

ARKANSAS TEACHER RETIREMENT SYSTEM

November 15, 2021

1400 West Third Street

BOARD ROOM

Little Rock, AR 72201

Board of Trustees - Called Meeting Meeting

4:00 p.m.

Trustees

Danny Knight, Chair

Lloyd Black, Vice Chair

Anita Bell

Kathy Clayton

Kelly Davis

Dr. Mike Hernandez

Shawn Higginbotham

Michael Johnson

Bobby G. Lester

Chip Martin

Amanda Webb

Ex Officio Trustees

Susannah Marshall, State Bank Commissioner

Johnny Key, Education Secretary

Honorable Andrea Lea, State Auditor

Honorable Dennis Milligan, State Treasurer

AGENDA
ARKANSAS TEACHER RETIREMENT SYSTEM
BOARD OF TRUSTEES - CALLED MEETING

November 15, 2021
4:00 p.m.
1400 West Third Street
Little Rock, AR 72201

- I. ***Call to Order/Roll Call.** page 1.
- II. ***Adoption of Agenda.** page 2.
- III. Executive Summary. (Attachment No. 1) page 4.
- IV. ***Disability Review for Board Action.**
 - A. ***Member Order - DR-2021-11-181245.** (Attachment No. 2) page 6.
- V. Discussions and Information about Implementing New Actuarial Assumptions.
 - A. 2015-2020 Experience Study. *Judy Kermans, Brian Murphy and Heidi Berry of Gabriel, Roeder, Smith and Company* (Attachment No. 3) page 9.
 - B. ATRS Long-Term Expected Rate of Return. *P. J. Kelly of Aon Hewitt Investment Consulting* (Attachment No. 4) page 62.
- VI. ***Recommendation to Adopt New Actuarial Assumed Rate of Return.**
 - A. ***Resolution No. 2021-60.** (Attachment No. 5) page 68.
- VII. ***Recommendation to Adopt Pub-2010 Mortality Table for the Actuarial Valuation of ATRS.**
 - A. ***Resolution No. 2021-61.** (Attachment No. 6) page 69.
- VIII. ***Recommendation to Adopt Additional Actuarial Assumptions Established by the 2015-2020 Experience Study.**
 - A. ***Resolution No. 2021-62.** (Attachment No. 7) page 70.
- IX. Other Business.

* Action Item

2021-11-12 09:32:31.130627

X. ***Adjourn.**

EXECUTIVE SUMMARY

TO: Board of Trustees
FROM: ATRS Staff
RE: Executive Summary
DATE: November 15, 2021

IV. Disability Review for Board Action. Under the Disability Review procedure described in A.C.A. §24-7-704(b)(3)(D) the Board shall approve the recommendations of the Medical Committee.

A. Member Order - DR-2021-11-181245. Member #181245 requested a one-time disability review within the six-month allotted time frame for a one-time disability review appeal. Executive staff concurs with the request and recommends to the Board that the case be returned to the Medical Committee to reconsider the matter using the standard of review established in A.C.A. §24-7-704(a)(1)(D). **This is an action item.**

V. Discussions and Information about Implementing New Actuarial Assumptions.

A. 2015-2020 Experience Study. The ATRS actuaries, GRS Consulting, have been working to provide ATRS an updated experience study. An experience study occurs about every five (5) years and is designed to determine assumptions used by ATRS and its actuaries to monitor member activity, plan for the future, and determine assets and liabilities. The experience study looks in detail at the ages when members will retire, the time when members will enter T-DROP, the number of members becoming disability retirees, the election of options by members, and essentially every aspect of member behavior, member elections, and member outcomes. As the ATRS membership changes, the member behavior patterns change and ATRS adjusts its assumptions based upon passed experience and reasonable forward looking models. The experience study is not completed and will be presented in December. However, it is clear that the changes in assumptions, actuarial standards, and national trends necessitate that ATRS consider new demographic and financial assumptions to stay in the mainstream of actuarial compliance and properly state its financial condition.

B. ATRS Long-Term Expected Rate of Return. Aon will provide their long-term expected rate of return based on the latest capital market assumptions. Aon develops risk, return and correlation assumptions for all major asset classes on a quarterly basis.

- VI. Recommendation to Adopt New Actuarial Assumed Rate of Return.** The actuarial assumed rate of return is the projected rate of investment returns used by actuaries to estimate a pension plan's future growth and asset size. A lower assumed rate of return will result in increasing the long term liabilities of ATRS. The Board periodically reviews the actuarial assumed rate of return used by ATRS to ensure it fairly and accurately reflects a reasonable rate of return for ATRS based upon the ATRS asset allocation, the expected rates of inflation, projected economic conditions, global economic activity, and actuarial standards.

As of June 30, 2021, ATRS had a fiscal year investment return of approximately 31% and a since inception investment return of over 8% that relates back to 1986. At the same time continued periods of lower inflation and changing actuarial standards have resulted in pension plans generally reducing actuarial assumed rates of return. With input from the ATRS general investment consultant, Aon, and additional input from Gabriel, Roeder, Smith, & Company, ATRS staff recommends adjusting the ATRS actuarial assumed rate of return from 7.5% to 7.25%. (**Resolution No. 2021-60**)

- VII. Recommendation to Adopt Pub-2010 Mortality Table for the Actuarial Valuation of ATRS.** The life expectancy of a plan's members is one of many factors used to calculate a pension plan's cost of benefits and estimate unfunded liabilities. ATRS pays all retirees a lifetime retirement benefit. The longer the life expectancy of members, the larger the total payout will be to the membership group as a whole. The life expectancy of a pension plan's members is estimated using mortality assumptions produced by actuarial groups. The Board periodically reviews the mortality table used by ATRS to ensure it is adequately conservative and accurately reflects reasonable life expectancies and is generally accepted by actuaries for plan valuations. With input from the ATRS actuary, GRS, ATRS staff recommends the adoption of the appropriate Pub-2010 tables to be used in fiscal year 2021 and for each fiscal year after until such time as the Board may approve another mortality table in the future. (**Resolution No. 2021-61**)

- VII. Recommendation to Adopt Additional Actuarial Assumptions Established by the 2015-2020 Experience Study.** With input from the ATRS actuary, GRS, ATRS staff recommends the adoption the demographic and economic assumption changes presented in the 2015-2020 Experience Study to be used in fiscal year 2021 and for each fiscal year after until such time as the Board may approve assumptions from an experience study in the future. (**Resolution No. 2021-62**)

**BEFORE THE
ARKANSAS TEACHER RETIREMENT SYSTEM**

IN THE MATTER OF
APPEAL OF DISABILITY RETIREMENT BENEFITS MEMBER #181245

PROPOSED DISABILITY REVIEW ORDER: DR-2021-11-181245

INTRODUCTION

This matter is a review of the medical committee's recommendation that a certain member's disability retirement benefits be terminated under subdivision A.C.A. §24-7-704(b)(3)(D)(iii).

FINDINGS OF FACT

1. Member was initially approved for ATRS Disability retirement October 24, 2018, with benefits starting October 1, 2018.
2. On May 24, 2021, ATRS sent a letter to member reminding them of the three-year deadline to apply and submit a Social Security Disability Award letter or denial letter with ATRS, or a Disability Review Application and current medical reports. Member was advised ATRS Disability benefits would be suspended September 30, 2021, if we did not receive the requested documents.
3. On September 27, 2021, the disability counselor sent a follow-up email to member, advising that ATRS has not received any requested documents to date.
4. On September 28, 2021, ATRS received the first of several medical reports, which was followed up on September 29, 2021, with the member's Social Security Disability Denial letter and an ATRS Application for Disability Review on September 29, 2021.
5. On September 29, 2021, ATRS sent the member a letter stating that the requested documents had been received, and that their case would be heard by the Medical Committee on October 4, 2021.

6. On October 4, 2021, the ATRS Medical Committee reviewed the member's application, medical reports, and Social Security Disability denial letter. The Medical Committee found that the member failed to meet the requirements of A.C.A. §24-7-704, and the member was denied.
7. On October 4, 2021, the member was notified of the Medical Committee's decision.
8. On October 6, 2021, the member was sent a letter stating that her ATRS Disability Retirement benefits were suspended.
9. On October 19, 2019, ATRS received a letter from the member requesting a one-time disability review appeal, and additional medical reports were received on October 26th and 28th, 2021.

ANALYSIS AND RECOMMENDATION TO THE BOARD

Under the Disability Review procedure described in A.C.A. §24-7-704(b)(3)(D), the Board shall review the recommendations of the Medical Committee.

