9,942,480 |
| Total Accounting Value of Assets | 16,284,808,245 | 14,558,576,729 |
| Market Value Adjustment | (153,341,318) | 679,945,286 |
| Funding Value of Assets | \$ 16,131,466,927 | \$ 15,238,522,015 |

Market Value of Assets

The net market value of assets at year-end was \$16,284,808,245 and was invested as shown below.

| | Market Value at June 30 | |
|--------------------------------------|-------------------------|-------------------|
| | 2017 | 2016 |
| Cash | \$ 273,336,545 | \$ 228,375,223 |
| Receivables | | |
| Unsettled Trades and Accrued Return | 58,987,011 | 89,180,723 |
| Member Contributions | 8,368,529 | 8,909,917 |
| Employer Contributions | 28,371,709 | 30,479,999 |
| Other | 203,914 | 373,109 |
| Total Receivables | 95,931,163 | 128,943,748 |
| Investments | | |
| Government Securities | 15,055,571 | 25,157,800 |
| Domestic Equities | 2,342,524,863 | 2,736,847,861 |
| International Equities | 987,229,454 | 733,961,206 |
| Commingled Funds | 7,313,897,063 | 5,808,435,670 |
| Corporate Bonds | 642,108,955 | 608,322,817 |
| Asset and Mortgage-backed Securities | 40,631,854 | 33,238,073 |
| Mortgages (CMO's) | - | - |
| Conventional Mortgages | - | - |
| Alternative Investments | 4,297,122,835 | 4,261,910,693 |
| Limited Partnerships | 70,178,093 | 37,471,079 |
| Real Estate | 59,095,506 | 58,730,872 |
| Other Investments | 224,000,000 | - |
| Investment Derivative Instruments | (284,155) | (195,507) |
| Total Investments | 15,991,560,039 | 14,303,880,564 |
| Invested Securities Lending | 431,215,542 | 574,498,212 |
| Net Equipment | 276,426 | 309,256 |
| Total Assets | 16,792,319,715 | 15,236,007,003 |
| Liabilities | | |
| Survivor Benefits for Minors | 342,588 | 302,374 |
| Other Payables | 6,924,468 | 6,226,684 |
| Securities Related Payables | 69,054,717 | 95,998,275 |
| Securities Lending Collateral | 431,189,697 | 574,902,941 |
| Total Liabilities | 507,511,470 | 677,430,274 |
| Net Market Value | \$ 16,284,808,245 | \$ 14,558,576,729 |
| Change from Prior Year | 1,726,231,516 | (477,124,584) |

Market Value Reconciliation

Assets developed during the year as follows:

| | Year Ended June 30 | |
|-----------------------------|--------------------|-------------------|
| | 2017 | 2016 |
| Net Market Value July 1 | \$ 14,558,576,729 | \$ 15,035,701,313 |
| Additions | | |
| Employer Contributions | 414,954,939 | 410,461,299 |
| Employee Contributions | 133,109,940 | 130,997,913 |
| Appreciation | 2,210,725,328 | (63,612,934) |
| Interest | 25,667,651 | 21,904,797 |
| Dividends | 76,202,416 | 78,774,203 |
| Real Estate | 7,516,675 | 7,205,691 |
| Other | 8,547,919 | 29,930,559 |
| Securities Lending Activity | 4,620,171 | 4,698,995 |
| Total Additions | 2,881,345,039 | 620,360,523 |
| Deductions | | |
| Age & Service Benefits | 907,314,702 | 852,695,640 |
| Disability Benefits | 38,833,696 | 37,812,689 |
| Option Benefits | 26,843,481 | 24,637,113 |
| Survivor Benefits | 10,470,562 | 9,946,290 |
| Reciprocal Service | 49,175,662 | 45,746,432 |
| Act 808 | 2,874,444 | 3,000,785 |
| Refunds | 10,874,003 | 10,145,471 |
| Active Member Death | 474,719 | 357,921 |
| T-DROP Benefits | 42,969,143 | 52,760,622 |
| CBA Benefits | 9,735,670 | 8,600,786 |
| CASH Benefit Program | 4,260,278 | 400,673 |
| Investment Expense | 43,461,569 | 43,321,655 |
| Administrative Expense | 7,825,594 | 8,059,030 |
| Total Deductions | 1,155,113,523 | 1,097,485,107 |
| Miscellaneous | - | - |
| Net Market Value June 30 | \$ 16,284,808,245 | \$ 14,558,576,729 |

Schedule of Funding Progress (Dollar amounts in Millions)

| Valuation Date June 30 | (1) Actuarial Value of Assets | (2) Entry Age AAL | (3) UAAL (2)-(1) | (4) Funding Ratio (1)/(2) | (5) Annual Payroll | Liabilities as a % of Payroll | | |
|------------------------------|--|-------------------------|------------------------|------------------------------------|--------------------------|-------------------------------|-------------------|------------------|
| | | | | | | Unfunded (3)/(5) | Funded (1)/(5) | Total (2)/(5) |
| 1998+* | \$ 5,815 | \$ 6,188 | \$ 373 | 94.0% | \$ 1,368 | 27.3% | 425.0% | 452.3% |
| 1999+ | 6,740 | 6,834 | 94 | 98.6% | 1,429 | 6.6% | 471.6% | 478.2% |
| 2000+ | 7,620 | 7,879 | 259 | 96.7% | 1,485 | 17.4% | 513.2% | 530.6% |
| 2001+ | 8,166 | 8,561 | 395 | 95.4% | 1,557 | 25.4% | 524.4% | 549.8% |
| 2002* | 8,328 | 9,062 | 734 | 91.9% | 1,628 | 45.1% | 511.5% | 556.6% |
| 2003+ | 8,113 | 9,445 | 1,332 | 85.9% | 1,683 | 79.1% | 482.1% | 561.2% |
| 2004 | 8,424 | 10,050 | 1,626 | 83.8% | 1,748 | 93.0% | 481.9% | 574.9% |
| 2005 | 8,817 | 10,973 | 2,156 | 80.4% | 1,962 | 109.9% | 449.4% | 559.3% |
| 2006 | 9,332 | 11,623 | 2,291 | 80.3% | 2,080 | 110.1% | 448.7% | 558.8% |
| 2007+ | 10,519 | 12,329 | 1,810 | 85.3% | 2,191 | 82.6% | 480.1% | 562.7% |
| 2008+ | 11,319 | 13,334 | 2,015 | 84.9% | 2,268 | 88.8% | 499.1% | 587.9% |
| 2009 | 10,617 | 14,019 | 3,402 | 75.7% | 2,318 | 146.8% | 458.0% | 604.8% |
| 2010+ | 10,845 | 14,697 | 3,852 | 73.8% | 2,381 | 161.8% | 455.5% | 617.3% |
| 2011+* | 11,146 | 15,521 | 4,375 | 71.8% | 2,728 | 160.4% | 408.6% | 569.0% |
| 2012 | 11,484 | 16,139 | 4,655 | 71.2% | 2,714 | 171.5% | 423.2% | 594.7% |
| 2013+* | 12,247 | 16,718 | 4,471 | 73.3% | 2,727 | 164.0% | 449.1% | 613.1% |
| 2014 | 13,375 | 17,310 | 3,935 | 77.3% | 2,758 | 142.7% | 484.9% | 627.6% |
| 2015 | 14,434 | 18,136 | 3,702 | 79.6% | 2,777 | 133.3% | 519.8% | 653.1% |
| 2016 | 15,239 | 18,812 | 3,573 | 81.0% | 2,785 | 128.3% | 547.2% | 675.5% |
| 2017+* | 16,131 | 20,298 | 4,167 | 79.5% | 2,814 | 148.1% | 573.2% | 721.3% |

+ Legislated benefit or contribution rate change.

* Revised actuarial assumptions.

A system with a high ratio of assets or liabilities to payroll will tend to experience more volatility than a system with a lesser ratio, assuming a similar asset allocation.

Schedule of Employer Contributions

| Fiscal Year Ended June 30 | Valuation Date June 30 | Covered Payroll * | Annual Required Contribution | (A) Annual Required Contribution | (B) Actual Contribution Dollars | (B)/(A) Percent Contributed |
|--|-----------------------------------|--------------------------|---|---|--|--|
| 2014 | 2012 | \$2,850,860,174 | 16.8% | \$478,944,509 | \$404,920,441 | 84.5% |
| 2015 | 2013 | 2,873,988,053 | 16.3% | 468,460,053 | 408,281,905 | 87.2% |
| 2016 | 2014 | 2,888,392,668 | 14.9% | 430,370,508 | 410,461,299 | 95.4% |
| 2017 | 2015 | 2,921,965,125 | 14.3% | 417,841,013 | 414,954,939 | 99.3% |

* Annual payroll of active, T-DROP and return to work employees as of June 30. Actual contributions were based on pay actually paid throughout the year which was different from the payroll reported above.

