BUCK

California Public Employees' Retirement System

Parallel Valuation and Certification Report
Judges' Retirement System II Valuation

as of June 30, 2019

August 2020

110 West Berry Street
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August 1, 2020

Board of Administration
California Public Employees' Retirement System (CalPERS)
P.O. Box 942701
Sacramento, CA 94229-2701

Members of the Board:

As provided in Contract 2015-8123, we have reviewed valuations prepared by the CalPERS professional actuarial staff in order to certify that such work satisfies applicable standards of the actuarial profession. In the following pages, we report the results of our review of the June 30, 2019 annual actuarial valuation prepared for the Judges' Retirement System II (Judges' II).

We reviewed the assumptions, methods and procedures used by CalPERS staff to perform the Judges' Retirement System II valuation we examined, and in our opinion, they conform to applicable Actuarial Standards of Practice.

In addition, we completed a parallel actuarial valuation for the Judges' Retirement System II using the same assumptions and census, asset and benefit provision data that were used by CalPERS staff to prepare their June 30, 2019 valuation of the plan. We compared key results of our parallel valuations to those in the valuation report published by CalPERS.

Each actuarial organization has its own valuation model and applies actuarial assumptions and methods in its preferred way. There is rarely a single "right" answer when it comes to actuarial calculations. For a pension actuarial valuation, we consider one actuary's calculations to reasonably match another actuary's calculations when the present values (liabilities), normal cost contributions, and total employer contributions computed by the two actuaries are within 5% of each other.

For the Judges' Retirement System II, our computations of the contribution rates matched those prepared by CalPERS staff within 5%, which was the target tolerance level specified by CalPERS. Our analysis also included a comparison of present value of future benefits, accrued liabilities and normal costs, which also matched within the required 5% threshold. We view the differences between our calculations as immaterial.

Although not required by our contract, we also compared key valuation results for each individual participant (active members, transferred and terminated members, and retired members and beneficiaries) in the Judges' Retirement System II. This enhanced reconciliation process provides a deeper review of the calculations and may highlight differences in the handling of individual participants in the valuation process whose effects offset each other when results are aggregated at the level of the entire plan.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions, applicable law or regulations. An analysis of the potential range of such future differences is beyond the scope of this study.

This report was prepared for the Board and professional staff of CalPERS for their use in evaluating the preparation of actuarial valuations by the System. Use of this report for any other purpose or by other parties may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for other purposes. No one may make any representations or warranties based on any statements or conclusions contained in this report without the prior written consent of Buck.

This report was prepared under the supervision of David L. Driscoll, a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary, and Peer Reviewed by Kelly L. Adams, an Associate of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about it.

Respectfully submitted,

Buck Global, LLC (Buck)

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Schedules

Section I - Introduction

Under the California Constitution, the Board of Administration has plenary authority and fiduciary responsibility to provide for actuarial services. The CalPERS Chief Actuary advises the Board and directs the activities of the CalPERS professional actuarial staff. The Board also retains the services of an outside actuarial firm to review the work of the CalPERS professional actuarial staff and to certify that such work satisfies actuarial professional standards.

This report summarizes our review of the Judges' Retirement System II's actuarial valuation results as of June 30, 2019. We did not audit or review the final valuation data provided to us by CalPERS for this parallel valuation, as review of the data is explicitly excluded from the scope of this assignment.

We first reviewed the actuarial assumptions and methods used for the June 30, 2019 Judges' II valuation. Our review reflects the Actuarial Standards of Practice (ASOP) applicable to the selection of economic assumptions (ASOP 27) and the selection of demographic assumptions (ASOP 35). The results of our review are discussed in Section II.

Next, we completed parallel actuarial valuations for the Judges' Retirement System II in order to compare our key valuation results with those published in the valuation report prepared for the plan. CalPERS requested that we reconcile any differences of more than 5% between the two sets of valuation results. Section III contains a summary of our parallel valuation methodology. The results of our analysis are summarized in Section IV.

We have also reviewed the report for the Judges' Retirement System II in light of the most recent guidance incorporated in ASOP 4, the standard of practice for measuring pension obligations and determining pension plan costs or contributions. ASOP 4 was significantly updated in late 2013 for valuations made on or after December 31, 2014.

Finally, we reviewed compliance with ASOP 51, which applies to funding calculations such as those presented in the June 30, 2019 Judges' Retirement System II's valuation report and requires certain disclosures of potential risks. We found that the risks associated with this plan were thoroughly and appropriately addressed.

