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TEACHERS'
Retirement System
TRS
KENTUCKY

TEACHERS' RETIREMENT SYSTEM OF THE STATE OF KENTUCKY

ECONOMIC ASSUMPTION REVIEW 2023

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September 1, 2023

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

Members of the Board:

Per House Bill 76 (RS 2022), an investigation of the economic assumptions of the Teachers' Retirement System of the State of Kentucky (TRS) has been completed as of June 30, 2023. KRS 161.400 (1)(b)(1) reads:

> At least once in each two (2) year period, the board shall cause an actuarial investigation to be made of all of the economic experience under the retirement system, including but not limited to the inflation rate, investment return, and payroll growth assumptions, relative to the economic assumptions and funding methods previously adopted by the board.

The purpose of this investigation was to assess the reasonability of the current TRS economic assumptions, including price inflation, investment return, wage inflation, and payroll growth. As a result of the investigation, it has been determined that the current economic assumptions are reasonable and can be used in the June 30, 2023 actuarial valuations.

In order to prepare the results in this investigation, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that, in our opinion, the assumptions developed in this report satisfy Actuarial Standards of Practice, in particular No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations).

The experience investigation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Edward J. Koebel, EA, FCA, MAAA
Chief Executive Officer

Alisa Bennett, FSA, EA, FCA, MAAA
President

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Section I – Executive Summary

Cavanaugh Macdonald Consulting, LLC (CMC) has performed this economic assumption review for each of the Plans under the TRS' Board of Trustees purview as of June 30, 2023. This report presents the results, analysis, and resulting determinations of our study. It is anticipated that any determined changes will first be reflected in the June 30, 2023 actuarial valuations.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Actuarial Standards of Practice adopted by the Actuarial Standards Board (ASB). While the determined assumptions represent our best estimate of future experience, there are other reasonable assumption sets that could be supported by the results of this economic assumption review. Those other sets of reasonable assumptions could produce liabilities and costs that are either higher or lower.

The following summarizes the findings and determinations with regard to the economic assumptions utilized for TRS. Detailed explanations are found in the section that follows.

Economic assumptions are some of the most visible and significant assumptions used in the valuation process. The items in the broad economy modeled by these assumptions can be very volatile over short periods of time, as clearly seen in the economic downturn in 2008 followed by the rebound in many financial markets in the years following, as well as the disturbance during the recent pandemic and subsequent recovery. Our goal is to try to find the emerging long-term trends in the midst of this volatility so that we can then apply reasonable assumptions.

Most of the economic assumptions used by actuaries are developed through a building-block approach. For example, the expected return on assets is based on the expectation for inflation plus the expected real return on assets. At the core of the economic assumptions is the inflation assumption. As we discuss later in the report, **we have determined that the price inflation assumption can be maintained at 2.50%**.

We have also determined that the long-term expected return on assets assumption for the Retirement Annuity Trust, Health Insurance Trust, and the Life Insurance Trust can be maintained at 7.10%, reflecting a 2.50% inflation assumption and a 4.60% real rate of return assumption. This will be discussed in detail later in this report, but a real rate of return of 4.60% is supported by the forecasting models developed using the Horizon Actuarial Services, LLC. Survey conducted in 2023 and the Board's target asset allocation.

Section I – Executive Summary

Finally, we have determined that the general wage inflation (payroll growth) assumption used as the underlying payroll growth for active members and used in the level percent of payroll amortization method can be maintained at 2.75%.

The following table summarizes the current and proposed economic assumptions:

Item	Current	Proposed
Price Inflation	2.50%	2.50%
Investment Return*		
Retirement Trust	7.10%	7.10%
Health Trust	7.10%	7.10%
Life Trust	7.10%	7.10%
Wage Inflation (Payroll Growth)	2.75%	2.75%

* Net of investment expenses only.

Although we have determined that a change in the set of economic assumptions is not necessary, we recognize there may be other sets of economic assumptions that are also reasonable for purposes of funding TRS. For example, we have typically reflected conservatism to the degree we would classify as moderate. Actuarial Standards of Practice allow for this difference in approaches and perspective, as long as the assumptions are reasonable and consistent.

Financial Impact

Since we are recommending no changes to the economic assumptions for all three plans, there is no financial impact at this time.

Section II – Economic Assumptions

There are four economic assumptions used in the actuarial valuations performed for TRS. They are:

- Price Inflation
- Investment Return
- Wage Inflation
- Payroll Growth for Amortization Method

Note that future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return and wage inflation. However, it is not directly used in the valuation process.

Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Economic Assumptions for Measuring Pension Obligations"* provides guidance to actuaries in selecting economic assumptions for measuring obligations under defined benefit plans. ASOP No. 27 requires that each economic assumption selected by the actuary should be reasonable which means it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed, or when alternative assumptions are used for the assessment of risk.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

Section II – Economic Assumptions

In our opinion, the economic assumptions determined in this report have been developed in accordance with ASOP No. 27. The following table shows the determined results followed by detailed discussions of each assumption.

Item	Current Assumptions	Proposed Assumptions
Price Inflation	2.50%	2.50%
Real Rate of Return*	4.60	4.60
Investment Return	7.10%	7.10%
Price Inflation	2.50%	2.50%
Real Wage Growth	0.25	0.25
Wage Inflation	2.75%	2.75%
Payroll Growth	2.75%	2.75%

* Net of investment expenses.

Section II – Economic Assumptions

Price Inflation

Background

As can be seen from the table on the previous page, assumed price inflation is used as the basis for both the investment return assumption and the wage inflation assumption. These latter two assumptions will be discussed in detail in the following sections.

It is important that the price inflation assumption be consistently applied throughout the economic assumptions utilized in an actuarial valuation. This is called for in ASOP No. 27 and is also required to meet the parameters for determining pension liabilities and expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and 68.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates are expected to result in lower expected investment returns, at least in the long run.

The current price inflation assumption is 2.50% per year.

Past Experience

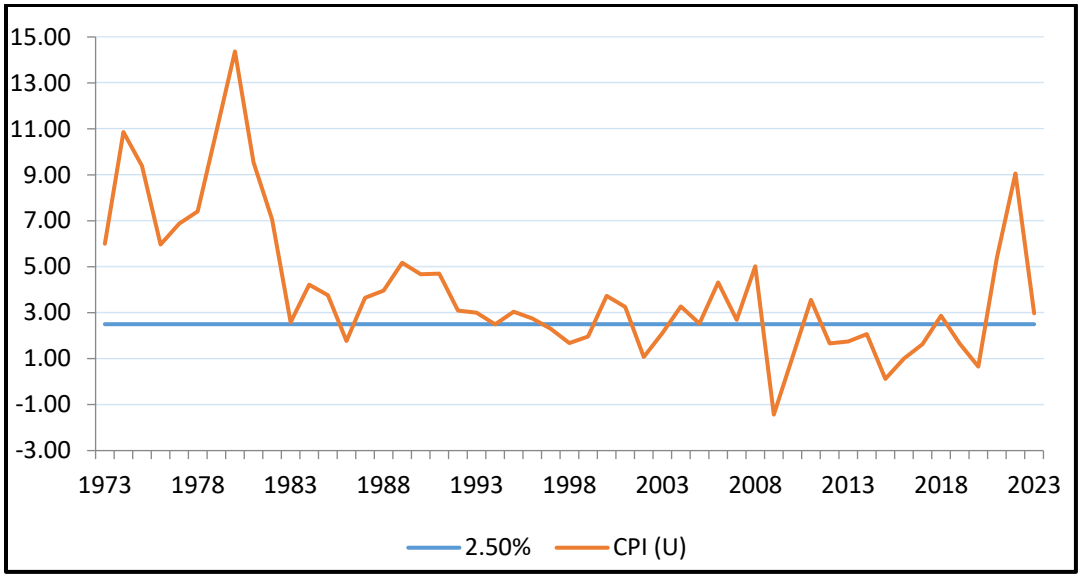
The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The table below provides historical annualized rates and annual standard deviation of the CPI-U over periods ending June 30th.

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 – 2023	97	2.96%	4.04%
1963 – 2023	60	3.91	2.91
1973 – 2023	50	3.94	3.10
1983 – 2023	40	2.84	1.76
1993 – 2023	30	2.52	1.86
2003 – 2023	20	2.57	2.23
2013 – 2023	10	2.71	2.67

Section II – Economic Assumptions

The following graph illustrates the historical levels of price inflation measured as of June 30th of each of the last 50 years and compared to the current 2.50% annual rate currently assumed.

Annual Rate of CPI (U) Increases



As can be seen from the table on the previous page, over the last 30 years, the average annual rate of increase in the CPI-U has been just over 2.50%. The higher annual rates over the past two years have increased this average.