Risk Measures (Based on Market Value of Assets)

| Valuation Date June 30 | (1) Accrued Liabilities (AAL) | (2) Market Value of Assets | (3) Unfunded AAL (1)-(2) | (4) Valuation Payroll | (5) Funded Ratio (2)/(1) | (6) Liability/ Payroll (1)/(4) | (7) Assets/ Payroll (2)/(4) | (8) Unfunded/ Payroll (3)/(4) | (9) Net External Cash Flow (NECF) | (10) NECF/ Assets (9)/(2) | (11) Portfolio Rate of Return | (12) 10 year Trailing Average |
|---------------------------|-------------------------------------|-------------------------------|--------------------------------|--------------------------|--------------------------------|---|--------------------------------------|--|---|------------------------------------|----------------------------------|----------------------------------|
| 2003# | \$ 9,445 | \$ 7,050 | \$ 2,395 | \$ 1,683 | 74.6% | 561.2% | 418.9% | 142.3% | \$ (109) | -1.6% | 1.1% | |
| 2004 | 10,050 | 8,122 | 1,928 | 1,748 | 80.8% | 574.9% | 464.6% | 110.3% | (115) | -1.4% | 17.0% | |
| 2005 | 10,973 | 8,811 | 2,162 | 1,962 | 80.3% | 559.3% | 449.1% | 110.2% | (84) | -1.0% | 9.6% | |
| 2006 | 11,623 | 9,868 | 1,755 | 2,080 | 84.9% | 558.8% | 474.4% | 84.4% | (110) | -1.1% | 13.3% | |
| 2007# | 12,329 | 11,637 | 692 | 2,191 | 94.4% | 562.7% | 531.1% | 31.6% | (118) | -1.0% | 19.2% | |
| 2008# | 13,334 | 11,018 | 2,316 | 2,268 | 82.6% | 587.9% | 485.8% | 102.1% | (135) | -1.2% | -4.2% | |
| 2009 | 14,019 | 8,847 | 5,172 | 2,318 | 63.1% | 604.8% | 381.7% | 223.1% | (172) | -1.9% | -18.3% | |
| 2010# | 14,697 | 9,884 | 4,813 | 2,381 | 67.2% | 617.3% | 415.1% | 202.2% | (203) | -2.1% | 14.2% | 3.6% |
| 2011#* | 15,521 | 11,895 | 3,626 | 2,728 | 76.6% | 569.0% | 436.1% | 132.9% | (201) | -1.7% | 22.6% | 6.1% |
| 2012 | 16,139 | 11,484 | 4,655 | 2,714 | 71.2% | 594.7% | 423.2% | 171.5% | (285) | -2.5% | -1.1% | 6.6% |
| 2013# | 16,718 | 12,830 | 3,888 | 2,727 | 76.7% | 613.1% | 470.5% | 142.6% | (337) | -2.6% | 14.9% | 8.0% |
| 2014 | 17,310 | 14,856 | 2,454 | 2,758 | 85.8% | 627.6% | 538.6% | 89.0% | (395) | -2.7% | 19.2% | 8.2% |
| 2015 | 18,136 | 15,036 | 3,100 | 2,777 | 82.9% | 653.1% | 541.5% | 111.6% | (445) | -3.0% | 4.3% | 7.7% |
| 2016 | 18,812 | 14,559 | 4,253 | 2,785 | 77.4% | 675.5% | 522.8% | 152.7% | (505) | -3.5% | 0.2% | 6.3% |
| 2017#* | 20,298 | 16,285 | 4,013 | 2,814 | 80.2% | 721.3% | 578.7% | 142.6% | (556) | -3.4% | 16.0% | 6.0% |

(*) ATRS had experience studies in these years leading to a change or "true up" in actuarial assumptions. A pattern of periodic studies is a sign of a well-run system and suggests the extent to which the liability measures the actuary provides are likely to be realistic.

(#) ATRS had benefit changes in these years. Benefit increases cause liabilities to rise; benefit decreases cause liabilities to fall. In either case benefit changes affect the year by year comparability of the measures on this page.

(5). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

(6) and (7) The ratios of liabilities and assets to payroll gives an indication of both maturity and volatility. Many systems have values between 500% and 700%. Values significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

(8) The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A value above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

(9) and (10) The ratio of Net External Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.

(11) and (12) Investment return is probably the largest single risk that most systems face. The year by year return and the 10-year geometric average give an indicator of the realism of the systems assumed return. The averages are of course distorted by the extraordinary events of 2008.

SECTION E

COVERED MEMBER DATA

Active Members in Valuation June 30, 2017
by Attained Age and Years of Service
(Excludes T-Drop and Rehired Retirees)

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|---------------|---------------|--------------|--------------|--------------|------------|---------------|------------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| Under 20 | 766 | | | | | | | 766 | \$ 1,516,142 |
| 20-24 | 1,955 | 10 | | | | | | 1,965 | 39,207,398 |
| 25-29 | 4,975 | 1,084 | 11 | | | | | 6,070 | 206,425,292 |
| 30-34 | 3,255 | 3,109 | 925 | 10 | | | | 7,299 | 269,630,968 |
| 35-39 | 2,876 | 2,144 | 2,913 | 648 | 2 | | | 8,583 | 336,187,462 |
| 40-44 | 2,353 | 2,012 | 2,104 | 2,354 | 585 | 2 | | 9,410 | 394,929,420 |
| 45-49 | 1,996 | 1,781 | 2,071 | 1,770 | 2,109 | 478 | | 10,205 | 437,509,365 |
| 50-54 | 1,519 | 1,261 | 1,697 | 1,547 | 1,466 | 1,353 | 59 | 8,902 | 361,855,143 |
| 55-59 | 1,321 | 1,078 | 1,399 | 1,434 | 1,370 | 987 | 83 | 7,672 | 286,565,564 |
| 60 | 219 | 209 | 200 | 227 | 262 | 216 | 22 | 1,355 | 50,190,907 |
| 61 | 240 | 185 | 200 | 214 | 222 | 174 | 20 | 1,255 | 46,962,650 |
| 62 | 167 | 171 | 176 | 180 | 170 | 150 | 18 | 1,032 | 37,686,925 |
| 63 | 174 | 134 | 163 | 109 | 108 | 131 | 12 | 831 | 28,855,805 |
| 64 | 122 | 147 | 118 | 98 | 108 | 110 | 13 | 716 | 26,019,880 |
| 65 | 117 | 115 | 118 | 84 | 86 | 74 | 18 | 612 | 20,647,633 |
| 66 | 116 | 86 | 53 | 30 | 30 | 16 | 9 | 340 | 8,790,451 |
| 67 | 108 | 57 | 37 | 13 | 12 | 6 | 1 | 234 | 5,481,867 |
| 68 | 95 | 44 | 22 | 6 | 7 | 1 | 4 | 179 | 3,385,627 |
| 69 | 97 | 48 | 25 | 5 | 2 | 3 | | 180 | 3,172,285 |
| 70 & Up | 368 | 228 | 88 | 27 | 10 | 7 | 3 | 731 | 11,746,867 |
| Totals | 22,839 | 13,903 | 12,320 | 8,756 | 6,549 | 3,708 | 262 | 68,337 | \$2,576,767,651 |

Group Averages:

Age: 44.3 years

Service: 10.2 years

WOMEN Active Members in Valuation June 30, 2017
by Attained Age and Years of Service
(Excludes T-Drop and Rehired Retirees)

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|---------------|--------------|--------------|--------------|--------------|------------|---------------|-------------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| Under 20 | 252 | | | | | | | 252 | \$ 612,776 |
| 20-24 | 1,416 | 2 | | | | | | 1,418 | 29,907,541 |
| 25-29 | 3,780 | 818 | 8 | | | | | 4,606 | 154,073,202 |
| 30-34 | 2,571 | 2,345 | 744 | 3 | | | | 5,663 | 200,981,193 |
| 35-39 | 2,336 | 1,654 | 2,267 | 514 | 1 | | | 6,772 | 253,692,898 |
| 40-44 | 1,877 | 1,629 | 1,690 | 1,817 | 448 | 1 | | 7,462 | 296,751,544 |
| 45-49 | 1,524 | 1,442 | 1,743 | 1,457 | 1,660 | 389 | | 8,215 | 337,296,483 |
| 50-54 | 1,048 | 965 | 1,416 | 1,311 | 1,188 | 1,034 | 49 | 7,011 | 273,285,350 |
| 55-59 | 896 | 787 | 1,105 | 1,211 | 1,178 | 808 | 66 | 6,051 | 219,191,767 |
| 60 | 149 | 143 | 150 | 184 | 213 | 183 | 18 | 1,040 | 37,509,071 |
| 61 | 148 | 134 | 153 | 177 | 191 | 158 | 17 | 978 | 36,052,296 |
| 62 | 97 | 109 | 128 | 134 | 135 | 131 | 17 | 751 | 26,914,325 |
| 63 | 98 | 87 | 122 | 82 | 90 | 114 | 10 | 603 | 21,093,644 |
| 64 | 69 | 99 | 87 | 73 | 101 | 88 | 10 | 527 | 19,085,287 |
| 65 | 62 | 75 | 81 | 64 | 75 | 62 | 16 | 435 | 14,931,962 |
| 66 | 60 | 56 | 35 | 25 | 25 | 14 | 6 | 221 | 5,703,438 |
| 67 | 61 | 32 | 25 | 13 | 8 | 5 | 1 | 145 | 3,617,425 |
| 68 | 55 | 16 | 15 | 5 | 6 | 1 | 3 | 101 | 1,872,682 |
| 69 | 50 | 27 | 17 | 3 | 2 | 3 | | 102 | 1,807,787 |
| 70 & Up | 196 | 99 | 50 | 14 | 5 | 5 | 3 | 372 | 5,859,304 |
| Totals | 16,745 | 10,519 | 9,836 | 7,087 | 5,326 | 2,996 | 216 | 52,725 | \$ 1,940,239,975 |

