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February 20, 2008

**AGENDA ITEM 6**

**TO: MEMBERS OF THE BENEFITS AND PROGRAM ADMINISTRATION COMMITTEE**

**I. SUBJECT:** Review of Actuarial Rate Smoothing Policies

**II. PROGRAM:** Actuarial & Employer Services

**III. RECOMMENDATION:**

Staff recommends no change to the current rate smoothing methods adopted by the Board in 2005.

**IV. ANALYSIS:**

In 2004 and 2005, CalPERS actuarial staff performed extensive analysis of various concepts that could be used to address employer rate fluctuations. The objectives of the analysis were to seek a smoothing method that would best simultaneously accomplish the following:

- Minimize the impact on the funded status of the plans
- Minimize the volatility in the employer's contribution
- Minimize the average future employer contribution.
- Comply with the generally accepted accounting standards as provided by Governmental Accounting Standards Board Statement No.27 (GASB 27)

After being presented with the results of the analysis, the CalPERS Board adopted in April 2005 a new rate smoothing methodology by selecting one of the 34 different methods being analyzed. A copy of the April 2005 agenda item is included in Attachment 1. For additional information on the topic of rate smoothing, Attachment 2 contains a copy of an issue paper that was written by the Chief for the Post-Employment Benefit Commission.

The new rate smoothing methodology increased the actuarial value of assets corridor from 90%-110% of market value to 80%-120% of market value, spread market value asset gains and losses over 15 years, and amortized all unamortized gains and losses over a rolling 30 year amortization. In addition, a minimum employer contribution rate equal to the employer normal cost minus a 30 year amortization of any surplus was implemented.

As it was meant to do, the new rate smoothing methodology has substantially dampened the impact of actuarial gains and losses. Over the last three years, about 75% of the plans have seen annual changes in rates of less than 1% of payroll.

Members of the Benefits and Program Administration Committee
February 20, 2008

**The Issue**

The new rate smoothing methodology was implemented at the end of the stock markets' largest downturn in many years and employer rates were at their highest in the last 25 years. Smoothing has thus "locked in" high employer rates despite the fact that investment returns over the past several years have brought most plans back to 100% funding on a market value of assets basis.

At the time of the new methodology implementation, the chief actuary told the CalPERS Board and employers that if investment returns turned and returned the plans to 100% funded status, that we would revisit our rate smoothing methods to see if changes could be implemented to bring the employer rates closer to the normal cost.

To complicate the issue, the current fiscal year return (from July 1, 2007 through the writing of this agenda item) is less than negative 2%, i.e. more than 9.75% less than needed to stay at 100% funding on a market value of assets basis.

The question then is, **"**Should any adjustment be made to the smoothing methodology at this time to begin bringing employer rates down to levels closer to normal cost?"

**Alternatives Considered in This Agenda Item**

The original smoothing study three years ago analyzed 34 different methods and significant mathematical analysis went into the recommendation adopted by the CalPERS Board. Nevertheless, there have been those that have suggested that the methodology be changed.

In addition, the chief actuary sought analysis that would by mathematical formula bring employer rates back to normal cost more quickly as the plans approached 100% funded status on a market value of assets basis. While there are many alternatives (as detailed in the original study), this agenda item discusses and analyzes five alternatives. The pros and cons of each alternative will be pointed out and the impact on short term (the next three fiscal years) and long term employer rates (the standard deviation of rate changes) will be discussed.

The five alternatives are:

<u>Alternative 1</u>: Make no changes at this time - leave the current enhanced smoothing methodology in place and revisit the issue a year from now.

<u>Alternative 2</u>: Make a permanent change to the current smoothing methodology that ties the smoothing to funded status on a market value of assets basis so that employer rates move more quickly towards normal cost as the employer's plan moves closer to 100% funded on a market value of assets basis.

<u>Alternative 3</u>: Make a permanent change to the current smoothing methodology by switching the current 15 year recognition of asset gains and losses to a 10 year recognition of asset gains and losses.

<u>Alternative 4</u>: Make a permanent change to the current smoothing methodology by switching from the current corridor limit of 80% to 120% of market value to a corridor limit of 90% to 110% of market value.

Alternative 5: Make a one-time change to the smoothing methodology by moving the June 30, 2007 actuarial value of assets from 87% of market value to a higher value, say 92% of market value. Then for the June 30, 2008 actuarial valuations return to the current smoothing methodology.

**Analysis of the five alternatives**

**Alternative 1**: Make no changes at this time - leave the current enhanced smoothing methodology in place and revisit the issue a year from now.