Forecasts

Based upon information contained in the "Survey of Professional Forecasters" for the second quarter of 2023 as published by the Philadelphia Federal Reserve Bank, the median expected annual rate of inflation for the next ten years is 2.36%. Although 10 years of future expectation is too short of a period for the basis of our inflation assumption, the information does provide some evidence that the consensus expectations of these experts are for rates of inflation very close to our current assumption of 2.50% for the near-term future.

The latest forecast from the National Association for Business Economics (NABE) released in August 2023 shows its members largely agree that the gain in inflation will remain above 3% for the remainder of 2023 and then ease further in 2024.

TRS' investment consultant, Aon, also has an inflation forecast in their capital market assumptions. Their short-term assumption (10 years) is 2.40% and long-term assumption (30

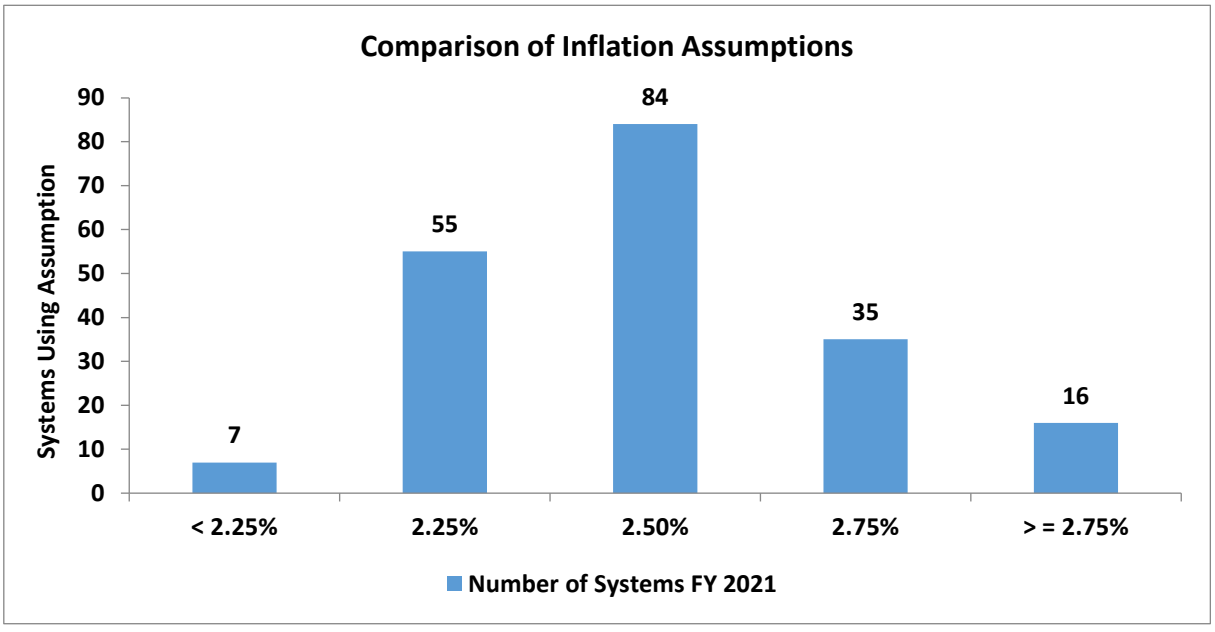
years) is 2.30%. Horizon Actuarial Services surveys a significant portion of the major investment advisors and publishes their assumptions. For the 2023 study, the inflation assumptions for the next 10 year period and 20 year period is 2.55% and 2.46%, respectively.

Social Security Administration

Although many economists forecast lower inflation than the assumption used by most retirement plans, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2023 annual report, the projected ultimate average annual increase in the CPI over the next 75 years was estimated to be 2.40%, under the intermediate (best estimate) cost assumption. The range of inflation assumptions used in the Social Security 75-year modeling, which includes a low and high-cost scenario, in addition to the intermediate cost projection, was 1.80% to 3.00%. These rates remained unchanged from their 2022 annual report.

Peer Comparison

While we do not recommend the selection of any assumption based on what other systems use, it does provide another set of relevant information to consider. The following chart shows the inflation rate assumptions of 194 plans in the Public Plan Database of the Center for Retirement Research. Based on the current data, the average inflation assumption is 2.52%. The assumptions are from actuarial valuations reported in FYE 2021. Although inflation has spiked recently, we have not seen a reversal of this trend and expect most systems to take a wait-and-see approach.



Section II – Economic Assumptions

Determination

It is difficult to predict inflation accurately. Inflation's short-term volatility is illustrated by comparing its average rate over the last 10 and 50 years. Although the 10-year average of 2.71% is closer to the System's assumed rate of 2.50%, the longer 50-year average of 3.94% is much higher and it includes the very high rates of inflation from the late 1970s and early 1980s. Those high rates will not be part of the 50-year average for much longer.