Section II - Review of Actuarial Assumptions and Methods

We have reviewed the actuarial assumptions and methods used in the Judges' II valuation. The key valuation assumptions include the following:

- Expected rate of return on investments, net of expenses: 6.50%
- Payroll growth: 2.75%. This is used for projecting payroll in developing amortization payment schedules.
- Salary increases: 2.75% per year
- Inflation: 2.50%
- Decrement assumptions including mortality, rates of termination and retirement: based on the most recent experience study adopted by the Board

Actuarial Standard of Practice (ASOP) 27 discusses the selection of economic assumptions for the measurement of pension liabilities. Similarly, ASOP 35 discusses the selection of demographic assumptions for the measurement of pension liabilities. In our opinion, the assumptions used in the Judges' II valuation are reasonable and the methodology used to select these assumptions is appropriate and consistent with the guidance provided in ASOP 27 and ASOP 35.

We have reviewed the assumed annual rate of return on plan assets of 6.50% using our own economic modeling tool and determined that it is a reasonable assumed long-term expected rate of return for the plan covered by this report. Note that the assumed rate of return is below that used in the valuation of other CalPERS plans. If this is due to the incorporation of a margin for adverse deviation, the disclosure requirement applicable to such a margin stated in Section 4.1.1 of ASOP 27 should be fulfilled.

Recommendation

1. **Add information to the report to meet communication requirements.**

   We note the following items may be considered for inclusion in future reports in order to more completely fulfill the requirements of ASOP 27 and ASOP 35.

   a.) In accordance with ASOP 27 Section 4.1.1 and ASOP 35 Section 4.1.1, a statement that all assumptions represent an estimate of future experience. We note that the descriptions of the mortality, inflation, salary increase, and payroll growth assumptions specifically refer to a separate experience study. It may be inferred that the requirement for these specific assumptions is met by the reference to the experience study. However, this is not the case for the other assumptions, for which the experience study is not referenced.

   b.) A description of the treatment of the Monetary Credit Account in the Actuarial Assumptions. In particular, participation and form of payment elections for the Monetary Credit Account benefit.

Section III – Parallel Actuarial Valuation Methodology

The steps followed in our parallel actuarial valuation are described below.

We requested a copy of the final June 30, 2019 valuation report for the Judges' Retirement System II, and completed the following steps:

1. We requested:
    a) The complete decrement tables used by CalPERS to prepare the valuation
    b) The final participant data used in generating the valuation report
    c) The key actuarial results presented in each valuation report (normal cost, actuarial accrued liability, present value of benefits, present value future salary, etc.) both in the aggregate and *on a per participant basis*.
2. Using the information provided in the valuation report and in 1(a) and 1(b) above, we produced a valuation for the plan using ProVal®, a commercially available valuation system used worldwide by actuaries and investment professionals. We generated the key actuarial results for comparison to results published in the actuarial valuation report.
3. In the reconciliation process, using the data provided in 1(c) above and the output from ProVal®, we compared the key results both on an aggregate basis and an individual basis. Reconciling results for individual participants as well as by plan may uncover multiple discrepancies that offset each other, producing aggregate results that fall within the 5% tolerance level. Valuation results that differ by less than 5% in total may camouflage systematic errors with respect to particular types of participants. Comparing results by participant helps us to identify the reasons for differences in aggregate result that exceed the 5% tolerance and to identify hidden material discrepancies for results that are within the tolerance as well. As part of this enhanced reconciliation process, we provide in Schedule C a frequency distribution of the percentage difference in key actuarial results by participant.
4. We have communicated preliminary results to CalPERS via email and telephone discussions.
5. In our Summary of Findings in the next section, we provide the following:
    - A recap of issues found in the actuarial review
    - A discussion of how issues were resolved
    - A description of any outstanding issues

Section IV - Summary of Findings

Schedule B summarizes the results for the Judges' Retirement System II.

In our parallel valuation and review, we compared present values of future pay, present values of future benefits, actuarial accrued liabilities, and total normal costs. We then used these key valuation results to compute and compare the total employer contribution rate. We are happy to report that our calculation of the employer contribution rate differed by less than 5% from the corresponding results reported by CalPERS.

Section V – Additional Comments and Recommendations

Our review has indicated that the actuarial process followed by CalPERS is thorough, complete, and complies with applicable Actuarial Standards of Practice.