Discussion: This method was the "best" at satisfying the four objectives of the original study. This method recognizes 1/15th (or 6.7%) of the previously unrecognized gains and losses each year. This method also superimposes limits on smoothed assets so that the smoothed value never falls below 80% of market value nor rises above 120% of market value.

Pros: Cut volatility as measured pre-2005 in half, has little chance of allowing funded status to deteriorate, raises the average future employer contribution by only .2% of pay, and produces employer rates in compliance with GASB statement 27.

Cons: "Locks in" employer rates at time of implementation. Takes about 15 years to recognize 100% funding after it is achieved.

**Alternative 2**: Make a permanent change to the current smoothing methodology that ties the smoothing to funded status on a market value of assets basis so that employer rates move more quickly towards normal cost as the employer's plan moves closer to 100% funded on a market value of assets basis.

Discussion: The CalPERS actuarial staff spent the past year analyzing various ways to modify the existing rate smoothing with the main goal being to find a method that directly links the amount of smoothing in a given year to the funded status of the plan on a market value of asset basis. Thirteen different variations of the smoothing formula were studied. The "best" solution drawn from this study is illustrated in the chart below:

| Funded Status on Market Value of Asset Basis | Percentage of the Unrecognized Asset Gain/(Loss) to be recognized |
|---|---|
| Less than 70% | 6.7% |
| 70% | 7.1% |
| 80% | 10.0% |
| 90% | 25.9% |
| 95% | 49.9% |
| 100% | 100% |
| 105% | 49.9% |
| 110% | 25.9% |
| 120% | 10.0% |
| 130% | 7.1% |
| Greater than 130% | 6.7% |

Since this is the first time this method has been seen, a more detailed analysis will be presented.

Employer rates produced by the new method depend on the funded status of the plans. As an example, the table below shows the estimated funded status on a market value of assets basis for each of the State plans for June 30, 2007 assuming no demographic gains or losses during fiscal 2006-07 (which is highly unlikely).

Also included in the table below is the estimated funded status on a market value of asset basis on June 30, 2008. Since the rate of return is not yet known for fiscal year 2007-2008, an estimated rate of return had to be used to perform the calculation. At the time of implementing rate smoothing in 2005, the average rate of return earned by CalPERS over the previous three 15 year period had been about 9.4%. For the June 30, 2008 estimate, we have used an estimated 0% investment return for 2007-2008. This is the rate of return necessary to maintain a 9.4% average over the last 15 years.

| | **June 30, 2006 Funded Status** | **ESTIMATED June 30, 2007 Funded Status** | **ESTIMATED June 30, 2008 * Funded Status** |
|---|---|---|---|
| State Miscellaneous | 89.8% | 99.6% | 93.2% |
| State Industrial | 95.0% | 105.3% | 98.4% |
| State Safety | 89.2% | 99.5% | 93.4% |
| State Police Officers & Firefighters | 86.0% | 95.6% | 89.8% |
| California Highway Patrol | 81.5% | 90.7% | 85.2% |

* Assuming a 0% return for fiscal 2007-2008.

Since the State Miscellaneous and State Safety plans are expected to have a funded status near 100% on a market value of asset basis on June 30, 2007, they would have a rate much closer to normal cost. The table below compares the estimated 2008-2009 State contribution under the current methods and the contributions under the revised smoothing methodology.

(Dollars are in Millions)

