California Public Employees' Retirement System

2019 Annual Review of Funding Levels and Risks

November 2019

CalPERS

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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. It does not 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, 2018 annual valuations, which have been projected forward to June 30, 2019 based on the known 6.7 percent investment return for fiscal year (FY) 2018-19. In general, all the current and projected results in the report have been based on a long-term discount rate of 7.00 percent and the demographic assumptions reflecting the 2017 Experience Study, unless stated otherwise.

The actual results based on the valuations at June 30, 2018 (state and public agencies using a discount rate of 7.00 percent, schools pool at 7.25 percent) 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 Beliefs

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

Due to the relatively good performance of the capital markets and the state and public agencies making additional discretionary payments over the previous three fiscal years, the estimated funded status of the system has increased to 70.4 percent as of June 30, 2019 (71 percent with inclusion of additional contributions made by the state in July 2019), despite the lowering of the discount rate to 7.00 percent. The funded status varies slightly among the different plans, with the average public agency plan having a higher funded status than the state plans. Plans for miscellaneous members generally have 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 are climbing, and 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.

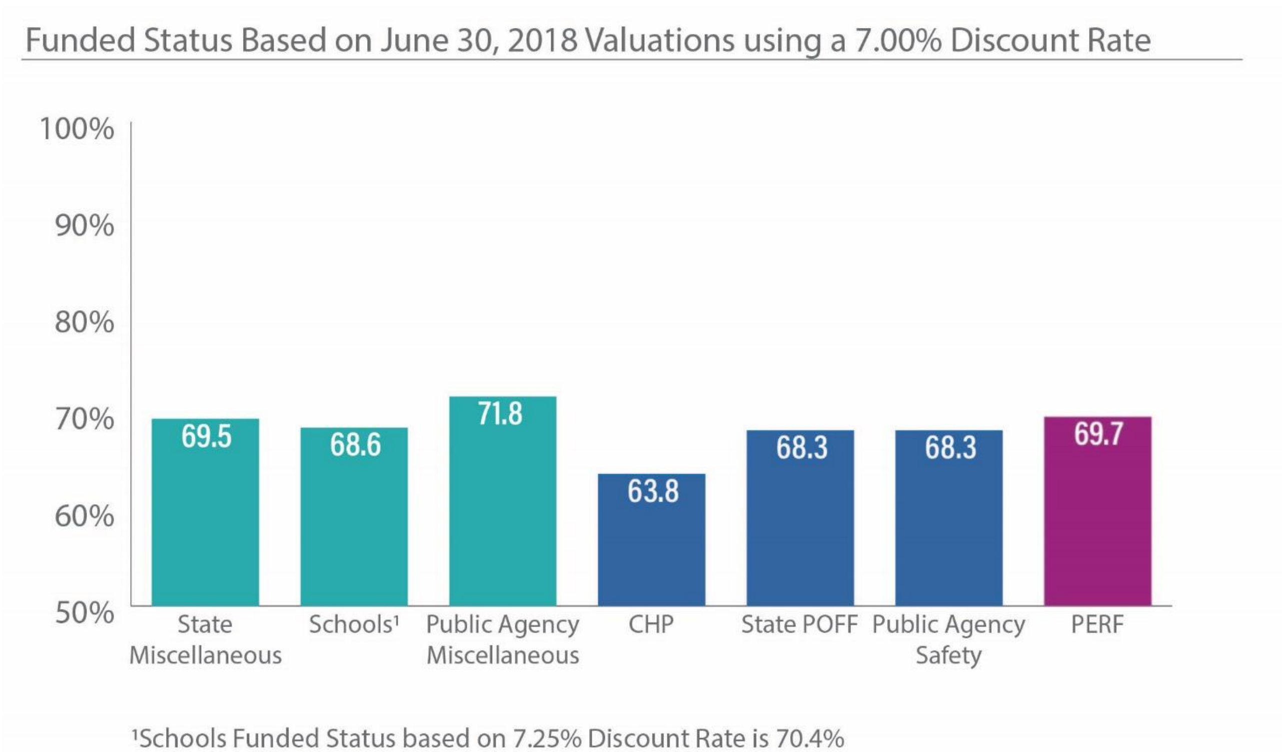
CalPERS completed an Asset Liability Management (ALM) review process in November 2017 that led to the adoption of a new strategic asset allocation and affirmed the prudence of the board's decision to lower the discount rate to 7.00 percent in December 2016. Subsequently, in February 2018 the board adopted a new Amortization Policy that prospectively shortens the amortization periods for experience gains and losses which will reduce the period required to attain full funding and lower the overall cost of the plans.

Overall, this report shows that while the funding position and the risk of falling to low funding levels in the future have improved, risks remain in the system. Required employer contributions are projected to increase over the next few years. 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.

Funding Levels

The overall level of funding of the system has improved due to the higher than expected investment returns over the last few years and additional discretionary payments by the state and public agencies, despite the lowering of the discount rate to 7.00 percent. 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 Amortization Policy will decrease the period for paying down the unfunded liability, 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) using a 7.0 percent discount rate for all plans.



The chart above shows that the average funded status of public agency miscellaneous and safety plans is greater than the funded status of corresponding state plans. Based on the results of the funding valuations at June 30, 2018, the overall funding position of the PERF is about 70 percent.

Public agencies have the right, in law, to elect to terminate their plans. When this happens, the employer is required to make the contribution necessary to fully fund the plan on a wind-up basis. 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.

As shown in the chart on page 4, Public Agency Miscellaneous plans were about 72 percent funded on average as of June 30, 2018 using a 7.0 percent discount rate. Based on a reasonable range of termination discount rates, Public Agency Miscellaneous plans were on average 43 to 48 percent funded as of June 30, 2018. Public Agency Safety plans were 38 to 43 percent funded on a termination basis versus 68 percent using a 7.0 percent discount rate.

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

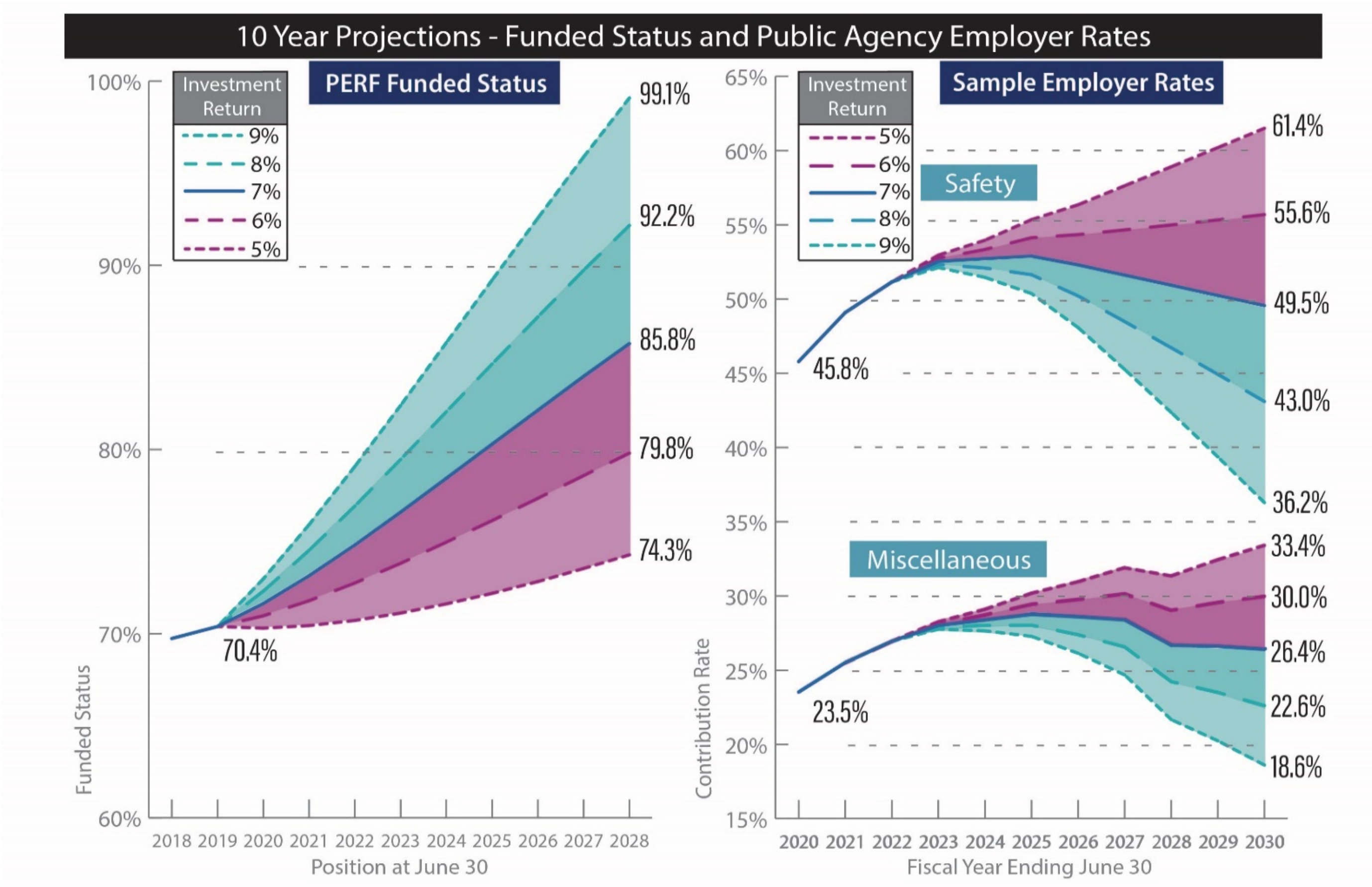
To the extent future experience deviates from the actuarial assumptions, adjustments are made to the unfunded liability position which result in required contribution increases or decreases from present levels. The factor that is likely to have the largest impact on future contribution requirements is 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 percent. If the actual returns every year in the future were 7.0 percent, the following are expected to occur:

- Required employer contributions would increase over the next few years while the full cost of recent discount rate changes and investment losses are being phased-in.
- In approximately 4 to 5 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 PEPRA 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 percent over the next 25 to 30 years.

Even if future returns for the PERF average 7 percent, year to year returns will not be exactly 7 percent. 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 7.00 percent annual investment return, with alternative annual investment returns at 5, 6, 8 and 9 percent to demonstrate the sensitivity of the PERF and the plans to future investment returns.



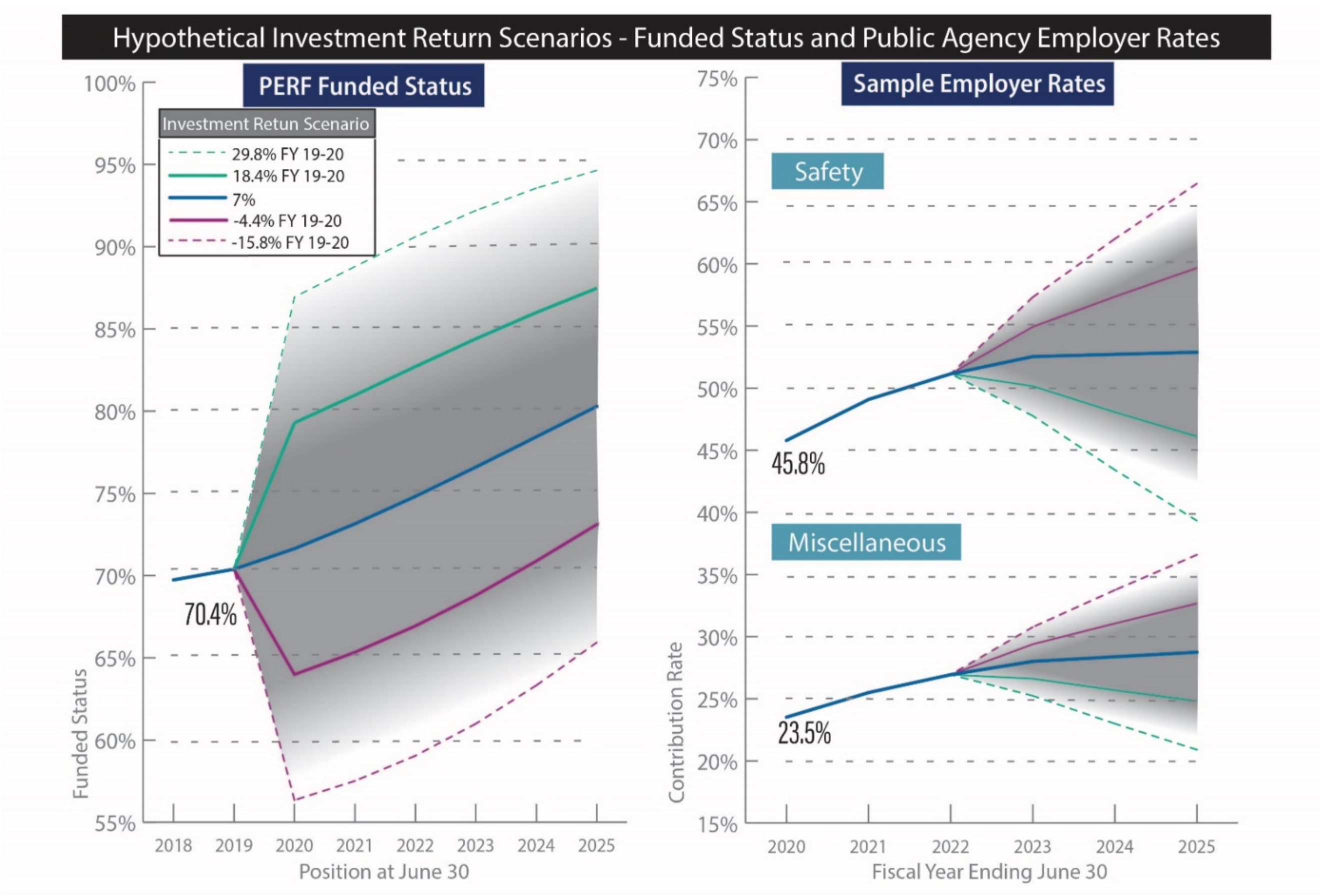
In the long-term it is likely the average investment return of the PERF will be close to 7 percent and very likely it will be between the alternate projection assumptions of 5 percent and 9 percent used in the chart above. However, in any single year the possibility of a return lower than 5 percent or greater than 9 percent is much greater. For example, given the expected volatility of the current investment allocation of the PERF, there is roughly a 16 percent chance that in a single year, the investment return will be lower than -4.4 percent and a 16 percent chance that it will be greater than 18.4 percent. These returns are one standard deviation lower and higher than the expected return of 7.0 percent. So, while it is more likely that any single year return will be between -4.4 percent and 18.4 percent (68 percent 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 percent chance of occurring. The two standard deviation range is -15.8 percent to 29.8 percent. Or said another way, a return of between -15.8 percent and 29.8 percent in any given year has a probability of around 95 percent.

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

The chart below provides the impact of various extreme returns in the year ending June 30, 2020 with no assumed future correction. The purpose of the chart is to illustrate the potential impact of a single very good 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 are generally paid in full due to the combination of CalPERS investment returns, employer contributions and member contributions. While there is a legal requirement for the employer to make the full contribution needed to fund the plan, in some circumstances the employer may be unable to do so. In these situations, the employer's financial hardship can become a direct risk to the plan's members and their benefits.

The risks borne by the employers (primarily investment return, inflation and mortality) can impact their ability to make required CalPERS contributions. Investment and actuarial policies adopted by the CalPERS Board are always adopted with the purpose of maintaining benefit security for members. When appropriate options are available, the Board may consider the employers' ability to pay future required contributions when setting these policies.

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.

Over the last few years, the methods used to determine the alternate investment scenarios have been modified somewhat to reflect what are believed to be more appropriate and accurate techniques. For the 2019 probability results shown in this section, the model was modified to produce slightly less favorable investment results over the next 10 years. As a result, the 2019 results for many of the items appear slightly less favorable than results that would have been produced under last year's model. For example, while significant additional contributions made by the state for both the state and schools plans in 2019 result in real reductions to the risks discussed in this section, the change to the model make these risk reductions harder to assess. Therefore, the differences between the 2018 and 2019 probability results should be considered less significant than the 2019 results themselves.

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 4, current funding levels for the PERF are below the target level of 100 percent. 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)

	40%		50%		60%	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
State Misc.	<1%	<1%	1%	1%	24%	24%
Schools	<1%	<1%	1%	1%	22%	21%
CHP	<1%	<1%	2%	2%	42%	39%
POFF	<1%	<1%	1%	1%	26%	19%
PA Misc.	<1%	<1%	2%	2%	27%	29%
PA Safety	<1%	<1%	4%	5%	43%	43%

The figures above are as of June 30, 2018 and reflect the adoption of the new Amortization policy that will be effective June 30, 2019. The 2019 results above incorporate the 6.7 percent investment return for FY 2018-19. The new 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 percent or 40 percent continue to be quite low.

The probabilities of falling below 60 percent are similar to last year's results or in some cases slightly lower due in part to additional discretionary payments. In July 2019, the state made additional discretionary payments totaling $2.5 billion to state plans and $660 million to the school's pool, which lowered their risk of low funding levels in the future.

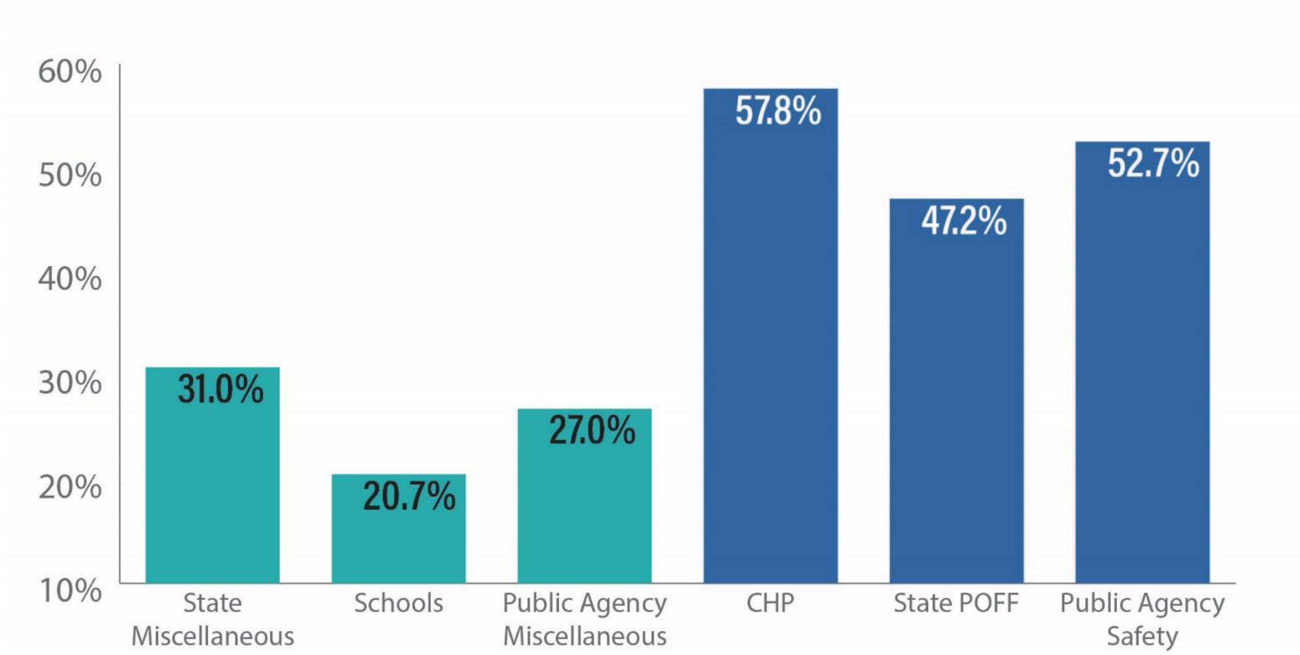
Risk of High Contribution Rates

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, requests for extensions to amortization schedules and information regarding termination procedures indicate that some public agencies are under significant strain.