Group Averages:

Age: 44.3 years

Service: 10.5 years

MEN Active Members in Valuation June 30, 2017
by Attained Age and Years of Service
(Excludes T-Drop and Rehired Retirees)

| Attained Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|--------------|--------------|--------------|--------------|------------|-----------|---------------|-----------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| Under 20 | 514 | | | | | | | 514 | \$ 903,366 |
| 20-24 | 539 | 8 | | | | | | 547 | 9,299,857 |
| 25-29 | 1,195 | 266 | 3 | | | | | 1,464 | 52,352,090 |
| 30-34 | 684 | 764 | 181 | 7 | | | | 1,636 | 68,649,775 |
| 35-39 | 540 | 490 | 646 | 134 | 1 | | | 1,811 | 82,494,564 |
| 40-44 | 476 | 383 | 414 | 537 | 137 | 1 | | 1,948 | 98,177,876 |
| 45-49 | 472 | 339 | 328 | 313 | 449 | 89 | | 1,990 | 100,212,882 |
| 50-54 | 471 | 296 | 281 | 236 | 278 | 319 | 10 | 1,891 | 88,569,793 |
| 55-59 | 425 | 291 | 294 | 223 | 192 | 179 | 17 | 1,621 | 67,373,797 |
| 60 | 70 | 66 | 50 | 43 | 49 | 33 | 4 | 315 | 12,681,836 |
| 61 | 92 | 51 | 47 | 37 | 31 | 16 | 3 | 277 | 10,910,354 |
| 62 | 70 | 62 | 48 | 46 | 35 | 19 | 1 | 281 | 10,772,600 |
| 63 | 76 | 47 | 41 | 27 | 18 | 17 | 2 | 228 | 7,762,161 |
| 64 | 53 | 48 | 31 | 25 | 7 | 22 | 3 | 189 | 6,934,593 |
| 65 | 55 | 40 | 37 | 20 | 11 | 12 | 2 | 177 | 5,715,671 |
| 66 | 56 | 30 | 18 | 5 | 5 | 2 | 3 | 119 | 3,087,013 |
| 67 | 47 | 25 | 12 | | 4 | 1 | | 89 | 1,864,442 |
| 68 | 40 | 28 | 7 | 1 | 1 | | 1 | 78 | 1,512,945 |
| 69 | 47 | 21 | 8 | 2 | | | | 78 | 1,364,498 |
| 70 & Up | 172 | 129 | 38 | 13 | 5 | 2 | | 359 | 5,887,563 |
| Totals | 6,094 | 3,384 | 2,484 | 1,669 | 1,223 | 712 | 46 | 15,612 | \$ 636,527,676 |

Group Averages:

Age: 44.1 years

Service: 9.1 years

Summary of Active Members (Excludes T-Drop and Rehired Retirees)

| | Teachers | | Support | | Total Active Members | |
|-------|----------|-------------------|---------|-------------------|----------------------|-------------------|
| | No. | Valuation Payroll | No. | Valuation Payroll | No. | Valuation Payroll |
| Women | 27,345 | \$ 1,351,730,455 | 25,380 | \$ 588,509,520 | 52,725 | \$ 1,940,239,975 |
| Men | 7,610 | 428,681,928 | 8,002 | 207,845,748 | 15,612 | 636,527,676 |
| All | 34,955 | \$ 1,780,412,383 | 33,382 | \$ 796,355,268 | 68,337 | \$ 2,576,767,651 |

| | Teachers | Support | Total |
|--------------------------|----------|---------|--------|
| Members Contributing Now | 32,388 | 18,476 | 50,864 |
| Members Not Contributing | 2,567 | 14,906 | 17,473 |
| All | 34,955 | 33,382 | 68,337 |

| June 30 | Number | Group Averages | | | Active Member Payroll (\$ Millions) |
|---------|--------|----------------|---------|-----------------|-------------------------------------|
| | | Age | Service | Annual Earnings | |
| 2001 | 61,389 | 43.7 | 9.5 | \$25,365 | \$1,557 |
| 2002 | 62,011 | 43.8 | 9.4 | 26,254 | 1,628 |
| 2003 | 62,432 | 44.0 | 9.5 | 26,963 | 1,683 |
| 2004 | 63,185 | 44.2 | 9.5 | 27,660 | 1,748 |
| 2005 | 65,793 | 44.2 | 9.4 | 29,826 | 1,962 |
| 2006 | 67,710 | 44.3 | 9.3 | 30,714 | 2,080 |
| 2007 | 69,226 | 44.4 | 9.3 | 31,645 | 2,191 |
| 2008 | 70,172 | 44.5 | 9.4 | 32,319 | 2,268 |
| 2009 | 70,655 | 44.7 | 9.5 | 32,804 | 2,318 |
| 2010 | 72,208 | 44.7 | 9.7 | 32,980 | 2,381 |
| 2011 | 72,293 | 44.8 | 9.9 | 33,995 | 2,458 |
| 2012 | 71,195 | 45.0 | 10.1 | 34,362 | 2,446 |
| 2013 | 70,660 | 45.0 | 10.2 | 34,920 | 2,467 |
| 2014 | 70,225 | 44.7 | 10.2 | 35,673 | 2,505 |
| 2015 | 68,945 | 44.6 | 10.3 | 36,717 | 2,531 |
| 2016 | 68,368 | 44.4 | 10.2 | 37,235 | 2,546 |
| 2017 | 68,337 | 44.3 | 10.2 | 37,707 | 2,577 |

Deferred Vested Members at June 30, 2017 by Attained Age

| Age | Number | Estimated Annual Benefits | Contribution Balance |
|------------------------|---------------|---------------------------|-----------------------|
| Below 40 | 1,802 | \$ 11,274,705 | \$ 23,701,563 |
| 40 | 225 | 1,588,587 | 3,518,289 |
| 41 | 251 | 1,679,831 | 3,273,675 |
| 42 | 278 | 1,859,510 | 3,680,045 |
| 43 | 296 | 1,892,916 | 3,444,814 |
| 44 | 265 | 1,731,879 | 3,256,978 |
| 45 | 328 | 2,069,707 | 3,518,633 |
| 46 | 406 | 2,696,866 | 4,552,593 |
| 47 | 363 | 2,392,543 | 4,068,806 |
| 48 | 380 | 2,607,445 | 4,186,098 |
| 49 | 417 | 2,464,646 | 3,367,364 |
| 50 | 433 | 2,600,997 | 4,141,723 |
| 51 | 435 | 2,626,335 | 3,860,346 |
| 52 | 515 | 3,078,930 | 4,587,707 |
| 53 | 556 | 3,214,519 | 5,062,597 |
| 54 | 508 | 3,063,643 | 4,500,436 |
| 55 | 532 | 3,112,221 | 4,822,445 |
| 56 | 543 | 3,382,202 | 5,995,450 |
| 57 | 525 | 3,420,745 | 5,816,764 |
| 58 | 585 | 3,688,160 | 6,180,361 |
| 59 | 575 | 3,764,504 | 6,103,465 |
| 60 & Up | 2,103 | 8,160,166 | 11,240,521 |
| Future Beneficiaries # | 80 | 506,799 | 0 |
| Totals | 12,401 | \$ 72,877,856 | \$ 122,880,673 |

These are beneficiaries of deceased active members who are eligible for a pension at age 62.

An inactive member is no longer actively working but has sufficient service credit to qualify for a monthly benefit at retirement age.