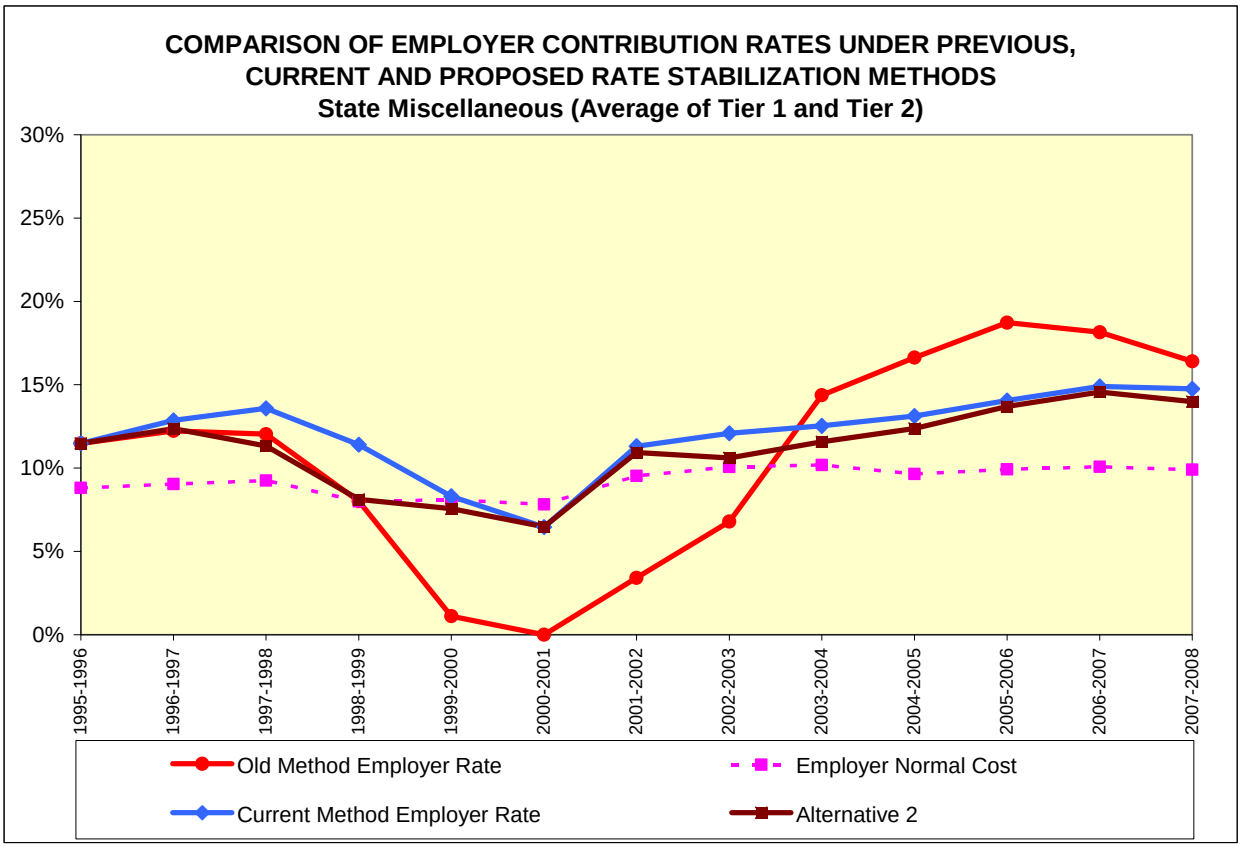
| | **2008-2009 Fiscal Year Current Smoothing Method** | | **2008-2009 Fiscal Year Alternative 2 Smoothing Method** | | |
|---|---|---|---|---|---|
| | **Employer Contribution** | **Employer Rate** | **Employer Contribution** | **Employer Rate** | **Employer Normal Cost** |
| State Misc. Tier 1 | $1,419 | 16.1% | $912 | 10.4% | 9.9% |
| State Misc. Tier 2 | $71 | 16.0% | $45 | 10.2% | 9.8% |
| State Industrial | $67 | 16.9% | $59 | 14.9% | 13.7% |
| State Safety | $234 | 18.5% | $200 | 15.8% | 15.5% |
| State Peace Officers & Firefighters | $789 | 25.0% | $701 | 22.2% | 17.7% |
| California Highway Patrol | $180 | 31.4% | $169 | 29.5% | 16.6% |
| **Total State** | **$2,760** | | **$2,086** | | |

The table below compares estimated employer rates for fiscal 2009-2010 assuming a 0% investment return for fiscal 2007-2008.

(Dollars are in Millions)
(Assuming a 0% Investment return for fiscal 2007-2008)

| | **2009-2010 Fiscal Year Current Smoothing Method** | | **2009-2010 Fiscal Year Alternative 2 Smoothing Method** | | |
|---|---|---|---|---|---|
| | **Employer Contribution** | **Employer Rate** | **Employer Contribution** | **Employer Rate** | **Employer Normal Cost** |
| State Misc. Tier 1 | $1,444 | 15.8% | $1,050 | 11.5% | 9.9% |
| State Misc. Tier 2 | $68 | 15.7% | $49 | 11.4% | 9.8% |
| State Industrial | $68 | 16.7% | $60 | 14.8% | 13.7% |
| State Safety | $239 | 18.3% | $213 | 16.3% | 15.5% |
| State Peace Officers & Firefighters | $804 | 14.7% | $723 | 22.2% | 17.7% |
| California Highway Patrol | $183 | 30.9% | $172 | 29.0% | 16.6% |
| **Total State** | **$2,806** | | **$2,267** | | |

The graph below compares employer rates for the State Miscellaneous plan over a full past economic cycle based on the old 3 year smoothing method, the current 15 year smoothing method, and the Alternative 2 (tying smoothing to funded status). Calculations were performed as though the revised smoothing methods had been initiated in the 1995-1996 fiscal year for the State Miscellaneous plan.



