Defined Benefit Program of the California State Teachers' Retirement System

June 30, 2021 Actuarial Valuation

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Teachers’ Retirement Board
California State Teachers’ Retirement System

Re: **Defined Benefit Program Actuarial Valuation as of June 30, 2021**

Dear Members of the Board:

At your request, we have performed an actuarial valuation of the Defined Benefit (DB) Program of the State Teachers' Retirement Plan as of June 30, 2021. The major findings of the actuarial valuation are contained in the following report, which reflects the benefit provisions and contribution rates in effect as of the valuation date. This report satisfies all basic disclosure requirements under the Model Disclosure Elements for Actuarial Valuation Reports recommended by the California Actuarial Advisory Panel.

Actuarial Certification

To the best of our knowledge and belief, this report is complete and accurate and contains sufficient information to fairly disclose the funded condition of the DB Program as of June 30, 2021.

CalSTRS funding is based on complex legislation. This valuation contains analysis based on our understanding of the relevant law based on our experience working with CalSTRS and other large public retirement systems and has been augmented by consultation with CalSTRS staff.

In preparing this report, we relied, without audit, on information (oral and in writing) supplied by CalSTRS staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. In our examination of these data, we have found them to be reasonably consistent and comparable with data used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for CalSTRS have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of CalSTRS and reasonable expectations) and which, in combination, offer a reasonable estimate of anticipated CalSTRS experience. Further, in our opinion, each actuarial assumption used is reasonably related to the experience of CalSTRS and to reasonable expectations which, in combination, represent a reasonable estimate of anticipated experience. The valuation results were developed using models intended for valuations that use standard actuarial techniques.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Teachers' Retirement Board has sole authority to determine the actuarial assumptions and methods used for the valuation of the DB Program. The board adopted the actuarial methods and assumptions used in the 2021 valuation. The only changes from the 2020 valuation were changes to the valuation policy that include limiting decreases in the state supplemental contribution rate and removing a provision that could have resulted in an increase in the employer supplemental contribution rate if the state supplemental contribution rate was not sufficient.

Actuarial computations presented in this report are for purposes of assessing the funding levels of CalSTRS and calculating contribution rates under CalSTRS valuation policy. The calculations in the enclosed report have been made on a basis consistent with our understanding of CalSTRS funding structure. Determinations for other purposes, such as for financial reporting in accordance with GASB standards, may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

This valuation report is only an estimate of the System's financial condition as of a single date. It can neither predict the System's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of System benefits, only the timing of System contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

Milliman's work is prepared solely for the internal business use of CalSTRS. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third-party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions:

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(b) CalSTRS may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

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The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the *Code of Professional Conduct* and *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion* in the United States promulgated by the American Academy of Actuaries. We are members of the American Academy of Actuaries and meet its Qualification Standards to render the actuarial opinion contained herein.

We would like to express our appreciation to the CalSTRS staff who gave substantial assistance in supplying the data on which this report is based.

We respectfully submit the following report and we look forward to discussing it with you.

Sincerely,

Nick J. Collier, ASA, EA, MAAA
Consulting Actuary

Scott D. Preppernau, FSA, EA, MAAA
Consulting Actuary

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Table of Contents

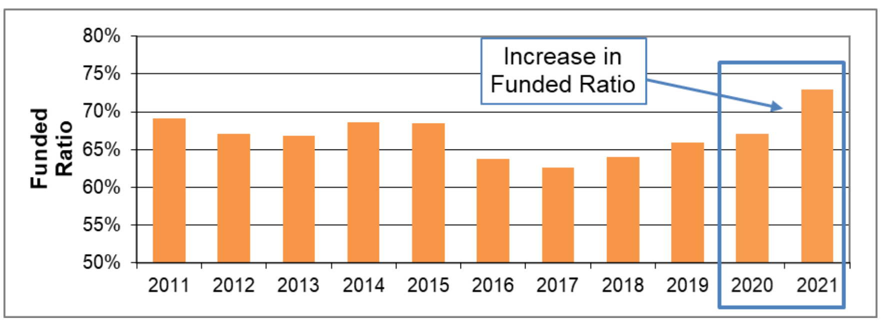
1. Summary of the Findings

The primary purpose of the actuarial valuation is to calculate the contribution rates for members, employers, and the state and to analyze the sufficiency of these future contributions to meet the current and future obligations of the Defined Benefit (DB) Program. By using the actuarial methods and assumptions adopted by the Teachers' Retirement Board (TRB), this actuarial valuation provides a reasonable estimate of the long-term financing of the DB Program. The assumptions and methods were adopted at the January 2020 TRB meeting, and there have been no changes to them since the last valuation. The board valuation policy was updated in February 2022 to include a limit on decreases in the state supplemental contribution rate. This change is reflected in this valuation.

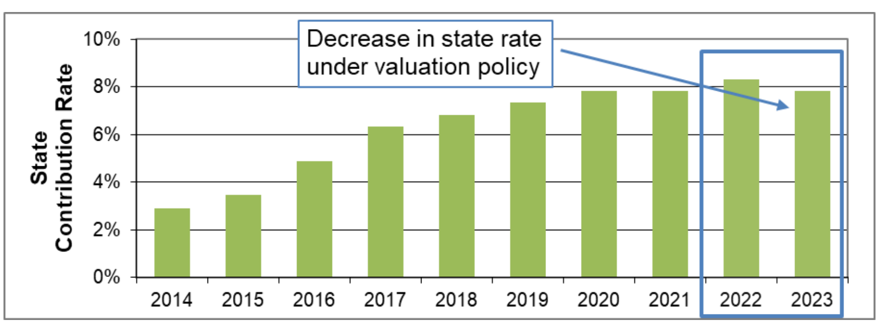
Under the board's valuation policy, a decrease to the state supplemental contribution rate and a decrease in the unadjusted employer supplemental contribution rate beginning July 2022 have been calculated. As discussed on the next page, because of a statutory offset in fiscal year 2021-22, the employers are currently paying less than the rate adopted by the board, and therefore the actual rate paid by employers is expected to increase next year. The contribution rates calculated in this valuation are based on the relevant provisions of the Education Code and the board's valuation policy and are not necessarily our opinion of what the funding level should be; however, we note that CalSTRS is projected to make progress toward paying off the Unfunded Actuarial Obligation (UAO).

The key findings of this actuarial valuation are:

- The **Funded Ratio** increased from 67.1% to 73.0% primarily due to an investment return greater than the assumed 7.0% in the prior fiscal year.

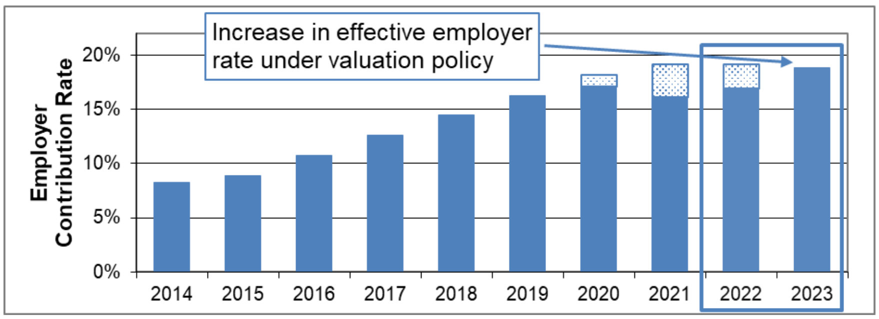


- A decrease in the **state supplemental contribution rate** of 0.500% of payroll to 5.811% of payroll (from 8.328% to 7.828% total state contribution rate excluding SBMA) has been calculated for the fiscal year beginning July 1, 2022 pursuant to the board's valuation policy. This decrease is limited to 0.500% under revisions to the valuation policy that are first effective with the 2021 valuation. The board has the authority to make no change in the rate, which would be reasonable given the significant amount of progress that still needs to be make for the DB Program to reach a 100% Funded Ratio.



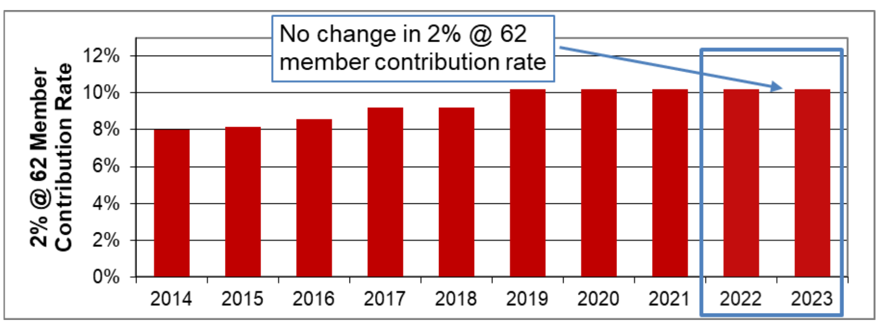
Note: The state contribution rate shown does not reflect SBMA contributions or additional lump-sum contributions made in excess of the required rate.

- A decrease in the calculated **employer supplemental contribution rate** from 10.850% to 10.563% of payroll has been calculated for the fiscal year beginning July 1, 2022 pursuant to the board's valuation policy. Under the Education Code, the Board has the discretion to adjust (or make no change to) the employer supplemental contribution rate up to 1.0% of payroll. As specified in Education Code §22950.6, for fiscal year 2021-22, employers are contributing to CalSTRS a rate that is 2.18% of payroll lower than the rate adopted by the board. As shown below and in the table on the next page, although the calculated employer contribution rate decreases, the total contribution rate actually paid by the employers will increase by 1.893% of payroll from the current 16.920% to 18.813% of payroll in fiscal year 2022-23 if the board elects to reduce employer supplemental contribution rate consistent with the valuation policy. It should be noted that the employer contribution rate is projected to increase over the next few years, so it would be reasonable for the board to maintain the current 10.850% supplemental contribution rate, which would result in an effective 2.180% increase in the rate actually paid.



Note: The solid bars reflect the rate actually paid by the employers. The lightly shaded areas reflect offsets that reduced the employer contribution rates adopted by the board, so the combined total is the rate adopted by the board.

- Based on this 2021 valuation, no change in the CalSTRS 2% at 62-member **contribution rate** is required for the fiscal year beginning July 1, 2022. The member contribution rate for 2% at 60 members is fixed in the Education Code, so no change is required for that group either.



In July of 2021, the state transferred $410 million in Proposition 2 revenues to CalSTRS for the 2021-22 fiscal year. In addition, the state is scheduled to make $174 million in quarterly contributions from the general fund to CalSTRS during the current fiscal year. These contributions are in addition to the statutorily required contributions. For purposes of the June 30, 2021 valuation results, we have not reflected these additional contributions made after the valuation date. However, we have reflected the combined $584 million in additional contributions for the 2021-22 fiscal year in the projection of future funding levels and contribution rates.

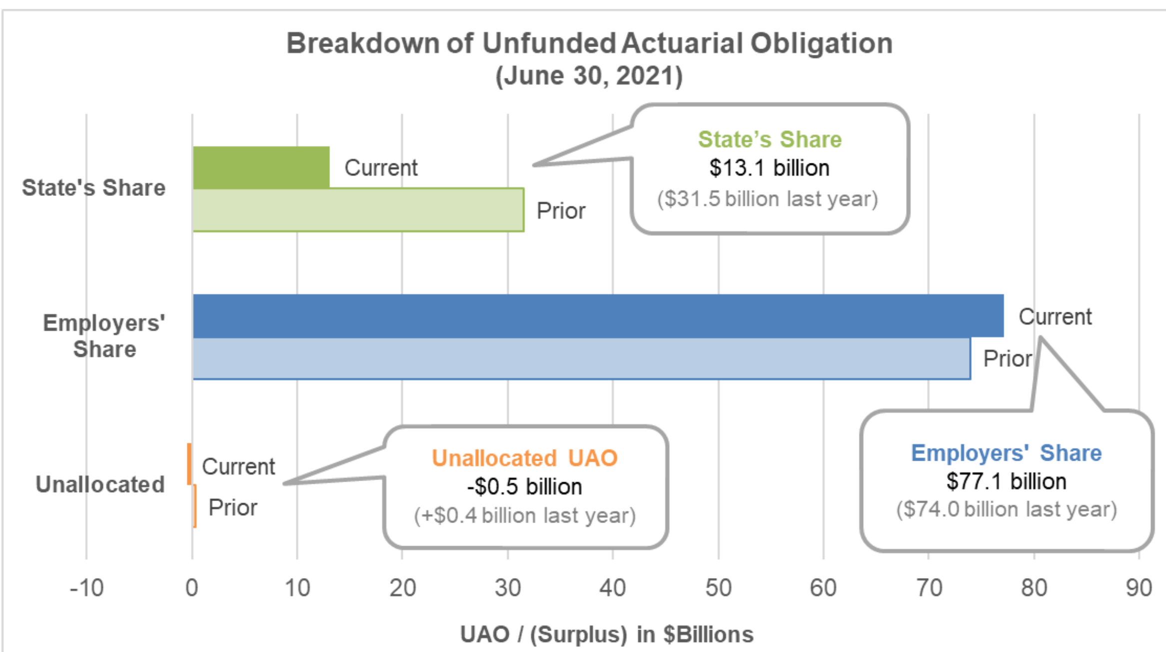
Funding Progress

The UAO of a retirement plan is equal to the difference between its Actuarial Value of Assets and its Actuarial Obligation, where the Actuarial Obligation is the value of all projected future benefit payments as of the valuation date based on service as of the valuation date. The Funded Ratio is equal to the Actuarial Value of Assets divided by the Actuarial Obligation.

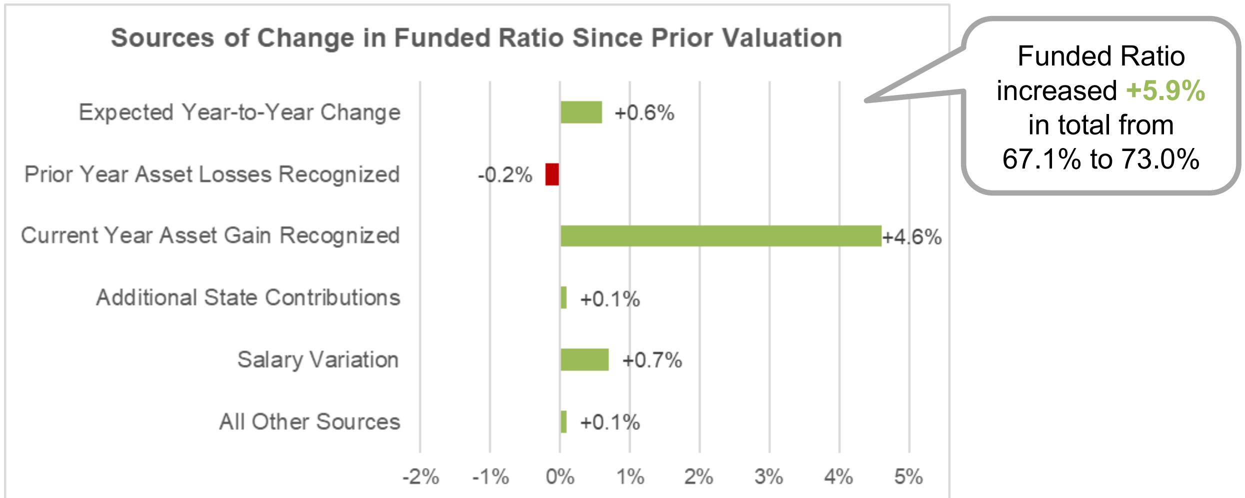
($ Millions)	2021 Valuation	2020 Valuation
Actuarial Obligation	$ 332,082	$ 322,127
Actuarial Value of Assets	242,363	216,252
Unfunded Actuarial Obligation	$ 89,719	$ 105,875
Funded Ratio	73.0%	67.1%

The $89.7 billion UAO compares to a projected June 30, 2021 value of $108.0 billion based on the prior valuation. The primary reasons for the increase in the Funded Ratio are a greater than expected investment return, salary increases less than assumed, additional state contributions, and contributions to pay down the UAO under the board's valuation policy. Additional discussion of the contributing factors to this change can be found in Section 5 under Actuarial Gains and Losses.

Under the CalSTRS funding plan, the $89.7 billion UAO can be viewed as split into three pieces: 1) the employers' share; 2) the state's share; and 3) the piece with no dedicated funding source, the unallocated piece, which is discussed in further detail later. This breakdown is shown in the following chart, with the employers' portion being approximately 86% of the total and the state's share 14% of the total, with the small residual piece not being allocated to either the employers or the state. Note that the Unallocated UAO is a negative amount as of June 30, 2021, so it is effectively a small surplus (assets exceed corresponding actuarial obligation).



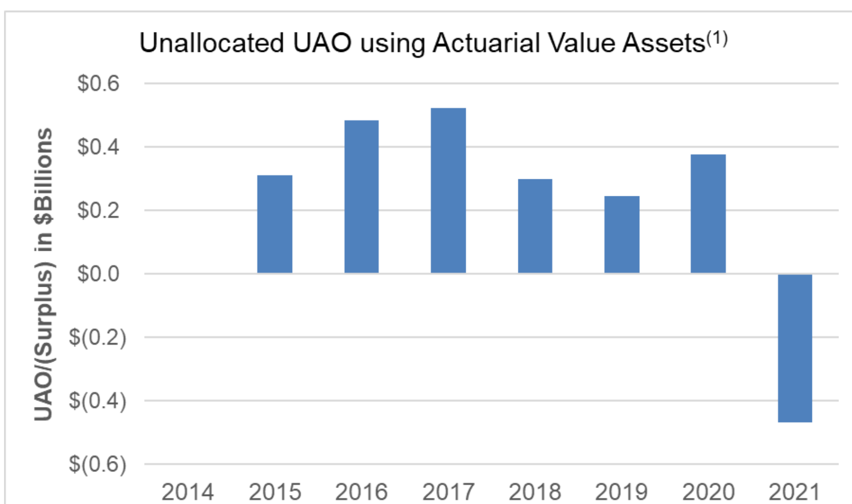
The chart below shows the factors that caused the 5.9% increase in the DB Program's Funded Ratio since the last valuation from 67.1% to 73.0%. As previously discussed, the primary reason for the increase in the Funded Ratio was the current year asset gain, with one-third of the gain being recognized in this valuation.



UAO for New Benefits, Post-2014 Service

The Education Code includes actuarial funding (within certain constraints) for most of the benefits provided by CalSTRS. The one exception is that there is no provision for the state, employers, or members to fund any UAO arising for New Benefits (i.e., those not included in the 1990 Benefit Structure) attributable to service after June 30, 2014. We will refer to this as the "Unallocated UAO." Under the valuation policy, a portion of each year's total contributions, equal to the Normal Cost of the New Benefits, is allocated to fund these benefits. Since the contribution is equal to the Normal Cost, there are no remaining contributions to pay down the Unallocated UAO, if any. Therefore, the Unallocated UAO will increase or decrease based on future experience.

The following table shows how the Unallocated UAO has evolved over time. The June 30, 2021 Unallocated UAO is a negative amount, so it is effectively a small surplus (assets exceed corresponding actuarial obligation).



1. The Unallocated UAO shown above is calculated using the actuarial value of assets. It is currently $(2,210) million based on the market value of assets.

There was a decrease in the Unallocated UAO from $377 million as of June 30, 2020 to a negative $469 million as of June 30, 2021. This type of decrease is not surprising given the leveraged nature of the calculation. As of June 30, 2021, the Unallocated UAO is small relative to the total UAO, as it only reflects service accrued for seven years. However, as members continue to accrue benefits for service after June 30, 2014, there is the potential for the Unallocated UAO to increase (or decrease) significantly if actual experience differs materially from that assumed or if further changes in assumptions occur. The primary cause of the decrease from last year is that the investment return was greater than the 7.0% assumption.

As previously discussed, there is currently no dedicated funding to pay off the Unallocated UAO. However, due to the strong returns from the prior year, the assets related to the Unallocated UAO exceed the related Actuarial Obligation, so no additional funding is currently needed, although this could change in the future.

Contribution Rates

The following table shows a summary of the contribution rates currently being paid (2021-22 fiscal year) and those calculated to be paid next year (2022-23 fiscal year) under the valuation policy. As previously noted, it would be reasonable for the board to maintain the current state and unreduced employer supplemental contribution rates given the significant Unfunded Actuarial Obligation that still exists and the future increases in the employer contribution rate currently projected.

Source of Revenue	2021 Valuation FY 22-23 Rate	2020 Valuation FY 21-22 Rate
Employers – Base Rate	8.000 %	8.000 %
Employers – Sick Leave	0.250	0.250
Employers – Supplemental Rate[1]	10.563	10.850
Employers – Total Calculated Rate	**18.813**	**19.100**
Reduction for Additional State Contribs[2]	0.000	(2.180)
Employers – Net Contribution Rate	**18.813**	**16.920**
State – Base Rate	2.017 %	2.017 %
State – Supplemental Rate[1]	5.811	6.311
State – Total DB Program	**7.828**	**8.328**
State – SBMA Rate[3]	2.500	2.500
State – Total Contribution to CalSTRS	**10.328**	**10.828**
Members – 2% at 60	10.250 %	10.250 %
Members – 2% at 62	10.205	10.205

1. Calculated based on valuation policy and subject to board adoption.

2. As specified in EC §22950.6.

3. The state contribution to fund the Supplemental Benefit Maintenance Account (SBMA) is reduced by $72 million each fiscal year.

