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**ACTUARIAL REVIEW REPORT ON THE
2019 INVESTIGATION OF EXPERIENCE
FOR THE
LOS ANGELES COUNTY EMPLOYEES
RETIREMENT ASSOCIATION**

Prepared by Cavanaugh Macdonald Consulting, LLC

January 30, 2020





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January 30, 2020

Mr. Richard Bendall
Chief Audit Executive
Los Angeles County Employees Retirement Association
300 North Lake Avenue, Suite 840
Pasadena, California 91101

Dear Mr. Bendall:

Cavanaugh Macdonald Consulting, LLC has performed an independent review of the 2019 Investigation of Experience for Retirement Benefit Assumptions, prepared for the Los Angeles County Employees Retirement Association (LACERA). As an independent reviewing or auditing actuary, we have provided our professional opinion on the reasonableness and appropriateness of the actuarial assumptions and actuarial cost methods recommended in the report and offered comments on possible ways to improve the process in future experience investigations.

The retained actuary for LACERA is Milliman, Inc. and we would like to thank them for their cooperation and assistance in providing the required information to us. **We find the proposed actuarial assumptions and methods to be reasonable. The Investigation of Experience was performed by qualified actuaries and was performed in accordance with the principles and practices prescribed by the Actuarial Standards Board.** This report documents the detailed results of our review.

If you need anything else, please do not hesitate to give us a call. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Sincerely,

Brent A. Banister, Ph.D., FSA, EA, MAAA, FCA
Chief Actuary

Patrice A. Beckham, FSA, FCA, MAAA, EA
Principal and Consulting Actuary



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1. EXECUTIVE SUMMARY

LACERA engaged Cavanaugh Macdonald Consulting, LLC (CMC) to prepare an independent review of the 2019 Investigation of Experience for the Retirement Benefits Assumptions Report prepared by Milliman for LACERA. The scope of the actuarial review requested by LACERA includes an independent verification of the results and evaluation of any recommendations in the Report, the preparation of a report containing CMC's findings and conclusions from the actuarial review, and a presentation of any findings to the Board of Investment.

The process of setting actuarial assumptions brings together a blend of both numerical analysis and professional judgment. An experience study is not simply a mathematical exercise, but also draws on the experience and insight of the professionals conducting the study. While our review included confirming certain data tabulations supporting the results in Milliman's report, we wish to stress that we have also examined the bigger picture to determine if an assumption, or recommended change, is appropriate. We consider whether there are other ways to form an assumption, whether an assumption may be simplified, and whether or not the assumption reflects trends that we have observed in other plans. The fact that we might prefer an alternate approach does not automatically mean that Milliman's approach is not reasonable. Rather, we offer some of these thoughts as a consideration for future studies, fully aware that there are multiple ways in which to appropriately model a dynamic retirement program like LACERA.

Overall, we find Milliman's work to be accurate and complete, and we have not identified any material findings.

We summarize our findings for each major review task as follows:

1. Review of Data Used in the 2019 Experience Study

The actuarial review of the 2019 Investigation of Experience for Retirement Benefit Assumptions Report is based on the experience study data that Milliman provided. We requested and received from Milliman the full valuation data files for the 2016, 2017, 2018, and 2019 valuations. These files allowed us to replicate certain portions of Milliman's work with regards to the analysis of demographic assumptions. In our opinion, the data used is sufficient for the purposes of the experience study, appears consistent with previous Retirement Plan valuations and, therefore, appropriately reflects the active and inactive membership of LACERA during the three-year period ending on June 30, 2019.

2. Review the Proposed Economic and Demographic Assumptions Contained in the 2019 Investigation of Experience for Retirement Benefits Assumptions Report

We find the work prepared by Milliman—reviewed within the scope of this assignment—to be based on reasonable processes, to be technically sound, and to be fairly presented. Milliman's work related to LACERA's experience, selecting assumptions, and presenting the associated results is based on generally accepted actuarial practices and principles. Relevant details for each assumption reviewed are provided in Section 3 of our Report.



1. EXECUTIVE SUMMARY

3. Present Any Recommendations to the Board of Investments Regarding the Work Completed by Milliman

We believe that the actuarial assumptions recommended by Milliman are reasonable and appropriate for use in the upcoming actuarial valuation for LACERA. We have no findings of material discrepancies with generally accepted actuarial principles or professional standards. In Section 4, we provide some minor considerations and recommendations for future studies.

Milliman proposes changes to most of the assumptions in its experience study. We would classify many of these as typical on-going and fine-tuning changes. We believe that all of the proposed changes are reasonable and appropriate. Our findings and recommendations are summarized as follows:

- The most significant of the proposed changes is the investment return assumption. Milliman provides two sets of other economic assumptions that each are consistent with their recommendation of 6.75% for the investment return assumption. The key difference in these two sets is the underlying inflation assumption which affects the other economic assumptions. While 6.75% is a reasonable assumption, Milliman notes that there is a broader range that could be acceptable. We comment on this further in our report.
- We suggest that Milliman consider the use of separate assumptions for Los Angeles inflation (for wage growth and COLA) and national inflation (for the investment assumption), especially if the Board is considering adopting a 2.50% national inflation assumption.
- Milliman's analysis of the total investment return assumption is a reasonable method, but we would suggest that they consider directly developing an assumption for the real rate of return to make the analysis of total return more transparent. This would also allow the inflation and real return assumptions to be decoupled.

Conclusions

Because of the complexity of actuarial work, we would not expect our opinions regarding the selection of assumptions and methods to be the same as the opinions of Milliman. We do expect, however, that there would be sufficient explanation of their choices that we can acknowledge that they are reasonable based upon the relevant factors. In our opinion, the assumptions and methods proposed by Milliman are reflective of sound professional judgement and are appropriate for the systematic funding of the pension obligations of LACERA.

We have determined that the actuarial methods, assumptions, processes, and the report are consistent with the applicable Actuarial Standards of Practice. Throughout this report, we have noted a few minor items for consideration that we believe may present opportunities for improvement, but none that we believe would have a material impact on the proposed assumptions.