As can be seen, the contribution rate for the State Miscellaneous group would have been stable under the revised smoothing and would also have remained closer to the employer normal cost compared to the current method.

This approach is slightly more volatile than the current method. It reduces the volatility by 50% compared to the old pre-2005 method while the current method reduces volatility by 52%.

Pros: Gains and losses are recognized faster as the plan's funded status moves closer to 100% and so moves the employer's rate faster towards normal cost. In addition, this new method still meets the criteria established in the 2005 smoothing study. That is, it preserves the balance between "smooth" rates, average employer rate, and the preservation/advancement of funded status. The new methodology would also substantially lower employer rates immediately since many of the plans will be near 100% funded in the June 30, 2007 valuation.

Cons: This new approach slightly increases the level of volatility. The analysis performed estimate that the volatility would increase by 4% compared to the current method. The main problem with this revised method is political in nature. Benefit changes impact the plan's liability but not the plan's market value of assets. Therefore, the funded status of the plan changes when benefits are changed. This alternative ties the smoothed asset value of assets to funded status. In some situations, this would make it appear that the Board has engaged in swapping rate changes for benefit improvements. Various ways to avoid this problem were analyzed but no solutions could be found. If a new smoothing method is approved using this approach, the Board needs to be aware of its political implications.

**Alternative 3**: Make a permanent change to the current smoothing methodology by switching the current 15 year recognition of asset gains and losses to 10 year recognition of asset gains and losses.

Pros: Would immediately lower employer rates.

Cons: Would result in slightly more volatile employer contributions in the future. The analysis performed shows that the volatility would increase by 2% compared to the current method.

**Alternative 4**: Make a permanent change to the current smoothing methodology by reducing from the current corridor limit of 80% to 120% of market value to a corridor limit of 90% to 110% of market value, which was the original corridor pre-2005.

Discussion: Such a change re-introduces volatility that had been removed with the existing method. The 80% to 120% corridor was selected back in 2005 because it was one of the important features of the smoothing recommendation. Having such a wide corridor helped provide the much needed reduction in volatility. This is also the maximum corridor allowed under ERISA minimum funding standards. While these standards do not apply to public employee plans, it does provide additional comfort in utilizing a common approach.

Pros: Would immediately reduce employer rates.

Cons: Would result in more volatile employer contributions in the future. The analysis performed shows that the volatility would increase by 21% compared to the current method.

More importantly, using this corridor would not have satisfied the criteria set back in 2005 because it did not reduce volatility by at least 50%.

**Alternative 5**: Make a one-time change to the smoothing methodology by moving the June 30, 2007 actuarial value of assets from 87% of market value to a higher value, for example 92% of market value. Then for the June 30, 2008 actuarial valuations return to the current smoothing methodology.

Discussion: For the June 30, 2007 valuation, most plans are expected to have an actuarial value of asset between 86% and 87% of the real market value of assets.

For the analysis, the incremental impact of recognizing an additional 1% of unrecognized gains and losses was quantified. For State Miscellaneous Tier 1, the employer contribution rate for the 2008-2009 fiscal year is expected to change by about 0.45% of payroll for each 1% recognition of gains and losses.

For example, using an actuarial value of assets equal to 92% of the market value in the June 30, 2007 valuation would result in an estimated contribution rate for the State Miscellaneous Tier 1 group equal to about 13.5% of payroll. That means that using an actuarial value of asset equal to 93% of market value of assets instead of the 92% would reduce the contribution rate by 0.45% compared to the 13.5%. Similarly, using 91% would increase the rate by 0.45%.

The one thing to keep in mind here is that if additional gains are recognized in the June 30, 2007 valuation through an ad hoc change then this ad hoc change would take away some of the gains that have been set aside for eventual investment losses. That could result in a reduction in rate in 2008-2009 followed by increases in rates in following years.

Pros: Would immediately lower employer rates to levels closer to normal cost.

Cons: The investment return for fiscal 2007-2008 is currently below negative 2%. Unless the investment markets turn around before the end of the fiscal year, CalPERS will experience its first investment loss in 5 years. Performing a one time adjustment to the actuarial value of assets would take away some of the gains that have been set aside for eventual investment losses.

