

California Public Employees' Retirement System

2020 Annual Review of Funding Levels and Risks

November 2020



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Introduction

This report is intended to assist the CalPERS Board of Administration (board) in assessing the soundness and sustainability of the Public Employees' Retirement System for ongoing pension plans. It does not address the Terminated Agency Pool or the 1959 Survivor Benefit Program, nor does it address the other systems (Judges' Retirement Systems, Legislators' Retirement System or the non-pension programs) administered by the board.

The results presented in this report are based on the June 30, 2019 annual valuations, which have been projected forward to June 30, 2020 based on the known 4.7% investment return (reduced for administrative expenses) for fiscal year (FY) 2019–20. In general, all the current and projected results in the report have been based on a long-term discount rate of 7.00% and the demographic assumptions reflecting the 2017 Experience Study, unless stated otherwise.

The actual results based on the valuations at June 30, 2019 are provided in Appendix A.

This report focuses on:

- Reporting the funded status for the system and key components
- Identifying and quantifying risks to the funding of the system
- Examining how risks are changing
- Outlining risk mitigations currently in effect and progress made in addressing the risks
- Assessing the effectiveness of the risk mitigations and whether changes are needed

Pension and investment beliefs adopted by the board that inform our work on risks and funding include the following:

Pension Belief 5: Funding policies should be applied in a fair, consistent manner, accommodate investment return fluctuations and support rate stability.

Pension Belief 9: Sound understanding and deployment of enterprise-wide risk management is essential to the ongoing success of a retirement system.

Investment Belief 1: Liabilities must influence the asset structure. More specifically, ensuring the ability to pay promised benefits by maintaining an adequate funding status is the primary measure of success for CalPERS.

Investment Belief 9: Risk to CalPERS is multi-faceted and not fully captured through measures such as volatility or tracking error.

Executive Summary

Although the pension fund did not earn the assumed 7% return, with the state and public agencies making additional discretionary payments during 2019-20, the estimated funded status of the system has increased to 70.6% as of June 30, 2020. The funded status varies somewhat among the different plans, with the plans for miscellaneous members generally having a higher funded status than plans for safety members.

The improvement in funded status has slightly reduced the risk that plans will fall to low funding levels. However, employer contribution levels continue to climb, and with the added economic stress due to the Coronavirus pandemic, this is potentially increasing financial stress on some employers. When combined with some of the environmental changes discussed in the report, this is an area of concern for the future. In addition to the overall level of the contributions, sudden sharp increases in employer contribution rates remain a concern as well. The greatest risk to the system continues to be the ability of employers to make their required contributions. However, with few exceptions, employers are currently up to date with their contribution requirements and many are making additional discretionary payments to improve their funded status and lower their overall costs.

The termination policies and processes currently in place should mitigate risk to the system. However, if an employer is under severe financial stress, the termination policies do not fully protect the benefits of members that have served that employer. Ultimately, the members' benefits are only secure if the employer continues to make the required contributions.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is required. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the Pension System and make recommendations to modify future assumptions where necessary.

Overall, this report shows that while the funding position and the risk of falling to low funding levels in the future are improving, risks remain in the system. Required employer contributions are projected to increase over the next few years and with the economic slowdown due to coronavirus, this could pose considerable problems for some employers. In addition, actual contribution increases could exceed expectations if future experience is unfavorable. Employers may struggle to continue to make future required contributions if they increase too significantly.

COVID-19

As of the publication of this document, there have been over 16,000 COVID-19 related deaths in California. While most deaths have been among older individuals, deaths have occurred at younger ages as well. The impacts of the pandemic in California began early in the 2020 calendar year and continue through today. During this relatively short period of time, impacts of the pandemic on the economy, public health and workplace norms have been significant but there remain many unknowns regarding the potential long-term impacts to CalPERS.

This pandemic has the potential to alter the experience of the retirement system in several different areas. These include, investment returns, inflation, deaths, retirements, terminations, disability retirements, pay increases, etc. Experience in these areas will impact future actuarial valuation results and required contributions.

Examples of Short-term Unknowns

- Will the short-term mortality increases be significant enough to materially decrease near-term contribution requirements?
- Will short-term pay increases be significantly lower than expected and if so, would lower pays be expected to continue or rebound?
- Will there be a higher number of retirements in the near-term due to pay reductions, childcare or healthcare needs of family members, or fears of returning to the workplace?
- Will there be a lower number of voluntary terminations due to concerns about changing jobs during such economic uncertainty?

Longer-term Questions

- Will viruses like COVID-19 be more common in the future?
- Will COVID-19 survivors have a higher likelihood of earlier death or disability?
- Will increased handwashing, masks, and social distancing practices lower the risk of existing diseases and therefore improve future mortality?
- Will changes in work patterns (e.g., increased teleworking) change the frequency of job changes?
- Will low interest rates and forecasts of slower economic growth persist and reduce the long-term expected return on plan assets?

The first valuation that will reflect any unexpected experience due to COVID-19 will be the June 30, 2020 valuations, which will not be released until July of 2021. These reports will determine required contributions for fiscal year 2022-23 for public agencies and fiscal year 2021-22 for the state and school's plans.

We expect the June 30, 2020 valuations to show a somewhat higher number of deaths than expected and a somewhat higher number of retirements among state employees. Given the current funding policies in place for recognizing such gains or losses, we do not currently expect the deviation in experience due to

the pandemic will result in significant contribution changes. However, even though we are past the June 30, 2020 valuation date, the impact of unexpected demographic experience has not yet been tabulated and could be greater than we currently anticipate.

Additionally, there is little evidence to suggest material long-term impacts on investment returns or demographic experience. However, due to the unknowns listed above, the potential does exist for long-term impacts on the retirement system. It will likely take years for these to become clear.

A larger concern is the impact of the pandemic on the budgets of CalPERS employers and their ability to continue to make required contributions to CalPERS. Even before the pandemic, employers' ability to make future required contributions was a concern. Decreased revenues resulting from the pandemic have added to this concern.

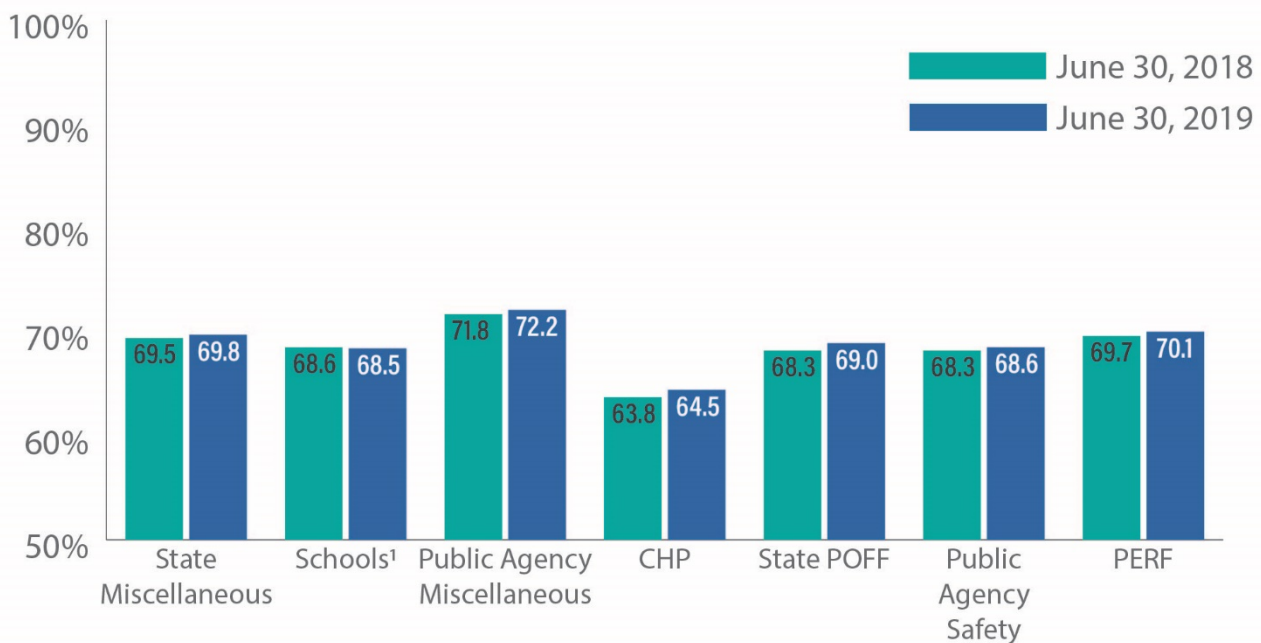
Several employers have utilized budget management tools such as golden handshakes, furloughs, pay decreases and staff reductions to reduce short-term spending. In addition, many employers have issued or are considering issuing Pension Obligation Bonds and using the proceeds to reduce or eliminate CalPERS unfunded liability. There are risks to some or all of these tools and it remains of utmost importance that employers use appropriate due diligence.

Funding Levels

The overall level of funding of the system has improved due to higher unfunded liability payments and additional discretionary payments by the state and public agencies. Recent fluctuations in the funded status are within the expected variation due to the investment volatility inherent in the asset allocation last adopted by the board. The overall funded status of the system remains a concern. However, the recent adoption of a new Actuarial Amortization Policy will decrease the period for paying down newly created unfunded liabilities, while addressing the generational equity concerns.

It should be noted that the system is a conglomeration of multiple plans and several risk sharing pools. Each of these pools and the non-pooled plans are funded separately. The chart below shows the funding levels of the various components of the Public Employees' Retirement Fund (PERF) at June 30, 2018 and June 30, 2019.

Funded Status Based using a 7.00% Discount Rate



¹June 30, 2018 schools pool funded status based on 7.25% discount rate is 70.4%

The chart above shows that the average funded status of plans for miscellaneous members is generally greater than the funded status of safety plans. Based on the results of the funding valuations at June 30, 2019, the overall funding position of the PERF is about 70%.

The term “funded status” as used in the chart above, is the funded portion of the funding target determined annually for each plan in the actuarial valuation process. This funding target reflects all the actuarial assumptions and methods adopted by the Board of Administration. Alternate funding methods and assumptions would yield different funding targets and therefore different funded status results. For example, reflection of a lower assumption for future investment return would lower the current funded status for each CalPERS plan. Page 21 of this report provides funded status results by employee group under alternate assumptions for future investment return (i.e., discount rate).

If an agency elects to terminate its contract with CalPERS, the employer is required to contribute the amount necessary to fully fund the plan. However, for this purpose, the funded status of the plan is determined using different actuarial assumptions and methods. Since the employer will no longer be obligated to make up any shortfalls in investment return (or due to other economic or demographic events), CalPERS funds the terminated agency pool on a much more conservative basis to ensure that the affected members’ benefits are secure. With the funding of terminated plans based on fixed income assets, the termination discount rate depends on actual market rates of return for such assets on the date of termination. Such rates are currently quite low (around 2%) and result in a much lower funded status for the vast majority of CalPERS plans.

A typical CalPERS plan that is currently 70% funded based on a 7% discount rate, would likely be well under 50% funded based on current termination rates and could be as low as 30% funded or even lower. This indicates some additional risk to public agency members, in the form of potential benefit reductions, if their employer were to terminate their plan and be unable to make the required final contribution.

