



UPDATE ON RATE COLLARING POLICY

OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM

Presented by:

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JULY 31, 2020

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Introduction

- Rate collaring was among methods and assumptions Board adopted in October 2019 to be used in calculating 2021-2023 contribution rates
 - The collar affects the timing of when OPERF asset gains and losses, along with the effect of assumption changes, are reflected in employer contribution rates
 - Given recent market turbulence it is important to continue to assess how the rate collar design operates
- At the March 2020 meeting, we presented an overview of current rate collaring policy
- At the May 2020 meeting, we summarized the pros and cons of input smoothing and output smoothing approaches to contribution rate calculations
- Today, we seek Board feedback on policies we intend to analyze in the annual financial modeling exercise scheduled for the December meeting

Our Understanding - Focus of Upcoming Analysis

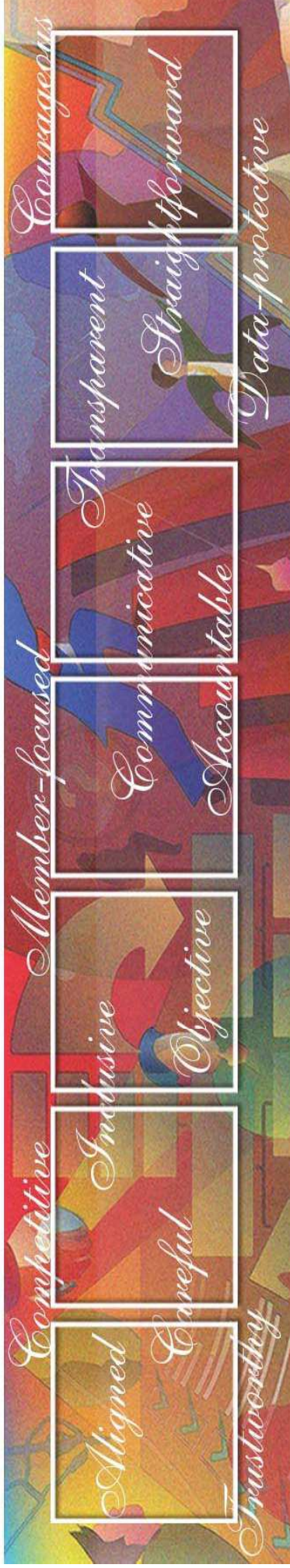
- Our analysis will focus on output smoothing approaches
 - The current rate collar structure is one example of an output smoothing approach
 - While input smoothing approaches are used by many other systems, they are less robust and less transparent than output smoothing approaches
 - Our impression of Board feedback in May was a preference for considering refinements to the output smoothing approach, rather than continuing to compare input and output smoothing
- Many changes have occurred since the rate collar was originally developed in 2005, and the analysis should be contemplative of those changes
- Possible output smoothing approaches we may analyze for comparison to the current structure include:
 - Elimination or modification of the “double collar” component
 - Determining the collar level as a different percentage of current rate
 - Having the collar defined as a fixed percent of payroll, rather than as a percentage of the current rate, at least for the large experience-sharing pools

Our Understanding - Focus of Upcoming Analysis

- Analysis will be presented as part of the annual financial modeling work, scheduled for the December Board meeting
- Most analysis will use the stochastic variable return model, which can assess the trade-offs between differing policy approaches
- The December work will inform the Board ahead of the review and adoption of methods in 2021 that will set 2023-2025 contribution rates

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Human Resource Consulting




May 20, 2005

Oregon PERS

First Steps in Managing Employer Rates:
Actuarial Methods

Bill Hallmark, Marcia Chapman
Portland, Oregon

 Marsh & McLennan Companies

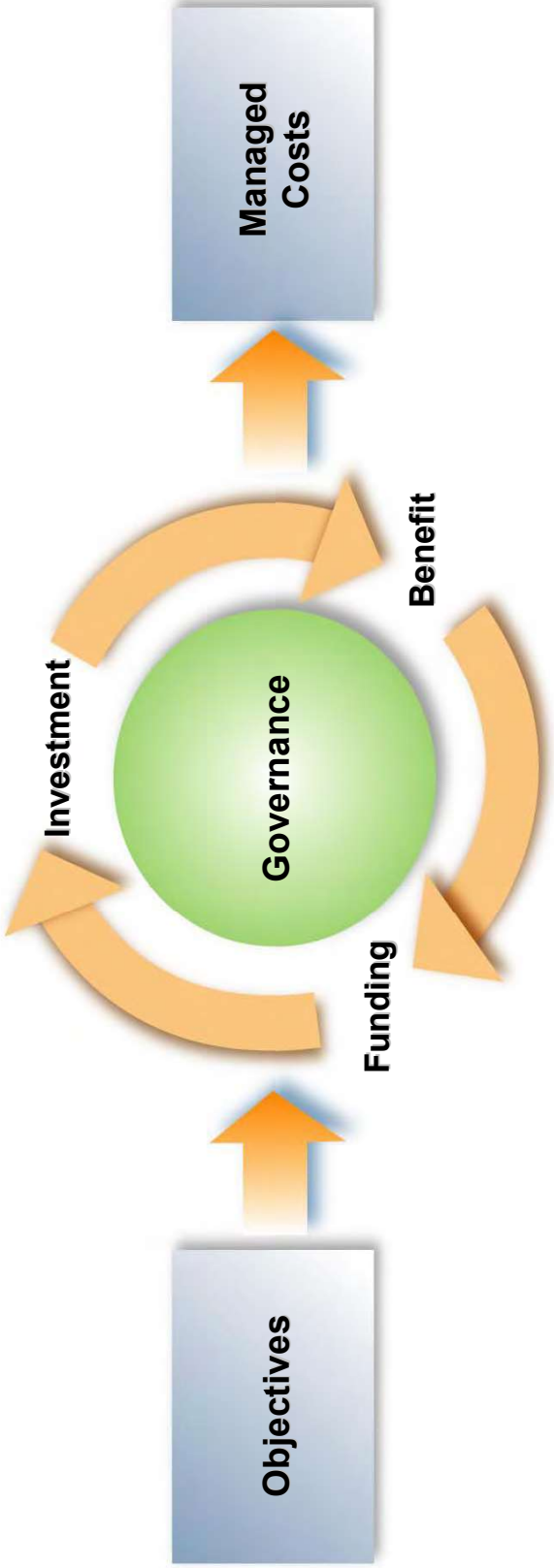


Agenda

- Background
 - Current environment
 - Current methods
- Proposed methods for consideration
- What other systems are doing
- Next Steps



Retirement Plan Financial Management Framework



Background

Current Environment

Benefit	Funding	Investment
<ul style="list-style-type: none"> ■ OPSP and IAP established for members hired after August 29, 2003 ■ Member contributions diverted from Tier One/Two to the IAP starting in 2004 ■ Reform curtailed growth in Money Match benefits ■ Strunk Ruling provides 8% per year earnings guarantee to Tier 1 member accounts ■ Employers can incur additional cost due to pick up of member contributions ■ Actuarial methods do not impact benefits paid 	<ul style="list-style-type: none"> ■ Actual savings due to reform lower than expected due to investment experience and the Strunk Ruling ■ Post-reform normal cost higher due to redirection of member contributions ■ Employer contribution rates high ■ Concerns around volatility of rates ■ 7/1/05 employer rates phased in to mitigate higher than expected increases ■ Board would like to evaluate options to mitigate volatility in employer contribution rates 	<ul style="list-style-type: none"> ■ Investment earnings affect assets available to pay benefits ■ Lack of clarity around how earnings impact employer contribution rates ■ Investment earnings impact Tier Two Money Match benefits through interest crediting ■ In the near-term, higher investment returns do not significantly reduce employer rates ■ In the long-term, investment returns significantly impact employer rates



Context High Earnings Won't Significantly Reduce Rates Immediately

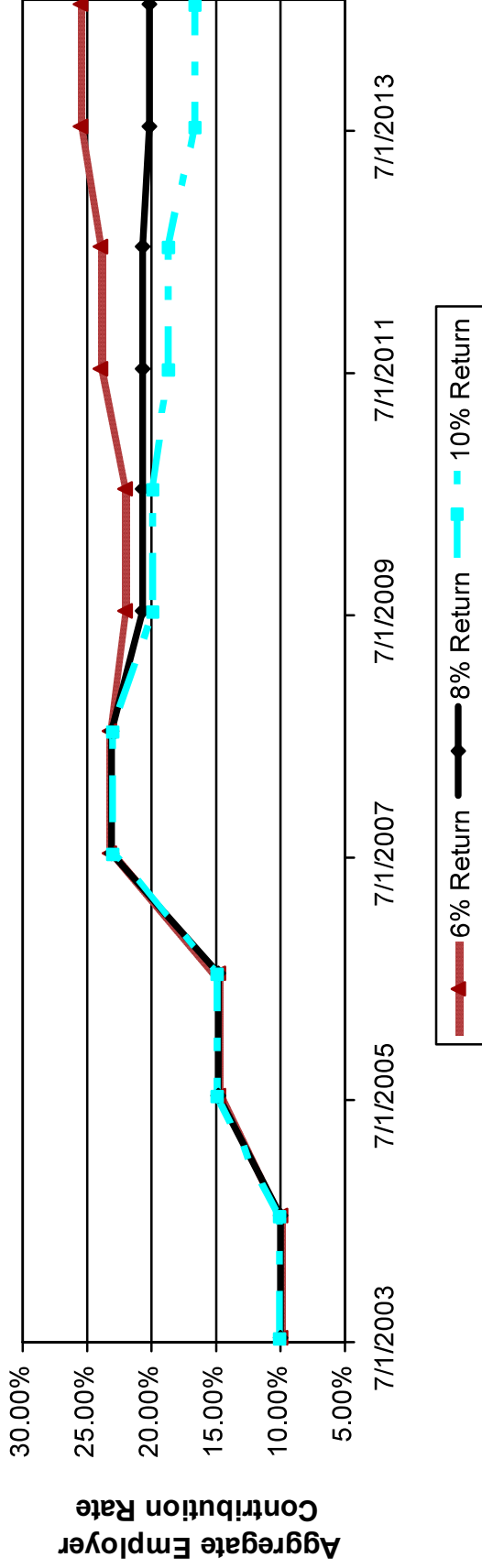
	2005 Earnings	
Payroll Increase	0%	8%
	27.2%	26.3%
	26.6%	25.8%
		25.6%
		25.1%

- The rates shown above do not include the 6% IAP contribution or the effect of employer side funds.
- Using reserves reduces these rates by about 2.1%.
- The actual contribution rates effective July 1, 2007 will depend on a number of factors, including changes in methods and assumptions Mercer recommends.
- Two critical factors are investment earnings during 2005 and the total payroll increase of the employer. The investment earnings affect the assets available to pay benefits, and the change in payroll determines how the amortization of the unfunded is spread as a percentage of employee salaries and also influences the liability for active members.
- Asset smoothing and amortization methods spread the impact of changes in payroll and investment earnings over a long period.



Context

Earnings Make a Significant Difference Long-Term (Using Non-Valuation Reserves)



- The rates shown above do not include the 6% IAP contribution or the effect of employer side funds.
- As part of the 2003 earnings crediting decision, the Board set aside approximately \$1.2 billion in the contingency and capital preservation reserves. Staff has recommended the Board set aside an additional \$600 million in these reserves out of 2004 earnings. This chart shows the expected contribution rates in the future, using \$1.8 billion of non-valuation reserves as of December 31, 2004.
- The funded status of the System is expected to decline from 86% (without side accounts) on December 31, 2003 to about 79% on December 31, 2005. The funded status of the System is expected to decline from 96% (with side accounts) on December 31, 2003 to about 91% on December 31, 2005.
- Over the long run, investment earnings will make a significant difference in contribution rates.



Background

Overview of Measures to Control Contribution Volatility

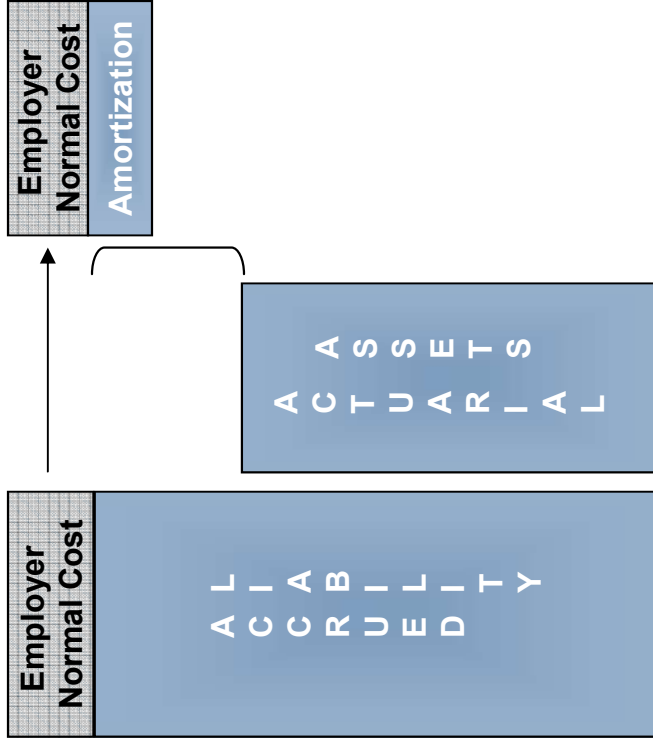
- Short-Term Measures
 - Use of the Contingency and Capital Preservation Reserves
 - Formal policy on interest crediting
- Intermediate-Term Measures
 - Review use of Entry Age Normal funding method
 - Review alternative methods to smooth contribution rates
 - Review other actuarial methods and assumptions
- Long-Term Measures
 - Financial modeling of reserving policies
 - Asset-liability study to assess the risk-return benefits of different asset allocations



Background

Basic Theory of Employer Contributions

Employer Rate Calculation



Funded Position as of
December 31, YYYY

Contribution as of
July 1, YYYY+2

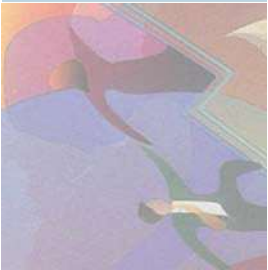
Theoretical Cost Allocation

- The **accrued liability** represents the liability attributable to prior service by the cost method.
- The **normal cost** represents the increase in liability attributable to an additional year of service.
- Different actuarial cost methods use different techniques for allocating costs to periods of service.

Background

Current Actuarial Methods

	Liability	Assets
Method	<ul style="list-style-type: none"> Entry Age Normal (EAN) Spreads cost of annual benefits as a level percentage of pay over the working life of each individual member Effective for final average formula benefits like Full Formula Present value of current and future benefits (PVB) = Accrued liability (AL) + Present value of future normal costs (PVNC) 	<ul style="list-style-type: none"> Smoothing method adopted in 2000 to control the volatility of employer rates Smooths investment gains and losses over four years Smoothed value within 10% of fair value Most public entities use some type of asset smoothing method
Issues	<ul style="list-style-type: none"> Allocates normal cost for Money Match benefit even after redirection to IAP Higher NC implies lower AL as PVB stays the same For the Money Match benefit, the accrued liability is lower than the present value of benefits accrued to date (PVAB) 	<ul style="list-style-type: none"> Current funded status is less transparent due to smoothing Does not smooth impact of earnings on liabilities Mismatch between assets and liabilities for Tier One and Tier Two (post-Strunk impact minimal)



Methods for Consideration

Objectives for Actuarial Methods

- Transparent
- Predictable and stable
- Actuarially sound
- Equitable across generations
- GASB compliant



Methods for Consideration

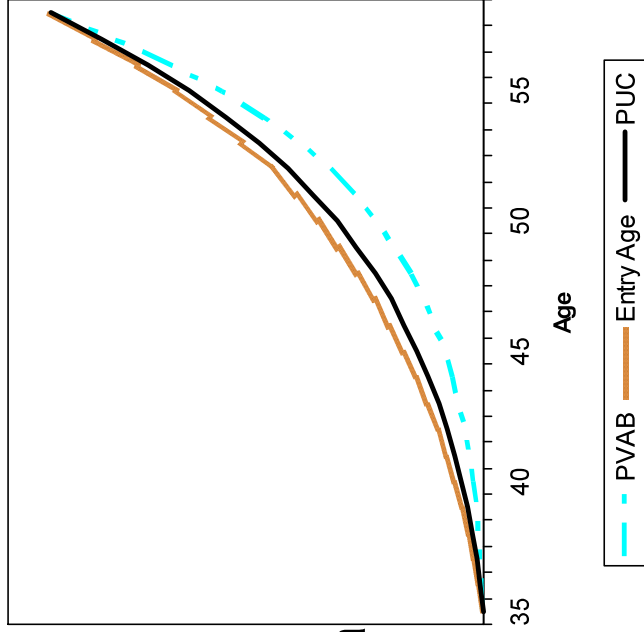
Actuarial Liability Methods

	Entry Age Normal (EAN)	Projected Unit Credit (PUC)
Normal Cost	<ul style="list-style-type: none"> Spreads cost of annual benefits as a level percentage of pay over the working life of each individual member 	<ul style="list-style-type: none"> Calculated for each individual member as cost of additional year of service based on projected pay
Accrued Liability	<ul style="list-style-type: none"> Accumulated value of prior normal costs 	<ul style="list-style-type: none"> Based on all prior service and projected pay
Impact	<ul style="list-style-type: none"> Higher normal cost and lower AL 	<ul style="list-style-type: none"> Lower normal cost and higher AL
Pros	<ul style="list-style-type: none"> Most common method used by public entities Stable normal cost as a percentage of payroll GASB compliant 	<ul style="list-style-type: none"> Accrued liability does not lag behind the value of benefits accrued to date Normal cost accurately reflects the value of benefits earned for additional service GASB compliant
Cons	<ul style="list-style-type: none"> May overstate normal cost when Money Match benefit is more valuable When member terminates, there is an increase in liability. 	<ul style="list-style-type: none"> Relatively uncommon for public entities Normal cost for the closed group of Tier One and Tier Two employees will increase as the group gets older 22-year amortization of higher UAL shifts Tier One costs to future generations

Methods for Consideration

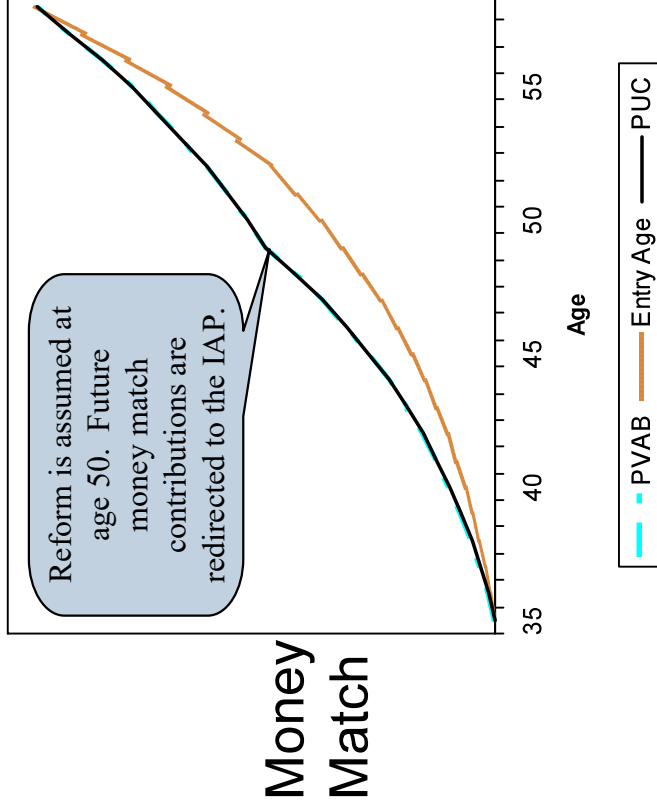
Full Formula and Money Match Benefit Liabilities

Comparison of Accrued Liability



- Present value of accrued benefits to date—PVAB—(based on current service and pay) increases rapidly as member approaches retirement
- Actuarial methods allocate these costs evenly across an employee's career

Comparison of Accrued Liability

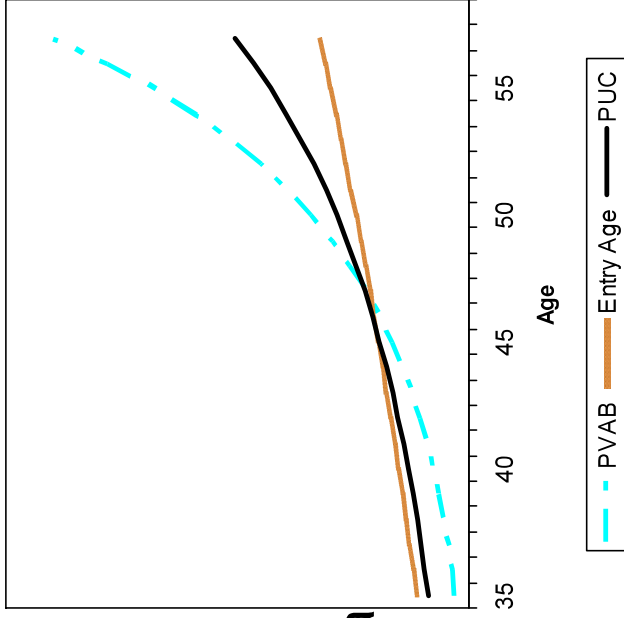


- For Money Match benefit, entry age accrued liability is less than the PVAB
- In this case, projected unit credit (PUC) follows the pattern of benefit accruals exactly, so the PUC accrued liability always equals the value of the accrued benefit

Methods for Consideration

Full Formula and Money Match Benefit Normal Cost

Comparison of Normal Cost

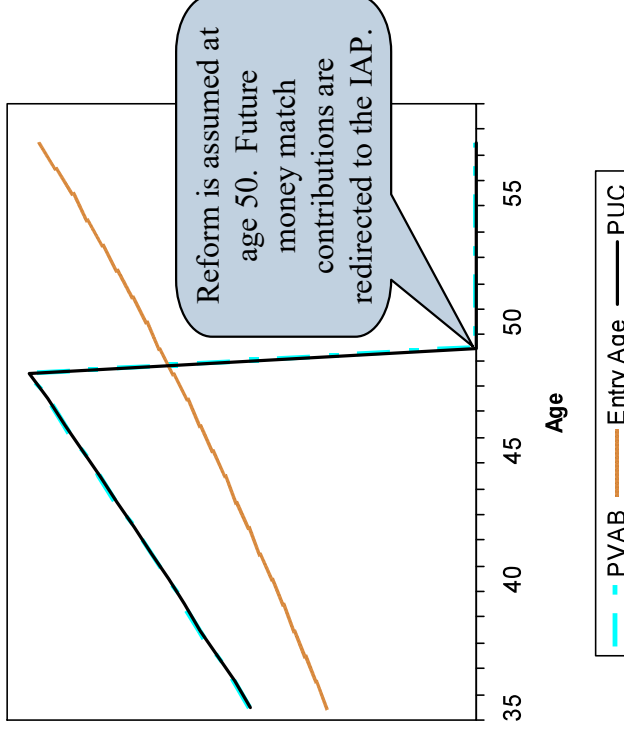


Full Formula

- PVAB normal cost shows the pattern in which benefits are actually earned
- Both Entry Age and PUC allocate normal cost more evenly through career than the PVAB cost by reflecting future pay; Entry Age more so than PUC