**Comparison of the Various Alternatives**

A good way of comparing the various alternatives is to compare how they will behave both in the short term and the long term. For the long term, the best approach is to compare and contrast the impact on the expected volatility of employer rates, funded status and the impact on the average employer rate.

The volatility of employer rates under each alternative was measured as the standard deviation of the annual change in employer rates over the 50 year study period for each of the 1,500 scenarios. The best way to interpret the standard deviation is that two-thirds of all outcomes fall within one standard deviation on either side of the average of all results and ninety-five percent of all results fall within two standard deviations.

The impact on average employer contribution rate is measured by looking at the increase in average employer rate produced by the additional smoothing over the 50 year period as

compared to the old pre-2005 smoothing method. The short term impact was measured by looking at what the State Miscellaneous Tier 1 employer contribution rate would be for the next three fiscal years under each alternative.

Since the rate of return is not yet known for the next three fiscal years, an estimated rate of return had to be used to perform the calculation. At the time of implementing rate smoothing in 2005, the average rate of return earned by CalPERS over the previous three 15 year period had been about 9.4%. For the first scenario, we calculated the rate of returns needed over the next three fiscal years in order to maintain a 9.4% average over the next three rolling 15 year periods.

In order to maintain the 9.4% average return, the returns in the table below were used. In addition, the table below includes an estimate of the funded status on a market value of asset basis for the State Miscellaneous plan for the next three years assuming the following pattern of investment returns occur in the next three years and assuming no demographic gains or losses during that period (which is highly unlikely).

| **Estimated Investment Return Needed to Maintain a 9.4% Return Over 15 Years** | **Estimated Funded Status of State Miscellaneous Plan (Market Value of Asset Basis)** |
|---|---|
| 0% return in fiscal year 2007-2008 | 93% on June 30, 2008 |
| 2% return in fiscal year 2008-2009 | 89% on June 30, 2009 |
| 16% return in fiscal year 2009-2010 | 96% on June 30, 2010 |

Note that the investment return for the 2006-2007 fiscal year was about 18.5% and, as pointed earlier out in this agenda item, the funded status on a market value of asset basis for the State Miscellaneous is expected to be almost 100% on June 30, 2007.

In addition to the scenario above, we also have looked at the impact of each alternative on the State Miscellaneous plan if the next three years of return were a repeat of the downturn experienced in the early 2000s. Once again, below is a table showing the estimated return for the next three years under this second scenario and the estimated funded status for the State Miscellaneous plan on a market value of asset basis.

| **Estimated Investment Return Assuming Early 2000s Repeats Itself** | **Estimated Funded Status of State Miscellaneous Plan (Market Value of Asset Basis)** |
|---|---|
| -7% return in fiscal year 2007-2008 | 87% on June 30, 2008 |
| -6% return in fiscal year 2008-2009 | 76% on June 30, 2009 |
| 4% return in fiscal year 2009-2010 | 73% on June 30, 2010 |

The tables on the following two pages provide the estimated impact of each alternative on both a short term and long term basis. Under alternative 5, the one time change in actuarial value of assets that was used was to increase the actuarial value of assets from 87% to 92% of the market value of assets.

Members of the Benefits and Program Administration Committee
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**Estimated Short Term Impact on State Miscellaneous Tier 1 – Scenario 1**

| | ALTERNATIVE 1 Current Methodology | ALTERNATIVE 2 Tie smoothing to funded status | ALTERNATIVE 3 (10 year smoothing) | ALTERNATIVE 4 90% to 110% corridor | ALTERNATIVE 5 Ad hoc change in actuarial value of assets to 92% |
|---|---|---|---|---|---|
| Fiscal Year 2008-2009<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Reflecting the actual 19% return for fiscal 2006-2007) | 16.1%<br>$1,419 millions | 10.4%<br>$912 millions | 15.9%<br>$1,400 millions | 14.4%<br>$1,271 millions | 13.5%<br>$1,192 millions |
| Fiscal Year 2009-2010<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Assuming a 0% return for fiscal 2007-2008) | 15.8%<br>$1,444 millions | 11.5%<br>$1,050 millions | 15.5%<br>$1,417 millions | 14.3%<br>$1,304 millions | 13.5%<br>$1,230 millions |
| Fiscal Year 2010-2011<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Assuming a 2% return for fiscal 2008-209) | 15.7%<br>$1,485 millions | 12.4%<br>$1,167 millions | 15.5%<br>$1,457 millions | 14.4%<br>$1,352 millions | 13.6%<br>$1,283 millions |
| Fiscal Year 2011-2012<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Assuming a 16% return for fiscal 2009-2010) | 15.4%<br>$1,505 millions | 12.5%<br>$1,218 millions | 15.1%<br>$1,468 millions | 14.1%<br>$1,382 millions | 13.5%<br>$1,316 millions |

