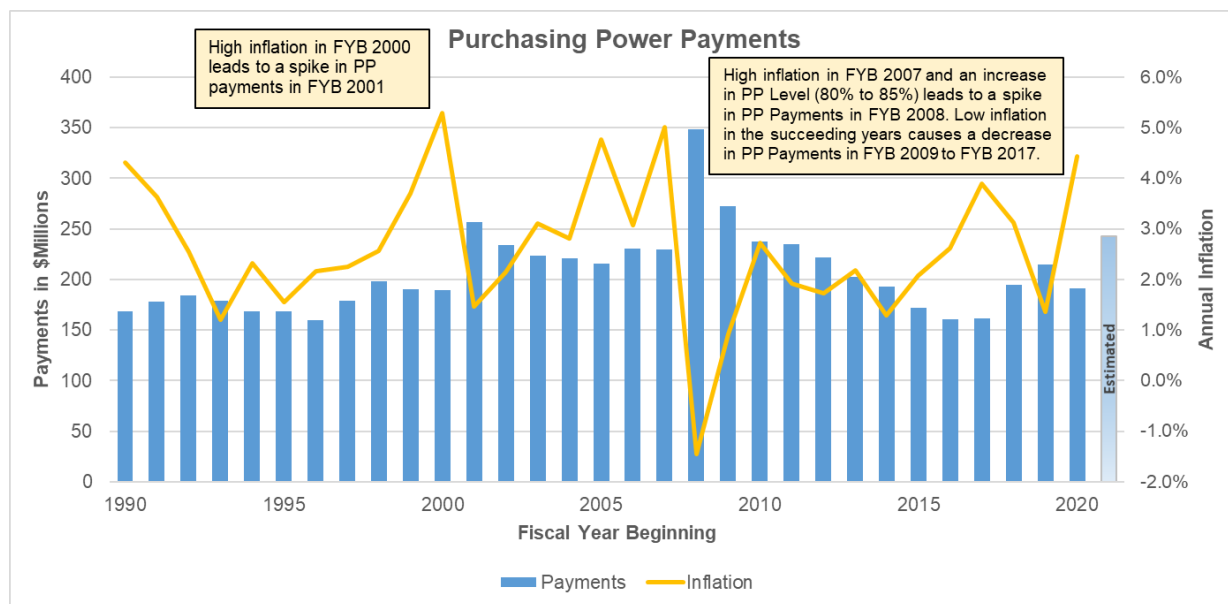




One way to assess future risks is to look at historical measurements. The following graph shows the historical purchasing power payments and how they can vary from year to year, particularly due to inflation.

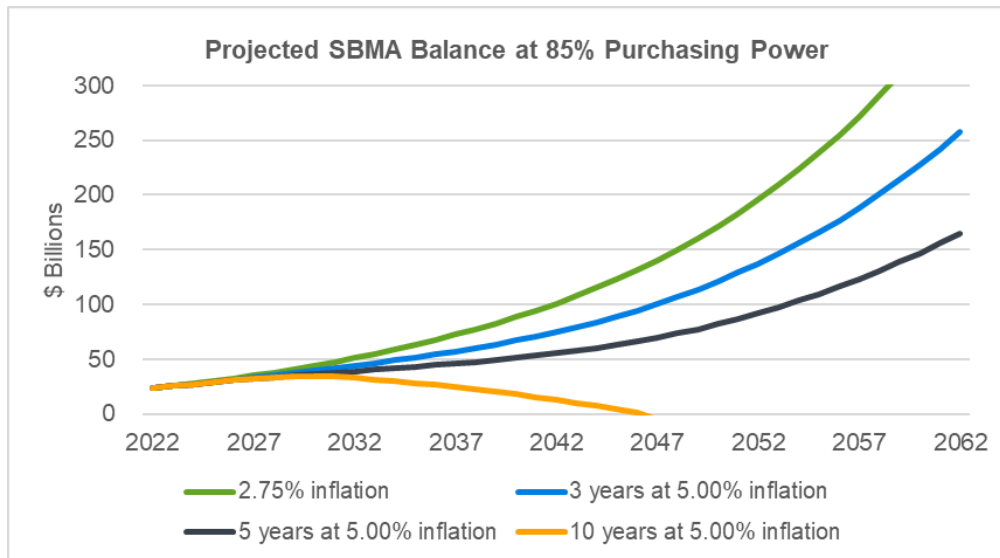


Risks specific to the DB Program are discussed in Milliman’s DB Program valuation report and the “Review of Funding Level and Risks” produced each fall by CalSTRS actuarial staff.