All Members Participating in T-DROP at June 30, 2017 by Attained Age

| Age | Number | Current T-DROP Contribution | Original T-DROP Contribution | T-DROP Account Balance | Pay |
|---------------|--------------|-----------------------------|------------------------------|------------------------|-----------------------|
| 48 | 1 | \$ 7,430 | \$ 7,214 | \$ 7,292 | \$ 22,656 |
| 49 | 6 | 82,401 | 79,194 | 110,802 | 305,652 |
| 50 | 19 | 334,779 | 344,812 | 408,798 | 1,102,974 |
| 51 | 75 | 1,395,348 | 1,433,800 | 2,044,905 | 4,574,921 |
| 52 | 135 | 2,634,716 | 2,689,516 | 4,664,251 | 8,424,651 |
| 53 | 216 | 4,147,757 | 4,212,750 | 9,471,608 | 13,139,906 |
| 54 | 264 | 5,167,127 | 5,271,888 | 15,190,426 | 16,598,637 |
| 55 | 328 | 6,829,451 | 6,771,675 | 24,930,451 | 20,800,030 |
| 56 | 347 | 7,298,763 | 6,974,822 | 30,974,317 | 21,172,500 |
| 57 | 355 | 7,497,151 | 7,473,897 | 38,874,947 | 22,555,031 |
| 58 | 353 | 7,420,131 | 7,319,140 | 44,977,724 | 22,086,320 |
| 59 | 346 | 7,127,279 | 7,189,813 | 49,482,043 | 21,893,261 |
| 60 | 325 | 5,596,941 | 6,389,868 | 47,328,600 | 19,665,837 |
| 61 | 280 | 4,354,746 | 5,670,203 | 43,394,551 | 17,562,697 |
| 62 | 225 | 2,645,111 | 4,506,060 | 38,985,720 | 14,128,045 |
| 63 | 173 | 2,364,003 | 3,300,940 | 27,895,902 | 10,865,693 |
| 64 | 164 | 1,822,433 | 3,071,855 | 28,599,280 | 9,930,657 |
| 65 | 103 | 944,907 | 1,947,947 | 16,681,734 | 6,205,055 |
| 66 | 44 | 488,873 | 821,226 | 5,703,346 | 2,560,897 |
| 67 | 16 | 170,196 | 276,285 | 2,600,454 | 1,034,209 |
| 68 | 12 | 148,869 | 217,123 | 1,248,851 | 698,851 |
| 69 | 9 | 164,560 | 166,270 | 1,130,806 | 534,165 |
| 70 | 10 | 138,489 | 190,304 | 1,917,297 | 643,695 |
| 71 | 2 | - | 34,235 | 251,204 | 107,966 |
| 74 | 1 | - | 24,306 | 343,545 | 58,046 |
| 75 | 1 | 1,507 | 1,277 | 9,361 | 62,089 |
| 79 | 1 | - | 12,570 | 215,505 | 32,881 |
| Totals | 3,811 | \$ 68,782,968 | \$ 76,398,990 | \$ 437,443,720 | \$ 236,767,322 |

A T-DROP member continues to work, but does not accrue retirement benefits. A reduced benefit is paid into the T-DROP account (see pages C-2 and C-3) during T-DROP participation. Deposits to T-DROP cease at 10 years of T-DROP participation. T-DROP participants may continue in covered employment after 10 years of participation, but do not accumulate additional service credit or make member contributions. ATRS receives full employer contributions on behalf of these people.

Active, TDROP and Return to Work Members as of June 30, 2017

| June 30 | Number | | | | Total Payroll \$Millions |
|---------|--------|-------|-------|--------|--------------------------------|
| | Active | TDROP | RTW | Total | |
| 2011 | 72,293 | 4,487 | 4,093 | 80,873 | \$ 2,818 |
| 2012 | 71,195 | 4,432 | 4,001 | 79,628 | 2,803 |
| 2013 | 70,660 | 4,265 | 4,025 | 78,950 | 2,819 |
| 2014 | 70,225 | 4,127 | 3,845 | 78,197 | 2,851 |
| 2015 | 68,945 | 3,974 | 3,741 | 76,660 | 2,874 |
| 2016 | 68,368 | 3,864 | 3,829 | 76,061 | 2,888 |
| 2017 | 68,337 | 3,811 | 3,881 | 76,029 | 2,922 |

The actuarial valuation assumes the number of working members will remain constant at the current level. In recent years the total number of working members has decreased. A decreasing population means less contribution income for the Retirement System than expected and can lead to funding difficulties in extreme cases.

Annuities Being Paid Retirees and Beneficiaries July 1, 2017 by Type of Annuity Being Paid

| Type of Annuity | No. | Annual Amounts | | |
|-----------------------------------|--------|--------------------|----------------|-------------------|
| | | Original Annuities | Base Annuities | Current Annuities |
| | | | | |
| RETIREMENT RESERVE ACCOUNT | | | | |
| Age & Service | | | | |
| Option 1 (Basic single life) | 31,870 | \$ 480,445,833 | \$ 612,167,853 | \$ 738,206,651 |
| Option A (Joint & 100% Survivor) | 4,996 | 83,955,510 | 103,132,031 | 124,168,827 |
| Option B (Joint & 50% Survivor) | 2,488 | 54,914,351 | 70,004,883 | 84,881,031 |
| Option C (10 year certain) | 686 | 10,698,878 | 11,821,428 | 13,945,808 |
| Beneficiaries | 1,048 | 18,155,764 | 19,060,059 | 23,386,957 |
| Totals | 41,088 | 648,170,336 | 816,186,254 | 984,589,274 |
| Disability | | | | |
| Option 1 | 2,278 | 22,621,045 | 27,670,242 | 33,045,230 |
| Option A | 373 | 3,961,131 | 4,392,674 | 5,161,550 |
| Option B | 82 | 1,124,725 | 1,307,213 | 1,557,834 |
| Option C | 36 | 321,146 | 323,116 | 393,121 |
| Beneficiaries | 294 | 3,173,082 | 3,769,675 | 4,638,623 |
| Totals | 3,063 | 31,201,129 | 37,462,920 | 44,796,358 |
| Totals | 44,151 | 679,371,465 | 853,649,174 | 1,029,385,632 |
| SURVIVOR'S BENEFIT ACCOUNT | | | | |
| Beneficiaries of Deceased Members | 698 | \$ 7,231,096 | \$ 8,898,509 | \$ 10,574,602 |
| OTHER ANNUITIES | | | | |
| Act 793 | 189 | \$ 1,062,758 | \$ 1,964,285 | \$ 1,964,285 |
| Act 808 | 54 | 1,037,095 | 2,820,203 | 2,820,203 |
| RETIREMENT SYSTEM TOTALS | | | | |
| Total Annuities Being Paid | 45,092 | \$ 688,702,414 | \$ 867,332,170 | \$ 1,044,744,722 |

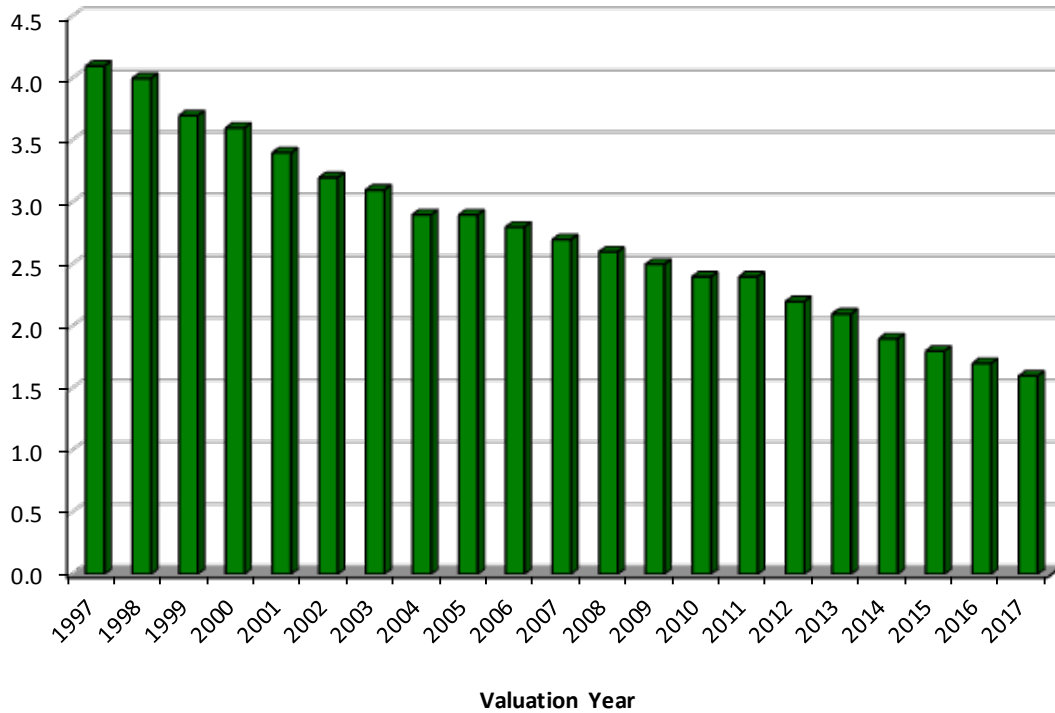
The Original Annuity is the annuity at the date of retirement.

The Base Annuity is the amount from which the 3.0% COLA is calculated. Base annuities include the stipend.

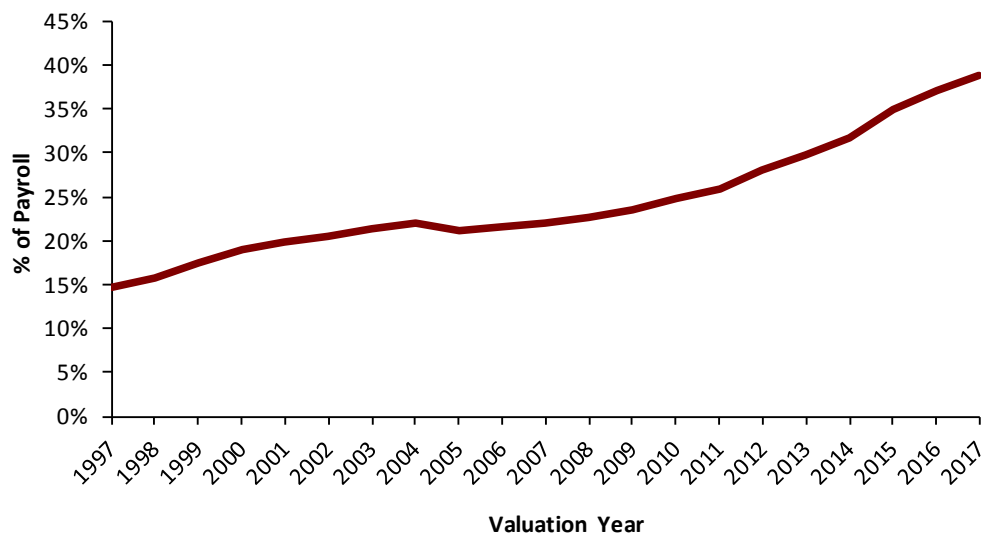
The Current Annuity is the annuity payable at July 1, 2017 (Includes July 1 COLA).