1. EXECUTIVE SUMMARY

The remainder of this report provides the basis for our findings and recommendations for each assumption that appears in the 2019 Investigation of Experience for Retirement Benefits Assumptions Report and our conclusions.

We would like to thank LACERA's staff for their responsiveness in providing the items and information that we requested during the course of our review. Additionally, we would also like to thank Milliman for their cooperation and assistance in providing the requested information, and answering our questions.



2. ACTUARIAL ASSUMPTIONS

BACKGROUND ON ACTUARIAL ASSUMPTIONS

The actuarial assumptions form the basis of any actuarial valuation or cost study. Since it is not possible to know in advance how each member's career will evolve in terms of salary growth, future service and cause of termination, the actuary must develop assumptions in an attempt to estimate future patterns. These assumptions enable the actuary to estimate the amount of benefits earned and to reasonably anticipate when and how long these benefits will be paid. Similarly, the actuary must make an assumption about future investment earnings of the trust fund. In developing the assumptions, the actuary examines the past experience, but more heavily considers future expectations to make the best estimate of the anticipated experience under the plan.

There are two general types of actuarial assumptions:

- Economic assumptions – these include the investment return assumption (expected return on plan assets), assumed rates of salary increase, price inflation, wage inflation, and increases in total covered payroll. The selection of economic assumptions should conform to ASOP No. 27 *“Selection of Economic Assumptions for Measuring Pension Obligations”*.
- Demographic assumptions – these include the assumed rates of retirement, mortality, termination, and disability. The selection of demographic assumptions should conform to ASOP No. 35 *“Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations”*.

The discussion on the actuarial assumptions on the following pages is based on the data and recommendations found in Milliman's 2019 Investigation of Experience for Retirement Benefit Assumptions report.



2. ACTUARIAL ASSUMPTIONS

ECONOMIC ASSUMPTIONS

Actuarial Standards of Practice (ASOPs) are issued by the Actuarial Standards Board to provide guidance to actuaries with respect to certain aspects of performing their work. As mentioned earlier, ASOP 27 is the actuarial standard that addresses the selection of or recommendations regarding economic assumptions for measuring pension obligations (liabilities) under defined benefit plans. There are two particular items from ASOP 27 that we believe are relevant to the discussion in our report: 1) For a given assumption, there is a range of possible choices, and 2) An assumption may be made with a degree of conservatism, when appropriate and disclosed.

Milliman has proposed two alternate sets of recommended assumptions for the Board of Investments to consider. The current and recommended sets of economic assumptions are:

	Current	Milliman Recommendations	
	Assumption	Alternative 1	Alternative 2
Price inflation	2.75%	2.75%	2.50%
Real wage growth	<u>0.50%</u>	<u>0.50%</u>	<u>0.50%</u>
Total wage growth	3.25%	3.25%	3.00%
Payroll Growth	3.25%	3.25%	3.00%
Price inflation	2.75%	2.75%	2.50%
Real rate of return	<u>4.50%</u>	<u>4.00%</u>	<u>4.25%</u>
Investment return	7.25%	6.75%	6.75%
Cost-of-Living Adjustment			
Plan A	2.75%	2.75%	2.50%
All others	2.00%	2.00%	2.00%

Each assumption is briefly discussed in the following narrative.

Price Inflation: Price inflation impacts the rates of future salary increase, the payroll growth assumption, and the investment return assumption, so the underlying price inflation component in each must be consistent in accordance with the guidance provided in ASOP 27. In addition, because the retirees receive a cost-of-living adjustment (COLA) linked to changes in the CPI-U, the inflation assumption also impacts the COLA assumption.

Inflation has varied significantly over time, with some notably high periods in the 1970's influencing the long-term average. Over more recent periods, inflation has been consistently below the long-term average, and the financial markets' pricing of inflation (comparing Treasuries and TIPS) suggests that the market expects the trend to continue for the next 30 years. However, these results may be partially driven by the actions of the Federal Reserve Bank and, therefore, may not be indicative of the long-term estimation that actuaries need for their work.



2. ACTUARIAL ASSUMPTIONS

While there can be arguments made for assuming inflation will remain low for a very long period of time, we note that inflation is not random. It can be significantly affected by monetary and fiscal policy, and those policies may change dramatically and rapidly. Consequently, there are also some strong arguments for assuming that inflation could increase from the current level at some point in the future.

Milliman provides supporting documentation for their recommendation to either lower the inflation assumption from 2.75% to 2.50% or to leave it unchanged. We note that the recent trend among public retirement systems has been to lower this assumption, with most selecting an assumption in the range of 2.25% to 2.75%. LACERA bases their COLA on the Los Angeles area CPI, which has tended to be higher than the national CPI over the recent past. Wages are also likely to be affected by the local economy. This leads us to believe that either of the two options recommended by Milliman are reasonable, with the set of assumptions using a 2.75% inflation assumption providing some degree of conservatism, while the 2.50% assumption may be closer to what is expected nationally.

General Wage Growth: The general wage growth or wage inflation assumption consists of price inflation and real wage growth (also called productivity). These increases are affected by a variety of factors including price inflation, the policies and financial state of the employer, and the nature and extent of competition for employees in the relevant labor markets. Over time, however, the impact of wage increases in the broader economy will have a strong influence as workers and competing employers respond to market forces.

Milliman considers several relevant sources in their analysis of this assumption including:

- (1) the National Average Wage Index (published by the Social Security Administration),
- (2) the assumption used by the Social Security Administration in their 75-year projections, and
- (3) actual LACERA data.

Based on these sources, Milliman recommends retaining the current 0.50% real wage growth assumption. While we do not find this assumption unreasonable, we would note that over the last 30 years – following the high inflation period of the 70’s and early 80’s – the real wage growth in the general economy has been higher than the 50-year average of 0.50% that Milliman cites. We also realize that the National Average Wage Index does not perfectly track wage inflation, although it is a reasonable proxy.

Public-sector employees have also lagged the increases across the broader economy in more recent years, at least when the costs of benefits are excluded. Another source to consider is the State and Local Government Workers Employment Cost Index, produced by the Bureau of Labor Statistics. It provides evidence that real “across the board” salary increases have averaged about 0.2% annually during the last 10 to 20 years. Total compensation (with benefits) have increased at a real rate of about 0.8% over that same period. Whether these trends will continue or there will be a correction is an open question.