Employer Contribution Rates Based on June 30, 2018 Valuations*



*The June 30, 2018 valuations were used to set contribution rates for FY 2020-21 for public agencies and for FY 2019-20 for state and schools. The contribution rates were determined using a 7.00 percent discount rate for state and public agency plans and a 7.25 percent discount rate for the schools pool.

Future State

It is anticipated that employer contributions will continue to increase for the next 3 to 5 years. This is due to current amortization schedules ramping 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)

	30% of Payroll		35% of Payroll		40% of Payroll	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
State Misc.	100%	100%	56%	55%	28%	31%
Schools	36%	39%	11%	14%	1%	2%
PA Misc.	53%	55%	23%	26%	6%	7%

	50% of Payroll		55% of Payroll		60% of Payroll	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
CHP	100%	100%	100%	100%	87%	80%
POFF	80%	66%	52%	42%	32%	31%
PA Safety	100%	100%	79%	83%	61%	63%

Note: The Funding Risk Mitigation Policy adopted by the board in 2015 is expected to gradually reduce the discount rate over the next 20 or so 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 state's contribution of an additional payment of $2.5 billion in fiscal year 2019-2020 contributed to lowering the risk of future high employer rates for state plans. The shorter amortization periods in the recently revised 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.

The table below shows the probability of increases in employer rates beyond their current level over the next 30 years.

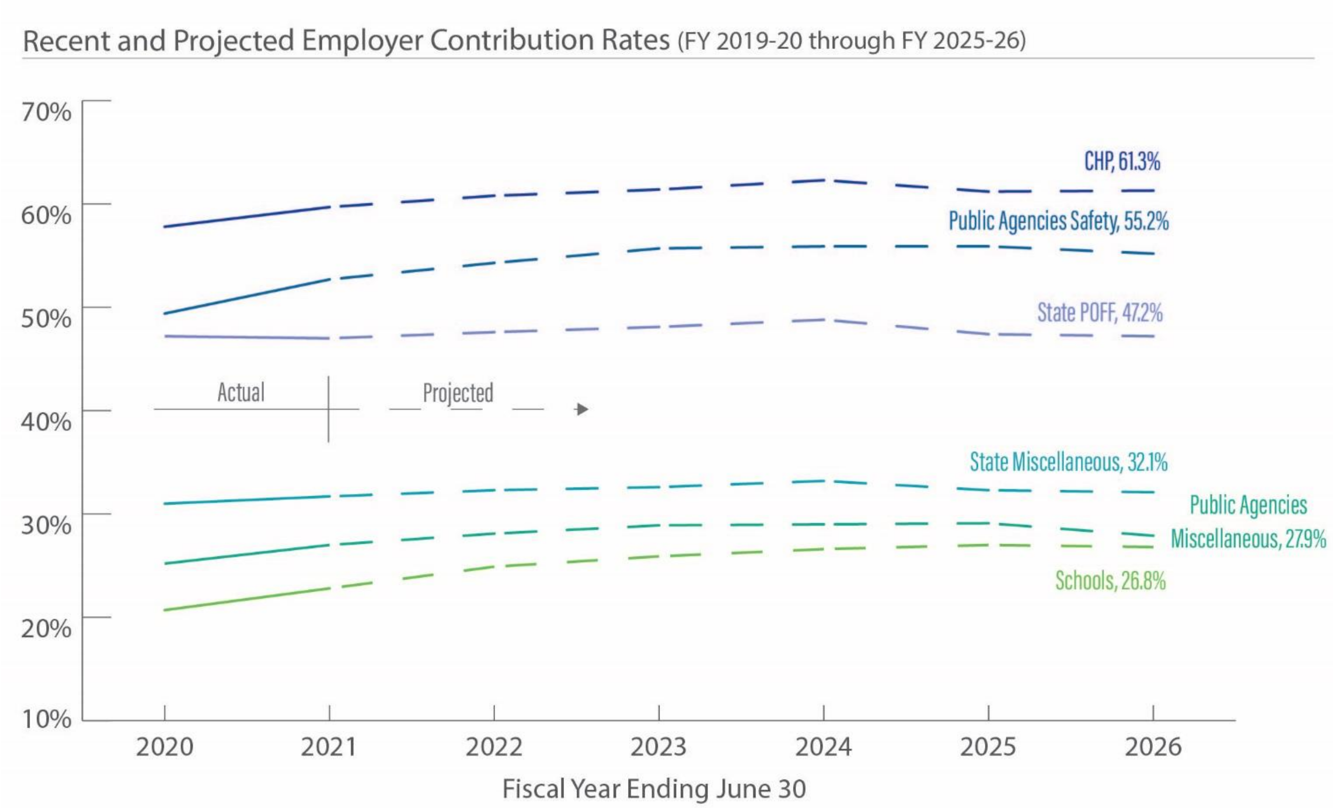
Probability of Cumulative Employer Contribution Rate Increases of Selected Magnitudes
(over the next 30 years)

	5% of Payroll		10% of Payroll		15% of Payroll	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
State Misc.	54%	50%	27%	27%	10%	10%
Schools	74%	54%	36%	24%	11%	5%
PA Misc.	68%	57%	33%	29%	11%	8%

	10% of Payroll		15% of Payroll		20% of Payroll	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
CHP	49%	47%	32%	31%	20%	19%
POFF	42%	40%	26%	25%	13%	14%
PA Safety	79%	67%	60%	52%	43%	37%

Current State

Below are projected employer contribution requirements (expressed as a percentage of payroll) based on the June 30, 2018 actuarial valuation results and an assumed future annual investment return of 7.0 percent.



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)

	3% of Payroll		5% of Payroll		7% of Payroll	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
State Misc.	53%	57%	12%	14%	6%	7%
Schools	41%	38%	7%	9%	4%	5%
PA Misc.	40%	43%	9%	11%	5%	6%

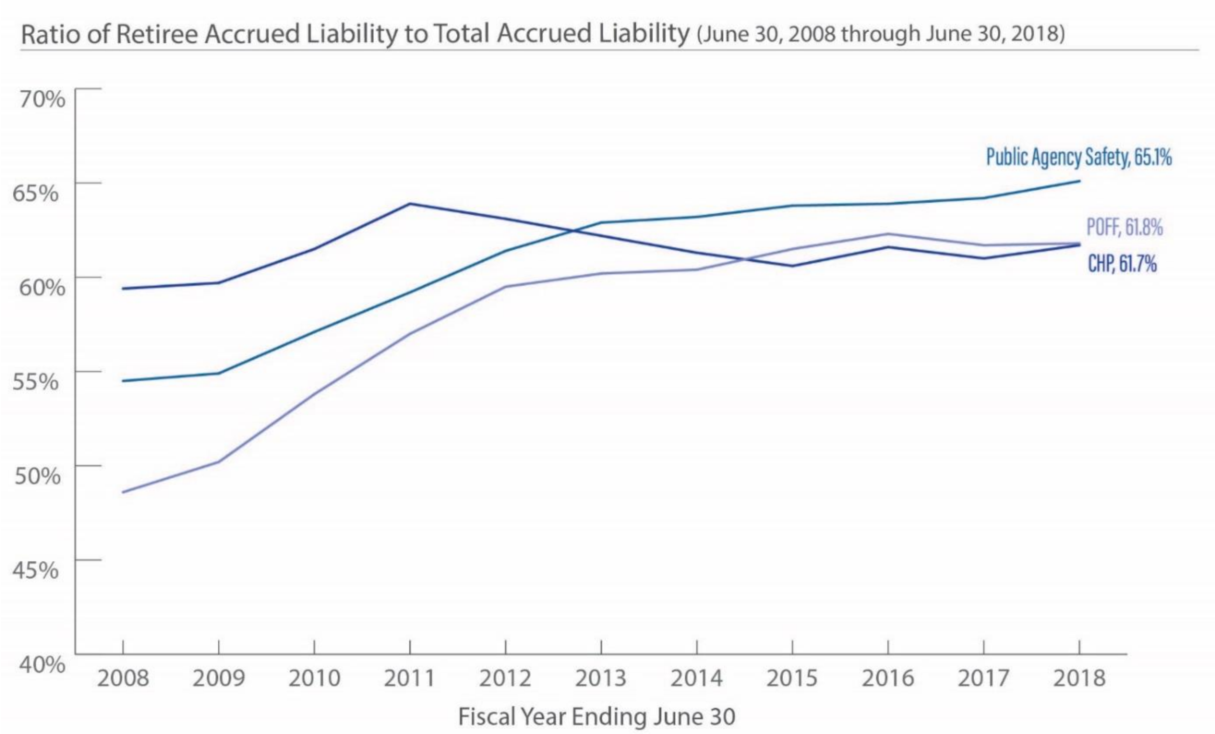
	5% of Payroll		7% of Payroll		9% of Payroll	
Plan	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
CHP	59%	64%	27%	32%	12%	16%
POFF	47%	52%	18%	21%	9%	11%
PA Safety	55%	55%	20%	23%	10%	12%

Environmental Factors: 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 percent. 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.

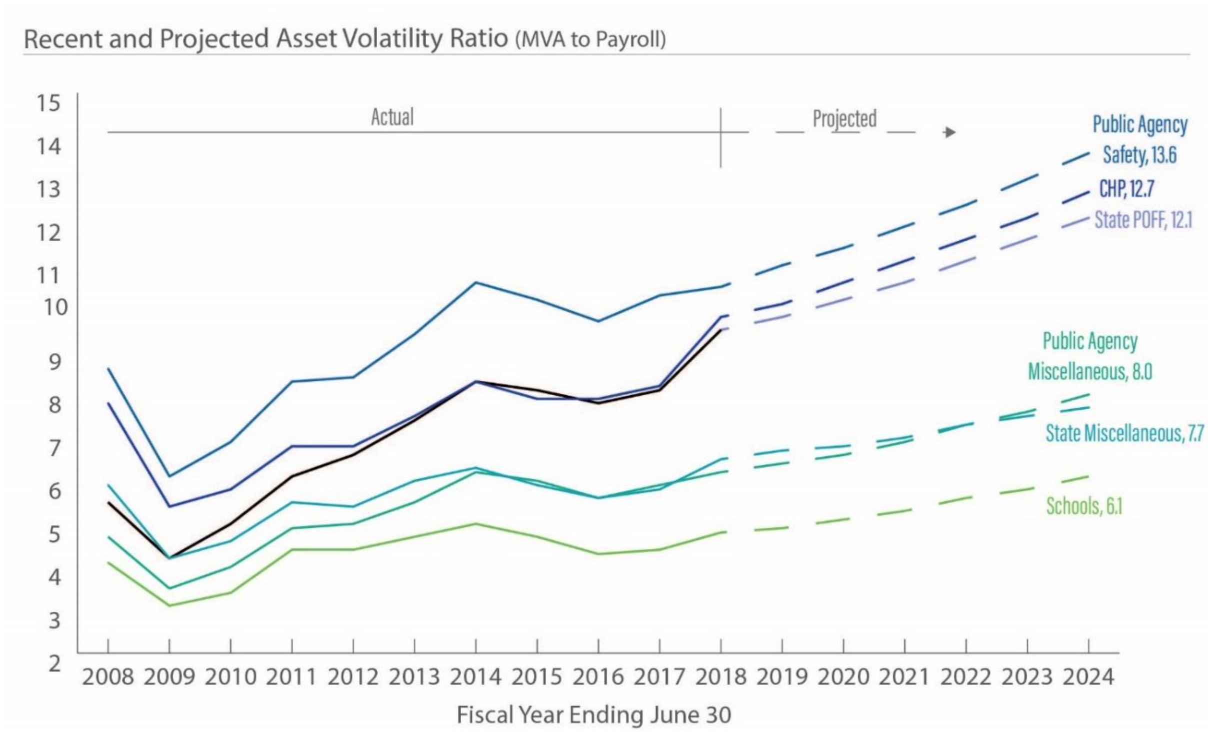


Another way to look at plan maturity is the ratio of assets to payroll, or the Asset Volatility Ratio (AVR). This ratio tends to rise as plans mature because assets must be built up to provide for benefit payments. Plans that have higher asset-to-payroll ratios experience more volatile employer contributions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

The chart on the following page shows previous and projected AVRs for various plans.

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 percent. 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 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).

Trend Toward Lower Expected Returns and Discount Rates

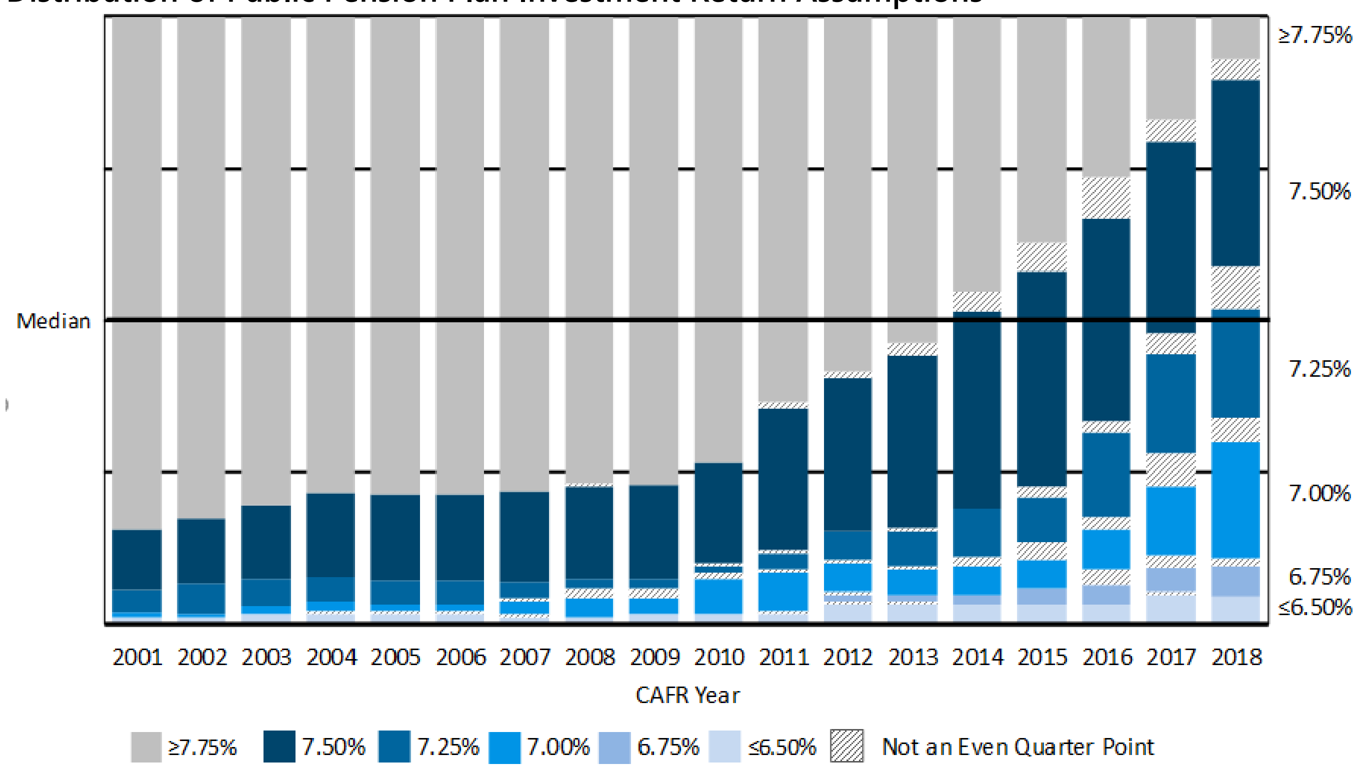
In addition to the demographic forces, concerns about lower returns over the near-term investment horizon persist. The trend nationally for public pension plans in recent years has been a reduction in the rate of return assumption.

Until very recently, economic conditions have seen continuing declines in long-term government bond interest rates that serve as the foundation of capital market returns. 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 reported in Comprehensive Annual Financial Reports (CAFR) from 2001 through 2018 as compiled by Public Plans Data.

The survey shows that based on the available FY 2017-18 CAFR data, the average discount rate is 7.26 percent, and the median is 7.25 percent. In the available 2018 results, there are more systems below 7.00 percent than above 7.50 percent.

Distribution of Public Pension Plan Investment Return Assumptions

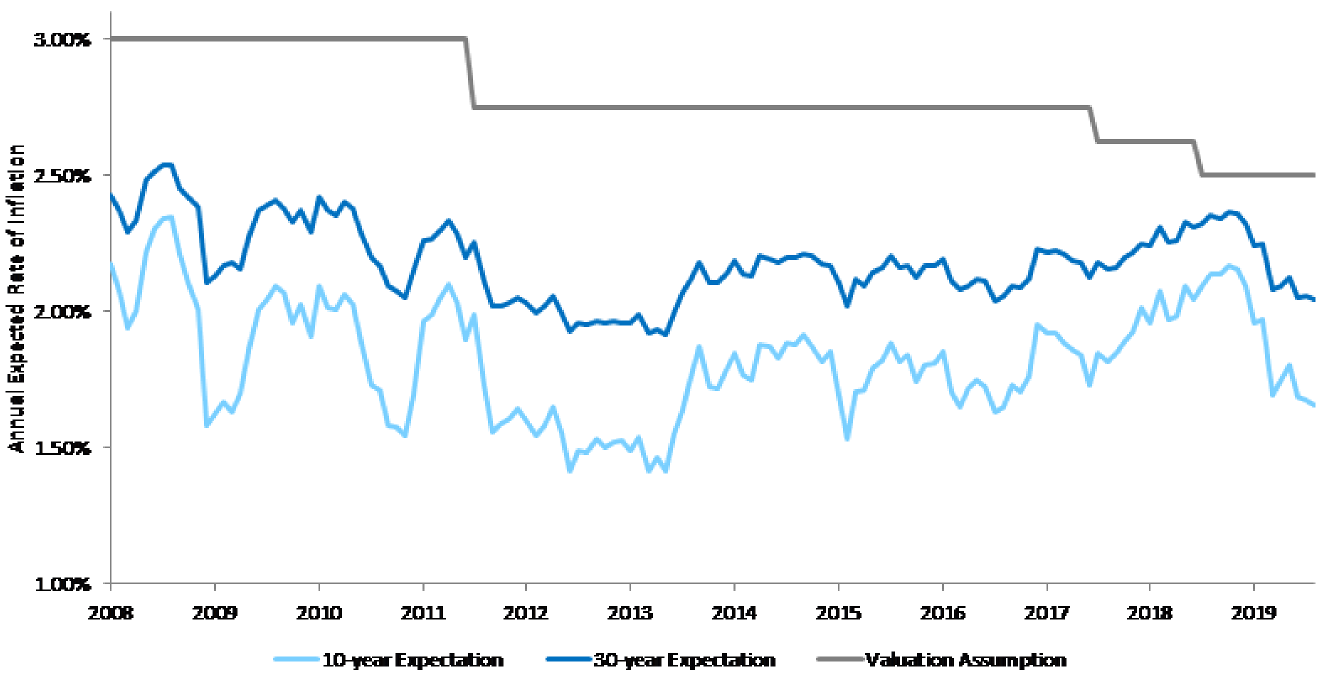


Data source: Center for Retirement Research at Boston College Public Plans Data

It is likely that the reductions in investment return assumptions are the result of the same factors that have influenced changes at CalPERS, namely, a general lowering of expectations about future investment returns for a given level of risk and a concern about the level of risk being taken. Two other factors may also be contributing to the trend towards lower discount rates. The first is that as plans mature the investment return assumption is often analyzed using a shorter time horizon. Return expectations would be lower using a 10 to 15-year time horizon than they are using a 50 to 60-year time horizon.