Under subdivision A.C.A. §24-7-704(a)(1)(H)(i): If the medical committee finds that a member is not qualified to receive disability benefits, the member may request a second review provided the member submits additional medical documentation. (ii): A second review may be requested one (1) time. (iii): The member has six (6) calendar months to submit additional medical documentation unless an extension is granted by the system.

Member #181245 requested a one-time disability review within the six-month allotted time frame for a one-time disability review appeal. The staff concurs with the request and recommends to the Board that the case be returned to the Medical Committee to reconsider the matter using the standard of review established in A.C.A. §24-7-704(a)(1)(D) for ATRS MEMBER #181245.

The Board, having considered the matter, finds that this case should be returned to the medical committee to determine whether the member is disabled within the meaning of A.C.A. §24-7-704.

IT IS SO ORDERED.

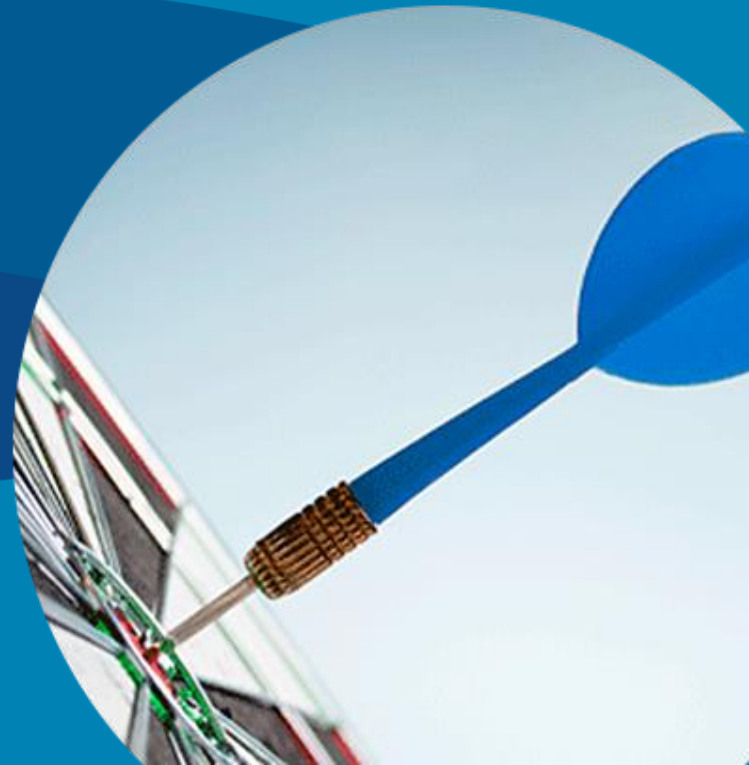
DATED this 15th day of November, 2021.

Danny Knight, Chair



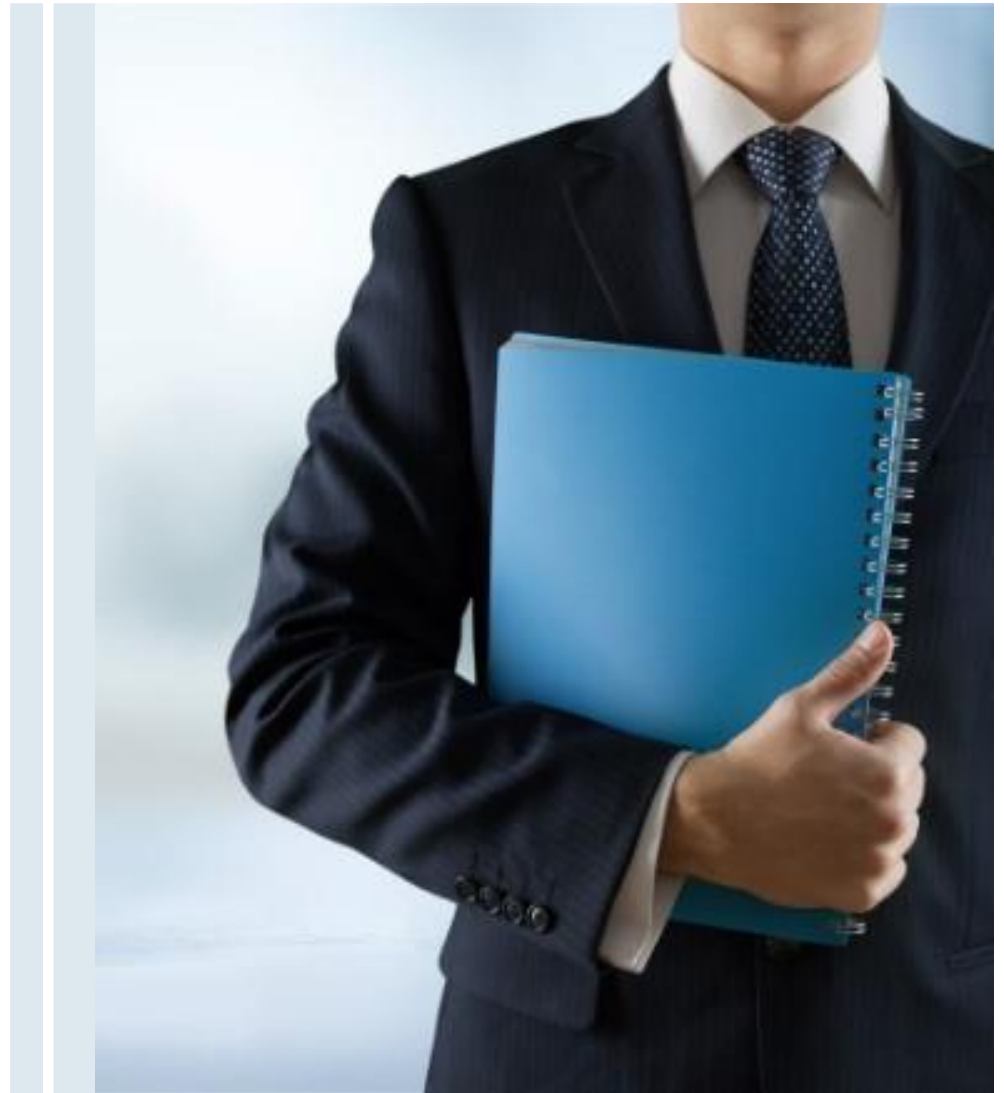
Arkansas Teacher Retirement System

5 Year Experience Study:
November 15, 2021 Board Meeting



Agenda

- 1 Introduction
- 2 Demographic Assumptions
- 3 Economic Assumptions
- 4 Effects on Pension Valuation Results
- 5 Summary and Next Steps



Introduction

- Each year the actuarial liabilities of ATRS are calculated as part of the June 30th valuation
- In order to perform the valuation, we must make assumptions about the future experience of the System with regard to various risk areas
- The results of the liability calculations depend upon those assumptions

Introduction – Key Risk Areas

- Economic Risk Areas
 - Investment return
 - Inflation
 - Patterns of salary increases
- Demographic Risk Areas
 - Rates of withdrawal
 - Rates of retirement
 - Rates of disability
 - Rates of mortality



Introduction

- Assumptions should be carefully chosen and continually monitored
 - Continued use of outdated assumptions can lead to ...

Introduction

- Understated measurements resulting in:
 - An overly optimistic representation of the amortization period required to amortize the unfunded actuarial accrued liability
 - Sharp increases in required contributions at some point in the future leading to a large burden on future taxpayers
 - In extreme cases, an inability to pay benefits when due and benefit reductions

Introduction

- Overstated measurements resulting in:
 - An overly pessimistic representation of the amortization period required to amortize the unfunded actuarial accrued liability
 - Benefit levels that are kept below the level that could be supported by the employer and member contribution rates
 - An unnecessarily large burden on the current generation of members, employers and taxpayers

Introduction

- No single set of assumptions will be suitable indefinitely
- Things change, and our understanding of things (whether or not they are changing) also changes
- The suggested time period for reviewing assumptions is every 5 years
- A systematic review of assumptions is called an “Experience Study”

Introduction - Actuary's Responsibility

- To present a package of reasonable demographic and economic assumptions that meet the Actuarial Standards of Practice (ASOPs)



Introduction

- An actuarial assumption is reasonable if:
 - It is appropriate for the purpose of the measurement being taken
 - It reflects the actuary's professional judgment
 - It takes into account relevant historical and current economic or demographic data
 - **It reflects the actuary's estimate of future experience and/or observation of the estimates inherent in market data**
 - It has no significant bias

Demographic Assumptions



Demographic Experience Study

- We tabulated results from 5 annual gain/loss analyses (2015–2020).
- We compared trends with those observed in prior studies.
- Generally, we give confirming trends more credibility than non-confirming trends.
- Philosophy: Do not overreact to results from any single experience period. It is better to make a series of small changes in the right direction, rather than a single large change that could turn out with hindsight to be in the wrong direction, except possibly for a margin for adverse deviation.