Historical Graphs

Active Members Per Retired Life *



**Retirement Benefits Being Paid
as a Percent of Member Payroll ***



* Beginning with the June 30, 2011 valuation, active members include T-DROP participants and payroll.

Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (1980 \$)

| Year Ended June 30 | Increase Beginning of Year | Benefit Dollars in Year* | Inflation (Loss) in Year# | Purchasing Power at Year End | |
|--------------------------|----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------|
| | | | | 1980 \$ | % of 1980 |
| 1980 | \$ - - - - | \$ 5,000 | - - - - | \$ 5,000 | 100% |
| 1981 | 75 | 5,075 | (9.6)% | 4,632 | 93% |
| 1982 | 152 | 5,227 | (7.1)% | 4,456 | 89% |
| 1983 | 152 | 5,379 | (2.6)% | 4,471 | 89% |
| 1984 | 431 | 5,810 | (4.2)% | 4,633 | 93% |
| 1985 | 438 | 6,248 | (3.7)% | 4,802 | 96% |
| 1986 | 509 | 6,757 | (1.7)% | 5,103 | 102% |
| 1987 | 197 | 6,954 | (3.7)% | 5,067 | 101% |
| 1988 | 400 | 7,354 | (3.9)% | 5,154 | 103% |
| 1989 | 503 | 7,857 | (5.1)% | 5,236 | 105% |
| 1990 | 497 | 8,354 | (4.7)% | 5,319 | 106% |
| 1991 | 230 | 8,584 | (4.7)% | 5,220 | 104% |
| 1992 | 762 | 9,346 | (3.1)% | 5,513 | 110% |
| 1993 | 792 | 10,138 | (3.0)% | 5,806 | 116% |
| 1994 | 820 | 10,958 | (2.5)% | 6,123 | 122% |
| 1995 | 303 | 11,261 | (3.0)% | 6,107 | 122% |
| 1996 | 303 | 11,564 | (2.8)% | 6,103 | 122% |
| 1997 | 1,657 | 13,221 | (2.3)% | 6,821 | 136% |
| 1998 | 1,214 | 14,435 | (1.7)% | 7,324 | 146% |
| 1999 | 323 | 14,758 | (2.0)% | 7,344 | 147% |
| 2000 | 1,039 | 15,797 | (3.7)% | 7,583 | 152% |
| 2001 | 1,220 | 17,017 | (3.2)% | 7,907 | 158% |
| 2002 | 672 | 17,689 | (1.1)% | 8,132 | 163% |
| 2003 | 468 | 18,157 | (2.1)% | 8,174 | 163% |
| 2004 | 468 | 18,625 | (3.3)% | 8,120 | 162% |
| 2005 | 468 | 19,093 | (2.5)% | 8,118 | 162% |
| 2006 | 468 | 19,561 | (4.3)% | 7,973 | 159% |
| 2007 | 468 | 20,029 | (2.7)% | 7,950 | 159% |
| 2008 | 468 | 20,497 | (5.0)% | 7,747 | 155% |
| 2009 | 468 | 20,965 | 1.4 % | 8,038 | 161% |
| 2010 | 629 | 21,594 | (1.1)% | 8,193 | 164% |
| 2011 | 648 | 22,242 | (3.6)% | 8,149 | 163% |
| 2012 | 648 | 22,890 | (1.7)% | 8,249 | 165% |
| 2013 | 648 | 23,538 | (1.8)% | 8,336 | 167% |
| 2014 | 648 | 24,186 | (2.1)% | 8,392 | 168% |
| 2015 | 648 | 24,834 | (0.1)% | 8,606 | 172% |
| 2016 | 648 | 25,482 | (1.0)% | 8,744 | 175% |
| 2017 | 648 | 26,130 | (1.6)% | 9,041 | 181% |
| 2018 | 648 | 26,778 | | | |

* The \$5,000 benefit used to begin this schedule is an arbitrary amount. A smaller beginning amount would show a smaller purchasing power loss in percent loss.

Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (1990 \$)

| Year Ended June 30 | Increase Beginning of Year | Benefit Dollars in Year* | Inflation (Loss) in Year# | Purchasing Power at Year End | |
|-----------------------|----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------|
| | | | | 1990 \$ | % of 1990 |
| 1990 | \$ ---- | \$ 5,000 | ---- | \$ 5,000 | 100% |
| 1991 | 150 | 5,150 | (4.7)% | 4,919 | 98% |
| 1992 | 457 | 5,607 | (3.1)% | 5,195 | 104% |
| 1993 | 475 | 6,082 | (3.0)% | 5,471 | 109% |
| 1994 | 492 | 6,574 | (2.5)% | 5,770 | 115% |
| 1995 | 182 | 6,756 | (3.0)% | 5,755 | 115% |
| 1996 | 182 | 6,938 | (2.8)% | 5,751 | 115% |
| 1997 | 330 | 7,268 | (2.3)% | 5,889 | 118% |
| 1998 | 667 | 7,935 | (1.7)% | 6,324 | 126% |
| 1999 | 177 | 8,112 | (2.0)% | 6,340 | 127% |
| 2000 | 849 | 8,961 | (3.7)% | 6,756 | 135% |
| 2001 | 826 | 9,787 | (3.2)% | 7,143 | 143% |
| 2002 | 387 | 10,174 | (1.1)% | 7,346 | 147% |
| 2003 | 270 | 10,444 | (2.1)% | 7,385 | 148% |
| 2004 | 270 | 10,714 | (3.3)% | 7,337 | 147% |
| 2005 | 270 | 10,984 | (2.5)% | 7,336 | 147% |
| 2006 | 270 | 11,254 | (4.3)% | 7,205 | 144% |
| 2007 | 270 | 11,524 | (2.7)% | 7,185 | 144% |
| 2008 | 270 | 11,794 | (5.0)% | 7,002 | 140% |
| 2009 | 270 | 12,064 | 1.4 % | 7,265 | 145% |
| 2010 | 362 | 12,426 | (1.1)% | 7,405 | 148% |
| 2011 | 373 | 12,799 | (3.6)% | 7,366 | 147% |
| 2012 | 373 | 13,171 | (1.7)% | 7,456 | 149% |
| 2013 | 373 | 13,544 | (1.8)% | 7,535 | 151% |
| 2014 | 373 | 13,917 | (2.1)% | 7,585 | 152% |
| 2015 | 373 | 14,290 | (0.1)% | 7,779 | 156% |
| 2016 | 373 | 14,663 | (1.0)% | 7,903 | 158% |
| 2017 | 373 | 15,036 | (1.6)% | 8,171 | 163% |
| 2018 | 373 | 15,409 | | | |

* The \$5,000 benefit used to begin this schedule is an arbitrary amount. A smaller beginning amount would show a smaller purchasing power loss in percent loss.

Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (2000 \$)

| Year Ended June 30 | Increase Beginning of Year | Benefit Dollars in Year* | Inflation (Loss) in Year# | Purchasing Power at Year End | |
|--------------------------|----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------|
| | | | | 2000 \$ | % of 2000 |
| 2000 | \$ ---- | \$ 5,900 | ---- | \$ 5,900 | 100% |
| 2001 | 177 | 6,077 | (3.2)% | 5,886 | 100% |
| 2002 | 252 | 6,329 | (1.1)% | 6,065 | 103% |
| 2003 | 179 | 6,508 | (2.1)% | 6,108 | 104% |
| 2004 | 179 | 6,687 | (3.3)% | 6,078 | 103% |
| 2005 | 179 | 6,867 | (2.5)% | 6,086 | 103% |
| 2006 | 179 | 7,046 | (4.3)% | 5,987 | 101% |
| 2007 | 179 | 7,225 | (2.7)% | 5,978 | 101% |
| 2008 | 179 | 7,404 | (5.0)% | 5,834 | 99% |
| 2009 | 179 | 7,583 | 1.4 % | 6,061 | 103% |
| 2010 | 228 | 7,811 | (1.1)% | 6,178 | 105% |
| 2011 | 234 | 8,045 | (3.6)% | 6,145 | 104% |
| 2012 | 234 | 8,280 | (1.7)% | 6,221 | 105% |
| 2013 | 234 | 8,515 | (1.8)% | 6,287 | 107% |
| 2014 | 234 | 8,749 | (2.1)% | 6,328 | 107% |
| 2015 | 234 | 8,983 | (0.1)% | 6,490 | 110% |
| 2016 | 234 | 9,217 | (1.0)% | 6,593 | 112% |
| 2017 | 234 | 9,451 | (1.6)% | 6,816 | 116% |
| 2018 | 234 | 9,685 | | | |

* The \$5,900 benefit used to begin this schedule is an arbitrary amount. A smaller beginning amount would show a smaller purchasing power loss in percent loss.

Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

SECTION F

FINANCIAL PRINCIPLES

Financial Principles and Operational Techniques

Promises Made and To Be Paid For. As each year is completed, the System, in effect, hands an “IOU” to each member then acquiring a year of service credit. The “IOU” says: “The Arkansas Teacher Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

The related **key financial questions** are:

Which generation of taxpayers contributes the money to cover the IOU?

The present taxpayers, who receive the benefit of the member’s present year of service?

Or the future taxpayers, who happen to be in Arkansas at the time the IOU becomes a cash demand?

The financial objective of the ATRS is that this year’s taxpayers contribute the money to cover the IOUs being handed out this year so that **the employer contribution rate will remain approximately level from generation to generation** -- our children and our grandchildren will not have to contribute greater percents of pay than we contribute now. This objective was set forth in Act 793 of 1977.

(There are systems which have **a design for deferring contributions to future taxpayers**, lured by a lower contribution rate now and putting aside the fact that the contribution rate must then relentlessly grow much greater over decades of time -- consume now, and let your children face higher contribution rates after you retire.)

An inevitable byproduct of the level-cost design is the accumulation of reserve assets for decades and the income produced when the assets are invested. **Investment income** becomes the **third and largest contributor** for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members’ service being rendered this year)

... plus ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded accrued liabilities are the difference between (i) liabilities for service already rendered and (ii) the accrued assets of the plan).

Computing Contributions to Support System Benefits. From a given schedule of benefits and from the employee data and asset data furnished, the actuary determines the contribution rates to support the benefits, by means of **an actuarial valuation**. An actuarial valuation has a number of ingredients such as: the rate of investment income which plan assets will earn; the rates of withdrawal of active members who leave covered employment before qualifying for any monthly benefit; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement. In an actuarial valuation, assumptions must be made as to what the above rates will be, for the next year and for decades in the future. Only the subsequent actual experience of the System can indicate the degree of accuracy of the assumptions.

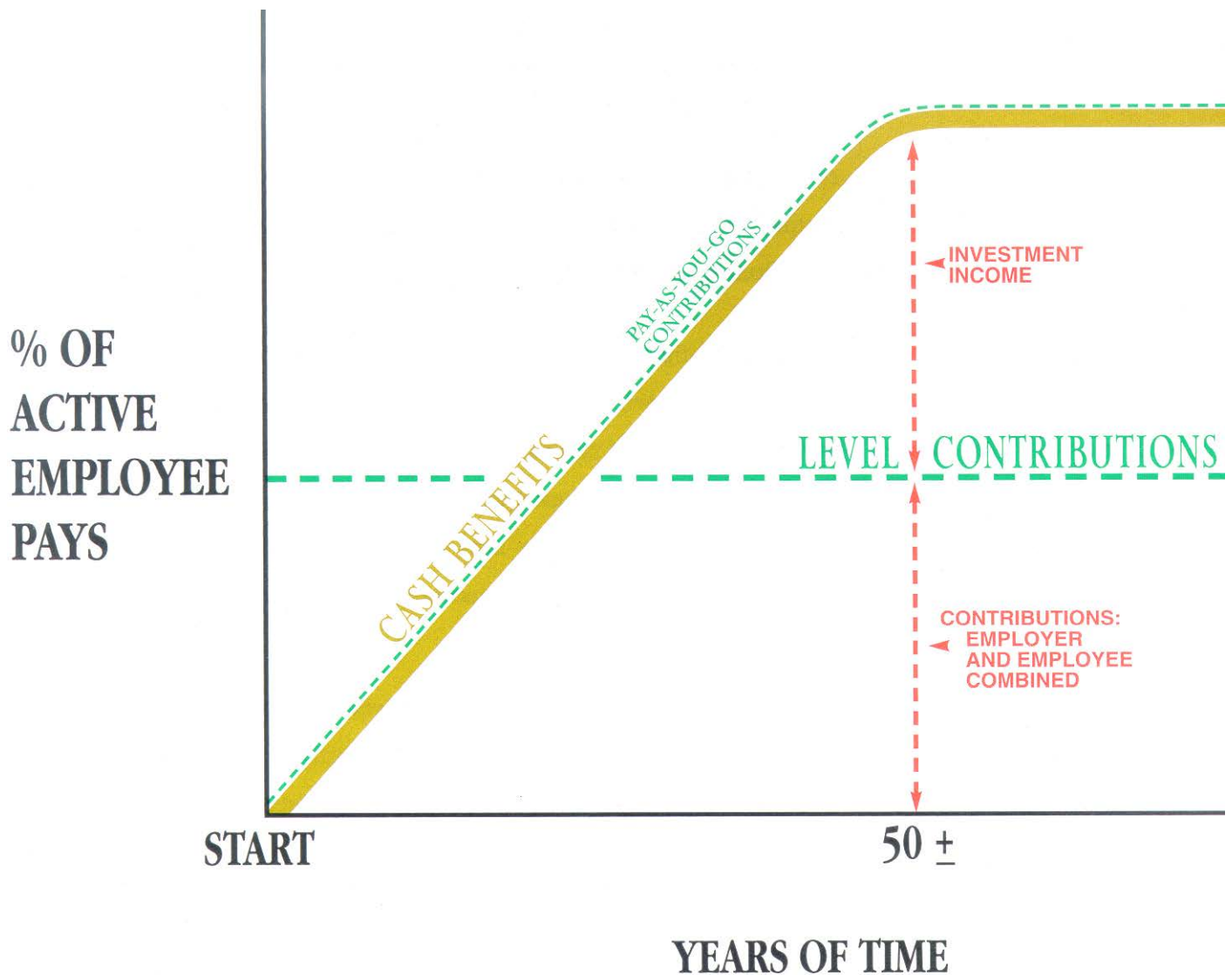
Reconciling Differences Between Assumed Experience and Actual Experience. Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the accuracy of the various financial assumptions or the skill of the actuary and the precision of the calculations made. The System copes with these continually changing differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continual adjustments in financial position.

The Actuarial Valuation Process

The financing diagram on the next page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program), and is thus an **increasing contribution method**; and the **level contribution method** which equalizes contributions between the generations.

The actuarial valuation is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

- A. **Census Data**, furnished by plan administrator
 - Retired lives now receiving benefits
 - Former employees with vested benefits not yet payable
 - Active employees
- B. + **Asset data** (cash & investments), furnished by plan administrator
- C. + **Benefit provisions** that establish eligibility and amounts of payments to members
- D. + **Assumptions concerning future financial experiences in various risk areas**, which assumptions are established by the Board of Trustees after consulting with the actuary.
- E. + **The funding method** for employer contributions (the long-term planned pattern for employer contributions)
- F. + **Mathematically combining the assumptions, the funding method, and the data**
- G. = Determination of:
 - Plan financial position**, and/or
 - New Employer Contribution Rate**



CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

Economic Risk Areas

- Rates of investment return
- Rates of pay increase
- Changes in active member group size

Non-Economic Risk Areas

- Ages at actual retirement
- Rates of mortality
- Rates of withdrawal of active members (turnover)
- Rates of disability

SECTION G

ACTUARIAL ASSUMPTIONS

Selection of Assumptions Used in Actuarial Valuations

Economic Assumptions

Investment return

Pay increases to individual employees:
the portion for economic changes

Active member group size and
total payroll growth

Demographic Assumptions

Actual ages at service retirement

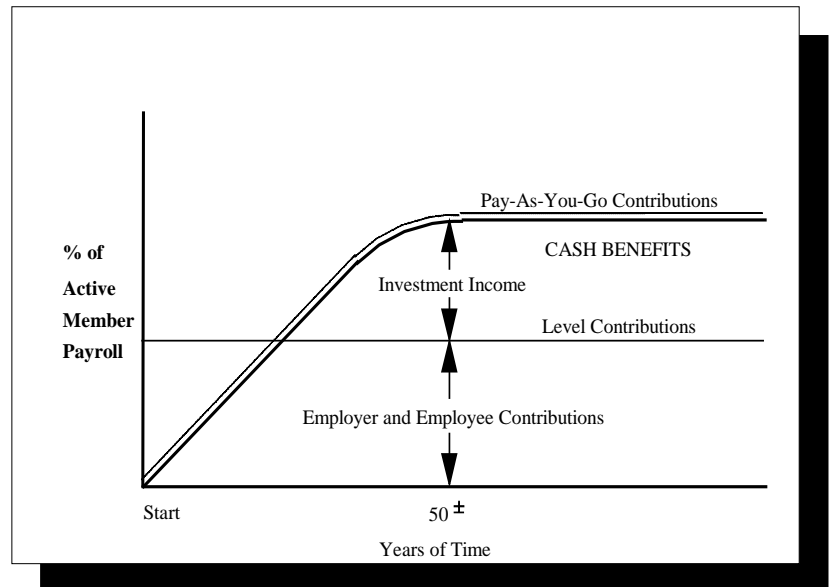
Pay increases to individual members:
the portion for merit & seniority

Disability while actively employed

Separations before retirement

Mortality after retirement

Mortality before retirement



Relationship Between Plan Governing Body and the Actuary

The actuary should have the primary responsibility for choosing the **demographic** assumptions used in the actuarial valuation, making use of specialized training and experience.