Mercer Human Resource Consulting

Comparison of Normal Cost



Money Match

- Entry Age normal cost is below the rate at which actual benefits accrue until contributions are re-directed to the IAP; after: significantly higher than the benefit accrual rate
- In this case, projected unit credit follows the pattern of benefit accruals exactly

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Methods for Consideration

Effect on 12/31/2003 Values

	PVAB		Normal Cost		Accrued Liability	
	EAN	PUC	EAN	PUC	EAN	PUC
<i>Actives Tier One</i>						
General Services	\$16.1	\$0.39	\$0.07	\$14.9	\$16.1	
Police & Fire	\$ 2.0	\$0.07	\$0.03	\$ 1.7	\$ 2.1	
<i>Actives Tier Two</i>						
General Services	\$ 1.1	\$0.25	\$0.12	\$ 1.0	\$ 1.2	
Police & Fire	\$ 0.2	\$0.05	\$0.03	\$ 0.2	\$ 0.3	
Judges	\$ 0.1	\$0.01	\$0.01	\$ 0.1	\$ 0.1	
Retirees & Inactives	\$28.3	\$0.00	\$0.00	\$28.3	\$28.3	
Total	\$47.8	\$0.77	\$0.26	\$46.2	\$48.1	

Calculations as of December 31, 2003 in billions



Methods for Consideration

Effect on 12/31/2003 Values

- Changing to the PUC method results in a lower normal cost and a larger UAL.
- The net effect is a reduction in contribution rate because the UAL amortization extends further into the future than the normal cost for members expected to retire under money match.
- With the increase in the UAL, the funded status of the system declines from 86% to 79% as of December 31, 2003 (without side accounts).
- By amortizing the difference in the UAL due to implementation of the PUC method over seven years the 7/1/05 contribution rate would be 17.6%

	EAN	PUC	PUC over 7 yrs
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NC Rate 12.6% 4.2% 4.2%

UAL Rate 7.1% 10.6% 13.4%

Contribution Rate (7/1/2005)	19.7%	14.8%	17.6%
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IAP 6% Contribution 6.0% 6.0% 6.0%

Funded Status (without side accounts)	86%	80%	80%
Funded Status (with side accounts)	96%	89%	89%

Methods for Consideration

Smoothing Methods

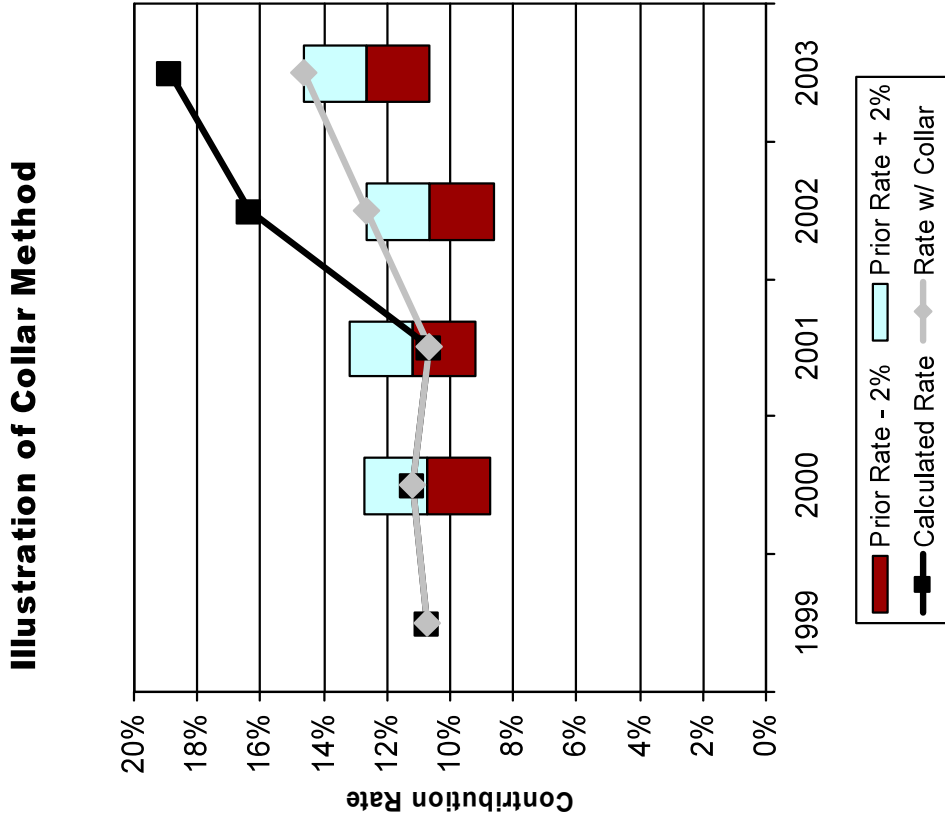
	Smoothed Assets	Collar on Contributions	Average Contributions
Method	<ul style="list-style-type: none"> Investment earnings smoothed over four years Smoothing limited to within 10% of fair asset value 	<ul style="list-style-type: none"> Uses market value of assets Smooth contribution rates Limit annual change in contributions within a specified “collar” 	<ul style="list-style-type: none"> Uses market value of assets Smooth contribution rates Average contribution rates over a period of years
Pros	<ul style="list-style-type: none"> Smoothing assets is the most common approach to smoothing contribution rates Can be enhanced by increasing smoothing period or removing 10% bracket 	<ul style="list-style-type: none"> Funded status of the system more transparent to stakeholders Contributions are smoothed rather than assets and liabilities Helps effectively budget for future contributions 	<ul style="list-style-type: none"> Funded status of the system more transparent to stakeholders Contributions are smoothed rather than assets and liabilities
Cons	<ul style="list-style-type: none"> Less transparent Does not smooth impact of earnings on liabilities 	<ul style="list-style-type: none"> Not prevalent though has been used by some public entities Slow to adjust to significant changes; funding may lag if extended losses occur Additional GASB reporting may be required 	<ul style="list-style-type: none"> Not prevalent Additional GASB reporting may be required



Methods for Consideration

Collar on Contributions Method

- The Board could establish a collar such that the contribution rate cannot increase or decrease by more than a specified percentage of payroll in any year. The example uses 2% of payroll.
- Provides a firm number for budgeting early in the process. For example, when the December 31, 2004 interim valuation is complete, employers would know the maximum and minimum rates effective July 1, 2007.
- This method can be slow to adjust to significant changes, so an exception may need to be made if the funding level drops below or exceeds a certain level.



Methods for Consideration

“Average Contributions” Method

- The Board could set rates based on the average calculated rate over the last 5 years. The calculated rate is based on the current value of assets and the current actuarial cost method.
- This method smoothes contribution rates, but is more sensitive than the collar method to sudden changes in assets or liabilities.
- This method does not set an absolute minimum and maximum for budgeting purposes, but narrows the range since the last valuation will only provide one-fifth of the rate.

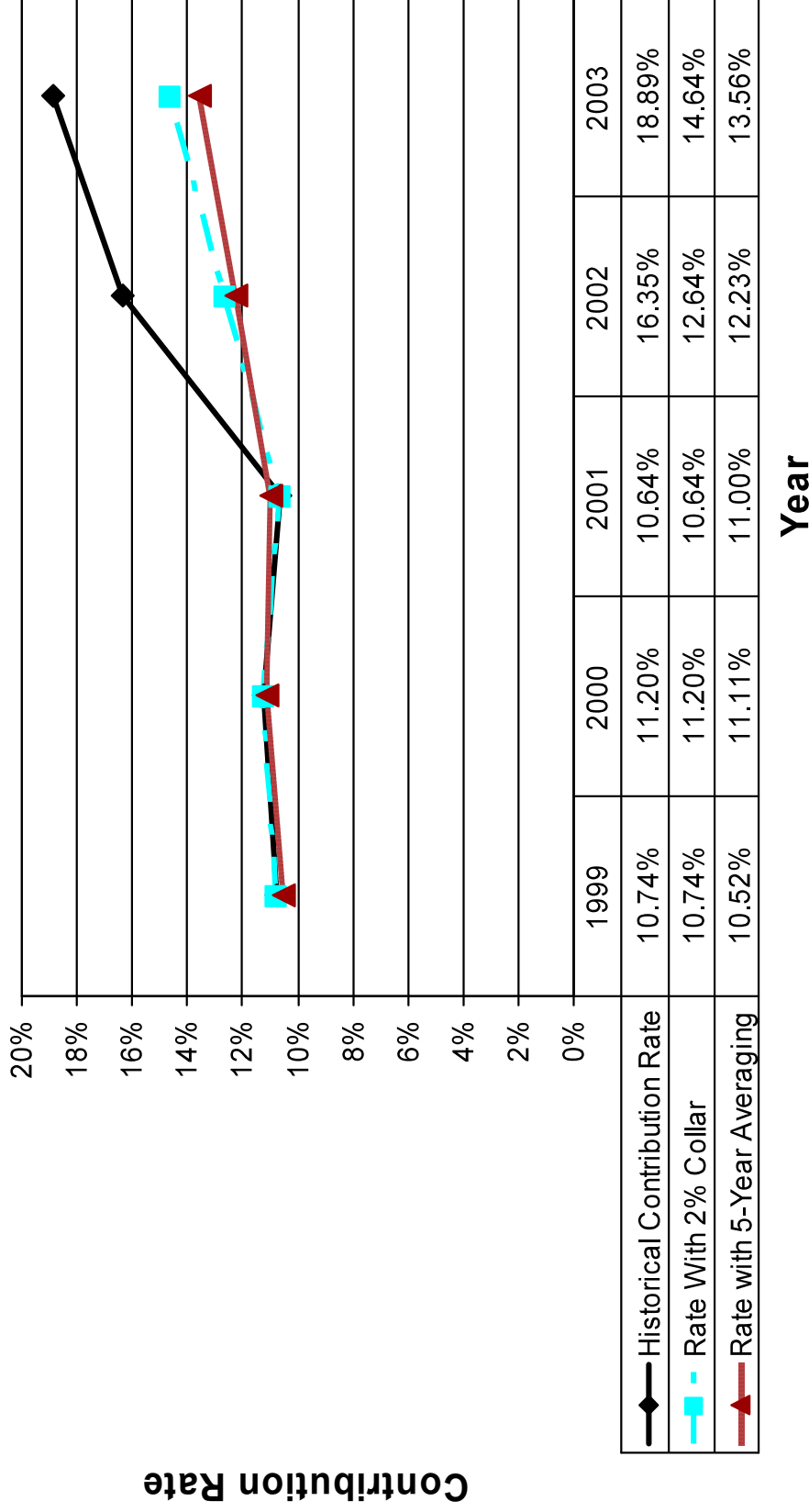
Illustration of Averaging Method	
Calculated Rates*	
12/31/1999	10.74%
12/31/2000	11.20%
12/31/2001	10.64%
12/31/2002	16.35%
12/31/2003	18.89%
Average Rate	
	13.56%

*The rates shown were calculated using a smoothed value of assets instead of a market value of assets.



Methods for Consideration

Smooth Contribution Rates—Historical Illustration



What Other Systems Are Doing

Cost Method

- Most public sector systems use the Entry Age Normal cost method.
- Projected Unit Credit cost method is common in the private sector because this method is required for accounting disclosures.

Asset Smoothing

- Most public sector systems smooth assets.
- Most private sector plans also smooth assets.

Prevalence of Cost Method*

Entry Age Normal	72%
Projected Unit Credit	13%
Aggregate	12%
Frozen Entry Age	3%

Prevalence of Asset Smoothing*

Smoothed Value	93%
Market Value	7%

* 2004 *Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation*



What Other Systems Are Doing

Smooth Contribution Rates	Recent System Actions
<ul style="list-style-type: none">■ Most systems do not smooth contribution rates directly.■ Some contribution rates are set by statute, and are only changed by changing the statute.■ Some statutes set a collar around changes in contribution rates. Some of these plans have struggled with funding if the collar is too tight because if the rate gets too far behind it is difficult to catch up.■ Some contribution rates are tied to specific revenue sources.	<ul style="list-style-type: none">■ Arizona<ul style="list-style-type: none">- Removed requirement that actuarial assets be within 20% of market value- Extended smoothing period from 5 to 10 years■ CalPERS<ul style="list-style-type: none">- Adopted a 15-year asset smoothing method- Changed UAL amortization to a 30-year rolling average- Established a minimum contribution rate■ Many Systems<ul style="list-style-type: none">- Pension obligation bonds



Next Steps

- **Seek stakeholder input** – These suggestions alter the pattern of contributions, but not the total cost of the system. Some alternatives may require additional accounting. It may be worthwhile to get some input from stakeholders regarding the various tradeoffs between transparency and stability.
- **Financial modeling** – Different alternatives may have different impacts on funded status and contribution rates. The Board may wish to explore these alternatives using the financial model before making a final decision.

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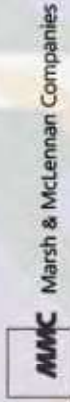


October 21, 2005

Oregon PERS

Policy Alternatives for Financial Modeling

Bill Hallmark
Portland, Oregon





Contents

- Introduction
- Policies for Analysis
- Recommendations
- Appendix



Introduction

Background

- Meeting with Legislative Advisory Committee on September 13, 2005
- Written input following meeting
- Common Goals:
 - Transparency
 - Stable rates
 - Equity across generations
 - Protect funded status
- Concerns
 - Not supportive of methods that reduce rates in the short-term, but result in higher rates later on
- Board has been evaluating policies to achieve these goals



Introduction

Agenda

- To direct Mercer to analyze three specific alternatives under the financial modeling provisions of the contract.
 - The Board is not being asked to make policy decisions at this point in time.
 - The policy variations proposed for analysis are intended as parameters to enable the Board to make informed decisions.
- With direction from the Board, we will:
 - Model the policy variations
 - Analyze the outcomes
 - Present results at the December Board meeting
- The analysis will provide the Board and stakeholders with an understanding of the long-term implications of decisions made now.



Introduction

Overview of Financial Modeling Services

- Annual stochastic projections for system as a whole following the actuarial valuation, beginning with the December 31, 2003 valuation
- Baseline projection representing all current methods, assumptions and policies
- Alternative policies requested by the Board
- Presentation of results at Board meeting



Policies for Analysis Initial Alternatives Considered

- Projected Unit Credit versus Entry Age Normal cost method
 - Transparency -- Normal cost and funded status
- Asset smoothing versus contribution rate smoothing
 - Stable rates – Managing volatility
- Reserve policy for contingency and capital preservation reserves
 - Stable rates – Managing surprises

The other objectives and concerns enter into the evaluation of these alternatives, but are not the primary motivation behind the proposed alternatives.



Policies for Analysis Comments Received

- Specific comments from employers*
 - Confine modeling to current methods and assumptions rather than looking at PUC and alternative smoothing methods.
 - Break out projections to show impacts on various groups of employers separately and on P&F versus general service members
 - Vary assumptions/experience for mortality, retirement rates, and assumed rate of return
 - Reserving policy

172/337

* League of Oregon Cities, Association of Oregon Counties, Special Districts Association of Oregon, Oregon School Boards Association, and Oregon Community Colleges Association



Policies for Analysis Comments Received

- Priorities for modeling from City of Portland
 - Reserving policy
 - Asset smoothing versus collar smoothing
 - Asset smoothing versus contribution rate averaging



Policies for Analysis Considerations

- The number of policy changes should be limited to manage information intake and effective decision making.
- The short-term impact on rates of a change to the Projected Unit Credit method should be managed through the amortization of the change in UAL. The modeling will illustrate these dynamics.
- The affect of these policy variations will be similar across any significant grouping of employers. Individual non-pooled employers may exhibit different effects depending on their demographics.
- Financial modeling doesn't effectively illustrate the impact of variations in demographic experience.



Policies for Analysis Future Considerations

- Policy variations that are affected by these primary variations should be considered for future analysis.
 - Assumed rate of return
 - Side funds – (Dynamics are specific to individual employer)
 - Interaction with pension obligation bond structure
 - Size of side fund compared to employer payroll



Recommendations

Policy Alternatives

<ul style="list-style-type: none">■ Baseline Projection<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #1<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Minimize Reserves
<ul style="list-style-type: none">■ Alternative Policy #2<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #3<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– Collar contribution rates– Maximize reserves



Recommendations

Policy Comparisons

<ul style="list-style-type: none">■ Baseline Projection<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #1<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Minimize Reserves
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- Illustrates impact of maximizing reserves versus minimizing reserves
- While neither of these reserve policies is expected to be the Board's actual policy, this information will be valuable in putting parameters around the effect of Board reserving decisions.



Recommendations

Policy Comparisons

<ul style="list-style-type: none">■ Baseline Projection<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #2<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– 4-Year Asset Smoothing– Maximize Reserves
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- Illustrates impact of projected unit credit versus entry age normal
- Specific amortization method will be designed for a smooth cost transition as Tier One members retire
- Please note that our primary reason for recommending a change to projected unit credit is transparency. The modeling will illustrate if there are any positive or negative financial effects associated with this change



Recommendations

Policy Comparisons

<ul style="list-style-type: none">■ Alternative Policy #2<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #3<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– Collar contribution rates– Maximize reserves
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- Illustrates impact of asset smoothing versus collaring contribution rates on stabilizing employer rates
- Evaluation of concerns of effect on funded status
- In addition, the modeling may also help us to define better parameters for the collar method to mitigate any negative effects



Appendix Reserve Policy Definitions

- Maximizing Reserves
 - Contingency and Capital Preservation Reserve – 7.5% of earnings in excess of 8.0%. These reserves are used to the extent necessary to maintain an 80% funded ratio
 - Rate Guarantee Reserve – All Tier One member regular account earnings in excess of 8.0%. This reserve is used to the extent necessary to credit 8.0% earnings to Tier One member accounts
- Minimizing Reserves
 - Contingency Reserve – 0.75% of earnings in excess of 8.0%. This reserve is used to the extent necessary to maintain an 80% funded ratio.
 - Capital Preservation Reserve – not used
 - Rate Guarantee Reserve – All Tier One member regular account earnings in excess of 8.0%. This reserve is used to the extent necessary to credit 8.0% earnings to Tier One member accounts.



Appendix UAL Amortization for Change to PUC Method

- With a change to the PUC method, the normal cost will be lower and the UAL will be higher. Depending on how the change in the UAL is amortized, the concern raised by employers may be valid.
- As a part of the modeling we will look at the expected pattern of Tier One retirements and amortize the change in UAL in a way intended to keep the combination of normal cost and UAL amortization either level or declining over time.
- The amortization method will likely be as a level dollar amount over a period of 5 to 10 years.