The Education Code includes several subsections which provide for adjustments in contribution rates. EC §22955.1 specifies graded increases in the supplemental state contribution rates. The board has the authority to annually adjust the state contribution rate for years through June 30, 2046, so that the rate is sufficient to amortize the UAO attributable to the 1990 contribution and benefit structure. However, the maximum increase or decrease in a given year is limited to 0.5% of payroll under the valuation policy.

EC §22950.5 specifies the board has the authority to annually adjust the employer supplemental contribution rate based on the contribution rate necessary to amortize the UAO attributable to service prior to July 1, 2014 that is not funded by the state as part of the 1990 Benefit Structure. However, the maximum increase or decrease in a given year is limited to 1.0% of payroll and the total employer contribution rate cannot exceed 20.25% of payroll.

The 2% at 60-member rate is fixed at 10.250% of pay. The 2% at 62-member rate, currently 10.205% of pay, can vary depending on the calculated Normal Cost Rate as discussed later in this section.

Actuarially Determined Contribution

In general, an actuarially determined contribution is a target or recommended contribution to a defined benefit pension plan based on the plan's funding policy. For CalSTRS, the actuarially determined contribution rate is the calculated level contribution rate to fully fund the DB Program over a closed period ending June 30, 2046. For GASB 67 and 68 reporting, the actuarially determined contribution is the combined employer and state portion of that contribution and is therefore net of member contributions. For the fiscal year beginning July 1, 2022, the actuarially determined contribution rate for the DB Program is the level rate calculated in the June 30, 2021 actuarial valuation and is equal to 24.459% of payroll. The projected contribution rate for the 2022-23 fiscal year of 26.235% (combined state and employer) is about 107% of the actuarially determined contribution rate.

Normal Cost Rate for CalSTRS 2% at 62 Members

As part of the annual valuation process, the Normal Cost Rate is calculated for CalSTRS 2% at 62 members, generally those first hired on or after January 1, 2013. The Normal Cost Rate is used as the basis for setting the base member contribution rate for this group for the following fiscal year, the fiscal year beginning July 1, 2022, for this valuation. Generally, the base member contribution rate is one-half of the Normal Cost Rate, within certain parameters.

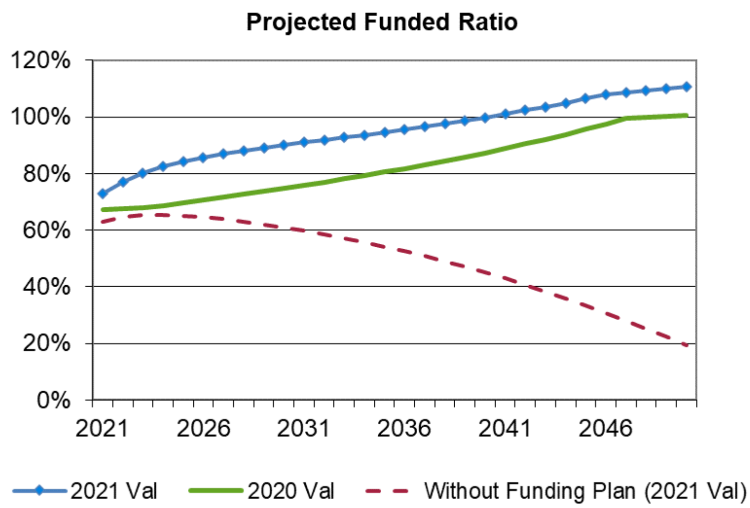
EC §22901(b)(1) requires the board to adopt the Normal Cost Rate that is used to determine the 2% at 62-member contribution rate. As of June 30, 2021, the Normal Cost Rate for the CalSTRS 2% at 62 members is 18.150%. We recommend the board adopt this rate. The Normal Cost Rate for the current valuation is a small increase of 0.064% from the prior valuation Normal Cost Rate of 18.086%, which represents typical year-to-year fluctuation.

EC §22901(b)(2) specifies that the CalSTRS 2% at 62 base member contribution rate does not change if the increase or decrease in the Normal Cost Rate for members is less than 1% of creditable compensation since the last adjustment. This year, the cumulative change is an increase in the Normal Cost Rate of 0.257%, from 17.893% (the time of the last adjustment) to 18.150% for this group. Therefore, the current base member contribution rate should remain at 9.00% for 2% at 62 members based on the relevant section of the Education Code.

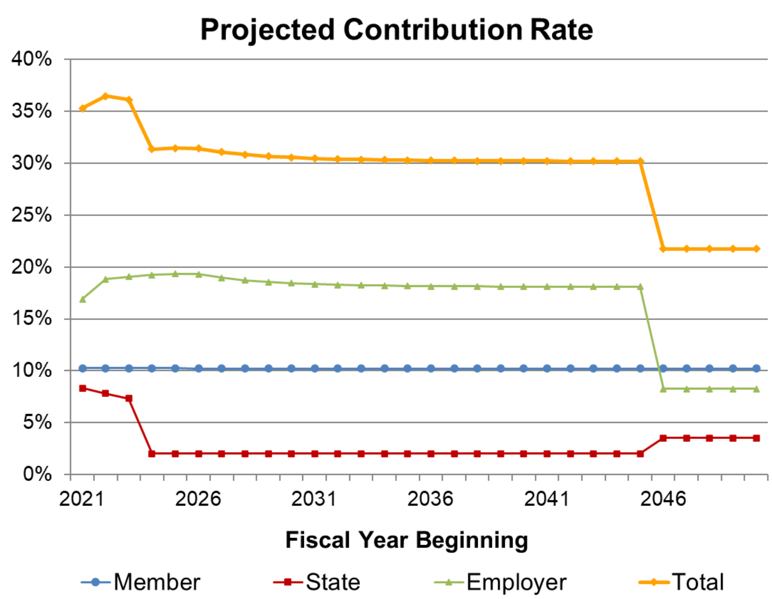
Note that under EC §22901.7(b) 1.205% of pay is added to the base member rate. Therefore, as of July 1, 2022, the total member contribution rate for 2% at 62 members continues to be 10.205% (9.00% plus the 1.205% additional contribution rate).

Looking Ahead

The following projection shows the Funded Ratio if the DB Program earns 7.00% in each future year and all other assumptions are met. As shown in the graph, the DB Program is projected to reach approximately 100% funding by 2041 based on the 2021 valuation (blue line). The Funded Ratio is greater than the 2020 valuation (green line) primarily due to the asset gain in the prior year. Note that we have also shown a hypothetical projection of the funded status based on the 2021 valuation but without the 2014 funding legislation (red line). See the end of this subsection for a summary of the assumptions on which these projections are based.



The following graph shows the projected contribution rates for each of the stakeholder groups, and in total, assuming all valuation assumptions are met in the future and the board exercises its rate-setting authority. Note that the actual contribution rates paid in the future will vary based on experience after the valuation date. The contribution rates shown include both the base and supplemental contribution rates, but do not reflect the state contribution to the Supplemental Benefit Maintenance Account (SBMA).



Asset gains and losses will generally have the largest year-to-year impact on the total contribution rates needed, although assumption changes can cause a significant change in the years in which they occur. Under the statute, as reflected in the valuation policy, the impact of asset gains and losses will tend to have a much more significant impact on the state contribution rate than the employer contribution rate. Therefore, the state contribution rate will tend to be more volatile than the employer contribution rate, as shown in the Section 10 as "Projections Under Alternate Return Scenarios".

The above projection calculations are based on the following assumptions:

- All experience subsequent to the valuation date is consistent with the valuation assumptions, as described in Appendix B.
- Future changes in the state and employer supplemental contribution rates will be consistent with the board's valuation policy. In particular, the state rate is based on funding the UAO by 2046, a year which is not defined in statute. Changes to the valuation policy that were adopted by the board in 2022 are reflected in this projection, including limiting decreases in the state supplemental contribution rate and removing a provision that could have resulted in an increase in the employer supplemental contribution rate if the state supplemental contribution rate was not sufficient.
- Current deferred asset gains and losses (currently a net deferred gain) are reflected in the future as they are expected to be recognized in the asset smoothing method.
- The projection assumes new members will have the same Normal Cost Rate as the current 2% at 62 members. The emerging Normal Cost Rate for the total plan will gradually decrease over time due to the lower benefits provided for 2% at 62 members.
- Additional state contributions of $584 million for fiscal year 2021-22 are reflected in the projections.

Future Variance

The results of any actuarial valuation are based on a set of assumptions. Although we believe the current DB Program assumptions provide a reasonable estimate of future expectations, it is almost certain that future experience will differ from the assumptions to some extent. We have provided a general discussion of the potential risks to CalSTRS funding in Section 10, as well as additional analysis on the potential impact of future investment returns on the Funded Ratio and contribution rates. A comprehensive analysis of potential risks to future DB Program funding levels ("Review of Funding Level and Risks") is completed each fall by CalSTRS internal actuarial staff.

Further Information

Details of our findings are included in later sections of this report. The appendices include supporting documentation on the benefit and eligibility provisions used to project future benefits, the actuarial methods and assumptions used to value the projected benefits, and the underlying census data provided by CalSTRS for this valuation.

Summary of Key Valuation Results

	2021 Valuation	2020 Valuation	Percent Change
1. Total Membership			
A. Active Members	429,681	448,419	(4.2) %
B. Inactive Members	230,770	213,056	8.3 %
C. Retired Members and Beneficiaries	320,413	314,518	1.9 %
D. Total Membership	980,864	975,993	0.5 %
2. Payroll as of Valuation Date (All Members)			
A. Annual Total *($Millions)*	$ 33,914	$ 33,811	0.3 %
B. Annual Average Earned Salary per Active Member	$ 78,928	$ 75,401	4.7 %
3. Average Annual Allowance Payable			
A. Service Retirement	$ 52,956	$ 51,852	2.1 %
4. Actuarial Obligation *($Millions)*			
A. Active Members	$ 144,057	$ 141,521	1.8 %
B. Inactive Members	8,427	7,338	14.8 %
C. Retired Members and Beneficiaries	179,339	172,994	3.7 %
D. Existing MPPP Unfunded Obligation	259	274	(5.5) %
E. Total	$ 332,082	$ 322,127	3.1 %
5. Value of System Assets *($Millions)*			
A. Fair Market Value	$ 292,980	$ 233,253	25.6 %
B. Deferred Investment (Gains) or Losses	(29,583)	2,124	
C. Actuarial Value	$ 263,397	$ 235,377	11.9 %
D. Ratio of Actuarial Value to Fair Value	90%	101%	
E. Less SBMA Reserve	(21,034)	(19,125)	10.0 %
F. Net Actuarial Value	$ 242,363	$ 216,252	12.1 %
6. Funded Status -- Actuarial Value Basis			
A. Unfunded Actuarial Obligation *($Millions)*	$ 89,719	$ 105,875	(15.3) %
B. Funded Ratio *(5F ÷ 4E)*	73.0%	67.1%	
7. Normal Cost Rates *(percent of salaries)*			
A. CalSTRS 2% at 60 Members	20.814%	20.833%	(0.1) %
B. CalSTRS 2% at 62 Members	18.150%	18.086%	0.4 %
C. All Members	20.227%	20.294%	(0.3) %
8. Next Fiscal Year Contribution Rates (percent of salaries)[(1)]			
A. 2% at 60 Members	10.250%	10.250%	- %
B. 2% at 62 Members	10.205%	10.205%	- %
C. State Supplemental Rate	5.811%	6.311%	(7.9) %
D. Employer Supplemental Rate[(2)]	10.563%	10.850%	(2.6) %
9. Funded Status -- Market Value Basis			
A. Unfunded Actuarial Obligation *($Millions) [4E - (5A + 5E)]*	$ 60,136	$ 107,999	(44.3) %
B. Alternate Funded Ratio (Based on Market Value of Assets)	81.9%	66.5%	

1. *Prior valuation rates are contribution rates actually being paid in fiscal year 2020-21, and current valuation rates are those calculated under the valuation policy which are subject to adoption and possible change by the board.*
2. *Prior to adjustments that reduce the actual contribution rate to be paid by employers for fiscal year 2021-22 by 2.18%.*

2. Scope of the Report

This report presents the actuarial valuation of the DB Program of the State Teachers' Retirement Plan as of June 30, 2021. A summary of the key results of this valuation is presented in the previous section. The remainder of this report is arranged as follows:

Section 3 describes the benefit obligations of CalSTRS, including the development of the Normal Cost and the Actuarial Obligation.

Section 4 outlines the Fair Market Value of Assets of the DB Program and the determination of the Actuarial Value of Assets as of June 30, 2021. All of the assets of the Program are available to finance future DB Program benefits and expenses, except those allocated for the Supplemental Benefit Maintenance Account (SBMA).

Section 5 shows the relationship between the Actuarial Value of Assets and the Actuarial Obligation, also called the Funded Ratio.

Section 6 discusses the calculations used to determine the state supplemental contribution rate in accordance with EC §22955.1(b). The key elements of this calculation pertain to an evaluation of the assets and obligations associated with the benefits in effect in 1990. An adjustment to the state supplemental rate is calculated based on this valuation and effective with the fiscal year beginning July 1, 2022.

Section 7 discusses the calculations used to determine the employer supplemental contribution rate in accordance with EC §22950.5. The key elements of this calculation are parallel to the funding valuation, except the assets and obligations are those associated with the benefits earned prior to July 1, 2014. An adjustment to the employer supplemental rate is calculated based on this valuation and effective with the fiscal year beginning July 1, 2022.

Section 8 discusses the calculation of the actuarially determined contribution.

Section 9 shows the projected UAO payment schedule and a comparison of the projected contributions and benefit payments for the DB Program.

Section 10 provides a general discussion of the potential risks to CalSTRS funding.

This report includes several appendices:

Appendix A is a summary of the current benefit structure, as determined by the provisions of governing law on June 30, 2021.

Appendix B is a summary of the actuarial methods and assumptions used to estimate actuarial obligations and the funding sufficiency.

In our opinion, the assumptions used in the valuation are reasonably related to the past experience of the DB Program, are internally consistent, and represent a reasonable estimate of future conditions affecting the DB Program. Nevertheless, the emerging costs of the DB Program will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions.

Appendix C includes schedules of valuation data classified by various categories of plan members. We relied upon the membership and beneficiary data supplied by CalSTRS. We compared the data for this and the prior valuation and tested for reasonableness. Based on these tests, we believe the data to be sufficient for the purposes of our calculations.

Appendix D is a glossary of actuarial terms used in this report.

3. Actuarial Obligation

In this section, the discussion will focus on the commitments of CalSTRS for retirement benefits, which are referred to as its Actuarial Obligation.

Normal Cost

The **Normal Cost** represents the cost assigned to an average member for a given year such that it would meet the continuing costs of a particular benefit if contributed each year starting with the date of membership. The Entry Age Normal Cost Method is designed to produce a Normal Cost that remains a level percentage of payroll (payroll is calculated as the sum of the expected creditable compensation for the active members) and is expressed as a rate of compensation. Normal Cost contributions are assumed to be contributed uniformly throughout the year.

The total DB Program Normal Cost Rate has decreased from 20.294% to 20.227% since the last valuation. This rate represents a blended average of the Normal Cost Rates for the 2% at 60 and 2% at 62 members. **Table 1** provides more details on the calculation of the Normal Cost and Normal Cost Rate.

In general, the Normal Cost Rate is expected to remain fairly stable as a percentage of payroll as long as the benefit provisions are not amended, the assumptions are not changed, membership experience emerges as assumed, and the demographic characteristics of the membership remain reasonably consistent. CalSTRS can expect modest decreases in the Normal Cost Rate as current members leave active employment and are replaced by new members with lower benefit levels. The Normal Cost Rate decreased since last year mainly due to the increasing membership of CalSTRS 2% at 62 members who have a lower overall Normal Cost Rate than the 2% at 60 members. We expect small decreases in the overall Normal Cost Rate to continue in future years if assumptions are unchanged.

Primarily because of different benefit formulas, the CalSTRS 2% at 60 members have higher Normal Cost Rates compared to the 2% at 62 members, as shown below for the fiscal year beginning July 1, 2021.

($ Millions)	2% at 60 Members	2% at 62 Members	Proportion 2% at 62
Projected Payroll	$26,434	$9,131	25.7%
Normal Cost $	5,502	1,657	23.1%
Normal Cost Rate	20.814%	18.150%	NA

Normal Cost Rate for CalSTRS 2% at 62 Members

As part of the annual valuation process, we determine the Normal Cost Rate for CalSTRS 2% at 62 members, generally those first hired on or after January 1, 2013. The Normal Cost Rate is used as the basis for setting the base member contribution rate for this group for the following fiscal year, the fiscal year beginning July 1, 2022 for this valuation. Generally, the base member contribution rate is one-half of the Normal Cost Rate within certain parameters.

EC §22901(b)(1) requires the board to adopt the Normal Cost Rate that is used to determine the 2% at 62-member contribution rate. As of June 30, 2021, the Normal Cost Rate for the CalSTRS 2% at 62 members is 18.150%. We recommend the board adopt the rate of 18.150%.

EC §22901(b)(2) specifies that the CalSTRS 2% at 62 base member contribution rate does not change if the increase or decrease in the Normal Cost Rate for members is less than 1% of creditable compensation since the last adjustment. This year, the cumulative change is an increase in the Normal Cost Rate of 0.257%, from 17.893% (the time of the last adjustment) to 18.150% for this group. Therefore, the current base member contribution rate should remain at 9.00% for 2% at 62 members based on the relevant section of the Education Code.

Note that increases under EC §22901.7(b) are added to the base member rate. Therefore, effective July 1, 2022, the calculated total member contribution rate for 2% at 62 members continues to be 10.205% (9.00% plus the 1.205% additional contribution rate).

Actuarial Obligation

The next step in the actuarial valuation process is to project all future DB Program benefit payments for current members and retirees. The level of benefits currently being paid is known, but assumptions are needed to estimate how long they will be paid, and the amount and timing of the payment of future benefits for active and inactive members who are not currently receiving payments. The summation of the discounted values of all projected benefit payments for all current members at the assumed rate of return is called the **Actuarial Present Value of Projected Benefits**.

Details are shown in **Table 2** and summarized below.

($ Millions)	2021 Valuation	2020 Valuation
Benefits Being Paid	$ 179,339	$ 172,994
Inactive Deferred Benefits	8,427	7,338
Active Member Benefits	226,402	224,198
Existing MPPP Unfunded Obligation	259	274
Present Value of Projected Benefits	$ 414,427	$ 404,804
Present Value of Future Normal Costs	82,345	82,677
Actuarial Obligation	$ 332,082	$ 322,127

The **Actuarial Present Value of Future Normal Costs** is the value of all remaining Normal Costs expected to be received over the future working lifetime of current active members. The **Actuarial Obligation** is the difference between the Actuarial Present Value of Projected Benefits and the Actuarial Present Value of Future Normal Costs. The Actuarial Obligation is equal to the assets that would exist if the current Normal Cost Rate had been paid for all members since entry into the Program, and if all experience had emerged as assumed.

Over time, 2% at 62 members will account for a larger portion of the Actuarial Obligation; however, as of this valuation, only 4.3% of the Actuarial Obligation for active members is for the 2% at 62 members.

($ Millions)	2% at 60 Members	2% at 62 Members	Proportion 2% at 62
Active PVB	$194,093	$32,309	14.3%
Active PVFNC	56,177	26,168	31.8%
Active AO	$137,916	$6,141	4.3%

Table 1
Normal Cost

($ Millions)	2021			2020
	2% at 60	2% at 62	Total	Total
Estimated Annual Earned Salaries [1]	$26,434	$7,515	$33,949	$33,808
Present Value of Future Normal Costs for Current Active Members	$56,177	$26,168	$82,345	$82,677
Present Value of Future Earned Salaries for Current Active Members	$271,225	$147,650	$418,875	$418,539
Normal Cost				
Service Retirement	$5,011	$1,215	$6,226	$6,224
Deferred Retirement & Refund	270	78	348	345
Death	33	9	42	43
Disability	189	62	251	249
Total Normal Cost	$5,503	$1,364	$6,867	$6,861
Normal Cost Rate Percent of Payroll				
Service Retirement	18.956 %	16.167 %	18.339 %	18.410 %
Deferred Retirement & Refund	1.018	1.038	1.025	1.020
Death	0.125	0.120	0.124	0.127
Disability	0.715	0.825	0.739	0.737
Total Normal Cost Rate	**20.814** %	**18.150** %	**20.227** %	**20.294** %

1. Annual payroll for active members on the valuation date, excluding active members over age 75 on the valuation date who are assumed to retire immediately and therefore do not generate a Normal Cost.