Although we have experienced rather high inflation over the last few months due to the recovery from the COVID-19 pandemic, current economic forecasts suggest annual inflation rates closer to 2.50% over the short-term and long-term, respectively. We concur with these forecasts and recommend maintaining the inflation assumption for the System at 2.50%.

Price Inflation Assumption	
Current	2.50%
Determined	2.50%

Section II – Economic Assumptions

Investment Return

Background

The assumed investment return is one of the most significant assumptions in the annual actuarial valuation process as it is used to discount the expected benefit payments for all active, inactive and retired members. Minor changes in this assumption can have a major impact on valuation results. The investment return assumption should reflect the asset allocation target for the funds set by the Board of Trustees.

The current assumption is 7.10%, consisting of a price inflation assumption of 2.50% and a real rate of return assumption of 4.60%.

Long Term Perspective

Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term perspective in order to make prudent choices regarding how to invest the trust funds. For actuarial calculations, we typically consider very long periods of time. For example, a newly, hired employee who is 25 years old may work for 35 years, to age 60, and live another 30 years, to age 90 (or longer). The retirement system would receive contributions for the first 35 years and then pay out benefits for the next 30 years. During the entire 65-year period, the system is investing assets related to the member. For such a typical career employee, more than one-half of the investment income earned on assets accumulated to pay benefits is received after the employee retires. In addition, in an open, ongoing system like TRS, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in the time perspective used by actuaries and investment consultants is frequently a source of debate and confusion when setting economic assumptions.

Past Experience

One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the timeframe used, especially if the year-to-year results vary widely. In addition, the asset allocation can also impact the investment returns so comparing results over long periods when different asset allocations were in place may not be meaningful.

Section II – Economic Assumptions

The assets for TRS are valued using a widely accepted asset-smoothing methodology that fully recognizes the expected investment income and also recognizes 20% of each year's investment gain or loss (the difference between actual and expected investment income). The recent experience over the last five years for the Retirement Annuity Trust is shown in the table below. Historical returns for the Health Insurance Trust and the Life Insurance Trust are similar.

Year Ending 6/30	Actuarial Value	Market Value
2022	7.9%	-10.9%
2021	12.9%	29.6%
2020	7.0%	5.5%
2019	7.1%	5.6%
2018	9.1%	10.5%
Average	8.8%	8.1%

While important to review and analyze, historical returns over such a short time period are not credible for the purpose of setting the long-term assumed future rate of return.

Future Expectation Analysis

ASOP 27 provides that the actuary may rely on outside experts in setting economic assumptions. TRS utilizes the services of Aon to assist them in developing investment strategies and providing capital market assumptions for the TRS portfolio. As part of their duties, Aon periodically performs asset-liability studies, along with comprehensive reviews of the expected return of the various asset classes in which the TRS portfolio is invested. We believe it is appropriate to consider the results of Aon's work as one factor in assessing expected future returns.

Our forward-looking analysis used the real rates of return in Aon's capital market assumptions for 10-year and 30-year assumptions and TRS' target asset allocation. Using statistical projections that assume investment returns approximately follow a lognormal distribution with no correlation between years, produces an expected range of real rates of return over a 50-year time perspective. Looking at one year's results produces a reasonable mean real return, but also has a high standard deviation or measurement of volatility. By expanding the time perspective, the real return does not change, but the volatility declines significantly.

Section II – Economic Assumptions

The table below provide a summary of the results of Aon's 10-year and TRS' target asset allocation for the Retirement Annuity Trust (Pension Plan).

Aon 10-year perspective Assumptions

Time Span in Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	95th
1	5.69%	13.12%	-14.42%	-3.51%	4.88%	14.00%	28.54%
5	5.04%	5.81%	-4.23%	1.04%	4.88%	8.87%	14.87%
10	4.96%	4.11%	-1.65%	2.15%	4.88%	7.69%	11.85%
20	4.92%	2.90%	0.22%	2.95%	4.88%	6.86%	9.76%
30	4.91%	2.37%	1.06%	3.30%	4.88%	6.49%	8.85%
40	4.90%	2.05%	1.56%	3.51%	4.88%	6.28%	8.31%
50	4.90%	1.83%	1.91%	3.65%	4.88%	6.13%	7.94%

The percentile results are the percentages of random returns over the time span shown that are expected to be less than the amount indicated. For example, using the Aon 10-year perspective assumptions, for the 10-year time span, 5% of the resulting real rates of return will be below -1.65% and 95% will be above that. As the time span increases, the results begin to converge. Over a 50-year time span, the results indicate there will be a 25% chance that real returns will be below 3.65% and a 25% chance they will be above 6.13%. In other words, there is a 50% chance the real returns will be between 3.65% and 6.13%.