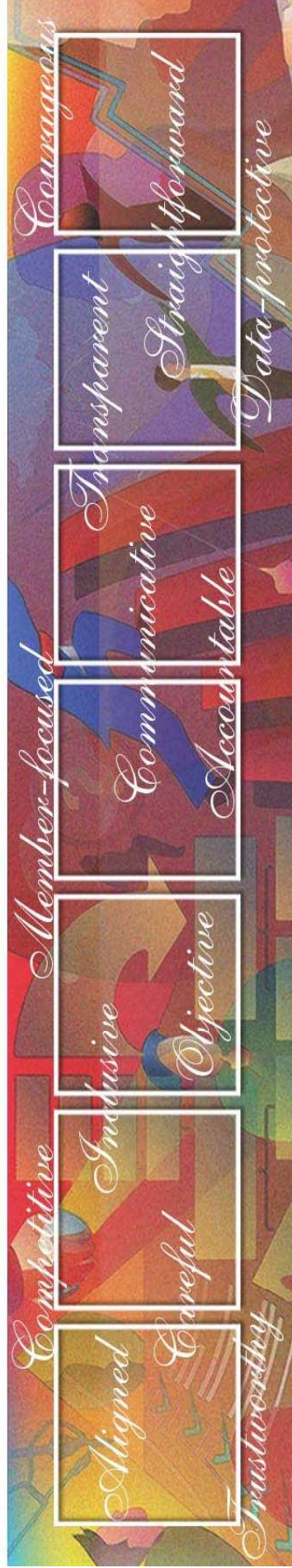


Appendix Definition of Collar Method

- Contribution rates will be confined to a collar based on the current contribution rate.
- The next contribution rate will not increase or decrease from the prior contribution rate by more than the greater of 3 percentage points or 20 percent of the current rate.
 - If current rate is 15%, the new rate cannot be more than 18% nor less than 12%.
 - If current rate is 20%, the new rate cannot be more than 24% nor less than 16%.
- If funded percentage drops below 80% or increases above 120%, the size of the collar doubles.
 - If current rate is 15% and funded status is below 80%, the new rate can be as high as 21%.
 - If current rate is 20% and funded percentage is below 80%, the new rate can be as high as 28%.
- All calculations will use the market value of assets

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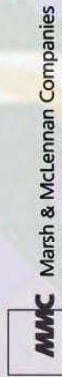
Human Resource Consulting



December 16, 2005

Oregon PERS Financial Modeling Results

Bill Hallmark and Greg Smith
Portland, Oregon





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- Background
- Baseline Projection Results
- Analysis of Reserving Policy
- Actuarial Cost Method
- Contribution Rate Smoothing
- Recommendations
- Appendix



Background Goals and Objectives

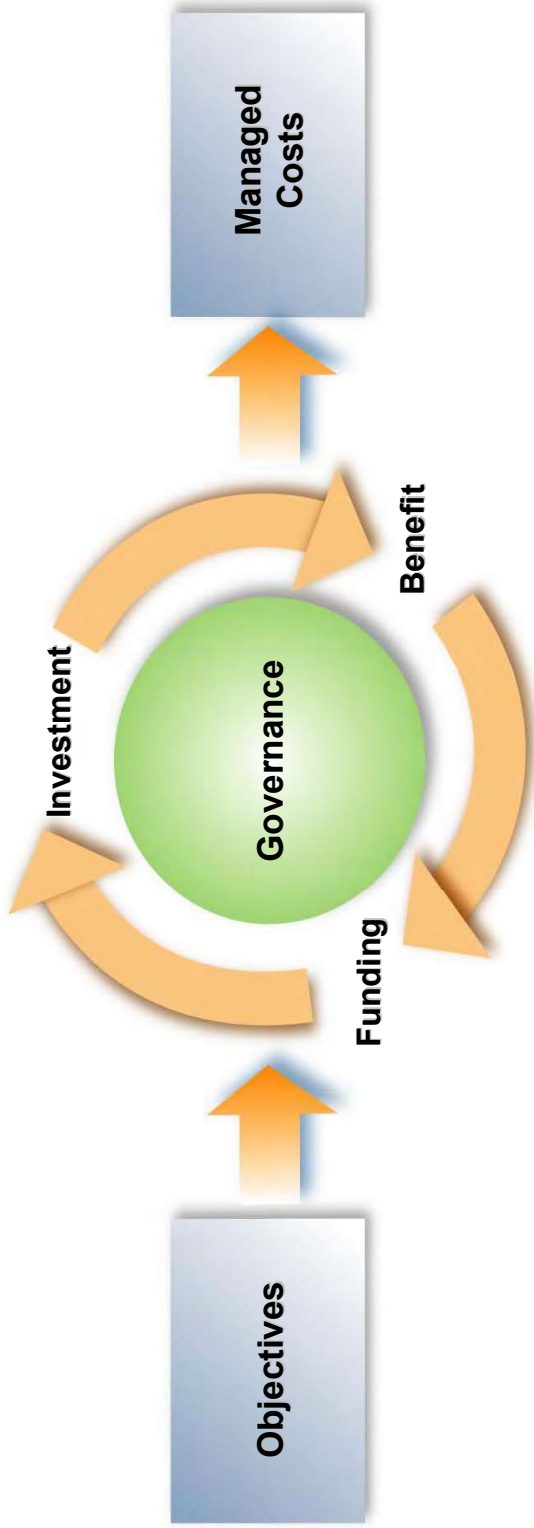
- **Objectives of Financial Modeling Project**
 - To better understand potential outcomes under current policies (baseline projection)
 - To analyze the impact of potential policy decisions today in managing the costs of the System over the next 10 years
 - Reserving policy
 - Actuarial cost method
 - Contribution rate smoothing method

- **Goals**
 - Transparency
 - Stable rates
 - Equity across generations
 - Protect funded status



Background

Retirement Plan Financial Management Framework





Background

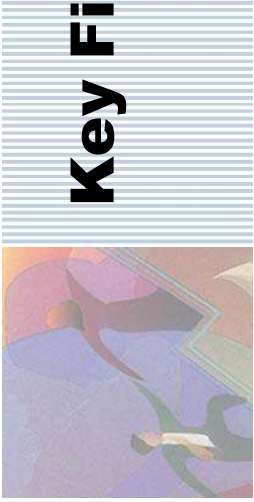
Policy Alternatives Analyzed

<ul style="list-style-type: none">■ Baseline Projection<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #1<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Minimize Reserves
<ul style="list-style-type: none">■ Alternative Policy #2<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #3<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– Collar contribution rates– Maximize reserves



Background

- The analysis shown in this presentation is based on the December 31, 2003 actuarial valuation of PERS. It does not include any adjustments for:
 - Side Funds
 - Bond Payments
 - Immediate use of contingency and capital preservation reserves
 - IAP contributions
 - OPSRP contributions
- All projections are illustrative and only to be used to compare baseline and alternative policy trends.



Key Findings

- **Baseline Projection**
 - Contribution rates and funded status are fairly volatile due to the volatility of investment returns.
- **Reserving Policy**
 - Reserves can play an important role managing surprises, but the interactions are complex and more analysis is needed to develop an appropriate reserve policy.
- **Actuarial Cost Method**
 - Projected Unit Credit provides important transparency benefits. The overall level of costs can be managed through the amortization method.
- **Contribution Rate Smoothing**
 - Collaring contribution rates provides important transparency benefits while also controlling the volatility of contribution rates.

Baseline Projections





Baseline Projections Highlights of Results

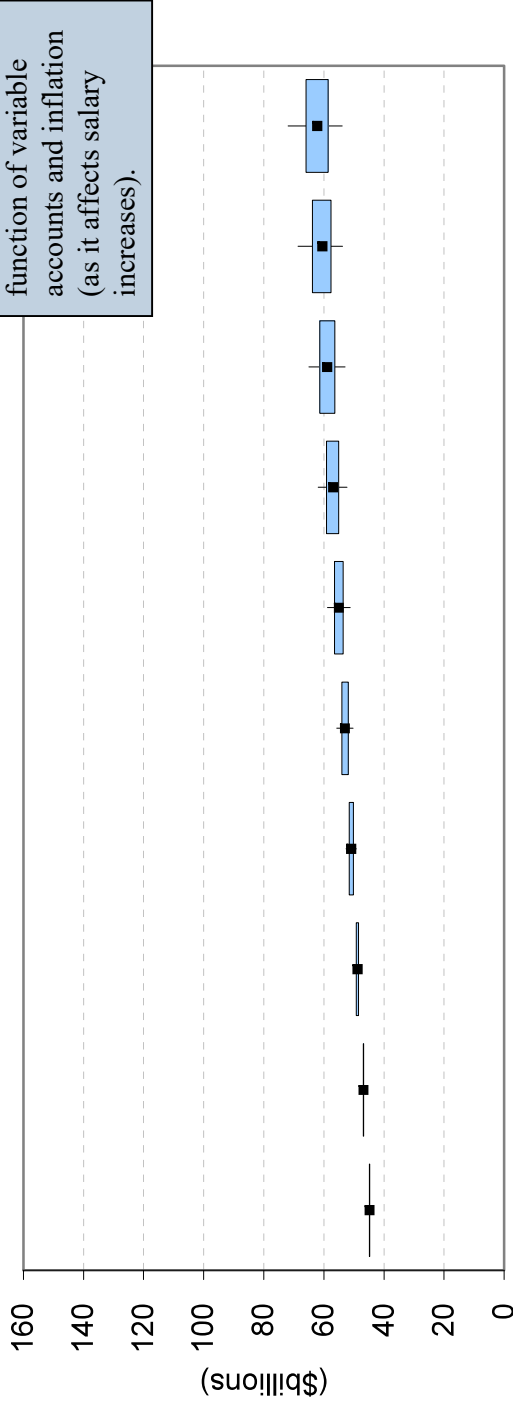
- **Liabilities are stable**
 - The growth in liabilities is very stable since the effect of investment returns on liabilities has largely been eliminated by the 2003 reforms.
- **Investment returns vary significantly**
 - Median investment return is expected to be near 8.0%, but the range of potential returns varies significantly around the median.
- **Contribution rates vary significantly**
 - Contribution rates are expected to be near 20% as of July 1, 2007, but in very bad scenarios, contribution rates could exceed 30% of pay. In very good scenarios, contribution rates could fall to 0% of pay.
 - Year-to-year changes in contribution rates are expected to remain within +/- 3%, but can vary as high as +/-10%.
- **Funded status varies significantly**
 - Funded status is expected to improve slightly, but could improve or deteriorate significantly depending on investment performance.

Baseline Projections

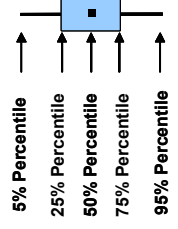
Projected Growth in Accrued Liability

With no new contributions to member accounts and limiting Tier I members to 8% interest credits, the liability doesn't depend on investment returns.

Actuarial Accrued Liability at Valuation Date 12/31



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
5th V. Bad	44.77	47.03	49.74	52.59	55.66	58.73	61.84	65.01	68.59	71.87
25th Bad	44.77	46.86	49.17	51.57	54.00	56.50	59.05	61.40	63.79	65.92
50th Median	44.77	46.76	48.80	50.87	52.96	54.98	56.92	58.86	60.51	62.17
75th Good	44.77	46.65	48.45	50.17	51.83	53.46	54.92	56.29	57.57	58.53
95th V. Good	44.77	46.48	47.94	49.20	50.27	51.31	52.27	53.01	53.81	53.85

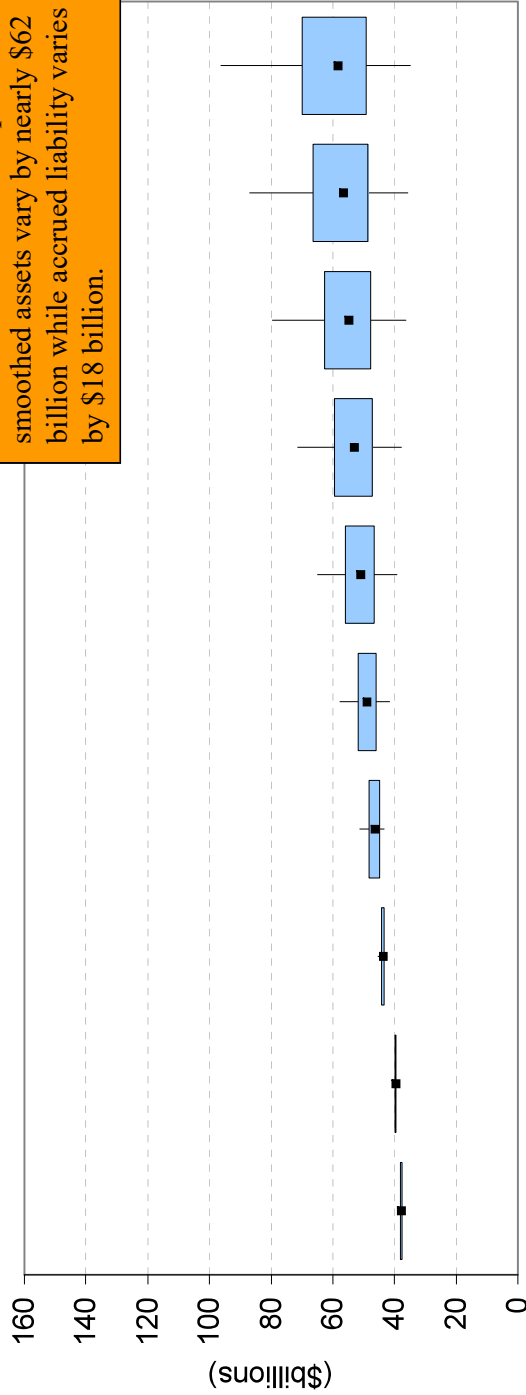




Baseline Projections

Even with short-term asset smoothing, there is significant variability in long-term asset levels.

AVA at valuation date 12/31

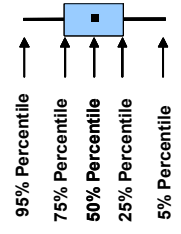


In 2013, smoothed assets vary by \$20 billion between the 25th and 75th percentiles. Accrued liability only varies by \$7 billion.

Between the 5th and 95th percentiles, smoothed assets vary by nearly \$62 billion while accrued liability varies by \$18 billion.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
95th V. Good	37.6	39.8	45.5	51.3	57.6	64.9	71.5	79.4	86.9	96.3
75th Good	37.6	39.7	44.2	48.2	51.9	56.0	59.5	62.7	66.3	69.8
50th Median	37.6	39.6	43.6	46.3	48.9	50.9	52.9	54.7	56.3	58.1
25th Bad	37.6	39.5	43.2	44.8	45.9	46.6	47.1	47.6	48.5	49.1
5th V. Bad	37.6	39.4	42.5	43.2	41.5	39.1	37.8	36.4	35.6	34.8

AVA = Actuarial Value of Assets

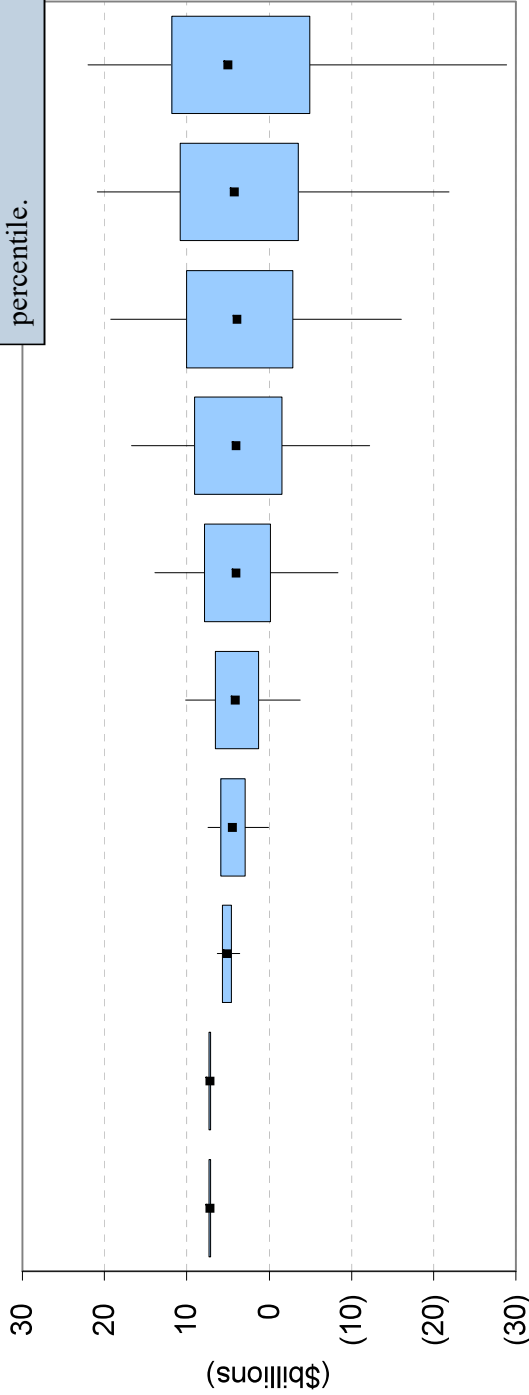




Baseline Projections

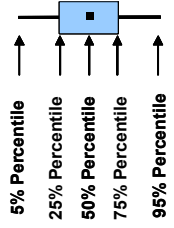
On a market value basis, the funded status of the system starts around 90%, but by 2013 varies from 58% to 158% between the 5th and 95th percentile.

Unfunded Actuarial Liability at Valuation Date 12/31



The volatility in assets results in volatility in the unfunded actuarial liability (UAL). The UAL is amortized as a level percentage of payroll and becomes part of the contribution rate.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
5th V. Bad	7.18	7.44	6.36	7.44	10.13	13.86	16.67	19.24	20.87	22.01
25th Bad	7.18	7.26	5.65	5.83	6.50	7.87	9.00	9.99	10.86	11.79
50th Median	7.18	7.15	5.12	4.47	4.16	4.03	4.02	3.92	4.18	4.99
75th Good	7.18	7.03	4.53	2.91	1.21	(0.20)	(1.57)	(2.90)	(3.58)	(5.03)
95th V. Good	7.18	6.86	3.58	0.10	(3.83)	(8.40)	(12.25)	(16.09)	(21.93)	(28.87)

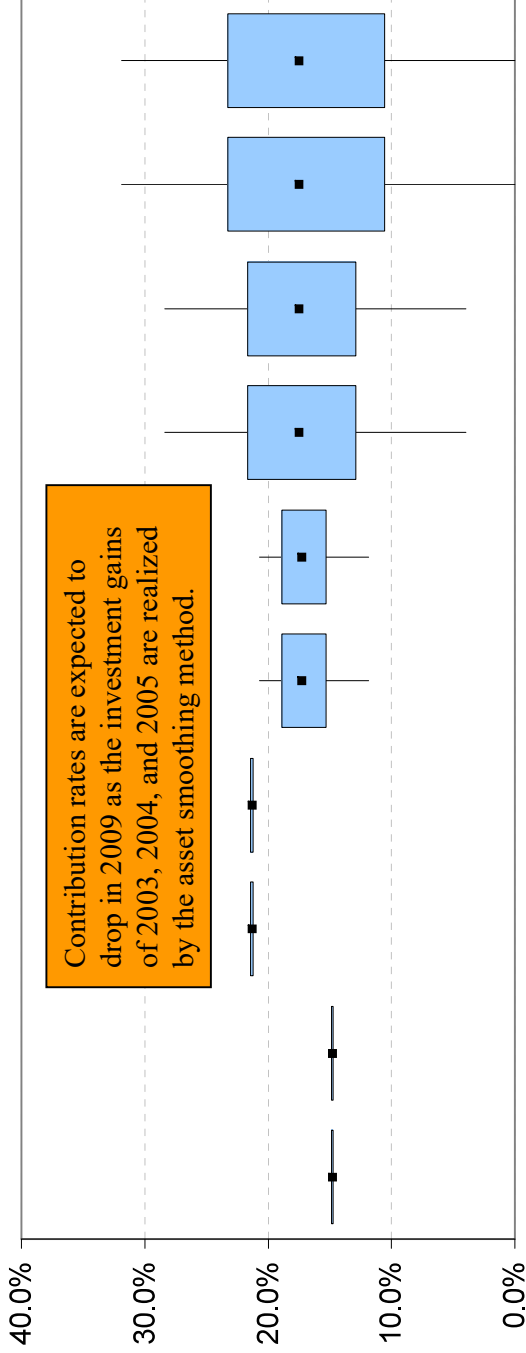




Baseline Projections

Volatility in investment returns results in a wide range of potential contribution rates.

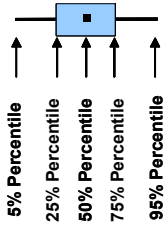
Contribution Rate effective from 7/1



Given recent investment experience and the phasing in of prior investment losses, contribution rates are expected to increase significantly to 21% of payroll effective 7/1/2007.

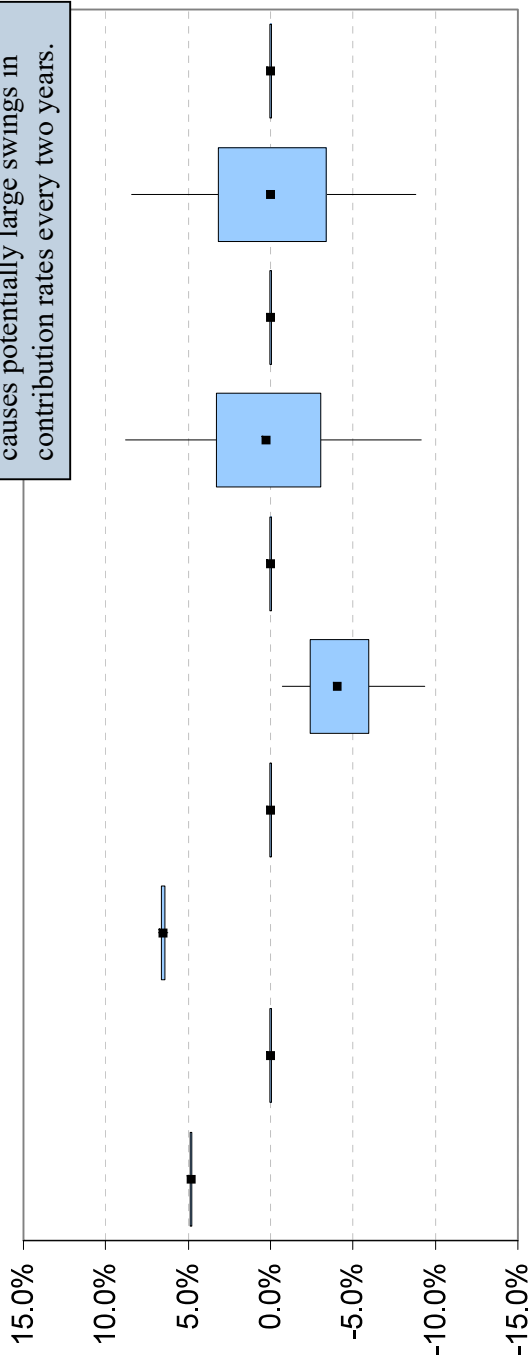
Contribution rates are expected to drop in 2009 as the investment gains of 2003, 2004, and 2005 are realized by the asset smoothing method.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
5th V. Bad	14.8%	14.8%	21.6%	21.6%	20.7%	20.7%	28.4%	28.4%	31.9%	31.9%
25th Bad	14.8%	14.8%	21.4%	21.4%	18.9%	18.9%	21.7%	21.7%	23.3%	23.3%
50th Median	14.8%	14.8%	21.3%	21.3%	17.2%	17.2%	17.5%	17.5%	17.5%	17.5%
75th Good	14.8%	14.8%	21.2%	21.2%	15.3%	15.3%	12.9%	12.9%	10.5%	10.5%
95th V. Good	14.8%	14.8%	21.1%	21.1%	11.9%	11.9%	4.0%	4.0%	0.0%	0.0%



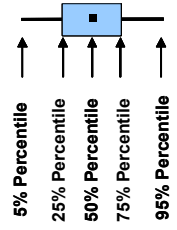
Baseline Projections

Change in Contribution Rate at 7/1



As a result of the asset smoothing, contribution rates effective 7/1/2009 are expected to go down, perhaps significantly.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
5th V. Bad	4.8%	0.0%	6.8%	0.0%	-0.7%	0.0%	8.8%	0.0%	8.5%	0.0%
25th Bad	4.8%	0.0%	6.6%	0.0%	-2.4%	0.0%	3.3%	0.0%	3.2%	0.0%
50th Median	4.8%	0.0%	6.5%	0.0%	-4.1%	0.0%	0.3%	0.0%	0.0%	0.0%
75th Good	4.8%	0.0%	6.4%	0.0%	-6.0%	0.0%	-3.1%	0.0%	-3.4%	0.0%
95th V. Good	4.8%	0.0%	6.3%	0.0%	-9.4%	0.0%	-9.1%	0.0%	-8.8%	0.0%





Baseline Projections Observations

- Investment returns and the volatility of those investment returns will drive contribution levels, volatility of contribution levels, and the funded status of the System.
- The potential outcomes vary significantly depending on the actual investment return achieved.
- Board policies and actuarial smoothing techniques can mitigate some of the volatility, but with assets equal to approximately 7 times payroll, volatile investment returns will have a significant impact on contribution rates in spite of efforts to smooth the impact.