Funded Status and Public Agency Contribution Rate Scenarios

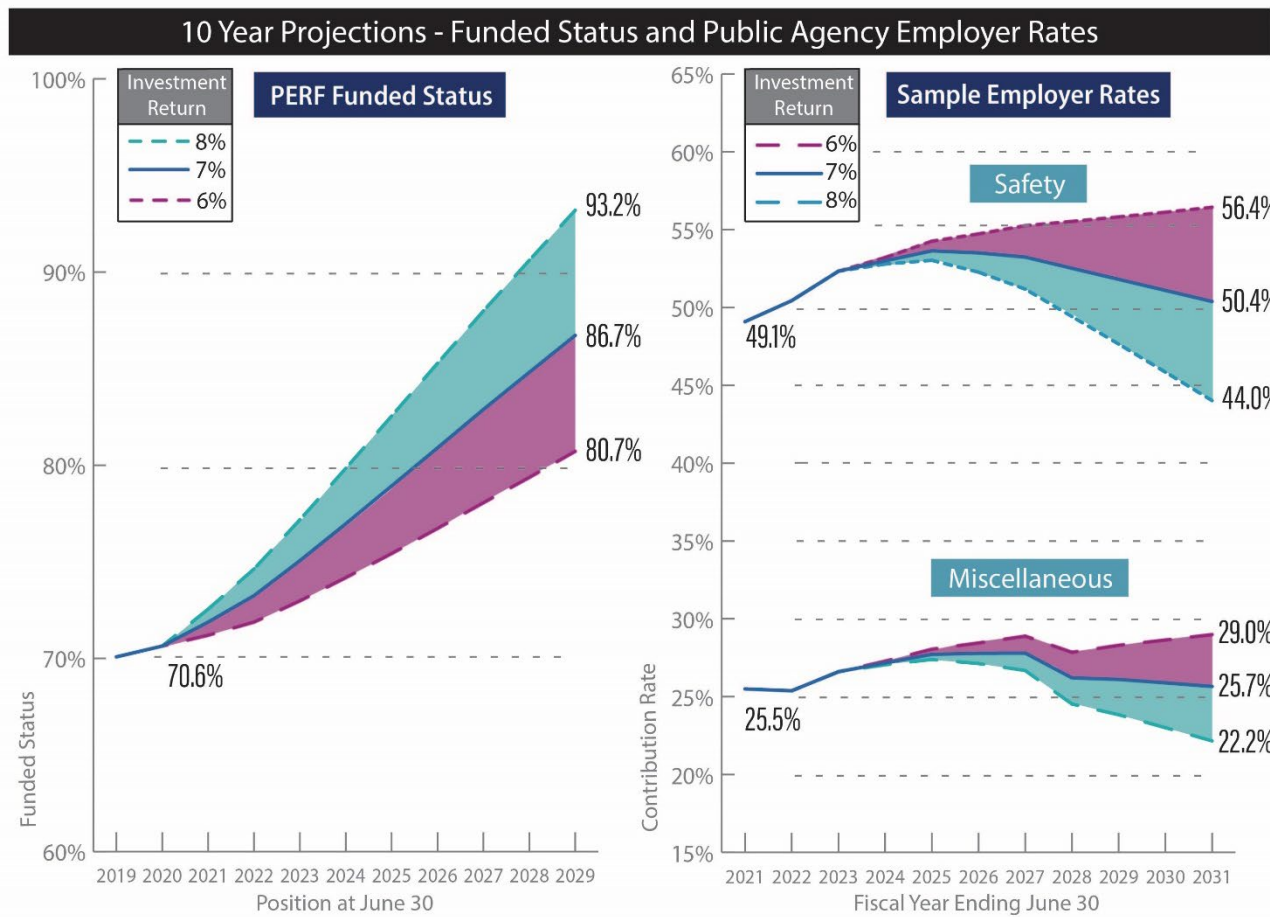
To the extent future experience deviates from the actuarial assumptions, adjustments are made to the unfunded liability position which result in required contribution increases or decreases from present levels. The factor that is likely to have the largest impact on future contribution requirements is the investment return of the PERF. While actual plan experience in other areas such as mortality, rates of retirement, pay changes, etc., also impact required contributions, these factors are typically not as volatile as investment return.

The expected long-term investment return of the PERF is 7.0%. If the actual returns every year in the future were 7.0%, the following are expected to occur:

- Required employer contributions would continue to increase over the next few years while the full cost of recent discount rate changes and investment losses are being phased-in.
- In approximately three to five years, required contributions are expected to decrease. This is due to two separate factors
 1. the continual decrease in normal cost as Classic members retire or terminate and are replaced by PEPRAs members, and
 2. current required payments toward existing unfunded accrued liability bases will be gradually eliminated as individual UAL bases are fully paid-off.
- In the long-term, required employer contributions will trend toward the employer portion of the normal cost.
- The funded status of all plans would gradually increase to around 100% over the next 25 to 30 years.

Even if future returns for the PERF average 7%, year to year returns will not be 7% each year. Therefore, it is important to examine the potential impacts of higher or lower returns in the short-term and long-term.

The charts below provide the projected funded status of the PERF and sample employer contribution rates for a public agency safety and miscellaneous plan over the next ten years reflecting the assumed 7% annual investment return, with alternative annual investment returns of 6% and 8% to demonstrate the sensitivity of the PERF and the plans to future investment returns.



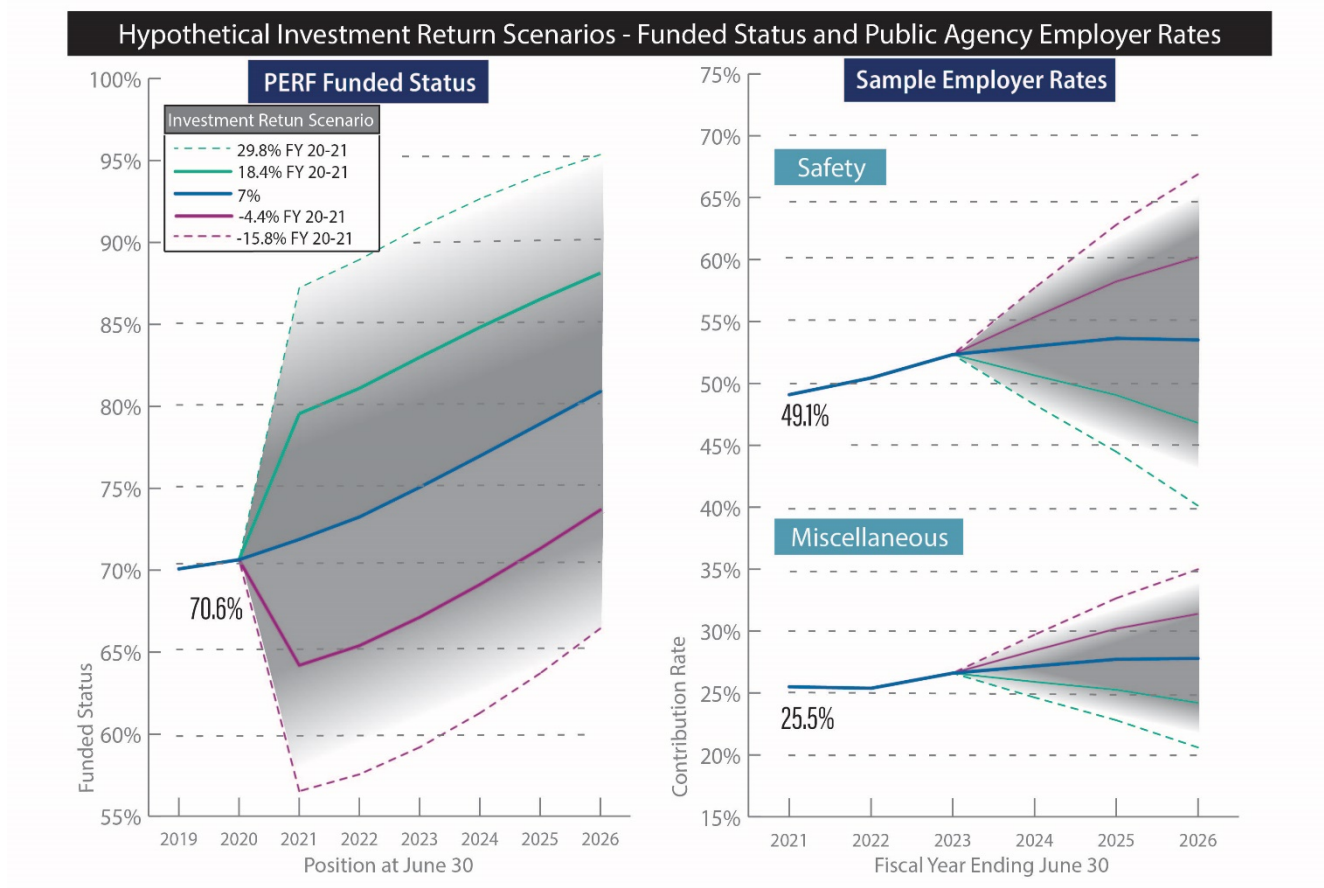
In the long-term it is expected that the average investment return of the PERF will be close to 7% and likely it will be between the alternate projection assumptions of 6% and 8% used in the chart above. However, in any single year the possibility of a return lower than 6% or greater than 8% is much greater. For example, given the expected volatility of the current investment allocation of the PERF, there is roughly a 16% chance that in a single year, the investment return will be lower than -4.4% and a 16% chance that it will be greater than 18.4%. These returns are one standard deviation lower and higher than the expected return of 7%. So, while it is more likely that any single year return will be between -4.4% and 18.4% (68% probability), the chance of falling outside this range for one year is not insignificant.

A two standard deviation higher or lower return is much less likely but does have roughly a 5% chance of occurring. The two standard deviation range is -15.8% to 29.8%. Or said another way, a return of between -15.8% and 29.8% in any given year has a probability of around 95%.

While such “shock” returns are possible and do occur, history has shown that market corrections in the opposite direction typically occur over the next few years. However, such corrections are certainly not guaranteed.

The chart below provides the impact of various “shock” returns in the year ending June 30, 2021 with no assumed future correction. The purpose of the chart is to illustrate the potential impact of a single very good year or very bad year of investment return.

As demonstrated in the chart, funded status is impacted immediately and significantly while changes to required contributions happen more gradually due to the 5-year phase-in of the impact of investment gains and losses. The 5-year phase-in would allow time for a possible correction to occur which would then begin to have the opposite effect on future contributions.



Identifying and Quantifying Risks

This section looks at the risk to the members and beneficiaries of the system by focusing on three key risk considerations:

1. The funded status and probability that it will fall to very low levels
2. The employer contribution level and the probability that it will reach very high levels
3. The possibility of high contribution increases in a single year

Shared Risk

Member benefits can be paid in full and when due through the combination of CalPERS investment returns, required employer contributions, and member contributions. While there is a legal requirement for the employer to make the full contribution needed to fund the system, in extreme circumstances the employer may be unable to do so. In these situations, the employer's financial hardship can become a direct risk to the members and their benefits.

The risks borne by the employers (primarily investment risk) can impact their ability to make required CalPERS contributions. Investment and actuarial policies adopted by the board are always adopted with the purpose of maintaining benefit security for members. However, in certain situations, if actuarial standards of practice as well as the judgment of the chief actuary allow for a narrow range of appropriate actuarial assumptions or methods, the board may consider employers' ability to pay future required contributions when selecting these assumptions or methods.

By focusing on the risks to the soundness and sustainability to the overall system, CalPERS can take steps to mitigate risks to both members and employers. Ultimately, pensions are a shared responsibility between members and employers.

Stochastic Modeling

Probability results provided in this section were determined using a stochastic modeling approach. Results are based on the outcomes of 5,000 alternate investment scenarios for all future years.

Alternate investment return scenarios were developed based on the expected returns and standard deviations of each of the asset classes in the PERF. Assumed correlations between asset classes as well as reversion to the mean techniques are also reflected.

Risk of Low Funding Levels

Low funding levels represent a risk to members because the current level of assets is not at the target level given the actuarial assumptions and methods being used to fund the benefits. As shown on page 5, current funding levels for the PERF are below the target level of 100%. A key risk metric associated with this is the probability of experiencing low funded status in the future.

Current State

Current funding levels were discussed in the Funding Levels section.

Future State

The probability of falling to low funding levels in the future is shown in the table below:

Probability of Falling Below Given Funding Level (at any point in next 30 years)

Plan	40%		50%		60%	
	2019	2020	2019	2020	2019	2020
State Misc.	<1%	<1%	1%	1%	24%	22%
Schools	<1%	<1%	1%	1%	21%	21%
CHP	<1%	<1%	2%	2%	39%	37%
POFF	<1%	<1%	1%	1%	19%	20%
PA Misc.	<1%	<1%	2%	1%	29%	23%
PA Safety	<1%	<1%	5%	3%	43%	36%

The figures above reflect the adoption of the new Actuarial Amortization Policy that was effective June 30, 2019. The 2020 results above incorporate the 4.7% investment return for FY 2019-20. The new Actuarial Amortization Policy has helped to reduce the risk of low funding levels in the future.

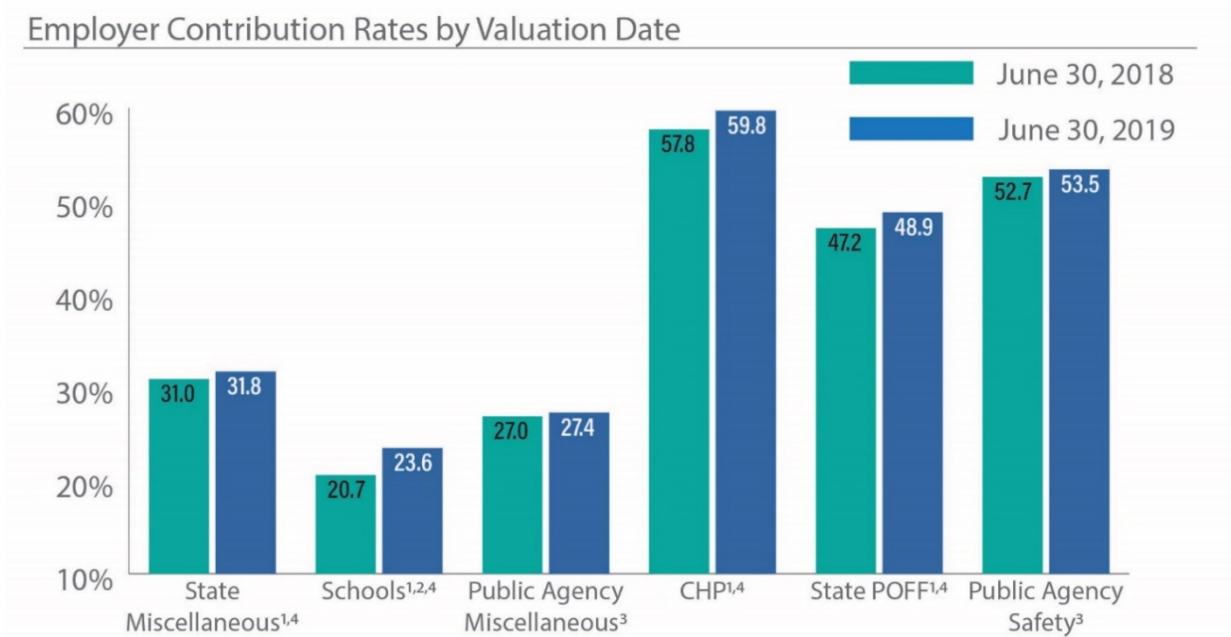
As shown in the table above, the probabilities of the funded status falling below 50% or 40% continue to be quite low. The probabilities of falling below 60% are similar to last year's results or in some cases slightly lower due in part to additional discretionary payments.