The results of our real return forward looking analysis are very similar to the real rate of return analysis developed by Aon in their first quarter of 2023 analysis, where they developed a real return expectation of 4.90% over a 10-year perspective and 5.1% over a 30-year perspective .

We also recognize that there can be differences of opinion among investment professionals regarding future return expectations. For a broader view of expected returns, we also reviewed the 2023 Survey of Capital Market Assumptions produced by Horizon Actuarial Services, LLC to see what other investment professionals are currently using for capital market assumptions.

Section II – Economic Assumptions

The Horizon survey includes both 10-year perspective and 20-year perspective capital market assumptions. We applied the same statistical analysis to these survey results as we did the capital market assumption of TRS investment advisor with the following real return results for the 10-year perspective and 20-year perspective. This information provides an additional perspective on what a broad group of investment experts anticipate for future investment returns.

Horizon Survey 10-year perspective

Time Span in Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	95th
1	5.30%	12.47%	-13.88%	-3.43%	4.57%	13.24%	26.98%
5	4.72%	5.53%	-4.13%	0.91%	4.57%	8.36%	14.05%
10	4.64%	3.91%	-1.66%	1.97%	4.57%	7.24%	11.19%
20	4.61%	2.76%	0.13%	2.73%	4.57%	6.45%	9.21%
30	4.59%	2.25%	0.93%	3.06%	4.57%	6.10%	8.34%
40	4.59%	1.95%	1.41%	3.26%	4.57%	5.90%	7.83%
50	4.59%	1.75%	1.74%	3.40%	4.57%	5.75%	7.48%

As can be seen in Appendix B, the Retirement Annuity Trust, the Healthcare Insurance Trust, and the Life Insurance Trust all have different asset allocations, so they each have slightly different real return expectations. The table below summarizes the 50th percentile returns for each of the three retirement plans under the TRS Board's purview for each of the four capital market assumptions provided by Aon and the Horizon survey, respectively.

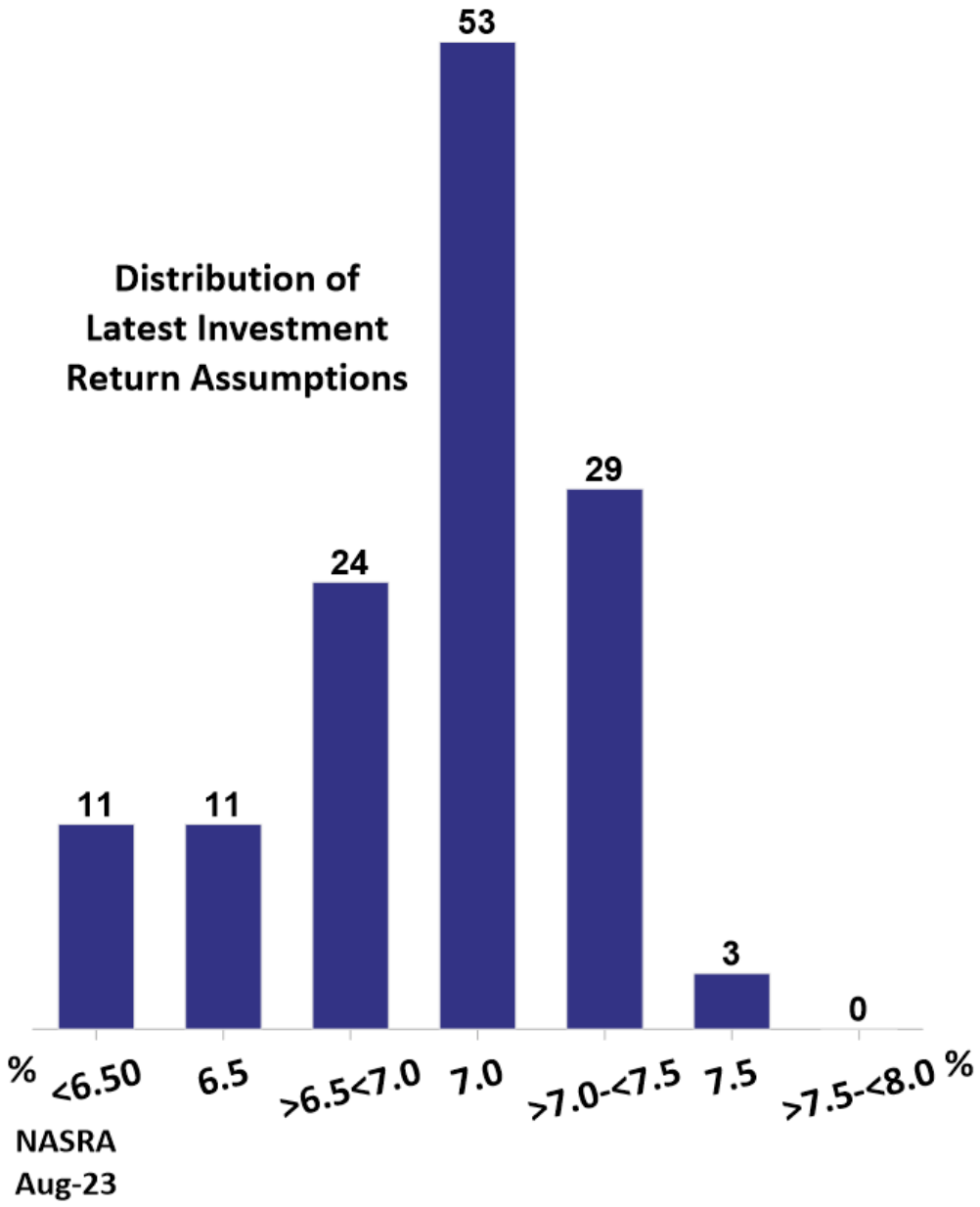
	Retirement Annuity Trust	Healthcare Insurance Trust	Life Insurance Trust
Aon – 10 year	4.88%	5.03%	4.73%
Aon – 30 year	5.15%	5.31%	4.99%
Horizon – 10 year	4.57%	4.73%	4.51%
Horizon – 20 year	4.98%	5.15%	4.91%