In our parallel valuations and review, we compared total present values of future benefits, actuarial accrued liabilities, and total normal costs. We then used these key valuation results to compute and compare the total employer contribution rates. We are happy to report that for all plans all of our calculations for these key results differed by less than 5% from the corresponding results reported by CalPERS.

The table in Schedule B summarizes the comparison for this plan. This schedule indicates that we were able to closely replicate the present value of future benefits, in most cases within 0.5% of CalPERS' results. The attribution of this liability under the entry age method gave rise to a greater variance, particularly in the normal cost, which we consider a result of differences in valuation systems. No two valuation systems will produce identical results due to differing approaches to age- and service-rounding, adjustments for mid-year timing, consideration of monthly-vs.- annual payments, etc. These differences generally will not produce materially different results.

The following observations relate to evident differences in valuation system. These are not errors; they are simply differences of approach. These items do not have a material effect on overall liabilities but can give rise to significant percentage differences on an individual basis.

The chart in Schedule C shows that Buck's present value of future benefits (PVFB) calculation differed by more than 5% for approximately 3% of the population. This is due primarily to the treatment of individuals expected to retire on or after the maximum assumed retirement age. The maximum assumed retirement age is age 70 and since many individuals enter the plan at a relatively older age they may not be eligible to retire until age 70 or later. In those instances, CalPERS imputes one-half year of service in the year of retirement, whereas ProVal assumes retirement at beginning of year. Since those first eligible to retire on or after age 70 generally have fewer than 20 years of service, then that imputed one-half year of service can produce a benefit that is several percent different than the benefit ProVal computes,

In the CalPERS valuation, the present value of a participant's future benefits is based on his or her actual credited service amount as of the valuation date. However, the accrued liability and normal cost are determined using a theoretical service amount built by assumption from entry age. Generally, the theoretical service is at least as much as the actual, which tends to produce a lower accrued liability and a higher normal cost than if actual service were used. This difference in approach has an insignificant effect on the plan's funded status.

The only element of Schedule B that does not show a comparison between CalPERS' and Buck's results of less than 5% is the Unfunded Actuarial Liability Payment, which is the amortization component of the projected unfunded actuarial liability (UAL). Though the 74.3% difference may appear large percentagewise, it is not a sign of a significant difference. It simply is a consequence of small differences in large numbers viewed in isolation. The UAL according to the CalPERS report is about $10.8 million, compared to an actuarial accrued liability (AAL) of $1,725.9 million. Our replication shows that we are within 0.3% of AAL, or about $4.9 million higher. Adding $4.9 million to the UAL represents a 45% increase in the UAL, which then gets projected to year-end, amortized and converted to a percentage of payroll. In reality, the UAL amortization component is about 3% of the total contribution requirement, thus, has no significant impact on replicating the employer contribution rate.

Schedule A – Comparison of Active Member Data

Plan		Number of Actives	Average Age	Average Service	Average Pay
Judges' II	CalPERS	1,645	58.8	9.6	$208,669
	Buck	1,645	58.8	9.6	$208,791

Schedule B – Comparison of Key Valuation Results

Liabilities as of June 30, 2019	CalPERS	Buck	% Difference
Present Value of Benefits			
1. Active members	$ 2,135,630,591	$ 2,135,007,277	0.0%
2. Inactive members	46,708	46,708	0.0%
3. Members receiving benefits	377,732,136	377,908,059	0.1%
4. Total	2,513,409,435	2,512,962,043	-0.0%
Accrued Actuarial Liability			
1. Active members	$ 1,348,098,363	$ 1,352,784,801	0.4%
2. Inactive members	46,708	46,708	0.0%
3. Members receiving benefits	377,732,136	377,908,059	0.1%
4. Total	1,725,877,207	1,730,739,568	0.3%
Projected Normal Cost (Employer + Employee)	120,823,884	122,037,922	1.0%

Contribution as a % of Payroll	CalPERS	Buck	% Difference
Total Normal Cost	33.34%	33.68%	1.0%
Employee Contribution	(9.49%)	(9.35%)	-1.5%
Employer Normal Cost	23.85%	24.32%	2.0%
Unfunded Actuarial Liability Payment	0.55%	0.97%	74.3%
Required Employer Contribution Rate	24.40%	25.29%	3.6%

Schedule C – Comparison of Individual Participant Results

Present Value of Future Benefit Differences
(Members Valued: 1,910)