Risk of High Contribution Rates

High employer contribution rates impose significant financial stress and may increase the risk that employers will default and be unable to make their required contributions. Since future employer contributions are one of the funding sources for the benefit payments, a default by the employer would result in increased risk to the members' benefits. The level of financial stress associated with any particular level of contributions will differ significantly by employer.

Current State

Current contribution levels or average contribution levels for public agency plans are shown in the table below. As shown below, employer contribution levels are relatively high, especially for safety plans. Actions to reduce the probability of low funded status or contribution volatility generally result in increases in the contribution levels. It is difficult to assess just how much strain current contribution levels are putting on employers. However, evidence such as collections activities, inquiries regarding extensions to amortization schedules and information regarding termination procedures indicate that some public agencies are under significant strain.



¹June 30, 2018 valuations for state plans and the schools pool set FY 2019-20 rates, while June 30, 2019 valuations set FY 2020-21 rates.

²June 30, 2018 schools pool valuations used a 7.25% discount rate, while state and public agency plans used a 7.00% discount rate.

³June 30, 2018 valuations for public agency set FY 2020-21 rates, while June 30, 2019 valuations set FY 2021-22 rates

⁴Rates not reduced by State of California July 2019 \$2.5 billion supplemental payment.

Future State

It is anticipated that employer contributions will continue to increase for the next three to five years. This is due to current amortization schedules continuing to ramp up over the next few years. The table below shows the probability of employer contribution levels exceeding certain thresholds at some point in the next 30 years.

Probability of Employer Contribution Rates Exceeding Given Level (at any point in next 30 years)

Plan	30% of Payroll		35% of Payroll		40% of Payroll	
	2019	2020	2019	2020	2019	2020
State Misc.	100%	100%	55%	56%	31%	31%
Schools	39%	41%	14%	15%	2%	2%
PA Misc.	55%	56%	26%	25%	7%	6%

Plan	50% of Payroll		55% of Payroll		60% of Payroll	
	2019	2020	2019	2020	2019	2020
CHP	100%	100%	100%	100%	80%	100%
POFF	66%	100%	47%	47%	31%	31%
PA Safety	100%	100%	83%	100%	63%	65%

Note: The Funding Risk Mitigation Policy adopted by the board in 2015 is expected to gradually reduce the discount rate over the next 20 years, putting upward pressure on required contributions. The potential impacts of this policy are not reflected in the results above.

Risk of Sharp Annual Increases in Contribution Rates

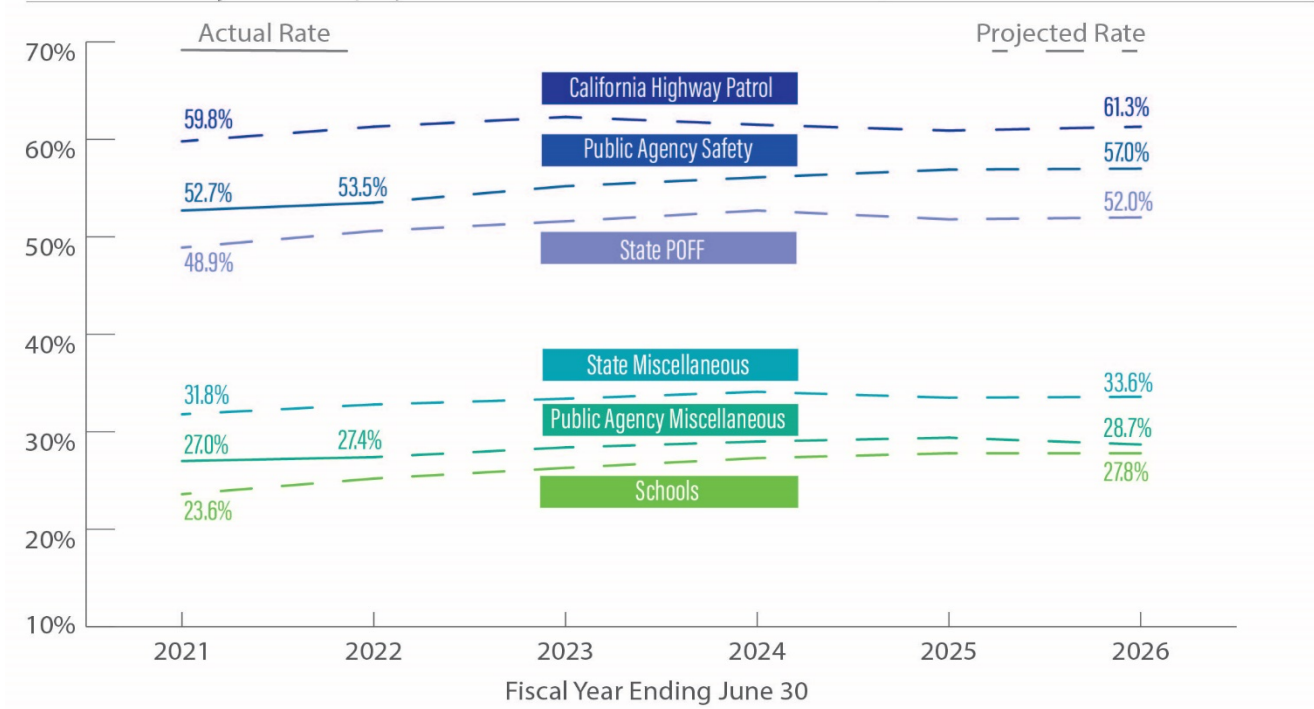
Sharp annual increases in contributions can also impose financial strain on employers. And, similar to high contribution rates, that strain may increase the risk that employers will default and be unable to make their required contributions.

The probability of high employer contribution rates is still quite high. The shorter amortization periods in the recently revised Actuarial Amortization Policy increase the probability that employer rates may exceed these thresholds at some point in the future. However, the expectation is that higher rates would be temporary. The new amortization policy is not expected to increase long-term cumulative employer contributions.

Current State

Below are projected employer contribution requirements (expressed as a percentage of payroll) based on the June 30, 2019 actuarial valuation results and an assumed future annual investment return of 7%.

Recent and Projected¹ Employer Contribution Rates (FY 2020-21 through FY 2025-26)



¹FY 2020-21 state plan and schools pool rates are actual. FY 2020-21 and 2021-22 public agency rates are actual.

Future State

The table below shows the probability of employers seeing various levels of single year contribution increases over the next 30 years.

Probability of Employer Contribution Rate Increases of Selected Magnitudes (at any point in next 30 years)

Plan	3% of Payroll		5% of Payroll		7% of Payroll	
	2019	2020	2019	2020	2019	2020
State Misc.	57%	55%	14%	14%	7%	7%
Schools	38%	35%	9%	10%	5%	5%
PA Misc.	43%	45%	11%	12%	6%	8%

Plan	5% of Payroll		7% of Payroll		9% of Payroll	
	2019	2020	2019	2020	2019	2020
CHP	64%	65%	32%	34%	16%	16%
POFF	52%	51%	21%	21%	11%	11%
PA Safety	55%	55%	23%	25%	12%	14%

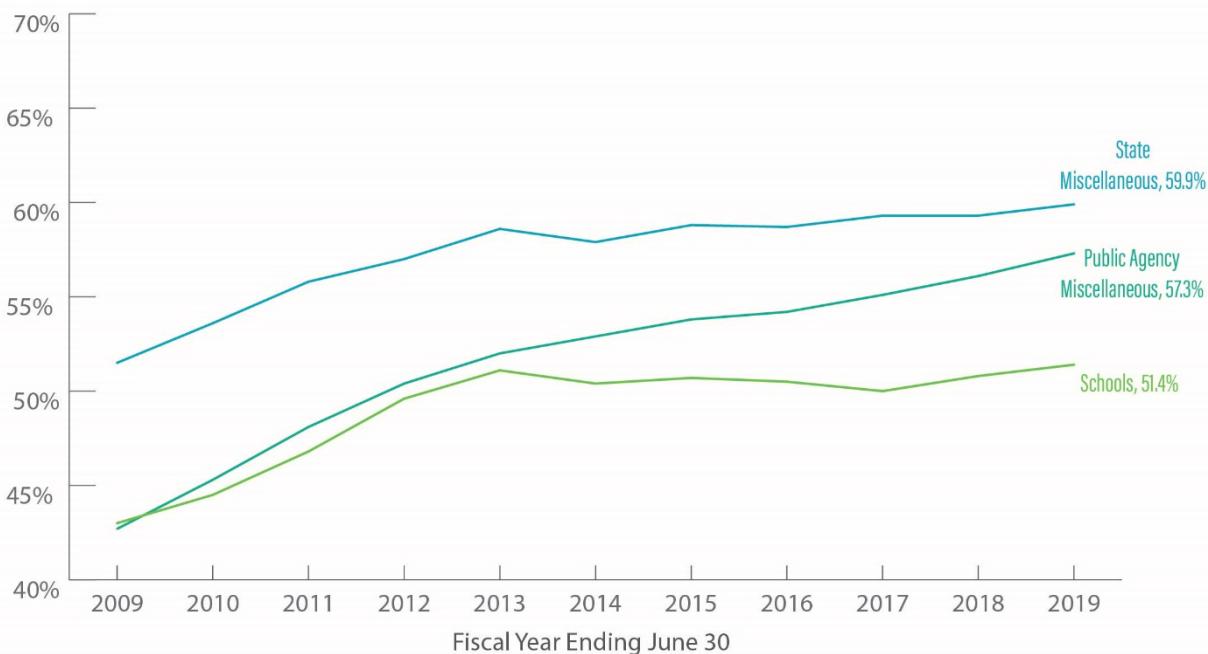
How Risks Are Changing

Plans Continue to Mature

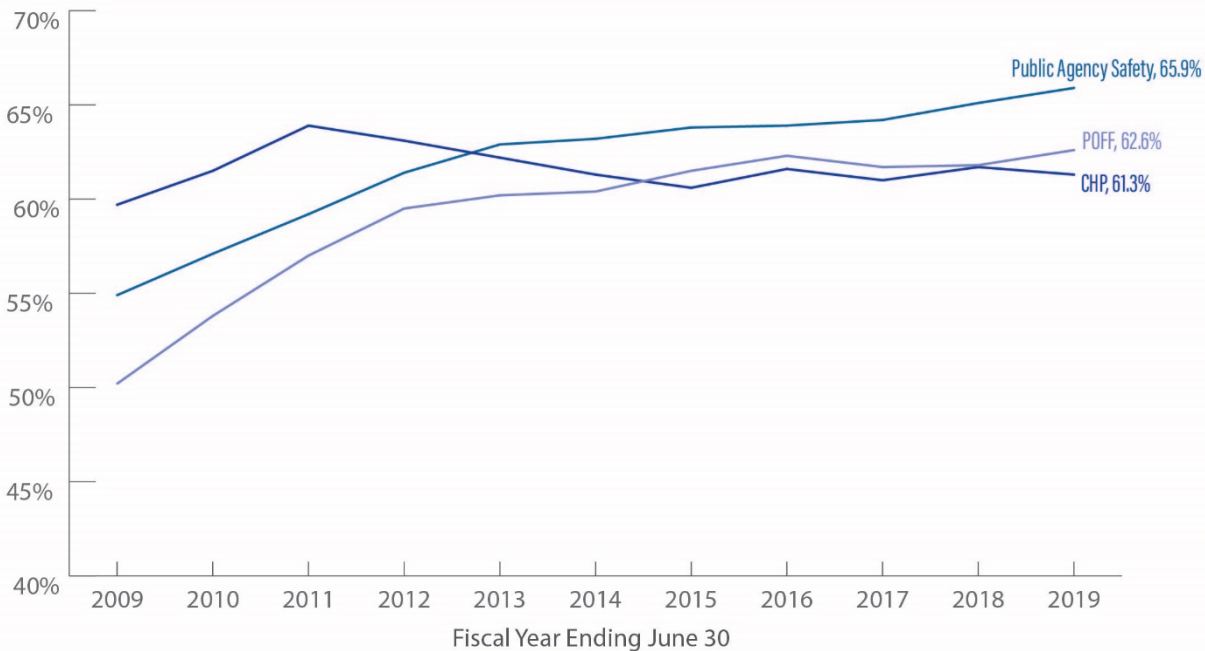
The aging of the population and the retirement of the baby boomer generation are well known demographic shifts that have long been predicted and considered in the funding of the system. The higher number of retirements experienced over the previous 10 years was anticipated, and this trend is expected to continue over the next five to ten years as the remainder of the baby boomer generation leaves the workforce to enter their retirement years. Even though anticipated, this demographic shift is impacting risk measures identified in this report and must be part of any discussion on funding levels and risks.