Risk of short-term high inflation exceeding the assumption

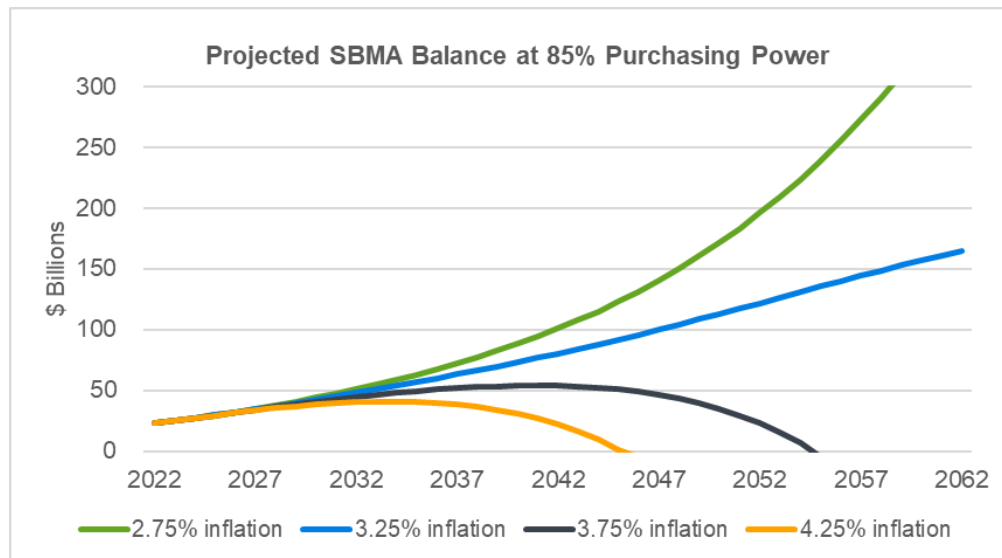
As an example of the potential impact of inflation on the sufficiency of SBMA funding, the following graph shows the projected SBMA balance at the baseline (the current inflation assumption of 2.75%) as well as under various inflation shocks, represented by future inflation of 5.00% for the next three, five, and ten years before returning to 2.75% for years after that. Each of the scenarios includes the proposed increase in the retiree benefits. As shown, the SBMA balance is projected to increase if future inflation is 2.75% for all future years and for the two scenarios with short-term inflation shocks of five years or less. This indicates the current assets plus future SBMA contributions are projected to be sufficient to pay all purchasing power benefits at these levels of inflation and 85% purchasing power. This is not the case if 5.00% inflation occurs for the next ten years before returning to 2.75% for all future years; however, under this scenario the purchasing power level could be reduced below 85% and the SBMA would be projected to be sufficient at the lower purchasing power level.





Risk of long-term inflation exceeding the assumption

Under the SBMA program, a rate of inflation that is higher than the 2.75% assumption will result in purchasing power allowances that exceed our projections. On the other hand, a lower-than-expected rate of inflation will result in lower purchasing power allowances. For example, if inflation is 2.75% each year in the future (as currently assumed), the balance of the SBMA is not projected to be depleted. If inflation is 3.75% each year in the future and the purchasing power level remained at 85%, the balance in the SBMA is projected to be depleted in about 35 years. In accordance with the board's purchasing power policy, if the date of depletion is determined to occur prior to 2089, a reduction in the purchasing power level would be recommended. The following graph shows these projections along with two additional scenarios. Each of the scenarios includes the proposed increase in the retiree benefits.



As another measurement of the sensitivity to future inflation, we used a stochastic model to assess the likelihood of the SBMA paying all benefits at the 85% purchasing power level through 2089. Based on this analysis, there was estimated to be a 35% probability of the funding being insufficient. This does not factor in the ability of the board to lower the purchasing power level to as low as 80%. Therefore, the probability of insufficiency at the minimum 80% purchasing power level would be less than 35%.