2. ACTUARIAL ASSUMPTIONS

We believe that Milliman’s recommended assumption of 0.50% for real wage increase is reasonable. However, long term historical data shows that real wage increases are generally higher in periods of lower price inflation and vice versa. Therefore, it might be appropriate to use a higher real wage increase assumption if a lower price inflation assumption, such as 2.50%, is selected.

In Milliman’s analysis of merit salary increases, there is a persistent merit increase of around 0.25% for service after 30 years. Typically, there is very little, if any, merit increase after 30 years. One could argue that this increase is more appropriately classified as part of the general wage increase rather than merit, although Milliman believes it truly is part of the merit salary increase. If it were considered part of the general wage increase, the real wage increase could be set at 0.75% and the merit scale reduced by 0.25%, resulting in an unchanged total salary increase assumption. In our opinion, Milliman’s choice of 0.50% real wage growth is reasonable, although we would also be comfortable with an assumption of 0.75%, potentially accompanied by an offsetting reduction of 0.25% in the merit salary increase assumption.

Milliman also uses the general wage growth assumption as the basis for their recommended payroll increase assumption. The payroll growth assumption is used in the amortization of the Unfunded Actuarial Accrued Liability (UAAL) and is appropriate for developing costs that are reasonably stable as a percentage of payroll. Using the general wage inflation to estimate future payroll growth has been a common practice amongst public plan practitioners for many years, but we would point out that some retirement systems are choosing to amortizing the UAAL with an assumed payroll growth that is lower than the wage inflation assumption or even setting the assumption equal to the expected growth in the revenue of the sponsoring organization.

One consideration in setting a lower assumption has been that as older employees retire, new employees are being hired with lower salaries. In theory, there are internal promotions to fill the vacated positions, but this expected payroll growth has not always been realized, especially given the high proportion of baby boomers still in the work force. Because the youngest baby boomers are 55-years old, this potential impact may be around for a while although LACERA’s experience may vary from that of other public plans. We are not opposed to Milliman’s choice of using the wage inflation assumption as the payroll increase assumption, but we could also be comfortable with an assumption that was between price inflation and wage inflation.

Investment Return Assumption: In our opinion, the investment return assumption should represent the long-term compound rate of return expected on the plan assets, considering the asset allocation, the real rate of return on each asset class, and the underlying inflation rate, all net of expenses paid from the Trust.

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 will result in lower expected investment returns, at least in the long run.

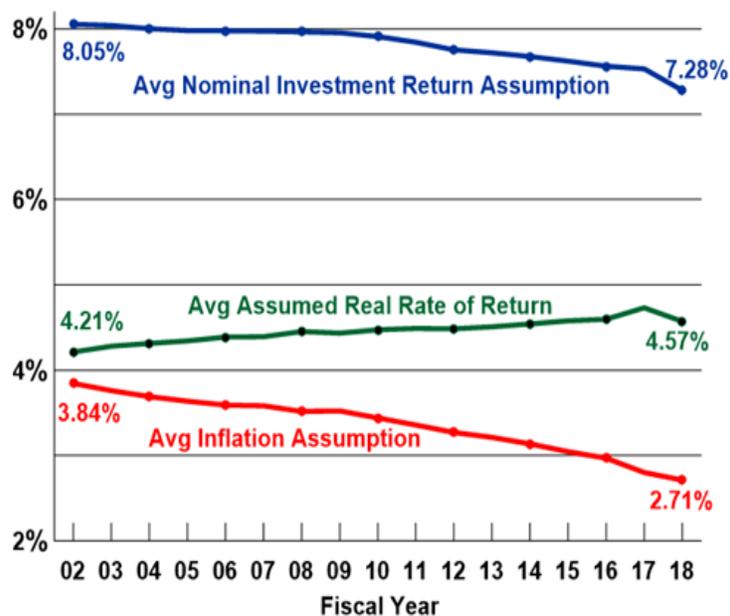


2. ACTUARIAL ASSUMPTIONS

The period considered for pension funding represents a very long time horizon. In reviewing this assumption, the actuary should consider asset allocation policy, historical returns, and expectations of future returns. Frequently, asset advisors focus on no more than the next 5 to 10 years since they are most concerned with how to invest the funds currently to maximize returns. The longer term is less relevant to them, but it is, of course, paramount to actuaries who are projecting benefits to be paid for the next 50 to 100 years. This difference in perspective can significantly influence how investment advisors and actuaries derive an investment return assumption.

Our preferred approach to setting the investment return assumption is called the “building block” approach. This approach develops a “real” return, or the return net of inflation, and then adds it to the inflation assumption. One advantage of this approach is that it assures that the total or “nominal” return is consistent with the inflation assumption, since it is determined as the sum of the price inflation assumption and the real rate of return. A second advantage is that it is helpful when comparing various sources of expected returns by eliminating any differences related to price inflation expectations as a source of variation in the nominal return assumptions. While we find this approach helpful, we also acknowledge that there are other reasonable approaches that may be used and are compliant with actuarial standards of practice.

This approach of looking at the real return can also be helpful in understanding broader trends as well. For instance, the following graph from the NASRA Public Fund Survey shows that across the universe of large public retirement systems, the reduction in the investment return assumption since the turn of the century has been largely a function of declining inflation assumptions. In fact, the real return assumption has actually increased over this time period. This does not mean that the real return for a given asset class has necessarily increased, since there are likely changes in asset allocation involved as well. In our opinion, separating the real return from the nominal return can be useful in developing the investment return assumption.





2. ACTUARIAL ASSUMPTIONS

In Milliman’s analysis of the expected return, they considered three sets of capital market assumptions regarding future expected returns. They also considered the general trend observed with respect to the investment return assumptions used by other large public systems, but primarily relied on the expected future return arising from these capital market assumptions. We believe their approach is appropriate as the asset allocations and risk perspective of each board influences the investment return used by the system, so the median return assumption would not necessarily be an appropriate basis to use in setting LACERA’s assumption. The three sources of capital market assumptions are:

- (1) Meketa, LACERA’s investment advisor,
- (2) Milliman’s internal investment experts, and
- (3) the 2019 Horizon Actuarial Services survey which reviews the assumptions of over 30 investment consulting firms (including Meketa) who work with defined benefit plans, providing a median return for each common asset class.

