November 14, 2017

Item Name: Review of Actuarial Assumptions

Program: Actuarial Office

Item Type: Information

Executive Summary
In accordance with the Board's Actuarial Assumptions Policy, The Actuarial Office (ACTO) has completed its statutorily mandated investigation (experience study) of the actuarial assumptions. The assumptions reviewed include both the economic assumptions and the demographic assumptions. This agenda item contains the preliminary recommendation for new actuarial assumptions as well as a draft copy of the experience study report. The final recommendation for the adoption of new actuarial assumptions by the Board is currently scheduled to occur in December 2017.

One primary economic assumption, the rate of return on investments, cannot be determined until the Board selects an asset allocation. Depending on the asset allocation, costs for the pension plan could be materially different. Aside from the rate of return on investment, all other recommended assumptions are not expected to have a material impact on contribution rates; contribution rates would vary positively or negatively by a minor amount. If adopted, these proposed assumptions would become effective with the June 30, 2017 actuarial valuations. Contribution rates for the State and Schools plans would be impacted in the 2018-19 Fiscal Year. Public Agencies would be impacted in the 2019-20 Fiscal Year.

See Attachment 1 for a copy of the draft experience study report.

Strategic Plan
This agenda item supports the Strategic Plan Goal A - Improve long-term pension and health benefit sustainability. This item further supports the Strategic Plan by providing employers and other stakeholders with thorough, risk-based information about the expected course and variability of future contribution rates.

Background
An experience study is a summarization of actual experience over a defined period and, along with future expectations, is used in setting actuarial assumptions. Experience studies which include reviews of both economic and demographic assumptions are required every four years under the Board's Actuarial Assumptions Policy and Government Code §20133. The previous experience study was completed in 2014. Note that actuarial standards of practice require the actuary to evaluate whether assumptions are reasonable for every valuation, so some change in assumptions could be recommended in the intervening years between mandated experience studies.

Not all demographic assumptions have the same relative impact on the results of the actuarial valuations (and hence on employer contribution rates). In almost all cases, retirement benefits make up most of the liabilities of a retirement system such as CalPERS. Accordingly, assumptions that affect retirement benefits will have more of an impact than assumptions that only affect death, disability or termination benefits. Since retirement rates, salary increases and post-retirement mortality all affect the valuation of retirement benefits, these assumptions generally have a much greater impact on contribution rates than do other demographic assumptions.

Economic assumptions affect all benefits as well as the expected return on plan assets and tend to have a significant impact on contribution rates.

Analysis

Review of Economic Assumptions

Actuaries use certain economic assumptions to set a contribution schedule of employee and employer contributions designed to accumulate with interest to an amount sufficient to provide for all benefits expected to be paid to members and their beneficiaries. The economic assumptions used by the Actuarial Office to determine liabilities and set contribution rates are price inflation, wage inflation, payroll growth and the discount rate assumption.

The summary of the result of the review of economic assumptions is as follows:

- **Price Inflation Assumption:** Currently, the Board has approved an annual price inflation assumption of 2.75 percent which has been unchanged since 2012. Since the 2012 study, price inflation has consistently been under 2 percent per year. Going forward, market indicators today point to an expectation that future price inflation may be in the range of 2.00 to 2.50 percent per year. ACTO recommends that the inflation assumption be decreased from 2.75 to 2.50 percent per year. This would place the assumption closer to the levels expected in the financial markets and predicted by economic models.

- **Wage Inflation Assumption:** Currently, the real wage inflation assumption is 0.25 percent. Historical data shows that increases in total compensation have generally outpaced price inflation by close to one percent; however, increasing health care costs and pension contributions leave little room for wage increases. In the current economic environment, ACTO believes that low real wage inflation in the public sector is likely to continue in the near term and is not recommending a change in this assumption.

- **Payroll Growth Assumption:** The payroll growth assumption is used as the payment escalation rate when amortizing the unfunded liability of open plans as a level percentage of payroll in accordance with the current Board policy. The current assumption is that the aggregated payroll of open plans will grow at a rate of 3 percent per year. This equates to 2.75 percent for price inflation plus 0.25 percent for real wage inflation. Since ACTO is recommending the price inflation assumption be reduced to 2.50 percent per year, the recommendation is that the annual payroll growth assumption be reduced by 0.25 percent to 2.75 percent.