Table 2
Actuarial Obligation

($ Millions)	2021			2020
	2% at 60	2% at 62	Total	Total
Present Value of Projected Benefits to All Current Members				
Benefits Currently Being Paid				
Service Retirement	$ 166,151	$ 19	$ 166,170	$ 160,343
Disability	4,070	5	4,075	4,047
Survivors	9,094	-	9,094	8,604
Total	$ 179,315	$ 24	$ 179,339	$ 172,994
Benefits to Inactive Members	8,145	282	8,427	7,338
Benefits to Active Members				
Retirement	$ 186,615	$ 29,102	$ 215,717	$ 213,591
Disability	4,222	1,459	5,681	5,582
Death	748	189	937	947
Deferred Retirement & Refund	2,508	1,559	4,067	4,078
Total	$ 194,093	$ 32,309	$ 226,402	$ 224,198
Existing MPPP Unfunded Obligation	259	-	259	274
Total Present Value of Projected Benefits	$ 381,812	$ 32,615	$ 414,427	$ 404,804
Present Value of Future Normal Costs	56,177	26,168	82,345	82,677
Actuarial Obligation	**$ 325,635**	**$ 6,447**	**$ 332,082**	**$ 322,127**

4. Valuation Assets

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date which, for this valuation, is June 30, 2021. On that date, the assets available for the payment of retirement benefits are appraised.

The next step in the valuation process is to calculate the **Actuarial Value of Assets** that will be used to determine the funding status of the Program. **Table 3** summarizes the assets separated by funding group. As shown in **Table 4**, the Fair Market Value (adjusted from the accounting value to account for pre-recognized GASB expenses) was reported as $292,980 million as of June 30, 2021, up from $233,253 million as of June 30, 2020. **Table 5** shows the asset changes for the period.

Valuation Assets

Because the underlying calculations in the actuarial valuation are long term in nature, it may be advantageous to use an asset smoothing method to lessen the impact of short-term fluctuations in the value of assets. This is particularly true given that the supplemental state and employer contribution rates are determined based on the applicable funded status.

The asset smoothing method uses a projection of the expected Actuarial Value of Assets from the Actuarial Value of Assets as of the previous year based on the assumed rate of investment return and the net cash flow during the year. The projection then recognizes one-third of the difference between the expected value and the Fair Market Value as of the valuation date to arrive at the Actuarial Value of Assets. The calculation of the Actuarial Value of Assets is shown in **Table 6** and the result is shown below.

($ Millions)	2021 Valuation	2020 Valuation
Fair Market Value (FMV)	$ 292,980	$ 233,253
Actuarial Value of Assets (AVA)	263,397	235,377
Deferred Investment Gains or (Losses)	$ 29,583	$ (2,124)
Ratio of AVA to FMV	89.9%	100.9%

Due to the asset smoothing method, there are investment gains of $29,583 million that have not yet been recognized (the difference between the Actuarial and Fair Market Value of Assets). Absent investment returns in future years less than the assumed rate to offset the deferred investment gains, the current deferred gains will gradually be reflected in the Actuarial Value of Assets.

If the future returns on the Fair Market Value of Assets are 7.00% each year, then as the current deferred gains flow through the smoothing method and are recognized, future valuations will show an actuarial gain. The result will be a gradual increase in the DB Program's funded status, ultimately decreasing the UAO by the $29,583 million of currently deferred investment gains.

Table 7 shows a history of the Actuarial Value of Assets compared to the Fair Market Value of Assets.

Table 3
Market Value of Assets by Funding Group

($ Millions)	June 30, 2021					June 30, 2020
	SBMA	1990 Benefit Structure	Pre-2014 New Benefits	Post-2014 New Benefits	Total DB Program	Total DB Program
Market Value, beginning of year	$ 19,125	$ 231,440	$ (28,413)	$ 11,101	$ 233,253	$ 225,466
Member Contributions(1)						
Regular at 8.000% (EC §22901(a))	-	2,773	-	-	2,773	2,769
Regular 2% at 62 Member Rate in Excess of 8.000% (EC §22901(b))		-	-	74	74	65
Supplemental at 2.250%/1.205% (EC §22901.7)	-	-	-	727	727	735
Other	-	18	-	2	20	17
Total Member Contributions	-	2,791	-	803	3,594	3,586
Employer Contributions(1)						
Regular at 8.000%	-	2,773	-	-	2,773	2,769
Sick Leave at 0.250% (EC §22951)	-	-	87	-	87	87
Supplemental at 10.850% / 9.88% (EC §22950.5)	-	-	3,693	68	3,761	3,420
Adjustment -2.95% / -1.030%	-	-	(1,023)	-	(1,023)	(357)
Other	-	-	2	-	2	4
Total Employer Contributions	-	2,773	2,759	68	5,600	5,923
State Contributions(1)						
Appropriation at 2.017% (EC §22955)	-	-	683	-	683	664
Supplemental at 5.811%/5.811%(EC §22955.1(b))	-	1,969	-	-	1,969	1,910
SBMA contribution at 2.500% less $72M	782	-	-	-	782	756
Additional contributions	-	297	-	-	297	1,117
Total State Contributions	782	2,266	683	-	3,731	4,447
Investment Income						
Net investment income	1,318	66,352	(8,110)	3,313	62,873	9,301
Net Pension/OPEB Obligation Adjustments	-	66	-	-	66	22
Net Investment Earnings	1,318	66,418	(8,110)	3,313	62,939	9,323
Benefits	(191)	(13,282)	(2,559)	(105)	(16,137)	(15,492)
Market Value, end of year	$ 21,034	$ 292,406	$ (35,640)	$ 15,180	**$ 292,980**	**$ 233,253**

1. The contributions for New Benefits have been allocated between the Pre-2014 and Post-2014 funding groups so that the total contributions allocated to each funding group are consistent with the valuation policy.
For purposes of this exhibit, we have shown member contributions being allocated to the Post-2014 New Benefit group.

Table 4
Statement of Program Assets

($ Millions)	June 30, 2021	June 30, 2020
Invested Assets		
Cash	$ 568	$ 504
Debt Securities	54,899	50,032
Equity Securities	139,761	106,636
Alternative Investments	101,691	78,041
Derivative Instruments	515	227
Bond Proceeds Investment	197	275
Total Investments	$ 297,631	$ 235,715
Receivables	10,565	6,567
Liabilities Net of Securities Lending Collateral	(15,871)	(9,819)
Net Deferred (Inflows) and Outflows	(238)	(37)
Exclude Net Pension and OPEB Obligation	893	827
Fair Market Value of Net Assets	**$ 292,980**	**$ 233,253**

Table 5
Statement of Changes in Program Assets

($ Millions)	June 30, 2021	June 30, 2020
Contributions		
Members	$ 3,594	$ 3,586
Employers	5,600	5,923
State of California	3,731	4,447
Total Contributions	12,925	13,956
Benefits and GASB Adjustments		
Retirement, Death and Survivors	(15,868)	(15,199)
Refunds of Member Contributions	(78)	(78)
Purchasing Power Benefits	(191)	(215)
Change in GASB Adjustments	66	22
Total Benefits and GASB Adjustments	(16,071)	(15,470)
Net Cash Flow	**$ (3,146)**	**$ (1,514)**
Investment Income		
Realized Income	$ 5,099	$ 4,899
Net Appreciation	58,374	4,857
Net Securities Lending Income	65	76
Investment Expenses	(517)	(419)
Administrative & Other Expenses	(238)	(213)
Other (Expense) Income	90	101
Net Investment Return	62,873	9,301
Net Increase (Decrease)	**$ 59,727**	**$ 7,787**
Fair Market Value of Net Assets		
Beginning of Year	233,253	225,466
End of Year	**$ 292,980**	**$ 233,253**
Estimated Net Rate of Return (1)	27.1%	4.1%

1. Estimated return on a Fair-Market-Value basis on all DB Program assets (including SBMA), net of all investment expenses, gross of administrative expenses, and assuming uniform cash flow throughout the year. This number may differ from the money-weighted return reported by CalSTRS. The estimated return for the fiscal year ended June 30, 2021 excluding SBMA assets was 29.0%

Table 6
Actuarial Value of Assets

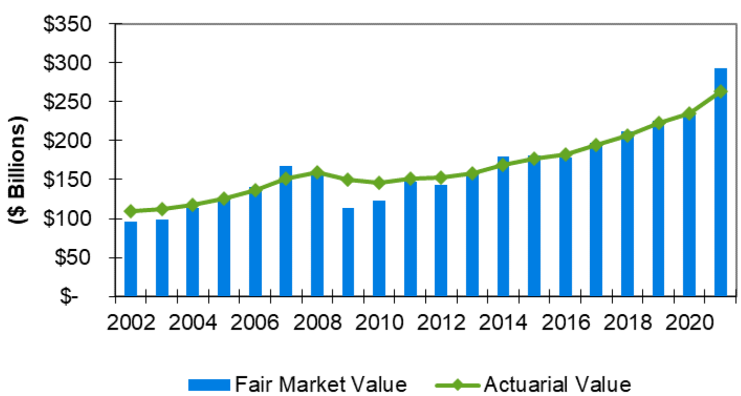
($ Millions)	June 30, 2021	June 30, 2020
Actuarial Value at Beginning of Year	$ 235,377	$ 222,399
Contributions	12,925	13,956
Benefits	(16,137)	(15,491)
Change in GASB Adjustments	66	22
Expected Return	16,374	15,553
Expected Actuarial Value End of Year	$ 248,605	$ 236,439
Fair Market Value	292,980	233,253
Difference between Fair Market Value and Expected Actuarial Value	$ 44,375	$ (3,186)
Recognition Factor	One-third	One-third
Recognized Gain or Loss	$ 14,792	$ (1,062)
Actuarial Value at End of of Year	**$ 263,397**	**$ 235,377**
Deferred Investment Gains or (Losses)	$ 29,583	$ (2,124)
Estimated Net Rate of Return [(1)]	13.3%	6.5%
Actuarial Value of Assets Excluding SBMA		
Actuarial Value Including SBMA	$ 263,397	$ 235,377
Supplemental Benefit Maintenance Account	21,034	19,125
Actuarial Value Excluding SBMA	$ 242,363	$ 216,252
Market Value Excluding SBMA	$ 271,946	$ 214,128
Ratio of Actuarial Value of Assets to Fair Market Value of Assets	89.122%	100.992%
Estimated Net Rate of Return [(1)]	13.9%	6.5%

1. Estimated return on an Actuarial-Value basis, net of all investment expenses, gross of administrative expenses, and assuming uniform cash flow throughout the year.

Table 7
History of Actuarial Value of Assets

($ Millions) June 30	Fair Market Value	Estimated Return [(1)]	Actuarial Value	Ratio of Actuarial to Market
2002	$ 96,028	(6.1) %	$ 109,755	114
2003	99,031	3.8	111,604	113
2004	113,815	16.6	117,206	103
2005	126,447	12.3	125,665	99
2006	140,192	12.5	135,832	97
2007	166,903	20.9	151,827	91
2008	155,763	(5.5)	159,785	103
2009	113,192	(25.4)	150,445	133
2010	123,242	12.9	146,404	119
2011	147,140	23.6	151,030	103
2012	143,118	0.6	152,515	107
2013	157,176	13.9	157,883	100
2014	179,479	18.6	168,838	94
2015	180,633	3.9	177,059	98
2016	177,914	1.3	182,772	103
2017	197,718	13.4	193,925	98
2018	211,367	9.0	206,207	98
2019	225,466	6.6	222,399	99
2020	233,253	4.1	235,377	101
2021	292,980	27.1	263,397	89

1. Estimated return on a Fair-Value basis on all DB Program assets (including SBMA), net of all investment expenses, gross of administrative expenses, and assuming uniform cash flow throughout the year, reported on a dollar-weighted basis. This number may differ from the money-weighted return reported by CalSTRS. The estimated return for the fiscal year ended June 30, 2021 excluding SBMA assets was 29.0%.



5. Funded Status

The **Unfunded Actuarial Obligation** (UAO) is the excess of the Actuarial Obligation over the Actuarial Value of Assets, which represents a liability that must be funded over time. Contributions in excess of the Normal Cost are used to amortize the UAO. An **Actuarial Surplus** exists if the Actuarial Value of Assets exceeds the Actuarial Obligation.

The **Funded Ratio** is equal to the Actuarial Value of Assets divided by the Actuarial Obligation. A Funded Ratio of 100% means the Value of Assets equals the Actuarial Obligation, and the DB Program could be financed by contributions equal to the Normal Cost if all future experience emerged as assumed. The Funded Ratio is shown below and in **Table 8**.

($ Millions)	2021 Valuation	2020 Valuation
Actuarial Obligation	$ 332,082	$ 322,127
Actuarial Value of Assets (AVA)		
From Table 6	$ 263,397	$ 235,377
Less SBMA Reserve	(21,034)	(19,125)
Net for Funding	242,363	216,252
Unfunded Actuarial Obligation	$ 89,719	$ 105,875
Funded Ratio (on AVA)	**73.0%**	**67.1%**
Alternate Funded Ratio (based on Fair Market Value)	*81.9%*	*66.5%*

The Funded Ratio increased by 5.9% during the past year, primarily due to the return on the Actuarial Value of Assets (13.9%) exceeding the assumed return (7.0%). The Alternate Funded Ratio using the Fair Market Value of assets has increased since the last valuation. This increase was primarily due to actual market returns for the fiscal year ended June 30, 2021 being greater than the assumed investment return of 7.0%.

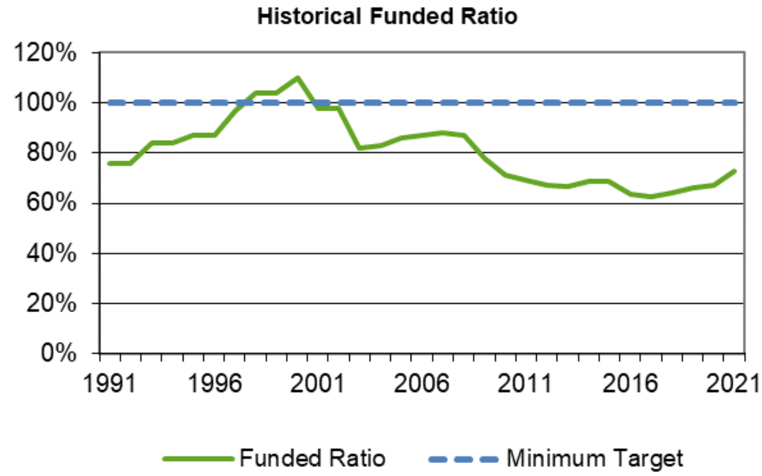
Future benefits provided through the Supplemental Benefits Maintenance Account (SBMA) are not part of the projected benefits included in this valuation. Therefore, the SBMA Reserve is subtracted from the DB Program assets to arrive at the value available to support the benefits included in this valuation.

In addition, the Teachers' Retirement Board has established a policy of allocating funds for future costs associated with the Teachers' Health Benefits Fund (THBF). This policy was revised in April of 2009 to make a one-time credit to the THBF and "true up" the future MPPP obligations (payable from the THBF) in the funding of the DB Program. As of June 30, 2021, only an amount to cover monthly payments resides in the THBF, while the remaining unfunded amount of $259 million is added to the DB Program obligation.

The table below shows a history of the Funded Status of the DB Program.

($ Millions) Year	Actuarial Obligation	Actuarial Value of Assets	Unfunded Actuarial Obligation	Funded Ratio
1975	**$ 12,834**	**$ 3,775**	**$ 9,059**	**29%**
1977	15,203	5,019	10,184	33%
1979	17,971	6,488	11,483	36%
1981	22,545	9,345	13,200	41%
1983	26,553	15,023	11,530	57%
1985	**28,401**	**17,457**	**10,944**	**61%**
1987	34,637	24,401	10,236	70%
1989	40,266	29,327	10,939	73%
1991	47,100	36,001	11,099	76%
1993	53,581	45,212	8,369	84%
1995	**63,391**	**55,207**	**8,184**	**87%**
1997	69,852	67,980	1,872	97%
1998	74,234	77,290	(3,056)	104%
1999	86,349	90,001	(3,652)	104%
2000	93,124	102,225	(9,101)	110%
2001	109,881	107,654	2,227	98%
2003	131,777	108,667	23,110	82%
2004	138,254	114,094	24,160	83%
2005	**142,193**	**121,882**	**20,311**	**86%**
2006	150,872	131,237	19,635	87%
2007	167,129	146,419	20,710	88%
2008	177,734	155,215	22,519	87%
2009	185,683	145,142	40,541	78%
2010	196,315	140,291	56,024	71%
2011	208,405	143,930	64,475	69%
2012	215,189	144,232	70,957	67%
2013	222,281	148,614	73,667	67%
2014	231,213	158,495	72,718	69%
2015	**241,753**	**165,553**	**76,200**	**69%**
2016	266,704	169,976	96,728	64%
2017	286,950	179,689	107,261	63%
2018	297,603	190,451	107,152	64%
2019	310,719	205,016	105,703	66%
2020	322,127	216,252	105,875	67%
2021	332,082	242,363	89,719	73%

The historical Funded Ratios are shown on the following graph. In years in which a valuation was not performed, the Funded Ratio from the previous year is used.



Actuarial Gains and Losses

Comparing the UAO as of two valuation dates does not provide enough information to determine whether there were actuarial gains or losses. The correct comparison is between the UAO on the valuation date and the expected UAO projected from the prior valuation date using the actuarial assumptions in effect since the previous valuation.

The actuarial gains and losses since the last report are summarized in the following tables and shown in **Table 9**.

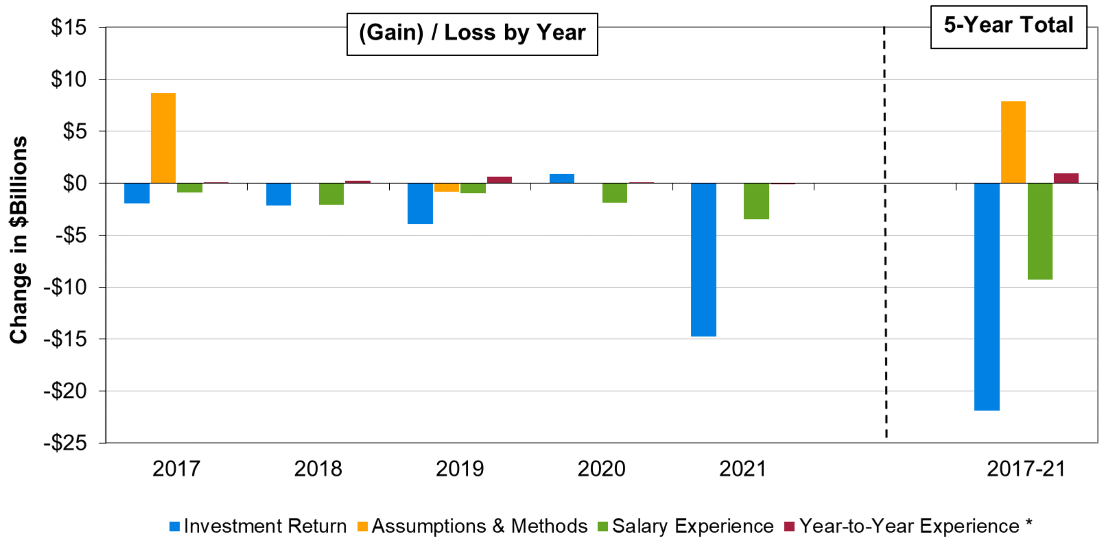
($ Millions)	Expected Results	Actual Results	(Gain) or Loss	Percent of AO / AVA
Actuarial Obligation	$ 335,579	$ 332,082	$ (3,497)	
Act. Value of Assets	227,612	242,363	(14,751)	
Unfunded Act. Oblig.	$ 107,967	$ 89,719	$ (18,248)	
Actuarial (Gains) or Losses by Source				
Changes in assumptions & methods (Actuarial Obligation)			$ 0	0.0%
Salaries increased less than assumed			(3,433)	(1.0%)
All other demographic sources			(64)	(0.0%)
(Gain) on the Actuarial Obligation			$ (3,497)	(1.1%)
Investment Return on Actuarial Value of Assets			(14,909)	(6.2%)
Changes in assumptions & methods (Actuarial Assets)			0	0.0%
Contributions (in excess of) or less than assumed			158	0.1%
(Gain) on the Actuarial Value of Assets			$ (14,751)	(6.1%)
Total Actuarial (Gain)			$ (18,248)	

These net gains and losses are within a reasonable range for variances in a single year.
Based on the 2020 Actuarial Valuation, the UAO was expected to increase to $107,967 million. The actual UAO of $89,719 million represents a net actuarial gain of $18,248 million.