The second factor is that there is also a trend towards lower inflation assumptions. The chart below shows the Federal Reserve Bank of Cleveland's expected inflation values from January 2008 through August 2019 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



As part of the recent ALM cycle concluding with the ALM workshop in November 2017, the current capital market assumptions were reflected and the appropriate asset allocation and expected investment return were selected and adopted by the board. The choice of the ultimate 7.00 percent discount rate assumption and 2.50 percent inflation assumption were consistent with the trends toward lower expected returns that is demonstrated in the earlier chart. On-going monitoring of capital market assumptions is imperative to ensure that the assets and liabilities are being managed appropriately.

Changes to Actuarial Amortization Policy

CalPERS has adopted the following changes to the Amortization Policy, effective with the June 30, 2019 valuations and contributions beginning FY 2020-21 for the state and school's plans, 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.

Amortization Policy Effective June 30, 2019

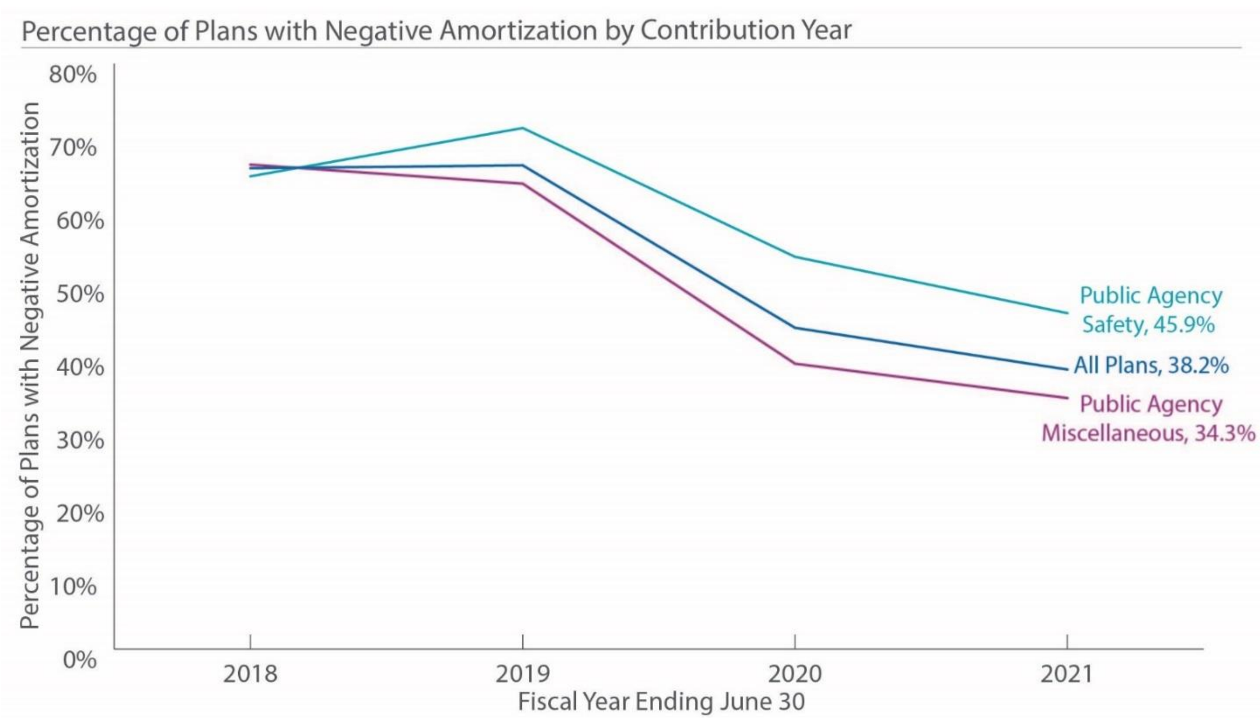
Driver	(Gain) / Loss Investment	(Gain) / Loss Non-Investment	Assumption / Method Change	Benefit Change	Golden Handshake
Amortization Period	20 Years	20 Years	20 Years	20 Years	5 Years
Escalation Rate	0%	0%	0%	0%	0%
Ramp Up	5	0	0	0	0
Ramp Down	0	0	0	0	0

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 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 average remaining amortization period for the UAL is relatively long. In such cases, the term "negative amortization" is used to indicate that the current annual required payment toward the UAL is not high enough to result in a decrease to the UAL.

As shown in the chart below we expect the number of plans with negative amortization to decline over the next few years as all UAL bases for these plans reach the end of the 5-year ramp-up period. In addition, the new amortization policy effective with the June 30, 2019 valuations will put downward pressure on the number of such plans in the future due to the use of a maximum amortization period of 20 years and the use of "level dollar" amortization.



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

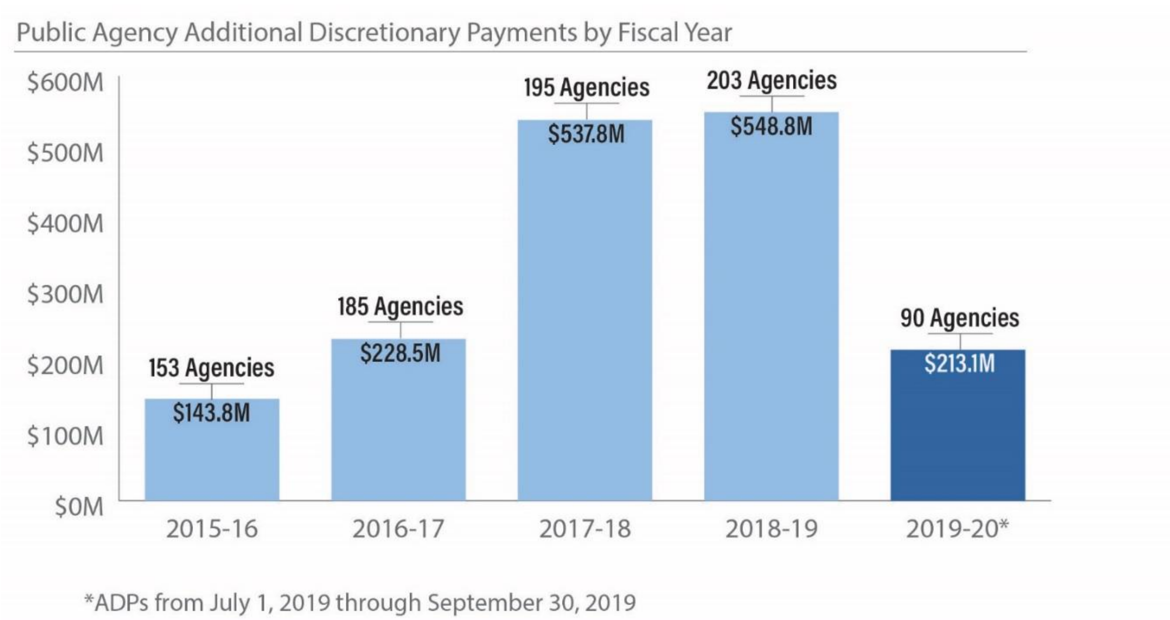
Employers Taking Charge of their Future

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 will also be making the Pension Outlook tool available to all agencies. This tool helps employers estimate what pension costs might be under different investment return and assumption scenarios. The tool is currently available in myCalPERS to agencies with non-pooled plans.

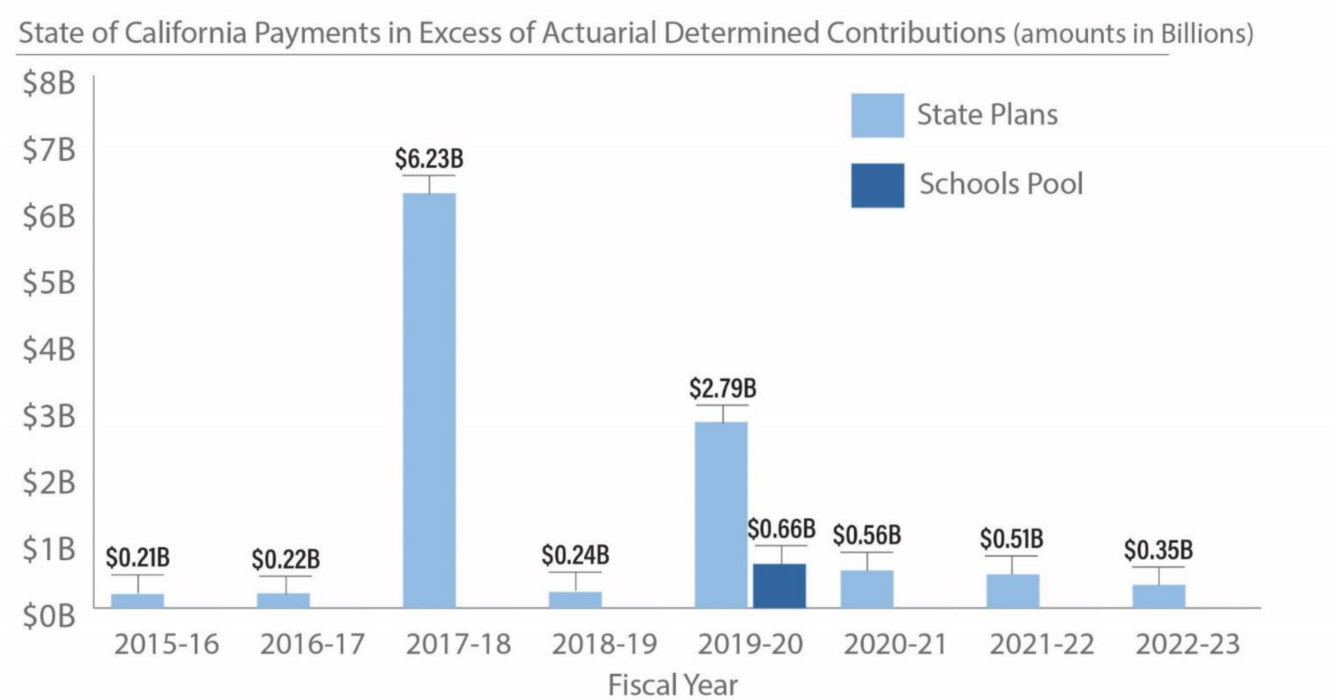
The primary advantages of additional contributions are:

- 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. Whatever the motivation or method of application of ADP's, there has been an increasing trend in the use of these payments as demonstrated by the chart below.



Aside from contracting agencies making ADP's, the state also makes contributions in excess of the actuarially determined contributions. The state makes these contributions in accordance with Government Code Sections 20683.2, 20825, 20825.1, 20825.15, and 20825.2. The following chart summarizes these contributions.



For additional details, see Appendix F - State of California Payments in Excess of Actuarial Determined Contributions.

California Employers' Pension Prefunding Trust Program

CalPERS has implemented the California Employers' Pension Prefunding Trust (CEPPT), which allows public employers to prefund their future pension costs. The new program, established by Senate Bill 1413, provides the state and public agencies an additional investment vehicle to accumulate assets over time to help manage long-term costs. Participation in the fund is voluntary and provides employers flexibility to determine the amount of their contributions, risk tolerance, and time horizon.

The fund 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 percent, 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.

Funding Risk Mitigation Policy

Current Policy

In November 2015, the board adopted the Funding Risk Mitigation Policy. This policy is currently in place and is expected to result in a lowering of investment volatility (and the lowering of the expected returns and 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 contribution rates.

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 consequent 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:

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 7.0 percent. The policy is once again effective, meaning an investment return of 9 percent or higher for the fiscal year ending June 30, 2020 will trigger a risk mitigation event.

Next Steps

The next step of the ALM cycle is the mid-cycle review in June 2020. The cycle is expected to conclude in 2021 with board decisions on economic and demographic assumption changes as well as the adoption of a potentially new strategic asset allocation.

Conclusion

The continued moderate improvement to the funded status combined with the recent modifications to the amortization policy have reduced the risks of plans falling to very low funding levels. However, the report shows that significant risks remain for potential increases to already relatively high required employer contributions.

The reduction to the discount rate resulted in a 7-year phase-in of increased required contributions beginning in the 2018-19 fiscal year for public agency plans. Increasing contribution levels will continue to be a challenge for many of our employers over the next few years and the financial stress on employers remains of concern, even if the 7.0 percent investment return assumption is met. Unfavorable future investment performance would lead to even higher employer contributions.

Decisions regarding asset allocation, amortization of unfunded liability, and the setting of the discount rate impact both contribution volatility and the security of promised members benefits. Regular monitoring of the risk measures provided within this report will help the board in assessing appropriate risk targets and tolerances.

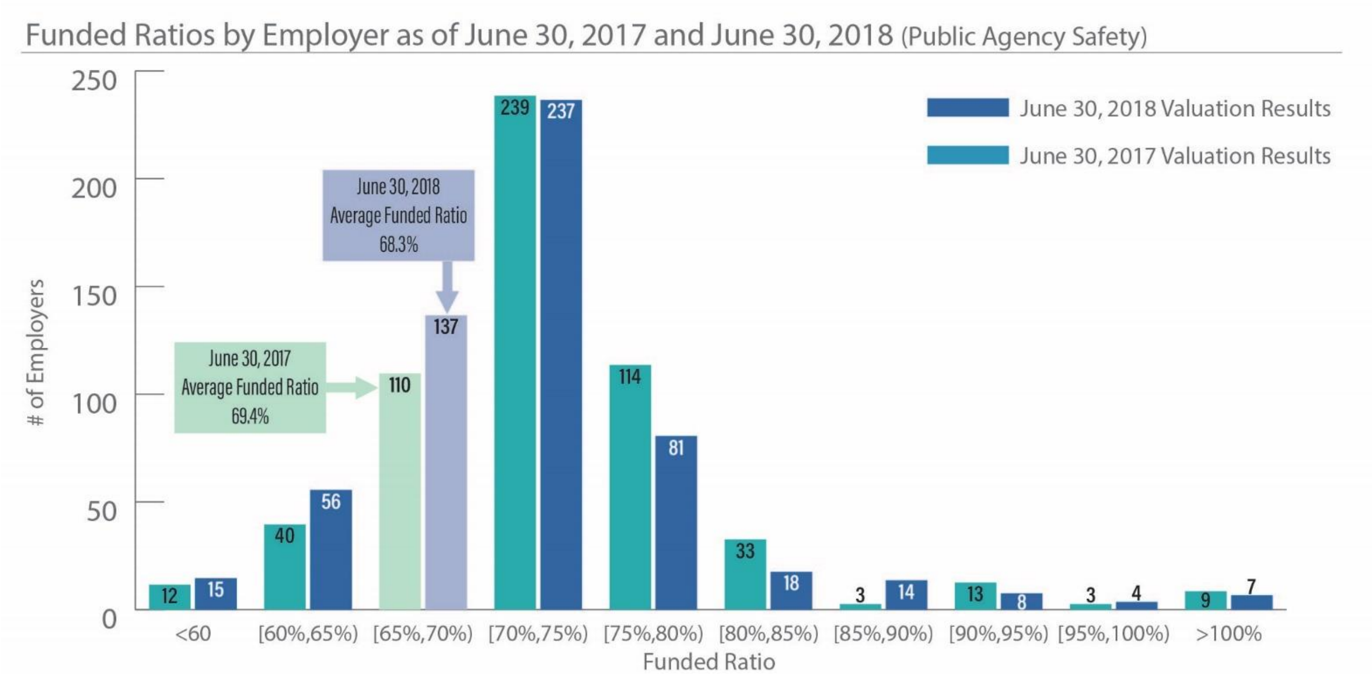
Appendix A – Public Employees' Retirement System (PERS) Summary Statistics[1]

	June 30, 2017	June 30, 2018
Number of Actives	835,474	846,327
Number of Transferred	171,083	176,413
Number of Separated	396,810	390,802
Number Receiving Benefits	792,174	831,825
Entry Age Accrued Liability	$464.4 billion	$504.3 billion
Market Value of Assets	$325.1 billion	$353.5 billion
Unfunded Liability	$139.3 billion	$150.8 billion
Funded Status	70.0%	70.1%
Prior Year Benefit Payments	$21.4 billion	$22.9 billion
Prior Year Employer Contributions	$12.3 billion	$19.9 billion
Prior Year Employee Contributions	$4.2 billion	$4.4 billion

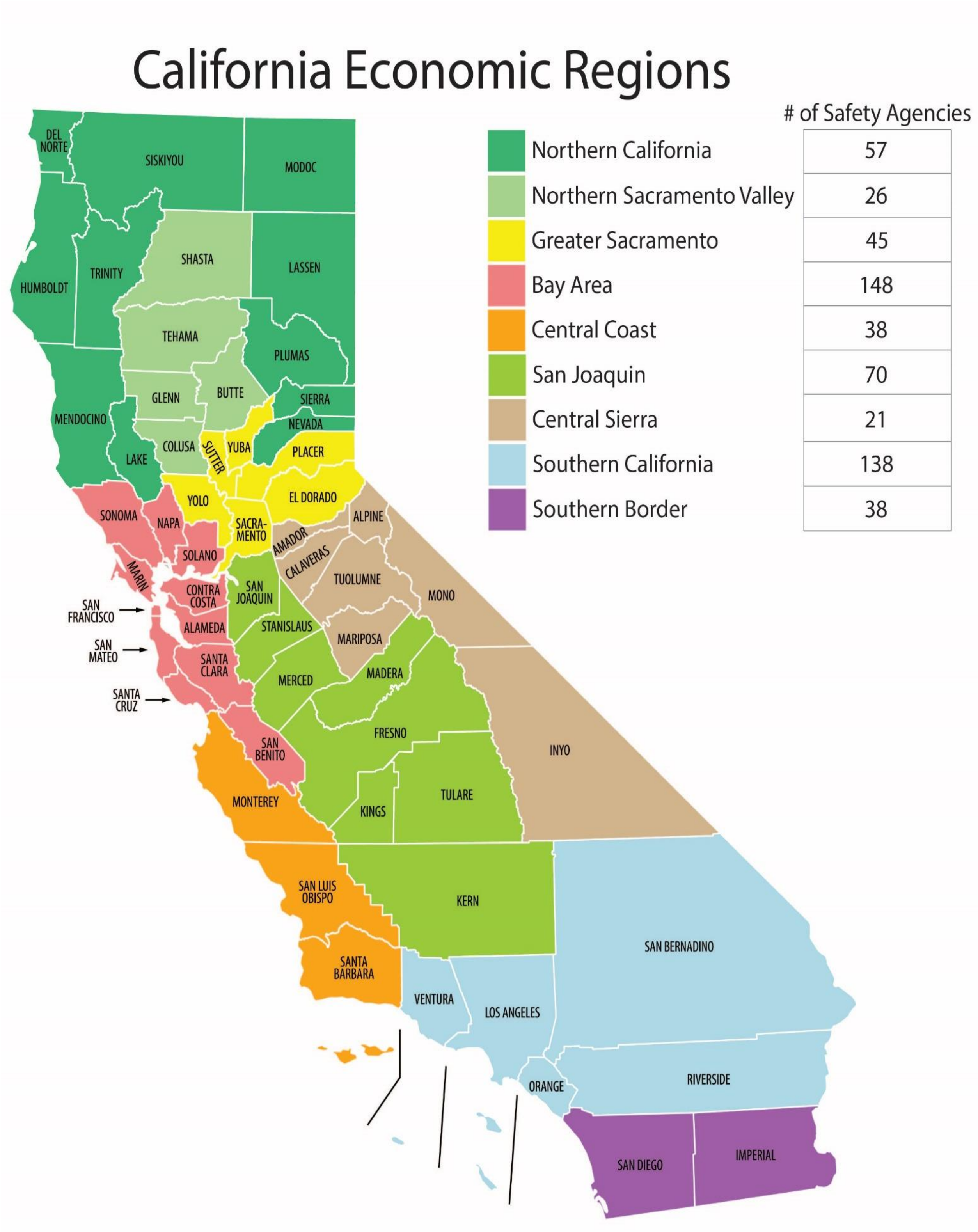
[1]All data reflects CalPERS Actuarial Valuation System