As was noted earlier, most investment advisors focus on a shorter timeframe than actuaries because they are using the assumptions for a different purpose. For instance, the 2019 Horizon survey included 34 advisors with capital market assumptions for the next 10-year period, but only 13 advisors with assumptions for periods of 20 years or more. Milliman’s discussion states they have given consideration to both the 10-year and 20-year time horizons, which we believe to be appropriate. As Milliman notes, LACERA is a mature retirement plan. One consequence is that annual benefit payments exceed annual contributions, so the difference must be made up from investment income. For LACERA, this shortfall is currently about 2% of the total trust fund, an amount that could likely be covered by income cash flows such as interest payments and stock dividends, rather than by selling assets. However, this net negative outflow means that the expected lower returns over the next ten years will diminish the corpus of the trust over this period so a comparatively lower trust fund balance will exist when the higher returns are earned. This will limit the ability of the higher returns on the LACERA trust fund in the long term to offset the impact of the lower returns in the next ten years, so we agree that it is appropriate to consider both the short and long horizons, as Milliman has done.

Milliman’s analysis, using our standard building block analysis, may be summarized as follows:

	Meketa	Milliman	Horizon
<u>Based on 10-Year Assumptions</u>			
- Expected Total Return	6.8%	6.3%	6.6%
- Expected Inflation	2.1%	2.3%	2.2%
- Expected Real Return	4.7%	4.0%	4.4%
<u>Based on 20-Year Assumptions</u>			
- Expected Total Return	7.5%	6.4%	7.3%
- Expected Inflation	2.6%	2.3%	2.3%
- Expected Real Return	4.9%	4.1%	5.0%



2. ACTUARIAL ASSUMPTIONS

Comparing the real rates of return illustrates the magnitude of differences in the expected return for the portfolio, absent inflation, of each source. Milliman's expected real return is considerably lower than both Meketa and the Horizon Survey in the short term and the long term. Based on conversations with Milliman, we understand that since the publication of these rates, Meketa has stated that they believe the nominal rates of return, based on current market conditions, would be around 0.50% lower. This reduction brings Meketa closer to Milliman's expected return, particularly over the next ten years. With that adjustment for Meketa, they are both noticeably lower than the Horizon average, likely because the survey data was collected based on capital market assumptions earlier in 2019 so there is a timing lag. We would point out that the range of views held by investment consultants is fairly broad, but we do not believe Milliman and Meketa are inappropriately low in their estimates. To the extent that these firms are trusted advisors of LACERA, it is reasonable for the Board to assign more credibility to their professional judgment, even if their expected returns are lower than estimates by other advisors.

Milliman does not directly develop a recommended real return, but rather recommends a nominal return of 6.75%. Because they propose two possible inflation assumptions with the same nominal return, this effectively creates two sets of economic assumptions:

- 1) Inflation of 2.50% and real return of 4.25%
- 2) Inflation of 2.75% and real return of 4.00%

We believe the same logic could lead to an alternative assumption of 2.50% inflation and 4.00% real return for a 6.50% nominal return, or yet another alternative assumption of 2.75% inflation and 4.25% real return for a 7.00% nominal return. If the Board ultimately selects the 2.50% inflation assumption, we would suggest consideration be given to using an assumption of 2.75% for purposes of developing the wage and COLA assumptions that reflects the Los Angeles area inflation.

In summary, there is a range of reasonable assumptions for the investment return assumption, and we believe the recommended assumption of 6.75% falls within that range. Other reasonable approaches could lead to different recommendations of which some might be lower than 6.75% and some might be higher. We believe it is certainly reasonable to choose a rate that is slightly lower to improve the likelihood of actual return reaching or exceeding that rate, and thereby reducing the likelihood of actuarial losses that will require additional funding.

Use of Investment Return Assumption for GASB Discount Rate: The investment return assumption used in the funding valuation is net of both investment and administrative expenses. GASB requires the use of an assumption regarding the expected return on assets that is net of investment expenses, but not administrative expenses. Administrative expenses are directly modeled in the projection of the Fiduciary Net Position for purposes of determining whether there is a depletion date of the plan assets in the future (called the crossover test). This test determines whether the assumption for the expected return on assets may be used for the GASB discount rate.

As part of the experience investigation, Milliman reviewed the actual administrative expenses for the past 10 years and estimated that these expenses have averaged about 0.13% of the asset value.



2. ACTUARIAL ASSUMPTIONS

Consequently, their recommendation for GASB 67 and 68 reporting is to use an investment return assumption that is 0.13% higher than the investment return assumption used for funding purposes. This approach has been used in the past, and we believe it is reasonable and appropriate to continue its use.

COLA: Closely related to the price inflation assumption is the Cost-of-Living Adjustment (COLA) assumption. The actual COLAs granted to LACERA members are based upon the change in the CPI-U for the Los Angeles metropolitan area. By law, there are upper limits on the COLA that may be granted each year (varying by plan), but to the extent that inflation exceeds the actual COLA granted in any year, there is a “carry-over” which future COLAs may use in years when inflation is lower than the cap. If inflation is less than 0% for a year, the member benefit may be reduced, but not below the original benefit. In these situations, it is also anticipated that the carry-over would be utilized to offset the negative inflation adjustment and perhaps even provide a positive COLA as well. Based on the design of the COLA, we believe Milliman’s recommendation to set the COLA assumption equal to the price inflation assumption (up to the capped level) is an appropriate model.



2. ACTUARIAL ASSUMPTIONS

DEMOGRAPHIC ASSUMPTIONS

The major demographic assumptions used in the valuation process are the assumed rates of retirement, termination of employment (with or without a vested benefit), disability, and mortality (death before or after retirement). Other non-economic assumptions that are typically evaluated include salary merit increases, election of refunds in lieu of a deferred benefit, and family composition (where applicable for death and some disability benefits).