One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio starts increasing. A mature plan will often have a ratio above 60%-65%. For both CalPERS and other retirement systems in the United States, these ratios have been steadily increasing in recent years. However, as seen in the charts below, this measure has flattened out somewhat in the last few years and in some plans, it has even declined. The steep incline in this measure from 2010 through 2013 was largely attributable to the wave of retirements experienced during the recession.

Ratio of Retiree Accrued Liability to Total Accrued Liability (June 30, 2009 through June 30, 2019)



Ratio of Retiree Accrued Liability to Total Accrued Liability (June 30, 2009 through June 30, 2019)



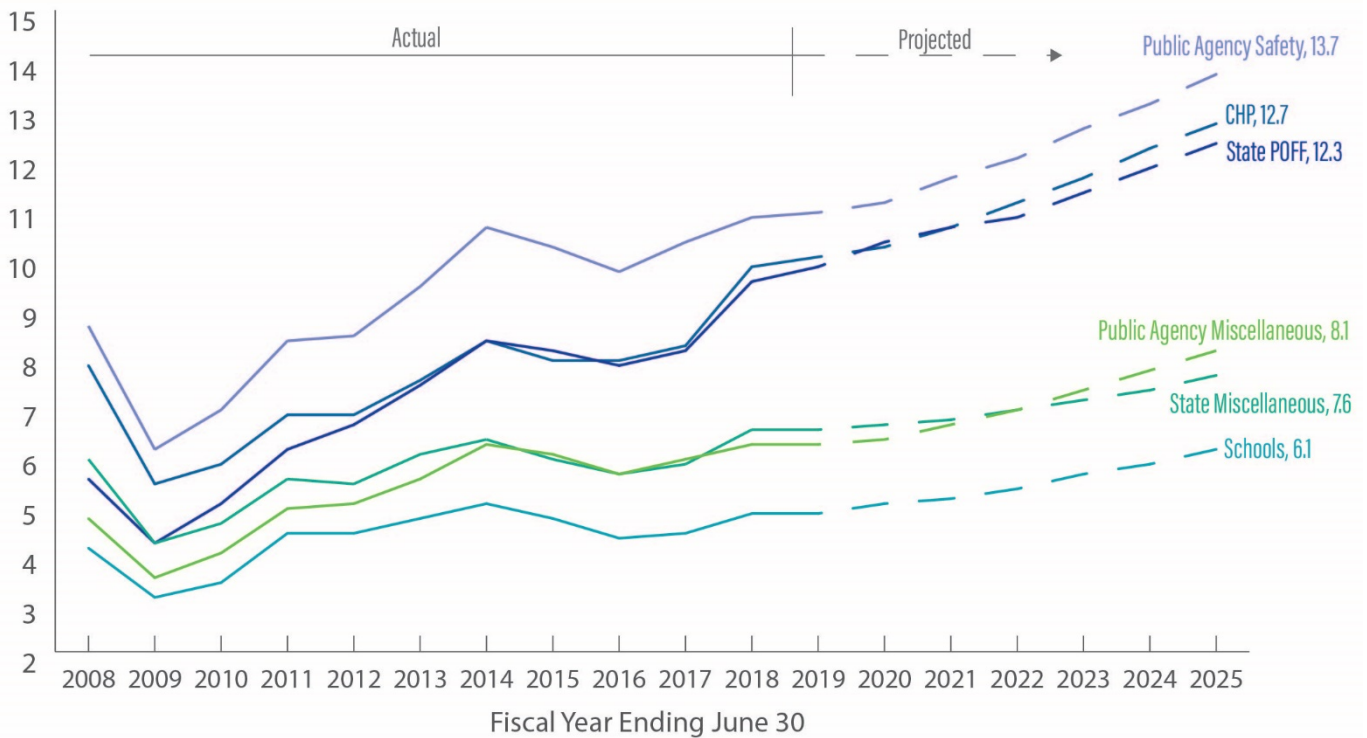
Another way to look at plan maturity is the ratio of assets to payroll, or the Asset Volatility Ratio (AVR). This ratio tends to rise as plans mature because assets must be built up to provide for benefit payments. Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, if the investment return in any given year is 1% less than expected, a plan with an AVR of 10 experiences an investment loss equal to 10% of annual payroll, whereas a plan with an AVR of 5 only suffers an investment loss equal to 5% of annual payroll.

The projected increases in the AVR are only partially due to demographic maturation. The other factor causing the AVRs to increase is the fact that the assets are projected to grow to equal the accrued liability as the funded ratio grows toward 100%. The funding policy alone will cause the AVRs to increase above current levels. As the AVR increases, each investment loss will have a higher impact than the last from the perspective of the employer.

As plans mature, they collect more assets, both in an absolute sense, but also in relation to the financial resources of the plan sponsor. This means that when financial markets fail to deliver a strong return or even collapse like they did in 2008-2009, it can lead to very high contribution levels. These high contribution levels could result in severe financial stress for employers.

The chart below shows historic and projected AVR values for public agency, state and schools pool plans.

Recent and Projected Asset Volatility Ratio (MVA to Payroll)



The maturing of a defined benefit retirement system is expected and is not a sign of mismanagement or that corrective action needs to necessarily take place. In fact, it is difficult to reduce plan maturity measures without lowering benefits or settling benefit obligations with retirees through lump sums or annuity purchases. However, it is important to recognize that increasing plan maturity typically leads to increased contribution volatility. Employers who may be more sensitive to such volatility may wish to create or increase funding toward a stabilization or rainy-day fund such as the new California Employers’ Pension Prefunding Trust (CEPPT). Eventually, there will be downward pressure on AVRs as liabilities for benefits earned by PEPPA members become a larger portion of total liabilities.

Trend Toward Lower Expected Returns and Discount Rates

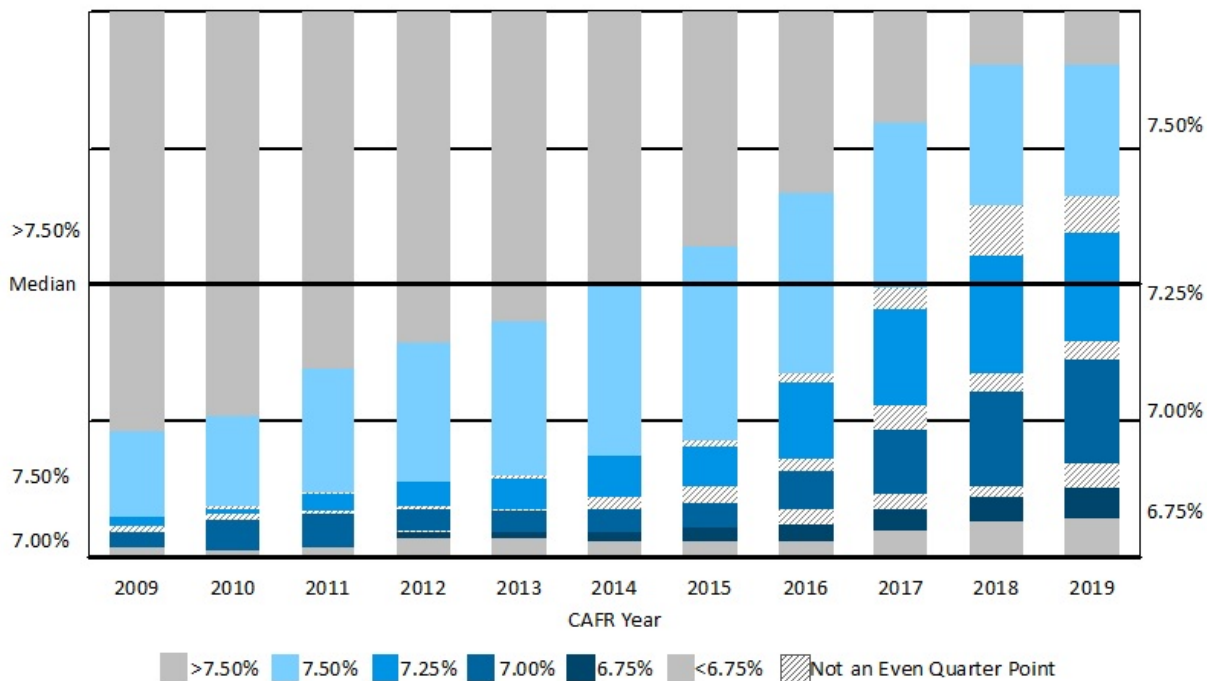
In addition to the demographic forces, concerns about lower returns over the next 10 to 20 years persist. The trend nationally for public pension plans in recent years has been a reduction in the rate of return assumption.

Not only have bond yields continued to trend downward, well below historical averages, but forecasts of economic growth also remain lower than they were prior to 2009. This has resulted in a general lowering of the expected returns (at least over the medium term) from the various asset classes. This in turn means that plans must change their asset allocations to accept a higher level of investment risk (to achieve the same level of expected return) or to accept a lower expected return on investments.

CalPERS is not alone in facing the changed expectations of what can be achieved in the capital markets. The chart below shows the change in distribution of public pension investment return assumptions from 2009 through 2019.

The survey shows that based on the available FY 2018-19 Comprehensive Annual Financial Report (CAFR) data, the average discount rate is 7.20%, and the median is 7.25%.

Distribution of Public Pension Plan Investment Return Assumptions



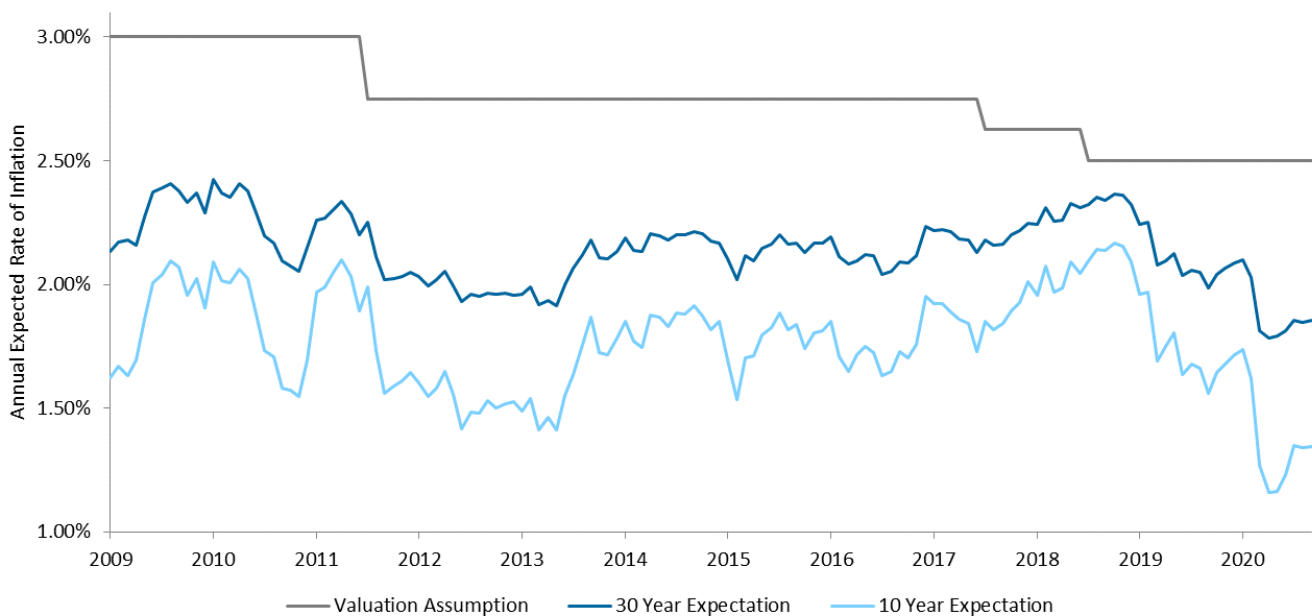
Note: The 2018 value was used in 2019 for 38 systems where the 2019 value was not yet available.

Data source: Center for Retirement Research at Boston College Public Plans Data, downloaded September 22, 2020.