Appendix B – Results of June 30, 2018 Public Agency Valuations for Safety Plans

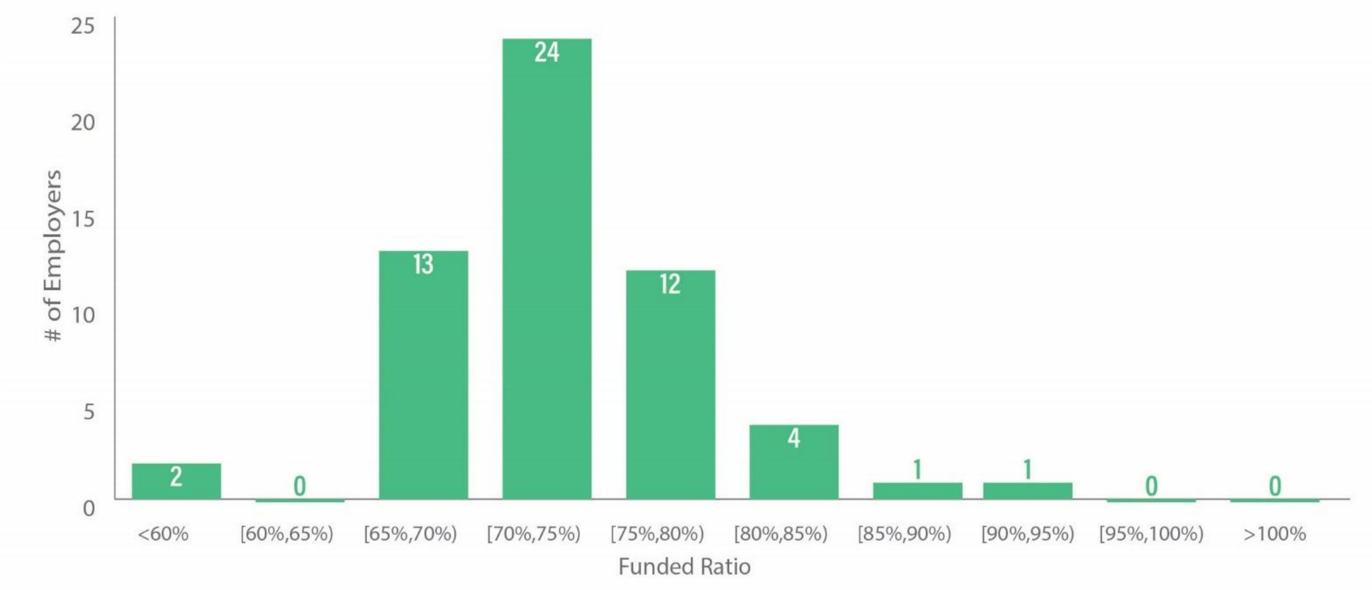
Public Agency Funded Ratios for Safety Plans



Public Agency Funded Ratios for Safety Plans by Economic Region



Northern California Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



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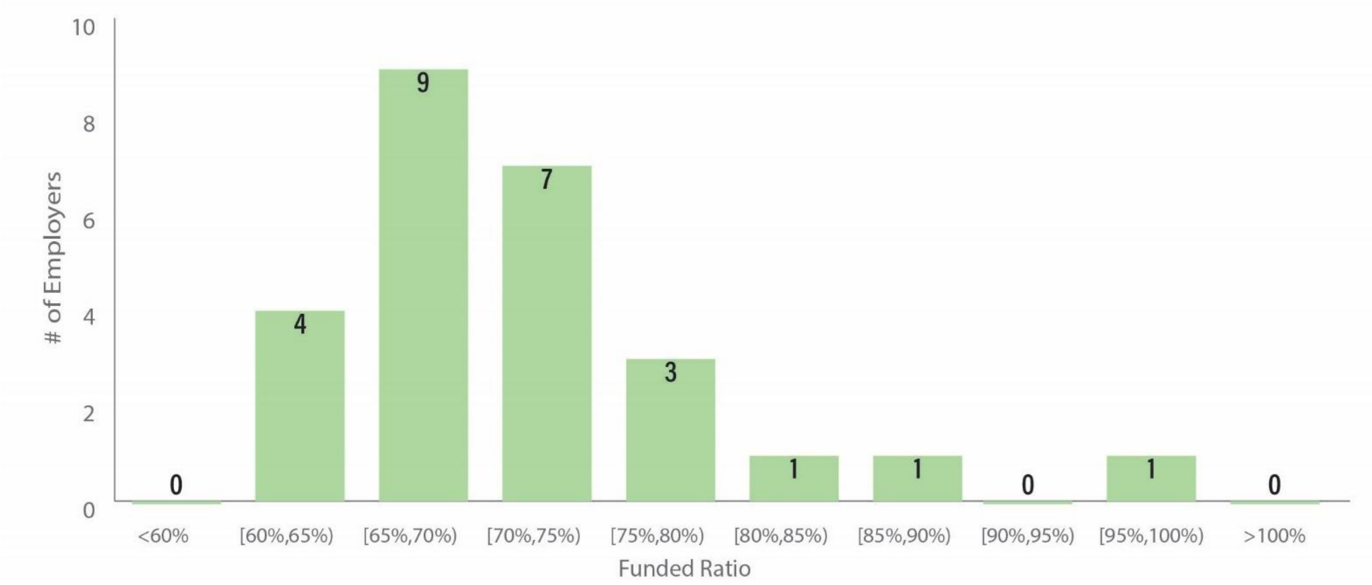
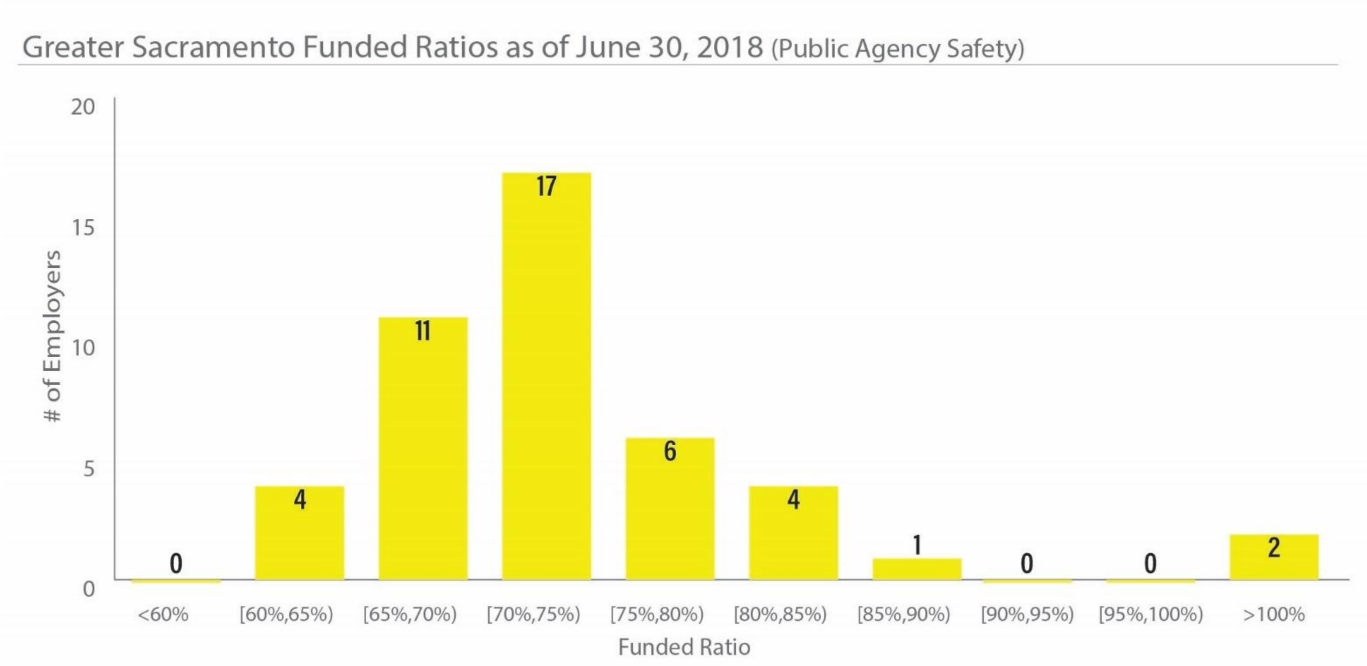
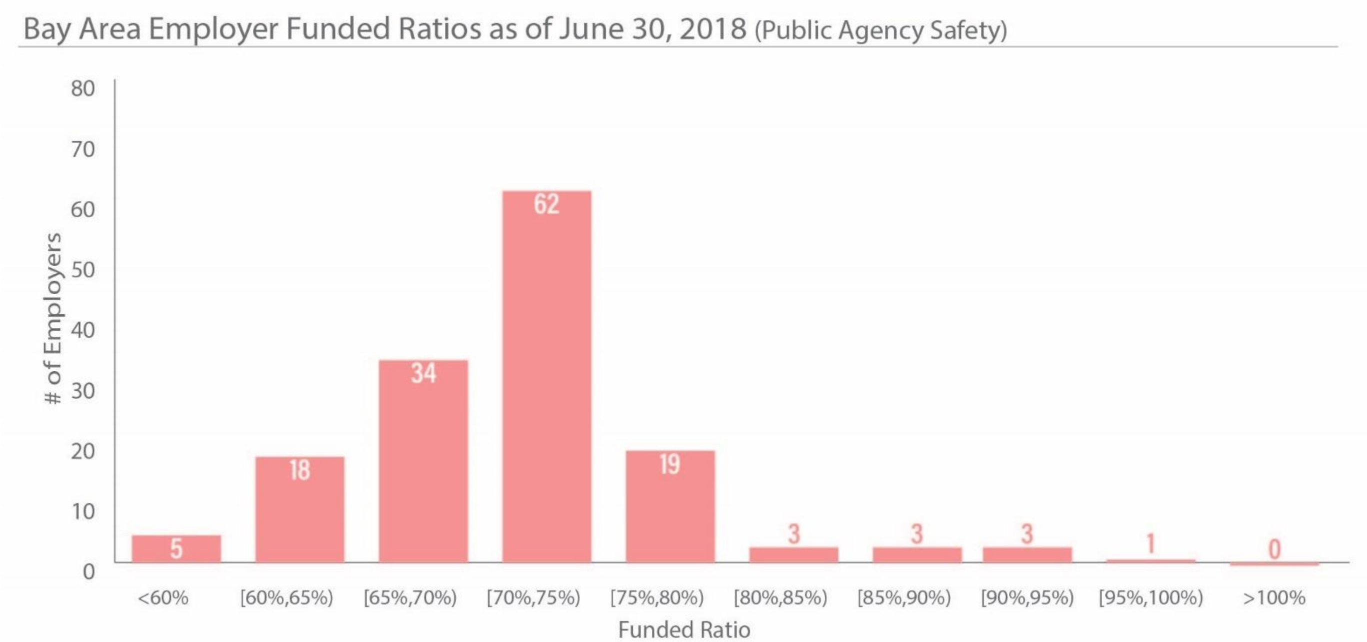
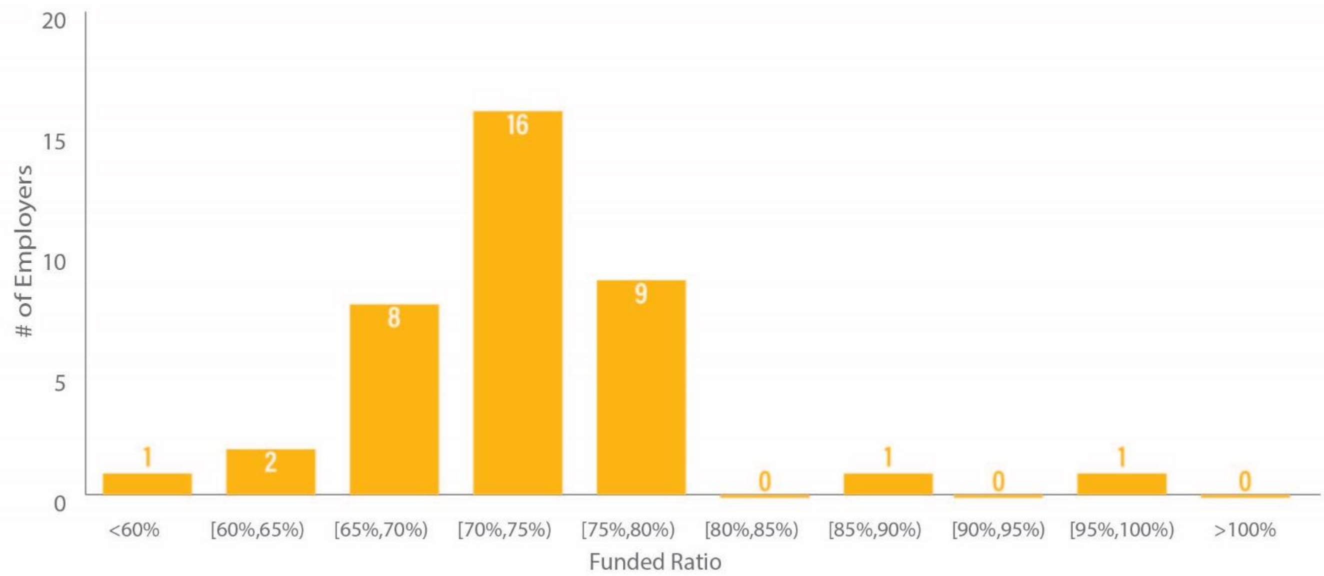
Northern Sacramento Valley Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



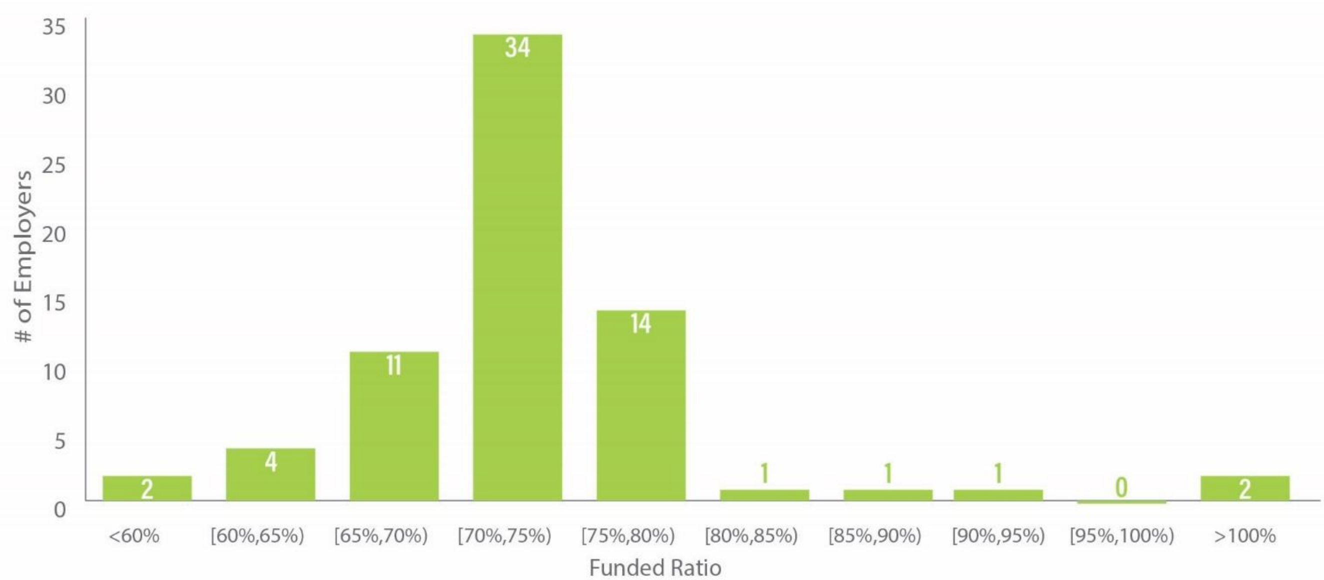

Greater Sacramento Funded Ratios as of June 30, 2018 (Public Agency Safety)
# of Employers
20
15
10
5
0
0
4
11
17
6
4
1
0
0
2
<60%
[60%,65%)
[65%,70%)
[70%,75%)
[75%,80%)
[80%,85%)
[85%,90%)
[90%,95%)
[95%,100%)
>100%
Funded Ratio


Bay Area Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)
# of Employers
80
70
60
50
40
30
20
10
0
5
18
34
62
19
3
3
3
1
0
<60%
[60%,65%)
[65%,70%)
[70%,75%)
[75%,80%)
[80%,85%)
[85%,90%)
[90%,95%)
[95%,100%)
>100%
Funded Ratio

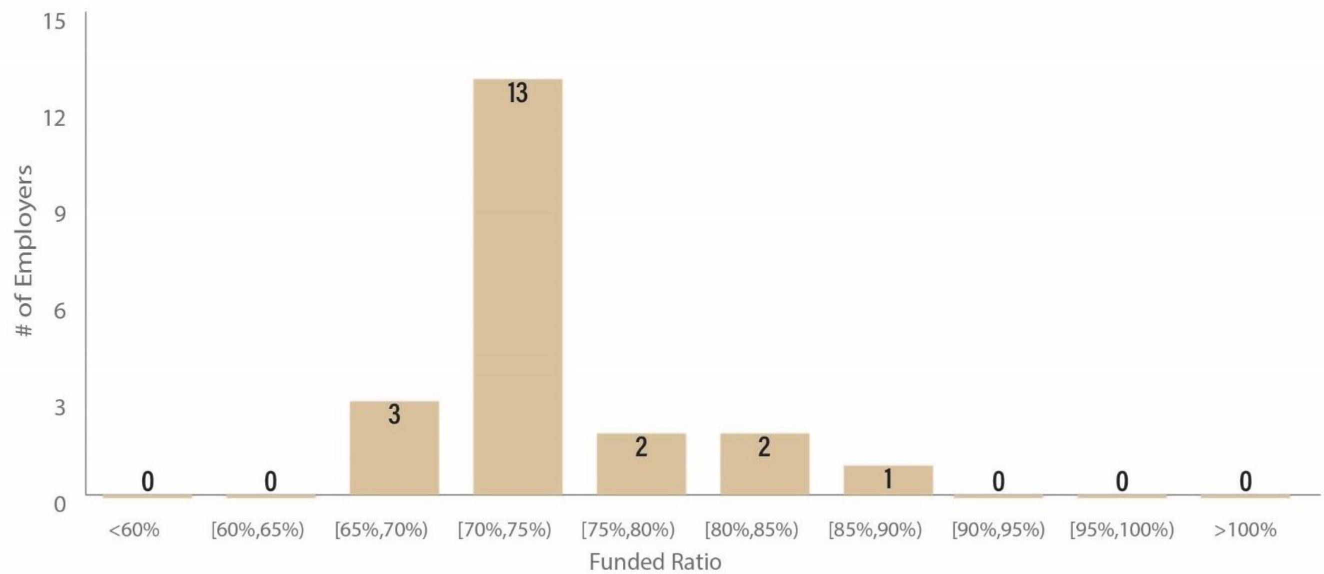
Central Coast Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