Retiree Mortality

- Post-retirement mortality is an important ingredient in the set of assumptions
- This assumption should be updated from time to time to reflect longevity improvements
- Mortality assumption consists of two components:
 - Base table – reflects expected mortality rates as of a base year
 - Mortality improvement – reflects anticipated improvements in mortality depending on birth year
 - E.g., a member born in 1970 is anticipated to have greater mortality improvement and live longer than a member born in 1950

Retiree Mortality

- New mortality tables (Pub-2010) were recently developed by the Society of Actuaries (SOA)
 - 94 different versions
 - Based upon public sector retirement system mortality experience
 - The SOA examined mortality for Teachers, Public Safety, and General employment categories
 - Prior to the release of these tables, the SOA developed and released the RP-2014 mortality tables (based upon private sector retirement system mortality experience)

Retiree Mortality

- The current and proposed rates assume that future mortality rates will continue to decline with each generation
- This means that next year's 65-year-old will have a slightly longer life expectancy than this year's, etc.

Retiree Mortality

- We compared the experience of healthy retirees to the Pub-2010 Amount-Weighted General Healthy Retiree mortality tables
- Healthy male and female retirees in ATRS have not experienced the same level of mortality improvement as that incorporated in these Pub-2010 mortality tables

Retiree Mortality

- We have used the Pub-2010 Amount-Weighted General Healthy Retiree mortality tables, adjusted for mortality improvement back to the observation period base year of 2010, and scaled by 105% for males and females
- A mortality improvement scale is then applied
- The improvement scales we used were the 2-dimensional MP-2020 mortality improvement scales
- It is anticipated that the SOA will release new improvement scales annually

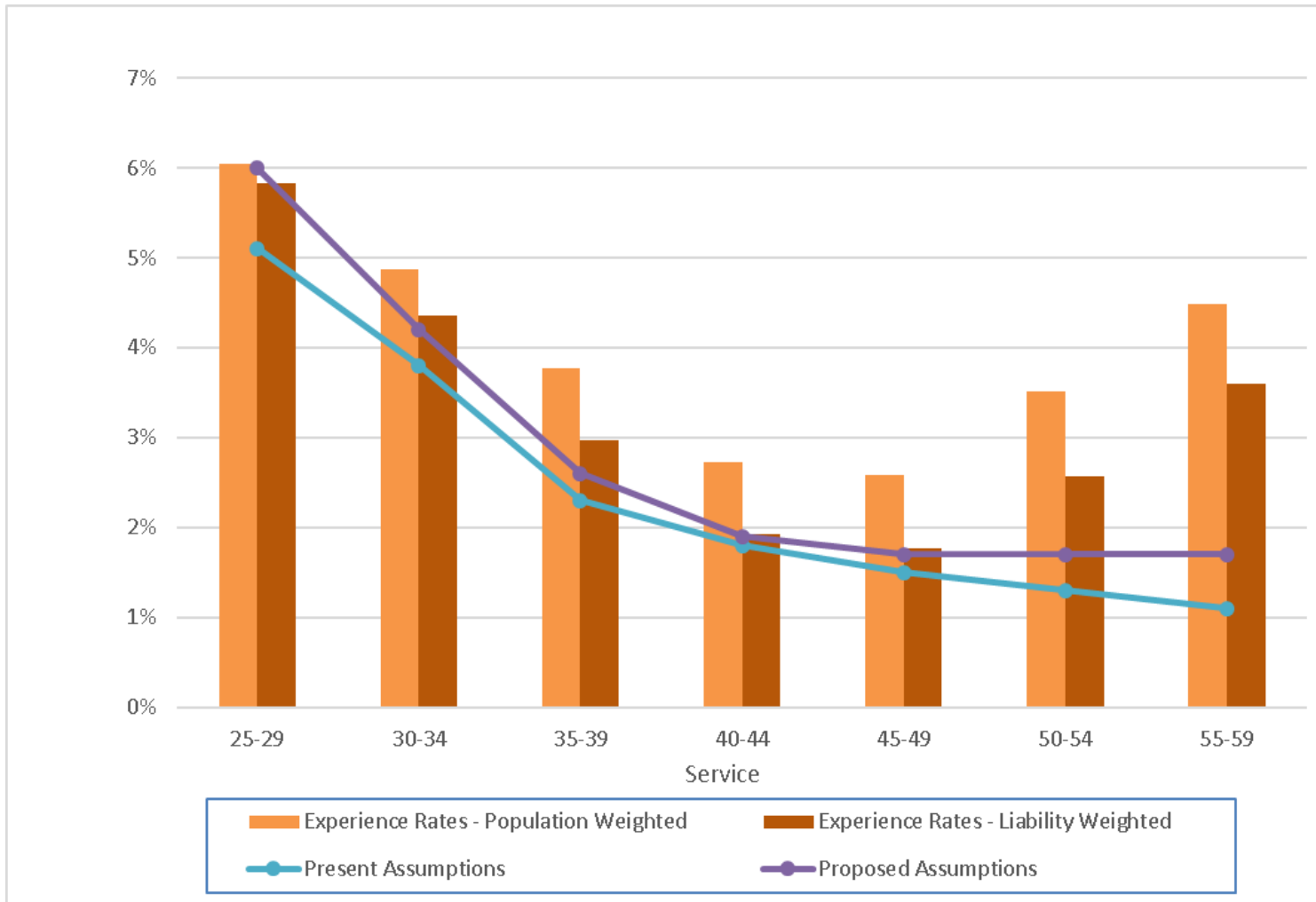
Retiree Life Expectancy

Age	Current Assumptions		New Mortality Assumption					
	Version of RP-2014 Projected with MP-2017		105% of the PubG-2010 Retiree Mortality Life expectancy determined by age in given future years using MP-2020					
	Year 2020		Year 2020		Year 2030		Year 2040	
	Male	Female	Male	Female	Male	Female	Male	Female
50	33.25	37.38	34.76	37.67	35.64	38.47	36.54	39.25
55	28.67	32.58	29.88	32.73	30.75	33.50	31.61	34.26
60	24.25	27.89	25.21	27.90	26.02	28.63	26.83	29.35
65	20.07	23.36	20.77	23.23	21.48	23.87	22.22	24.54
70	16.15	19.02	16.58	18.74	17.17	19.31	17.83	19.91
75	12.52	14.95	12.71	14.54	13.20	15.04	13.75	15.56
80	9.29	11.30	9.32	10.81	9.70	11.20	10.13	11.62

Withdrawal (Quits)

- Withdrawal assumptions for members with less than five years of service and withdrawal assumptions for members with more than five years of service were studied separately
- Liability-weighted and population-weighted rates are included with our withdrawal results
- Overall, the plan experienced more withdrawals than expected
- We recommend adjustments to the current service-based and age-based tables