General Comments

The purpose of a study of demographic experience is to compare what actually happened to the individual members of LACERA during the study period (July 1, 2016 through June 30, 2019) with what was expected to happen based on the actuarial assumptions, using the results as an important tool to evaluate whether some adjustment to the current assumptions is necessary.

The basic steps performed by most actuaries include the following:

- First, the number of members changing membership status, called decrements, during the study is tabulated by age, duration, gender, group, and membership class as appropriate (active, retired, etc.).
- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposure, by the expected rates of decrement.
- Finally, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio), and is expressed as a percentage.

The A/E ratio is a key indicator as to the *overall fit* of actual experience to that expected based on the assumptions. While this metric is an important measurement, the fit of the assumption at each individual age or service duration is also critical because experience that is higher at certain ages/durations does not typically offset the impact of experience that is lower at other ages/durations. The fit of the actual experience to the assumption at each age or duration is important in order to more accurately value the liabilities (present value of future benefits). The A/E ratio also provides a good way to easily evaluate the impact of the recommended assumption in comparison to the current assumption to determine how much the assumption was adjusted.

For the most part, Milliman's analysis develops these A/E ratios with compensation-weighted exposures and decrements (for actives) or benefit-weighted exposures and decrements (for retirees) rather than using the counts of members. This means, for example, that the influence of the higher-paid members on retirement rates is greater than lower-paid members. Since the higher-paid (and usually longer service) group also has greater liability, this aligns the assumptions better with actual experience of the plan liabilities and should reduce the dollar amount of actuarial gains



2. ACTUARIAL ASSUMPTIONS

and losses from year to year. We are very supportive of this approach, as we use it in our own practice.

As part of our review of the demographic assumptions, Milliman provided us with the processed valuation data files for the 2016 through 2019 valuations. They also provided us with their detailed experience study results, including the number of exposures and observed decrements, broken down by LACERA plan, sex, and age or service as appropriate for each assumption. We used the valuation data files to replicate the exposure and decrement summary for active and retired members over the study period and matched the total number of decrements almost exactly. We also attempted to validate Milliman's results at each age or service data point. Due to rounding issues, we did not always match each cell exactly, but we were able to satisfy ourselves that Milliman's processing was performed with a sufficient degree of accuracy that the results are reliable for the assessment and development of actuarial assumptions.

In the following paragraphs, we make specific comments on the demographic assumptions.

Merit Salary Increases: In the economic assumptions section, we discussed Milliman's development of the general wage growth assumption. A second type of salary increase occurs at the individual level as a result of such things as promotion and longevity. Milliman examined these increases separately for General and Safety members, recognizing that the two groups have different patterns of salary increase through a typical member's career. They also studied the assumption as a function of years of service. We agree that these two factors are the most appropriate and commonly used approaches to model merit increases.

Total salaries are reported from year to year so, in order to isolate the merit component of the salary increases, Milliman compared the total salaries of each individual member in each consecutive year of employment, after removing the estimated general wage inflation observed in the actual LACERA data for each year. Based on our recommendation, Milliman has more fully described the details of this process in their report, including their methodology for identifying the general wage increase each year. We find this approach a reasonable way in which to isolate the salary increases due to merit and longevity.

For purposes of this analysis, Milliman used the last 15 years of actual salary increases. We note that this period is quite long and includes the recession of 2008 and subsequent recovery. From our perspective, a period that is too long may not be sensitive to recent changes or trends. For instance, with nearly all of the active membership being employed by the County, a change in the longevity compensation structure could quickly affect the merit scale but might not be easily detected with Milliman's longer time frame. We raised this issue with Milliman, but understand they prefer the use of the long period as they believe it provides a better estimate of long-term patterns. They also indicated that they did look at the most recent three years, even though that is not discussed in the report. We would suggest that in the next investigation of experience, Milliman comment on their analysis of both the long and short time periods to communicate that recent events and trends, as well as long-term patterns, are considered.



2. ACTUARIAL ASSUMPTIONS

Rates of Mortality: One of the most important demographic assumptions in the pension valuation is mortality because it projects how long benefit payments are expected to be made. The longer retirees live and receive benefits, the larger the liability of the system, thus increasing the contributions necessary to actuarially fund the system. In addition, if members live longer than anticipated by the assumption, the true cost of future benefit obligations will be understated and contributions will increase as the unfavorable experience unfolds. Because there are also death benefits payable for active members, it is also relevant to consider the patterns of death for active members, although this assumption has comparatively little impact on the valuation results due to the low probability of active member deaths.

In early 2019, the Society of Actuaries (SOA) published a new set of mortality tables (Pub-2010 Tables) that are based solely on the experience of public retirement systems rather than corporate pension plans (the source of data for past mortality tables published by the SOA). The new tables include mortality rates for active members, healthy retirees, disabled retirees, and beneficiaries of retirees, and also vary by membership type (general government, teachers, and public safety). They represent a significant improvement in the universe of mortality tables available to value public retirement systems. Although they have only recently been released, our experience indicates that these tables are, in general, a better fit to the mortality observed in public plans than prior tables that were available such as LACERA's current mortality assumption. Milliman used these new tables, with certain adjustments as appropriate, for their recommended mortality rates. We believe that Milliman's use of these tables is appropriate and reasonable.

In the past, mortality rates for those of retirement age have gradually declined each year. Because actuarial valuations are projecting many years into the future, it is reasonable to anticipate that mortality rates will continue to decline, so they will be lower in the future than they are now. In order to anticipate that improvement, Milliman uses an approach known as "generational mortality" in which the mortality rates at most ages are "improved" by a small amount each year in estimating an individual's future lifespan. The SOA publishes a projection scale each year which essentially grades recently observed mortality improvement into its long-term expected improvement over a short period of time. Milliman's assumption has been, and continues to be, a simplified version of the SOA-published mortality improvement scale that uses only the ultimate year of that projection scale. There is insufficient data from LACERA to statistically test this assumption, but we believe it is reasonable and have observed other systems using similar simplified mortality improvement assumptions.