Analysis of Reserving Policy

Minimum vs. Maximum Reserves





Analysis of Reserving Policy

Reserve Policy Definitions

<ul style="list-style-type: none">■ Baseline Projection<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #1<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Minimize Reserves
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Reserving Policy:

- Provides for manual smoothing of employer contribution rates to help manage large year-to-year changes in employer contribution rates and promote system stability.
- The alternatives considered illustrate the impact of maximizing reserves versus minimizing contingency and capital preservation reserves.



Analysis of Reserving Policy

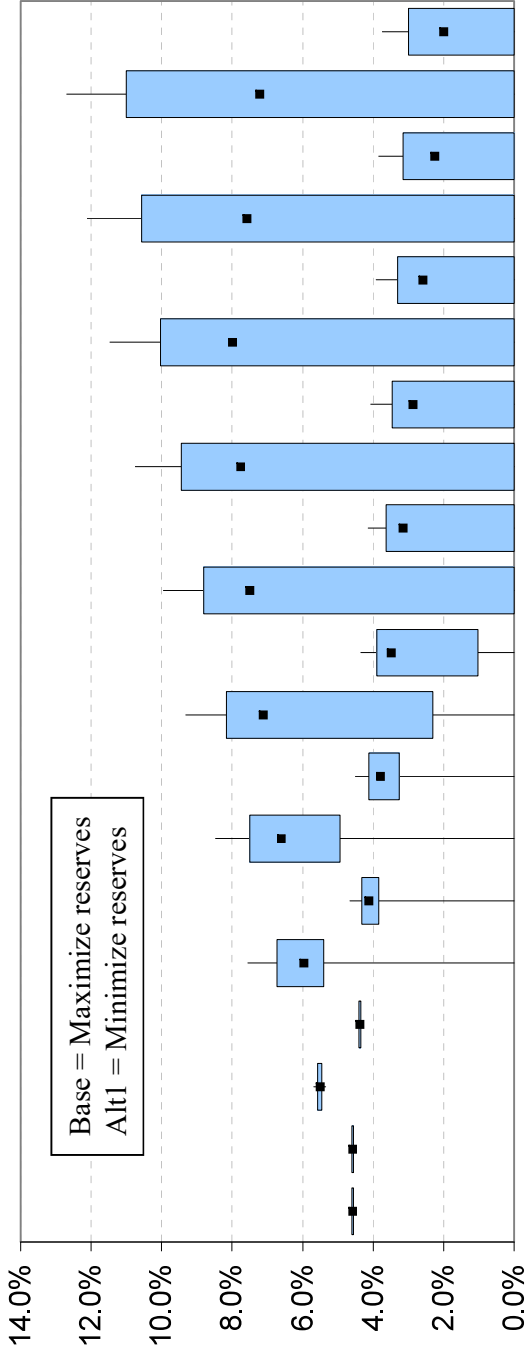
Highlights of Results

- **To be effective, reserves have to be built**
 - Using reserves to support an 80% funded ratio requires a reserve to be built up before the system drops below 80%. In these projections, scenarios that built significant reserves were unlikely to then fall below the 80% threshold.
- **Reserves act as a manual smoothing method**
 - The Contingency and Capital Preservation Reserves can act as a manual smoothing method to support system and rate stability.
- **Interactions are complex**
 - Exposing the reserves to the same investment risk as the rest of the fund creates some complex dynamics.
 - Determining appropriate time to use reserves is a critical decision.
- **More analysis needed**

Analysis of Reserving Policy Maximum vs. Minimum Reserves

(Contin. Reserve plus Capital Pres. Reserve) as a % of (MVA + CR + CPR) (Base vs. Alt#1)

In median and better scenarios, a sizeable reserve develops under the maximum reserve policy. In poor scenarios, however, the reserve is used up quickly under either reserving policy.



Base	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
95th V. Good	4.6%	5.7%	7.6%	8.5%	9.3%	10.0%	10.8%	11.5%	12.1%	12.7%
75th Good	4.6%	5.6%	6.7%	7.5%	8.2%	8.8%	9.5%	10.0%	10.6%	11.0%
50th Median	4.6%	5.5%	6.0%	6.6%	7.1%	7.5%	7.8%	8.0%	7.6%	7.2%
25th Bad	4.6%	5.4%	5.4%	4.9%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%
5th V. Bad	4.6%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

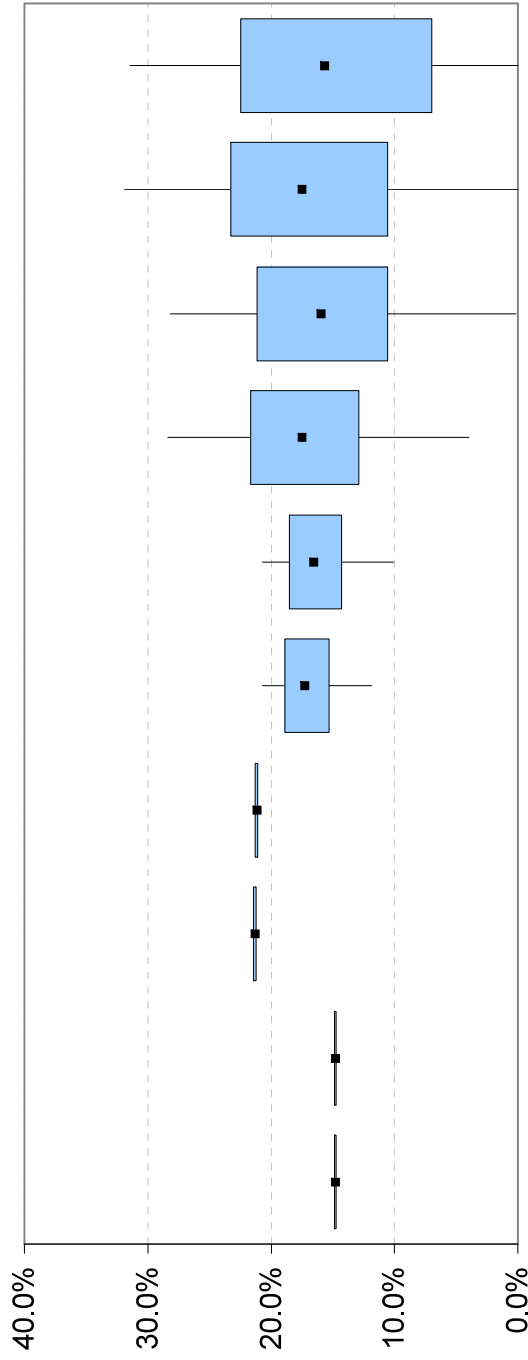
Alt #1	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
95th V. Good	4.6%	4.4%	4.7%	4.5%	4.4%	4.2%	4.1%	3.9%	3.8%	3.7%
75th Good	4.6%	4.4%	4.3%	4.1%	3.9%	3.6%	3.5%	3.3%	3.2%	3.0%
50th Median	4.6%	4.4%	4.1%	3.8%	3.5%	3.2%	2.9%	2.6%	2.3%	2.0%
25th Bad	4.6%	4.4%	3.8%	3.2%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5th V. Bad	4.6%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Mercer Human Resource Consulting

Analysis of Reserving Policy Maximum vs. Minimum Reserves

Maximizing reserves results in a slight increase in contribution rates in most scenarios.

Contribution Rate effective from 7/1 (Base vs. Alt#1)



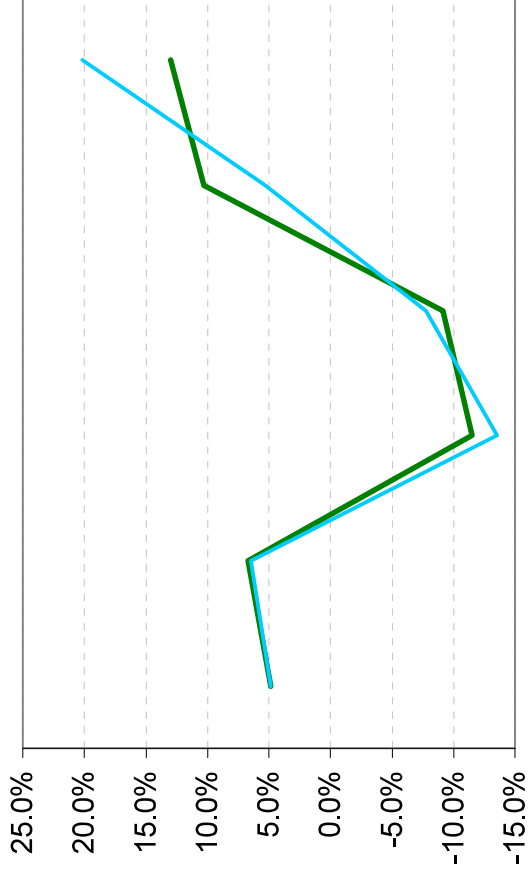
	Base 2005	Alt1 2005	Base 2007	Alt1 2007	Base 2009	Alt1 2009	Base 2011	Alt1 2011	Base 2013	Alt1 2013
5th V. Bad	14.8%	14.8%	21.6%	21.5%	20.7%	20.7%	28.4%	28.2%	31.9%	31.4%
25th Bad	14.8%	14.8%	21.4%	21.3%	18.9%	18.5%	21.7%	21.1%	23.3%	22.4%
50th Median	14.8%	14.8%	21.3%	21.2%	17.2%	16.6%	17.5%	15.9%	17.5%	15.7%
75th Good	14.8%	14.8%	21.2%	21.1%	15.3%	14.3%	12.9%	10.5%	10.5%	7.0%
95th V. Good	14.8%	14.8%	21.1%	20.9%	11.9%	10.1%	4.0%	0.1%	0.0%	0.0%

Base = Maximize reserves
Alt1 = Minimize reserves

Analysis of Reserving Policy Maximum vs. Minimum Reserves

This graph shows one trial from our stochastic projections. In this trial, there are good investment returns for 5 years followed by poor investment returns. In the last year of the projection, the reserves are finally deployed, reducing the change in contribution rate from 20% to 13%.

Contribution Rate change at 7/1 (Base vs. Alt#1)



	2005	2007	2009	2011	2013	2015
Base	4.8%	6.7%	-11.5%	-9.1%	10.3%	13.0%
Alt#1	4.8%	6.5%	-13.5%	-7.7%	5.3%	20.2%



Analysis of Reserving Policy Observations

- Reserves can play an important role in managing large changes in contribution rates.
- With the current interest crediting regimen, the higher the reserves, the more valuation assets are leveraged, particularly for negative investment experience.
- The value of the reserves may not be seen until there is a significant reserve established. It may take more than 10 years to establish a significant reserve.
- It appears that reserving decisions may be an important part of managing the long-term costs of the System. Additional analysis is warranted both in terms of the amount to put into reserves and when to use reserves.

Actuarial Cost Method

Entry Age Normal vs. Projected Unit Credit





Actuarial Cost Method

Entry Age Normal vs. Projected Unit Credit

<ul style="list-style-type: none">■ Baseline Projection<ul style="list-style-type: none">– Entry Age Normal– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #2<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– 4-Year Asset Smoothing– Maximize Reserves
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Projected Unit Credit Cost Method:

- The cost of benefits earned is funded each year and the liability represents the value of benefits earned to date. Projected unit credit provides stakeholders and users of the actuarial valuation report a real measure of the cost and liability of the system that is easily understood.



Actuarial Cost Method

Highlights of Results

- **Improved transparency**
 - The projected unit credit cost method more accurately reflects the reality of how benefits are earned.
- **Contribution rates appear to remain as stable as under entry age normal**
 - There does not appear to be any change to the stability of contribution rates in the stochastic projections.
 - However, there are concerns beyond 10 years that the projected unit credit cost method would continue to experience increases in the normal cost rate.
- **Contribution rates are lower**
 - Projected unit credit results in lower contribution rates

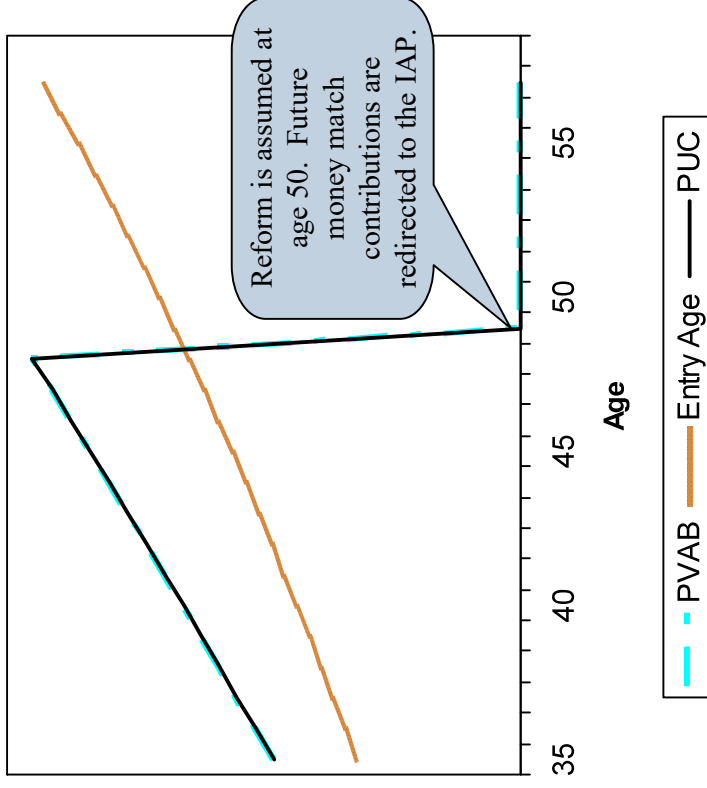


Actuarial Cost Method

Money Match Benefit Normal Cost

- After reform, member benefits under the Money Match formula will not increase for additional service.
- Entry age normal continues to assign a normal cost for these benefits even though they do not increase.
- Projected unit credit, on the other hand, follows the pattern of benefit accruals exactly.
- Therefore, the normal cost portion of the contribution rate directly reflects the cost of benefits earned.

Comparison of Normal Cost Money Match Formula

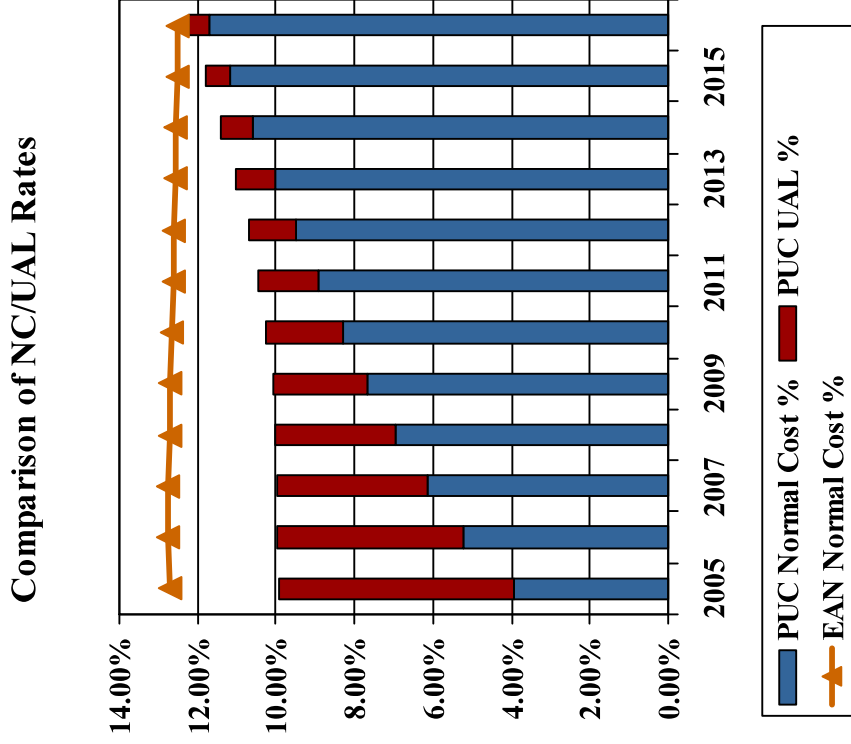




Actuarial Cost Method

Normal Cost and UAL Change Rates

- The PUC Normal Cost Rate starts around 4%, but increases over the next 10 years to almost 12%.
- Using the 5-year rolling level dollar amortization for the change in UAL, the initial payment is about 6% decreasing to 0.5% over 10 years.
- The UAL payment is made over total combined payroll while the normal cost payment is made on the declining Tier 1/2 payroll.
- At some point in the future, the Board will want to fix the rolling amortization, to pay it off, but the rolling method helps match the expected change in normal cost as Money Match members retire.

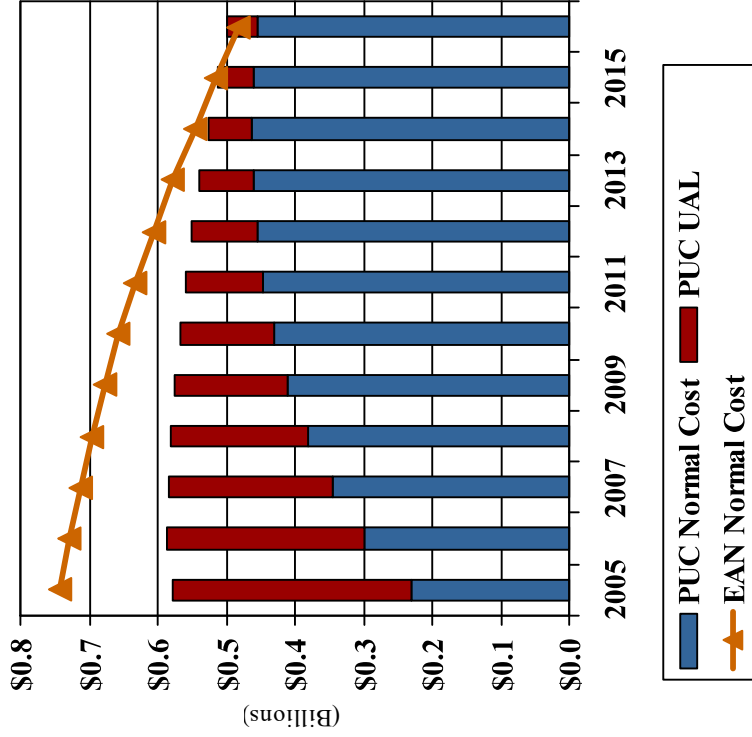




Actuarial Cost Method

Normal Cost and UAL Change Payments

Comparison of Payments



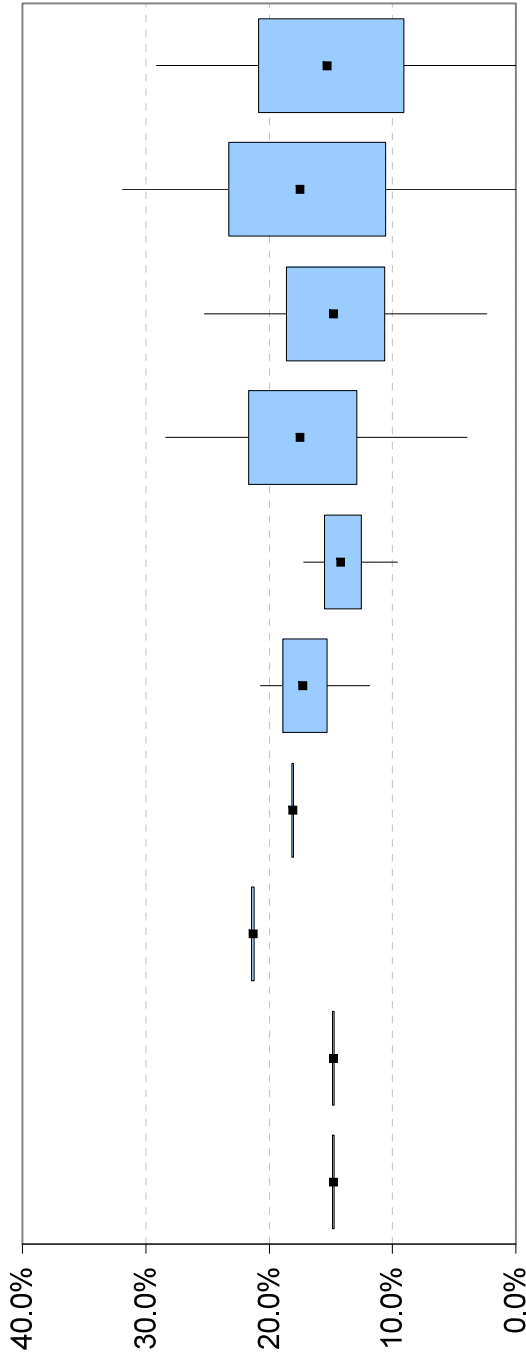
- Under Entry Age Normal, the normal cost payments decline as Tier 1/2 members retire more than they increase as pay increases.
- Under PUC, the normal cost payments increase as the Full Formula population ages more than they decrease as Tier 1/2 members retire. Near the end of the projection period, this trend reverses.
- The rolling 5-year level dollar amortization method for the change in UAL levels out the contribution amounts so they are non-increasing.

Actuarial Cost Method

Entry Age Normal vs. Projected Unit Credit

PUC contribution rates are approximately 200 basis points less than the EAN contribution rates.

Contribution Rate effective from 7/1 (Base vs. Alt#2)



	Base 2005	Alt2 2005	Base 2007	Alt2 2007	Base 2009	Alt2 2009	Base 2011	Alt2 2011	Base 2013	Alt2 2013
5th V. Bad	14.8%	14.8%	21.6%	18.3%	20.7%	17.2%	28.4%	25.2%	31.9%	29.1%
25th Bad	14.8%	14.8%	21.4%	18.2%	18.9%	15.5%	21.7%	18.6%	23.3%	20.8%
50th Median	14.8%	14.8%	21.3%	18.1%	17.2%	14.2%	17.5%	14.8%	17.5%	15.3%
75th Good	14.8%	14.8%	21.2%	18.0%	15.3%	12.5%	12.9%	10.6%	10.5%	9.1%
95th V. Good	14.8%	14.8%	21.1%	17.9%	11.9%	9.6%	4.0%	2.3%	0.0%	0.0%

Base = Entry Age Normal
Alt2 = Projected Unit Credit



Actuarial Cost Method Observations

- The primary advantage of the PUC method is the increased transparency provided by a more realistic allocation of costs between the past (accrued liability) and the future (normal cost).
- There are two other effects of switching to PUC:
 - The average normal cost rate will tend to rise as Money Match members retire and they represent a smaller proportion of the population.
 - The average normal cost rate will tend to rise as the closed Tier 1/2 population ages.
- Both of these effects are somewhat mitigated by the declining payroll to which they apply.
- The PUC method also produces lower contribution rates. The amount of reduction is less than it appears as the UAL is amortized over combined payroll while the normal cost rate is only charged to the closed Tier 1/2 payroll.