- Salaries increased less than projected by the current actuarial assumptions, causing the Actuarial Obligation to decrease by $3,433 million from the expected amount. We expect to continue to see salary increase fluctuations from year to year.
- All other demographic experience caused the Actuarial Obligation to decrease by $64 million. This represents only a relatively small portion of the expected Actuarial Obligation. These relatively minor net gains and losses indicate that the census is reasonably consistent from the prior period and that the actual experience tracked closely overall with actuarial assumptions (exclusive of the salary increases).
- On the asset side, there was an actuarial asset gain based on the actuarial value of assets as well as an actuarial asset gain on the Market Value of Assets. The return on market value (including the SBMA) was estimated at 27.1% which is greater than the assumed 7.0% return from the prior valuation. The return on the Actuarial Value of Assets was also greater (estimated at 13.9%) than assumed as the market return for the most recent year had a greater impact than the recognition of prior year actuarial investment losses which were being deferred.

Actuarial Gain and Loss History

To get an idea of the overall trend of gains and losses, we have analyzed actuarial gains and losses since 2017.



** Year-to-Year Experience includes changes due to Termination, Retirement, Mortality, and Other Experience.*

Over the last five years, investment returns that have generally exceeded the assumed return assumption resulting in a decrease in the UAO by about $22 billion. During that period, all other changes combined had a relatively minor impact on the UAO. In particular, assumption and method changes increased the UAO, but this was offset by salary increases that were generally been less than assumed causing a decrease in the UAO.

Note that the UAO has decreased by approximately $7 billion over the last 5 years. This compares to the net effect of actuarial gains and losses (including assumption changes) described above which account for approximately $22 billion of the decrease in UAO. The remaining $15 billion increase is due to contributions received by CalSTRS that were insufficient to cover the interest on the UAO resulting in an increase in the UAO. In the short-term future, the contributions are projected to approximately cover the interest on the UAO, and then eventually exceed the interest on the UAO and reduce the principal. Under the baseline projections included in this report, the UAO is projected to start declining immediately as the deferred actuarial gains are reflected.

Table 8
Funded Status

($ Millions)	2021	2020
Actuarial Obligation *(Table 2)*	$332,082	$322,127
Actuarial Value of Assets		
Calculated *(Table 6)*	$ 263,397	$ 235,377
Less SBMA Reserve	(21,034)	(19,125)
Program Assets	$ 242,363	$ 216,252
Unfunded Actuarial Obligation	**$ 89,719**	**$ 105,875**
Funded Ratio	**73.0%**	**67.1%**

Table 9
Actuarial Gains and Losses

($ Millions)	Expected	Actual	(Gain) / Loss
Actuarial Obligation			
Actuarial Obligation June 30, 2020	$322,127		
Normal Cost for 2020-21	7,152		
Benefits Paid (Excludes Purchasing Power)	(15,946)		
Expected Interest at 7.00%	22,246		
Actuarial Obligation June 30, 2021	**$335,579**	**$332,082**	**$ (3,497)**
By Source:			
Change in actuarial assumptions			*0*
Retiree Mortality			*(387)*
Active Member Mortality			*73*
Service Retirements			*101*
Disability Retirement			*(1)*
Other Terminations of Employment			*152*
Salary increases more / (less) than assumed			*(3,433)*
All Other Non-investment Sources			*(2)*
Total (Gain) Loss on the Actuarial Obligation			*$ (3,497)*
Actuarial Value of Assets			
Actuarial Value of Assets June 30, 2020	$216,252		
Expected Contributions for 2020-21	12,295		
Benefits Paid (Excludes Purchasing Power)	(15,946)		
Expected Interest at 7.00% on AVA	15,011		
Actuarial Value of Assets June 30, 2021	**$227,612**	**$242,363**	**$ (14,751)**
By Source: Investment Return on Actuarial Value of Assets (including the recognition of prior deferred investment gains and losses)			*$ (14,909)*
Change in actuarial asset method			*$ 0*
Contributions (in excess of) or less than assumed (including service purchases)			*158*
Total (Gain) Loss on the Actuarial Value of Assets			*$ (14,751)*
Unfunded Actuarial Obligation	**$107,967**	**$ 89,719**	**$(18,248)**

6. State Supplemental Contribution Rate

Under EC §22955.1(b), adjustments to the state supplemental contribution rate are based on actuarial funding. We will refer to this contribution as the state supplemental contribution. Note that for the state, the payroll is the second prior fiscal year payroll, so contributions made in fiscal year 2022-2023 will be based on the covered member compensation for fiscal year 2020-2021. The state supplemental rate is in addition to the base state contribution under EC §22955.1(a) of 2.017% of payroll and contributions to fund the SBMA under EC §22954.

The board shall increase or decrease the state supplemental contribution rate (within certain parameters) to reflect the contribution required to eliminate the UAO associated with the 1990 benefit and contribution rate structure. This will be referred to as the 1990 UAO. State supplemental contributions are included as part of the assets used in determining the 1990 UAO. Although not specified in the law, the board's valuation policy calls for the state supplemental contribution rate to be calculated to amortize the UAO by June 30, 2046.

Changes in the state supplemental contribution are determined annually and subject to the following conditions:

- The state supplemental contribution rate cannot increase or decrease by more than 0.5% of payroll over the prior year supplemental rate.
- In any year when there is no UAO for the 1990 Benefit Structure, the supplemental contribution shall be reduced to zero.
- The state supplemental contribution rate shall not be reduced below 4.311% if an UAO for the 1990 Benefit Structure exists.

The state is contributing a supplemental rate of 6.311% of pay for the current fiscal year ending June 30, 2022. Under the valuation policy, the calculated rate is a decrease to 5.811% for the next fiscal year as discussed in this section. The board has the authority to make no change in the rate, which would be reasonable given the significant amount of progress that still needs to be made for the DB Program to reach a 100% Funded Ratio.

1990 Unfunded Actuarial Obligation

The 1990 Actuarial Obligation for the DB Program is calculated using the benefit provisions in place during 1990. CalSTRS provides us with supplementary information on the census data for this determination. The process has limitations since we do not know, for example, whether members would have retired earlier or later if the post 1990 benefit enhancements had not been enacted. However, we believe it is a reasonable process to estimate what the Actuarial Obligation would be if only the 1990 benefits were currently in place. There were no benefit improvements enacted between 1990 and 1998 that had a material cost. All benefit enhancements enacted with effective dates from July 1, 1990 to December 31, 1998 have been presumed to be cost-neutral. Due to the enhanced retirement benefits enacted since 1990, a separate set of retirement probabilities is used to evaluate the 1990 Benefit Structure.

The Actuarial Obligation related to the 1990 Benefit Structure is $273.7 billion. This compares to the Actuarial Obligation for the current DB Program benefit structure of $332.1 billion.

($ Millions)	2021 Valuation	2020 Valuation
Actuarial Obligation -- 1990 Benefit Structure		
Value of Projected Benefits	$ 346,680	$ 338,130
Value of Future Normal Costs	73,018	72,869
Actuarial Obligation	$ 273,662	$ 265,261

The Market Value of Assets associated with the 1990 Actuarial Obligation is calculated each year by 1) increasing the prior year value (excluding the SBMA) by contributions based on the contribution rates in effect prior to September 30, 1998 (16.00% of earned salaries); 2) adding state supplemental contributions under 22955.1(b)); 3) adding additional state contributions in excess of the statutory requirements that are designated to pay down the 1990 UAO, if any; 4) reducing by benefit payments attributable to the 1990 Benefit Structure; and 5) adjusting for the actual investment return for the DB Program (excluding the SBMA). Limitations exist with this approach since precise data regarding the portion or the timing of benefit payments that would be attributable to only the 1990 benefit structure is unknown.

The Market Value of Assets under the 1990 Benefit Structure is smoothed based on the same ratio (Actuarial Value of Assets divided by Market Value of Assets) as the DB Program.

See **Table 10** for the details of the 1990 asset calculation.

($ Millions)	2021 Valuation	2020 Valuation
Assets -- 1990 Benefit Structure		
Market Value of Assets	$ 292,406	$ 231,440
Ratio for DB Program	89.122%	100.992%
Actuarial Value of Assets	$ 260,597	$ 233,735

For purposes of testing the funding sufficiency of the 1990 Benefit Structure, note that we did not reserve the board's allocation of assets for future THBF costs, because it was established subsequent to 1990.

The following table summarizes the Funded Status of the 1990 Benefit Structure as detailed in **Table 11**. The 1990 Benefit Structure has an actuarial deficit equal to the UAO of $13.1 billion.

($ Millions)	2021 Valuation	2020 Valuation
Funded Status -- 1990 Benefit Structure		
Actuarial Obligation	$ 273,662	$ 265,261
Actuarial Value of Assets	260,597	233,735
Unfunded Actuarial Obligation	$ 13,065	$ 31,526
Funded Ratio	95.2%	88.1%

State Supplemental Contributions

The statute calls for an annual adjustment to the state supplemental contribution rate to amortize the 1990 UAO. Based on the June 30, 2021 valuation, a decrease in the state supplemental contribution rate effective July 1, 2022 is calculated under the valuation policy.

As shown in **Table 11**, a supplemental contribution rate of 4.087% of payroll is needed to amortize the 1990 UAO by June 30, 2046 based on the board's current valuation policy. This is based on an unconstrained decrease of about 2.3% of payroll from the current supplemental rate of 6.311%. However, decreases in the state contribution rate are limited to 0.5%. Therefore, the state supplemental contribution rate for the fiscal year beginning July 1, 2022 is calculated to be 5.811% under EC §22955.1(b). Note that the 4.087% is based on the Actuarial Value of Assets, so it does not reflect the future recognition of currently deferred asset gains and losses and therefore differs from the projection shown in the "Looking Ahead" subsection of Section 1.

The following table shows a numerical breakdown of each of the factors that caused the increase or decrease in the unconstrained (i.e., prior to the application of the minimum supplemental rate and the maximum decrease) state supplemental contribution rate. The actual calculated rate is limited to a 0.5% decrease over the prior year under the valuation policy and cannot be less than 4.311% until the 1990 UAO has been fully paid off.

Sources of Change	Theoretical Unconstrained State Supplemental Rate
June 30, 2020 Actuarial Valuation	**7.56%**
Expected Year-to-Year Change	0.10%
Recognized Asset (Gain) / Loss	
• From Prior Years	0.07%
• From Current Year	-3.05%
Additional State Contributions made in FY2020-21	-0.06%
Salary / Payroll Variation	
• Salary Increase < Assumed	-0.48%
• Payroll Increase < Assumed	0.07%
All Other Sources	-0.12%
Total Change	**-3.47%**
June 30, 2021 Actuarial Valuation	**4.09%** (1)

1. Calculated rate is 5.811% due to application of maximum decrease.

Table 14 (in the next section) show the actual amounts to be contributed to fund both the 1990 benefits and the pre-2014 "New" benefits respectively.

Actuarial Gains and Losses

Similar to the total DB Program, we perform a comparison for the 1990 Benefit Structure between the UAO on the valuation date and the Expected UAO projected from the prior valuation date using the actuarial assumptions in effect since the previous valuation.

The actuarial gains and losses since the last report for the 1990 Benefit Structure are summarized in the following table.

($ Millions)	Expected Results	Actual Results	(Gain) or Loss
Actuarial Obligation	$ 276,501	$ 273,662	$ (2,839)
Act. Value of Assets	244,249	260,597	(16,348)
Unfunded Act. Oblig.	$ 32,252	$ 13,065	$ (19,187)
Actuarial (Gains) or Losses by Source			
Changes in assumptions & methods (Actuarial Obligation)			$ 0
Salaries increased less than assumed			(2,788)
All other demographic sources			(51)
(Gain) on the Actuarial Obligation			$ (2,839)
Investment Return on Actuarial Value of Assets			(16,230)
Changes in assumptions & methods (Actuarial Assets)			0
Contributions (in excess of) or less than assumed			(118)
(Gain) on the Actuarial Value of Assets			$ (16,348)
Total Actuarial (Gain)			$ (19,187)

Table 10
Assets for 1990 Benefit Structure

($ Millions)	2021	2020
Assets Allocated to 1990 Structure[1]		
Allocated Market Value at Beginning of Year	$231,440	$226,790
Contributions During the Year		
Member: EC §22901(a) at 8.00% of Earned Salaries	2,773	2,769
Employer: EC §22950 at 8.00% of Earned Salaries	2,773	2,769
State: EC §22955.1(b) Contribution at 5.811% / 5.811% of second preceding fiscal year Earned Salaries	1,969	1,910
State: Additional State Contributions Designated to reduce 1990 Structure UAO	297	1,117
Member Redeposits	18	16
Total 1990 Structure Contributions	7,830	8,581
Benefits Paid During the Year		
Total Benefits Paid During the Year	(15,946)	(15,277)
Post-1990 Benefits Paid During the Year	2,662	2,529
Post-1990 Refunds of supplemental member contributions	7	6
Prior 2% DBS redirection contributions refunded	(6)	(7)
Total 1990 Benefits Paid [1]	(13,283)	(12,749)
Estimated Investment Earnings for the Year [2]	66,353	8,796
Change in GASB Adjustments	66	22
Allocated 1990 Assets due to Assumption Changes	-	-
Total Allocated 1990 Structure Market Value at End of Year	**$292,406**	**$231,440**
Ratio of Actuarial Value to Market Value [3]	89.122%	100.992%
Assets Allocated to 1990 Structure (Actuarial Value of Assets)	**$260,597**	**$233,735**

1. May not add exactly, due to rounding.

2. Based on Fair Market Value and uniform cash flow for contributions, benefits, and expenses. The rates of return used in these calculations were 3.90% for 2019-20 and 28.99% for 2020-21.

3. Developed from Table 6.

Table 11
Funded Status and Supplemental Contribution Rate for 1990 Benefit Structure

($ Millions)	2021	2020
Actuarial Obligation		
Present Value of Projected Benefits		
Benefits Currently Being Paid	$ 148,520	$ 143,330
Benefits to Inactive Members	8,083	7,069
Benefits to Active Members	190,077	187,731
Total	$ 346,680	$ 338,130
Present Value of Future Normal Costs	(73,018)	(72,869)
Actuarial Obligation	$ 273,662	$ 265,261
Funded Status		
Actuarial Obligation	$ 273,662	$ 265,261
Actuarial Value of Assets (Table 10)	260,597	233,735
Unfunded Actuarial Obligation (Surplus)	$ 13,065	$ 31,526
Funded Ratio	95.2%	88.1%
Amortization Sufficiency Under Current Contribution Schedule		
Revenue for 1990 Benefits	16.000%	16.000%
Normal Cost Rate for 1990 Benefits	(17.766)	(17.784)
Equivalent Normal Cost Surplus / (Deficit) Express as Percent of Employer Payroll	(1.766%)	(1.784%)
Equivalent Normal Cost Surplus / (Deficit) Express as Percent of State Payroll	(1.890%)	(1.910%)
Level Equivalent Additional Revenue Under EC 22955.1(b)	6.311	5.811
Revenue Available for Amortization	4.421%	3.901%
Revenue Needed for Amortization	2.197	5.646
Revenue Surplus / (Deficit)	2.224%	(1.745%)
Amortization Status under current contribution rate	Projected to Fund 1990 UAO by 2046	Contribution Increases Needed
Contribution Rate for Amortization of 1990 UAO without Statutory Limits		
Current EC 22955.1(b) Contribution Rate	6.311%	5.811%
Increase / (Decrease) in State Contribution Rate for Next Fiscal Year	(2.224)	1.745
Unconstrained Contribution Rate for Next FY	4.087%	7.556%
Contribution Rate for Amortization of 1990 UAO with Statutory Limits		
Current EC 22955.1(b) Contribution Rate	6.311%	5.811%
Increase / (Decrease) in State Contribution Rate for Next Fiscal Year (capped at 0.5%)	(0.500)	0.500
EC 22955.1(b) Contribution Rate for Next FY	**5.811%**	**6.311%**

7. Employer Supplemental Contribution Rate

Under EC §22950.5, annual adjustments in the employer contribution rate are calculated. We will refer to the total value of the adjustment as the employer supplemental contribution rate. The employer supplemental rate is in addition to the base employer contribution rate under EC §22950 and §22951 of 8.25% of payroll.

The board shall increase or decrease the employer supplemental contribution rate (within certain parameters) to reflect the contribution required to eliminate the remaining UAO associated with service earned prior to July 1, 2014. This will be referred to as the pre-2014 UAO. Note that although the language in the Education Code refers to the UAO for all benefits earned prior to July 1, 2014, the basic calculation in the board's valuation policy only allocates the funding of the pre-2014 UAO for "new" benefits (i.e., those adopted after 1990) to the employers, as the state is responsible for the funding of all 1990 benefits.

The calculated employer supplemental contribution rate for the fiscal year beginning July 1, 2022 decreases to 10.563% of payroll (currently 10.850%) pursuant to the board's valuation policy and assumes the board exercises its limited rate-setting authority. Under EC §22950.6, the contribution rate for employers was reduced for fiscal year 2021-22 by 2.180% to reflect the additional contribution paid by the state on behalf of employers in fiscal year 2018-19. This means the effective supplemental contribution rate paid by the employers is calculated to increase by 1.893% from 8.670% of pay (16.920% in total) to 10.563% of pay (18.813% in total) for the fiscal year beginning July 1, 2022. Note that the board elected to keep the employer supplemental contribution rate at the 10.85% rate for fiscal year 2021-22 (prior to the adjustment under EC §22950.6).

It should be noted that the employer contribution rate is projected to increase over the next few years, so it would be reasonable for the board to maintain the current 10.850% supplemental contribution rate, which would result in an effective 2.180% increase in the rate actually paid.

There is an additional complexity in that the pre-2014 UAO that the employer is responsible for funding overlaps with the 1990 UAO that the state is responsible for funding. Under the board's valuation policy, the pre-2014 UAO is split into two separate pieces: 1) the pre-2014 UAO for the 1990 Benefit Structure; and 2) the pre-2014 UAO for "new" benefits (i.e., those adopted after 1990). The employers are responsible for funding the New Benefit UAO. However, a provision of the valuation policy limits the employer supplemental contribution rate to the amount that is calculated to sufficiently pay down the total Pre-2014 UAO when combined with the base employer rate, the state, and member contribution rates. This is referred to as the "Pre-2014 limit." The pre-2014 limit exceeds the calculated employer supplemental contribution rate in the 2021 valuation, so it does not apply this year. Prior to the 2021 valuation, a corresponding minimum rate was applied to the employer supplemental rate, but that language was removed from the valuation policy effective with the 2021 valuation.

The board has authority to change the employer supplemental contribution rate annually, subject to the following conditions:

- The employer supplemental contribution rate cannot increase or decrease by more than 1.0% of payroll over the prior year supplemental rate. The 1.0% adjustment is applied before the reductions specified in EC §22950.6
- The employer supplemental contribution rate cannot exceed 12.00%.

To determine the pre-2014 UAO for New Benefits, we must determine the total UAO for pre-2014 service and subtract the 1990 UAO for pre-2014 service.

Pre-2014 Unfunded Actuarial Obligation

The pre-2014 Actuarial Obligation for the DB Program is calculated using service through June 30, 2014 and projected salaries. Since there are no future service accruals for this portion of the Actuarial Obligation, the Projected Unit Credit actuarial cost method is used, per the board's valuation policy.

To determine the pre-2014 assets to be used in the 2021 valuation, a theoretical pre-2014 asset value is maintained based on the prior year value adjusted as follows:

- Add total contributions (excluding SBMA),
- Subtract total Normal Costs for prior year,
- Subtract benefit payments attributable to pre-2014 service, and
- Adjust for actual investment return.

See **Table 12** for the details of the asset adjustment.

Pre-2014 Unfunded Actuarial Obligation for 1990 Benefit Structure

A second calculation is done to isolate the portion of the pre-2014 UAO that is allocated to the 1990 Benefit Structure and therefore is subject to state funding. The Actuarial Obligation for this portion is calculated using the 1990 Benefit Structure, service through June 30, 2014 and projected salaries. Since there are no future service accruals, the Projected Unit Credit actuarial cost method is used.

To determine the pre-2014 assets allocated to the 1990 Structure that are to be used in the 2021 valuation, a theoretical pre-2014 asset value for the 1990 Structure is maintained based on the prior year value adjusted as follows:

- Add contributions equal to 16.00% of prior year payroll,
- Add state supplemental contributions under EC §22955.1(b),
- Subtract total Normal Costs for prior year attributable to 1990 Benefit Structure,
- Subtract benefit payments attributable to pre-2014 service and the 1990 Benefit Structure, and
- Adjust for actual investment return.

See **Table 13** for the details of the asset adjustment.

Pre-2014 Unfunded Actuarial Obligation for New Benefits

The following table shows the calculation of the UAO for Pre-2014 Service attributable to New Benefits.