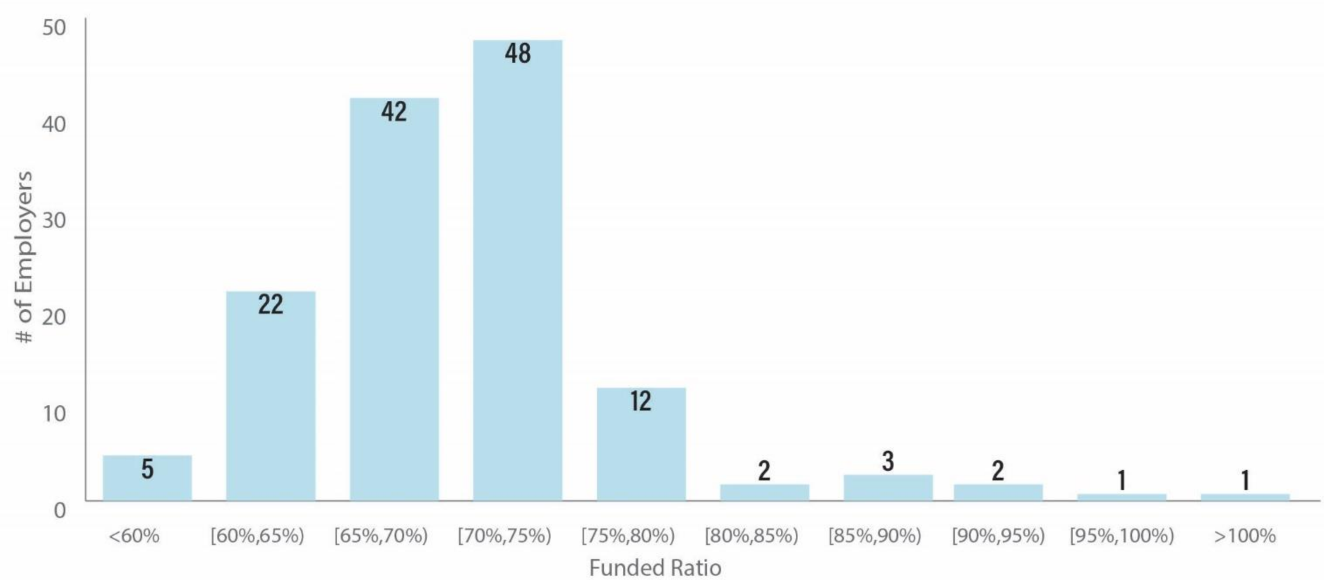
San Joaquin Valley Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)

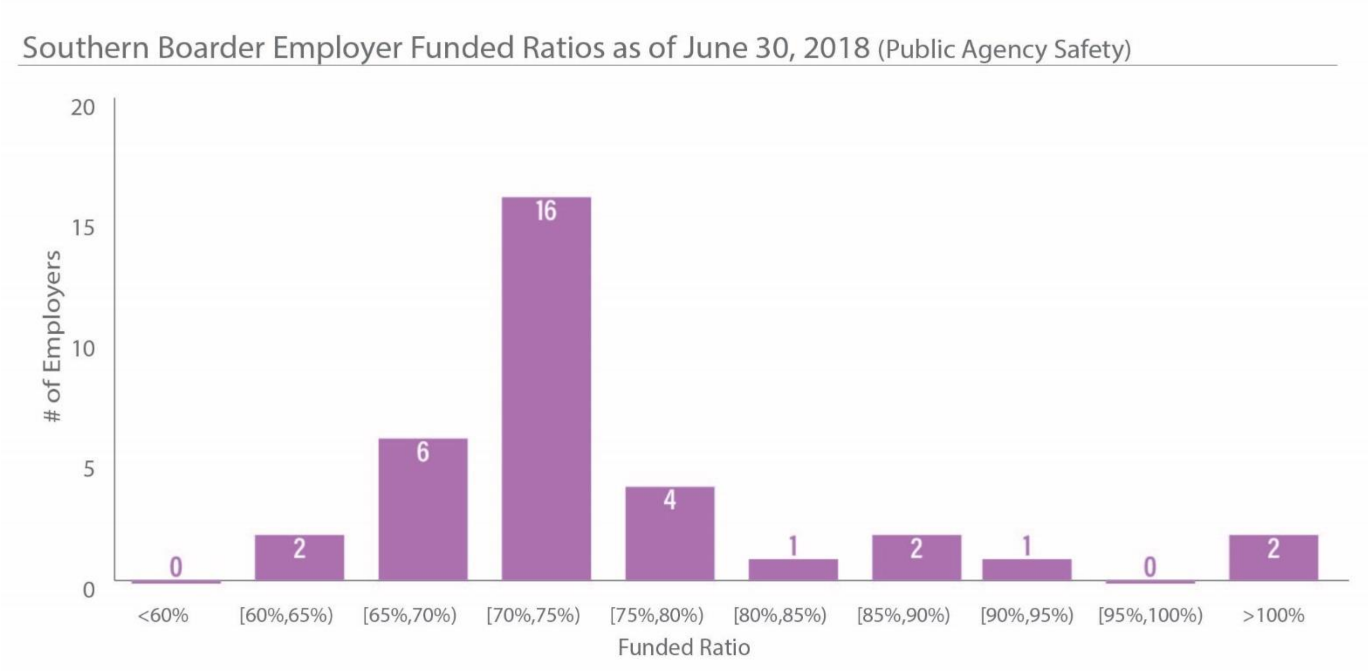


Central Sierra Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



Southern California Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



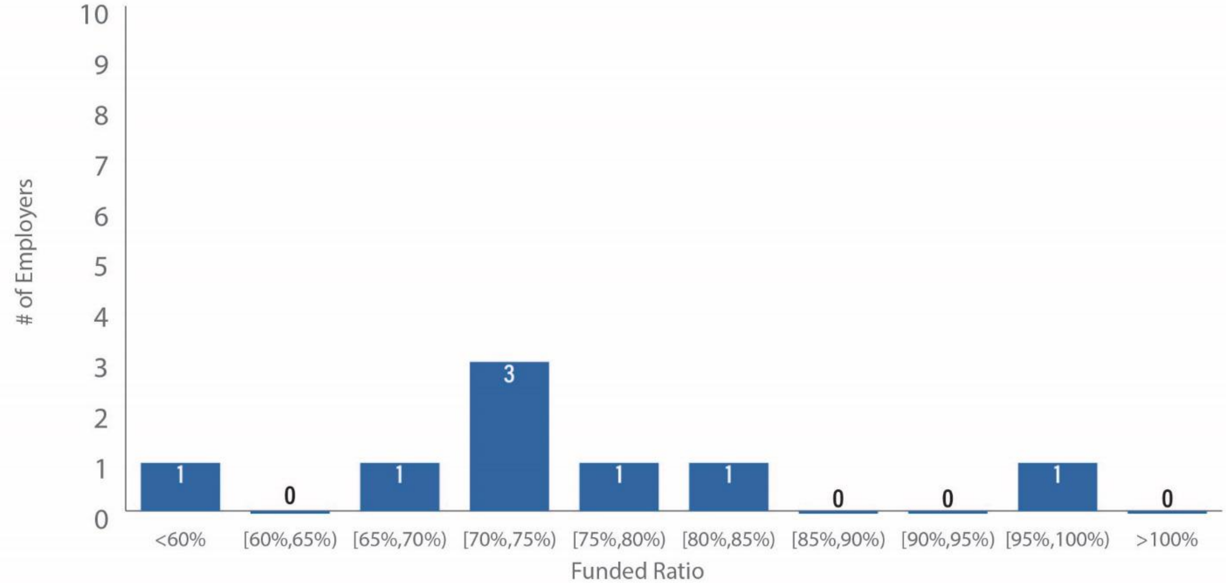

Southern Boarder Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)
# of Employers
20
15
10
5
0
0
2
6
16
4
1
2
1
0
2
<60%
[60%,65%)
[65%,70%)
[70%,75%)
[75%,80%)
[80%,85%)
[85%,90%)
[90%,95%)
[95%,100%)
>100%
Funded Ratio

Public Agency Funded Ratios for Safety Plans by Agency Type

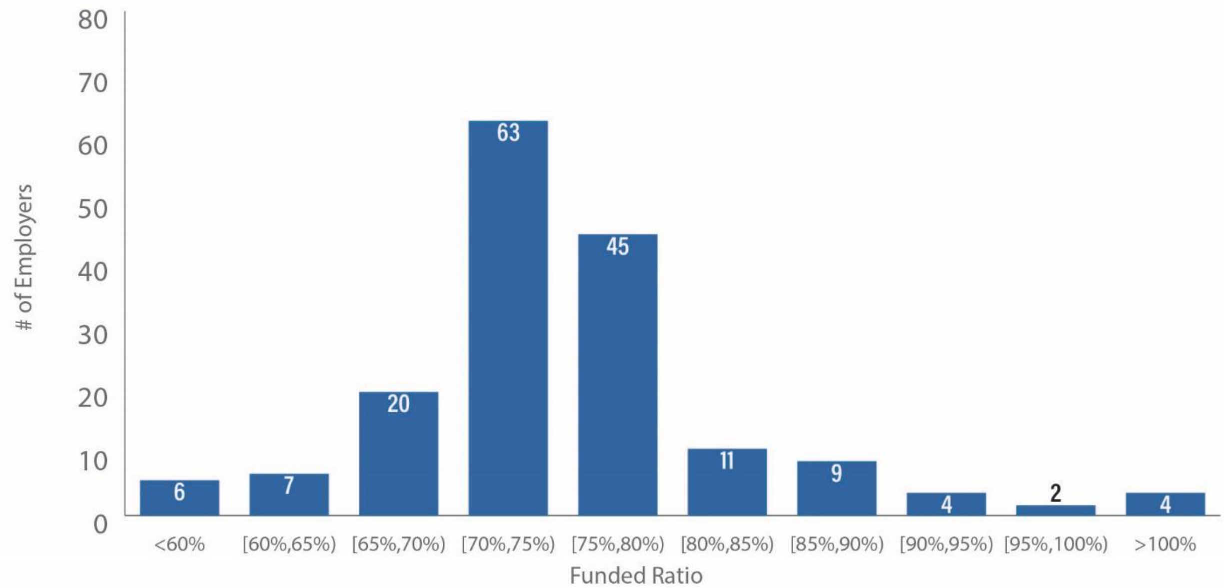
Number of Safety Agencies by Type

Agency Type	Number of Safety Agencies
Joint Powers Authority	8
Special District	171
City or Town	362
Non-Profit	0
County	36
Total	**577**

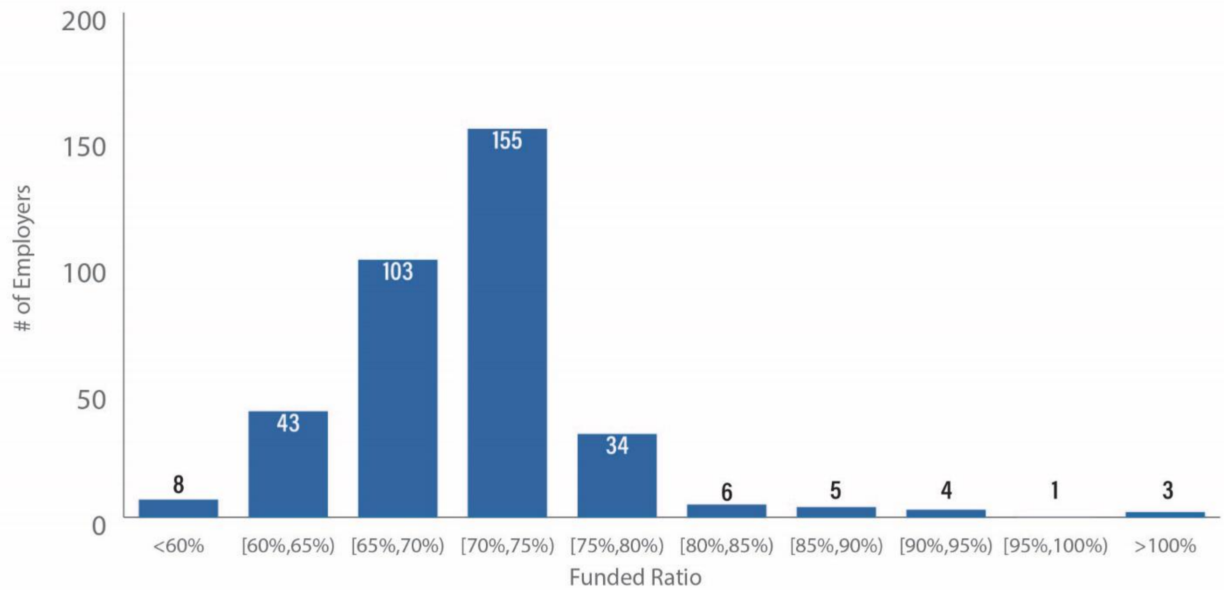
Joint Power Authority Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



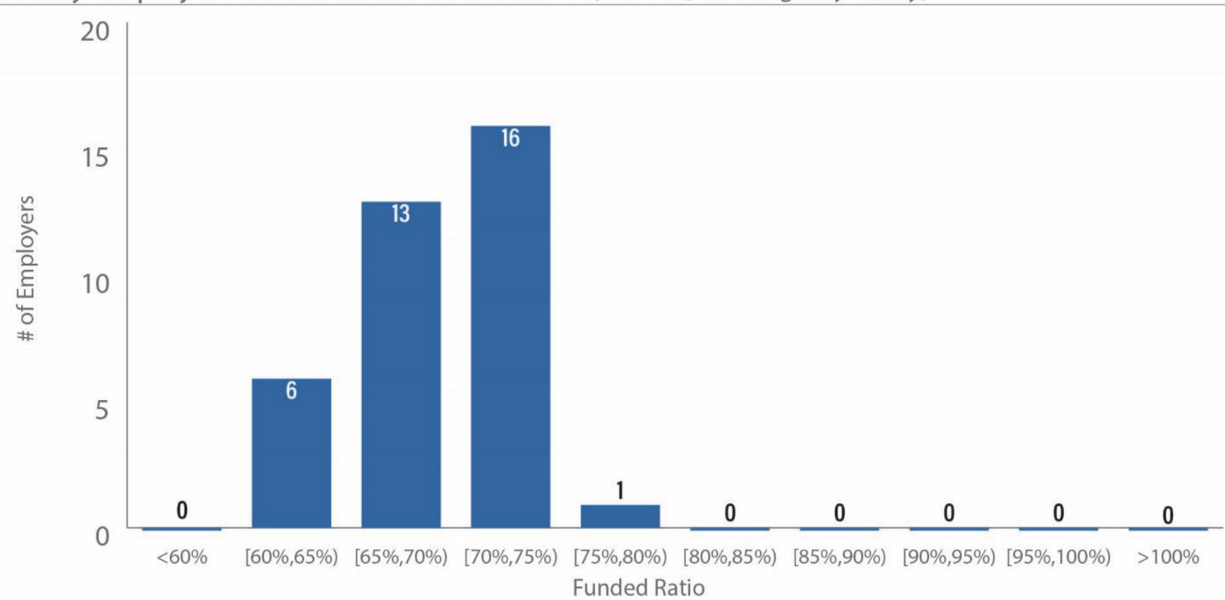
Special District Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



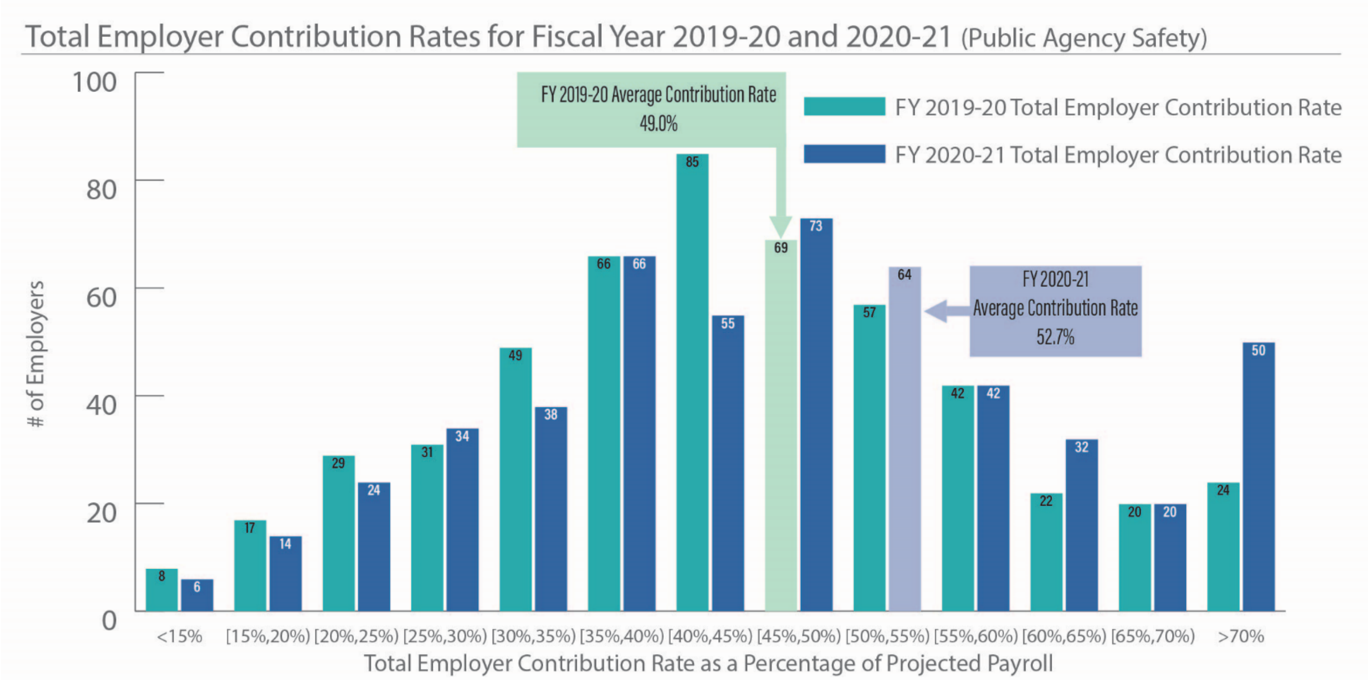
City or Town Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)