Milliman uses separate mortality assumptions based on sex, membership type (General or Safety), and status (active, healthy retiree, and disabled retiree). For the most part, they use the corresponding table from the SOA Pub-2010 tables, scaled by a constant multiplier in some cases to achieve a better fit. For General disabled members, they blend the healthy and disabled retiree tables to achieve a table that more appropriately reflects LACERA experience. Overall, this approach to selecting mortality tables is a common actuarial practice. Further, they base their analysis on benefit-weighted amounts for retirees and compensation-weighted amounts for actives. This weighting is an appropriate way in which to reflect the observed patterns of mortality rates varying by benefits/compensation.



2. ACTUARIAL ASSUMPTIONS

While we do not disagree with Milliman's recommendations, we offer some considerations for the next investigation of experience. First, the SOA Pub-2010 Tables include beneficiary mortality tables. Milliman elected to use the General membership healthy retiree table for beneficiaries. This has been standard practice in the pension actuarial community and so we have no objection, but we would suggest Milliman consider the use of the Pub-2010 Beneficiary Table next time, recognizing that data to analyze beneficiary mortality may be limited.

Second, in our experience we have found that the quality of the fit of a mortality table can sometimes be improved by applying one scaling factor at younger ages and a different factor at older ages (with a blending around the transition age). We would suggest that Milliman consider whether or not such an approach might allow a better fit of the mortality assumption to observed experience across all ages. This approach is not as widely used in the pension actuarial profession, but for larger retirement systems, such as LACERA, may have some merit.

Rates of Retirement: Retirement is a decision that is usually planned by an individual at a time that is perceived as most beneficial from a personal and financial perspective. One significant factor is the interaction of the retirement eligibility provisions with the potential retirement date. Because the different LACERA retirement plans have different eligibility requirements and benefit provisions, it is not surprising that retirement behavior varies by plan. Milliman develops retirement rates for General plans A-C, plan D, plan E, and plan G, and for Safety plans A&B and plan C. The newer plans (General G and Safety C) do not have any meaningful retirement experience yet, and so the proposed rates are based on applying professional judgment to the experience observed in the other plans.

For each plan or group of plans, Milliman observed the actual and expected retirements, weighted by compensation, as described earlier. The assumption and analysis varies by age, a typical approach. In general, we believe that the proposed changes recommended by Milliman are an appropriate response to the observed retirement patterns.

In some plans, particularly in the public safety arena, the provisions for the availability and amount of benefits lead to patterns that are more influenced by years of service than age. If Milliman has not reviewed that potential correlation recently, we would suggest they consider including this analysis in their next investigation.

Rates of Termination: The termination of employment assumption is a service-based assumption which is the most commonly used format for other public retirement systems. Milliman examined General members and Safety members separately, which is reasonable given the different jobs and termination patterns of the two groups. General plan E is valued separately from plans D and G because experience has shown a different behavior by those who elected this option.

Milliman proposes some minor adjustments to some of the termination rates to improve the quality of the fit to actual experience. Their analysis considered compensation-weighting in the



2. ACTUARIAL ASSUMPTIONS

development of the A/E ratios, and we concur with that, even though it did not have a material effect on the analysis.

For General plans A-C, the termination assumption has no significant effect on estimating future obligations since there are few members left who are not currently retirement eligible. However, we would suggest that Milliman consider using the termination rates from the newer plans for General plans A-C because in calculating the normal cost, the Entry Age Normal cost method requires the use of retrospective termination rates. As these plan members retire, though, this becomes a less significant consideration.

Refund of Employee Contributions: In the valuation process, this assumption is applied to active members who are assumed to terminate employment after becoming vested. It anticipates the election of a refund of accumulated employee contributions by the member and the resulting forfeiture of any vested monthly benefit at retirement eligibility. As would be expected, the probability of electing a refund declines as service increases, and so Milliman studies this assumption as a function of service, with separate rates for General and Safety membership.

We find Milliman's analysis and proposed changes reasonable. There are some retirement systems where the valuation assumes that the decision of whether or not a refund is elected is based on which option is most valuable to the member, from the system's perspective (i.e., which has the higher present value). Such an approach is designed to value the worst case scenario to the system, regardless of how experience is expected to unfold. While we are not necessarily suggesting that Milliman change to this approach, we would suggest that in a future investigation they consider whether this alternate approach might be worth considering, particularly with active members covered by different plans and benefit provisions.

Rates of Disability: Disability is a relatively low occurrence event, and so the analysis of disability rates is generally challenging. Lack of data creates results with limited credibility. Milliman has considered disability separately for males and females and for General and Safety members, which is a very common and appropriate approach. (Because General plan E has no disability provision, those members are excluded.) Disability may be either service-connected or not-service-connected, so an analysis of both rates was conducted. For Safety members, all but one of over 430 observed disabilities was service-connected, so for practical purposes, the service-connection distinction is relevant only for the General membership.

In general, we believe that Milliman's analysis and proposed adjustments to the disability rates are reasonable and appropriate. Because of the limited number of disabilities, some of the graphs exhibit patterns that are hard to interpret with the results from the A/E ratios. Milliman may want to consider ways to present these results that would help resolve this, but we also recognize that the sparse nature of actual disablements will often lead to odd graphical representations.

The 2016 Investigation of Experience was audited by Segal. One of their comments related to the manner in which Milliman collected the data for the disability study and how that approach essentially discarded one of the three years of data. Based on discussions with Milliman, they used



2. ACTUARIAL ASSUMPTIONS

a different approach in evaluating the disability experience in the current study, so the data used now draws from all three years. We believe this was an appropriate improvement in response to Segal's comment.

Other Assumptions: There are some miscellaneous assumptions that were addressed in the experience study report. For the most part, these assumptions do not have a major impact on the valuation results, and we believe the recommendations are all reasonable. The assumptions include:

- Probability of retiring with an eligible survivor
- Beneficiary age
- Deferred vested member retirement age
- Reciprocity employment rates for deferred vested members



3. ACTUARIAL METHODS

ACTUARIAL COST METHOD

For all retirement plans, whether defined benefit or defined contribution, the basic retirement funding equation is:

$$C + I = B + E$$

Where:

- C = employer and member contributions
- I = investment income
- B = benefits paid
- E = expenses paid from the fund, if any.