While TRS is a long-term vehicle expected to pay benefits to its retirees for many years in the future, a high percentage of the present value of the benefits is determined within the next ten to fifteen years, so the real return assumption should fall within the bands shown above.

Section II – Economic Assumptions

Peer Comparison

The following chart shows the nominal investment return assumptions of 131 plans in the National Association of State Retirement Administrators (NASRA). The assumptions shown below are as of August 2023 and are updated frequently by the NASRA staff.



Section II – Economic Assumptions

Determination

By actuarial standards, we are required to maintain a long-term perspective in setting all assumptions, including the investment return assumption. Therefore, we believe we must be careful not to let recent experience or short-term expectations impact our judgment regarding the appropriateness of the current assumption over the long term.

Based on our analysis of the Board's target asset allocation and the Horizon Survey capital market assumptions, we have determined that a real return assumption of 4.60% is still a very reasonable assumption and below the 50th percentile in all of our analysis. Based on an inflation assumption of 2.50% and real return assumption of 4.60%, we have determined a 7.10% expected long term nominal rate of return assumption.

Investment Return Assumption		
	Current	**Proposed**
Real Rate of Return*	4.60%	4.60%
Inflation	2.50	2.50
Net Investment Return	7.10%	7.10%

* Net of investment expenses.

As the Health Insurance Trust and Life Insurance Trust show similar long-term projections to the Retirement Annuity Trust and because the asset allocation strategy for the Health Insurance Trust could be impacted by the lower incoming cash flows once the plan reaches a 100% funded ratio, we believe the TRS Board should use the same investment return assumption for all three plans.

Section II – Economic Assumptions

Wage Inflation

Background

The wage inflation assumption is composed of the price inflation assumption and an assumption for the real rate of wage increases. The salary increase assumption combines the wage inflation assumption with an assumption for promotion and longevity, often called merit increases. Merit assumptions are generally age and or service related and are outside the scope of this review of economic assumptions. The excess of wage growth over price inflation is also considered the increase in productivity that labor provides.

The current wage inflation assumption is 2.75% and is composed of a 2.50% rate of inflation assumption and a 0.25% real rate of wage inflation.

Past Experience

The Social Security Administration publishes data on wage growth in the United States (see Appendix C). While this is the most comprehensive data available, it is based on all wage earners in the country so it can be influenced by the mix of jobs as well as by changes in certain sectors of the workforce that may not be seen by all segments.

As with our analysis of inflation, we provide below wage inflation and a comparison with price inflation over various time periods. Currently, this wage data is only available through calendar year 2021. We remove the rate of price inflation for each year from the data to result in the historical real rate of wage inflation.