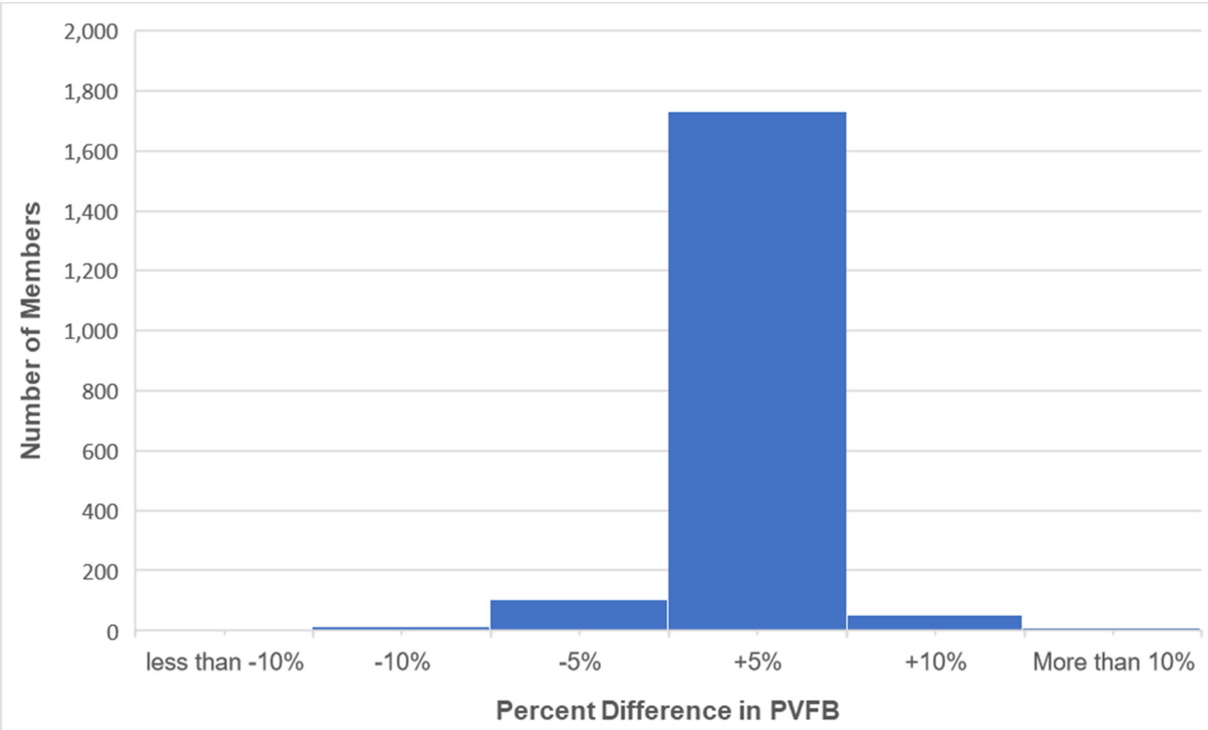

Chart Tabulation Method and Notation: The chart above reflects percent differences between Buck and CalPERS results, rounded to the nearest hundredth of a percent, where -5% reflects Buck results that were within the range from 0.00% to -4.99% compared to CalPERS results, where -10% reflects Buck results within -5.00% to -9.99% of CalPERS results, etc.

Schedule D – Previous Parallel Valuation and Certification Report Recommendations

Recommendations

Actuarial Standard of Practice 4 (ASOP 4), which provides guidance for measuring pension obligations and determining pension plan costs or contributions, was significantly revised in 2013 for measurements made as of dates on or after December 31, 2014. We have noted the following items that may be considered for inclusion in future reports in order to more completely fulfill the requirements of the current version of ASOP 4:

a) An enhanced description of the contribution allocation procedure, including a more detailed description of what the five-year ramp up and ramp-down in amortizations entail. (4.1(k) of ASOP 4).

Comment: This issue is no longer applicable.

b) A statement regarding the impact of the funding policy on future contributions and funded status; i.e., an explanation that the impact on funding associated with a current-year gain or loss will be increasing over the next five years before leveling out and the funded status will increase. This observation is similar to item (a) above but slightly different, as this is specifically addressed to the impact on future contributions and funded status. (4.1(m) of ASOP 4).

Comment: The report does not have a statement regarding the impact of the funding policy on future contributions and funded status.

c) In accordance with 4.1(s), more detail on the rationale for changes in assumptions than was present in the report we reviewed.

Comment: The June 30, 2019 valuation report has addressed this recommendation.