As can be seen from the formula, for a given level of benefits and expenses the greater “I” is, the smaller “C” is. This is the underlying reason for advance funding a pension plan, and historically investment income pays for 65% to 75% of the benefit dollars received by plan members. In other words, for every dollar paid to a member only 25 to 35 cents comes from contributions. To determine what pattern of contributions is needed, plan sponsors hire actuaries to estimate the cost of their plans and to create a budget for systematic contributions to meet that cost.

Different actuarial cost methods can provide for more rapid funding, more level funding over time, or more flexibility in funding. The choice of an actuarial cost method will determine the pattern or pace of the funding and, therefore, should be linked to the long-term financing objectives of the system and benefit security considerations.

The actuarial cost method used by LACERA is the Entry Age Normal method. This cost method determines the normal cost as a level percentage of pay which, if paid from entry into the plan to the last assumed retirement age, will accumulate to an amount sufficient to pay the expected benefit payments. Entry Age Normal tends to result in stable normal cost rates, a feature that has helped make it the most commonly used cost method for public plans. An additional cost is determined by amortizing the unfunded actuarial accrued liability (discussed later in this section).

In our opinion, the actuarial cost method employed by the LACERA is appropriate and will systematically fund the prospective pension benefits on an actuarially sound basis, if all of the actuarial assumptions are realized and the actuarial required contributions are made.



3. ACTUARIAL METHODS

ASSET VALUATION METHOD

Since the purpose of actuarial funding is to build up an asset pool (remember the importance of “I” in “ $C + I = B + E$ ”) actuaries need to value the current asset pool on each valuation date. The market value could be used, but it would tend to create too much volatility from valuation date to valuation date, and a single day’s measurement is not necessarily indicative of the true underlying value of the investments held by the plan. Thus, most actuaries use an asset valuation method which smoothes out these fluctuations in pursuit of achieving more stable funding measures and (when relevant) developing more level contributions. A good asset valuation method places values on a plan’s assets which are related to current market value, but which will also produce a smooth pattern of costs.

The goal of the actuarial asset valuation method is thus to smooth or reduce investment market fluctuations. This is particularly important during periods of volatile capital markets in which abrupt changes in asset values, when factored into the funding valuation, produce sudden unnecessary changes in contribution levels. In this case, “unnecessary” implies that the change in asset values is not necessarily a true revaluing of the assets involved, but rather a fluctuation reflecting a current economic climate or a short-term reaction to specific news.

LACERA Asset Valuation Method: The asset valuation method used by Milliman in the valuation is a variant of methods commonly used by other public sector retirement systems. The smoothing method finds the difference between the actual investment return and the expected investment return on the market value of assets. The dollar amount of this difference is then recognized equally over five years. This is the most common asset valuation method used by public systems.

Compliance with ASOP 44

Actuarial Standard of Practice Number 44, “*Selection and Use of Asset Valuation Methods for Pension Valuations*”, provides guidance to the actuary when selecting an asset valuation method for purposes of a defined benefit pension plan actuarial valuation. Several of the terms in the criteria of ASOP 44 such as “reasonable” and “sufficiently narrow” are not well defined. As a result, actuaries can differ in their opinion on these matters. As we consider the current asset valuation method used by LACERA in light of ASOP 44, we believe it satisfies these requirements.

We find LACERA’s asset valuation method to be reasonable and appropriate and compliant with ASOP 44.



3. ACTUARIAL METHODS

AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY METHOD

Currently, the unfunded actuarial accrued liability is amortized using a layered base approach. Following the establishment of the initial UAAL base, each year gains or losses arising from asset and demographic experience are amortized over a new 30-year period with payments that are determined as a level percentage of payroll. Milliman proposes that future amortization bases be amortized over 20 years.

The layered amortization approach has rapidly become the most common amortization method used by public retirement systems, and we believe this method is reasonable for amortizing LACERA's UAAL. It is also worth noting that, as LACERA does, most public retirement systems develop UAAL payments that are intended to be level, as a percentage of payroll, in the future. This general amortization methodology is very mainstream.

However, it is worth noting that the amortization periods have generally become shorter over the last five to ten years based on guidance from organizations such as the Conference of Consulting Actuaries (CCA), Society of Actuaries (SOA), California Actuary Advisory Panel (CAAP), and the Government Finance Officers' Association (GFOA). For most systems, the amortization periods for newly established amortization bases is in the range of 20 to 25 years. Therefore, we agree with Milliman that the current 30-year amortization of new layers is longer than desirable. Their recommendation is to move to 20 years which provides a reasonable balance between stability in contributions and moving the system toward being 100% funded.

Milliman also recommends the possible consolidation and re-amortization over 22 years of the existing amortization bases with more than 22 years remaining. We are comfortable with the proposed plan to eliminate the longer existing bases, but we also believe that it would be appropriate to continue to pay the bases down over their original period. The ultimate decision is dependent on which contribution pattern, and resulting funding progress, is most acceptable to the Board.



SECTION 4 – INVESTIGATION OF EXPERIENCE REPORT REVIEW

GENERAL OBSERVATIONS

Because of the diversity of public retirement systems and their actuaries, along with the scope and frequency of experience studies, the reports are also very diverse, ranging from extensive formal reports with many charts and tables to a simple slide presentation. Actuarial Standards of Practice provide only minimal guidance on the contents of these reports, so much of the report depends upon the style and preference of both the actuary and the retirement system. Milliman's report is on the more complete end of the spectrum, including some degree of numerical detail and graphical illustration along with narrative explanation.

In offering the following ideas, we are by no means suggesting that these are necessary or that the current report is inadequate. Rather, we are sharing some ideas from our years of experience that we believe might be useful to LACERA and Milliman. Ultimately, they will decide if any of these ideas are worth pursuing in future studies.

At the end of the report, Milliman includes an appendix that contains the proposed assumptions, with the assumption changes highlighted. While this approach makes it very easy to identify which rates were changed, it is not clear how they have changed. As an alternative, they could consider an additional appendix which includes the current assumptions, allowing an easy way to compare not only what rates were changed, but how they were changed.