Each year from 2010 through 2019 between 15% and 40% of the systems included in the survey reduced their discount rate. Although costly in the short-term, reducing the discount rate decreases the investment risk borne by the plan sponsors, reduces the likelihood and magnitude of future contribution increases, and positively impacts employer credit analysis.

Another contributing factor in declining discount rates is the trend towards lower inflation assumptions. The chart below shows the Federal Reserve Bank of Cleveland’s expected inflation values from January 2009 through September 2020 for 10 and 30 years along with the assumption used by CalPERS. The discount rate assumption is calculated as the sum of expected inflation and the assumed real rate of return. Lowering the inflation assumption lowers the discount rate.

Expected Annual Inflation: 10 and 30-Year Time Horizons

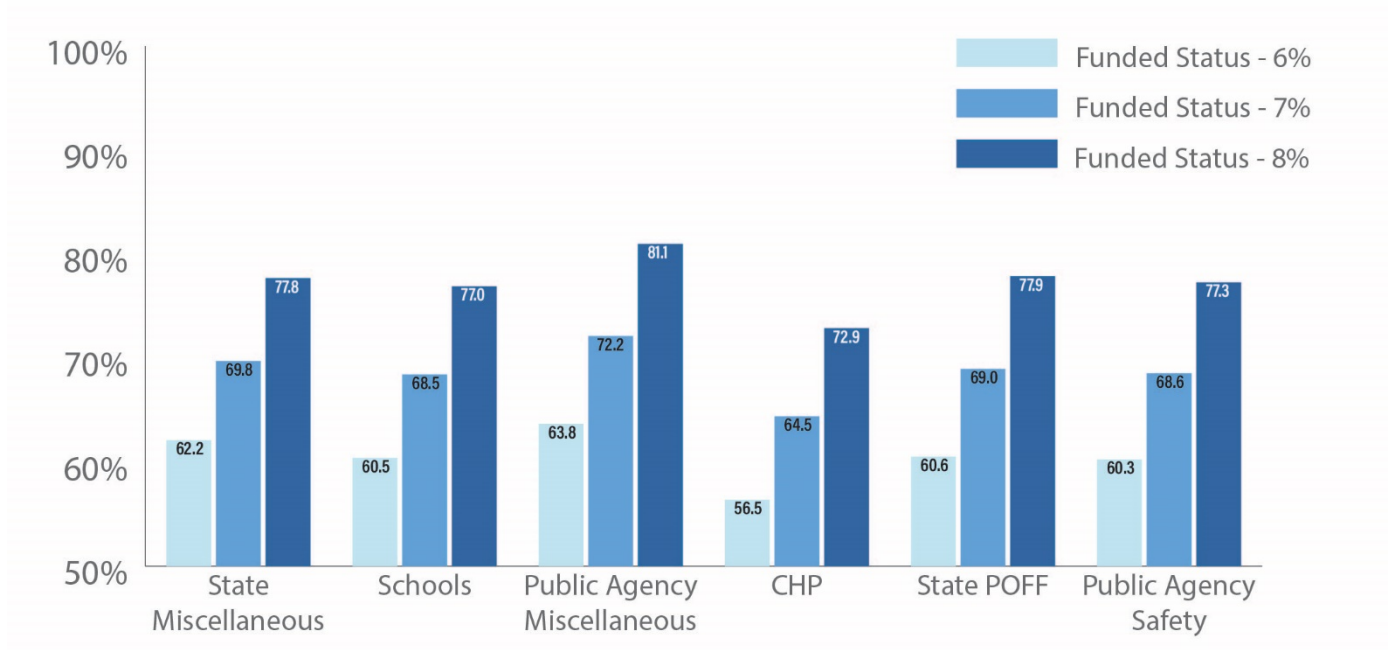


Although CalPERS has reduced the inflation assumption 0.50% over the previous decade, it remains higher than the current long-term forecasts of most economists and the Federal Open Market Committee’s formal long-range target. While reducing the inflation assumption reduces the discount rate, it has a smaller immediate impact on contribution requirements than would reducing the real rate of return assumption, since the inflation assumption affects projected benefit payments as well as projected investment earnings. As part of the current ALM cycle, which will conclude with the ALM workshop in November 2021, the inflation assumption will be under review. On-going monitoring of capital market assumptions is imperative to ensure that the assets and liabilities are being managed appropriately.

Given the recent changes in capital market assumptions, and the uncertainty regarding what the actual CalPERS long-term rate of investment return will be, it is informative to consider the current funded status under alternate discount rate assumptions. The chart below provides such results assuming 6%, 7%, and 8% discount rates with no change to the current inflation assumption of 2.5%.

Funded Status based upon 6%, 7% and 8% Discount Rates

Funded Status Based using 6%, 7% and 8% Discount Rates¹ as of June 30, 2019



¹Inflation assumption is kept at 2.5% for all scenarios listed. The inflation assumption may increase or decrease along with the discount rate assumption.

Changes to Actuarial Amortization Policy

CalPERS has adopted the following changes to the Actuarial Amortization Policy, effective with the June 30, 2019 valuations and contributions beginning FY 2020-21 for the state plans and schools pool, and FY 2021-22 for public agencies:

1. Reduced period over which actuarial gains and losses are amortized, from 30 years to 20 years. This change applies only to new gains/losses established on or after June 30, 2019.
2. Level Dollar amortization payments for all Unfunded Accrued Liabilities (UAL) bases throughout the amortization period. This change applies only to new UAL bases established on or after June 30, 2019.
3. Elimination of five-year ramp-up or ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses established on or after June 30, 2019.
4. Elimination of five-year ramp-down on investment gains/losses established on or after June 30, 2019. The five-year ramp up from the current policy will continue.

These changes will improve fund sustainability, benefit security, and intergenerational equity.

The following table summarizes key features of the policy for bases established on or after June 30, 2019 with contributions beginning FY 2020-21.

Actuarial Amortization Policy Effective June 30, 2019

Driver	(Gain) / Loss Investment	(Gain) / Loss Non-Investment	Assumption / Method Change	Benefit Change	Golden Handshake
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

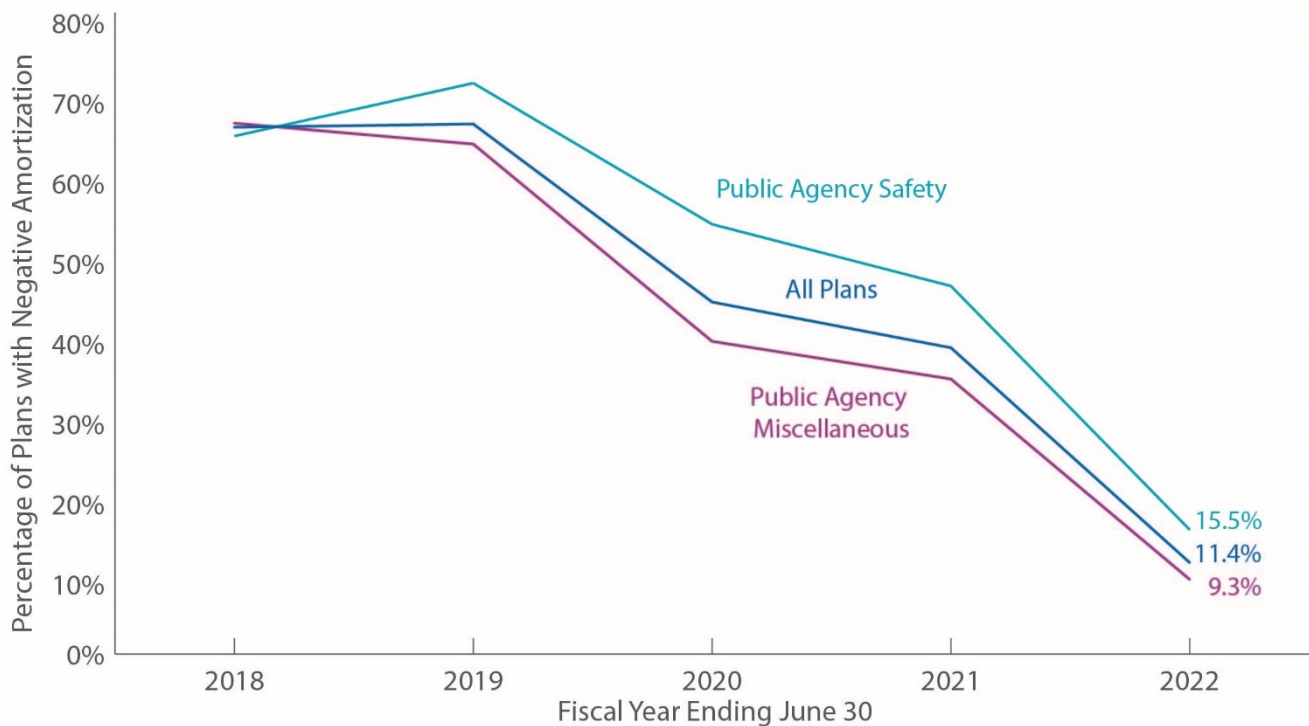
Current Amortization Progress

An analysis of the current contribution rate supports the need for the gradual, but steady, increases in the contribution rates shown earlier in this report (see Risk of Sharp Annual Increases in Contribution Rates section). The contribution rate includes an amortization payment which serves to reduce the unfunded accrued liability (UAL). If that amortization payment were sufficient to fund the UAL over the desired timeframe, contribution rate increases would not be necessary.

For some rate plans, the required payment toward the UAL is less than one year of interest on the UAL. The main causes of this are 1) recent increases in the UAL due to investment losses or assumption changes for which required payments are in the 5-year ramp-up period, and 2) the relatively long average remaining amortization period for the UAL. When the current annual required payment towards the UAL is less than interest on the UAL, the balance of the UAL is expected to increase from one year to the next, a phenomenon known as “negative amortization.”

As shown in the chart below, the number of rate plans subject to negative amortization has declined over the last few years as the recent UAL bases due to investment losses and assumption changes approach the end of the 5-year ramp-up period. In addition, the new amortization policy (effective with the June 30, 2019 valuations) will limit the extent of any negative amortization that may result from future UAL bases due to a maximum amortization period of 20 years and “level dollar” amortization.

Percentage of Plans with Negative Amortization by Contribution Year



The Actuarial Amortization Policy addresses situations where an employer has requested an extension of the amortization of the UAL due to a financial necessity. Such employers are required to contribute at least interest on the UAL.

A table with further details can be found in Appendix E – Historical Summary of Public Agency Negative Amortization Counts.

Employers Making Supplemental Payments

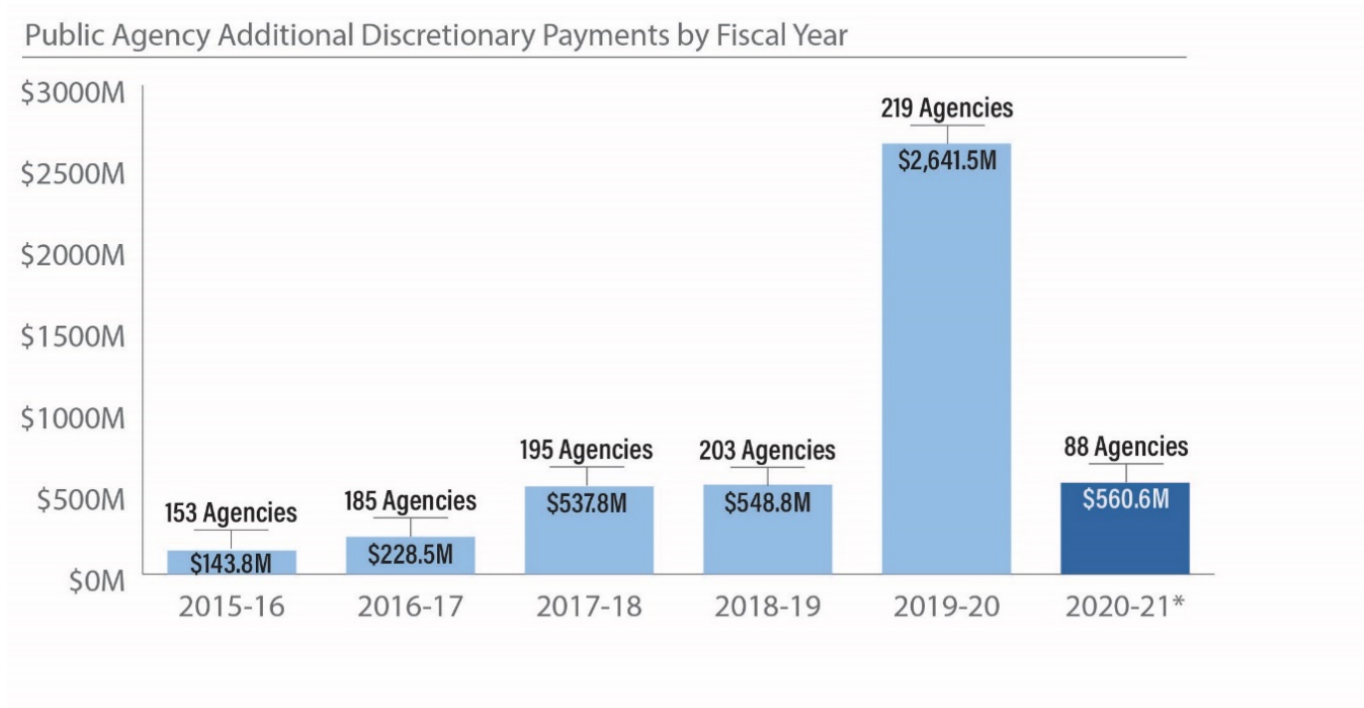
The number of employers that have elected to make additional contributions over and above the minimum required contributions continues to rise. Education efforts over the last few years have increased employers' awareness of the ability to make such payments and the many advantages of doing so. As part of the education efforts, CalPERS Actuarial Office has been providing Managing Employer Contribution spreadsheets upon employer request. These spreadsheets help employers determine the possible impact of additional contributions on their plans. CalPERS also made the Pension Outlook tool available to Non-Pooled plans in early November 2019 and to public agencies that participate in risk pools in fall 2020. This tool helps employers estimate what pension costs might be under different investment return and assumption scenarios.