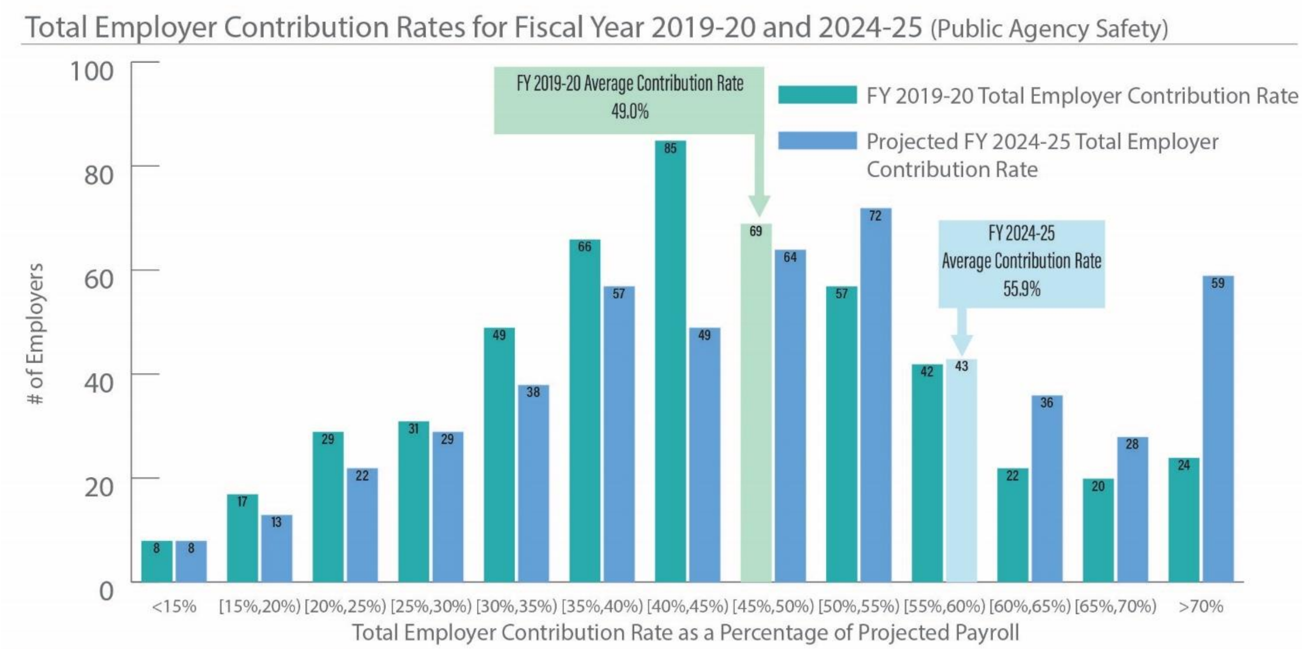


County Employer Funded Ratios as of June 30, 2018 (Public Agency Safety)



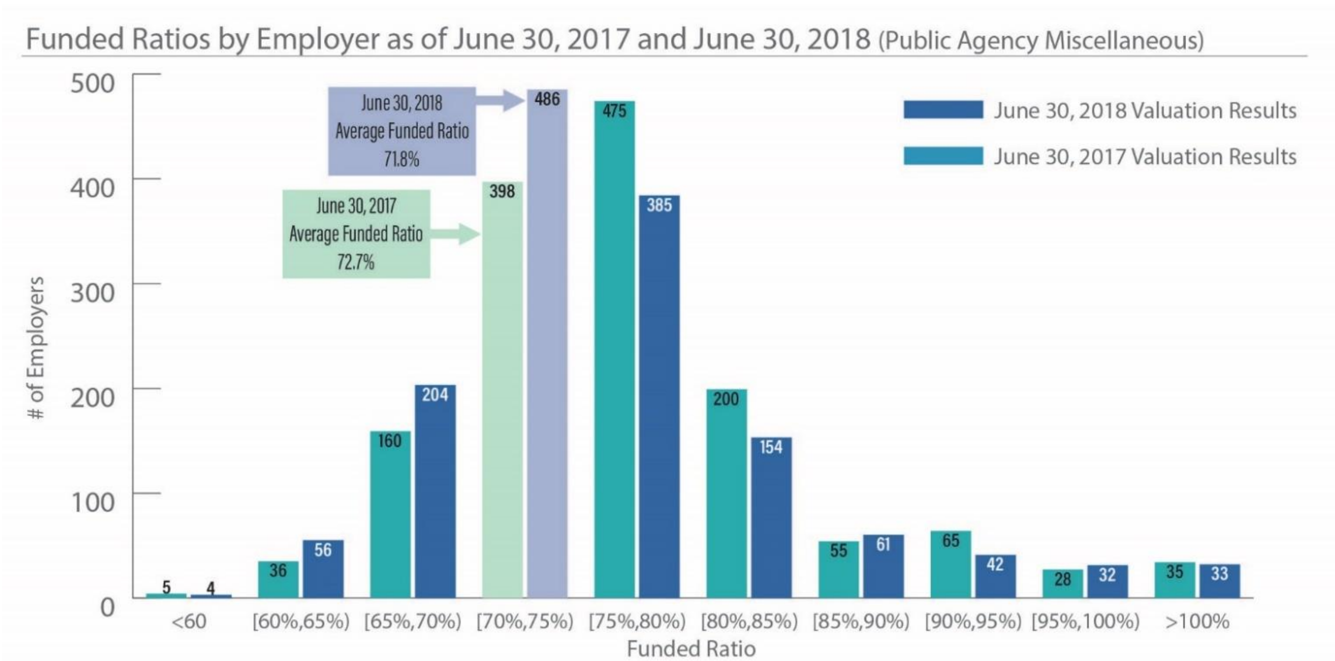
Public Agency Contribution Rates for Safety Plans



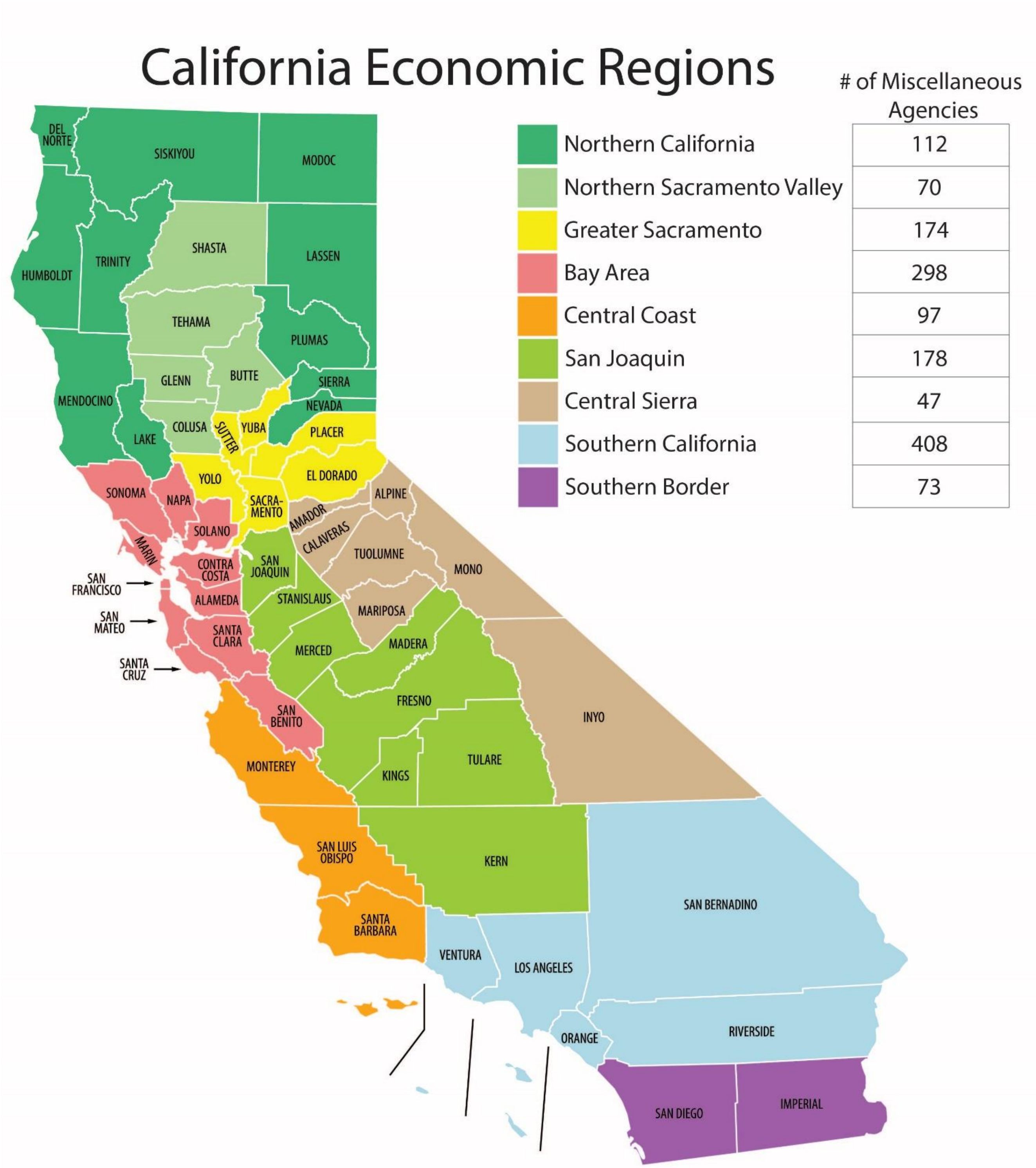


Appendix C – Results of June 30, 2018 Public Agency Valuations for Miscellaneous Plans

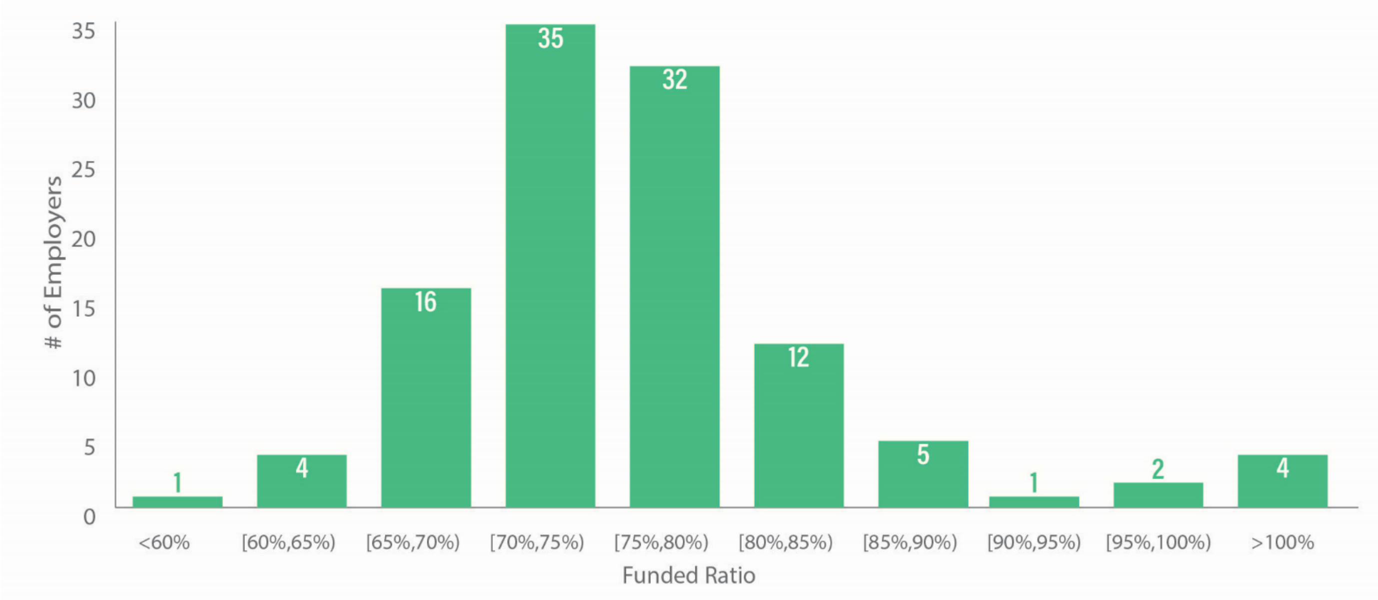
Public Agency Funded Ratios for Miscellaneous Plans



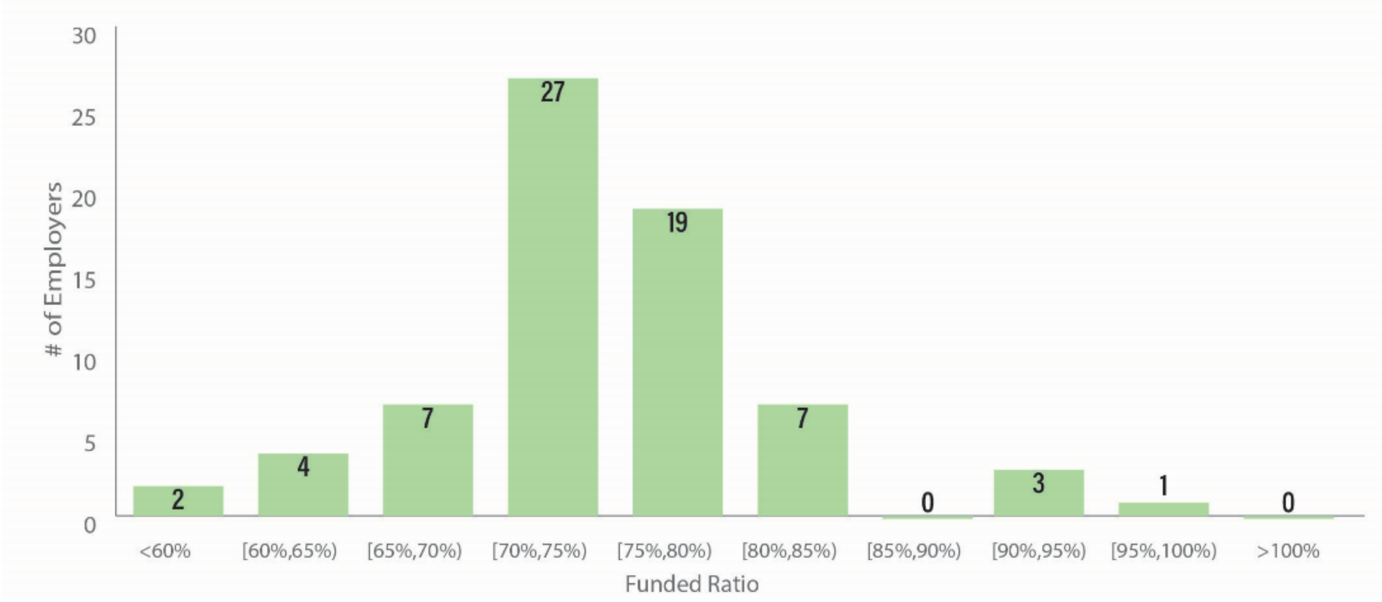
Public Agency Funded Ratios for Miscellaneous Plans by Economic Region

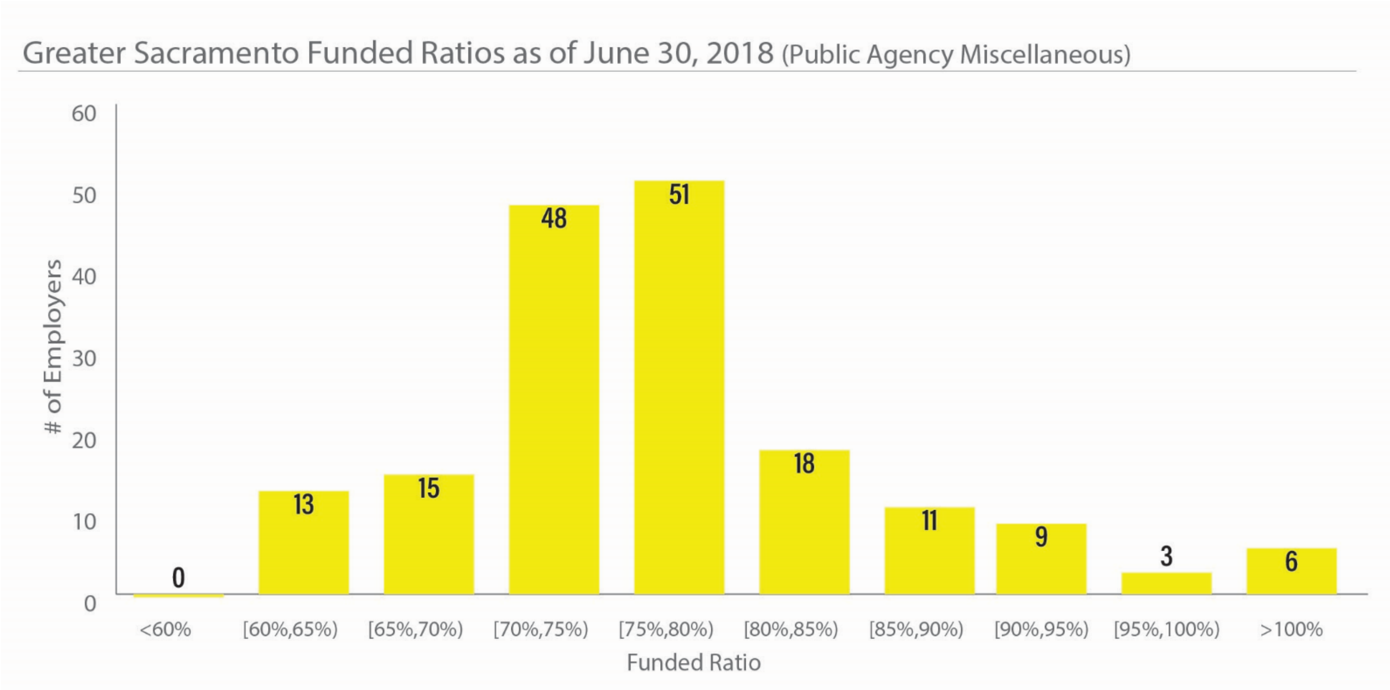


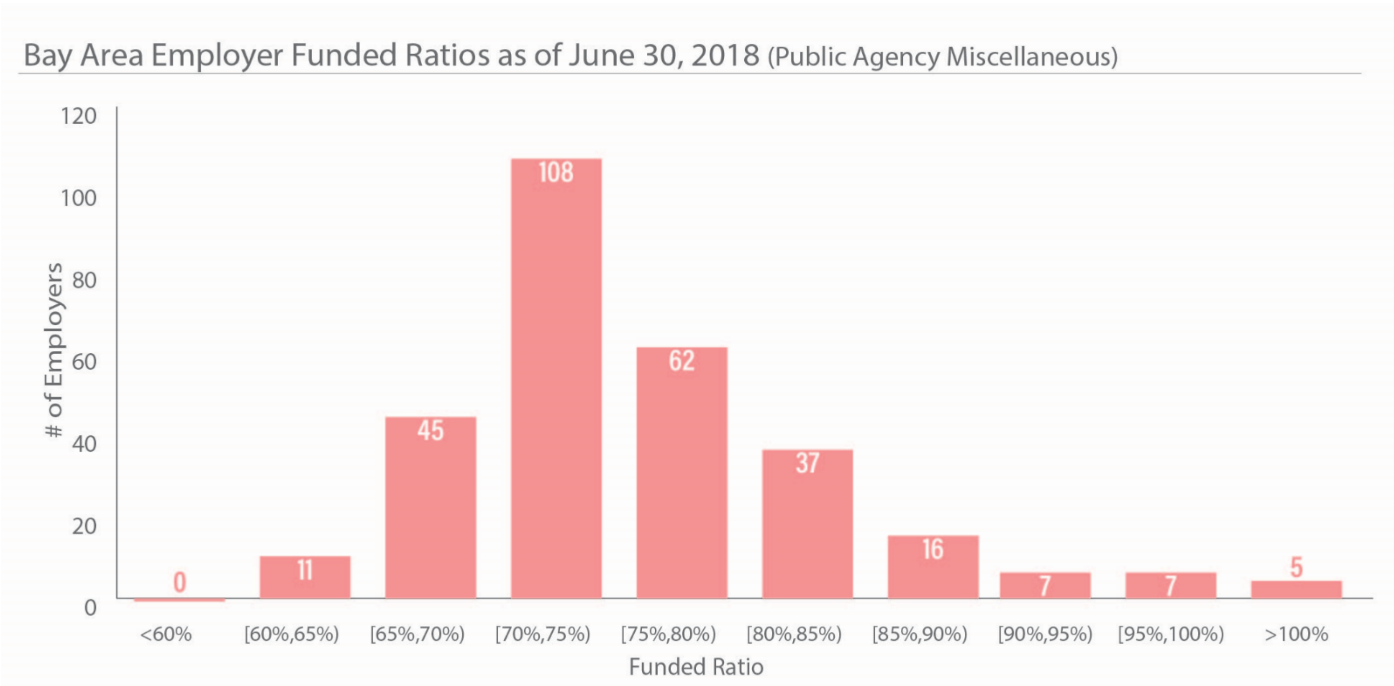
Northern California Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