Period	Wage Inflation	Price Inflation	Real Wage Growth
2011-2021	3.49%	1.87%	1.62%
2001-2021	3.10%	2.14%	0.96%
1991-2021	3.46%	2.33%	1.13%
1981-2021	3.77%	2.78%	0.99%
1971-2021	4.57%	3.88%	0.69%

Thus, over the last 50 years, annual real wage growth has averaged 0.69%.

Section II – Economic Assumptions

Social Security Administration

The wage index used for the historical analysis is projected forward by the Office of the Chief Actuary of the Social Security Administration in their 75-year projections. In April of 2023, the annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.54%, 1.14% higher than the Social Security intermediate inflation assumption of 2.40% per year. The range of the assumed real wage inflation in the 2023 Trustees report was 0.54% to 1.74% per year.

Public Sector Compensation and Wages

The Bureau of Labor Statistics publishes the Employment Cost Index, including detail for real (net of inflation) total compensation and wages and salaries. Further, this index is also broken down for state and local government workers. From 2004 through 2022, total compensation grew at an annualized rate of 2.78%, while wages and salaries grew at a rate of 2.12% (inflation was 2.51% over the same period). This difference is a reflection that state and local government workers have had much of their compensation increase delivered through benefits rather than wages. While it is reasonable to anticipate that total compensation will continue to increase faster than wages, it is also reasonable to anticipate that the difference between the two will moderate over time.

Determination

The data the Social Security Administration collects is nationwide and predominantly from the private sector which includes many collectively bargained employees. It is questionable whether public sector employees can match the productivity rates of the private sector. In addition, the experience of real wage growth for teachers in the State of Kentucky is below the national average. As mentioned above, the wage growth assumption is used in combination with the merit increase assumption to create the salary increase assumption which is applied to individual pay increase. The merit increase assumption is outside the scope of this review. Although there has been pressure to increase salaries in recent months, the wage increase assumption in isolation is primarily used for the level percent of payroll amortization method amortization method rather than projecting future retirement benefits for individuals. **Therefore, we have determined that the real wage growth inflation assumption should be maintained at 0.25% as a more conservative assumption and will be reviewed again in the next study.**

Wage Inflation Assumption		
	Current	Proposed
Price Inflation	2.50%	2.50%
Real Wage Growth	0.25%	0.25%
Wage Inflation	2.75%	2.75%

Section II – Economic Assumptions

Payroll Growth

Background

The assumed future rate of payroll growth increase in the total payroll of TRS' active members is an assumption used in the level percentage of payroll amortization method that affects the calculation of the amortization period required to fully amortize the unfunded actuarial accrued liability and the actuarially determined employer contribution. The total payroll growth is impacted by individual member's increases and population growth. The current assumption is 2.75% per year which is equal to the current wage inflation assumption.

Past Experience

The following table shows the actual TRS' annual payroll growth experienced over different time periods.

Period	Number of Years	Annual Payroll Growth
1992 – 2022	30	2.98%
2002 – 2022	20	2.82%
2007 – 2022	15	2.05%
2012 – 2022	10	1.49%
2017 – 2022	5	2.51%

Determination

The table above shows that since 1992 annual payroll growth has been near assumed levels. However, over the past 10 to 15 years, annual payroll growth has been much lower than assumed. This is a direct result of the financial crisis of 2008/2009. Projections for population growth in the State of Kentucky are encouraging as some counties are growing significantly. The need for attracting and retaining teachers to any state is tied to the population growth and the ability to pay teachers more. **Taking all of this information into account, we have determined that the payroll growth assumption should be maintained at 2.75%.**

Appendix A – Historical June CPI (U) Index

Year	CPI (U)	Year	CPI (U)
1965	31.6	1995	152.5
1966	32.4	1996	156.7
1967	33.3	1997	160.3
1968	35.7	1998	163.0
1969	34.7	1999	166.2
1970	38.8	2000	172.4
1971	40.6	2001	178.0
1972	41.7	2002	179.9
1973	44.2	2003	183.7
1974	49.0	2004	189.7
1975	53.6	2005	194.5
1976	56.8	2006	202.9
1977	60.7	2007	208.352
1978	65.2	2008	218.815
1979	72.3	2009	215.693
1980	82.7	2010	217.965
1981	90.6	2011	225.722
1982	97.0	2012	229.478
1983	99.5	2013	233.504
1984	103.7	2014	238.343
1985	107.6	2015	238.638
1986	109.5	2016	241.018
1987	113.5	2017	244.955
1988	118.0	2018	251.989
1989	124.1	2019	256.143
1990	129.9	2020	257.797
1991	136.0	2021	271.696
1992	140.2	2022	296.311
1993	144.4	2023	305.109
1994	148.0		