The primary advantages of additional contributions are:

- A reduction to net pension liability for financial reporting purposes
- A reduction in pension expense for financial reporting purposes
- Savings in interest and lowering the overall cost of their pension programs
- Lower risk of low funded status in the future
- Lower risk of high contributions in the future

The form of these additional discretionary payments (ADP's) vary between employers. Some employers make occasional ADP's on an ad hoc basis, for example, if they have a budgetary surplus towards the end of a fiscal year. While other employers and the state have made more regular ADP's on a monthly or quarterly basis and some even have a formal plan in place to pay off their unfunded liabilities by a specific target date. For example, the State of California made a \$6 billion additional discretionary payment in FY 2017-18.

In addition to additional discretionary payments, public agencies have also been issuing Pension Obligation Bonds (POBs) with increased frequency in FY 2019-20 and FY 2020-21. A POB is a taxable bond that some agencies issue to fund the unfunded portion of their pension liabilities by creating debt. The low interest environment could be contributing to the recent trend of public agencies issuing POBs. The chart below reflects both ADPs and payments made with funds from POBs from public agencies. CalPERS does not have information about which payments were made as a result of a POB.



*ADPs from July 1, 2020 through September 30, 2020

California Employers' Pension Prefunding Trust Program

The funding levels and risks summarized to this point do not tell the complete story of pension funding and the risk management efforts of CalPERS employers. Many public employers set aside assets in a trust separate from the pension trust to help manage future pension contributions. These trusts, known as section 115 trusts (after the Internal Revenue Code section that affords these trusts preferential tax treatment), give employers a number of advantages over the pension trust. Unlike the PERF, employers can control the asset allocation in a section 115 trust, and the assets can be used at the discretion of the employer to make required or additional contributions to the pension trust. The unfunded liabilities and future contribution volatility summarized in the previous sections of this report do not reflect the fact that some employers already have assets set aside in a section 115 trust that can be used to reduce and stabilize future pension costs. One drawback, however, of section 115 trusts is that they can be expensive to set up and administer, especially for small employers.

In order to help employers take advantage of section 115 trusts, CalPERS established the California Employers' Pension Prefunding Trust (CEPPT), which allows public employers to prefund their future defined benefit pension costs without the expense of a privately administered trust. The program, established by Senate Bill 1413 and implemented in July 2019, provides the state and public agencies an additional investment vehicle to accumulate assets over time to help manage long-term pension costs. Participation in the trust is voluntary and provides employers flexibility to determine the amount of their contributions, risk tolerance, and time horizon.

The CEPPT offers employers two diversified strategic asset allocations with low and moderate risk levels that are expected to have a net rate of investment return of 4% and 5%, respectively. The CEPPT is designed to give public agencies who offer defined benefit pensions the opportunity to save money by investing now for their future pension contributions.

As of July 2020, a total of 15 employers have established CEPPT accounts with assets totaling approximately \$11 million. Although this is a small portion of employers' unfunded pension liabilities at this time, the CEPPT is expected to grow over time as more employers enroll. Also, the CEPPT balance only represents a fraction of the assets employers have set aside in section 115 trusts. Several CalPERS agencies have established a privately administered section 115 trust to help the agency meet its future obligations to CalPERS.

Funding Risk Mitigation Policy

In November 2015, the board adopted the Funding Risk Mitigation Policy. This policy supports the board's strategic objective of reducing the likelihood of a significant investment loss by gradually transforming the strategic asset allocation over time to one that will meet the board's target of an expected fund volatility of 8% or less. The policy is currently in place and is expected to result in a lowering of investment volatility (and a lowering of the discount rate) over time. The goal of the policy is to reduce the risk to members' benefits that could result from investment volatility impacting funded status and required employer contributions.

The policy provides for a reduction in the investment risk by changing the asset allocation when investment performance significantly outperforms the discount rate. To achieve a lower level of investment volatility, the new asset allocation will have a higher allocation to less volatile asset classes, such as fixed income. This in turn means that the new asset allocation will have a lower expected investment return and require a lowering of the discount rate.

The thresholds that trigger a risk mitigation event (the changing of the asset allocation and consequent reduction in the discount rate) are shown below:

Funding Risk Mitigation Policy – How the Policy Works

Excess Investment Return	Reduction in Discount Rate	Reduction in Expected Investment Return
If the actual investment returns exceed the discount rate by	Then the discount rate will be reduced by	And the expected investment return will be reduced by
2 percentage points	0.05%	0.05%
7 percentage points	0.10%	0.10%
10 percentage points	0.15%	0.15%
13 percentage points	0.20%	0.20%
17 percentage points	0.25%	0.25%

The policy provides that the reduced discount rate would be included in employer actuarial valuations effective as of June 30 in the fiscal year in which the funding risk mitigation event occurred. The policy had been suspended during the period over which the discount rate was being reduced to 7%. The policy is once again effective, meaning an investment return of 9% or higher for the fiscal year ending June 30, 2021 will trigger a risk mitigation event.

Conclusion

The demographic and economic experience of the retirement system during the year ending June 30, 2019 was relatively consistent with expectations. Therefore, there are no significant changes in the characterization of retirement system risks due to recent experience.

The system continues to gradually mature which continues to increase the risk for significant changes to required contribution rates, particularly due to unexpected investment return. We expect this to continue steadily in the near-term. However, certain risk measures (such as liability volatility ratios and asset volatility ratios) will level off or potentially drop somewhat as lower benefits for PEPRAs members become a larger portion of system liabilities.

There has been a significant decrease in the number of plans paying UAL contributions less than interest on the plans' UAL. This is primarily due to increases in required UAL payments toward the impact of lowering of the discount rate to 7% as the 5-year ramp-up period progresses. In addition, recent changes to the amortization policy effective for the June 30, 2019 valuations are expected to reduce the likelihood of negative amortization in the future. Limiting negative amortization will reduce the likelihood of decreases in funded status and increase the likelihood of faster progress towards 100% funding.

With the recent increases in required employer contributions, due partly to the reduction in the discount rate to 7%, combined with the current economic difficulties caused by the pandemic, some employers will likely have difficulty making required CalPERS contributions over the next few years. In addition, recent trends in capital market assumptions suggest it may be difficult to achieve a 7% long-term investment return without taking on additional risk in the portfolio. The asset allocation and discount rate will be reviewed during the ALM process in 2021. A decrease in the current discount rate would immediately increase employer and PEPRAs member contribution rates. In addition, selecting a discount rate that is not ultimately achieved would gradually increase employer contribution rates and ultimately cost even more. This potential for further increases to required employer contributions increases the risk that individual agencies may lack the ability to make required CalPERS contributions leading to potential contract terminations and possible benefit reductions. While financial necessity policies within the CalPERS amortization policy can be used in some cases to spread amortization payments over a longer period and hence reduce near-term contributions, these policies require minimum contributions that may still pose challenges for some agencies. In addition, these policies do not reduce costs but merely delay and increase them.

Careful review and consideration of risk measures and risk tolerances during the ALM process in 2021 will be critical for optimal selection of investment policies, asset allocations, and funding policies for the near-term funding of the system and the protection of member benefits.

Appendix A – Public Employees’ Retirement System (PERS) Summary Statistics

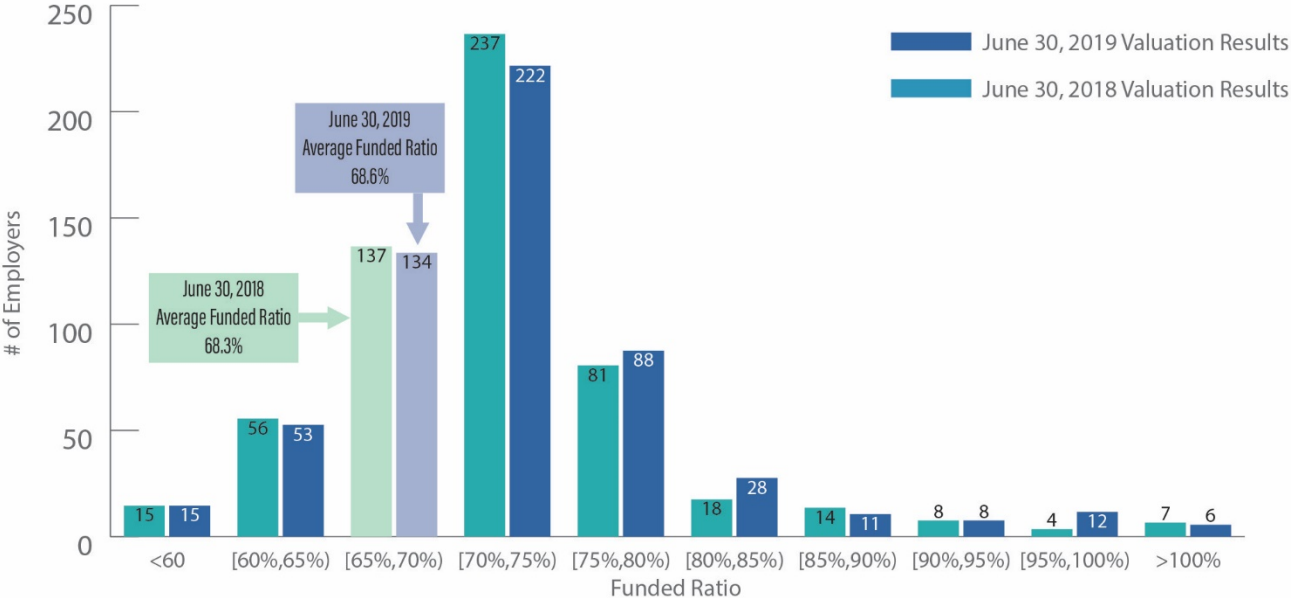
	June 30, 2018	June 30, 2019
Number of Actives¹	846,327	859,879
Number of Transferred¹	176,413	179,262
Number of Separated¹	390,802	435,296
Number of Receiving¹	831,825	845,231
Entry Age Accrued Liability	\$504.3 billion	\$530.6 billion
Market Value of Assets	\$353.5 billion	\$371.9 billion
Unfunded Liability	\$150.8 billion	\$158.8 billion
Funded Status	70.1%	70.1%
Prior Year Benefit Payments	\$22.6 billion	\$24.5 billion
Prior Year Employer Contributions	\$20.0 billion	\$15.6 billion
Prior Year Employee Contributions	\$4.3 billion	\$4.7 billion

¹These counts are from the CalPERS actuarial valuation system, which may not match the statistics provided in CalPERS Comprehensive Annual Financial Report (CAFR). For example, the number of receiving displayed in this report is not the count of unique benefit recipients; rather, it is the count of data records in CalPERS actuarial valuations for benefits in pay status. Some individual retirees have multiple records in our data due to having worked at multiple CalPERS agencies. Numbers shown in the CAFR for retirees receiving benefits include individuals just once in the count even if they are receiving benefits from multiple CalPERS agencies.