Assumptions and Methods

Please note that certain simplified modeling techniques and assumptions were used to produce the results of this analysis, which include estimating purchasing power benefits for current and future retirees and beneficiaries, including for people who are expected to become members of CalSTRS in the future and then retire and ultimately receive a purchasing power benefit. We believe these techniques are reasonable for purposes of this analysis (i.e., determining the sufficiency of the purchasing power between 80% and 85% levels) but may need to be modified if the purpose of the analysis is expanded beyond these levels.



The actuarial assumptions and methods have not been updated since the last analysis and were adopted by the Teachers' Retirement Board in January 2020. They are the same as those used in the June 30, 2021 DB Program valuation, except for the following modifications:

- **Treatment of Benefit Increases** – Additional benefits under the legislation would be paid entirely from the SBMA. Future 2% annual benefit adjustments and purchasing power payments would apply to the additional benefits based on the effective date of the increase, as previously discussed. A 1% load is applied to projected benefits to account for potential future purchasing power payments.
- **Participant Data** – Actual purchasing power benefits for existing retirees and beneficiaries was not provided, so they were estimated based on historical CPI information provided by CalSTRS.
- **Historical Benefit Increases** – In the calculation of an individual's purchasing power benefit, the only previous post-retirement increases (outside of purchasing power benefits) are assumed to have been the 2% annual benefit adjustments. Certain retiree benefit increases that occurred in 2000 and 2001, such as the minimum guaranteed benefit and the ad-hoc COLA under AB 429, are treated as separate benefits with an effective date of the date of the increase. For current and future retirees, only the 2% annual benefit adjustment is assumed to occur in the future.
- **Projected Inflation** – In providing the estimated cost of the proposed benefit increase, we have assumed annual inflation of 2.75% after June 30, 2021, with the exception that we have assumed 4.32% inflation in the fiscal year ended June 30, 2022. The 4.32% figure represents actual California CPI for the first half of the fiscal year ended June 30, 2022 and a rate of 2.75% in the second half. Similarly, when illustrating alternative future inflation scenarios, we reflected actual California CPI for the first half of the fiscal year ended June 30, 2022 and the assumed level of inflation beginning in the second half.
- **Projected Payroll and Salary Growth** – In projections where the inflation is varied from the assumption, such as the stochastic modeling, we have assumed that projected salary and payroll are greater than or less than the assumed payroll and general wage growth assumption of 3.5% by the difference between actual and projected inflation. This affects the projected contributions to the SBMA and benefits payable to future retirees. For example, if in a given year projected inflation was 3.75% (1.00% greater than the assumed 2.75%), we have adjusted payroll growth used in projected contributions and salaries used in the projected benefits to be 1.00% higher than the corresponding assumption.
- **New Entrants** – The projection of future purchasing power benefits includes anticipated new active members replacing those active members who are expected to leave active employment each year. This expected number of new entrants is based on the average number of new entrants over the last 10 years and is approximately 23,000 new active members each year.
- **Equilibrium** – After 50 years, the population receiving purchasing power benefits is assumed to reach an equilibrium; that is, expected deaths from the group are replaced by the same number of new retirees eligible for the benefit. This is reflected in the projection with an increase in the purchasing power benefits paid of 3.50% each year starting in 50 years. This increase is equivalent to the assumed annual increase in payroll and therefore the annual increase in the average DB Program benefit.