Contributing Rate Smoothing

Asset Smoothing vs.
Contributing Rate Collaring



Contribution Rate Smoothing

Asset Smoothing vs. Contribution Rate Collaring

<ul style="list-style-type: none">■ Alternative Policy #2<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– 4-Year Asset Smoothing– Maximize Reserves	<ul style="list-style-type: none">■ Alternative Policy #3<ul style="list-style-type: none">– Projected Unit Credit– Amortize change in UAL separately– Collar contribution rates– Maximize reserves
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Contribution rate collaring:

- Smooths contribution rates instead of assets. The true market value of assets is reflected in the measurement of the funded status of the system and the determination of contribution rates. Stakeholders and users of the actuarial valuation report will better understand the financial position of the system in order to make timely management, benefit, investment and funding decisions.
- The collar provides limits to changes in contribution rates that are useful for budgeting purposes.



Contribution Rate Smoothing

Highlights of Results

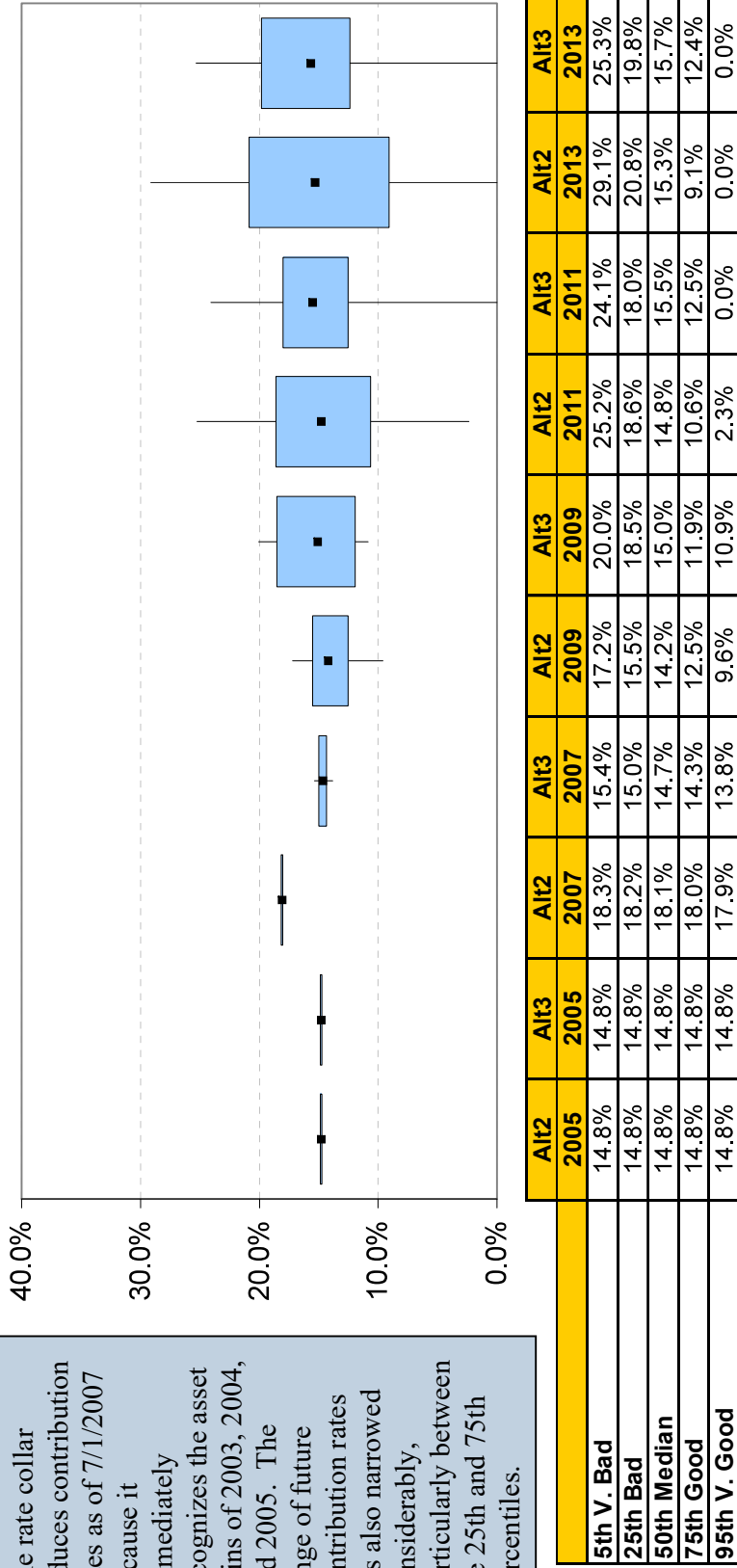
- **Contribution rates are more stable**
 - Extreme changes in contribution rates are significantly reduced by the collar approach.
 - Range of contribution rate levels is narrowed by the collar approach.
- **Funded status appears similar**
 - The collar approach still results in a wide range of funded status, but the range of outcomes appears virtually identical to the asset smoothing approach.
- **Transparency slightly improved**
 - Calculations on a market value basis more accurately illustrate the current status of the system.
- **Lower contribution rates in 2007**
 - The collar approach switches to market value of assets, allowing for the immediate recognition of the investment gains from 2003, 2004 and 2005.

Contribution Rate Smoothing

Asset Smoothing vs. Contribution Rate Collaring

The rate collar reduces contribution rates as of 7/1/2007 because it immediately recognizes the asset gains of 2003, 2004, and 2005. The range of future contribution rates has also narrowed considerably, particularly between the 25th and 75th percentiles.

Contribution Rate effective from 7/1 (Alt#2 vs. Alt#3)



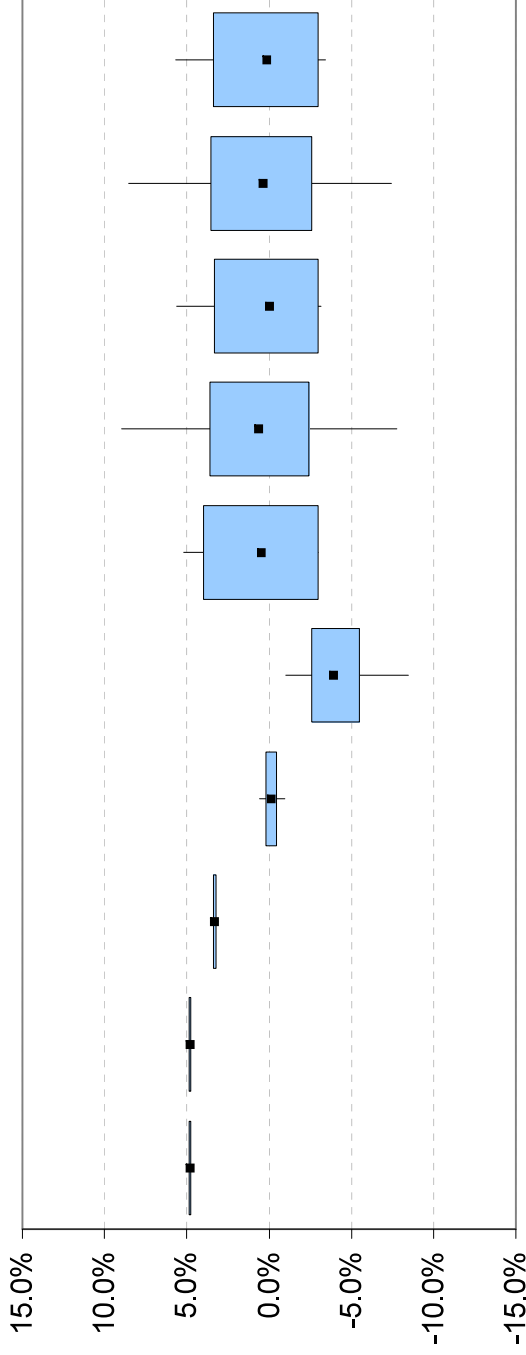
Alt2 = Asset Smoothing
Alt3 = Rate Collaring

Contribution Rate Smoothing

Asset Smoothing vs. Contribution Rate Collaring

The rate collar reduces the volatility of contribution rates by eliminating most changes outside of the standard collar. Inside the collar, however, rate changes may be more volatile as the rate is based on the market value of assets.

Change in contribution rate effective from 7/1 (Alt#2 vs. Alt#3)



	Alt2 2005	Alt3 2005	Alt2 2007	Alt3 2007	Alt2 2009	Alt3 2009	Alt2 2011	Alt3 2011	Alt2 2013	Alt3 2013
5th V. Bad	4.8%	4.8%	3.5%	0.6%	-1.0%	5.2%	9.0%	5.6%	8.5%	5.7%
25th Bad	4.8%	4.8%	3.4%	0.2%	-2.6%	4.0%	3.6%	3.3%	3.6%	3.4%
50th Median	4.8%	4.8%	3.3%	-0.1%	-3.9%	0.4%	0.6%	0.0%	0.4%	0.1%
75th Good	4.8%	4.8%	3.2%	-0.5%	-5.5%	-3.0%	-2.5%	-3.0%	-2.6%	-3.0%
95th V. Good	4.8%	4.8%	3.1%	-1.0%	-8.5%	-3.0%	-7.8%	-3.1%	-7.5%	-3.4%

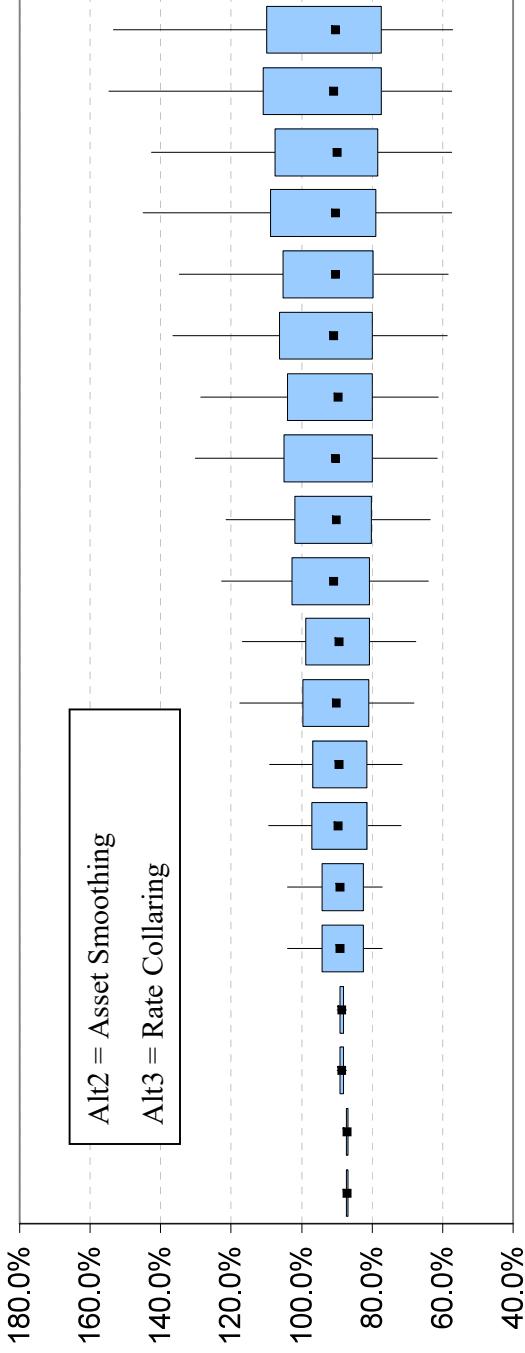
Alt2 = Asset Smoothing
Alt3 = Rate Collaring

Contribution Rate Smoothing

Asset Smoothing vs. Contribution Rate Collaring

Funded Status (using MVA) at valuation date 12/31 (Alt#2 vs. Alt#3)

The concern that the rate collar may increase the probability of severe under funding or over funding does not appear to be warranted.



Alt #2	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
95th V. Good	87.0%	90.0%	104.0%	109.4%	117.5%	122.6%	130.2%	136.5%	144.9%	154.6%
75th Good	87.0%	89.1%	94.3%	97.1%	99.7%	102.8%	104.9%	106.4%	108.8%	111.0%
50th Median	87.0%	88.5%	89.0%	89.7%	90.1%	90.8%	90.3%	91.0%	90.5%	91.0%
25th Bad	87.0%	88.0%	82.6%	81.5%	81.0%	80.6%	80.0%	80.0%	78.9%	77.3%
5th V. Bad	87.0%	87.3%	77.2%	71.7%	68.2%	64.1%	61.5%	58.7%	57.4%	57.4%

Alt #3	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
95th V. Good	87.0%	90.0%	104.0%	109.2%	116.8%	121.4%	128.5%	134.6%	142.7%	153.4%
75th Good	87.0%	89.1%	94.3%	96.9%	99.0%	101.8%	104.1%	105.2%	107.6%	109.9%
50th Median	87.0%	88.5%	89.0%	89.5%	89.5%	90.1%	89.8%	90.3%	89.9%	90.5%
25th Bad	87.0%	88.0%	82.6%	81.4%	80.6%	80.1%	80.0%	79.8%	78.5%	77.4%
5th V. Bad	87.0%	87.3%	77.2%	71.5%	67.6%	63.6%	61.4%	58.3%	57.4%	57.1%

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Contribution Rate Smoothing Observations

- The proposed collar method appears to provide very desirable results
 - Reduced contribution rate volatility
 - Reduced contribution rates
 - No impairment of funded status
- Investment return volatility still produces a wide range of potential outcomes.

Recommendations





Recommendations Reserve Policy

- In the 10-year period of the projection, additional reserves appeared to help in a minor way with the most extreme situations.
- More study is needed to develop an appropriate reserving policy
 - How large does the reserve need to be to be useful or are reserves not useful for managing surprises?
 - Should reserves be released when contribution rates increase above a threshold instead of or in addition to when funded status dips below a threshold?
 - Should reserves be invested differently and retain their own earnings?



Recommendations Actuarial Cost Method

- Projected Unit Credit provides greater transparency of benefit accrual patterns, but these accrual patterns will likely increase for the closed group of actives who retire under full formula.
- The projection should be extended beyond 10 years on a deterministic basis to assess the increasing rate for a declining population both as a percentage of the declining payroll and as a dollar amount.



Recommendations Contribution Rate Smoothing

- The collar method appears to stabilize contribution rates (at least within the range of the collar) without any negative impact on funded status.
- Calculations using market value of assets improve the transparency of the funded status of the system and improve the intuitiveness of results. That is, good investment returns will lead to a reduction in the calculated rate (before the collar is applied).
- PERS may want to pursue a change to this collar method on time for the 12/31/2005 actuarial valuation.
- If a collaring method is adopted, additional GASB disclosures will be required if the contribution rate is limited by the collar.

Appendix





Appendix **Reserve Policy Definitions**

- **Maximizing Reserves**
 - Contingency and Capital Preservation Reserve – 7.5% of earnings in excess of 8.0%. These reserves are used to the extent necessary to maintain an 80% funded ratio, and statutory restrictions on when the Capital Preservation Reserve can be used have been ignored for this analysis.
 - Rate Guarantee Reserve – All Tier One member regular account earnings in excess of 8.0%. This reserve is used to the extent necessary to credit 8.0% earnings to Tier One member accounts.
- **Minimizing Reserves**
 - Contingency Reserve – 0.75% of earnings in excess of 8.0%. This reserve is used to the extent necessary to maintain an 80% funded ratio.
 - Capital Preservation Reserve – not used
 - Rate Guarantee Reserve – All Tier One member regular account earnings in excess of 8.0%. This reserve is used to the extent necessary to credit 8.0% earnings to Tier One member accounts.



Appendix Definition of Collar Method

- Contribution rates will be confined to a collar based on the current contribution rate.
- The next contribution rate will not increase or decrease from the prior contribution rate by more than the greater of 3 percentage points or 20 percent of the current rate.
 - If current rate is 15%, the new rate cannot be more than 18% nor less than 12%.
 - If current rate is 20%, the new rate cannot be more than 24% nor less than 16%.
- If funded percentage drops below 80% or increases above 120%, the size of the collar doubles.
 - If current rate is 15% and funded status is below 80%, the new rate can be as high as 21%.
 - If current rate is 20% and funded percentage is below 80%, the new rate can be as high as 28%.
- All calculations will use the market value of assets

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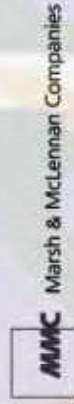


March 31, 2006

Oregon PERS

December 31, 2004 Actuarial Valuation Results
Projected Unit Credit Method with Rate Collaring

Bill Hallmark and Annette Strand





Contents

- Background
- Key Findings
- Normal Cost
- Actuarial Accrued Liability
- Unfunded Accrued Liability
- Funded Status
- Appendix



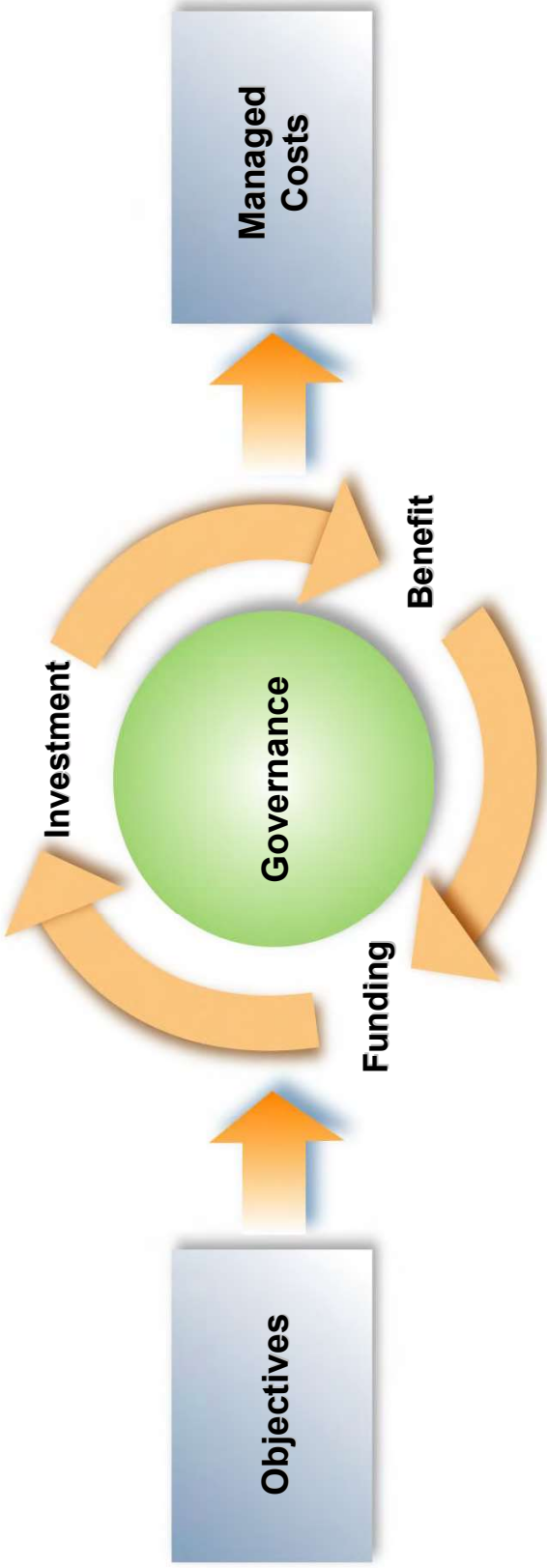
Background Development of Proposed Method

- May 20, 2005 Board Meeting
 - Initially proposed alternative methods for consideration to manage contribution rates
- September 13, 2005 LAC Meeting
 - Feedback from employer and member representatives on proposed alternative methods
- December 16, 2005 Board Meeting
 - Financial modeling results of alternative methods
- March 31, 2006 Board Meeting
 - Compare December 31, 2004 valuation results between current and proposed methods



Background Retirement Plan Financial Management Framework

$$\text{Total Contributions} = \text{Benefits Paid} - \text{Investment Earnings}$$



Actuarial methods primarily affect the timing of contributions



Background Objectives for Actuarial Methods

- Transparent
- Predictable and stable rates
- Protect funded status
- Equitable across generations
- Actuarially sound
- GASB compliant



Background

Overview of Proposed Changes

Projected Unit Credit Cost Method:

- The cost of benefits earned is funded each year and the liability represents the value of benefits earned to date. Projected unit credit provides stakeholders and users of the actuarial valuation report a real measure of the cost and liability of the system that is easily understood.

Contribution rate collaring:

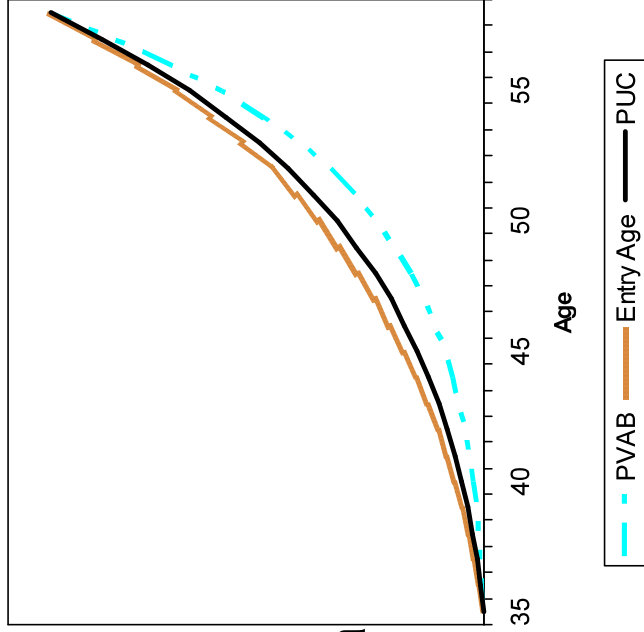
- Smooths contribution rates instead of assets. The true market value of assets is reflected in the measurement of the funded status of the system and the determination of contribution rates. Stakeholders and users of the actuarial valuation report will better understand the financial position of the system in order to make timely management, benefit, investment and funding decisions.
- The collar provides limits to changes in contribution rates that are useful for budgeting purposes.