The actuary and other professionals can provide guidance concerning the choice of suitable economic assumptions, but the basis of the economic assumptions is the assumed rate of **inflation**, a quantity which defies accurate prediction. Given an assumed rate of future inflation, it is very important that this rate be applied in a consistent manner in deriving the assumed rate of investment return, the economic portion of the assumption on pay increases to individual employees, and the assumed rate of growth of active member payroll. Consistent application of assumptions is an area in which the actuary has specialized training.

Summary of Assumptions Used in Actuarial Valuations for the Arkansas Teacher Retirement System Assumptions Adopted by Board of Trustees After Consulting with Actuary

The rationale for the assumptions is the July 1, 2010 through June 30, 2015 5-Year Experience Study.

Economic Assumptions

The **price inflation** assumption is 2.50% although no specific Price Inflation is needed for this valuation. It is assumed that the 3% COLA will always be paid.

The **wage inflation** assumption is 2.75%. This consists of 2.50% related to pure price inflation and 0.25% related to general economic improvements.

The investment return rate used in the valuation was 7.50% per year, compounded annually (net after administrative expenses). This rate of return is not the assumed real rate of return. The real rate of return over wage inflation in this valuation is defined to be the portion of investment return which is more than the wage inflation rate. Considering wage inflation recognition of 2.75%, the 7.50% rate translates to an assumed real rate of return over wage inflation of 4.75%. This rate was first used for the **June 30, 2017** valuation. The assumed real rate of return over price inflation is 5%.

Pay increase assumptions for individual active members are shown on pages G-7 and G-8. Part of the assumption for each age is for a merit and/or seniority increase, and the other 2.75% recognizes wage inflation. These rates were first used for the **June 30, 2017** valuation.

The Active Member Group size is assumed to remain constant at its present level.

Total active member payroll is assumed to increase 2.75% per year, which is the portion of the individual pay increase assumptions attributable to wage inflation. This rate was first used for the **June 30, 2017** valuation.

Non-Economic Assumptions

The mortality tables used were the RP-2014 Healthy Annuitant, Disabled Annuitant and Employee Mortality headcount weighted tables for males and females. Mortality rates were adjusted for future mortality improvements using projection scale MP-2017 from 2006. Related values are shown on page G-4. These tables were first used for the **June 30, 2017** valuation.

A limited fluctuation credibility procedure was used to determine the appropriate scaling factor of each gender and each member classification (see the 2010-2015 Experience Study), and are shown below:

| | Scaling Factor |
|--------------------------|-------------------|
| Healthy Male Retirees | 101% |
| Healthy Female Retirees | 91% |
| Disabled Male Retirees | 99% |
| Disabled Female Retirees | 107% |
| Male Active Members | 94% |
| Female Active Members | 84% |

The probabilities of retirement for members eligible to retire are shown on pages G-5 and G-6. The rates for full retirement and reduced retirement were first used in the **June 30, 2017** valuation.

The probabilities of withdrawal from service, death-in-service and disability are shown for sample ages on pages G-7 and G-8. These rates were first used in the **June 30, 2017** valuation.

The entry age actuarial cost method of valuation was used in determining accrued liabilities and normal cost.

Differences in the past between assumed experience and actual experience (“actuarial gains and losses”) become part of actuarial accrued liabilities.

Unfunded actuarial accrued liabilities are amortized to produce contribution amounts (the total of principal & interest) which are level percents of payroll contributions.

These cost methods were first used in the June 30, 1986 valuation.

Asset Valuation Method. A market value related asset method is used as described on page D-1. This method was first used in the June 30, 1995 valuation. It was modified following the 1997-2002 Experience Study to include an 80% - 120% market value corridor.

The data about persons now covered and about present assets was furnished by the System’s administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary. Members whose dates of birth were not supplied were assumed to be 40 years old on the valuation date. Members whose salaries were not supplied and that entered T-DROP were assumed to have the group average pay of those with salary data as of the valuation date that entered T-DROP.

Single Life Retirement Values

| Sample Attained Ages in 2017* | Present Value of \$1.00 Monthly for Life | | Present Value of \$1 Monthly for Life Increasing 3.0% Annually | | Future Life Expectancy (years) | | Percent Dying within Next Year | |
|-------------------------------|--|-------------|--|-------------|--------------------------------|-------|--------------------------------|--------|
| | Men | Women | Men | Women | Men | Women | Men | Women |
| 40 | \$150.63 | \$154.11 | \$198.39 | \$204.91 | 42.44 | 46.72 | 0.32 % | 0.28 % |
| 45 | 146.61 | 151.28 | 190.86 | 199.17 | 37.65 | 41.91 | 0.42 % | 0.32 % |
| 50 | 141.34 | 147.34 | 181.46 | 191.61 | 32.94 | 37.09 | 0.54 % | 0.36 % |
| 55 | 134.64 | 141.90 | 170.05 | 181.80 | 28.37 | 32.31 | 0.72 % | 0.45 % |
| 60 | 126.34 | 134.84 | 156.54 | 169.71 | 23.99 | 27.65 | 0.98 % | 0.60 % |
| 65 | 116.25 | 125.74 | 140.94 | 154.99 | 19.86 | 23.15 | 1.37 % | 0.82 % |
| 70 | 103.94 | 114.03 | 122.97 | 137.25 | 15.96 | 18.80 | 1.99 % | 1.26 % |
| 75 | 89.30 | 99.87 | 102.87 | 117.08 | 12.33 | 14.75 | 3.13 % | 2.09 % |
| 80 | 73.14 | 83.85 | 81.95 | 95.60 | 9.13 | 11.14 | 5.20 % | 3.54 % |
| 85 | 56.94 | 67.04 | 62.12 | 74.34 | 6.49 | 8.07 | 8.90 % | 6.20 % |
| Base | 2635 x 1.01 | 2636 x 0.91 | 2635 x 1.01 | 2636 x 0.91 | | | | |
| Projection | 939 | 940 | 939 | 940 | | | | |

* Applicable to calendar year 2017. Rates and life expectancies in future years are determined by the MP-2017 projection scale.

| Sample Attained Ages | Benefit Increasing 3.0% Yearly | Portion of Age 60 Lives Still Alive | |
|----------------------|--------------------------------|-------------------------------------|-------------|
| | | Men | Women |
| 60 | \$100.00 | 100% | 100% |
| 65 | 115.00 | 95% | 97% |
| 70 | 130.00 | 87% | 92% |
| 75 | 145.00 | 78% | 86% |
| 80 | 160.00 | 66% | 77% |
| Ref | | 2635 x 1.01 | 2636 x 0.91 |

Probabilities of Retirement for Members

| Retirement Ages | % of Active Participants Retiring with Unreduced Benefits | | | |
|--------------------|---|--------|---------|--------|
| | Education | | Support | |
| | Male | Female | Male | Female |
| 48 | 8% | 7% | 8% | 6% |
| 49 | 8% | 7% | 8% | 6% |
| 50 | 8% | 7% | 8% | 6% |
| 51 | 8% | 7% | 8% | 6% |
| 52 | 8% | 7% | 8% | 6% |
| 53 | 8% | 7% | 8% | 6% |
| 54 | 8% | 7% | 8% | 6% |
| 55 | 8% | 9% | 8% | 6% |
| 56 | 8% | 9% | 8% | 6% |
| 57 | 8% | 11% | 8% | 11% |
| 58 | 8% | 11% | 8% | 11% |
| 59 | 17% | 14% | 8% | 15% |
| 60 | 17% | 17% | 13% | 13% |
| 61 | 24% | 17% | 13% | 15% |
| 62 | 24% | 29% | 28% | 23% |
| 63 | 27% | 26% | 25% | 19% |
| 64 | 27% | 24% | 25% | 23% |
| 65 | 54% | 50% | 47% | 50% |
| 66 | 54% | 53% | 47% | 44% |
| 67 | 54% | 39% | 47% | 38% |
| 68 | 54% | 39% | 47% | 38% |
| 69 | 54% | 39% | 47% | 38% |
| 70 | 54% | 39% | 47% | 38% |
| 71 | 54% | 39% | 47% | 38% |
| 72 | 54% | 39% | 47% | 38% |
| 73 | 54% | 39% | 47% | 38% |
| 74 | 54% | 39% | 47% | 38% |
| 75 | 100% | 100% | 100% | 100% |
| Ref | 2634 | 2635 | 2636 | 2637 |

These rates are based upon data presented in the 2010-2015 experience study and were first used in the 2017 valuation.