Appendix B – Results of June 30, 2019 Public Agency Valuations for Safety Plans

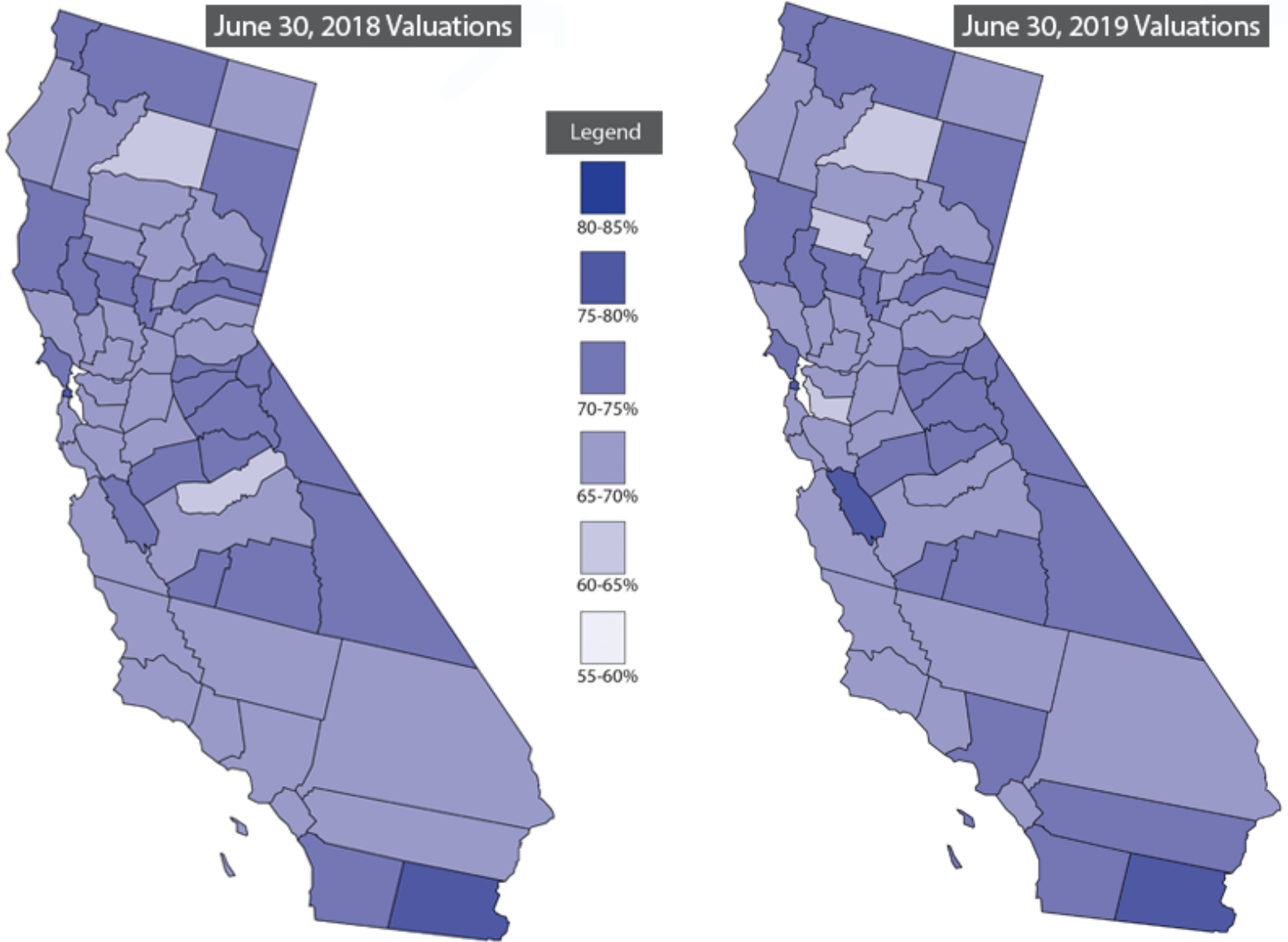
Public Agency Funded Ratios for Safety Plans

Funded Ratios by Employer as of June 30, 2018 and June 30, 2019 (Public Agency Safety)



Public Agency Funded Ratios by County (Safety Plans)

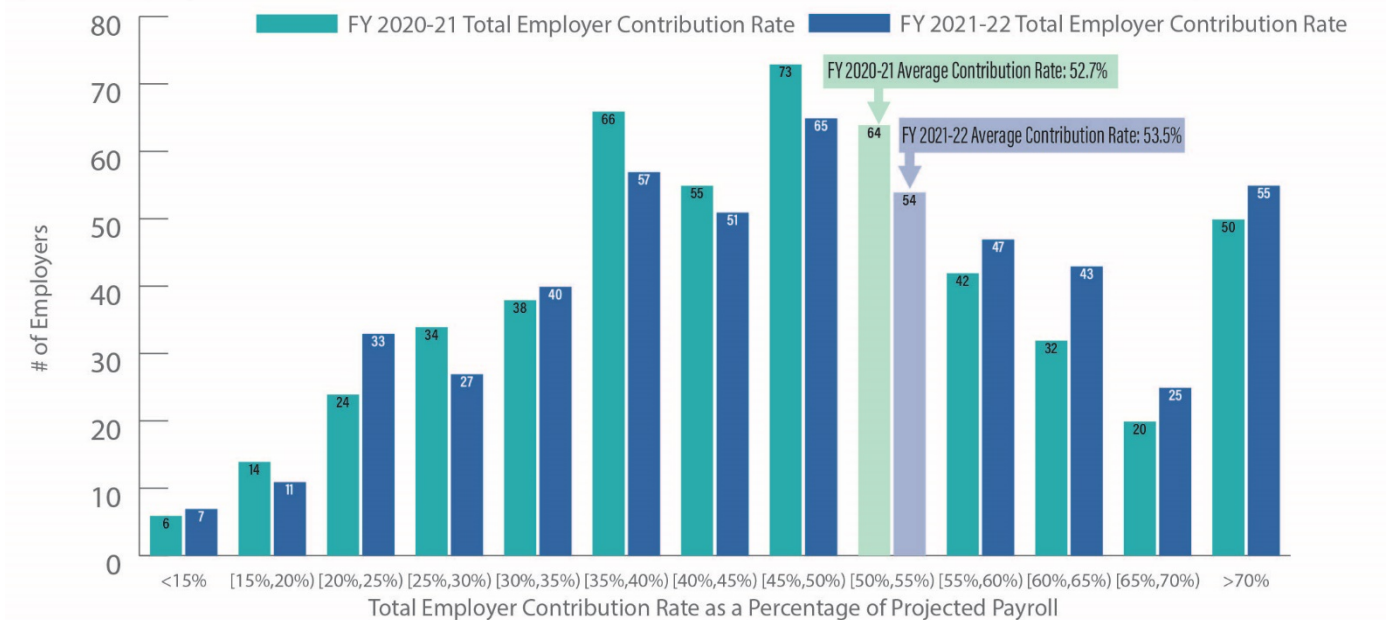
Funded Ratio by County (Public Agency Safety)



Public Agency Contribution Rates for Safety Plans

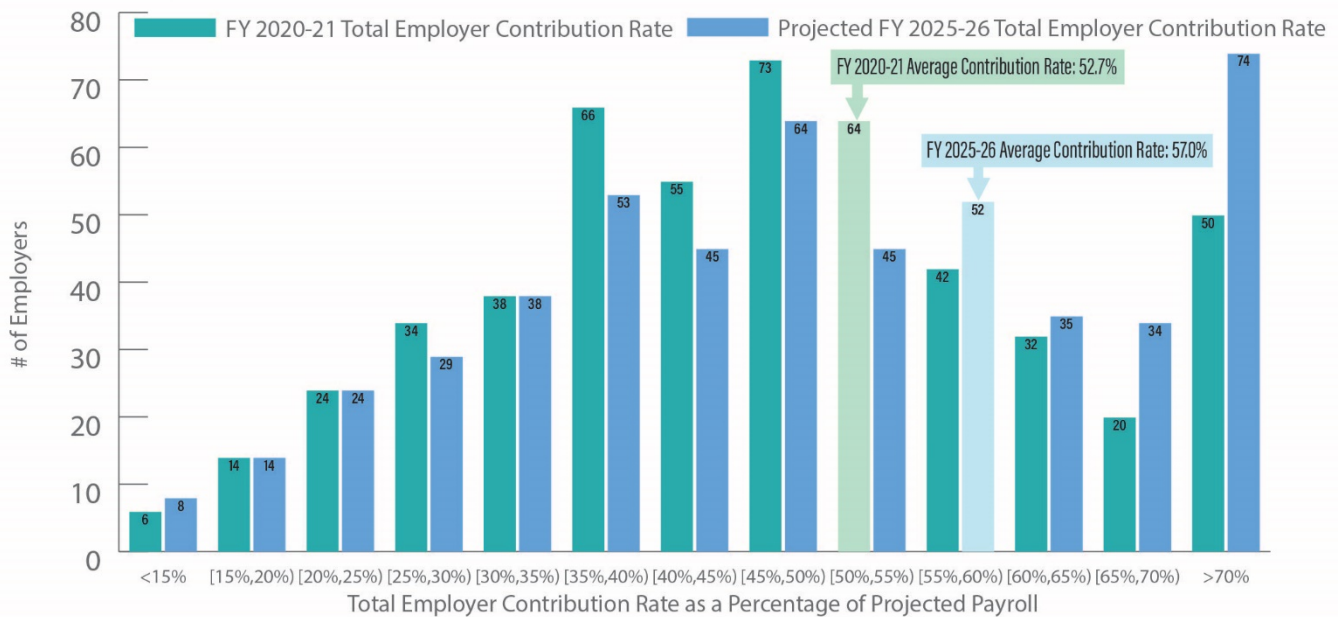
The following table displays the total employer contribution rates for public agency safety plans that contract with CalPERS for benefits. These contribution percentages reflect both the required normal cost contribution percentage and the required payment toward any unfunded liability (converted to a % of payroll).

Total Employer Contribution Rates for Fiscal Year 2020-21 and 2021-22 (Public Agency Safety)



The following table displays the actual and projected total employer contribution rates for public agency safety plans that contract with CalPERS for benefits. These contribution percentages reflect both the required normal cost contribution percentage and the required payment toward any unfunded liability (converted to a % of payroll). FY 2025-26 rates are based on a projected payroll. For plans with a decreasing number of active members (and therefore decreasing payroll), these contribution percentages can become quite large when the required payment toward unfunded liability becomes a large percentage of the decreasing payroll. In addition, the projected contributions are based on experience through June 30, 2019. There will be additional investment, economic and demographic experience that will impact the projected rates before they become actual rates in the future.

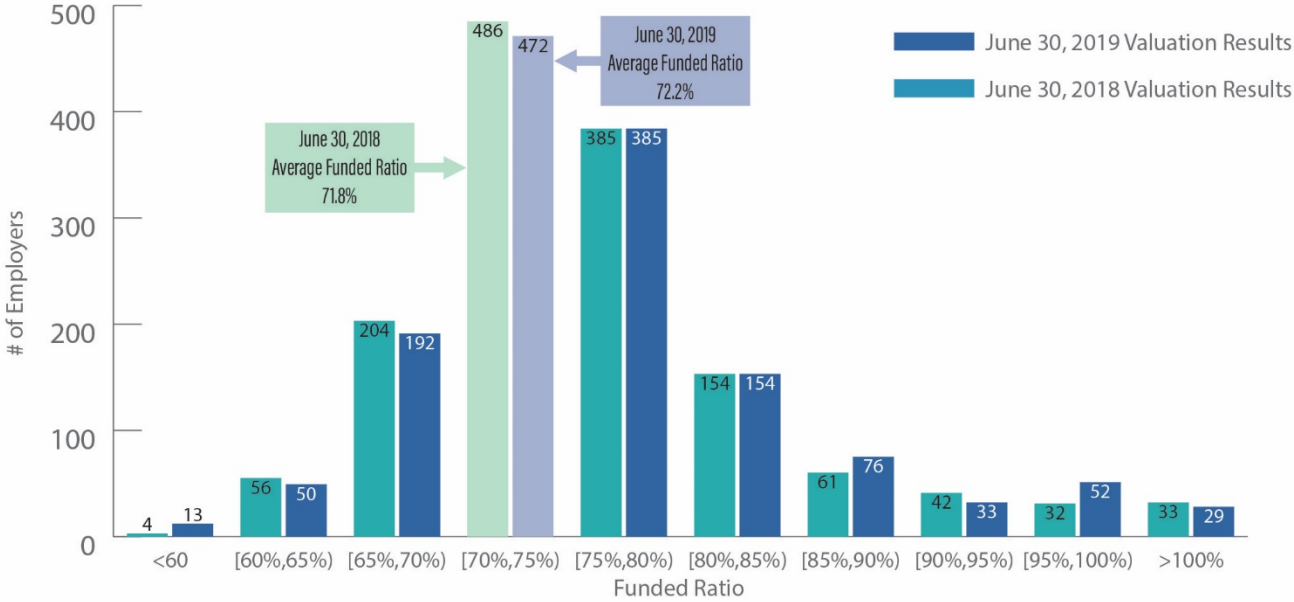
Total Employer Contribution Rates for Fiscal Year 2020-21 and 2025-26 (Public Agency Safety)



Appendix C – Results of June 30, 2019 Public Agency Valuations for Miscellaneous Plans