Members of the Benefits and Program Administration Committee
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**Estimated Short Term Impact on State Miscellaneous Tier 1 – Scenario 2**

| | ALTERNATIVE 1 Current Methodology | ALTERNATIVE 2 Tie smoothing to funded status | ALTERNATIVE 3 (10 year smoothing) | ALTERNATIVE 4 90% to 110% corridor | ALTERNATIVE 5 Ad hoc change in actuarial value of assets to 92% |
|---|---|---|---|---|---|
| Fiscal Year 2008-2009<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Reflecting the actual 19% return for fiscal 2006-2007) | 16.1%<br>$1,419 millions | 10.4%<br>$912 millions | 15.9%<br>$1,400 millions | 14.4%<br>$1,271 millions | 13.5%<br>$1,192 millions |
| Fiscal Year 2009-2010<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Assuming a -7% return for fiscal 2007-2008) | 16.0%<br>$1,462 millions | 11.4%<br>$1,040 millions | 15.8%<br>$1,444 millions | 14.5%<br>$1,322 millions | 13.7%<br>$1,248 millions |
| Fiscal Year 2010-2011<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Assuming a -6% return for fiscal 2008-209) | 16.3%<br>$1,538 millions | 14.8%<br>$1,395 millions | 16.3%<br>$1,538 millions | 17.7%<br>$1,673 millions | 14.4%<br>$1,360 millions |
| Fiscal Year 2011-2012<br>Estimated Employer Rate<br>Estimated Employer Contribution<br>(Assuming a 4% return for fiscal 2009-2010) | 16.7%<br>$1,626 millions | 16.5%<br>$1,613 millions | 16.9%<br>$1,646 millions | 19.1%<br>$1,868 millions | 16.1%<br>$1,576 millions |

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February 20, 2008

**Estimated Long Term Impact**

| | Old 3 year Smoothing Method | ALTERNATIVE 1 Current Methodology | ALTERNATIVE 2 Tie smoothing to funded status | ALTERNATIVE 3 (10 year smoothing) | ALTERNATIVE 4 90% to 110% corridor | ALTERNATIVE 5 Ad hoc change in actuarial value of assets to 92% |
|---|---|---|---|---|---|---|
| Volatility Measure (standard deviation of changes in future employer rates) | 3.27% of pay | 1.57% of pay | 1.64% of pay | 1.60% of pay | 1.99% of pay | 1.57% of pay |
| Reduction in Volatility (When compared with old 3 year smoothing method) | 0% | 52% | 50% | 51% | 39% | 52% |
| Impact on average employer rate (When compared with old 3 year smoothing method) | 0% of pay | 0.2% of pay | 0.2% of pay | 0.2% of pay | 0.1% of pay | 0.2% of pay |

**Conclusion**

In light of the above analysis, the recommendation is that the current rate smoothing methods adopted by the Board in 2005 remain unchanged.

The main reason for this is to avoid changing smoothing methods that have been in place for only a short period of time. The 15 years smoothing and the 80%-120% corridor were chosen for a reason. We should wait a few more years before deciding whether or not they were the appropriate approach to consider at the time. Also, one of the recommendations from the Post-Employment Benefit Commission was to avoid making changes to existing changes to provide temporary rate relief. In addition, employers have repeatedly expressed in public settings that CalPERS should not modify the current smoothing method. For these reasons, no method change should be considered for the time being.

## V. STRATEGIC PLAN:

The current rate stabilization method supports Goal VIII of the CalPERS' Strategic Plan. The Plan reads as follows:

Goal VIII
Manage the risk and volatility of assets and liabilities to ensure sufficient funds are available, first, to pay benefits and second, to minimize and stabilize contributions.

David Lamoureux, Supervising Pension Actuary
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# ATTACHMENT 1

# AGENDA ITEM FROM APRIL 2005 BENEFITS AND ADMINISTRATION COMMITTEE MEETING

# ATTACHMENT 2

# ISSUE PAPER PRESENTED TO THE POST-EMPLOYMENT BENEFIT COMMISSION IN JULY 2007