- **Discount Rate Assumption:** The primary economic assumption is the discount rate assumption. This is the sum of assumed price inflation and the expected long-term real rate of return. In December 2016, the Board acted to lower the discount rate from 7.50 percent to 7.00 percent (phased in over three years). For the State and Public Agency plans, the 2016 valuations were completed using a discount rate of 7.375 percent (2.75 percent inflation plus 4.625 percent real return) and are scheduled to use 7.25 percent for the 2017 valuations. The implementation of this phase in for school employers is one valuation year behind the State and Public Agency plans. The ultimate reduction to 7.00 percent is scheduled for the 2018 valuations, but the Board left open the possibility that the ALM process, which is in its final stages, could lead to an ultimate discount rate of something other than 7.00 percent.

  If the Board decides to remain with the current discount rate of 7.00%, ACTO recommends that the proposed change in the price inflation assumption be implemented in two steps in conjunction with the decreases in the discount rate. For the 2017 actuarial valuations, ACTO recommends the discount rate for the State and Public Agency plans be set at 7.25 percent (2.625 inflation plus 4.625 percent real return). For the 2018 State and Public Agency valuations, ACTO recommends a discount rate of 7.00 percent (2.50 inflation plus 4.50 percent real return). The phase in of the inflation rate for school employers will be one year behind the State and Public Agency plans.

  In the event the Board adopts a discount rate other than 7.00 percent, a different approach may be recommended.

Review of Demographic Assumptions

In addition to the economic assumptions, actuaries use several demographic assumptions to set the contribution schedule of employee and employer contributions. These demographic assumptions include mortality rates, retirement rates, disability rates (both work and non-work related), and rates of salary increases due to seniority and promotion.

After performing the review of demographic assumptions, ACTO recommends several changes to these assumptions. The new demographic assumptions being proposed would have predicted retirement, termination and mortality experience much closer to the actual experience than the current assumptions. The new assumptions should present an improvement at predicting long-term future experience than the current assumptions.

Life expectancies in the developed world are improving and this is consistent with the data in the experience study. ACTO believes that proper funding of the system requires the continued inclusion of mortality improvements in the mortality assumption. This is consistent with best practices and changing actuarial standards. The latest research, however, indicates lower levels of mortality improvement than previously assumed. This is consistent with the data observed in the experience study.

The summary of the result of the review of demographic assumptions is as follows:

- **Mortality:** The review of mortality rates has shown that members have approximately the same post-retirement life expectancy as currently assumed. ACTO is recommending using a 15-year mortality improvement projection using 90 percent of Scale MP 2016. The 15 years was determined to be the years of projection needed to approximate the liabilities determined for the system if it were to adopt a fully generational mortality assumption. Under the proposed assumptions, the life expectancy of males is decreasing on average by about 0.1 years and is remaining unchanged for females.

- **Retirement Probabilities:** The review of retirement rates has shown a continued trend of members electing to retire earlier in the State CHP and POFF plans. This was observed in the Public Agency Police 2% at 50 and 3% at 55 benefit formulas plans as well as Public Agency miscellaneous members subject to the 2% at 60 benefit formula. The review showed slightly later retirement age for most other members. No changes are being proposed for Public Agency fire members.

- **Salary scale:** The review showed a continuation of the trend of higher than expected salary increases for Public Agency safety members and CHP members. ACTO recommends minor changes for most other groups.

- **Disability Retirement:** The review of disability experience revealed a continued trend downward in the last four years. In most cases, the proposed rates produce lower numbers of disability. No changes in assumptions are being proposed for State Miscellaneous Tier 1 males, Public Agency Police or CPO.

- **Other assumptions:** Mixed results for other assumptions that have minimal overall impact on cost. These are described in detail in the experience study report.

See Attachment 1 for the draft Experience Study report detailing the development of all actuarial assumptions.

External Review of Experience Study

As in the prior experience study, an external actuarial audit has been performed. The final audit report will be presented in December.

Impact on Employer Contribution Rates

The estimated impact of the recommended assumption changes on the total employer contribution rate and the total normal cost are listed in Attachment 2.

Budget and Fiscal Impacts
The experience study and review of assumptions was prepared internally and will be reviewed externally. Funding was already identified within existing budgetary resources.

Benefits and Risks
Actuarial assumptions determine the expected costs of the plan. The actual long term costs of the plan will be revealed as the plan's experience is realized. Assumptions that align with future expectations are necessary if costs are to remain stable. Assumptions that are overly optimistic produce artificially low current costs but lead to significantly higher future costs. The opposite is true for assumptions that are overly pessimistic. The long-term relatively stable costs of the plan depend on actual benefits and expenses paid and actual investment earnings being realized.

By adopting the proposed assumptions, CalPERS ensures that the resulting contribution requirements reflect, to the extent possible, the true cost of the plan under the actuarial methodology and policies adopted by the Board.

Attachments
Attachment 1 – Experience Study
Attachment 2 – Impact on Contribution Rates
Attachment 3 – Review of Actuarial Assumptions Presentation

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