- **Mortality Improvement** – After 50 years, the mortality of the retired population is assumed to improve over current levels; that is, retirees and beneficiaries are assumed to live longer. This is reflected in an annual increase in purchasing power benefits of 0.25%, in addition to the 3.50% increase described above. Note that prior to 50 years, a projection scale is included with the base mortality assumptions to reflect expected future mortality improvement.
- **Form of Payment Adjustment** – In the DB Program valuation, all members who have not yet retired are assumed to receive their benefit in the unmodified (member's life only) form upon retirement. Since optional forms are assumed to be reduced on an actuarial equivalent basis, this assumption does not have a material impact on the DB Program valuation. However, this is not true for the actuarial projection of the SBMA. The value of a purchasing power benefit with a survivor continuance and an actuarial reduction made on the basis of the DB Program is usually greater than the value of a purchasing power benefit under the unmodified form. We have increased the projected purchasing power benefits for future retirements by 17.6% to account for the increased value of optional forms of payment. Similar to the DB Program, we have used the actual form of payment elected for current retirees and beneficiaries.
- **Retirement Timing** – Retirement from active status is assumed to occur at the middle of the year in the DB Program valuation. For purposes of calculating eligibility for the purchasing power benefit, retirement is assumed to occur on July 1 of the applicable year. There are three possible periods that affect the purchasing power calculation differently. The July 1 retirement assumption approximates actual experience and is the middle-cost option of the three, which is why we selected it. The three periods using July 1, 2021 to June 30, 2022 retirement dates are shown as an example. The percentage of the total service retirements based on current retirees is also shown.
 1. July 1 to August 31, 2021 (23% of retirements) – The first 2% benefit adjustment would be received September of 2022; CPI would be based on the year 2021. Under this approach, the first 85% Purchasing Power payment is projected to be made after 17 years (from the valuation date).
 2. September 1 to December 31, 2021 (8% of retirements) – The first 2% benefit adjustment would be received September of 2022; CPI would be based on the year 2020. Under this approach, the first 85% Purchasing Power payment is projected to be made after 16 years (from the valuation date). If this assumption were used, it would result in the highest estimated cost.
 3. January 1 to June 30, 2022 (69% of retirements) – The first 2% benefit adjustment would be received September of 2023; CPI would be based on the year 2021. Under this approach, the first 85% Purchasing Power payment is projected to be made after 18 years (from the valuation date). If this assumption were used, it would result in the lowest estimated cost.
- **School Lands Revenue** – The projection does not assume any additional revenues from school lands in the future. Currently this makes up less than 1% of the total contributions received by the SBMA. If this were included, it would not materially impact the results of the actuarial projection.
- **Stochastic Model** – The model varies actual inflation in the future, based on a geometric average inflation of 2.75% with an annual standard deviation of 2.0%, an annual reversion to the mean of 25%, and 200 different inflation scenarios.



Actuarial Certification

The cost estimates presented in this letter reflect the SBMA benefit provisions in effect as of June 30, 2021 and the actuarial assumptions and methods used in the June 30, 2021 DB Program valuation, except where noted. Note that the June 30, 2021 DB Program valuation is preliminary and has not had final peer review completed by Milliman and has not yet been submitted to the board for adoption.

These projections are subject to the uncertainties of a regular actuarial valuation; the projections are inexact because they are based on assumptions that are themselves necessarily inexact, even though we consider them reasonable. Thus, the emerging costs may vary from those presented in this letter to the extent actual experience differs from that projected by the actuarial assumptions.

In preparing the June 30, 2021 actuarial valuation upon which this letter is based, we relied, without audit, on information (some oral and some in writing) supplied by CalSTRS staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information 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 experience affecting CalSTRS. Further, in our opinion, each actuarial assumption used is reasonably related to the experience of the plan and to reasonable expectations which, in combination, represent a reasonable estimate of anticipated experience under CalSTRS. The 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 letter 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; 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 the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix B of the DB Program valuation report. Modified assumptions specific to this actuarial projection are discussed in the "Assumptions and Methods" section of this letter.

Actuarial computations presented in this letter are for purposes of determining the projected funding sufficiency of the SBMA. The calculations in this letter have been made on a basis consistent with our understanding of CalSTRS' current funding requirements. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this letter. Accordingly, additional determinations may be needed for other purposes.

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:

- (a) CalSTRS may provide a copy of Milliman's work, in its entirety, to CalSTRS' professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit CalSTRS.
- (b) CalSTRS may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

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 letter is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices, including the relevant Actuarial Standards of Practice. We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We respectfully submit this letter and we look forward to discussing it with you.

Sincerely,

Handwritten signature of Nick J. Collier in black ink.

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

Handwritten signature of Scott Preppernau in blue ink.

Scott Preppernau, FSA, EA, MAAA
Consulting Actuary

Handwritten signature of Julie D. Smith in black ink.

Julie D. Smith, FSA, EA, MAAA
Consulting Actuary

NJC/SP/JDS/nlo

cc: Jordan Fassler
David Lamoureux
Rick Reed