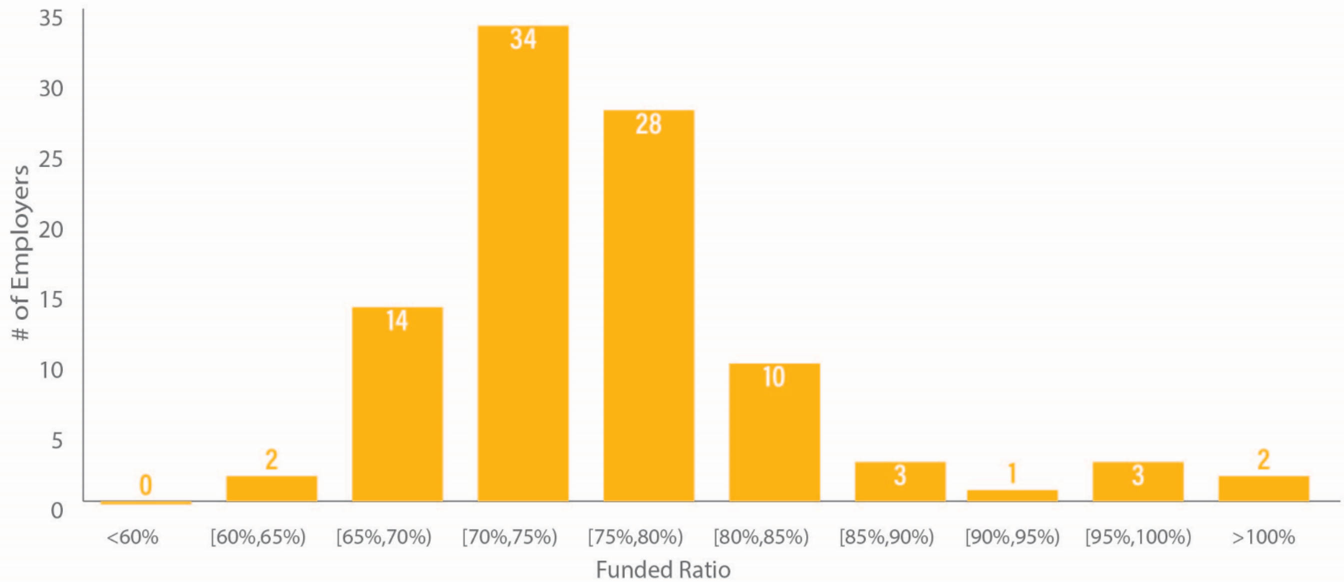
Northern Sacramento Valley Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



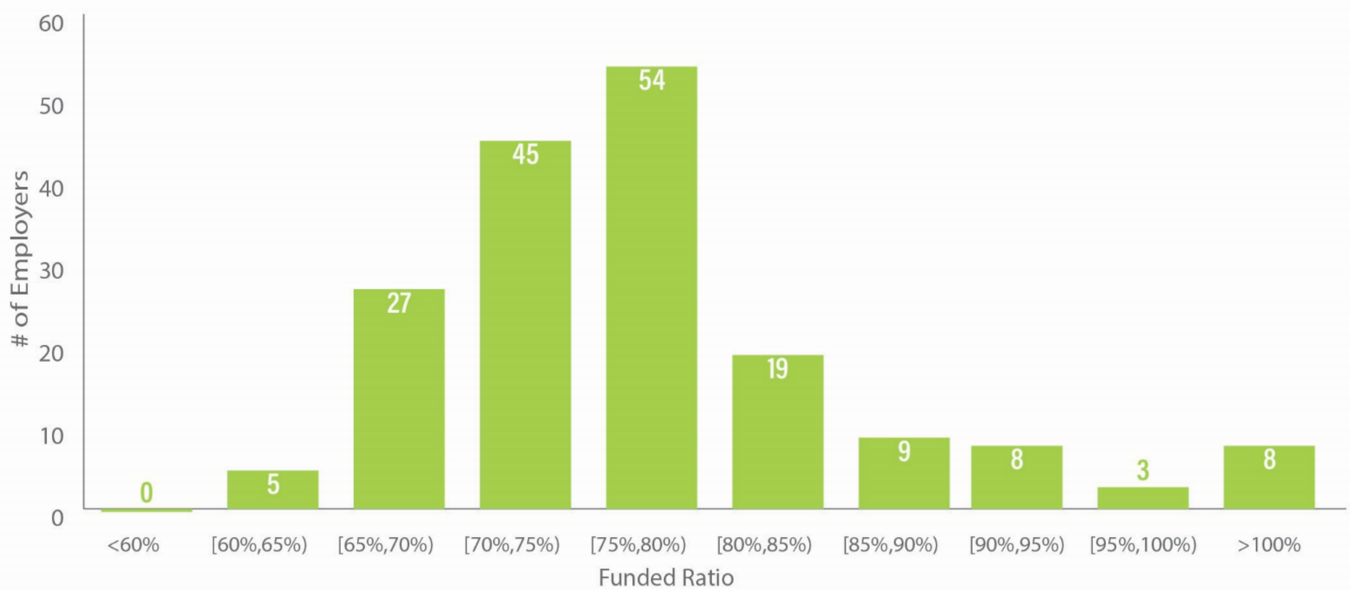

Greater Sacramento Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)
# of Employers
60
50
40
30
20
10
0
0
13
15
48
51
18
11
9
3
6
<60%
[60%,65%)
[65%,70%)
[70%,75%)
[75%,80%)
[80%,85%)
[85%,90%)
[90%,95%)
[95%,100%)
>100%
Funded Ratio


Bay Area Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)
# of Employers
120
100
80
60
40
20
0
0
11
45
108
62
37
16
7
7
5
<60%
[60%,65%)
[65%,70%)
[70%,75%)
[75%,80%)
[80%,85%)
[85%,90%)
[90%,95%)
[95%,100%)
>100%
Funded Ratio

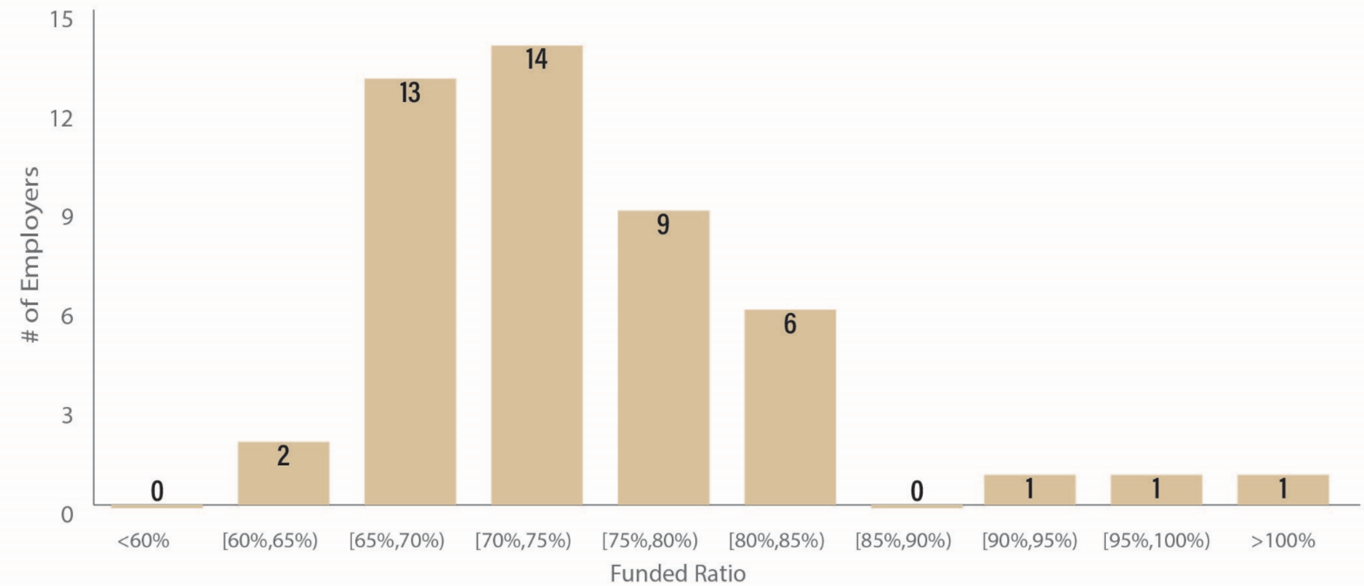
Central Coast Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



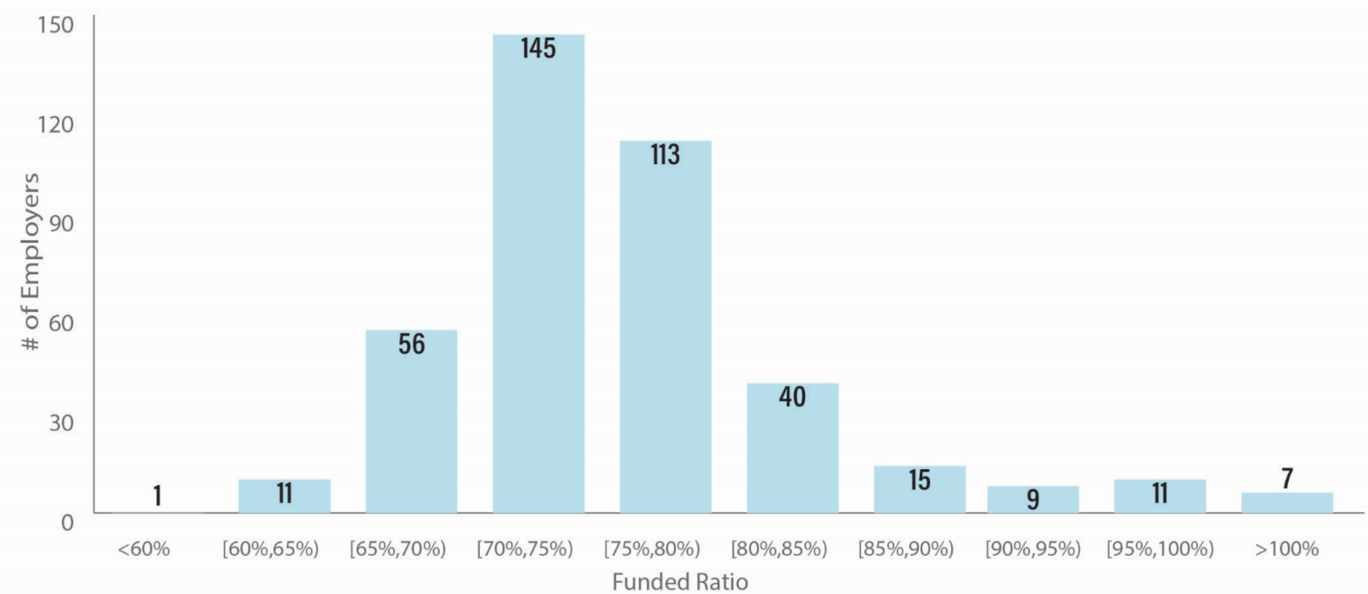
San Joaquin Valley Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



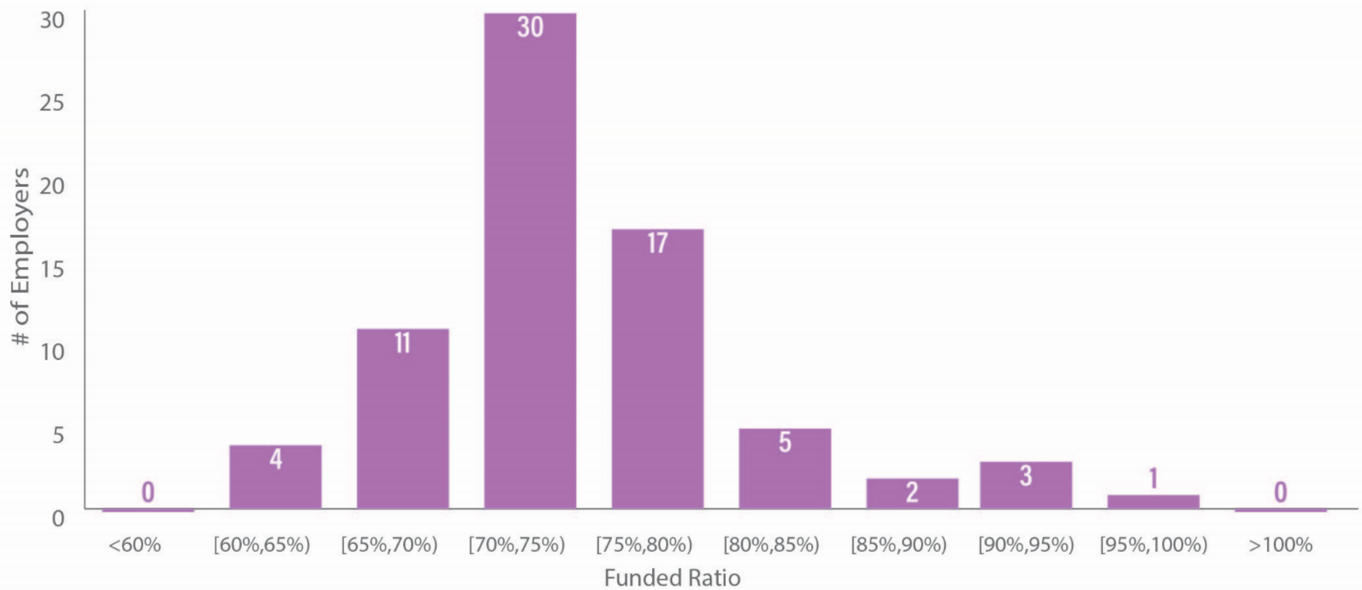
Central Sierra Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



Southern California Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



Southern Boarder Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)

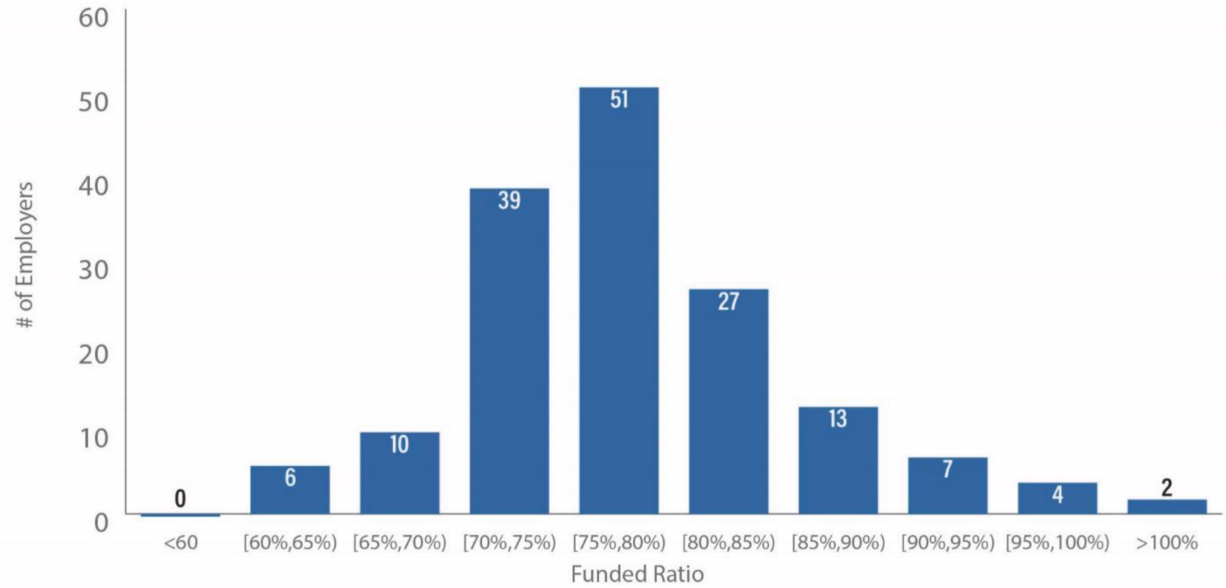


Public Agency Funded Ratios for Miscellaneous Plans by Agency Type

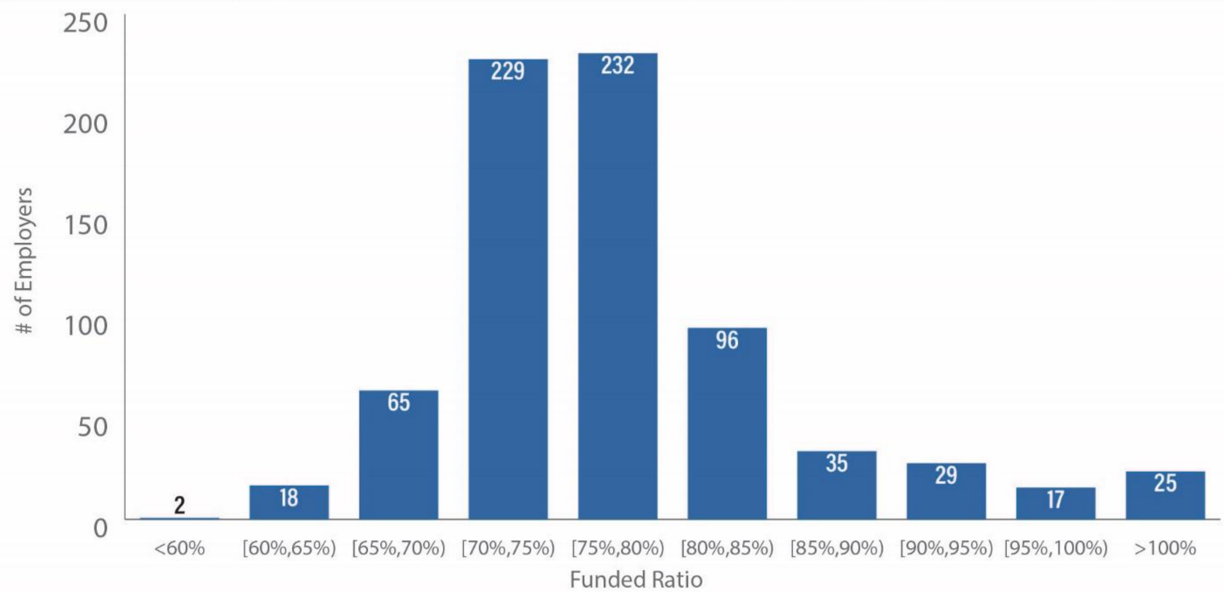
Number of Miscellaneous Agencies by Type