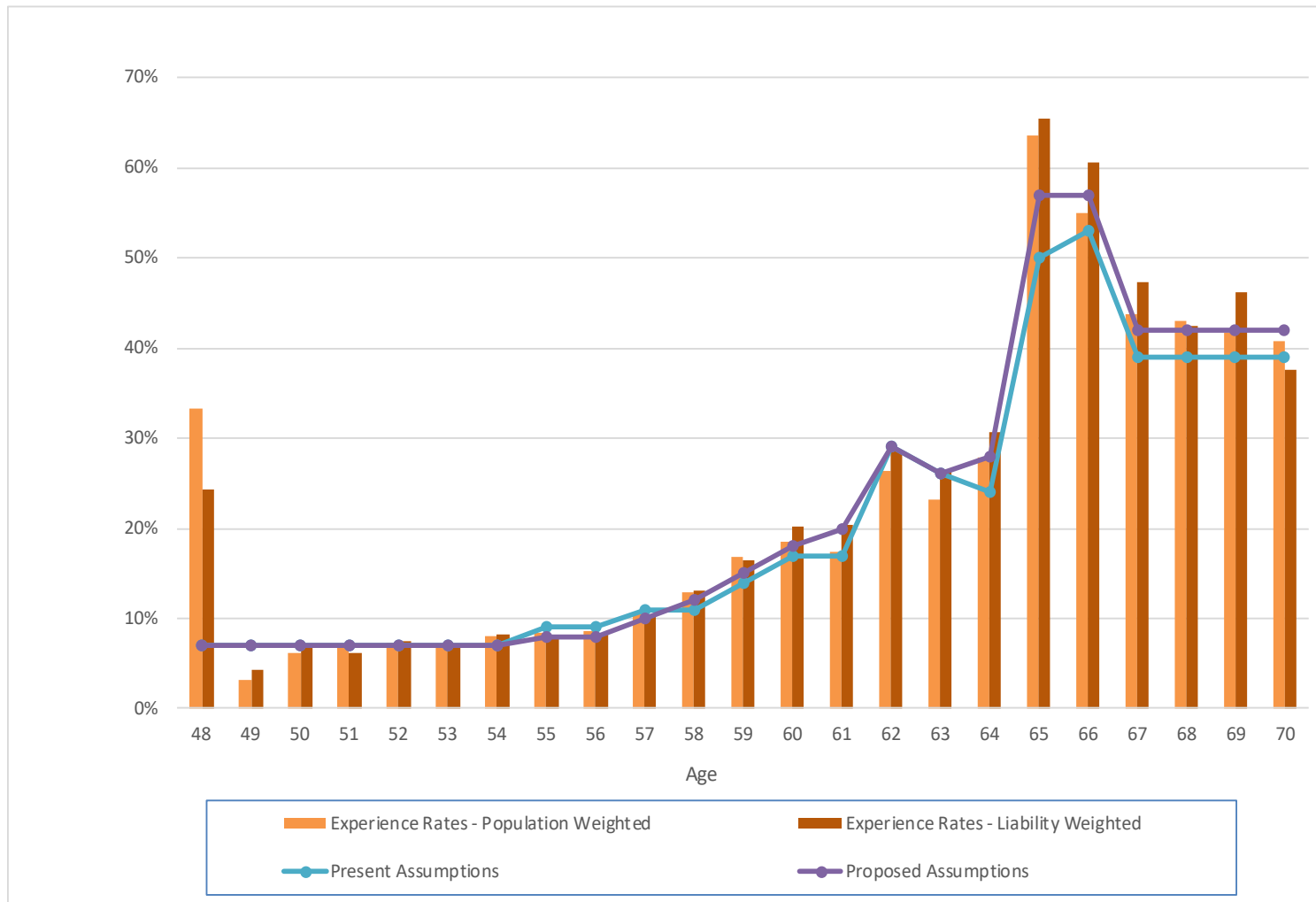
Withdrawal Experience – Education Female Members with More Than 5 Years of Service



Rates of Retirement

- The retirement assumption was analyzed both for unreduced and reduced retirements
- Overall, Education & Support members experienced **more** Normal and Early Retirements than projected by the present assumptions
- Therefore, we recommend changes to the retirement rates to reflect experience

Normal Retirement – Education Females



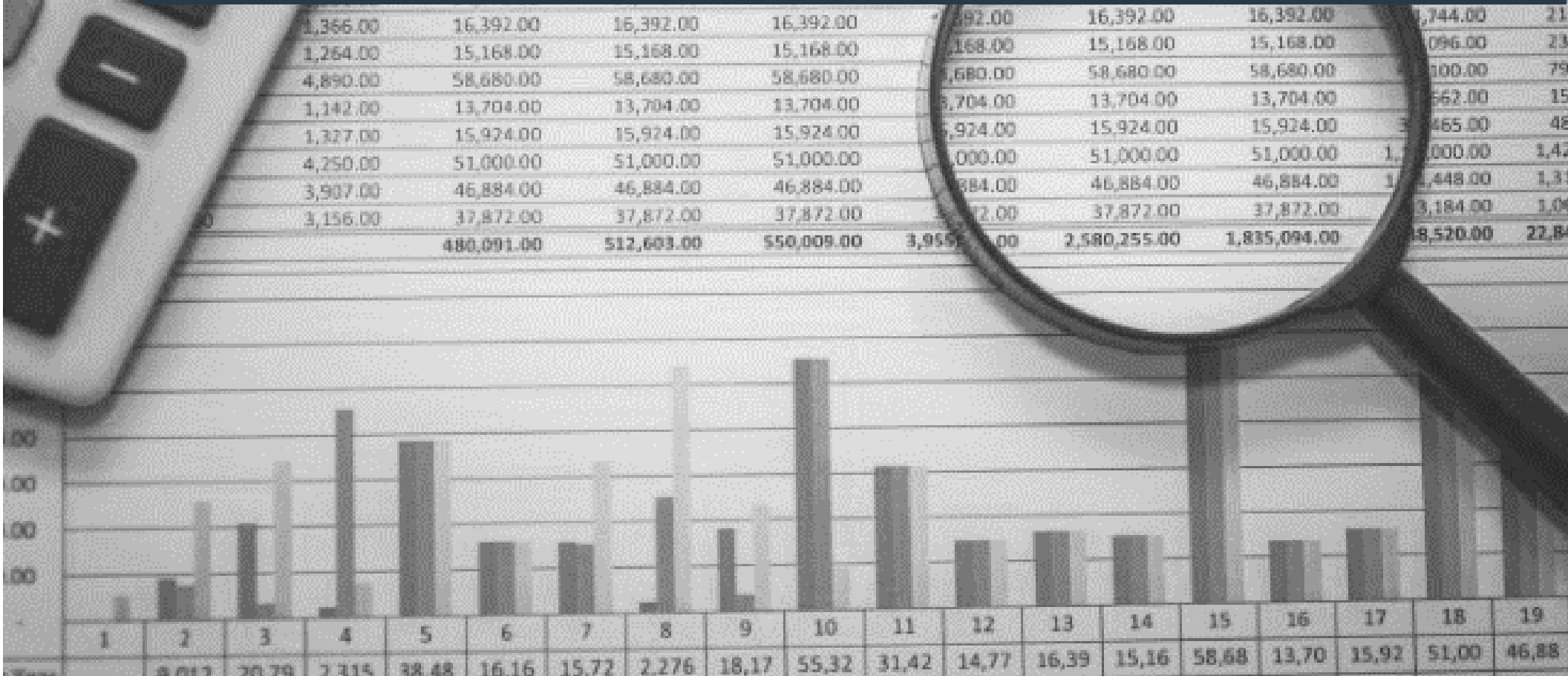
T-DROP Duration

- The average duration by age for members who retired from T-DROP or who are still in T-DROP during the experience period is shown below:

Age at DROP Date	Average Observed Duration Years		Assumed Duration Years	
	T-DROP Membership at 6/30/2020	Retired during Experience Period		
	Present	Proposed		
<= 56	4.9	7.2	7	7
57	3.6	4.7	6	6
58	3.5	4.4	5	5
59 +	2.7	3.2	4	4

- Members still in T-DROP have an unknown drop out date so duration will be higher than shown above for most members
- There may be longer duration periods experienced in the future due to the benefit provision providing T-DROP interest for those who remain over 10 years
- Considering this and the observed experience, we recommend no changes to the expected T-DROP duration period at this time

Economic Assumptions



Economic Assumptions – Current

- The economic assumptions currently in place are:
 - Investment Return – 7.50%
 - Net of administrative and investment expenses
 - Wage Inflation – 2.75%
 - Price Inflation – 2.50%

Economic Assumptions – ASOP No. 27

- Guidance regarding the selection of economic assumptions is governed by Actuarial Standard of Practice (ASOP) No. 27
- ASOP No. 27 requires that the selected economic assumptions be individually reasonable and consistent with one another
- That is, the selection of the price inflation assumption should be consistent with the selection of the wage inflation and investment return assumptions

Economic Assumptions – Wage Inflation

- Wage inflation consists of two components:
 - A portion due to pure price inflation (i.e., increases due to changes in the CPI)
 - Increases in average salary levels in excess of pure price inflation (real wage growth/differential)
- We reviewed various sources to arrive at the price inflation assumption

Forward-Looking Price Inflation Forecasts ^a	
Congressional Budget Office^b	
5-Year Annual Average	2.18%
10-Year Annual Average	2.29%
Federal Reserve Bank of Philadelphia^c	
5-Year Annual Average	2.20%
10-Year Annual Average	2.20%
Federal Reserve Bank of Cleveland^d	
10-Year Expectation	1.48%
20-Year Expectation	1.75%
30-Year Expectation	1.95%
Federal Reserve Bank of St. Louis^e	
10-Year Breakeven Inflation (3/1/2021)	2.28%
20-Year Breakeven Inflation (2/1/2021)	2.38%
30-Year Breakeven Inflation (3/1/2021)	2.23%
U.S. Department of the Treasury^f	
10-Year Breakeven Inflation	2.36%
20-Year Breakeven Inflation	2.32%
30-Year Breakeven Inflation	2.35%
50-Year Breakeven Inflation	2.36%
100-Year Breakeven Inflation	2.37%
Social Security Trustees^g	
Ultimate Intermediate Assumption	2.40%



^aEnd of the First Quarter, 2021. Version 2021-06-17 by Gabriel, Roeder, Smith & Company

^b*The Budget and Economic Outlook: 2021 to 2031*, Release Date: February 2021, Consumer Price Index (CPI-U), Percentage Change from Year to Year, 5-Year Annual Average (2021 - 2025), 10-Year Annual Average (2021 - 2030).