($ Millions)	Pre-2014 Service		
	Total	1990 Benefits	New Benefits
Funded Status — Pre-2014 Service			
Actuarial Obligation	$ 258,272	$ 212,912	$ 45,360
Actuarial Value of Assets	166,635	198,398	(31,763)
Unfunded Actuarial Obligation	$ 91,637	$ 14,514	**$ 77,123**

Employer Supplemental Contributions

The Education Code specifies an annual adjustment to the employer supplemental contribution rate to amortize the pre-2014 UAO. As shown in **Table 14**, a decrease from the current employer supplemental contribution rate of 10.850% is calculated. Effective July 1, 2022, an employer supplemental contribution rate of 10.563% of pay would be needed to amortize the pre-2014 UAO for New Benefits by June 30, 2046, a decrease of 0.287%. Combining this amount with the base employer contribution rate of 8.250%, the calculated total employer contribution rate for the fiscal year beginning July 1, 2022 is 18.813%.

The following table shows a numerical breakdown of each of the factors that caused the increase or decrease in the unconstrained (i.e., prior to the application of the maximum increase or decrease) employer supplemental contribution rate.

Sources of Change	Theoretical Unconstrained Employer Supp. Rate
June 30, 2020 Actuarial Valuation	**9.78%**
Expected Year-to-Year Change	0.11%
Recognized Asset (Gain) / Loss	
• From Prior Years	0.00%
• From Current Year	0.36%
Salary / Payroll Variation	
• Salary Increase < Assumed	-0.08%
• Payroll Increase < Assumed	0.46%
All Other Sources	-0.08%
Total Change	**0.78%**
June 30, 2021 Actuarial Valuation	**10.56%**

Allocation of Contribution Rates

As previously discussed, the state is responsible for the UAO associated with 1990 benefits the employers are responsible for UAO associated with New benefits. The table below shows a breakdown of the calculated contribution rates between 1990 and New benefits on a percentage of payroll basis.

Allocation of Contribution Rates for the DB Program

	2021 Valuation: FY 2022-23 Rate			2020 Valuation
Source of Revenue	1990 Benefits	New Benefits	Total	FY 2021-22 Rate
Employers – Base Rate	8.000 %	0.000 %	8.000 %	8.000 %
Employers – Sick Leave	0.000	0.250	0.250	0.250
Employers – Supplemental Rate(1)	0.000	10.563	10.563	10.850
Employers – Total Calculated Rate	**8.000**	**10.813**	**18.813**	**19.100**
Reduction for Additional State Contribs(2)	0.000	0.000	0.000	(2.180)
Employers – Net Contribution Rate	**8.000**	**10.813**	**18.813**	**16.920**
State – Base Rate	0.000 %	2.017 %	2.017 %	2.017 %
State – Supplemental Rate(1)	5.811	0.000	5.811	6.311
State – Total DB Program(3)	**5.811**	**2.017**	**7.828**	**8.328**
Members – 2% at 60	8.000 %	2.250 %	10.250 %	10.250 %
Members – 2% at 62	8.000	2.205	10.205	10.205

1. *Calculated based on valuation policy and subject to board adoption.*
2. *As specified in EC §22950.6.*
3. *The state also contributes 2.5% (less $72 million) to the Supplemental Benefit Maintenance Account (SBMA).*

Table 12
Total Assets Allocated for Pre-2014 Service[1]

($ Millions)	2021	2020
Asset Value for Pre-2014 Service (excludes SBMA)		
Allocated Market Value at Beginning of Year	$ 154,036	$ 156,795
Contributions During the Year		
Total Contributions (excluding SBMA)	12,143	13,200
Less Normal Costs for Year with Expenses	(7,036)	(7,063)
Total Adjusted Contributions	$ 5,107	$ 6,137
Benefits and Expenses Paid for Pre-2014 Service	(15,344)	(14,848)
Estimated Investment Earnings for the Year [2]	43,176	5,952
Total Allocated Market Value at End of Year	**$ 186,975**	**$ 154,036**
Ratio of Actuarial Value to Market Value [3]	89.122%	100.992%
Actuarial Value of Assets for Pre-2014 Service	**$ 166,635**	**$ 155,564**

1. May not add exactly, due to rounding.

2. Based on Fair Market Value excluding SBMA and uniform cash flow for contributions, benefits, and expenses. The rates of return used in these calculations were 3.90% for 2019-20 and 28.99% for 2020-21.

3. Developed from Table 6.

Table 13
1990 Assets Allocated for Pre-2014 Service[1]

($ Millions)	2021	2020
1990 Asset Value for Pre-2014 Service (excludes SBMA)		
Allocated Market Value at Beginning of Year	$ 182,449	$ 185,388
Contributions During the Year for 1990 Structure		
Total Contributions (excluding SBMA)	7,831	8,582
Less 1990 Normal Costs for Year with Expenses	(6,165)	(6,169)
Total Adjusted Contributions	$ 1,666	$ 2,413
Benefits and Expenses Paid for Pre-2014 Service	(12,785)	(12,395)
Estimated Investment Earnings for the Year [2]	51,285	7,043
Total 1990 Allocated Market Value at End of Year	**$ 222,615**	**$ 182,449**
Ratio of Actuarial Value to Market Value [3]	89.122%	100.992%
1990 Actuarial Value of Assets for Pre-2014 Service	**$ 198,399**	**$ 184,259**

1. May not add exactly, due to rounding.

2. Based on Fair Market Value excluding SBMA and uniform cash flow for contributions, benefits, and expenses. The rates of return used in these calculations were 3.90% for 2019-20 and 28.99% for 2020-21.

3. Developed from Table 6.

Table 14
Funded Status and Employer Supplemental Contribution Rate for Pre-2014 Service

($ Millions)	2021	2020
Funded Status		
Total Unfunded Actuarial Obligation (Pre-2014 Service)		
Total Actuarial Obligation for Pre-2014 Service	$258,272	$258,250
Total AVA for Pre-2014 Service	166,636	155,564
Total UAO (Pre-2014 Service)	$91,636	$102,686
1990 Unfunded Actuarial Obligation (Pre-2014 Service)		
1990 Actuarial Obligation for Pre-2014 Service	$212,912	$212,973
1990 AVA for Pre-2014 Service	198,399	184,259
1990 UAO (Pre-2014 Service)	$14,513	$28,714
Post-1990 UAO (Pre-2014 Service)	$77,123	$73,972
Amortization Sufficiency for Post-1990, Pre-2014 UAO Under Current Contribution Schedule		
Post-1990 Normal Cost Rate (Surplus)/Deficit	2.584%	2.582%
Current Supplemental Contribution Rate Under EC 22950.5	10.850	10.850
Revenue Available for Amortization	13.434%	13.432%
Revenue Needed for Amortization	13.147	12.362
Revenue Surplus / (Deficit)	0.287%	1.070%
Supplemental Contribution Rate (Unconstrained)	10.563%	9.780%
Contribution Rate for Amortization of UAO for pre-2014 Service and New Benefits		
Current EC 22950.5 Contribution Rate	10.850%	10.850%
Adjustment in Employer Contribution Rate for Next Fiscal Year	(0.287)	0.000
EC 22955.1(b) Contribution Rate for following FYB	**10.563%**	**10.850%**
EC 22950.6 Adjustment	-	(2.180)
EC 22950 & EC22951 Base Contribution Rate	8.250	8.250
Total Employer Contribution Rate for following FYB	**18.813%**	**16.920%**

8. Actuarially Determined Contribution

In general, an actuarially determined contribution is a target or recommended contribution to a defined benefit pension plan based on the plan's funding policy. For CalSTRS, the actuarially determined contribution rate is the calculated level contribution rate to fully fund the DB Program over a closed period ending June 30, 2046. For GASB 67 and 68 reporting, the actuarially determined contribution is the employer portion (including the state portion) of that contribution and is therefore net of member contributions. For the fiscal year ended June 30, 2021, the actuarially determined contribution was the level rate calculated in the June 30, 2019 actuarial valuation applied to the actual DB Program payroll for the fiscal year ended June 30, 2021.

The actual contribution rates are set in statute, with the board having limited rate-setting authority to adjust contribution rates annually within the parameters of the Education Code. The current projections show CalSTRS is projected to be 100% funded by June 30, 2046, the target date of the funding plan to achieve a 100% Funded Ratio. This projection includes future contribution adjustments based upon the valuation policy and the board's limited rate-setting authority.

As shown in the following table, the actual employer contribution made for all programs (including those contributions made by the state) to the State Teachers' Retirement Plan was 92% of the actuarially determined contribution for the fiscal year ended June 30, 2021. Note that contributions to the State Teachers' Retirement Plan include contributions to the Defined Benefit, Defined Benefit Supplement, Cash Balance Benefit, and Supplemental Benefit Maintenance Account programs. This shortfall between the actual employer contribution and the actuarially determined contribution is projected to decline or be eliminated in the near term due to the expected recognition of deferred asset gains over the next several years.

($ Millions)	Fiscal Year-End 2021	Fiscal Year-End 2020
Actuarially Determined Contribution		
ADC percentage for DB Program (a)	26.937%	27.126%
Covered Payroll (b)	$ 34,590	$ 36,668
ADC for DB Program (a x b) = (c)	9,318	9,947
ADC for other programs[1] (d)	927	902
Total ADC for STRP (c + d) = (e)	10,245	10,849
Actual employer contribution[2] (f)	9,475	10,512
Percentage of Actual to ADC (f / e)	92.48%	96.89%

1. For the SBMA, CBB, and DBS programs, the actuarially determined contribution is equal to the actual contributions.

2. Includes actual contributions from non-employer contributing entities (which for CalSTRS is the state).

Based on the 2021 valuation, the calculated level contribution rate needed to fully fund the DB Program over a closed period ending June 30, 2046 is less than the calculated 2022-23 contribution rate under the valuation policy due to the limitations on annual contribution rate decreases. The theoretical contributions made based under the level contribution rate (net of member contributions) are analogous to the actuarially determined contributions included in CalSTRS GASB 67 and 68 reporting. The following table shows the estimated actuarially determined contribution rate for the DB Program for the upcoming year. The 2021 valuation results are used to calculate the actuarially determined contribution rate for the fiscal year ending 2023.

(Percent of Earned Salaries)	2021 Valuation FY 2022-23	2020 Valuation FY 2021-22
Actuarially Determined Contribution for DB Program		
Normal Cost Rate	19.575 %	19.598 %
Amortization Rate Needed	15.120	17.653
Total Level Rate for DB Program	34.695	37.251
Estimated Member Contribution Rate	(10.236)	(10.239)
ADC for DB Program	24.459	27.012
Estimated State Rate for DB Program[1]	7.422	9.473
Estimated Employer Rate for DB Program	18.813	15.920
Estimated Employer+State Contribution Rate[2]	26.235	25.393
Percentage of Actuarially Determined Contribution expected to be received	107.3 %	94.0 %

1. Includes expected state contributions of $584 million in fiscal year 2021-22.

2. Assumes the board exercises its limited rate-setting authority and adjusts contribution rates as calculated in this report and includes expected contributions from both employers and non-employer contributing entities (which, for CalSTRS, is the state).

Table 15 shows the details of how the estimated actuarially determined contribution rate is calculated for the upcoming year as well as the actual actuarially determined contribution for the current fiscal year.

Table 15
Actuarially Determined Contribution Rate for DB Program

($ Millions)	2021 Valuation FY 2022-23	2020 Valuation FY 2021-22
Unfunded Actuarial Obligation		
Beginning of Year	$ 89,719	$ 105,875
Normal Cost	7,159	7,152
Contributions	(12,532)	(12,295)
Benefit Payments	-	-
Interest	6,096	7,235
Projected to End of Year (a)	90,442	107,967
Present Value of Future Payroll		
Starting One Year After Valuation Date (b)	$ 598,177	$ 611,614
UAO Rate Needed		
End of Year UAO / PV Payroll [(a) / (b)]	15.120%	17.653%
Actuarially Determined Contribution Rate		
Normal Cost Rate	19.575%	19.598%
Amortization Rate Needed	15.120%	17.653%
Total Level Rate for DB Program	34.695%	37.251%
Member Contribution Rate	(10.236%)	(10.239%)
Actuarially Determined Contribution (for DB Program only)	24.459%	27.012%
Estimated Contribution Rate		
Estimated Contributions		
Member 22901 & 22901.7	$ 3,768	$ 3,753
Employer 22950 & 22951	3,037	3,024
Employer 22950.5 & 22950.6	3,888	2,811
State 22955.2	-	-
State 22955(a)	704	700
State 22955.1(b)	2,028	2,189
Additional State Contributions	-	584
Total Estimated Contributions	13,425	13,061
Projected Salaries	36,810	36,655
Total Contribution Rate	36.471%	35.632%
Member Contribution Rate	(10.236%)	(10.239%)
Estimated Employer+State Contribution Rate[1]	26.235%	25.393%

1. Assumes the board exercises its rate-setting authority and adjusts contribution rates as discussed in this report. Estimated rates include both projected employer and state contributions. Estimated rates for FY 2021-22 reflect temporary reductions in employer contribution rates and additional state contributions of $584 million in fiscal year 2021-22.

9. Projected Amortization and Cash Flows

We have previously shown graphical projections of contribution rates, the Funded Ratio, and the UAO. In this section, we show the numerical details behind those projections.

Table 16 shows the amortization of the UAO for the total DB Program on a year-by-year basis, based on 7.00% future returns, additional contribution rate increases, and the future recognition of the currently deferred asset gains. Assuming all other future experience emerges as assumed and no changes in the current contribution rates, the UAO is projected to be amortized by June 30, 2046. In total, the Funded Ratio is projected to be 107.9% under the assumptions described in the "Looking Ahead" subsection of Section 1. Note that additional state contributions budgeted but not specifically defined in the Education Code are not reflected in Table 16 or Table 17.

In **Table 16**, we show the contributions projected to be paid into the DB Program to fund ongoing benefits and amortize the UAO. **Table 17** shows a comparison of these inflows into DB Program with the outflows from the DB Program, which consist of benefit payments and expenses. The difference between these two values is the net cash flow. A negative value indicates CalSTRS is paying out more than it is receiving. Note that this projection does not account for cash received internally, such as interest and dividends on investments.

The net cash flow is currently negative, and this is projected to become increasingly negative over the next several years. This is a typical pattern for a mature retirement system where it is expected that contributions will be less than benefits and that the system will begin drawing on the fund that has been built up over prior years.

Table 16
Amortization of Unfunded Actuarial Obligation(1)

(Reflecting Projected Contribution Increases)(2)

($Millions)

		Beginning	Amortization Payment						Interest	Ending	Ending
		Unfunded	Contributions				Normal	Available	Charge	Unfunded	Funded
Year	FYE	Act. Oblig.	Member	Employer	State	Total	Cost	Amtzn.	at 7.00%	Act. Oblig.	Ratio
1	2022	$89,719	$3,641	$6,018	$3,471	$13,130	$7,159	$5,971	$6,075	$79,272	77.0%
2	2023	79,272	3,768	6,925	2,732	13,425	7,394	6,031	5,342	71,057	80.2%
3	2024	71,057	3,900	7,261	2,606	13,767	7,637	6,130	4,763	64,321	82.7%
4	2025	64,321	4,036	7,584	742	12,362	7,888	4,474	4,349	60,365	84.4%
5	2026	60,365	4,177	7,900	768	12,845	8,145	4,700	4,064	56,997	85.8%
6	2027	56,997	4,322	8,151	795	13,268	8,409	4,859	3,823	54,011	87.1%
7	2028	54,011	4,473	8,291	823	13,587	8,681	4,906	3,612	51,327	88.2%
8	2029	51,327	4,629	8,473	852	13,954	8,960	4,994	3,421	48,762	89.2%
9	2030	48,762	4,790	8,690	882	14,362	9,246	5,116	3,237	46,175	90.1%
10	2031	46,175	4,957	8,934	913	14,804	9,539	5,265	3,051	43,456	91.0%
11	2032	43,456	5,130	9,202	945	15,277	9,839	5,438	2,855	40,513	91.9%
12	2033	40,513	5,309	9,491	977	15,777	10,147	5,630	2,642	37,269	92.8%
13	2034	37,269	5,494	9,797	1,012	16,303	10,465	5,838	2,408	33,656	93.7%
14	2035	33,656	5,685	10,121	1,047	16,853	10,794	6,059	2,147	29,613	94.7%
15	2036	29,613	5,883	10,460	1,084	17,427	11,133	6,294	1,856	25,081	95.6%
16	2037	25,081	6,088	10,815	1,122	18,025	11,483	6,542	1,531	20,002	96.6%
17	2038	20,002	6,301	11,184	1,161	18,646	11,845	6,801	1,166	14,320	97.6%
18	2039	14,320	6,520	11,569	1,202	19,291	12,220	7,071	759	7,974	98.7%
19	2040	7,974	6,747	11,968	1,244	19,959	12,610	7,349	305	906	99.9%
20	2041	906	6,983	12,382	1,287	20,652	13,015	7,637	(199)	(6,949)	101.0%
21	2042	(6,949)	7,226	12,812	1,332	21,370	13,436	7,934	(759)	(15,655)	102.3%
22	2043	(15,655)	7,478	13,257	1,379	22,114	13,874	8,240	(1,379)	(25,283)	103.6%
23	2044	(25,283)	7,739	13,717	1,428	22,884	14,330	8,554	(2,064)	(35,908)	105.0%
24	2045	(35,908)	8,010	14,194	1,477	23,681	14,806	8,875	(2,819)	(47,606)	106.4%
25	2046	(47,606)	8,289	14,686	1,529	24,504	15,304	9,200	(3,649)	(60,459)	107.9%

1. *Based on the actuarial value of assets with projected recognition of known deferred asset gains and losses and additional state contributions of $584 million in fiscal year 2021-22.*
2. *Contribution rates include projected changes allowed under Education Code.*

Table 17
Projected Cash Flow

(Reflecting Projected Contribution Increases)[1]

($Millions)		Contributions[1]				Benefit	Net Program	Cash Flow as a Percentage of		Ending
Year	FYE	Member	Employer	State	Total	Payments[2]	Cash Flow	Payroll	Market Value of Assets	Funded Ratio
1	2022	$3,641	$6,018	$3,471	$13,130	$17,491	($4,361)	(12.3%)	(1.6%)	77.0%
2	2023	3,768	6,925	2,732	13,425	17,934	(4,509)	(12.2%)	(1.5%)	80.1%
3	2024	3,900	7,261	2,606	13,767	18,659	(4,892)	(12.8%)	(1.6%)	82.7%
4	2025	4,036	7,584	742	12,362	19,411	(7,049)	(17.9%)	(2.2%)	84.3%
5	2026	4,177	7,900	768	12,845	20,199	(7,354)	(18.0%)	(2.1%)	85.8%
6	2027	4,322	8,151	795	13,268	21,029	(7,761)	(18.4%)	(2.2%)	87.0%
7	2028	4,473	8,291	823	13,587	21,923	(8,336)	(19.1%)	(2.2%)	88.1%
8	2029	4,629	8,473	852	13,954	22,876	(8,922)	(19.7%)	(2.3%)	89.1%
9	2030	4,790	8,690	882	14,362	23,906	(9,544)	(20.4%)	(2.3%)	90.1%
10	2031	4,957	8,934	913	14,804	25,069	(10,265)	(21.2%)	(2.4%)	91.0%
11	2032	5,130	9,202	945	15,277	26,312	(11,035)	(22.0%)	(2.4%)	91.9%
12	2033	5,309	9,491	977	15,777	27,616	(11,839)	(22.8%)	(2.5%)	92.8%
13	2034	5,494	9,797	1,012	16,303	28,957	(12,654)	(23.5%)	(2.6%)	93.7%
14	2035	5,685	10,121	1,047	16,853	30,332	(13,479)	(24.2%)	(2.6%)	94.6%
15	2036	5,883	10,460	1,084	17,427	31,749	(14,322)	(24.9%)	(2.7%)	95.6%
16	2037	6,088	10,815	1,122	18,025	33,197	(15,172)	(25.5%)	(2.7%)	96.6%
17	2038	6,301	11,184	1,161	18,646	34,655	(16,009)	(26.0%)	(2.8%)	97.6%
18	2039	6,520	11,569	1,202	19,291	36,109	(16,818)	(26.3%)	(2.8%)	98.7%
19	2040	6,747	11,968	1,244	19,959	37,551	(17,592)	(26.6%)	(2.8%)	99.8%
20	2041	6,983	12,382	1,287	20,652	39,053	(18,401)	(26.9%)	(2.8%)	101.0%
21	2042	7,226	12,812	1,332	21,370	40,541	(19,171)	(27.1%)	(2.8%)	102.3%
22	2043	7,478	13,257	1,379	22,114	42,006	(19,892)	(27.2%)	(2.8%)	103.6%
23	2044	7,739	13,717	1,428	22,884	43,435	(20,551)	(27.1%)	(2.8%)	105.0%
24	2045	8,010	14,194	1,477	23,681	44,811	(21,130)	(26.9%)	(2.7%)	106.4%
25	2046	8,289	14,686	1,529	24,504	46,162	(21,658)	(26.7%)	(2.7%)	107.9%

1. Contribution rates include projected changes allowed under Education Code and additional state contributions of $584 million in fiscal year 2021-22.