Agency Type	Number of Miscellaneous Agencies
Joint Powers Authority	159
Special District	748
City or Town	449
Non-Profit	64
County	37
Total	**1,457**

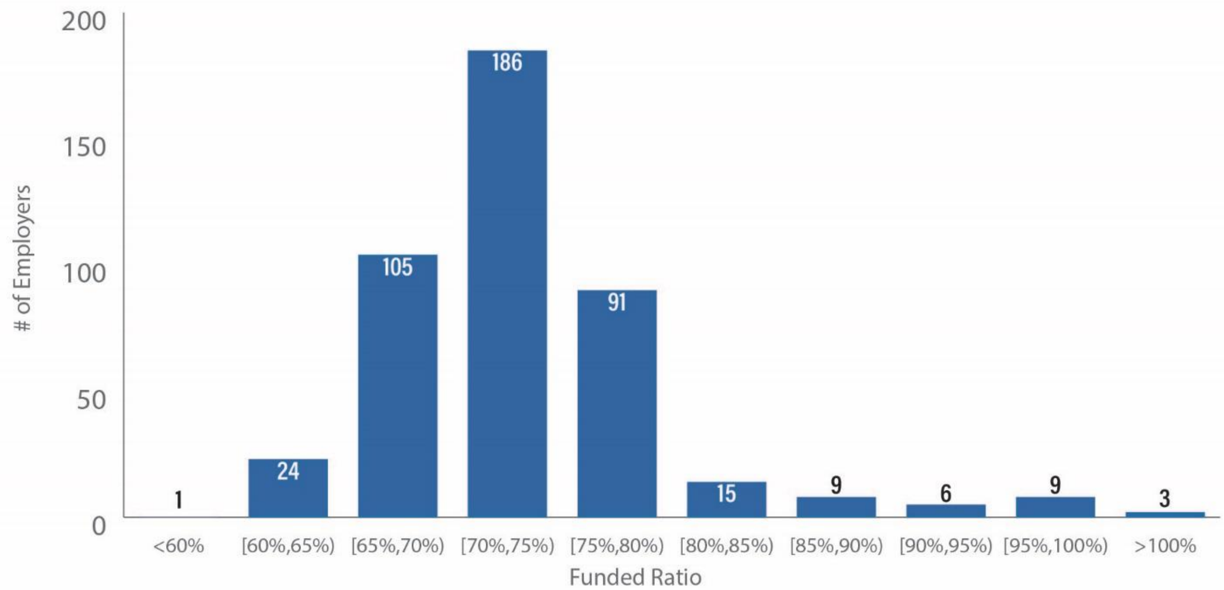
Joint Power Authority Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



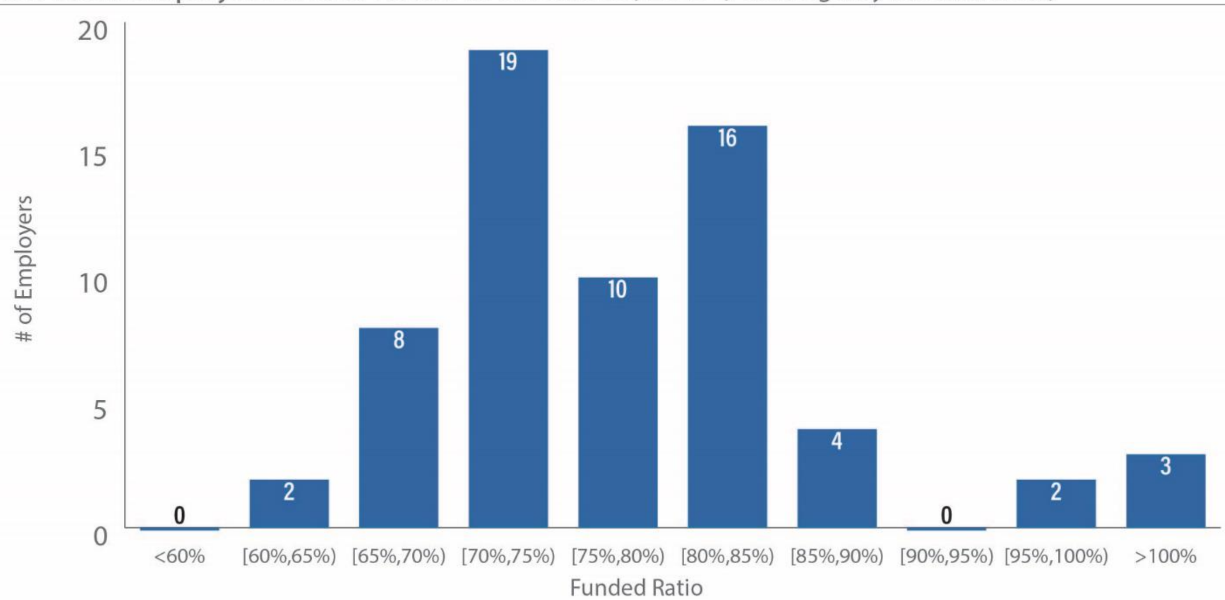
Special District Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



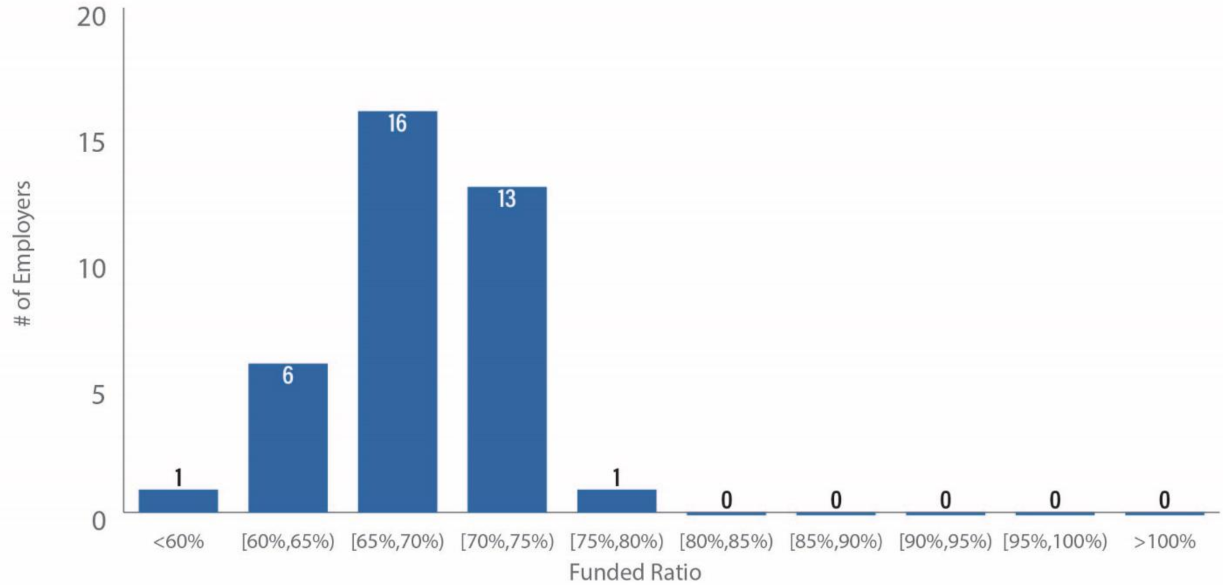
City or Town Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)



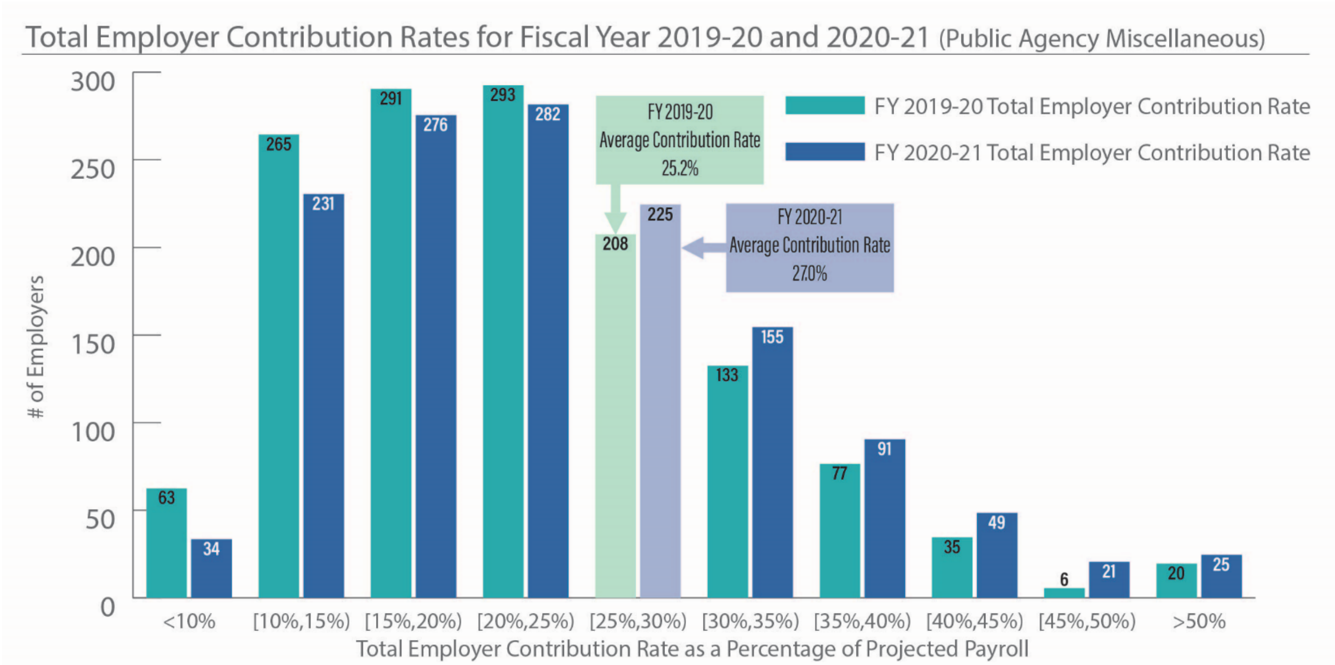
Non-Profit Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)

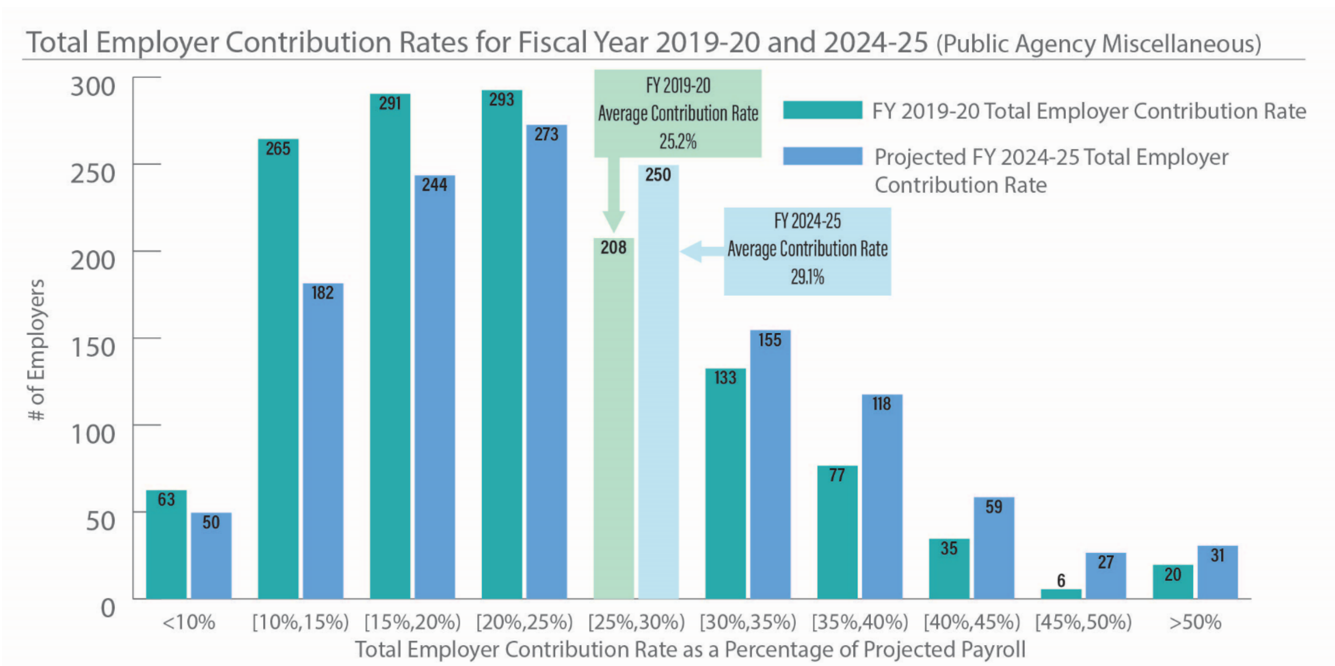


County Employer Funded Ratios as of June 30, 2018 (Public Agency Miscellaneous)

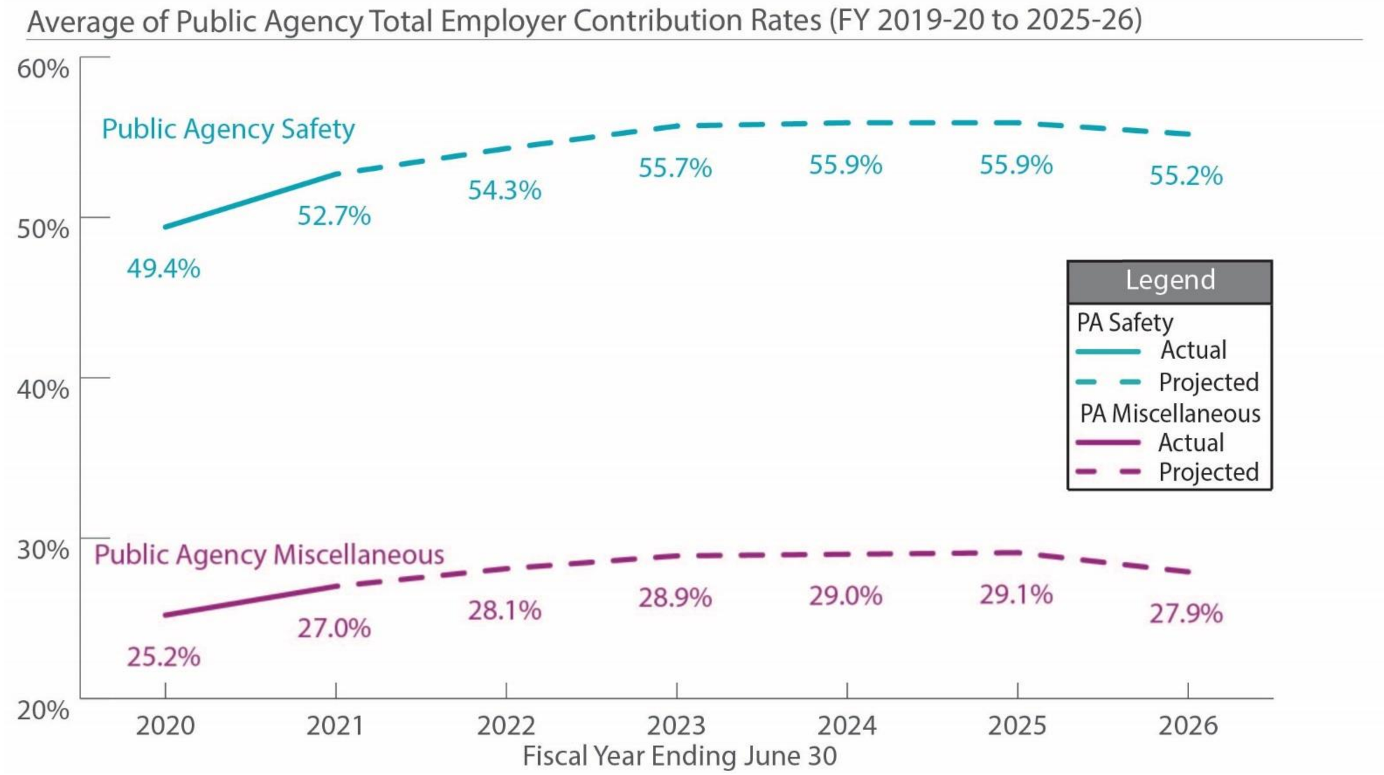


Public Agency Contribution Rates for Miscellaneous Plans





Appendix D – Recent and Projected Employer Contribution Rates



Appendix E – Historical Summary of Public Agency Negative Amortization Counts

Contribution Year		FY 2017 - 2018			FY 2018 - 2019			FY 2019 - 2020			FY 2020 - 2021		
Discount Rate		7.50%			7.375%			7.25%			7.00%		
Group of Plans	Plan Type	Total # of Plans	# of Plans with Negative Amortization	% of Plans with Negative Amortization	Total # of Plans	# of Plans with Negative Amortization	% of Plans with Negative Amortization	Total # of Plans	# of Plans with Negative Amortization	% of Plans with Negative Amortization	Total # of Plans	# of Plans with Negative Amortization	% of Plans with Negative Amortization
Pooled Plans	Total	3,393	2,142	63.13%	3,511	2,201	62.69%	3,566	1,542	43.24%	3,612	1,376	38.10%
	Miscellaneous	2,251	1,443	64.10%	2,322	1,386	59.69%	2,355	930	39.49%	2,377	839	35.30%
	Safety	1,142	699	61.21%	1,189	815	68.54%	1,211	612	50.54%	1,235	537	43.48%
Non-Pooled Plans	Total	431	371	86.08%	430	405	94.19%	428	212	49.53%	426	166	38.97%
	Miscellaneous	306	251	82.03%	306	285	93.14%	304	108	35.53%	303	79	26.07%
	Safety	125	120	96.00%	124	120	96.77%	124	104	83.87%	123	87	70.73%
All Plans	Total	3,824	2,513	65.72%	3,941	2,606	66.13%	3,994	1,754	43.92%	4,038	1,542	38.19%
	Miscellaneous	2,557	1,694	66.25%	2,628	1,671	63.58%	2,659	1,038	39.04%	2,680	918	34.25%
	Safety	1,267	819	64.64%	1,313	935	71.21%	1,335	716	53.63%	1,358	624	45.95%

Appendix F – State of California Payments in Excess of Actuarial Determined Contributions

State of California Payments in Excess of Actuarial Determined Contributions

Plan Name	Amounts by Fiscal Year (in Millions)[1]							
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
State Misc.	$11	$12	$3,612	$12	$861	$20	$81	$26
State Industrial	$6	$6	$106	$6	$89	$7	$14	$8
State Safety	$25	$26	$327	$28	$213	$31	$45	$34
POFF	$54	$56	$1,558	$60	$1,446	$75	$175	$86
CHP	$11	$11	$512	$12	$37	$280	$38	$38
Schools	$0	$0	$0	$0	$660	$0	$0	$0
Total	**$106**	**$110**	**$6,115**	**$118**	**$3,306**	**$415**	**$353**	**$192**

[1]Dollar amounts due to Section 20683.2 are approximate

2019 Annual Review of Funding Levels and Risks

November 2019