^c*First Quarter 2021 Survey of Professional Forecasters*, Release Date: February 12, 2021, Headline CPI, Annualized Percentage Points, 5-Year Annual Average (2021 - 2025), 10-Year Annual Average (2021 - 2030).

^dInflation Expectations, Model output date: March 1, 2021.

^eThe breakeven inflation rate represents a measure of expected inflation derived from X-Year Treasury Constant Maturity Securities and X-Year Treasury Inflation-Indexed Constant Maturity Securities. Observation date: March 1, 2021.

^f*The Treasury Breakeven Inflation (TBI) Curve*, Monthly Average Rates, March, 2021.

^g*The 2020 Annual Report of The Board of Trustees of The Federal Old-Age And Survivors Insurance and Federal Disability Insurance Trust Funds*, April 22, 2020, Long-range (75-year) assumptions, Intermediate, Consumer Price Index (CPI-W), for 2024 and later.

Price Inflation

- Forward looking Price Inflation forecasts are all below the current 2.5% assumption.
- The 2021 annual report of the Social Security Trustees uses 2.4% as the intermediate assumption.
- However, very current CPI-U rates are well above 2.5%.
- Production shortages resulting from Pandemic shutdowns have increased prices on certain products in the short term.
- Therefore, we recommend maintaining the current price inflation assumption of 2.5%.

Wage Inflation

- We think that a spread over Price Inflation of 0.25% to 1% is reasonable.
- Adding 0.25% to a 2.5% price inflation assumption produces a wage inflation assumption of 2.75%, which is the current assumption for ATRS.
- Therefore, we recommend maintaining the current wage inflation assumption of 2.75%.

Economic Assumptions – Merit and Seniority

- Total pay increases for an individual consist of a portion due to wage inflation and a portion due to an individual's on the job performance (i.e., merit and seniority)
- There were lower merit and seniority increases for ATRS Education and higher increases for Support members during the 5-year period than assumed
- We are recommending slight adjustments in the merit and seniority pay increase assumptions based on experience during the last 5 years

Economic Assumptions – Investment Return

- The investment return assumption is the actuarial assumption that has the largest effect on actuarial valuation results
- As more of the actuarial accrued liabilities are related to non-active members, the nominal (as opposed to real) investment return assumption becomes a more prominent factor
- More than 50% of ATRS liabilities are attributable to retirees

Economic Assumptions - Investment Return Averages

- NASRA Issue Brief as of July 2021 shows average investment return assumption for 130 Systems was 7.11% and the median was 7.00%.
- Many public employee retirement systems have been lowering their investment return assumption.
- NASRA average has been declining steadily over the past few years (e.g., the average in fiscal year 2017 was 7.53%).
- This trend is likely to continue in the near future.

Economic Assumptions – Investment Return Target Asset Allocation

- Based on ATRS Board Policy 4, amended June 7, 2021, the target asset allocation for the plan is as follows:

Asset Category	Asset Allocation
Total Equity	53.0%
Fixed Income	15.0
Opportunistic/Alternatives	5.0
Real Assets	15.0
Private Equity	12.0
Total	100.0%

Economic Assumptions – Investment Return

AON 10-year Capital Market Assumptions

Asset Class	Allocation (%)	Expected Return*	Risk
Public Equity	53.0%	6.5%	18.5%
Private Equity	12.0	8.2	25.0
Real Assets	15.0	7.0	13.4
Opportunistic / Alternatives	5.0	5.6	5.6
Fixed Income	15.0	3.4	5.4
Total ATRS Real ROR	100%	4.39%	13.75%
Total ATRS Nominal ROR*		6.69%	

*Aon's inflation assumption is 2.2%.

Note: Based on Aon 3Q 2021 10-year Capital Market Assumptions.

Investment advice and consulting services provided by Aon Investments, Inc., an Aon Company.

Economic Assumptions – Investment Return

AON 30-year Capital Market Assumptions

Asset Class	Allocation (%)	Expected Return	Risk
Public Equity	53.0%	7.0%	19.0%
Private Equity	12.0	8.7	25.5
Real Assets	15.0	6.9	13.8
Opportunistic / Alternatives	5.0	5.9	5.8
Fixed Income	15.0	4.1	5.8
Total ATRS Real ROR	100%	4.95%	14.12%
Total ATRS Nominal ROR*		7.15%	

*Aon's inflation assumption is 2.1%.

Note: Based on Aon 3Q 2021 30-year Capital Market Assumptions.

Investment advice and consulting services provided by Aon Investments, Inc., an Aon Company.



Economic Assumptions – Investment Return

- AON's 10-year geometric return based on its third quarter 2021 capital market assumptions is 6.69%
 - Price inflation assumption of 2.2%
 - Real Rate of Return of 4.39%
- AON's 30-year geometric return based on its third quarter 2021 capital market assumptions is 7.15%
 - Price inflation assumption of 2.1%
 - Real Rate of Return of 4.95%

Economic Assumptions – Investment Return

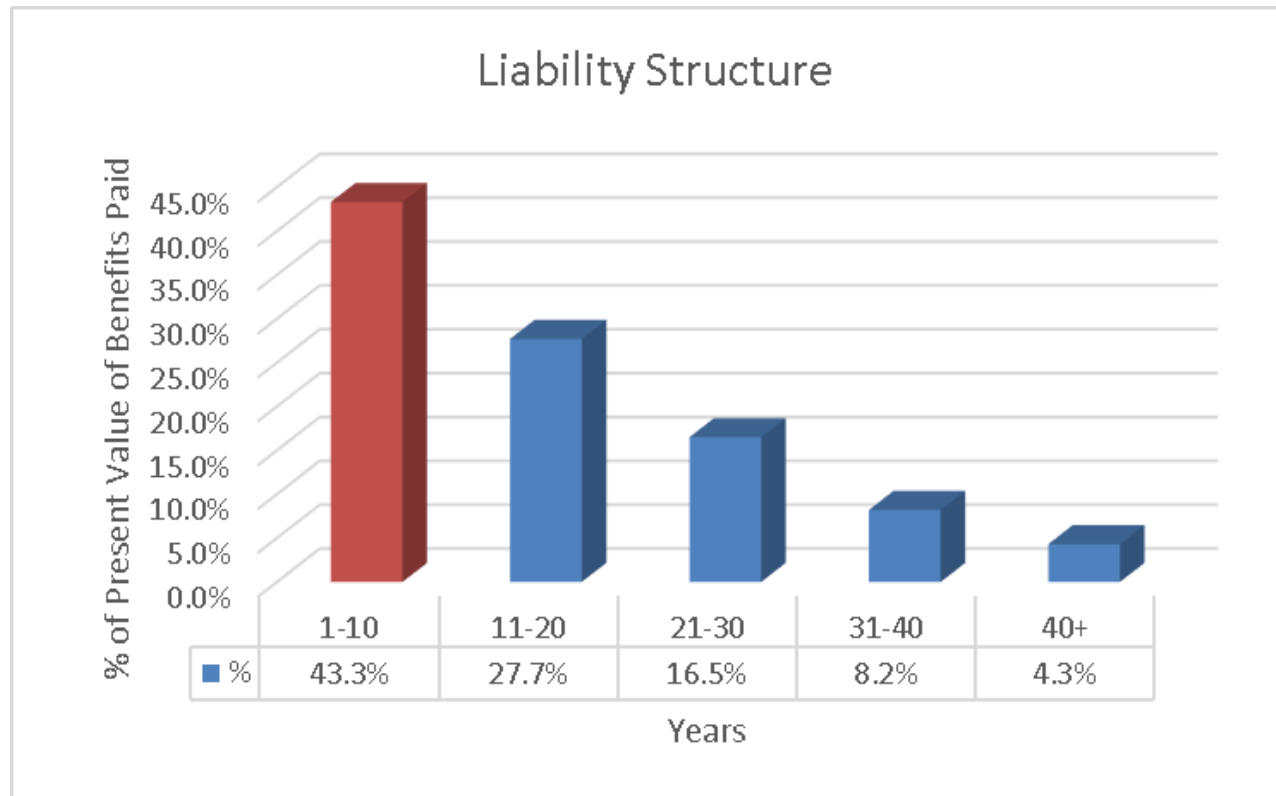
- Based upon the proposed asset allocation, future return expectations of various investment firms were analyzed
- Our analysis is based on the GRS Capital Market Assumption Modeler (CMAM)
 - Because GRS is a benefits consulting firm and does not develop or maintain its own capital market expectations, we request and monitor forward-looking expectations developed by several major investment firms
 - We update our CMAM on an annual basis
- The next few slides show the results of the analysis
 - Plan incurred administrative expenses were assumed to be 0.05% based on historical data
 - Final expected nominal investment return results are based upon a 2.5% price inflation assumption

Time Horizon for Investment Return

Assumption for ATRS

- 12 investment firms in our model provide capital market assumptions over an approximate 10-year time horizon.
- 6 investment firms provide capital market expectations over a 20- to 30-year period.
- Our understanding is that the 10-year CMAs tend to be more data driven than the 20-30 year CMAs, which are sometimes based on mean reversion.