2. Projected benefit payments include estimated administrative expenses.

10. Risk Disclosures

The results of any actuarial valuation are based on a set of assumptions. Although we believe the current DB Program assumptions provide a reasonable estimate of future expectations, it is almost certain that future experience will differ from the assumptions to some extent.

The following is a general discussion of the potential risks to CalSTRS funding. A comprehensive analysis of potential risks to future DB Program funding levels ("Review of Funding Level and Risks") is completed each fall by CalSTRS internal actuarial staff.

Factors Affecting Future Results

There are a number of factors that affect future valuation results. To the extent actual experience for these factors varies from the assumptions, this will likely cause either increases or decreases in the plan's future funding level and calculated supplemental contribution rates. Examples of factors that can have a significant impact on valuation results are:

- Investment return
- Payroll variation
- Salary variation
- Mortality (how long retirees live)
- Service retirement
- Termination (members leaving active employment for reasons other than death, disability, or service retirement)
- Contribution limitations. The board has limited rate-setting authority. If significant contribution increases are needed in the future, CalSTRS may receive insufficient funding due to the limitations on the board's ability to increase contribution rates under the current law. Projections based on the valuation assumptions indicate this is not currently an issue.

Of these factors, we believe the factor with the greatest potential risk is future investment returns. Payroll variation could also have a significant impact if there was a significant decline in the active teacher population, which, for example could occur if there was a large increase in the proportion of charter schools.

As an example of these risks, if actual investment returns fall short of the current assumption of 7% per year, this will cause an increase in the total supplemental contribution rate and a decrease in the Funded Ratio for the DB Program, all other things being equal. Conversely, if returns exceed 7%, this will decrease the total supplemental contribution rate and increase the Funded Ratio.

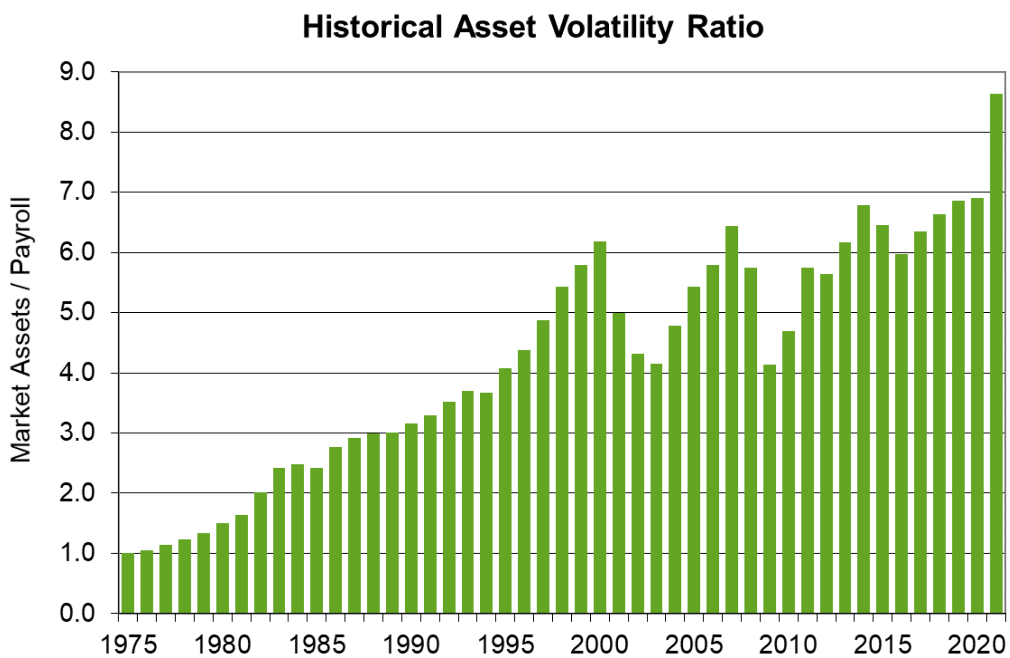
Maturity Risk

The magnitude of any contribution rate increase or decrease is affected by the Program's maturity level. As the DB Program becomes more mature (i.e., the number of retirees grows compared to the number of actives, and the accumulated assets grow compared to payroll), it tends to be subjected to increase volatility in the contributions needed. Specifically, for CalSTRS there may be significant fluctuations in the state supplemental contribution rates (and to a lesser extent the employer contribution rates) from year to year due to the actual investment return. One way to measure maturity risk is volatility ratios.

One indicator of this potential volatility is the Asset Volatility Ratio (AVR), which is equal to the Fair Market Value of Assets divided by total payroll. Note that for purposes of the AVR calculation, the assets include the SBMA. Plans with a high Asset Volatility Ratio will be subjected to a greater level of contribution rate volatility. The AVR is a current measure since it is based on the current level of assets and will vary from year to year.

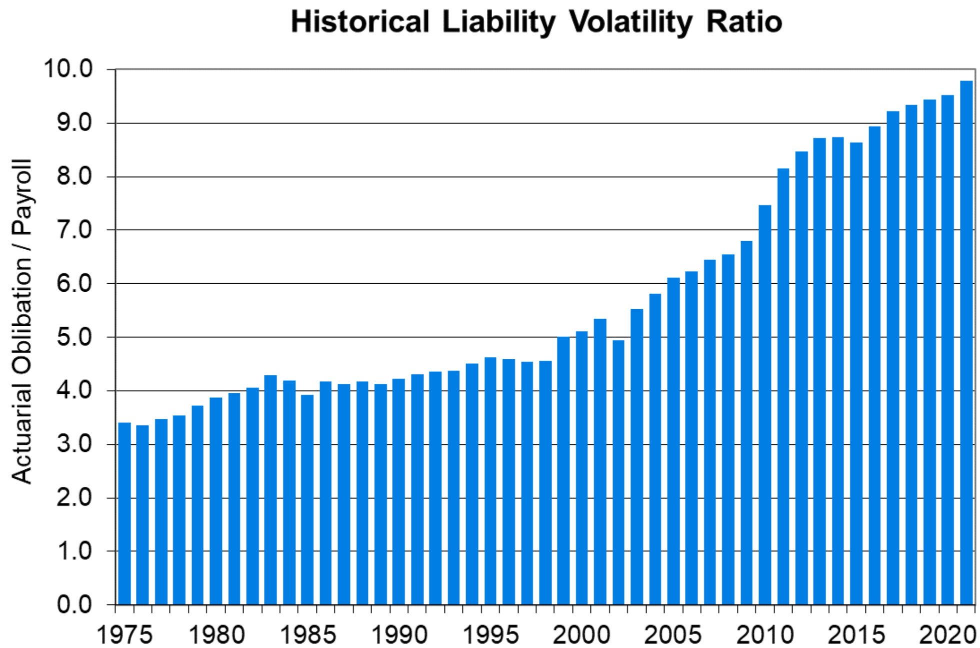
For CalSTRS, the current AVR is equal to 8.6, which is typical for a mature system. This means that for each 1% asset loss (in relation to the assumed investment return), there will need to be an increase in contributions equivalent to 8.6% of one-year's payroll. Since CalSTRS is currently targeting a funding period of 24 years (the years from the next valuation date to June 30, 2046), the increase (or decrease) in the state and employer contribution rates will be spread out over 24 years, resulting in approximately a 0.52% of payroll increase (or decrease) in the total contribution rate needed for each 1% asset loss (or gain). An asset loss (or gain) will primarily cause a contribution rate increase (or decrease) for the state and have a much smaller impact on the employer contribution rate.

The following graph shows how the System matured during the last 25 years of the 20th Century, as represented by the increasing AVR. Over the last decade and a half, increases in the AVR had somewhat leveled off although there was a large increase this year due to the significant increase in the market value of assets.



Another measure of a system's maturity is the Liability Volatility Ratio (LVR), which is equal to the Actuarial Obligation divided by the total payroll. This ratio provides an indication of the longer-term potential for contribution rate volatility if CalSTRS becomes fully funded. In addition, this ratio provides an indication of the potential contribution rate volatility due to liability experience (gains and losses) and liability re-measurements (assumption changes). For CalSTRS, the current LVR is 9.8.

The following graph shows the historical LVR. It is a similar pattern to the Asset Volatility Ratio except the increase is more gradual and the year-to-year variance is significantly less, although there have been larger changes in years where assumptions changes have occurred.



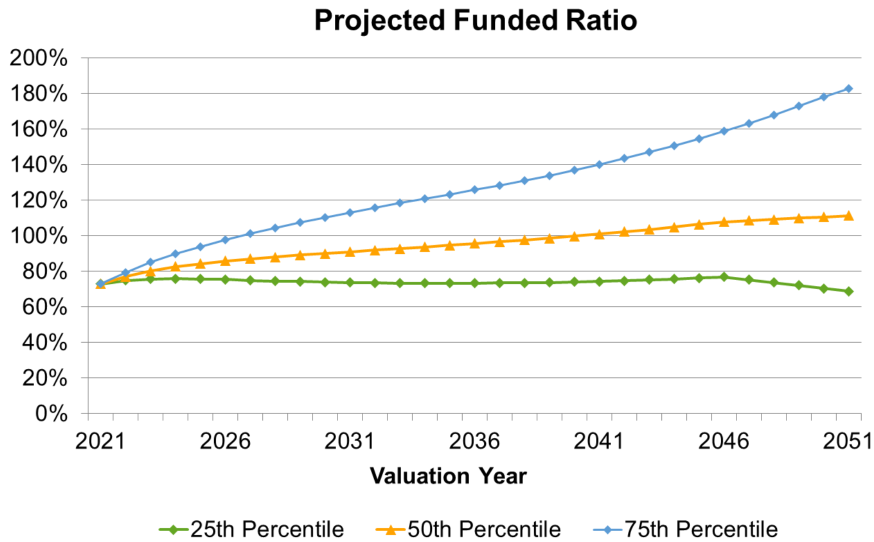
Projections Under Alternate Return Scenarios

Actuarial valuations are based on a certain set of assumptions. The reality is that these assumptions will not be exactly met and that this will affect future valuation results. Investment returns will likely have the biggest impact on the future funding of CalSTRS. In the following graphs, we show some simple examples of the future variation that may occur on key funding metrics. This is not intended to be a comprehensive analysis of the potential risks to CalSTRS funding, but it will provide the board a general sense of the sensitivity of funding levels and contribution rates caused by returns that are above or below the assumption over a long period.

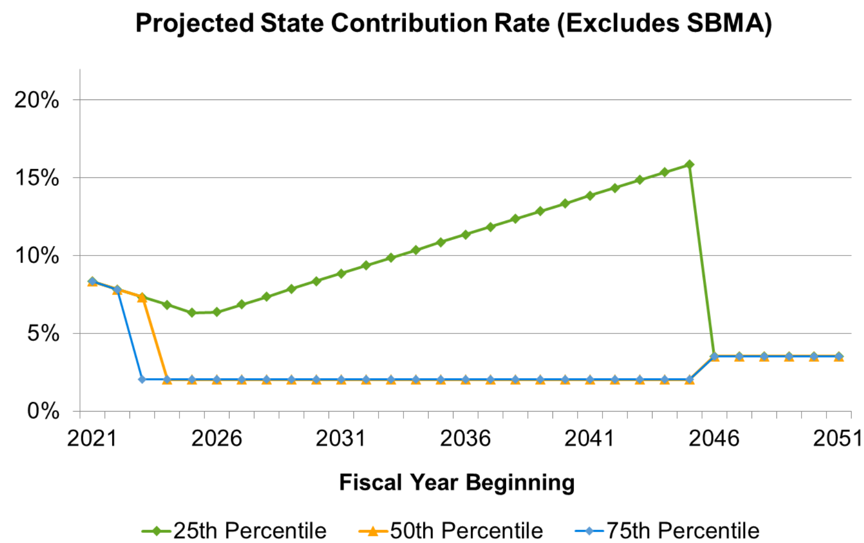
To show potential variability of future returns, we have assumed CalSTRS earns the 25th, 50th, and 75th percentile returns over the next 30 years. This assumes a median (50th percentile) geometric return of 7.0% and a standard deviation of 11.6% (before adjusting for the impact of guaranteed SBMA crediting). The average 30-year returns shown for the 30-year period are approximately 5.5% for the 25th percentile and 8.5% for the 75th percentile.

Note that the 25th percentile indicates there is a 25% probability of earning a return lower than 5.5%. This may be different than the way investment professionals use percentiles, but we have used this approach for consistency with the way CalSTRS actuarial staff reports percentiles in their risk report.

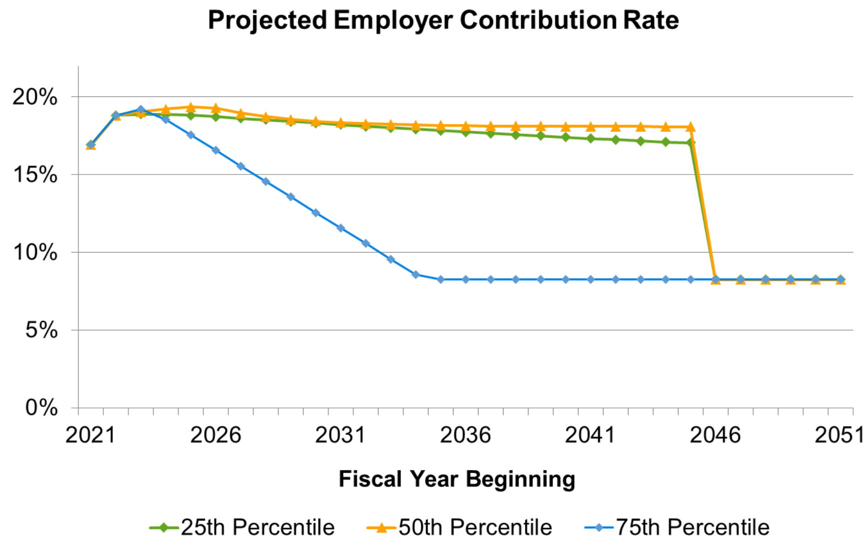
The graph below shows the potential impact of alternate returns on CalSTRS Funded Ratio. The green line (below-average returns) illustrates how the caps on contribution rate increases restrict CalSTRS ability to make significant progress toward its funding goal following sustained below-average returns.



The following graph shows the potential impact of alternate returns on the state contribution rate (excluding contributions to the SBMA). The state's contribution rate is quite sensitive to future returns, although the 0.5% cap on increases prevents large year-over-year increases. It should be noted that minimizing the year-over-year increases defers these costs and ultimately results in a higher ultimate contribution level than if the full increase needed was implemented in the following fiscal year.



The graph below shows the potential impact of varying returns on the employer contribution rate. Note that due to the way assets are allocated between the state and the employer, the projected employer contribution rate is slightly less under the 25th percentile scenario (green line) than the 50th percentile scenario (gold line).



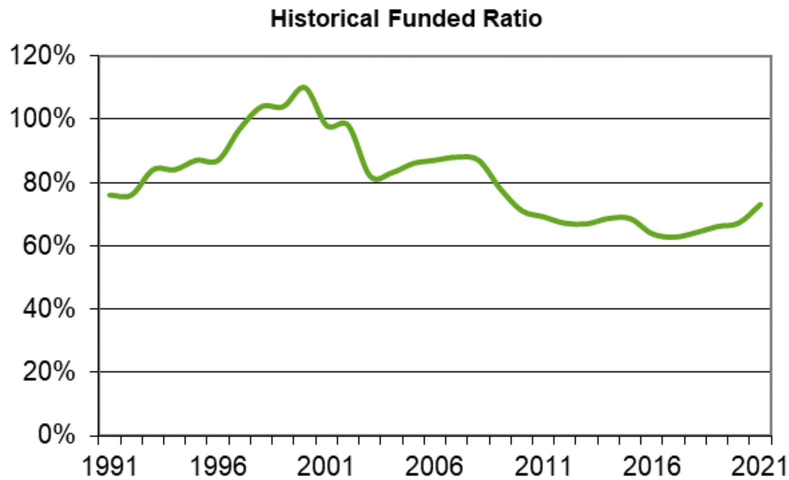
Member rates are not affected by future returns; however, the 2% at 62 member contributions may be affected by changes in the investment return assumption or other assumption changes.

Sensitivity to Payroll Growth

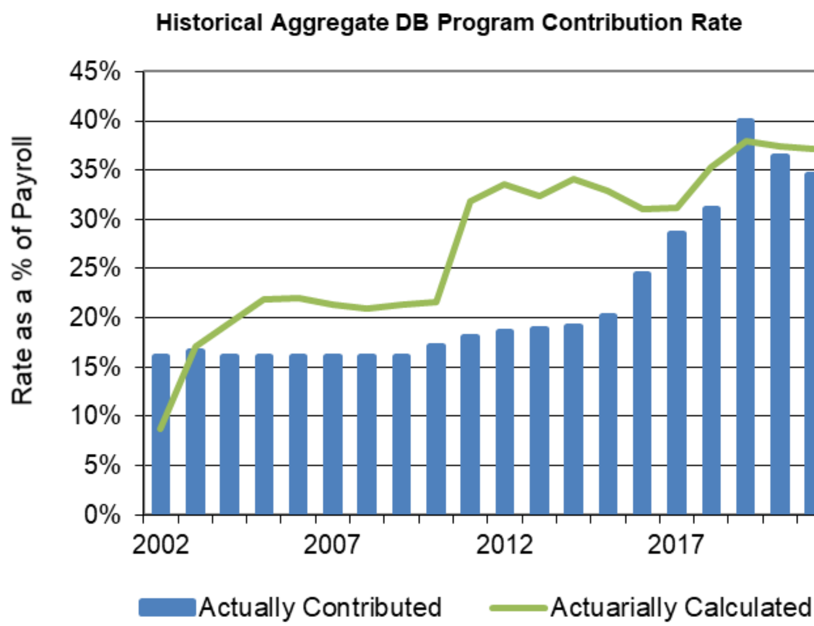
As discussed in this report, we believe future investment returns are likely to have the greatest impact on future CalSTRS funding and contribution rates. We believe a secondary factor could be variance in the total payroll for CalSTRS members. For example, if there was a 10% decline in the payroll next year, although the projected Funded Ratio in 2046 would decrease only slightly to 107.8% (from 107.9%), the total contribution rate from all stakeholders would be projected to ultimately increase by about 2.1% of pay. Note that this assumes that the decrease in payroll is due only to a decline in the active population (as opposed to decreases or less-than-assumed increases in members' compensation).

Historical Measures

One way to assess future risks is to look at historical measurements. The graph below shows how the DB Program Funded Ratio has varied over the last 30 years. In particular, it reflects the significant impact that investment returns can have. The strong returns of the 1990's caused a large increase in the Funded Ratio. Since 2000, actual returns have lagged the assumption and expectations of future returns have decreased. Additionally, the actual contribution rate has lagged the actuarially determined rate during most of the period, as discussed in the next paragraph. This combination has been the primary cause of the decline in the Funded Ratio since then.



The graph below shows the history of the actual contributions made (blue bar) as a percentage of payroll. The green line shows the actuarially calculated contribution rate based on amortizing the UAO by June 30, 2046 (for years before 2014, a 30-year amortization was used). There has been variance in both rates. As previously noted, as the DB Program continues to mature, year-to-year variance is projected to increase. Year-to-year changes in the actual contribution rate will likely be less than for the actuarially calculated rate due to the restrictions on changes in the state and employer supplemental contribution rates. Note that for purposes of this graph, the contribution rates include member, employer and state contributions to the DB Program and excludes contributions to the SBMA and other programs.



Appendix A Provisions of Governing Law

The actuarial calculations contained in this report are based upon our understanding of the CalSTRS DB Program as contained in Part 13 of the California Education Code and augmented by consultation with CalSTRS staff. The provisions used in this valuation are summarized below for reference purposes.

Member Contributions

Base Contribution Rate:

2% at 60 Members: 8.0% of creditable compensation. 25% of this contribution was redirected to the member's Defined Benefit Supplement account from January 1, 2001 through December 31, 2010.

The redirection of member contributions does not apply to the 1990 Benefit Structure.

2% at 62 Members: Equal to one-half of the Normal Cost Rate determined in the valuation rounded to the nearest quarter percent. Member rates only change when the Normal Cost Rate changes by 1.0% of payroll as compared to the initial Normal Cost Rate (or at the time of the last adjustment). Currently, the base member contribution rate is equal to 9.0% of creditable compensation.

Supplemental Contribution Rates:

In addition to the base contribution rates, members make additional contributions for fiscal years beginning July 1, 2016 and later:

2% at 60 Members: 2.250% of creditable compensation

2% at 62 Members: 1.205% of creditable compensation

Interest Rate:

Interest is credited at the end of each fiscal year based on rates adopted by the Teachers' Retirement Board. Currently, rates are approximately equal to two-year Treasury notes.

Normal Retirement

Eligibility Requirement:

2% at 60 Members: Age 60 with five years of credited service.

2% at 62 Members: Age 62 with five years of credited service.

Allowance:

Two percent of final compensation for each year of credited service.