Appendix B – Capital Market Assumptions and Asset Allocations

Aon's 30-year Geometric Real Rates of Return and Standard Deviations by Asset Class

Asset Class	Expected Geometric Rates of Return*	Standard Deviation
Large Cap U.S. Equity	7.3%	17.5%
Small Cap U.S. Equity	7.8%	23.5%
Developed International Equity	7.8%	21.0%
Emerging Markets Equity	8.4%	24.5%
Fixed Income	4.2%	5.0%
High Yield Bonds	6.1%	10.0%
Other Additional Categories	5.9%	7.0%
Real Estate	5.5%	17.9%
Private Equity	10.3%	25.5%
Cash	3.9%	2.0%

* Rates above include an inflation assumption of 2.3%

Long Term Asset Allocation Targets (Retirement Annuity Trust)

Asset Class	Asset Allocation
Large Cap U.S. Equity	35.4%
Small Cap U.S. Equity	2.6%
Developed International Equity	15.7%
Emerging Markets Equity	5.3%
Fixed Income	15.0%
High Yield Bonds	5.0%
Other Additional Categories	5.0%
Real Estate	7.0%
Private Equity	7.0%
Cash	2.0%

Appendix B – Capital Market Assumptions and Asset Allocations

Long Term Asset Allocation Targets (Health Insurance Trust)

Asset Class	Asset Allocation
Large Cap U.S. Equity	35.4%
Small Cap U.S. Equity	2.6%
Developed International Equity	15.0%
Emerging Markets Equity	5.0%
Fixed Income	9.0%
High Yield Bonds	12.5%
Other Additional Categories	4.5%
Real Estate	6.5%
Private Equity	8.5%
Cash	1.0%

Long Term Asset Allocation Targets (Life Insurance Trust)

Asset Class	Asset Allocation
Large Cap U.S. Equity	32.0%
Small Cap U.S. Equity	8.0%
Developed International Equity	15.0%
Emerging Markets Equity	5.0%
Fixed Income	21.0%
High Yield Bonds	3.3%
Other Additional Categories	1.7%
Real Estate	7.0%
Private Equity	5.0%
Cash	2.0%

Appendix C – Social Security Administration Wage Index

Year	Wage Index	Annual Increase	Year	Wage Index	Annual Increase
1962	$4,291.40		1992	22,935.42	5.15%
1963	4,396.64	2.45%	1993	23,132.67	0.86
1964	4,576.32	4.09	1994	23,753.53	2.68
1965	4,658.72	1.80	1995	24,705.66	4.01
1966	4,938.36	6.00	1996	25,913.90	4.89
1967	5,213.44	5.57	1997	27,426.00	5.84
1968	5,571.76	6.87	1998	28,861.44	5.23
1969	5,893.76	5.78	1999	30,469.84	5.57
1970	6,186.24	4.96	2000	32,154.82	5.53
1971	6,497.08	5.02	2001	32,921.92	2.39
1972	7,133.80	9.80	2002	33,252.09	1.00
1973	7,580.16	6.26	2003	34,064.95	2.44
1974	8,030.76	5.94	2004	35,648.55	4.65
1975	8,630.92	7.47	2005	36,952.94	3.66
1976	9,226.48	6.90	2006	38,651.41	4.60
1977	9,779.44	5.99	2007	40,405.48	4.54
1978	10,556.03	7.94	2008	41,334.97	2.30
1979	11,479.46	8.75	2009	40,711.61	(1.50)
1980	12,513.46	9.01	2010	41,673.83	2.36
1981	13,773.10	10.07	2011	42,979.61	3.13
1982	14,531.34	5.51	2012	44,321.67	3.12
1983	15,239.24	4.87	2013	44,888.16	1.28
1984	16,135.07	5.88	2014	46,481.52	3.55
1985	16,822.51	4.26	2015	48,098.63	3.48
1986	17,321.82	2.97	2016	48,642.15	1.13
1987	18,426.51	6.38	2017	50,321.89	3.45
1988	19,334.04	4.93	2018	52,145.80	3.62
1989	20,099.55	3.96	2019	54,099.99	3.75
1990	21,027.98	4.62	2020	55,628.60	2.83
1991	21,811.60	3.73	2021	60,575.07	8.89