Time Horizon for Investment Return Assumption for ATRS



- Given the structure of liabilities and particularly that 43% of liabilities will be paid out within the first ten years, we think it is important to consider the 10-year capital market assumptions more than the longer term assumption in formulating an opinion regarding the expected return on assets.

Economic Assumptions – Investment Return

The chart below gives the distribution of compounded returns over a ten-year period and the probability of achieving various returns compounded over the period.

GRS 2021 CMAM				
Capital Market Assumption Set (CMA)	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of exceeding 7.50%
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	4.55%	5.67%	6.79%	34.00%
2	4.66%	5.78%	6.91%	35.03%
3	4.93%	5.91%	6.90%	34.20%
4	4.98%	5.94%	6.91%	34.20%
5	4.89%	6.03%	7.18%	37.30%
6	5.00%	6.08%	7.17%	37.11%
7	5.14%	6.15%	7.17%	36.88%
8	5.16%	6.24%	7.34%	38.56%
9	5.37%	6.47%	7.57%	40.59%
10	5.45%	6.60%	7.77%	42.27%
11	5.55%	6.74%	7.94%	43.60%
12	6.08%	7.15%	8.23%	46.75%
Average	5.15%	6.23%	7.32%	38.37%
Average from last 3 CMAMs over 10-year horizon		6.63%		

Economic Assumptions – Investment Return

- The preferred assumption in the actuarial community is the forward-looking expected geometric return (i.e., 50th percentile) of 6.23%
 - 6.63% using the 3-year average of CMAMs
- The 20-30 year geometric expectation of the portfolio is 7.23%

Economic Assumptions – Investment Return

- Given the investment return expectations, we suggest that ATRS consider an investment return assumption in the range of 6.23% to 7.23%
- We review the investment return assumption on an annual basis to determine whether it remains reasonable for use in the actuarial valuation

Economic Assumptions – Investment Return

- The actuary must certify the reasonableness of all actuarial assumptions each valuation year
- An assumption at the upper end of reasonable could move outside of the reasonable range in future years increasing the risk of a qualification statement being needed in the actuarial valuation unless the assumption is changed

EFFECTS ON PENSION VALUATION RESULTS

Proposed Alternate Economic Assumptions

Computed Contributions for	Percents of Active Member Payroll					
	Present Assumptions	Proposed Demographic Assumptions	Proposed Demographic & Economic Assumptions			
			Scenario #1 7.25% Interest 2.75% Wage	Scenario #2 7.00% Interest 2.75% Wage	Scenario #3 6.75% Interest 2.75% Wage	Scenario #4 6.25% Interest 2.75% Wage
Normal Cost	12.44%	12.45%	13.25%	14.11%	15.02%	17.12%
Average Member Contributions	6.17%	6.17%	6.17%	6.17%	6.17%	6.17%
Net Employer Normal Cost	6.27%	6.28%	7.08%	7.94%	8.85%	10.95%
Unfunded Actuarial Accrued Liabilities	8.73%	8.72%	7.92%	7.06%	6.15%	4.05%
Employer Contribution Rate	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Amortization Years	19.8	21.8	32.9	59.7	over 100	over 100
Actuarial Accrued Liability	23,130,729,663	23,354,299,584	24,007,751,088	24,692,113,421	25,409,184,030	26,949,443,245
Actuarial Value of Assets	19,342,870,512	19,342,870,512	19,342,870,512	19,342,870,512	19,342,870,512	19,342,870,512
Funded Ratio	83.6%	82.8%	80.6%	78.3%	76.1%	71.8%

- Based on preliminary results of the June 30, 2021 valuation

Proposed Alternate Economic Assumptions

- The June 30, 2021 actuarial valuation is underway and the draft results are presented on page 46 (depending on assumptions selected)
- A 7.25% assumed rate of return and all other assumptions as recommended would produce an amortization period of about 33 years
 - This will place ATRS above the median return of other public retirement systems
- A 6.25% assumed rate of return and all other assumptions as recommended would produce an amortization period of over 100 years

Proposed Alternate Economic Assumptions

- The DRAFT results already reflect the high investment returns experienced during the Fiscal Year Ending 2021
 - The Market Rate of Return was approximately 30% for the Fiscal Year Ending 2021. The Funding Rate of Return was approximately 11%, recognizing one-fourth (1/4) of the extraordinary return for 2021 as well as prior gains and losses on assets
 - If all assumptions are met going forward, the amortization period is expected to decrease as remaining gains are recognized

**NEXT
STEPS**

SUMMARY AND NEXT STEPS

Making a Decision

- GRS recommends adopting the set of proposed demographic assumptions as a package
- GRS recommends lowering the investment return assumption from 7.50% to something in the range of 6.25% to 7.25%
- Choosing an assumption at the upper end of the range may lead to a series of continuing losses for ATRS
- Upper end assumption could be deemed unreasonable in the June 30, 2022 valuation

Timeline

- Today or very soon
 - Board action taken regarding the actuarial assumptions
- December
 - GRS to present detailed valuation results to ATRS Board & Staff based on the new assumptions
 - GRS to produce formal experience study report as a follow up
 - GRS to produce GASB 67 & 68 Schedules



THANK YOU

QUESTIONS

Disclosures

- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- Brian Murphy, Judith Kermans, Heidi Barry and Derek Henning are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.
- Additional information regarding actuarial assumptions and methods, and important additional disclosures will be provided in the report titled “5-Year Experience Study – July 1, 2015 through June 30, 2020”.
- If you need additional information to make an informed decision about the contents of this presentation, or if anything appears to be missing or incomplete please contact us before using this presentation.



Memo

To Arkansas Teacher Retirement System (ATRS) Board of Trustees

From PJ Kelly, CFA, CAIA, Katie Comstock

Cc Clint Rhoden, Rod Graves, Jerry Meyer

Date November 15, 2021

Re ATRS Long-Term Expected Rate of Return

Summary

The Arkansas Teacher Retirement System (ATRS) is evaluating the actuarial assumed rate of return based on the results of their 2021 Experience Study conducted by the actuary, GRS. The actuarial assumed rate of return is used to determine the liability associated with the promise of future benefit payments for plan participants. The actuarial assumed rate of return is informed by forward-looking market views and long-term return expectations on assets. The industry, along with Aon, has seen expected returns come down over the past several years due primarily to the low interest rate environment and high equity valuations. The flipside of this challenging forward-looking environment is that these same factors resulted in ATRS enjoying strong absolute returns, in excess of 12%, over the past five fiscal years, annualized.

As the Board's General Investment Consultant, ATRS requested Aon provide our long-term expected rate of return based on our latest capital market assumptions. Aon develops risk, return and correlation assumptions for all major asset classes on a quarterly basis. Based on our 30-year assumptions as of September 30, 2021, Aon's median forward-looking expectation for the ATRS portfolio is a return of 7.2% with a standard deviation of 14.1%. Please see the table below for details.

Asset Class	Allocation (%)	30-Year Expected Return	30-Year Expected Risk
Public Equity	53.0%	7.0%	19.0%
Private Equity	12.0	8.7	25.5
Real Assets	15.0	6.9	13.8
Opportunistic / Alternatives	5.0	5.9	5.8
Fixed Income	15.0	4.1	5.8
Total ATRS Portfolio		7.2%	14.1%

Note: Based on Aon's September 30, 2021 30-year Capital Market Assumptions. Aon's inflation assumption is 2.1%.



Based on our knowledge of the ATRS portfolio and expectations from the capital markets, Aon finds the 7.2% long-term expected rate of return to be reasonable.

Please see the appendix for additional information.