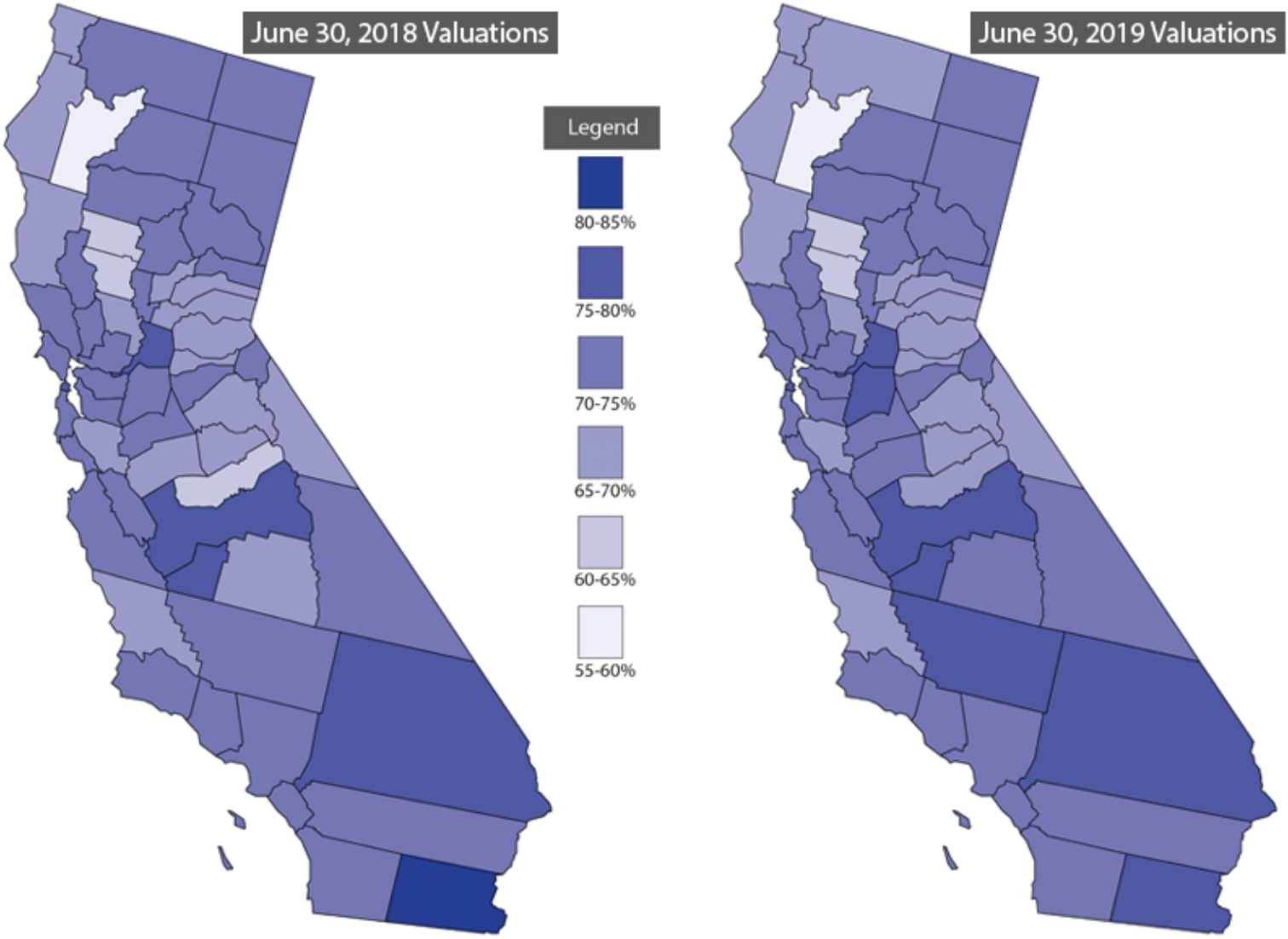
Public Agency Funded Ratios for Miscellaneous Plans

Funded Ratios by Employer as of June 30, 2018 and June 30, 2019 (Public Agency Miscellaneous)



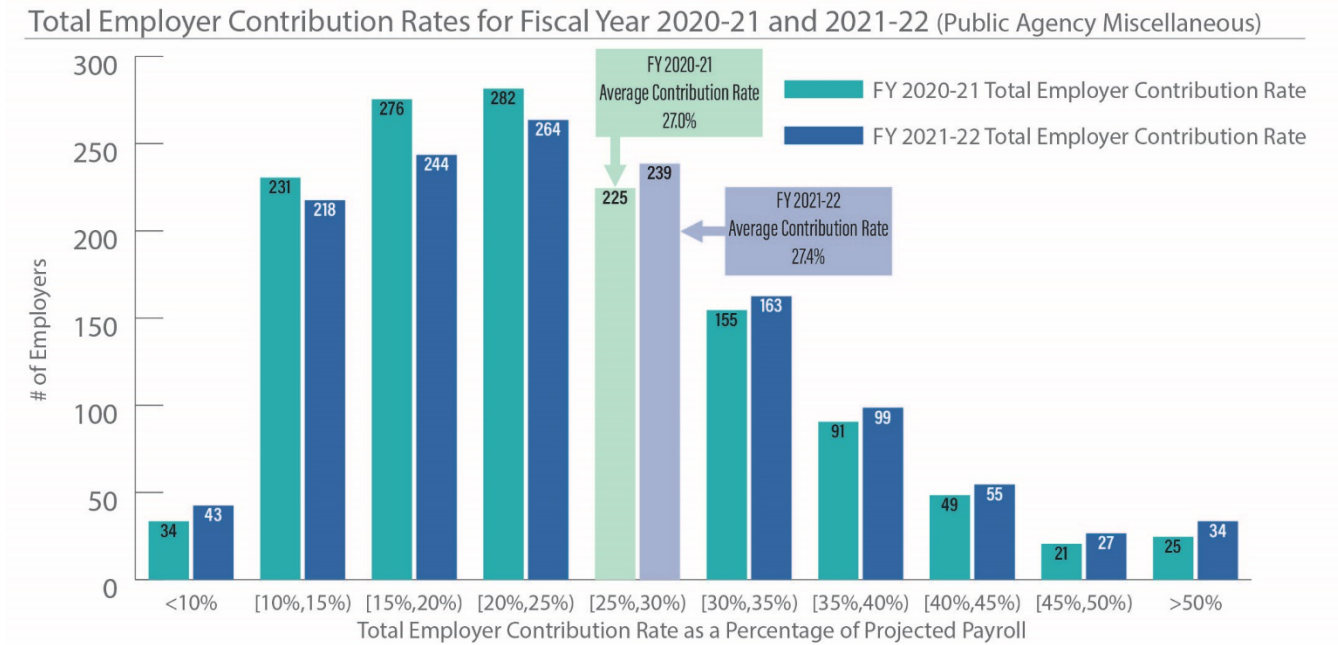
Public Agency Funded Ratios by County for Miscellaneous Plans

Funded Ratio by County (Public Agency Miscellaneous)



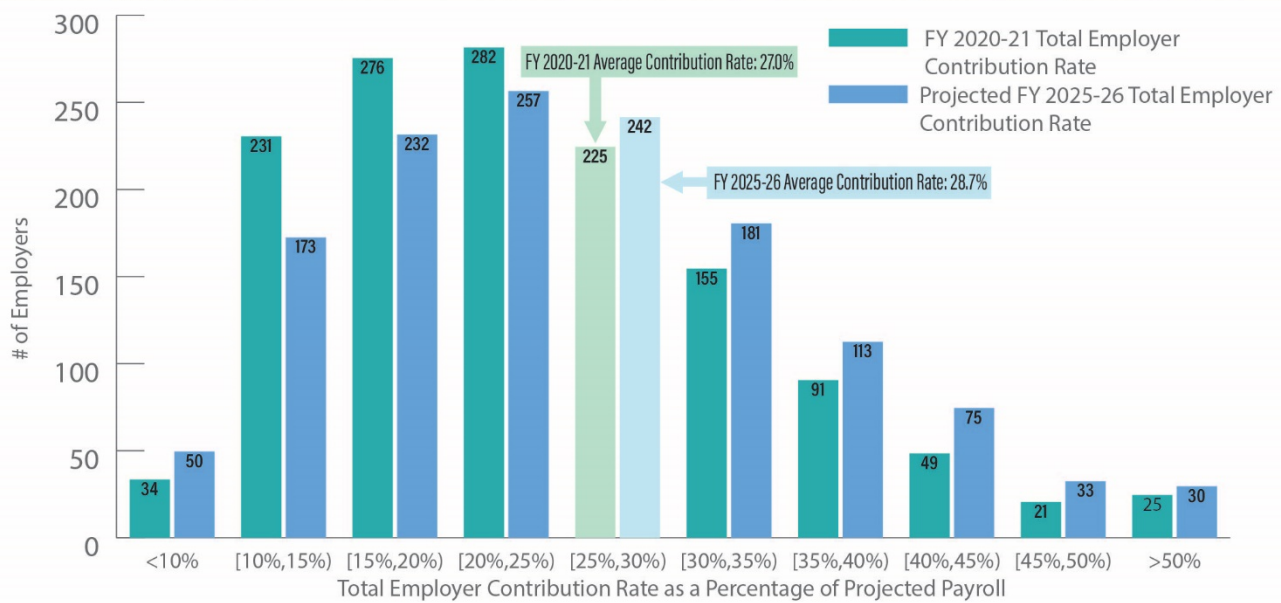
Public Agency Contribution Rates for Miscellaneous Plans

The following table displays the total employer contribution rates for public agency miscellaneous plans that contract with CalPERS for benefits. These contribution percentages reflect both the required normal cost contribution percentage and the required payment toward any unfunded liability (converted to a % of payroll).



The following table displays the actual and projected total employer contribution rates for public agency miscellaneous plans that contract with CalPERS for benefits. These contribution percentages reflect both the required normal cost contribution percentage and the required payment toward any unfunded liability (converted to a % of payroll). FY 2025-26 rates are based on a projected payroll. For plans with a decreasing number of active members (and therefore decreasing payroll), these contribution percentages can become quite large when the required payment toward unfunded liability becomes a large percentage of the decreasing payroll. In addition, the projected contributions are based on experience through June 30, 2019. There will be additional investment, economic and demographic experience that will impact the projected rates before they become actual rates in the future.

Total Employer Contribution Rates for Fiscal Year 2020-21 and 2025-26 (Public Agency Miscellaneous)



Appendix D – Recent and Projected Employer Contribution Rates

Average of Public Agency Total Employer Contribution Rates (FY 2020-21 to 2026-27)



Appendix E – Historical Summary of Public Agency Negative Amortization Counts

		Pooled Plans			Non-pooled			All Plans		
		Total	Misc	Safety	Total	Misc	Safety	Total	Misc	Safety
Contribution Year FY	Total Number of Plans	3,393	2,251	1,142	431	306	125	3,824	2,557	1,267
2017-18	# of Plans with Negative Amortization	2,142	1,443	699	371	251	120	2,513	1,694	819
Discount Rate 7.50%	% of Plans with Negative Amortization	63.13%	64.10%	61.21%	86.08%	82.03%	96.00%	65.72%	66.25%	64.64%
Contribution Year FY	Total Number of Plans	3,511	2,322	1,189	430	306	124	3,941	2,628	1,313
2018-19	# of Plans with Negative Amortization	2,201	1,386	815	405	285	120	2,606	1,671	935
Discount Rate 7.375%	% of Plans with Negative Amortization	62.69%	59.69%	68.54%	94.19%	93.14%	96.77%	66.13%	63.58%	71.21%
Contribution Year FY	Total Number of Plans	3,566	2,355	1,211	428	304	124	3,994	2,659	1,335
2019-20	# of Plans with Negative Amortization	1,542	930	612	212	108	104	1,754	1,038	716
Discount Rate 7.25%	% of Plans with Negative Amortization	43.24%	39.49%	50.54%	49.53%	35.53%	83.87%	43.92%	39.04%	53.63%

		Pooled Plans			Non-pooled			All Plans		
		<u>Total</u>	<u>Misc</u>	<u>Safety</u>	<u>Total</u>	<u>Misc</u>	<u>Safety</u>	<u>Total</u>	<u>Misc</u>	<u>Safety</u>
Contribution Year FY 2020-21	Total Number of Plans	3,612	2,377	1,235	426	303	123	4,038	2,680	1,358
	# of Plans with Negative Amortization	1,376	839	537	166	79	87	1,542	918	624
	Discount Rate 7.00%	38.10%	35.30%	43.48%	38.97%	26.07%	70.73%	38.19%	34.25%	45.95%
Contribution Year FY 2021-22	Total Number of Plans	3,639	2,387	1,252	425	303	122	4,064	2,690	1,374
	# of Plans with Negative Amortization	434	225	209	30	26	4	464	251	213
	Discount Rate 7.00%	11.93%	9.43%	16.69%	7.06%	8.58%	3.28%	11.42%	9.33%	15.50%

2020 Annual Review of Funding Levels and Risks

November 2020