Final Compensation:

2% at 60 Members: Average annualized pay rate for the highest three consecutive years of credited service for one position. For members with 25 years of service, the calculation is based on the highest average annualized pay rate in a consecutive 12-month period.

Twelve-month highest average compensation does not apply to the 1990 Benefit Structure.

2% at 62 Members: Final compensation is based on the highest three consecutive years of annualized pay rate. Compensation is limited to 120% of the Social Security Wage Base. The limit effective July 1, 2021 is $154,418 (after applying the 120% factor) and is adjusted annually based on changes to the Consumer Price Index for All Urban Consumers. The 2% at 62 members are not eligible for the one-year final compensation benefit enhancement.

Credited Service:

For each year of membership, credited service is granted based on the ratio of salary earned to full-time annualized pay rate for one position.

Sick Leave Service Credit:

Credited service is granted for unused sick leave at the time of retirement. Sick Leave Service Credit up to 0.2 years of Credited Service may be used for eligibility for One-Year Final Compensation or to attain the Career Factor or the Longevity Bonus.

Unused sick leave service credit does not apply to the 1990 Benefit Structure for members hired after June 30, 1980.

Career Factor:

If a member has 30 years of credited service, the age factor is increased by 0.2%. However, the maximum age factor is 2.4%.

Career factor does not apply to 2% at 62 members or the 1990 Benefit Structure.

Longevity Bonus:

For members attaining 30 years of service by January 1, 2011, a longevity bonus of $200 per month is added to the unmodified allowance. The bonus is increased to $300 per month with 31 years of service, and $400 per month with 32 or more years of service.

Longevity Bonus does not apply to 2% at 62 members or the 1990 Benefit Structure.

IRC Section 415:

Benefits are subject to limits imposed under Internal Revenue Code (IRC) Section 415. However, no limits are imposed in the valuation of the DB Program until they actually occur, in order to address the potential pay-as-you-go funding needs of the Teachers' Replacement Benefits Program Fund.

IRC Section 401(a)(17):

Compensation is limited under IRC Section 401(a)(17) and assumed to increase at the rate of inflation for valuation purposes. Current 401(a)(17) limits do not apply to members hired before July 1, 1996.

Early Retirement

Eligibility Requirement:

2% at 60 Members: Age 55 with five years of credited service, or age 50 with 30 years of credited service.

2% at 62 Members: Age 55 with five years of credited service.

Benefit Reduction:

2% at 60 Members: A half-percent reduction in the normal retirement allowance for each full month or partial month the member is younger than age 60, plus a reduction of a quarter percent for each full month or partial month the member is younger than age 55.

2% at 62 Members: A half-percent reduction in the normal retirement allowance for each full month or partial month the member is younger than age 62.

Late Retirement

Allowance:

2% at 60 Members: Members continue to earn additional service credit after age 60. The 2% age factor increases by 0.033% for each quarter year of age that the member is over age 60, up to a maximum of 2.4%.

2% at 62 Members: Members continue to earn additional service credit after age 62. The 2% age factor increases by 0.033% for each quarter year of age that the member is over age 62, up to a maximum of 2.4%.

The late retirement adjustment does not apply to the 1990 Benefit Structure.

Deferred Retirement

Allowance:

Any time after satisfying the minimum service requirement, a member may cease active service, leave the accumulated contributions on deposit, and later retire upon attaining the minimum age requirement.

Post-Retirement Benefit Adjustment

Benefit Improvement:

2% simple increase on September 1 following the first anniversary of the effective date of the allowance, applied to all continuing allowances.

Coverage for Disability and Survivor Benefits

Coverage A: CalSTRS member on or before October 15, 1992 and did not elect Coverage B before April 1993.

Coverage B: Not a Coverage A member.

Disability Allowance - Coverage A

Eligibility Requirement Allowance:*

Member has five years of credited California service and has not attained age 60.

- 50% of final earned compensation or
- 5% of final earned compensation for each year of service credit if over age 45 with less than 10 years of service credit.

**Note that, for valuation purposes, the greater of the service retirement allowance and the disability allowance is valued if the member is eligible for service retirement.*

Children's Benefit:

10% for each eligible dependent child, up to a maximum of 40% of final earned compensation. The increment for each eligible child continues until the child marries or attains age 22.

Offsets:

Allowance, including children's increment, is reduced by disability benefits payable under Social Security, Workers' Compensation, and employer-paid income protection plan.

Disability Allowance - Coverage B (including 2% at 62 members)

Eligibility Requirement:

Member has five years of credited California service.

Allowance:*

50% of final compensation, regardless of age and service credit.

Children's Benefit:

10% for each eligible child up to four children, for a maximum of 40% of final compensation. The increment for each child continues until the child attains age 21, regardless of student, marital, or employment status.

Offsets:

The member's allowance is reduced by disability benefits payable under Workers' Compensation.

**Note that, for valuation purposes, the greater of the service retirement allowance and the disability allowance is valued if the member is eligible for service retirement.*

Death Before Retirement - Coverage A

Eligibility Requirement:

One or more years of service credit for active members or members receiving a disability allowance. Ineligible members may receive a lump sum payment of their contributions with interest.

Lump Sum Payment:

$6,480 lump sum to the designated beneficiary. If there is no surviving spouse, domestic partner, or eligible children, the contributions and interest are paid to the designated beneficiary.

Allowance:

The surviving spouse or domestic partner with eligible children will receive a family benefit of 40% of final compensation for as long as there is at least one eligible child. An additional 10% of final compensation is payable for each eligible child up to a maximum benefit of 90%.

If there is no surviving spouse or domestic partner, an allowance of 10% of final compensation is payable to eligible children up to a maximum benefit of 50%.

When there are no eligible children, the spouse or domestic partner may elect to receive one-half of a 50% joint and survivor allowance projected to age 60, or take a lump sum payment of the remaining contributions and interest.

Death Before Retirement - Coverage B (including 2% at 62 members)

Eligibility:

One or more years of service credit for active members. Ineligible members may receive a lump sum payment of their contributions with interest.

Lump Sum Payment:

$25,920 lump sum to the designated beneficiary. If there is no surviving spouse or domestic partner, the contributions and interest are paid to the designated beneficiary.

Allowance:

A lump sum payment of the contributions and interest. Or, one-half of a 50% joint and survivor allowance, beginning on the member's 60th birthday, or immediately with a reduction based on the member's and spouse's (or domestic partner's) ages at the time the benefit begins.

If the surviving spouse or domestic partner elects a monthly allowance, each eligible child would receive 10% of the member's final compensation, with a maximum benefit of 50%.

Death After Retirement

Lump Sum Payment:

$6,480 lump sum to the designated beneficiary.

Annuity Form:

If the retiree had elected one of the joint and survivor options, the retirement allowance would be modified in accordance with the option selected.

If no annuity option had been elected, payment of the unpaid contributions and interest, if any, remaining in the retiree's account will be made.

Termination from the Program

Refund:

Refund of contributions with interest as credited to the member's account to date of withdrawal. A refund terminates membership and all rights to future benefits from the System.

Re-entry After Refund:

Former members who re-enter the System may redeposit all amounts previously refunded plus regular interest. The member must earn one year of credited service after re-entry before becoming eligible for System benefits.

Appendix B Actuarial Methods and Assumptions

This section of the report discloses the actuarial methods and assumptions used in this Actuarial Valuation. These methods and assumptions have been chosen on the basis of recent experience of the DB Program and on current expectations as to future economic conditions. The assumptions were reviewed and changed for the June 30, 2019 actuarial valuation as a result of the 2020 Experience Analysis. The assumptions were reviewed for continued reasonableness with the June 30, 2021 valuation; no changes were made. Please refer to the Experience Analysis report dated January 14, 2020 for the data and rationale used in the recommendation of each assumption.

The assumptions are intended to estimate the future experience of the members of the DB Program and of the DB Program itself in areas that affect the projected benefit flow and anticipated investment earnings. Any variations in future experience from that expected from these assumptions will result in corresponding changes in estimated costs of the DB Program's benefits.

Actuarial Cost Method

Entry Age Normal Cost Method:

The accruing costs of all benefits with future accruals are measured by the Entry Age Normal Cost Method. For measurements where no future service is earned (i.e., those with service fixed as of June 30, 2014), the Actuarial Obligation uses the Projected Unit Credit Cost Method.

The projected revenue in excess of the Normal Cost rate is tested for sufficiency to amortize the Unfunded Actuarial Obligation created under this method. Amortization is calculated on a level percentage of salary including general wage inflation but no increase or decrease in the number of active members.

The actuarial present value of projected benefits for each individual member included in the valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Normal Cost. The Normal Cost is based on the respective benefit structures. For projection purposes, the Normal Cost rate is assumed to increase by a relative 0.12% per year to reflect an assumed gradual increase in life expectancies due to generational mortality. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future Normal Costs is called the Actuarial Obligation. The excess of the Actuarial Obligation over the Actuarial Value of Assets is called the Unfunded Actuarial Obligation. If the Actuarial Value of Assets exceeds the Actuarial Obligation, the difference is called the Actuarial Surplus.

Entry Age:

The ages at entry of future active members are assumed to average the same as the entry ages of the present active members they replace. If the number of active members should increase (or decrease), it is further assumed that the average entry age of the larger (or smaller) group will be the same, from an actuarial standpoint, as that of the present active group. Under these assumptions, the Normal Cost Rate will not vary significantly due to the termination of the present active membership, or with an expansion or contraction of the active membership.

Entry age is determined as the age at membership date.

Projected Unit Credit (PUC) Cost Method:

This cost method is used for calculations of the actuarial obligation where there are no future service accruals. Under the PUC method, the actuarial present value of projected benefits for each individual member included in the valuation is determined based on the current service and salary projected to the age the member leaves active employment. The Normal Cost is $0 since no benefits are being earned.

Asset Valuation Method

The assets are valued using a method that delays recognition of investment gains or losses. The expected actuarial value is the prior year's actuarial value increased with net cash flow of funds, and all increased with interest during the past year at the expected investment return assumption. One-third of the difference between the expected actuarial value of assets and the Fair Market Value of assets is added to the expected actuarial value of assets to arrive at the Actuarial Value of Assets. The smoothing is applied on the total DB Program assets and then the SBMA is deducted to determine the net actuarial value for funding purposes. The Fair Market Value excludes the liability for "Net Pension and OPEB Obligation," which are pre-recognized administrative expenses, from the Fiduciary Net Position reported for accounting purposes.

Actuarial Assumptions

The Actuarial Standards Board has adopted Actuarial Standard of Practice No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. This Standard provides guidance on selecting economic assumptions under defined benefit retirement programs such as the System. In our opinion, the economic assumptions have been developed in accordance with the Standard.

The Actuarial Standards Board has adopted Actuarial Standard of Practice No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*. This Standard provides guidance on selecting demographic assumptions under defined benefit retirement programs such as the System. In our opinion, the demographic assumptions have been developed in accordance with the Standard.

The assumptions are intended to estimate the future experience of the members of the DB Program and of the System itself in areas that affect the projected benefit flow and anticipated investment earnings. Any variations in future experience from that expected from these assumptions will result in corresponding changes in estimated costs of the Program's benefits.

The demographic assumptions are listed in Table B.1 and illustrated at selected ages and duration combinations in Tables B.2 – B.7.

Payroll Growth Assumption

The wage growth assumption is equal to 3.50%, and the active population is assumed to be stable. Thus, the DB Program payroll is assumed to increase at a rate of 3.50% each year.

Table B.1
List of Major Valuation Assumptions

Economic Assumptions

Investment Return (net of investment and administrative expenses)	7.00%
Interest on Member Accounts	3.00%
Wage Growth	3.50%
Inflation	2.75%

Demographic Assumptions

Mortality[(1)]		
Active - Male	2019 CalSTRS Active Member Male	Table B-2
Active - Female	2019 CalSTRS Active Member Female	Table B-2
Retired & Beneficiary - Male	2019 CalSTRS Service Retired Male	Table B-2
Retired & Beneficiary - Female	2019 CalSTRS Service Retired Female	Table B-2
Disabled - Male	2019 CalSTRS Disabled Retiree Male	Table B-2
Disabled - Female	2019 CalSTRS Disabled Retiree Female (select rates in first three years for both Males and Females)	Table B-2
Service Retirement		Table B-3
Disability Retirement		Table B-4
Withdrawal		Table B-5
Probability of Refund		Table B-6
Merit Salary Increases		Table B-7
Supplemental Assumptions		Table B-8

1. The mortality assumption uses a generational mortality approach with a base year of 2019. Projected improvement is based on 110% of the MP-2019 Ultimate Projection Scale. The combined base tables and projection scale specified contain a margin for expected future mortality improvement.

Table B.2
Mortality as of June 30, 2021

	Active Members(1)	
Age	Male	Female
25	0.012%	0.007%
30	0.017	0.011
35	0.023	0.015
40	0.032	0.023
45	0.050	0.036
50	0.084	0.055
55	0.130	0.081
60	0.199	0.121
65	0.327	0.203

	Retired Members and Beneficiaries(1)		Disabled Members (After Year 3)(1)	
Age	Male	Female	Male	Female
50	0.230%	0.128%	1.768%	0.998%
55	0.339	0.202	2.056	1.249
60	0.454	0.268	2.331	1.474
65	0.645	0.404	2.713	1.761
70	1.033	0.666	3.364	2.286
75	1.853	1.225	4.436	3.253
80	3.399	2.348	6.142	4.818
85	6.536	4.684	8.922	7.159
90	12.631	9.548	13.558	10.600
95	21.628	17.929	20.312	15.721

Select minimum rates for disability:		
First year of disability	4.0%	3.0%
Second year of disability	3.5	2.5
Third year of disability	3.0	2.0

1. The mortality assumption uses a generational mortality approach with a base year of 2019 for the mortality rates. Projected improvement is based on 110% of the MP-2019 Ultimate Projection Scale. The rates shown reflect mortality improvement through June 30, 2021. The projection scale does not apply to the select minimum rates.

Table B.3a
Service Retirement – 2% at 60 Males

DB Program - 2% at 60 Members - Males								
	Years of Credited Service							
Age	5-9 years	10-14 years	15-19 years	20-24 years	25 years	26-29 years	30 years	31 or More Years
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	4.5%
51	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5
52	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5
53	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5
54	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5
55	2.0	2.5	3.0	4.0	6.0	5.0	7.5	5.5
56	1.5	1.5	2.0	2.5	4.0	3.5	7.5	5.5
57	1.5	1.5	2.0	2.5	4.0	3.5	10.0	7.5
58	2.0	2.0	2.5	3.5	6.0	5.0	12.5	9.0
59	3.0	3.0	4.0	5.0	8.5	7.0	18.5	13.5
60	4.0	5.0	6.5	8.0	11.5	9.5	28.0	20.5
61	5.0	5.5	7.5	9.0	16.0	13.5	50.0	50.0
62	7.0	8.0	10.5	13.0	25.5	21.0	45.0	45.0
63	8.5	9.5	12.5	15.5	34.5	29.0	35.0	35.0
64	9.0	10.5	13.5	17.0	27.5	23.0	30.0	30.0
65	11.0	13.0	17.0	21.0	32.0	27.0	32.5	32.5
66	11.0	13.0	17.0	21.0	27.5	23.0	30.0	30.0
67	11.0	13.0	17.0	21.0	27.5	23.0	27.0	27.0
68	10.0	11.0	14.5	18.0	27.5	23.0	27.0	27.0
69	10.0	11.0	14.5	18.0	27.5	23.0	25.0	25.0
70	10.0	11.0	14.5	18.0	27.5	23.0	25.0	25.0
71	9.0	10.0	13.0	16.5	27.5	23.0	25.0	25.0
72	9.0	10.0	13.0	16.5	27.5	23.0	25.0	25.0
73	9.0	10.0	13.0	16.5	27.5	23.0	25.0	25.0
74	9.0	10.0	13.0	16.5	27.5	23.0	25.0	25.0
75+	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The assumptions shown above are for retirement from active status. It is assumed that all vested terminated 2% at 60 members retire at age 60.

Table B.3b
Service Retirement – 2% at 60 Females

DB Program - 2% at 60 Members - Females

Age	Years of Credited Service							
	5-9 years	10-14 years	15-19 years	20-24 years	25 years	26-29 years	30 years	31 or More Years
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	4.5%
51	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0
52	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0
53	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0
54	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0
55	2.0	3.0	3.5	4.5	6.0	5.0	8.5	6.5
56	1.5	2.0	2.5	3.5	5.0	4.0	8.5	6.5
57	1.5	2.0	2.5	3.5	6.0	5.0	9.5	7.5
58	2.0	3.0	3.5	4.5	7.0	5.5	14.5	11.0
59	3.0	4.0	5.5	7.0	10.0	8.0	18.0	14.0
60	4.0	5.5	7.5	9.5	15.5	12.5	30.5	23.0
61	5.0	7.0	9.5	12.0	21.5	17.0	50.0	50.0
62	7.0	10.0	13.0	17.0	33.0	26.0	48.0	48.0
63	9.0	13.0	17.0	21.5	42.0	33.5	38.0	38.0
64	7.5	11.0	14.5	19.0	36.0	28.5	36.0	36.0
65	10.0	14.5	19.0	24.5	39.0	31.0	38.0	38.0
66	10.0	14.5	19.0	24.5	36.0	28.5	32.0	32.0
67	9.0	13.0	17.0	21.5	36.0	28.5	32.0	32.0
68	9.0	13.0	17.0	21.5	36.0	28.5	30.0	30.0
69	9.0	13.0	17.0	21.5	36.0	28.5	30.0	30.0
70	9.0	13.0	17.0	21.5	36.0	28.5	30.0	30.0
71	8.5	12.0	16.0	20.5	36.0	28.5	30.0	30.0
72	8.5	12.0	16.0	20.5	36.0	28.5	30.0	30.0
73	8.5	12.0	16.0	20.5	36.0	28.5	30.0	30.0
74	8.5	12.0	16.0	20.5	36.0	28.5	30.0	30.0
75+	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The assumptions shown above are for retirement from active status. It is assumed that all vested terminated 2% at 60 members retire at age 60.

Table B.3c
Service Retirement – 2% at 62 Males

DB Program - 2% at 62 Members - Males						
	Years of Credited Service					
Age	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30 or More Years
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
51	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0
55	1.5	2.0	2.5	3.0	4.0	5.0
56	1.0	1.0	1.5	2.0	2.5	3.0
57	1.0	1.0	1.5	2.0	2.5	3.0
58	1.5	1.5	2.0	2.5	4.0	5.0
59	2.5	2.5	3.0	4.0	5.5	6.5
60	3.0	4.0	5.0	6.0	7.5	9.0
61	4.0	4.0	5.5	7.0	10.5	12.5
62	5.5	6.0	8.0	10.0	16.5	20.0
63	6.5	7.0	9.0	11.5	17.5	21.0
64	7.0	8.0	10.0	13.0	18.0	21.5
65	11.0	13.0	17.0	21.0	28.0	28.0
66	11.0	13.0	17.0	21.0	24.0	24.0
67	13.0	15.5	20.5	25.0	28.5	28.5
68	10.0	11.0	14.5	18.0	24.0	24.0
69	10.0	11.0	14.5	18.0	24.0	24.0
70	10.0	11.0	14.5	18.0	24.0	24.0
71	9.0	10.0	13.0	16.5	24.0	24.0
72	9.0	10.0	13.0	16.5	24.0	24.0
73	9.0	10.0	13.0	16.5	24.0	24.0
74	9.0	10.0	13.0	16.5	24.0	24.0
75	100.0	100.0	100.0	100.0	100.0	100.0

The assumptions shown above are for retirement from active status. It is assumed that all vested terminated 2% at 60 members retire at age 60.

Table B.3d
Service Retirement – 2% at 62 Females

DB Program - 2% at 62 Members - Females						
	Years of Credited Service					
Age	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30 or More Years
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
51	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0
55	1.5	2.5	2.5	3.5	4.0	5.0
56	1.0	1.5	2.0	2.5	3.0	3.5
57	1.0	1.5	2.0	2.5	4.0	5.0
58	1.5	2.5	2.5	3.5	4.5	5.5
59	2.5	3.0	4.0	5.5	6.5	8.0
60	3.0	4.0	5.5	7.0	10.0	12.0
61	4.0	5.5	7.0	9.0	13.5	16.0
62	5.5	7.5	10.0	13.0	20.5	24.5
63	5.5	8.0	10.5	14.0	21.5	26.0
64	5.5	8.5	11.0	14.5	22.5	27.0
65	10.0	14.5	19.0	24.5	32.5	32.5
66	10.0	14.5	19.0	24.5	30.0	30.0
67	11.0	15.5	20.5	26.0	36.0	36.0
68	9.0	13.0	17.0	21.5	30.0	30.0
69	9.0	13.0	17.0	21.5	30.0	30.0
70	9.0	13.0	17.0	21.5	30.0	30.0
71	8.5	12.0	16.0	20.5	30.0	30.0
72	8.5	12.0	16.0	20.5	30.0	30.0
73	8.5	12.0	16.0	20.5	30.0	30.0
74	8.5	12.0	16.0	20.5	30.0	30.0
75	100.0	100.0	100.0	100.0	100.0	100.0

The assumptions shown above are for retirement from active status. It is assumed that all vested terminated 2% at 62 members retire at age 62.