APPENDIX

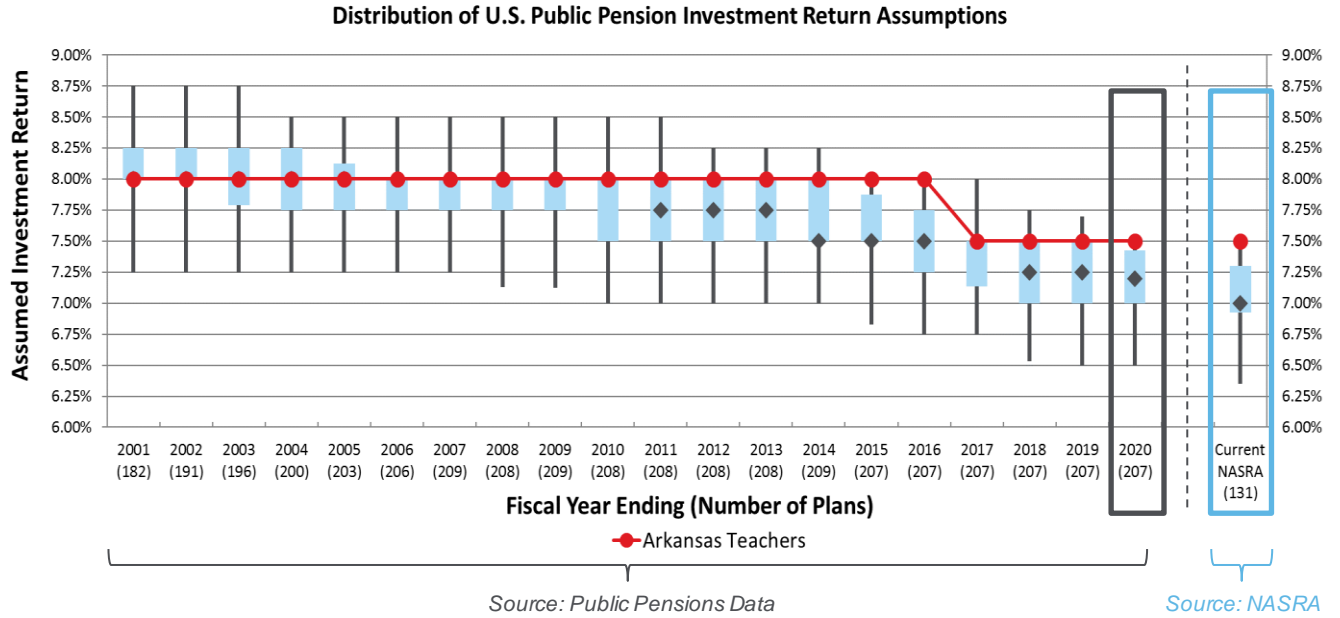
A. Aon's Asset Allocation Approach

Aon centers setting asset allocation around the asset-liability study. We believe optimal decisions regarding pension plan management are made when they are based on a clear understanding of the assets and liabilities of the plan and how they interact. For pension funds, we believe asset allocation decisions should be made with a long-term view, consistent with the fact that the assets support liabilities that have a very long-time horizon. Our asset allocation recommendations are developed based on capital market developments, changes in the underlying liabilities, and/or changes in the financing of the plan (contributions from employers and employees). Aon conducts an asset-liability study every 3 to 5 years. The next one for ATRS is intended to be completed in early 2022.

The structure of ATRS's asset allocation and investment strategy is less dependent on the assumed rate of return when compared to similar plans. This is because ATRS' contributions are set by statute rather than the current funding level, so a decrease in the assumed rate does not result in an immediate increase in contributions. The main basis for our investment strategy analysis and recommendations weigh heavily on the amount of contributions and ultimate benefit payments (cash flows in and out of the plan over time). As a result, the reduction in assumed rate of return does not have a meaningful impact on the short-term investment strategy and asset allocation policy of the plan, but may over the long run.



B. Distribution of U.S. Public Pension Investment Return Assumptions





C. Capital Market Assumptions – What are they?

- Asset class return, volatility and correlation assumptions
- Long-term: (10- and 30-year), forward-looking assumptions
- Best estimates: (50/50 probability of better or worse long-term results than expected)
- Quarterly: Updated on a quarterly basis to reflect current market pricing/levels
- Return assumptions most critical
 - Market Returns: no active management value added or fees (except for hedge funds and private equity, where traditional passive investments are not available)
- Volatility assumptions are set with a forward-looking view, considering:
 - Implied volatilities priced into option contracts of various terms
 - Historical volatility levels
 - For illiquid asset classes, such as real estate, de-smoothing techniques are employed when assessing historic volatility levels
 - The broad economic/market environment
- Correlation assumptions are formulated with reference to historic experience over different time periods and during different economic conditions

	30-yr	30-yr	30-yr	
	Expected Real Return ¹	Expected Nominal Return ¹	Expected Volatility	Sharpe Ratio
Equity				
1 Large Cap U.S. Equity	4.1%	6.3%	17.5%	0.251
2 Small Cap U.S. Equity	4.6%	6.8%	23.5%	0.209
3 Global Equity	4.8%	7.0%	19.0%	0.268
4 International Developed Equity	4.8%	7.0%	20.5%	0.249
5 Emerging Markets Equity	5.3%	7.5%	27.5%	0.204
Fixed Income				
6 Cash (Govt)	-0.2%	1.9%	1.5%	0.000
7 Cash (LIBOR)	0.1%	2.2%	1.5%	0.200
8 TIPS	-0.3%	1.8%	3.5%	-0.029
9 Core Fixed Income (Market Duration)	0.4%	2.5%	4.5%	0.133
10 Long Duration Bonds – Govt / Credit	0.5%	2.6%	8.0%	0.088
11 Long Duration Bonds – Credit	0.8%	2.9%	10.0%	0.100
12 Long Duration Bonds – Govt	0.0%	2.1%	7.5%	0.027
13 High Yield Bonds	2.4%	4.5%	13.0%	0.200
14 Bank Loans	2.8%	5.0%	7.5%	0.413
15 Non-US Developed Bonds (0% Hedged)	-0.3%	1.8%	10.5%	-0.010
16 Non-US Developed Bonds (50% Hedged)	-0.1%	2.0%	6.0%	0.017
17 Non-US Developed Bonds (100% Hedged)	0.0%	2.1%	3.5%	0.057
18 Short Govt Bonds	-0.2%	1.9%	2.0%	0.000
19 Short Corporate Bonds	0.5%	2.6%	2.5%	0.280
20 Intermediate Govt Bonds	-0.2%	1.9%	3.5%	0.000
21 Intermediate Corporate Bonds	0.7%	2.8%	4.5%	0.200
22 25-year Government Bond	0.1%	2.2%	12.0%	0.025
23 Emerging Market Bonds (Sovereign USD)	2.2%	4.3%	14.5%	0.166
24 Emerging Market Bonds (Corporate USD)	2.1%	4.2%	11.5%	0.200
25 Emerging Market Bonds (Sovereign Local)	2.1%	4.2%	14.5%	0.159
Alternative Investments				
26 Broad Hedge Funds3	2.8%	5.0%	10.0%	0.310
27 Broad Hedge Funds3 (Buy List)	4.1%	6.3%	10.0%	0.440
28 Hedge Fund-of-Funds2	1.5%	3.6%	10.5%	0.162
29 Hedge Fund-of-Funds2 (Buy List)	2.6%	4.8%	10.0%	0.290
30 eLDI	1.6%	3.7%	5.5%	0.327
31 Real Estate (Core)	3.3%	5.5%	15.5%	0.232
32 U.S. REITs	2.9%	5.1%	19.0%	0.168
33 Commodities	2.3%	4.4%	17.0%	0.147
34 Private Equity	6.5%	8.7%	25.5%	0.267
35 Infrastructure	4.9%	7.1%	15.0%	0.347
36 Multi Asset Credit	3.4%	5.6%	10.0%	0.370
37 ILS	2.2%	4.3%	7.5%	0.320
38 Equity Insurance Risk Premium - High Beta	3.3%	5.5%	11.5%	0.313
39 Equity Insurance Risk Premium - Low Beta	2.3%	4.4%	5.5%	0.455
40 Private Debt (Direct Lending)	3.9%	6.1%	17.5%	0.240
41 Alternative Risk Premia (ARP)	4.0%	6.2%	9.5%	0.453
42 U.S. Inflation	0.0%	2.1%	1.5%	0.133