Generally, Milliman has presented graphs with quinquennial grouped data. This has the advantage of smoothing out some of the variability that exists without the grouping, but it may also make the shape of assumption and its fit at each age/duration harder to observe, particularly for an assumption like retiree mortality which ranges from low rates to high rates. It might be worth considering whether some of the graphs would better communicate the results if they were not grouped.

Another idea for improvement would be to provide tables to show the exposure, actual decrements, expected decrements and proposed decrements, and resulting A/E ratios for each key assumption. Viewing the data graphically does not tell the reader which rates are based on more underlying data and, therefore, are more credible. In our opinion, including tables with the details of the underlying calculation of the results would improve the technical aspect of the report.

REVIEW OF PRIOR AUDIT

Segal Consulting prepared an audit report of the 2016 Milliman Investigation of Experience which included the following suggestions for future experience studies:

- (1) For the investment return assumption, review the methodology regarding the treatment of investment expenses in conjunction with ASOP 27.
- (2) For the real wage growth assumption, consider increases in this assumption if future recommendation are made to decrease the price inflation assumption.



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- (3) For the merit and promotional salary assumption, consider increasing the rates that apply for all members below 10 years of service and the ultimate rate that applies after 15 years of service for Safety member as recent experience shows that an increase may be justified.
- (4) For the service retirement assumption, consider extending the analysis shown in the report to include General members retiring at ages 44 to 49 and 70 to 75. In addition, consider eliminating retirement rates below age 45 from the General Plans as they are not needed and reducing the General Plan G retirement rates below age 55 to reflect significant differences between the Plan G benefit formula as compared to Plan D.
- (5) For the retirement age assumption for deferred vested members, consider using one assumed retirement age for Safety Plan A and B.
- (6) For the post-retirement mortality rates, consider using the two-dimensional improvement scale in the generational projection together with using a more recent projection scale that reflects more recent mortality improvement experience.
- (7) For the disability retirement rates, consider using the data from the third year of the previous investigation period along with the first two years' data from the current investigation period.
- (8) For the assumption the for percentage of members assumed to work for a reciprocal employer, consider obtaining data on what percentage of terminated members went on to work for a reciprocal employer during both the investigation period and also for the entire current terminated member population. This may further validate this assumption, which is based on experience for members retiring from deferred status during the investigation period. In addition, the assumption for future salary increases for reciprocal terminated members should be discussed in the body of the report.

We reviewed Milliman's current report to ensure that all of Segal's comments in the current experience investigation were addressed. Milliman has addressed most of Segal's suggestions, as outlined below:

- (1) Milliman reflected a 0.05% passive investment expense as part of the development of the investment return assumption.
- (2) Milliman's recommendation for the real wage growth assumption was 0.50% for both the alternative with price inflation at 2.75% and 2.50%. There is no discussion in their report to indicate they considered Segal's suggestion to increase the real wage growth assumption if price inflation is lowered.
- (3) Milliman made adjustments to the merit salary scale that are consistent with both the observed experience and Segal's recommendation.
- (4) It appears Segal's recommendation for extending the retirement rates to age 75 for General members was implemented in the last study. In the current study, Milliman considers how General plan G might differ from plan D in its development of retirement rates, reflecting Segal's suggestion.
- (5) In their report, Milliman explains that there are very few deferred vested Safety Plan A members so the assumption is deemed not to be material. Therefore, no change is recommended in the 2019 Study.



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- (6) In the current study, Milliman discusses the basis of their recommendation for continued use of the ultimate MP-2014 projection scale. Although it is not consistent with Segal's recommendation, Milliman has provided sufficient information to support their recommendation, in our opinion.
- (7) Based on Milliman's explanation of the change in their approach for analyzing disability experience, we believe Segal's concerns have been addressed.
- (8) It does not appear that Milliman addressed Segal's recommendations with respect to validating the assumption regarding the percentage of members assumed to work for reciprocal employers or the recommendation to discuss the assumption for future salary increases for these members in the body of the report.

SUMMARY OF CMC SUGGESTIONS FOR FUTURE INVESTIGATIONS OF EXPERIENCE

Throughout this report, we have identified several items that we believe could improve the next Investigation of Experience. We have summarized these items below for convenience:

- We suggest that Milliman consider the use of separate assumptions for Los Angeles inflation (for wage growth and COLA) and national inflation (for the investment assumption).
- For Milliman's analysis of actual wage inflation observed by LACERA, we would encourage them to consider how this analysis might be influenced by changes in workforce composition over the last 30 years.
- We recommend that Milliman and LACERA consider whether the amortization of the UAAL should be based on the wage inflation assumption, or if a lower rate might be more appropriate in case total wages grow slower than wage inflation. In fact, if County revenue growth reflects price inflation more than wage inflation, the use of a lower growth assumption for amortization could come closer to matching the amortization growth to revenue growth.
- Milliman's analysis of the total investment return assumption is a reasonable method, but we would suggest that they consider directly developing an assumption for the real rate of return to make the analysis of total return more transparent. This would also allow the inflation and real return assumptions to be decoupled.
- For the salary merit scale analysis, we suggest that Milliman comment on their analysis of periods shorter than 15 years. We do not object to also considering the longer-term analysis, but believe that solely relying on it will delay the detection of new patterns.
- We suggest that Milliman consider the use of the Society of Actuaries beneficiary tables rather than simply using the same tables as the members.
- We encourage Milliman to consider if the quality of fit of mortality tables could be improved by scaling the younger and older ages differently.
- We encourage Milliman to see if there are any discernible service-related patterns in regards to retirement rates that would provide an improved modeling of future experience.



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- We suggest using the termination rates for General plans A-C that include rates from current plans D and G members at lower service levels to better accommodate the Entry Age Normal cost method. We also note that the declining number of members in plans A-C will make this increasing less important.
- We recommend that Milliman consider whether the refund of member contributions assumption should be replaced by assuming members choose the most valuable option.
- We suggest that Milliman consider presenting both current and proposed rates in the appendices so that a reader can more easily see the magnitude of recommended changes.
- Where appropriate, we believe it could be useful if some of Milliman's graphs displayed age-by-age information rather than grouping the results quinquennially.
- When there are graphical results presented in the report, we think that there are opportunities for Milliman to enhance the report by including tables with supporting data that would assist more technical readers.