Probabilities of Reduced Retirement for Members

| Retirement Ages | % of Active Participants Retiring with Reduced Benefits | | | |
|--------------------|---|--------|---------|--------|
| | Education | | Support | |
| | Male | Female | Male | Female |
| 50 | 1.5% | 1.0% | 0.5% | 1.5% |
| 51 | 1.5% | 1.0% | 1.0% | 1.5% |
| 52 | 1.5% | 1.5% | 1.5% | 2.0% |
| 53 | 1.5% | 2.0% | 2.0% | 2.0% |
| 54 | 2.0% | 2.0% | 2.5% | 2.0% |
| 55 | 2.5% | 2.5% | 3.0% | 2.0% |
| 56 | 3.0% | 2.5% | 3.5% | 2.0% |
| 57 | 5.0% | 2.5% | 4.5% | 2.5% |
| 58 | 5.0% | 2.5% | 4.5% | 2.5% |
| 59 | 3.5% | 2.5% | 4.5% | 2.5% |
| Ref | 2640 | 2638 | 2641 | 2639 |

These are 50% of the rates presented in the 2010-2015 experience study and were first used in the 2017 valuation. These rates anticipate reduced election of early retirement due to the increase in the early retirement reduction from 5% to 10%.

Duration of T-DROP for Members

Present T-DROP members are assumed to remain in T-DROP according to the following table:

| Entry Age | Assumed Duration Years |
|-----------|------------------------|
| 50-56 | 7 |
| 57 | 6 |
| 58 | 5 |
| 59+ | 4 |

Teachers

Separations From Active Employment Before Age and Service Retirement & Individual Pay Increases

| Sample Ages in 2017 | Percent of Active Members Separating within the Next Year | | | | | | |
|---------------------------|---|-------------|-------------|------------|---------|--------|--------|
| | Service | Death | | Disability | | Other | |
| | | Men | Women | Men | Women | Men | Women |
| | 0 | | | | | 17.80% | 12.60% |
| | 1 | | | | | 13.10% | 11.10% |
| | 2 | | | | | 12.10% | 10.10% |
| | 3 | | | | | 8.60% | 8.70% |
| | 4 | | | | | 5.70% | 6.50% |
| 25 | 5 & Up | 0.06% | 0.02% | 0.03% | 0.03% | 4.50% | 5.40% |
| 30 | | 0.06% | 0.02% | 0.03% | 0.03% | 3.60% | 4.30% |
| 35 | | 0.07% | 0.03% | 0.03% | 0.04% | 2.70% | 2.90% |
| 40 | | 0.08% | 0.05% | 0.05% | 0.09% | 2.00% | 2.00% |
| 45 | | 0.12% | 0.07% | 0.16% | 0.19% | 1.60% | 1.60% |
| 50 | | 0.20% | 0.12% | 0.40% | 0.43% | 1.30% | 1.40% |
| 55 | | 0.33% | 0.19% | 0.86% | 0.73% | 1.10% | 1.20% |
| 60 | | 0.56% | 0.28% | 1.15% | 1.00% | 0.90% | 1.00% |
| 65 | | 0.97% | 0.40% | 1.15% | 1.00% | 0.70% | 0.80% |
| Ref: | | | | | | 1029 | 1030 |
| | | 2633 x 0.94 | 2634 x 0.84 | 747 x 1 | 748 x 1 | 1381 | 1382 |

| Age | Pay Increase Assumptions for an Individual Member | | |
|------|--|--------------------|-----------------------|
| | Merit & Seniority | Base (Economic) | Increase Next Year |
| 20 | 5.00% | 2.75% | 7.75% |
| 25 | 2.90% | 2.75% | 5.65% |
| 30 | 2.40% | 2.75% | 5.15% |
| 35 | 1.90% | 2.75% | 4.65% |
| 40 | 1.40% | 2.75% | 4.15% |
| 45 | 0.70% | 2.75% | 3.45% |
| 50 | 0.30% | 2.75% | 3.05% |
| 55 | 0.00% | 2.75% | 2.75% |
| 60 | 0.00% | 2.75% | 2.75% |
| 65 | 0.00% | 2.75% | 2.75% |
| Ref: | 472 | | |

Support Employees

Separations From Active Employment Before Age and Service Retirement & Individual Pay Increases

| Sample Ages in 2017 | Percent of Active Members Separating within the Next Year | | | | | | |
|---------------------------|---|-------------|-------------|------------|---------|--------|--------|
| | Service | Death | | Disability | | Other | |
| | | Men | Women | Men | Women | Men | Women |
| | 0 | | | | | 49.90% | 47.50% |
| | 1 | | | | | 30.10% | 28.30% |
| | 2 | | | | | 19.40% | 19.10% |
| | 3 | | | | | 15.30% | 14.90% |
| | 4 | | | | | 11.80% | 12.10% |
| 25 | 5 & Up | 0.06% | 0.02% | 0.03% | 0.02% | 9.20% | 9.70% |
| 30 | | 0.06% | 0.02% | 0.09% | 0.04% | 7.30% | 6.90% |
| 35 | | 0.07% | 0.03% | 0.09% | 0.05% | 5.60% | 5.00% |
| 40 | | 0.08% | 0.05% | 0.10% | 0.07% | 4.50% | 4.40% |
| 45 | | 0.12% | 0.07% | 0.22% | 0.16% | 3.70% | 4.00% |
| 50 | | 0.20% | 0.12% | 0.51% | 0.34% | 3.30% | 3.60% |
| 55 | | 0.33% | 0.19% | 0.86% | 0.59% | 3.30% | 3.30% |
| 60 | | 0.56% | 0.28% | 1.11% | 0.76% | 3.30% | 2.80% |
| 65 | | 0.97% | 0.40% | 1.11% | 0.80% | 2.80% | 2.10% |
| Ref: | | | | | | 1031 | 1032 |
| | | 2633 x 0.94 | 2634 x 0.84 | 749 x 1 | 750 x 1 | 1383 | 1384 |

| Age | Pay Increase Assumptions for an Individual Member | | |
|------|--|--------------------|-----------------------|
| | Merit & Seniority | Base (Economic) | Increase Next Year |
| 20 | 5.00% | 2.75% | 7.75% |
| 25 | 3.75% | 2.75% | 6.50% |
| 30 | 2.60% | 2.75% | 5.35% |
| 35 | 2.40% | 2.75% | 5.15% |
| 40 | 2.10% | 2.75% | 4.85% |
| 45 | 1.00% | 2.75% | 3.75% |
| 50 | 0.50% | 2.75% | 3.25% |
| 55 | 0.00% | 2.75% | 2.75% |
| 60 | 0.00% | 2.75% | 2.75% |
| 65 | 0.00% | 2.75% | 2.75% |
| Ref: | 473 | | |

Miscellaneous and Technical Assumptions

June 30, 2017

| | |
|------------------------------------|--|
| Marriage Assumption: | 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses. |
| Pay Increase Timing: | Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date. |
| Decrement Timing: | Decrements are assumed to occur mid-year, with the exception of normal and early retirement, which are assumed to occur at the beginning of the year. This implies that people who worked the entire school year are reported as active members even if they retired at the end of the year. |
| Eligibility Testing: | Eligibility for benefits is determined based upon the age nearest birthday and the service nearest whole year on the date of the valuation. |
| Decrement Relativity: | Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects. |
| Decrement Operation: | Disability does not operate during the first 5 years of service. Disability and turnover do not operate during retirement eligibility. |
| Normal Form of Benefit: | The assumed normal form of benefit is the straight life form. |
| Incidence of Contributions: | Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. The payroll used for this purpose is payroll for all active members plus payroll for members in the T-DROP and retirees who returned to work. |
| Liability Adjustments | For simplicity, retiree benefits (not applicable to Act 793 & Act 808 retirees) were modeled assuming a stipend reduction from \$75 to \$50 per month and removal of the stipend from the base benefit (from which the simple COLA is determined) effective as of the valuation date. The actual effective dates are Fiscal Years 2020 and 2019, respectively. This model produced a liability of \$11,299,197,032. An additional liability of \$38,025,673 was estimated to account for the later effective dates. This liability is included with Option 1 Straight Life) on page B-4. |

Miscellaneous and Technical Assumptions

June 30, 2017

Data Adjustments:

Members whose dates of birth were not supplied were assumed to be 40 years old on the valuation date.

Members whose salaries were not supplied and that entered the T-DROP were assumed to have the group average pay of those with salary data as of the valuation that entered the T-DROP.

SECTION H

GLOSSARY

Glossary

Accrued Service. The service credited under the plan which was rendered before the date of the actuarial valuation.

Accumulated Benefit Obligation. The actuarial present value of vested and non-vested benefits based on service to date and past and current salary levels.

Actuarial Accrued Liability. The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

Actuarial Assumptions. Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

Actuarial Equivalent. A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

Actuarial Present Value. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Actuarial Present Value of Credited Projected Benefits or Pension Benefit Obligation. The present value of future benefits based on service to date and the effect projected salary increases.

Actuary. A person who is trained in the applications of probability and compound interest to solve problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation A.S.A. and ultimately to Fellowship with the designation F.S.A. The federal government certifies actuaries to practice under ERISA with the designation of E.A.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Glossary

Experience Gain (Loss). A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Plan Termination Liability. The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a “going concern” basis and is not normally determined in a routine actuarial valuation.

Reserve Account. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”

Valuation Assets. The value of current plan assets recognized for valuation purposes. Generally based on book value plus a portion of unrealized appreciation or depreciation.