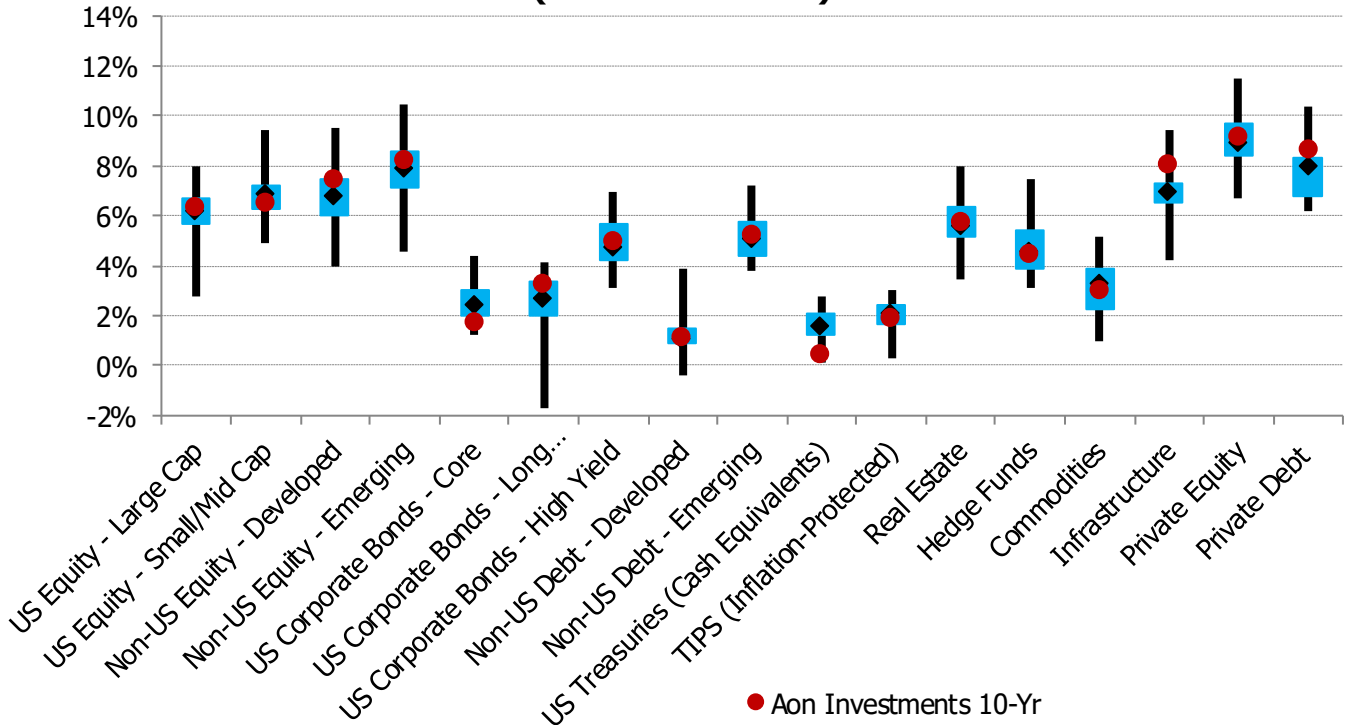
Aon Hewitt | Retirement and Investment
 200 E. Randolph Street, Suite 700 | Chicago, IL 60601
 t +1.312.381.1200 | f +1.312.381.1366 | aonhewitt.com

Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company



D. Horizon Actuarial Services, LLC – Survey of Capital Market Assumptions

**Expected Geometric Returns of 39 Investment Advisors
(10 Year Forecast)**



SOURCE: Horizon Actuarial Solutions, LLC survey of 2020 capital market assumptions from 39 independent investment advisors

Expected returns of the survey are annualized over 10-years (geometric).

Aon Investments' expected returns are annualized over 10-years as of 2Q 2020 (3/31/2020)

ARKANSAS TEACHER RETIREMENT SYSTEM
1400 West Third Street
Little Rock, Arkansas 72201

RESOLUTION
No. 2021-60

**MODIFICATION OF ACTUARIAL ASSUMED RATE OF RETURN
FOR FISCAL YEAR 2021 AND THEREAFTER**

WHEREAS, the Board of Trustees (Board) of the Arkansas Teacher Retirement System (ATRS) is authorized to adjust the actuarial assumed rate of return for ATRS; and

WHEREAS, the ATRS Board reviews the actuarial assumed rate of return for ATRS to ensure it fairly and accurately reflects a reasonable rate of return for ATRS based upon the ATRS asset allocation, the expected rates of inflation, projected economic conditions, global economic activity, and actuarial standards; and

WHEREAS, the ATRS Board has reviewed the recommendation of the ATRS executive staff, considered input from the ATRS general investment consultant, Aon Hewitt Investment Consulting, Inc., and received additional input from the ATRS actuary, Gabriel, Roeder, Smith & Company, regarding an appropriate actuarial assumed rate of return for ATRS; and

WHEREAS, the ATRS executive staff's recommendation is for the Board to adopt an actuarial assumed rate of return of 7.25% based upon the various factors and conditions discussed.

NOW, THEREFORE, BE IT RESOLVED, that the ATRS Board approves the establishment of a 7.25% annual actuarial assumed rate of return for fiscal year 2021, and each fiscal year thereafter, until such time as the ATRS Board modifies the actuarial assumed rate of return.

FURTHER, BE IT RESOLVED, that the ATRS staff is hereby authorized and directed to take all necessary and proper steps to implement this resolution.

Adopted this 15th day of November, 2021.

Mr. Danny Knight, Chair
Arkansas Teacher Retirement System

**ARKANSAS TEACHER RETIREMENT SYSTEM
1400 West Third Street
Little Rock, Arkansas 72201**

**RESOLUTION
No. 2021-61**

**ADOPTION OF THE PUB-2010 MORTALITY TABLE FOR THE
ACTUARIAL VALUATION OF ATRS FOR FISCAL YEAR 2021
AND THEREAFTER**

WHEREAS, the Board of Trustees (Board) of the Arkansas Teacher Retirement System (ATRS) is authorized to adopt an appropriate mortality table for the actuarial valuation of ATRS; and

WHEREAS, the ATRS Board has the duty to review the mortality table to be used by ATRS to ensure it fairly and accurately reflects reasonable life expectancies and is generally accepted by actuaries for valuations; and

WHEREAS, the ATRS Board has reviewed the recommendation of the ATRS executive staff, along with input from the ATRS actuary, Gabriel, Roeder Smith & Company, regarding the appropriate mortality table for use in the ATRS actuarial valuation; and

WHEREAS, the ATRS executive staff recommendation is for ATRS to use the appropriate Pub-2010 mortality table and appropriate mortality improvement scales for fiscal year 2021 and thereafter, unless replaced by the ATRS Board at some time in the future.

NOW, THEREFORE, BE IT RESOLVED, that the ATRS Board approves the use of the appropriate Pub-2010 mortality table and appropriate mortality improvement scales for fiscal year 2021, and each fiscal year thereafter, until such time as the ATRS Board approves the use of a different mortality table.

FURTHER, BE IT RESOLVED, that the ATRS staff is hereby authorized and directed to take all necessary and proper steps to implement this resolution.

Adopted this 15th day of November, 2021.

Mr. Danny Knight, Chair
Arkansas Teacher Retirement System

**ARKANSAS TEACHER RETIREMENT SYSTEM
1400 West Third Street
Little Rock, Arkansas 72201**

**RESOLUTION
No. 2021-62**

**TO APPROVE ACTUARIAL ASSUMPTIONS
IN THE COMPLETION OF THE
FIVE (5) YEAR EXPERIENCE STUDY**

WHEREAS, the ATRS actuaries, Gabriel, Roeder, Smith & Company, have conducted a five (5) year experience study for fiscal years 2015 through 2020 (2015-2020 Experience Study) that necessitates changes in assumptions used by the actuaries in establishing assets and liabilities; and

WHEREAS, it is important for all assumptions used in the ATRS valuations to be updated through the experience study to accurately reflect the current financial status of ATRS; and

WHEREAS, the actuaries have provided updated assumptions that the actuaries have determined properly reflect expected member activity and economic conditions.

NOW, THEREFORE, BE IT RESOLVED, that the ATRS Board approves the updated actuarial demographic assumptions, including withdrawal rates, retirement rates, and T-DROP duration, that the actuaries determined through the 2015-2020 Experience Study and with the understanding that any other demographic assumption derived from the 2015-2020 Experience Study not included in other resolutions adopted at this meeting are also approved and adopted through this resolution.

FURTHER BE IT RESOLVED, that the ATRS Board approves the updated actuarial economic assumptions, including wage inflation of 2.75%, price inflation of 2.50%, and merit and seniority pay increase rates, that the actuaries determined through the 2015-2020 Experience Study and with the understanding that any other economic assumption derived from the 2015-2020 Experience Study not included in other resolutions adopted at this meeting are also approved and adopted through this resolution.

FURTHER BE IT RESOLVED, that the ATRS staff is hereby authorized and directed to take all necessary and proper steps to implement this resolution.

Adopted this 15th day of November, 2021.

Mr. Danny Knight, Chair