Background

Full Formula and Money Match Benefit Liabilities

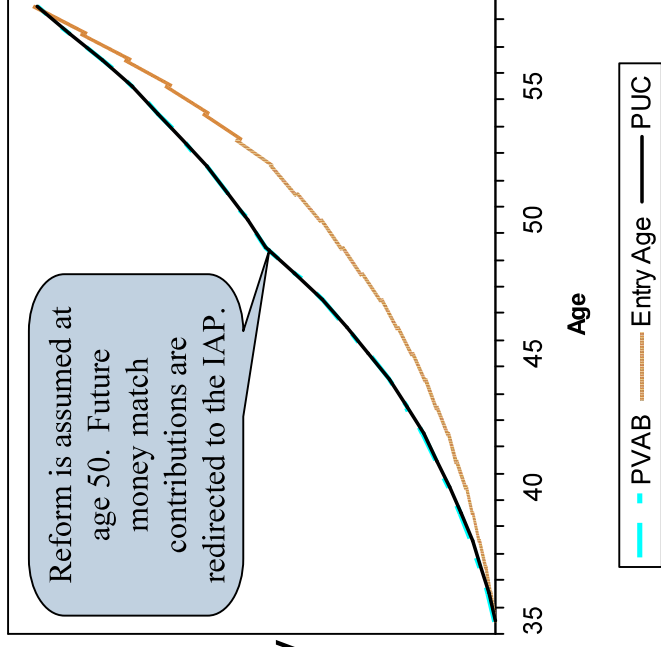
Comparison of Accrued Liability



Full Formula

- Present value of accrued benefits to date—PVAB—(based on current service and pay) increases rapidly as member approaches retirement
- Actuarial methods allocate these costs evenly across an employee's career

Comparison of Accrued Liability



Money Match

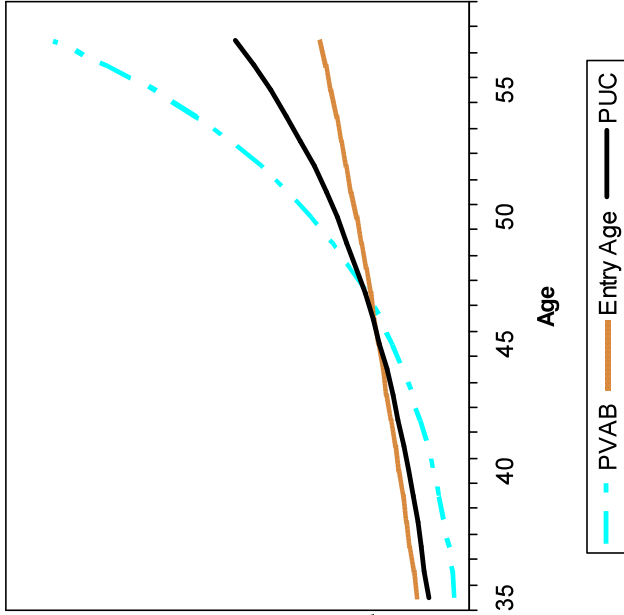
- For Money Match benefit, entry age accrued liability is less than the PVAB
- In this case, projected unit credit (PUC) follows the pattern of benefit accruals exactly, so the PUC accrued liability always equals the value of the accrued benefit



Background

Full Formula and Money Match Benefit Normal Cost

Comparison of Normal Cost

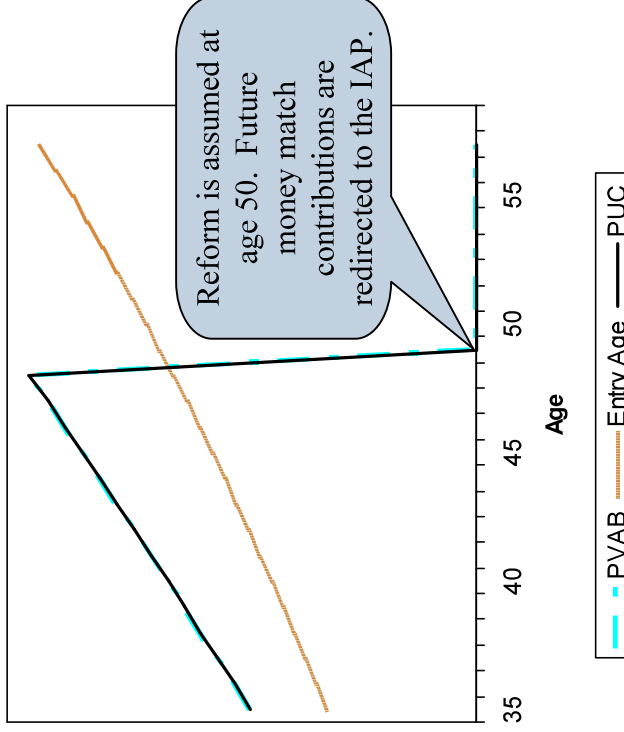


Full Formula

- PVAB normal cost shows the pattern in which benefits are actually earned
- Both Entry Age and PUC allocate normal cost more evenly through career than the PVAB cost by reflecting future pay; Entry Age more so than PUC

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Comparison of Normal Cost



Money Match

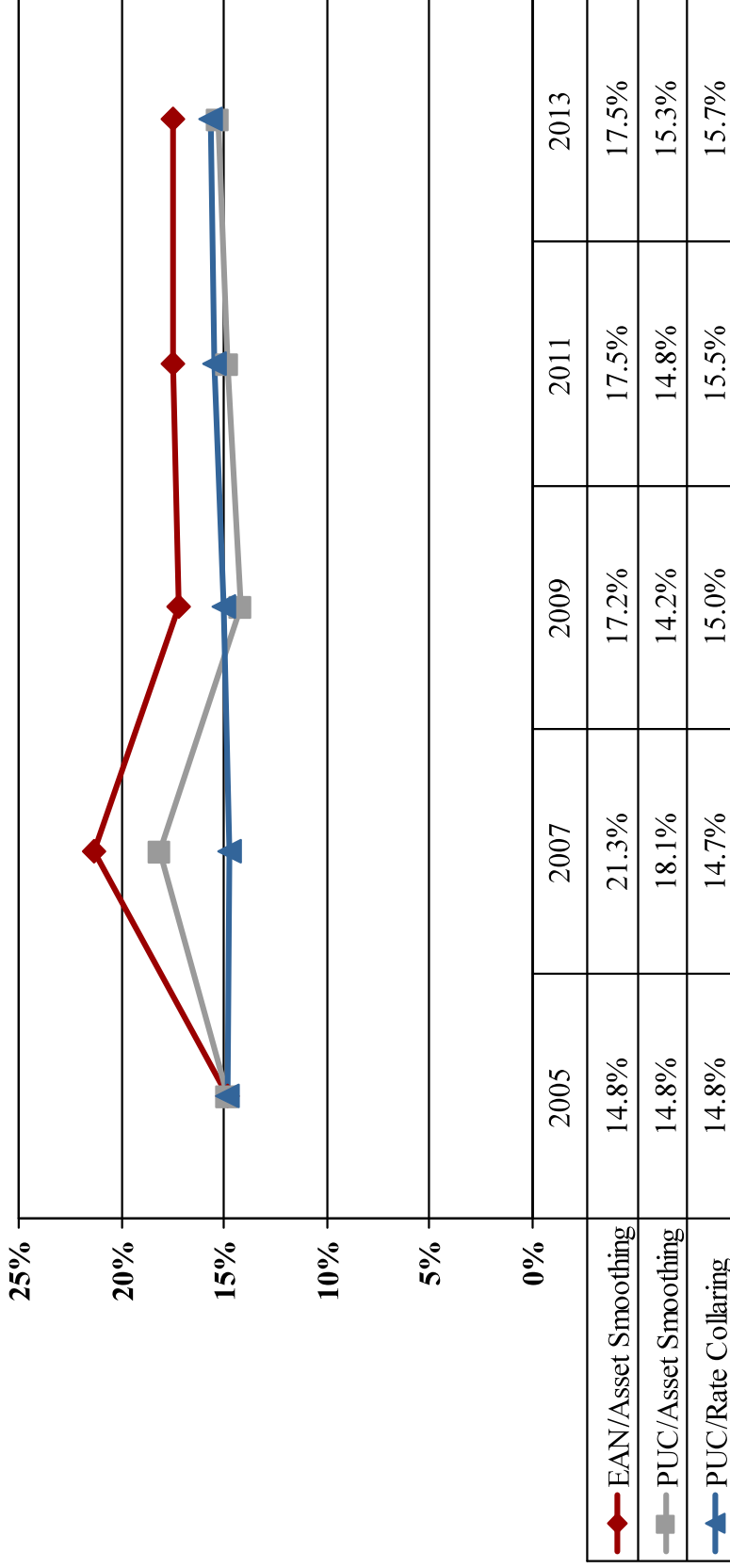
- Entry Age normal cost is below the rate at which actual benefits accrue until contributions are re-directed to the IAP; after: significantly higher than the benefit accrual rate
- In this case, projected unit credit follows the pattern of benefit accruals exactly



Background Financial Modeling Results

The financial modeling projections showed that the current asset smoothing method creates an expected spike in contribution rates as of 7/1/2007.

Median Pension Contribution Rate



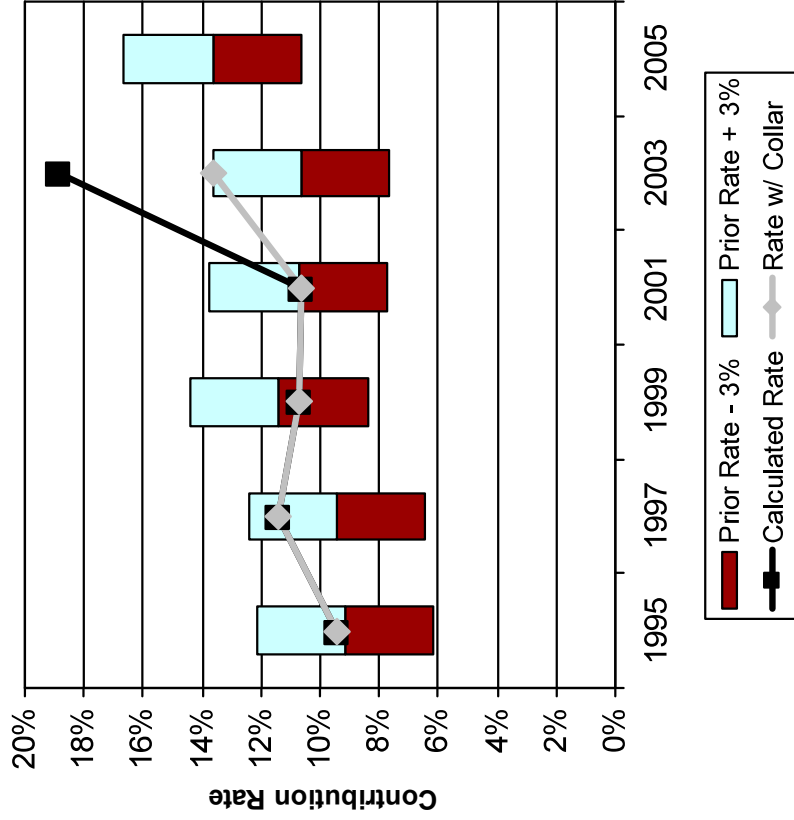


Background

Collar on Contributions Method

- Contribution rates are confined to a collar based on the current contribution rate.
- The next contribution rate will not increase or decrease from the prior contribution rate by more than the greater of 3 percentage points or 20 percent of the current rate.
 - If current rate is 15%, the new rate cannot be more than 18% nor less than 12%.
 - If current rate is 20%, the new rate cannot be more than 24% nor less than 16%.
- If funded percentage drops below 80% or increases above 120%, the size of the collar doubles.
 - If current rate is 15% and funded status is below 80%, the new rate can be as high as 21%.
 - If current rate is 20% and funded percentage is below 80%, the new rate can be as high as 28%.
- All calculations use the market value of assets

Illustration of Collar Method
(Assumes Collar Always Used)





Key Findings Overview

As of 12/31/2004			
	Current	Proposed	Change
Normal Cost	\$775	\$316	(\$459)
Accrued Liability	\$46,769	\$47,984	\$1,215
Assets	\$38,003	\$40,306	\$2,303
UAL	\$8,766	\$7,678	(\$1,088)
UAL Payment	\$569	\$686	\$117
NC Rate	12.3%	5.0%	-7.3%
UAL Rate	8.4%	10.1%	1.7%
Total	20.7%	15.1%	-5.6%

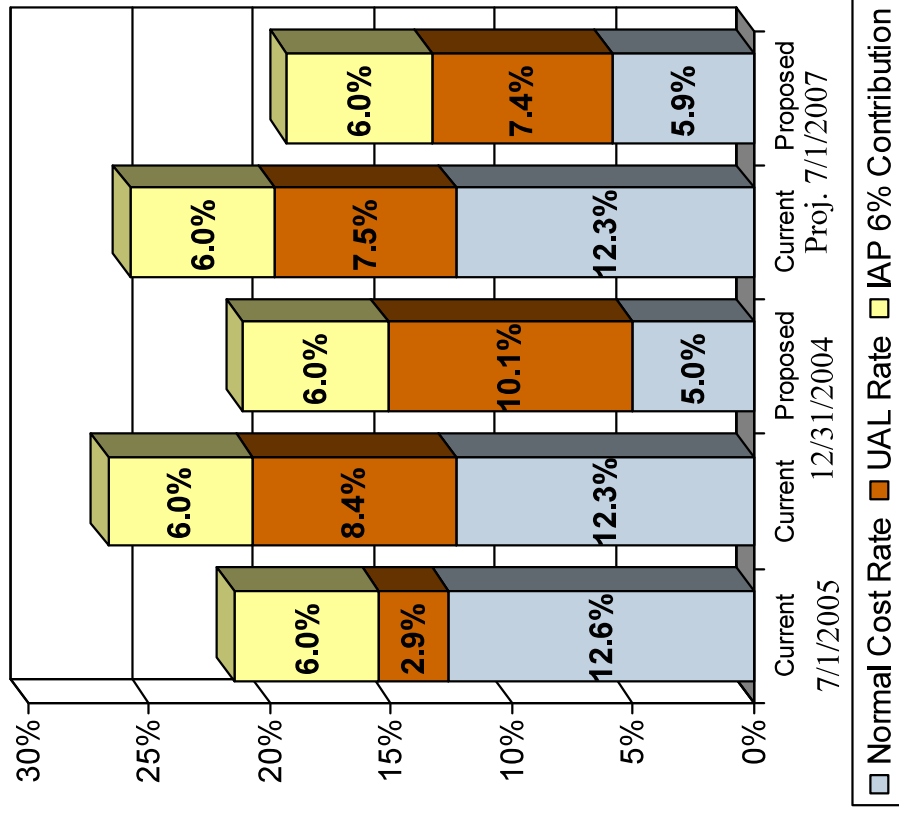
- Projected unit credit results in a significantly lower normal cost rate that more accurately reflects the expected accrual of benefits.
- The accrued liability under projected unit credit is higher than under entry age, more accurately reflecting the value of benefits that have already been earned.
- The market value of assets more accurately reflects the current funded status of the System
- The normal cost rate is applied to PERS T1/T2 payroll, but the UAL rate is applied to PERS and OPSRP payroll
- Note that employers are currently paying an average rate of 15.5%



Key Findings

Employer and Member Contribution Rates

- The reduction in projected contribution rates is even more significant as of 7/1/2007
 - Reflects full market performance during 2005 instead of only recognizing 25% of gains
 - Reflects projected increase in PUC normal cost rate
- Projected 7/1/2007 rates also reflect the deployment of reserves
- Actual rates effective 7/1/2007 will be based on the December 31, 2005 valuation reflecting all assumption changes from the 2005 experience study

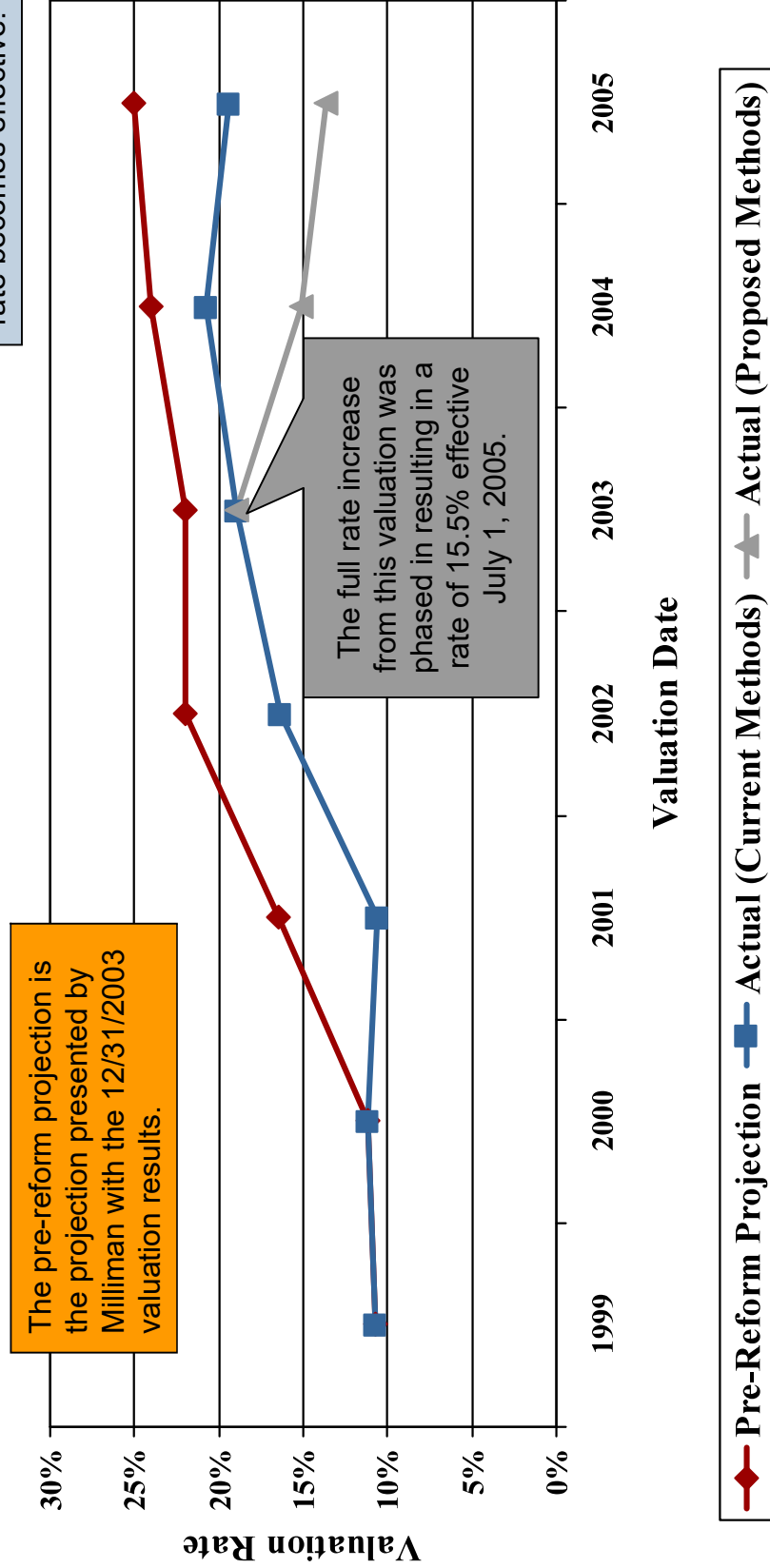




Key Findings Comparison to Pre-Reform Projections

Rates shown in this graph are as of the valuation date and do not represent the rate actually paid. Actual rates are based on odd year valuation results with an adjustment for the 18-month delay before the rate becomes effective.

Projected and Actual Valuation Rates





Key Findings

Breakdown of Reduction in Rates

- The deployment of reserves reduces projected rates by approximately 1.2%
- Adopting projected unit credit reduces the normal cost by 6.4%, but increases the amortization payment by 3.2%
- Fully recognizing the better than expected investment performance of the last three years reduces projected rates by approximately 3.3%

Change from 12/31/2004 Valuation Results

Prior Projected 7/1/07 Contribution Rate	21.0%
Deploy Reserves	-1.2%
Adopt Projected Unit Credit Method	-3.2%
Adopt Market Value with Collar	-3.3%
New Projected 7/1/07 Contribution Rate	13.3%



Key Findings

Breakdown of Reduction in Rates

- The deployment of reserves reduces projected rates by approximately 1.2%
- Financial modeling assumed earnings for 2005 were approximately 9%. However, when the alternative investments were valued as of 12/31/2005 earnings were close to 14%. These additional earnings reduced rates by approximately 0.8%
- The financial modeling results did not include retiree medical benefits.

Change from Financial Modeling Results

Median 7/1/07 Pension Contribution Rate	14.7%
Deploy Reserves	-1.2%
Additional 2005 Earnings	-0.8%
Retiree Medical	0.6%
New Projected 7/1/07 Contribution Rate	13.3%



Key Findings

Employer Contribution Rates

Both sets of projected rates below reflect the deployment of reserves.

	SLGRP	Independents	School Districts	Judiciary (Includes Member Contribution)	System-Wide
Current					
Projected 7/1/2007 Rate	19.7%	12.9%	22.7%	26.0%	19.8%
Proposed					
Projected 7/1/2007 Rate	13.3%	7.2%	15.9%	20.1%	13.3%

- Projected contribution rates are significantly lower for all employer groups under the proposed methods.
- Side accounts may further reduce the rates paid by employers.

* Assumes election of phase-in rate
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Normal Cost

The normal cost represents the value of benefits assigned to the next year of service by the actuarial cost method. Under the projected unit credit method, the normal cost reflects the benefits earned in the next year.