Table B.3e
Service Retirement – 1990 Benefit Structure Males

DB Program - 1990 Structure - Males						
	Years of Credited Service					
Age	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30 or More Years
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
51	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0
54	1.0	1.0	1.5	1.5	1.5	1.5
55	3.5	4.5	5.0	6.0	6.0	6.5
56	2.5	3.0	3.5	4.0	4.0	4.5
57	3.0	4.0	4.5	5.0	5.0	5.5
58	4.0	5.5	6.0	7.0	7.0	8.0
59	10.5	14.0	16.0	17.5	18.5	20.0
60	15.0	20.0	22.5	25.0	26.5	29.0
61	10.0	13.0	15.0	16.5	17.5	19.0
62	10.0	13.0	15.0	16.5	17.5	19.0
63	9.0	12.0	13.5	15.0	16.0	17.5
64	10.5	14.0	16.0	17.5	18.5	20.0
65	12.0	16.0	18.0	20.0	21.0	23.0
66	9.5	13.0	14.5	16.0	17.0	18.5
67	9.5	13.0	14.5	16.0	17.0	18.5
68	9.5	13.0	14.5	16.0	17.0	18.5
69	9.5	13.0	14.5	16.0	17.0	18.5
70+	100.0	100.0	100.0	100.0	100.0	100.0

The assumptions shown above are for retirement from active status. It is assumed that all vested terminated members retire at age 60 under the 1990 Benefit Structure.

Table B.3f
Service Retirement – 1990 Benefit Structure Females

DB Program - 1990 Structure - Females						
	Years of Credited Service					
Age	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30 or More Years
50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
51	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0
54	1.0	1.0	1.5	1.5	1.5	1.5
55	4.0	5.5	6.5	7.0	7.5	8.0
56	2.5	3.5	4.0	4.5	4.5	5.0
57	2.5	3.5	4.0	4.5	4.5	5.0
58	4.0	5.5	6.5	7.0	7.5	8.0
59	8.5	11.0	12.5	14.0	14.5	16.0
60	13.0	17.5	20.0	22.0	23.0	25.5
61	9.0	12.0	13.5	15.0	16.0	17.5
62	9.0	12.0	13.5	15.0	16.0	17.5
63	9.0	12.0	13.5	15.0	16.0	17.5
64	11.0	14.5	16.0	18.0	19.0	20.5
65	11.0	14.5	16.0	18.0	19.0	20.5
66	11.0	14.5	16.0	18.0	19.0	20.5
67	11.0	14.5	16.0	18.0	19.0	20.5
68	9.5	13.0	14.5	16.0	17.0	18.5
69	9.5	13.0	14.5	16.0	17.0	18.5
70+	100.0	100.0	100.0	100.0	100.0	100.0

The assumptions shown above are for retirement from active status. It is assumed that all vested terminated members retire at age 60 under the 1990 Benefit Structure.

Table B.4
Disability Retirement

Coverage A		
Age	Male	Female
25	0.015%	0.015%
30	0.025	0.025
35	0.040	0.050
40	0.065	0.075
45	0.090	0.090
50	0.130	0.180
55	0.170	0.225

Coverage B		
Age	Male	Female
25	0.010%	0.015%
30	0.015	0.015
35	0.025	0.030
40	0.050	0.055
45	0.085	0.095
50	0.125	0.165
55	0.235	0.285
60	0.345	0.360
65	0.380	0.380
70	0.380	0.380

Table B.5
Other Terminations of Employment (Withdrawal)

Year[1]	Male	Female
0	12.25%	11.25%
1	8.50	7.00
2	6.75	5.50
3	5.40	4.25
4	3.75	3.25
5	3.10	2.70
10	1.65	1.50
15	1.05	1.05
20	0.75	0.75
25	0.50	0.50
30	0.45	0.40

1.Based on elapsed service since membership date.

Table B.6
Probability of Refund

	Entry Ages					
Year[1]	Under 25	25-29	30-34	35-39	40-44	45 and Up
Under 5	100%	100%	100%	100%	100%	100%
5	60	60	60	54	50	45
10	38	38	38	34	25	
15	30	30	28	17		
20	24	22	18			
25	14	12				
30	5					

1. Assumption applied at time of assumed termination based on credited service. Members who terminate with less than five years of credited service are assumed to have a 100% probability of refund.

Table B.7
Merit Salary Increases(1)

Year(2)	Entry Age - Annual Increase in Salaries Due to Merit					
	Under 25	25-29	30-34	35-39	40-44	45 & up
0	6.4%	5.8%	5.3%	4.8%	4.5%	3.7%
1	6.4	5.8	5.3	4.8	4.5	3.7
2	6.0	5.5	5.0	4.5	4.3	3.5
3	5.6	5.3	4.8	4.3	4.1	3.3
4	5.4	5.0	4.5	4.1	3.9	3.0
5	5.2	4.8	4.3	3.9	3.8	2.8
10	3.7	3.4	3.0	2.7	2.5	1.8
15	1.8	1.7	1.5	1.2	1.2	0.9
20	1.3	1.2	1.2	0.8	0.8	0.6
25	1.1	1.0	0.9	0.6	0.6	
30	0.9	0.8	0.7	0.5		
35	0.8	0.7	0.6			
40	0.8	0.7				
45	0.8					

1. The total expected increase in salary includes both merit (shown above) and the general wage increase assumption of 3.50% per annum. The total result is compounded rather than additive. For example, the total assumed increase for service less than one year (Year 0 above) is 10.124% (1.064 x 1.035) for members in the entry age under 25 group.

2. Based on elapsed service since membership date.

Table B.8
Supplemental Assumptions

PEPRA Coverage	All members hired on or after the valuation date are assumed to be subject to the provisions of PEPRA.
Unused Sick Leave	Credited Service is increased by 1.7%.
Optional Forms	Active and Inactive: Based on single life annuity assumed. Retirees and Beneficiaries: Based on optional form in data.
Probability of Marriage	Male: 85% Female: 65% Male spouses are assumed to be three years older than female spouses.
Children	Married members under age 60 are assumed to have the number of children shown in the following table. Children are assumed to receive benefits until the member would have turned age 60.

Member's Gender	Assumed Number of Children
Male	0.65
Female	0.50

Assumed Offsets	No offsets to disability and survivor benefits are assumed.

Valuation of Inactive Members

Salary and benefit information is not available on the valuation data provided for inactive members. Therefore, we estimate the projected retirement benefits for inactive members as follows:

1) The inactive member's annualized pay rate information is retrieved from when they were active by matching with a database of active valuation data back to 2001 and taking the highest annualized pay rate for the member during the period.
2) For those members who cannot be located on the active database (because they terminated prior to 2001 or another reason), their annualized pay rate is estimated based on 120% of the average annualized pay rate for all active members in the year the member terminated.
3) The annualized pay rate amount from the prior steps is treated as the member's final compensation with two additional adjustments.
   a. An additional load of 5% for all inactive members is applied to their salary amount to account for potential post-termination increases in salary due to factors such as reciprocity.
   b. Final compensation is increased by an additional 4.3% if the member has 25 or more years of credited service.
4) Based on the salary data described above and the birth date and credited service from the current year's valuation data, the projected benefit amount is calculated and valued as a deferred service retirement.
5) Non-vested members who have been inactive for less than two years are assumed to take an immediate refund of their member contributions.

Appendix C Valuation Data

The membership data for this actuarial valuation was supplied by CalSTRS. Although we did not audit this data, we compared the data for this and the prior valuation and tested for reasonableness, as well as for consistency with prior periodic reports from the CalSTRS staff. Based on these tests, we believe the data to be sufficiently accurate for the purposes of this valuation. Since the valuation results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

Note that CalSTRS provides two files with benefit recipients. The benefit valuation file includes all service retirees, disabled retirees, and most surviving beneficiaries. The family benefit valuation file includes other survivors, including child beneficiaries and survivors deferring their benefit. Information from the family benefit valuation file is included with the survivor information shown in this section, except for average ages and benefit amounts.

Tables C.1-C.6 summarize the census data used in this valuation.

Table C.1
Summary of Statistical Information

	June 30, 2021	June 30, 2020
Number of Members		
Active Members (1)	429,681	448,419
Inactive Members (1)	230,770	213,056
Retirees and Beneficiaries		
Service Retirees	281,302	276,070
Disabled Retirees	9,973	10,095
Survivors	29,318	28,353
Total Benefit Recipients	320,413	314,518
Total Membership in Valuation	980,864	975,993
Active Member Statistics		
Earned Salaries (2)	$ 33,914 million	$ 33,811 million
Average Earned Salary	$ 78,928	$ 75,401
Average Age	45.4 years	45.3 years
Average Service	12.9 years	12.4 years

1. Some active members were reported with no Annualized Pay Rate, in which case their liabilities, if any, were included with inactive members.

2. Total of prior year Earned Salaries for all active members. This may differ from the payroll amounts shown elsewhere which may include other adjustments.

Retired Member Statistics(3)	June 30, 2021	June 30, 2020
Average Age		
Service Retiree	74.3	74.1
Disabled Retiree	67.2	66.9
Survivors	77.8	77.8
All Benefit Recipients	74.3	74.2
Average Monthly Benefit		
Service Retirees	$ 4,378	$ 4,279
Disabled Retirees	3,047	2,971
Survivors	2,898	2,797
All Benefit Recipients	$ 4,217	$ 4,119

3. Average retiree ages shown here are current ages; average retiree ages shown elsewhere in this Appendix are age at retirement. Survivors from family benefit valuation file are excluded from averages. Average Monthly Benefit amounts exclude the supplemental benefit.

Table C.1
Summary of Statistical Information
(Continued)

Inactive Member Statistics	**June 30, 2021**	**June 30, 2020**
Average Age	50.2	50.0
Average Account Balance	$ 13,740	$ 13,257

Active Member Statistics by Benefit Formula [1]	**2% at 60 Members**	**2% at 62 Members**
Number	298,366	131,315
Earned Salaries [2]	$ 26,709 million	$ 7,205 million
Average Earned Salary	$ 89,516	$ 54,871
Average Age	49.7 years	35.7 years
Average Service	17.0 years	3.5 years

Retired Member Statistics by Benefit Structure[3]	**1990 Benefit**	**Total Benefit**
Average Monthly Benefit		
Service Retirees	$ 3,607	$ 4,378
Disabled Retirees	3,017	3,047
Survivors	2,514	2,898
All Benefit Recipients	$ 3,501	$ 4,217

	Pre-2014	**Total**
Pre-2014 Statistics		
Active Member Average Service	7.4 years	12.9 years
Inactive Member Average Account Balance	$ 9,600	$ 13,740
Average Monthly Benefit for All Benefit Recipients	$ 4,066	$ 4,217

1. Some active members were reported with no Annualized Pay Rate, in which case their liabilities, if any, were included with inactive members.

2. Total of prior year Earned Salaries for all active members. This differs from the payroll amounts shown elsewhere in this report which reflect annualized amounts for members who were hired part way through the prior year.

3. Milliman estimates the 1990 Benefit based on CalSTRS-provided data.

Table C.2
Age and Service Distribution – Active Male Members

Male

	Years of Service					
Age	**1 & Under**	**Greater than 1 & Under 5**	**5-9**	**10-14**	**15-19**	**20-24**
Less than 25	724	306	0	0	0	0
25 to 30	2,020	4,930	815	0	0	0
30 to 35	1,389	5,312	5,039	369	0	0
35 to 40	982	3,459	5,183	3,885	751	1
40 to 45	812	2,407	3,363	3,974	5,503	900
45 to 50	578	1,776	2,161	2,402	4,837	6,745
50 to 55	470	1,572	1,672	1,685	3,272	6,345
55 to 60	355	1,073	1,210	1,124	1,950	3,281
60 to 65	211	790	777	816	1,223	1,722
65 to 70	115	480	419	395	554	643
70 and over	77	344	269	240	266	231
Total	7,733	22,449	20,908	14,890	18,356	19,868

	Years of Service					
Age	**25-29**	**30-34**	**35-39**	**40-44**	**45 & Over**	**Total**
Less than 25	0	0	0	0	0	1,030
25 to 30	0	0	0	0	0	7,765
30 to 35	0	0	0	0	0	12,109
35 to 40	0	0	0	0	0	14,261
40 to 45	5	0	0	0	0	16,964
45 to 50	536	4	0	0	0	19,039
50 to 55	4,010	311	2	0	0	19,339
55 to 60	3,087	2,188	164	1	0	14,433
60 to 65	1,261	1,020	398	11	0	8,229
65 to 70	335	239	109	52	7	3,348
70 and over	130	88	57	38	36	1,776
Total	9,364	3,850	730	102	43	118,293

Table C.3
Age and Service Distribution – Active Female Members

Female

Age	Years of Service					
	1 & Under	Greater than 1 & Under 5	5-9	10-14	15-19	20-24
Less than 25	3,039	1,403	1	0	0	0
25 to 30	5,899	17,530	3,531	0	0	0
30 to 35	2,975	13,755	17,268	1,360	1	0
35 to 40	2,089	8,420	13,972	12,917	2,697	2
40 to 45	1,794	6,409	8,768	11,559	16,994	2,811
45 to 50	1,331	4,803	6,516	6,907	12,543	16,129
50 to 55	1,054	3,560	5,090	5,471	8,214	12,903
55 to 60	592	2,347	3,118	3,509	5,341	7,237
60 to 65	342	1,327	1,891	2,126	3,433	4,061
65 to 70	160	614	809	786	1,217	1,362
70 and over	77	332	359	302	375	449
Total	19,352	60,500	61,323	44,937	50,815	44,954

Age	Years of Service					
	25-29	30-34	35-39	40-44	45 & Over	Total
Less than 25	0	0	0	0	0	4,443
25 to 30	0	0	0	0	0	26,960
30 to 35	0	0	0	0	0	35,359
35 to 40	0	0	0	0	0	40,097
40 to 45	4	0	0	0	0	48,339
45 to 50	1,283	2	0	0	0	49,514
50 to 55	8,349	873	4	0	0	45,518
55 to 60	5,905	5,041	498	0	0	33,588
60 to 65	2,692	1,886	912	42	0	18,712
65 to 70	685	397	167	88	14	6,299
70 and over	262	179	81	60	83	2,559
Total	19,180	8,378	1,662	190	97	311,388

Table C.4
Age and Service Distribution – All Active Members

Total

	Years of Service					
Age	**1 & Under**	**Greater than 1 & Under 5**	**5-9**	**10-14**	**15-19**	**20-24**
Less than 25	3,763	1,709	1	0	0	0
25 to 30	7,919	22,460	4,346	0	0	0
30 to 35	4,364	19,067	22,307	1,729	1	0
35 to 40	3,071	11,879	19,155	16,802	3,448	3
40 to 45	2,606	8,816	12,131	15,533	22,497	3,711
45 to 50	1,909	6,579	8,677	9,309	17,380	22,874
50 to 55	1,524	5,132	6,762	7,156	11,486	19,248
55 to 60	947	3,420	4,328	4,633	7,291	10,518
60 to 65	553	2,117	2,668	2,942	4,656	5,783
65 to 70	275	1,094	1,228	1,181	1,771	2,005
70 and over	154	676	628	542	641	680
Total	27,085	82,949	82,231	59,827	69,171	64,822

	Years of Service					
Age	**25-29**	**30-34**	**35-39**	**40-44**	**45 & Over**	**Total**
Less than 25	0	0	0	0	0	5,473
25 to 30	0	0	0	0	0	34,725
30 to 35	0	0	0	0	0	47,468
35 to 40	0	0	0	0	0	54,358
40 to 45	9	0	0	0	0	65,303
45 to 50	1,819	6	0	0	0	68,553
50 to 55	12,359	1,184	6	0	0	64,857
55 to 60	8,992	7,229	662	1	0	48,021
60 to 65	3,953	2,906	1,310	53	0	26,941
65 to 70	1,020	636	276	140	21	9,647
70 and over	392	267	138	98	119	4,335
Total	28,544	12,228	2,392	292	140	429,681

Table C.5
Inactive Members

Fiscal Year Ending June 30	Number Vested	Total Number	Male % of Total	Female % of Total
2007	28,922	141,450	28.9%	71.1%
2008	30,370	147,997	29.0	71.0
2009	31,661	156,207	29.0	71.0
2010	33,036	166,976	29.2	70.8
2011	33,976	173,719	29.1	70.9
2012	34,848	178,655	29.1	70.9
2013	35,883	182,576	29.1	70.9
2014	36,344	182,815	29.2	70.8
2015	36,953	184,396	29.3	70.7
2016	38,014	187,722	29.4	70.6
2017	38,955	192,601	29.5	70.5
2018	39,942	198,058	29.6	70.4
2019	41,192	204,593	29.6	70.4
2020	42,835	213,056	29.7	70.3
2021	47,040	230,770	29.8	70.2

Fiscal Year Ending June 30	Average Account on Deposit	Average Age	Average Service Credit	Average Years Inactive
2007	$12,440	46.0	3.0	7.7
2008	12,698	46.3	2.9	8.0
2009	12,717	46.5	2.9	8.2
2010	12,334	46.7	2.8	8.3
2011	12,035	46.8	2.8	8.6
2012	11,818	47.2	2.8	8.9
2013	11,771	47.6	2.8	9.4
2014	11,815	48.1	2.8	9.9
2015	11,825	48.7	2.9	10.4
2016	11,953	49.1	2.9	10.8
2017	12,072	49.4	2.9	11.1
2018	12,257	49.7	2.9	11.4
2019	12,671	49.8	2.9	11.6
2020	13,257	50.0	3.0	11.7
2021	13,740	50.2	3.0	11.5

Table C.6
Members Retired for Service

Fiscal Year Ending June 30	Total	Male % of Total	Female % of Total
2007	188,659	36.1%	63.9%
2008	195,960	35.7	64.3
2009	203,649	35.3	64.7
2010	213,952	34.9	65.1
2011	222,222	34.4	65.6
2012	230,278	34.0	66.0
2013	236,487	33.6	66.4
2014	241,920	33.1	66.9
2015	247,353	32.7	67.3
2016	252,672	32.3	67.7
2017	258,550	31.9	68.1
2018	264,780	31.5	68.5
2019	270,835	31.1	68.9
2020	276,070	30.8	69.2
2021	281,302	30.3	69.7

Fiscal Year Ending June 30	Average Age at Retirement	Average Years of Service Credit	Final Average Monthly Compensation	Average Current Allowance Payable
2007	60.8	26.3	$4,437	$2,878
2008	60.8	26.3	4,620	3,021
2009	60.8	26.4	4,798	3,164
2010	60.9	26.3	4,983	3,302
2011	61.0	26.3	5,138	3,417
2012	61.1	26.2	5,271	3,517
2013	61.1	26.1	5,385	3,609
2014	61.2	26.s0	5,487	3,694
2015	61.3	25.9	5,597	3,786
2016	61.3	25.8	5,716	3,884
2017	61.4	25.7	5,846	3,985
2018	61.5	25.6	5,981	4,086
2019	61.6	25.6	6,110	4,184
2020	61.7	25.5	6,229	4,279
2021	61.7	25.4	6,365	4,217

Appendix D Glossary

The following definitions are largely excerpts from a list adopted by the major actuarial organizations in the United States. In some cases, the definitions have been modified for specific applicability to the CalSTRS DB Program. Defined terms are capitalized throughout this Appendix.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as mortality, withdrawal, disablement and retirement, changes in compensation, rates of investment earnings and asset appreciation or depreciation, and procedures used to determine other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Obligation.

Actuarial Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Actuarial Gain or Loss

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two actuarial valuation dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Obligation

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

Actuarial Surplus

The excess, if any, of the Actuarial Value of Assets over the Actuarial Obligation.

Actuarial Valuation

The determination, as of a Valuation Date, of the Normal Cost, Actuarial Obligation, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an actuarial valuation.

Entry Age Cost Method

An Actuarial Cost Method under which the Actuarial Present Value of Projected Benefits of each individual included in the actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a Valuation Date by the Actuarial Present Value of future Normal Costs is called the Actuarial Obligation.

Normal Cost

The portion of the Actuarial Present Value of Projected Benefits which is allocated to a valuation year by the Actuarial Cost Method.

Projected Unit Credit Cost Method

An Actuarial Cost Method under which the Actuarial Obligation is equal to the portion of the Actuarial Present Value of Projected Benefits of each individual included in the actuarial valuation is attributable to service credit that has been earned to date (past service). Since this cost method is only used in this valuation for cases where the service is fixed as of June 30, 2014, the Actuarial Obligation is equal to the portion of the Actuarial Present Value of Projected Benefits for the DB Program, and there is no Normal Cost.

Unfunded Actuarial Obligation

The excess, if any, of the Actuarial Obligation over the Actuarial Value of Assets.

Valuation Date

June 30, 2021.