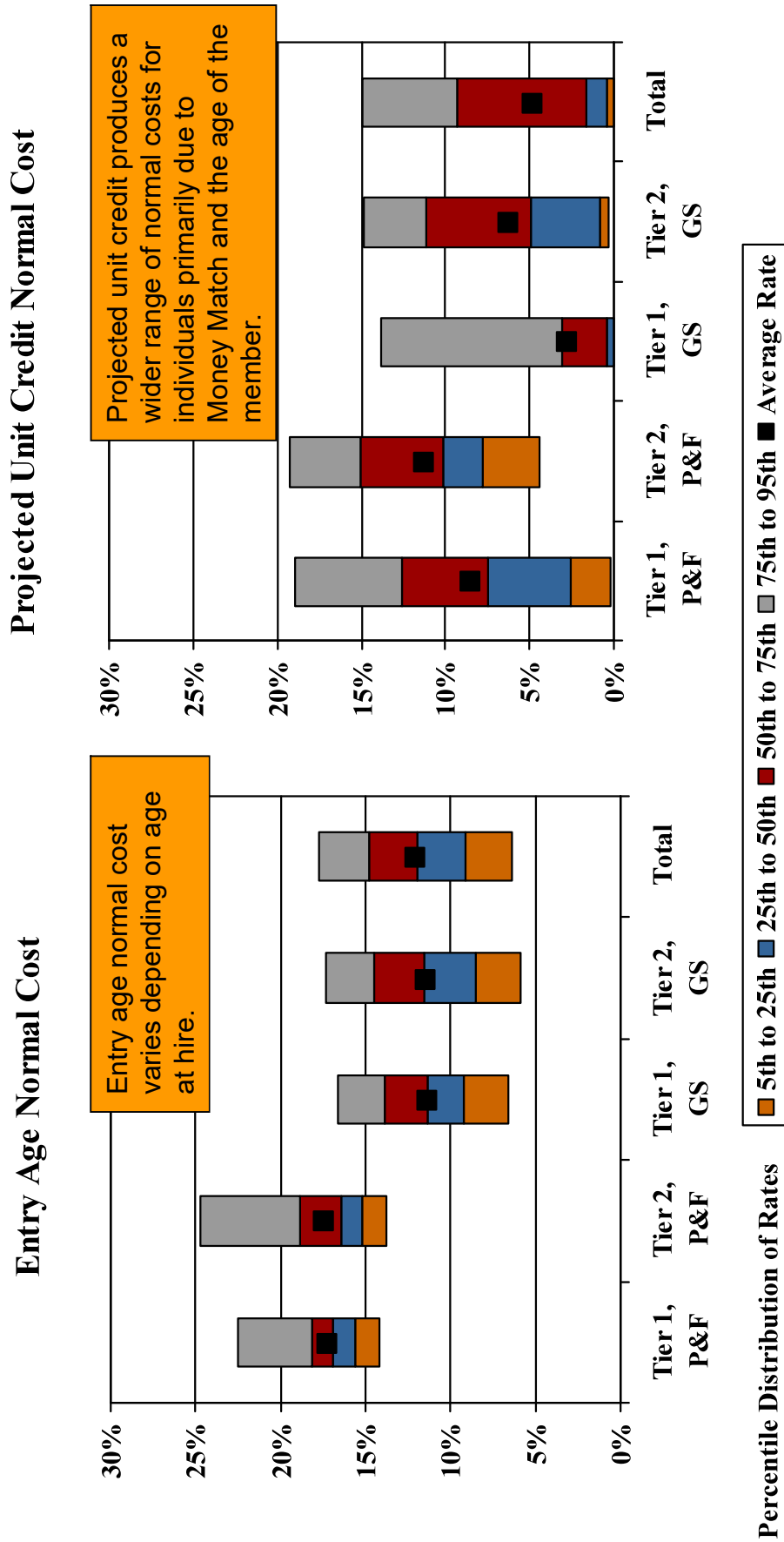
	SLGRP	Independents	School Districts	Judiciary (Includes Member Contributions)	System-Wide
T-1, General	2.43%	2.41%	2.99%	30.76%	2.80%
T-1, P&F	8.25%	9.20%			8.52%
T-1, Average	3.39%	4.02%	2.99%	30.76%	3.45%
T-2, General	6.16%	5.69%	6.75%		6.29%
T-2, P&F	11.40%	10.78%			11.24%
T-2, Average	7.08%	6.65%	6.75%		6.91%
Retiree Healthcare	0.22%	0.18%	0.18%	0.26%	0.20%
System Average	5.12%	5.34%	4.49%	31.02%	5.00%

- The normal cost rate for Judiciary is higher under projected unit credit than under entry age normal
- The lower normal cost rate reflects the impact of the frozen Money Match formula. Almost 25 percent of Tier 1, general service members have no normal cost under projected unit credit.



Normal Cost

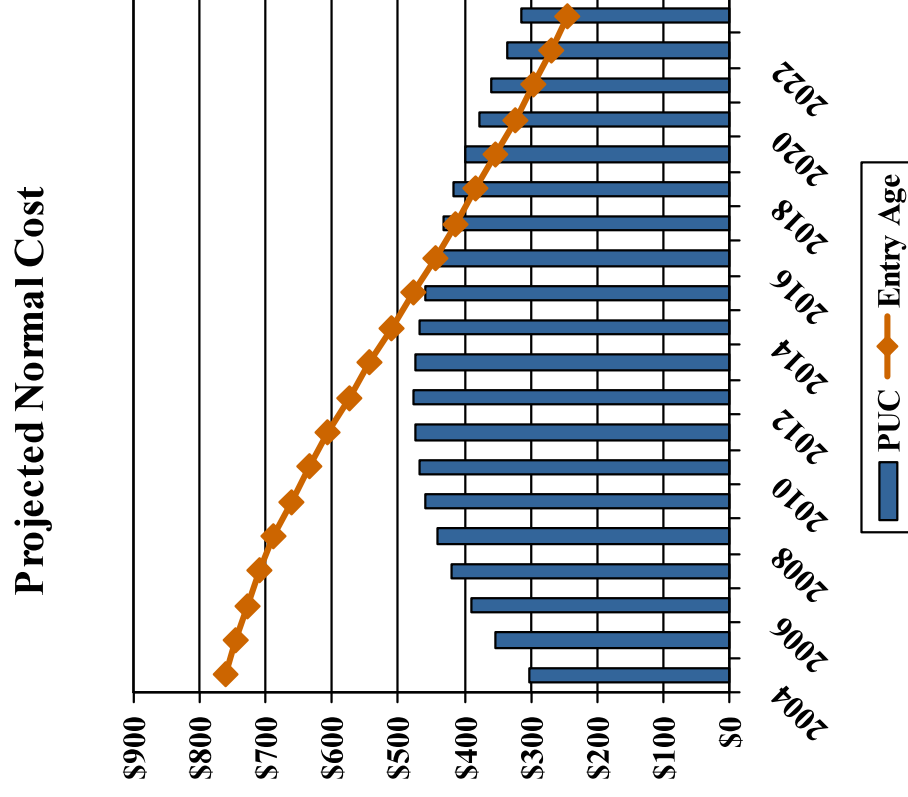
Distribution of Individual Normal Cost Rates





Normal Cost

- Under Entry Age Normal, the normal cost payments decline relatively rapidly as members retire.
- Under PUC, the normal cost payments initially increase.
 - Members move from Money Match to Full Formula
 - Members age
- After about 10 years, this trend reverses and normal cost decreases.





Actuarial Accrued Liabilities Actives

The actuarial accrued liability represents the value of benefits assigned to past service by the actuarial cost method.

	SLGRP	Independents	School Districts	Judiciary	System-Wide
T-1, General	\$7,323	\$1,271	\$6,589	\$61	\$15,244
T-1, P&F	\$1,214	\$533	\$3		\$1,752
T-1, Total	\$8,537	\$1,804	\$6,592	\$61	\$16,996
T-2, General	\$695	\$204	\$486		\$1,385
T-2, P&F	\$198	\$61	\$1		\$260
T-2, Total	\$893	\$265	\$487		\$1,645
Retiree Healthcare					\$162
PUC Total	\$9,430	\$2,069	\$7,080	\$61	\$18,804
EAN Total	\$8,852	\$1,921	\$6,569	\$68	\$17,587

The difference between the PUC accrued liability and the EAN accrued liability will be amortized over 5 years.

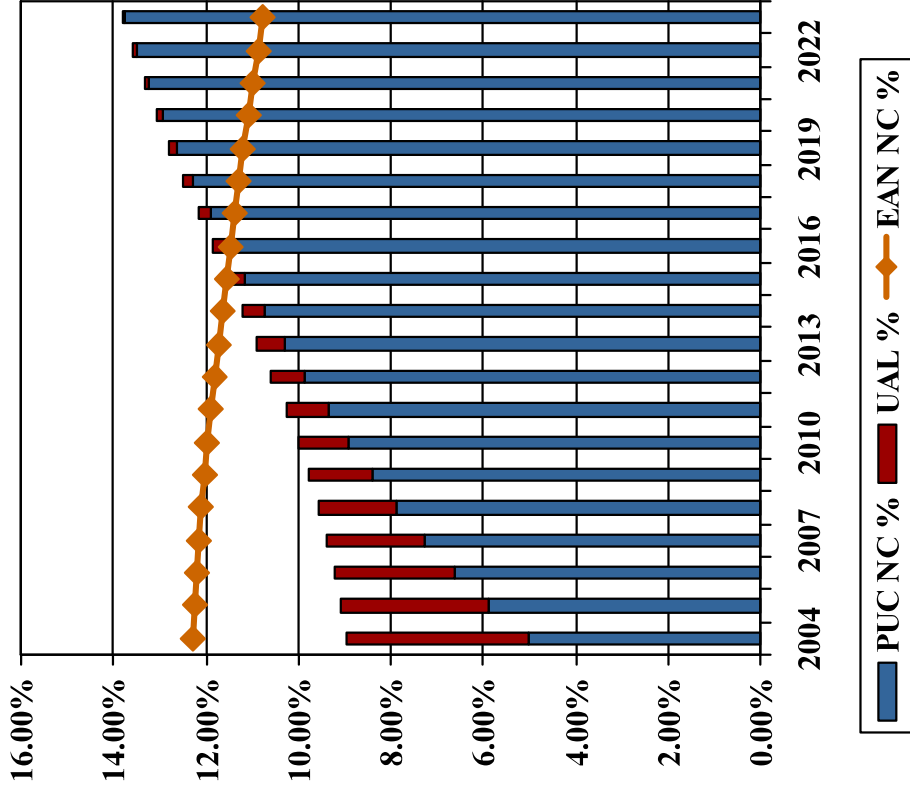
System-wide results include Multnomah Fire District #10
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Actuarial Accrued Liabilities

Amortization of Change Combined with Normal Cost

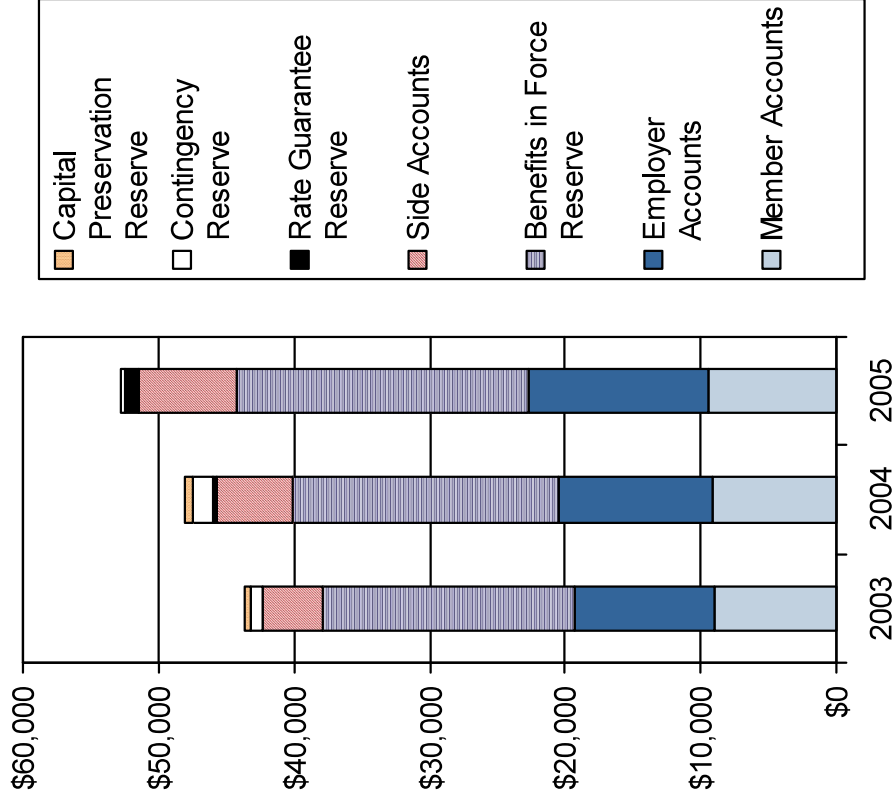
- The entry age normal cost rate is expected to decline over time, but the projected unit credit rate is expected to increase.
- The rate will be applied to a smaller and smaller group as time goes on, so the dollar amount contributed will decline under both methods
- The change in accrued liability is amortized over a rolling 5-year period that helps to somewhat level the increase in PUC normal cost rate. This rate, however, is charged to combined PERS and OPSRP payroll.





Assets

Total Pension Assets



- Valuation assets are growing faster than expected
 - Deployment of reserves
 - Higher rate of earnings than expected
 - Building the rate guarantee reserve
- Continued high rate of earnings will drive contribution rates down regardless of which method is used.
- Side funds continue to grow with new deposits and high rates of earnings



Unfunded Accrued Liabilities Pension Only

Liability for pension obligation bonds is about equal to side accounts, implying that the total obligation for PERS on a market value basis is about \$7.2 billion. However, with the deployment of reserves and 2005 earnings, the obligation is expected to drop to about \$4.6 billion as of 12/31/2005.

	SLGRP	Independents	School Districts	Judiciary	System -Wide
Accrued Liability	23,407	4,315	19,483	129	47,399
Market Value of Assets	19,861	4,190	16,020	145	40,153
Unfunded Accrued Liability	3,546	125	3,463	(16)	7,246
Side Funds	2,869	35	2,652	0	5,556
UAL – Side Funds	677	90	811	(16)	1,690
POBs	3,175	176	2,165	0	5,516
Total Unfunded Obligations	3,852	266	2,976	(16)	7,206

System-wide results include Multnomah Fire District #10

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Unfunded Accrued Liabilities Pension Only

The unfunded represents a significant portion of payroll, causing contribution rates to be relatively high.

	SLGRP	Independents	School Districts	Judiciary	System-Wide
Payroll (T1/T2 + OPSRP)	3,389	1,034	2,333	16	6,772
UAL	3,546	125	3,463	(16)	7,246
UAL as % of Payroll	105%	12%	148%	-100%	107%
UAL – Side Funds	677	90	811	(16)	1,690
Net UAL as % of Payroll	20%	9%	35%	-100%	25%
UAL – Side Funds + POBs	3,852	266	2,976	(16)	7,206
Net Obligation as % of Payroll	114%	26%	128%	-100%	106%



Funded Status System-Wide Funded Status

Estimates as of 12/31/2005 include the deployment of reserves.

Valuation	12/31/2003		12/31/2004		12/31/2005 (est.)	
	Excluding Side Funds	Including Side Funds	Excluding Side Funds	Including Side Funds	Excluding Side Funds	Including Side Funds
Current	86%	96%	81%	93%	85%	99%
Proposed	N/A	N/A	85%	96%	90%	104%

- The current methods disclose funded status based on smoothed assets and the entry age accrued liability
- The proposed methods disclose funded status based on the market value of assets and projected unit credit accrued liability providing a better indicator of the funded status of the system
- After three years of good investment performance, it is expected that funded status will improve and contribution rates will decrease



Conclusions

- The proposed methods offer better indicators of the status of the system
 - Normal cost better represents the cost of benefits for additional years of service
 - Accrued liability better represents value of benefits earned to date
 - Market value of assets better represents funded status
 - Contribution rates move in intuitive directions
- The proposed methods also offer a significant reduction in employer contribution rates, and the financial modeling showed a more level contribution rate



Next Steps

- March Board Meeting -- 12/31/2004 system-wide valuation results
 - Projected unit credit method
 - Market value of assets
 - Contribution rate collar
- April Board Meeting – Decision on actuarial methods
- June Board Meeting – Experience study
- September Board Meeting – 12/31/2005 system-wide valuation results
 - OPSRP
 - PERS T1/T2

Appendix





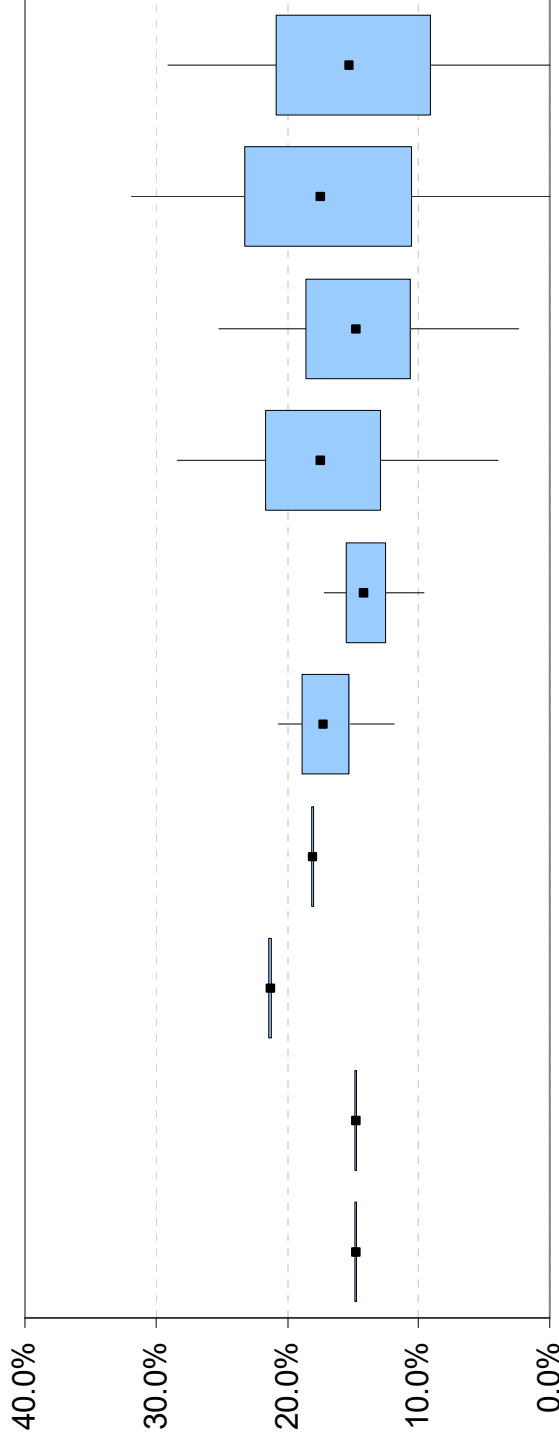
Actuarial Cost Method Observations

- The primary advantage of the PUC method is the increased transparency provided by a more realistic allocation of costs between the past (accrued liability) and the future (normal cost).
- There are two other effects of switching to PUC:
 - The average normal cost rate will tend to rise as Money Match members retire and they represent a smaller proportion of the population.
 - The average normal cost rate will tend to rise as the closed Tier 1/2 population ages.
- Both of these effects are somewhat mitigated by the declining payroll to which they apply.
- The PUC method also produces lower contribution rates. The amount of reduction is less than it appears as the UAL is amortized over combined payroll while the normal cost rate is only charged to the closed Tier 1/2 payroll.

Actuarial Cost Method

Entry Age Normal vs. Projected Unit Credit

Contribution Rate effective from 7/1 (Base vs. Alt#2)



PUC contribution rates are approximately 200 basis points less than the EAN contribution rates.

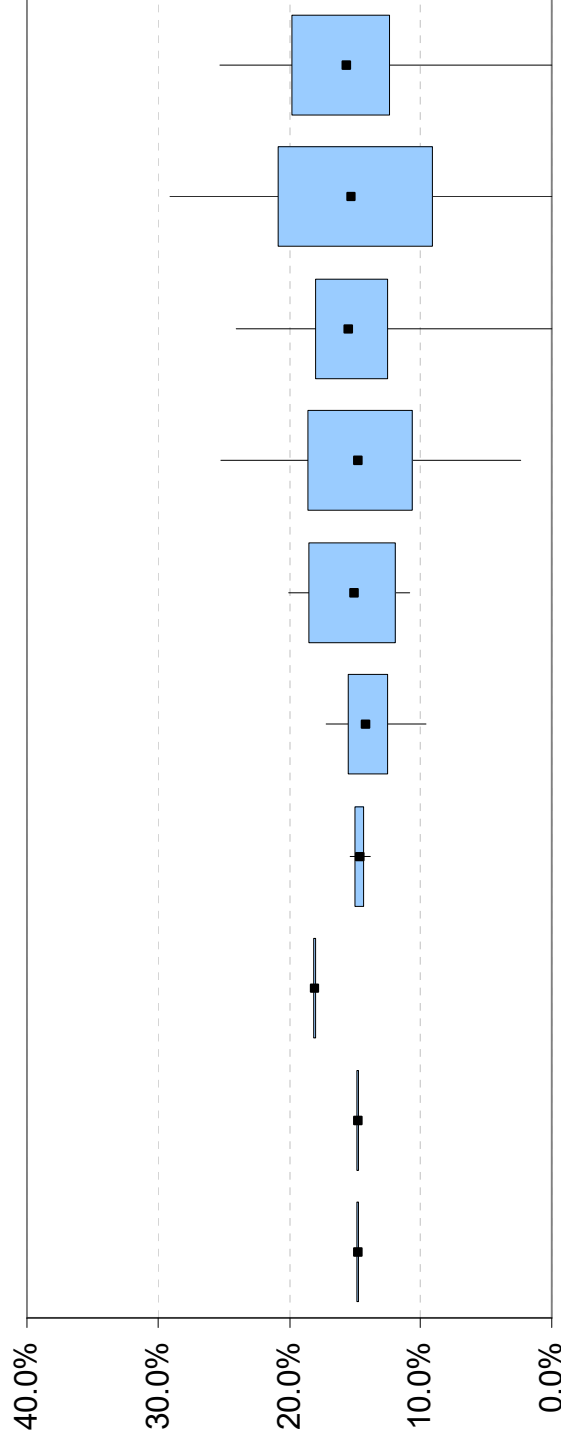
	Base 2005	Alt2 2005	Base 2007	Alt2 2007	Base 2009	Alt2 2009	Base 2011	Alt2 2011	Base 2013	Alt2 2013
5th V. Bad	14.8%	14.8%	21.6%	18.3%	20.7%	17.2%	28.4%	25.2%	31.9%	29.1%
25th Bad	14.8%	14.8%	21.4%	18.2%	18.9%	15.5%	21.7%	18.6%	23.3%	20.8%
50th Median	14.8%	14.8%	21.3%	18.1%	17.2%	14.2%	17.5%	14.8%	17.5%	15.3%
75th Good	14.8%	14.8%	21.2%	18.0%	15.3%	12.5%	12.9%	10.6%	10.5%	9.1%
95th V. Good	14.8%	14.8%	21.1%	17.9%	11.9%	9.6%	4.0%	2.3%	0.0%	0.0%

Contribution Rate Smoothing

Asset Smoothing vs. Contribution Rate Collaring

The rate collar reduces contribution rates as of 7/1/2007 because it immediately recognizes the asset gains of 2003, 2004, and 2005. The range of future contribution rates has also narrowed considerably, particularly between the 25th and 75th percentiles.

Contribution Rate effective from 7/1 (Alt#2 vs. Alt#3)



	Alt2 2005	Alt3 2005	Alt2 2007	Alt3 2007	Alt2 2009	Alt3 2009	Alt2 2011	Alt3 2011	Alt2 2013	Alt3 2013
5th V. Bad	14.8%	14.8%	18.3%	15.4%	17.2%	20.0%	25.2%	24.1%	29.1%	25.3%
25th Bad	14.8%	14.8%	18.2%	15.0%	15.5%	18.5%	18.6%	18.0%	20.8%	19.8%
50th Median	14.8%	14.8%	18.1%	14.7%	14.2%	15.0%	14.8%	15.5%	15.3%	15.7%
75th Good	14.8%	14.8%	18.0%	14.3%	12.5%	11.9%	10.6%	12.5%	9.1%	12.4%
95th V. Good	14.8%	14.8%	17.9%	13.8%	9.6%	10.9%	2.3%	0.0%	0.0%	0.0%

Alt2 = Asset Smoothing
 Alt3 = Rate Collaring

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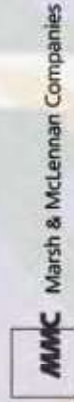


April 27, 2006

Oregon PERS

December 31, 2004 Actuarial Valuation Results

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Review of 12/31/2004 Valuation Results

Overview

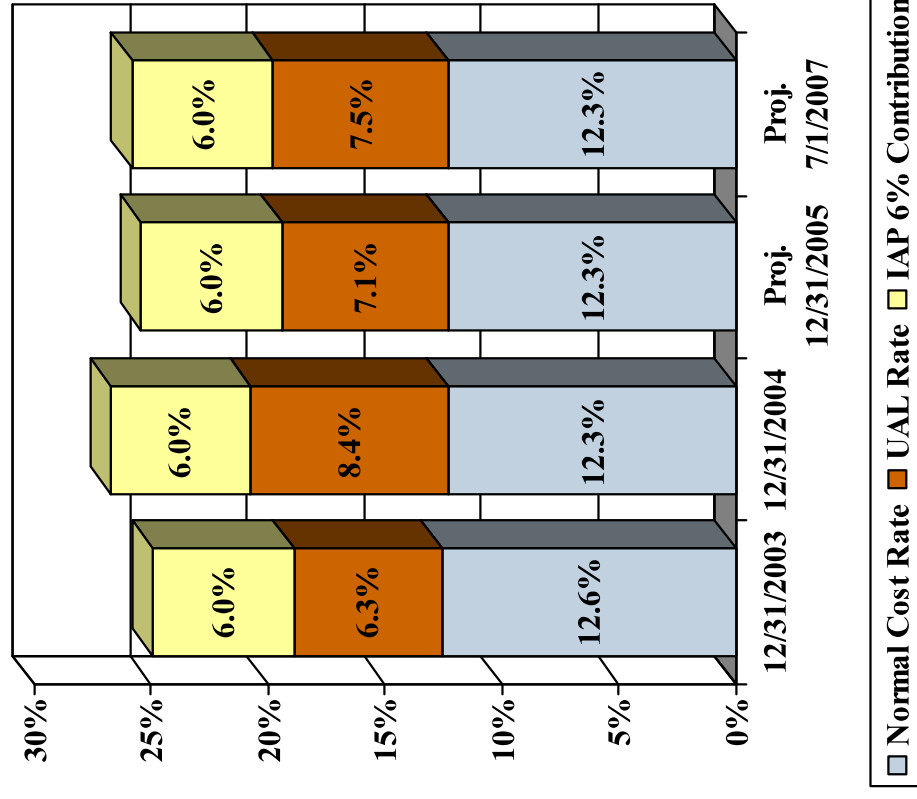
- December 31, 2004 actuarial valuation results
 - Are advisory — no effect on contribution rates
 - Reflect estimated effect of Strunk/Eugene decisions
 - Use same methods and assumptions as prior valuation
 - Some exceptions due to transition (see Appendix), Strunk/Eugene (see Appendix), and a change to the SLGRP pooling method
 - Excludes OPSRP and IAP (assets, benefits, earnings, etc.)



Review of 12/31/2004 Valuation Results

Employer and Member Contribution Rates

- The average normal cost rate declined slightly since the prior valuation.
- The average UAL rate increased since the last valuation reflecting:
 - Strunk and Eugene decisions
 - Recognition of more of the prior investment losses, and
 - the 18-month delay in contribution rate changes
- The average UAL rate is expected to decrease slightly by 12/31/2005 reflecting 2004 and 2005 investment performance and the deployment of reserves, offset by the phase-in of contribution rates.





Review of 12/31/2004 Valuation Results

Change in Employer Contribution Rate

7/1/05 Employer Rate	15.4%
Planned Phase-in	5.0%
Asset Smoothing	1.8%
Strunk/Eugene	0.9%
2004/05 Earnings/ Reserves	(1.4%)
Other Gains/Losses	(0.7%)
Deploy Reserves	(1.2%)
7/1/07 Expected Employer Rate	19.8%
IAP 6% Contribution	6.0%

- In April, 2005, we projected employer rates to increase to 25.8% by 7/1/2007.
- With the Eugene decision, favorable investment experience, and the deployment of the Contingency and Capital Preservation Reserves, we now project 7/1/2007 employer contribution rates, using current methods and assumptions, to average 19.8%.



Review of 12/31/2004 Valuation Results Employer and Member Contribution Rates

Projected 7/1/2007 rates below reflect the deployment of reserves.

	SLGRP	Independ -ents	School Districts	Judiciary (Includes Member Contribution)	System- Wide
Actual 7/1/2005 Employer Contribution Rates	14.9%	11.5%*	17.0%	29.4%	15.4%
Projected 7/1/2007 Employer Contribution Rates	19.7%	12.9%	22.7%	26.0%	19.8%
IAP 6% Contribution	6.0%	6.0%	6.0%	N/A	6.0%

- While system-wide rates are projected to average 19.8%, rates vary significantly by pool and employer.
- Side accounts may further reduce the rates paid by employers.

* Assumes election of phase-in rate
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Review of 12/31/2004 Valuation Results

Impact of Side Accounts

	SLGRP	Independents	School Districts	Judiciary (Includes Member Contribution)	System-Wide
Total Number of Employers	286	287	232	1	806
Number of Employers with a Side Account	23	3	77	0	103
12/31/2004 Side Account Balance	\$2,869.0	\$35.0	\$2,652.1	\$0.0	\$5,556.2
Average Reduction in Employer Contribution Rate due to Side Account	8.1%	3.8%	12.3%	0.0%	9.6%

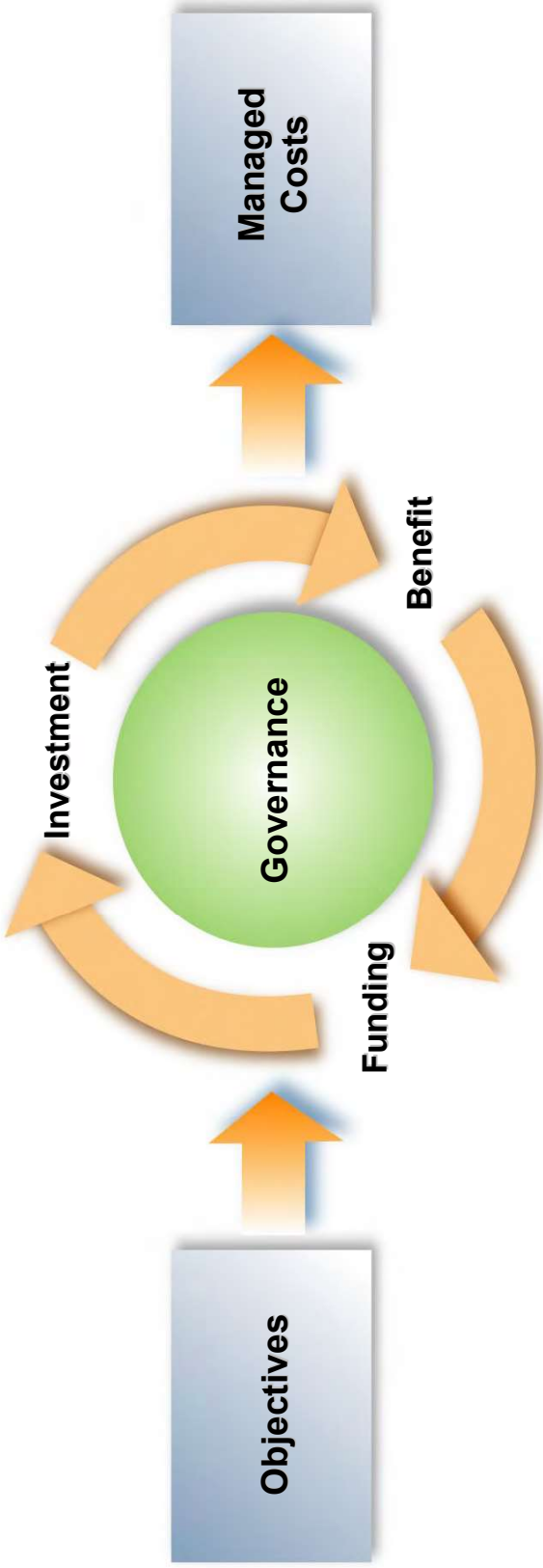
- Average reduction in employer contribution rates is a weighted average for the employers with a side account.



Consideration of Method Changes

Retirement Plan Financial Management Framework

Total Contributions = Benefits Paid - Investment Earnings



Actuarial methods primarily affect the timing of contributions



Consideration of Method Changes

Development of Proposed Method

- May 20, 2005 Board Meeting
 - Initially proposed alternative methods for consideration to manage contribution rates
- September 13, 2005 LAC Meeting
 - Feedback from employer and member representatives on proposed alternative methods
- December 16, 2005 Board Meeting
 - Financial modeling results of alternative methods
- March 31, 2006 Board Meeting
 - Compare December 31, 2004 valuation results between current and proposed methods
- April 11, 2005 LAC Meeting
 - Feedback from employer and member representatives on proposed alternative methods



Consideration of Method Changes

Board Objectives for Actuarial Methods

- Transparent
- Predictable and stable rates
- Protect funded status
- Equitable across generations
- Actuarially sound
- GASB compliant

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Consideration of Proposed Changes

Entry Age Normal vs. Projected Unit Credit

Entry Age Normal Cost Method:

- The cost of projected benefits is funded as a level percentage of pay over an employee's career. For Full Formula benefits, the result is an accrued liability greater than the value of the accrued benefit, but for Money Match benefits, the accrued liability is less than the value of accrued benefits. The normal cost does not reflect the pattern in which benefits accrue. Although the method funds the benefits adequately, stakeholders may be misled about the cost and liability of the system.

Projected Unit Credit Cost Method:

- The cost of benefits earned is funded each year and the liability represents the value of benefits earned to date. Projected unit credit provides stakeholders and users of the actuarial valuation report a real measure of the cost and liability of the system that is easily understood.



Consideration of Proposed Changes Entry Age Normal vs. Projected Unit Credit

As of 12/31/2004			
	EAN	PUC	Change
Normal Cost	\$775	\$316	(\$459)
Accrued Liability	\$46,769	\$47,984	\$1,215
Assets	\$38,003	\$38,003	\$0
UAL	\$8,766	\$9,981	\$1,215

Amounts in millions

Change in Normal Cost and UAL

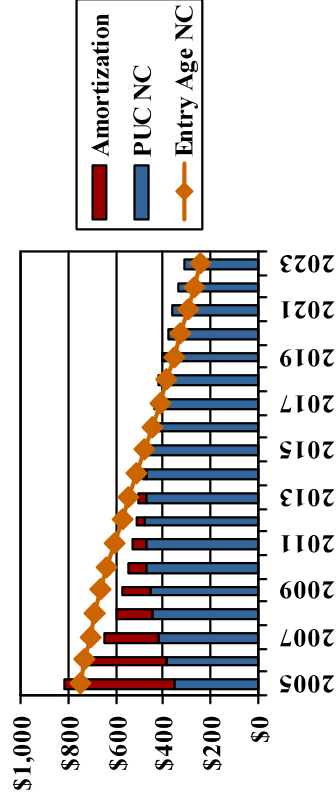
- Projected unit credit results in a significantly lower normal cost that more accurately reflects the expected accrual of benefits.
- The accrued liability under projected unit credit is higher than under entry age, more accurately reflecting the value of benefits that have already been earned.
- The \$1.2 billion increase in accrued liability can be amortized over a shorter period than the rest of the UAL



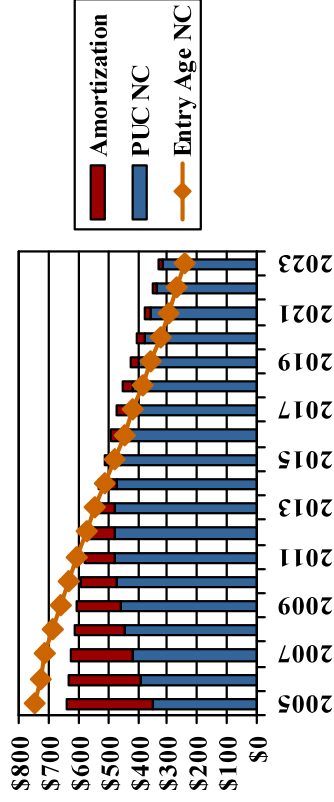
Consideration of Proposed Changes Entry Age Normal vs. Projected Unit Credit

- The change in accrued liability due to the change to PUC could be amortized over rolling 3-, 4-, or 5-year periods to approximate the pattern of costs under entry age normal.
- At some point the Board will likely want to fix the amortization period instead of rolling it with each valuation.

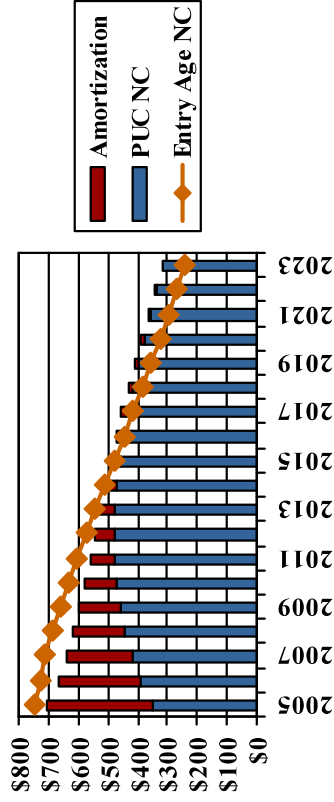
Rolling 3-Year Amortization



Rolling 5-Year Amortization



Rolling 4-Year Amortization



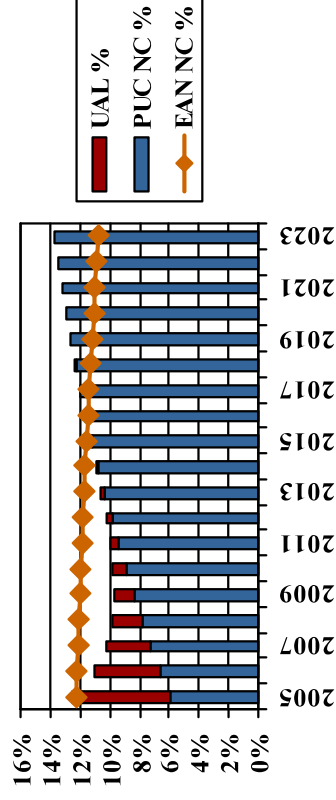
Amounts in millions



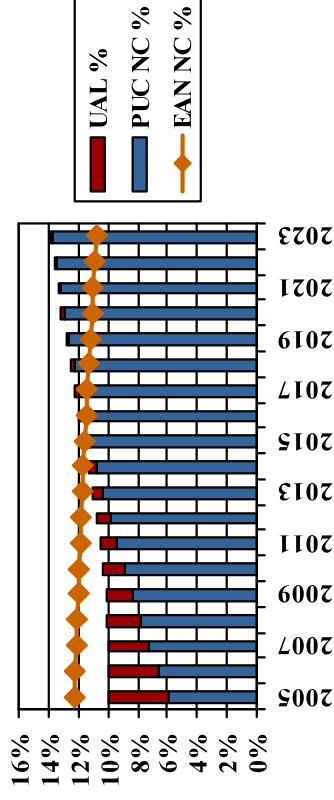
Consideration of Proposed Changes Entry Age Normal vs. Projected Unit Credit

- Note that normal cost is paid on PERS T1/T2 payroll only while the UAL contribution rate is paid on combined PERS and OPSRP payroll.
- The PUC normal cost rate starts lower than the EAN normal cost rate, but they cross after about 10 years. However, the PERS T1/T2 payroll is much smaller at that point.

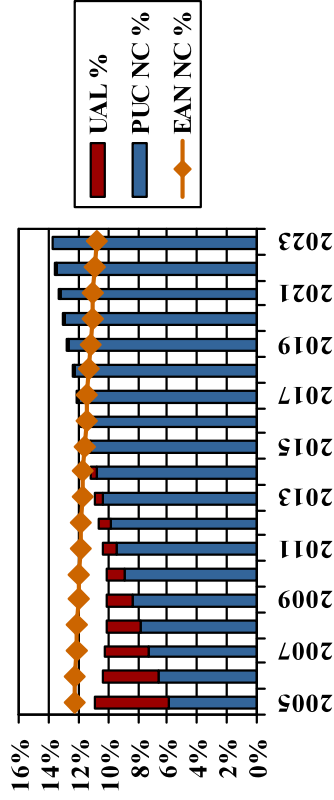
Rolling 3-Year Amortization



Rolling 5-Year Amortization



Rolling 4-Year Amortization



Amounts in millions



Consideration of Proposed Changes

Entry Age Normal vs. Projected Unit Credit

Expected contributions as of 12/31/2004	Projected Unit Credit			
	Entry Age Normal	3-Year Amortization	4-Year Amortization	5-Year Amortization
Normal Cost	\$775	\$316	\$316	\$316
UAL Change*		\$428	\$327	\$266
Regular UAL	\$569	\$569	\$569	\$569
Total	\$1,344	\$1,313	\$1,212	\$1,151

Amounts in millions

- Amortizing the change over a rolling 3 years results in a slight reduction in expected contributions
- Amortizing the change over a rolling 5 years results in approximately a 14% reduction in expected contributions

*UAL change amounts are for illustration only. The actual amortization of the change will commence with the 12/31/2005 valuation.



Consideration of Proposed Changes Entry Age Normal vs. Projected Unit Credit

Projected 7/1/07 Rates					
	Current Rates	Entry Age Normal	3-Year Amortization	4-Year Amortization	5-Year Amortization
			Projected Unit Credit		
Normal Cost	12.6%	12.3%	5.9%	5.9%	5.9%
UAL Change			6.6%	5.0%	4.1%
Regular UAL	2.9%	7.1%	7.0%	6.9%	6.7%
Total	15.5%	19.8%	19.5%	17.8%	16.7%

Side accounts may further reduce the rates paid by employers.

- Amortizing the change over a rolling 3 years results in a 0.3% reduction in expected contribution rates
- Amortizing the change over a rolling 5 years results in approximately a 3.1% reduction in expected contribution rates



Consideration of Proposed Changes Asset Smoothing vs. Market Value with Rate Collar

Four-year asset smoothing:

- Investment returns greater than or less than expected are not recognized immediately, but are smoothed in over a four-year period. The intent is to smooth out fluctuations in contribution rates. However, it also creates confusion among stakeholders as the actuarial value of assets may be higher or lower than the market value and contribution rates may go up after a year of good investment returns.

Contribution rate collaring:

- Smooths contribution rates instead of assets. The true market value of assets is reflected in the measurement of the funded status of the system and the determination of contribution rates. Stakeholders and users of the actuarial valuation report will better understand the financial position of the system in order to make timely management, benefit, investment and funding decisions.
- The collar provides limits to changes in contribution rates that are useful for budgeting purposes.



Consideration of Proposed Changes Asset Smoothing vs. Market Value with Rate Collar

As of 12/31/2004			
	Asset Smoothing	Market Value	Change
Accrued Liability	\$46,769	\$46,769	\$0
Assets	\$38,003	\$40,306	\$2,303
UAL	\$8,766	\$6,463	(\$2,303)
UAL Payment	\$569	\$420	(\$149)
UAL Rate	8.4%	6.2%	(2.2%)

Amounts in millions

- The market value of assets more accurately reflects the current funded status of the System.
- Recognizing the gains from 2003 and 2004 asset performance immediately reduces contribution rates by 2.2% or \$149 million.
- The reduction is expected to be greater as of 12/31/2005 after reflecting the greater than expected investment performance of 2005.



Consideration of Proposed Changes Asset Smoothing vs. Market Value with Rate Collar

Projected 7/1/07 Rates					
	Current Rate	Entry Age Normal	3-Year Amortization	4-Year Amortization	5-Year Amortization
	Projected Unit Credit				
Smoothed Assets	15.5%	19.8%	19.5%	17.8%	16.7%
Market Value Assets		16.4%	16.1%	14.4%	13.3%
Net Change		(3.4%)	(3.4%)	(3.4%)	(3.4%)

Side accounts may further reduce the rates paid by employers.

- All projected rates are within the rate collar if you start from the current system-wide rate of 15.5%
- Immediately recognizing the gains from 2003, 2004 and 2005 reduces rates approximately 3.4%



Consideration of Proposed Changes Additional Amortization Options

Amortization Periods	3.5% Payroll Growth	4.0% Payroll Growth
22 / 5	13.6%	13.3%
22 / 4	14.6%	14.4%
22 / 3	16.3%	16.1%
20 / 5	13.8%	13.6%
20 / 4	14.9%	14.6%
20 / 3	16.6%	16.4%

- The current amortization period is 22 years as of 12/31/2005, but is scheduled to drop to 20 years as of 12/31/2007 and then new gains and losses will continue to be amortized over 20 years. The Board could choose to accelerate this schedule to be at 20 years as of 12/31/2005
- With the experience study, we will review the payroll growth assumption. To illustrate the impact this assumption has on contribution rates, we have shown rates assuming the current 4.0% assumption and a 3.5% assumption

Side accounts may further reduce the rates paid by employers.

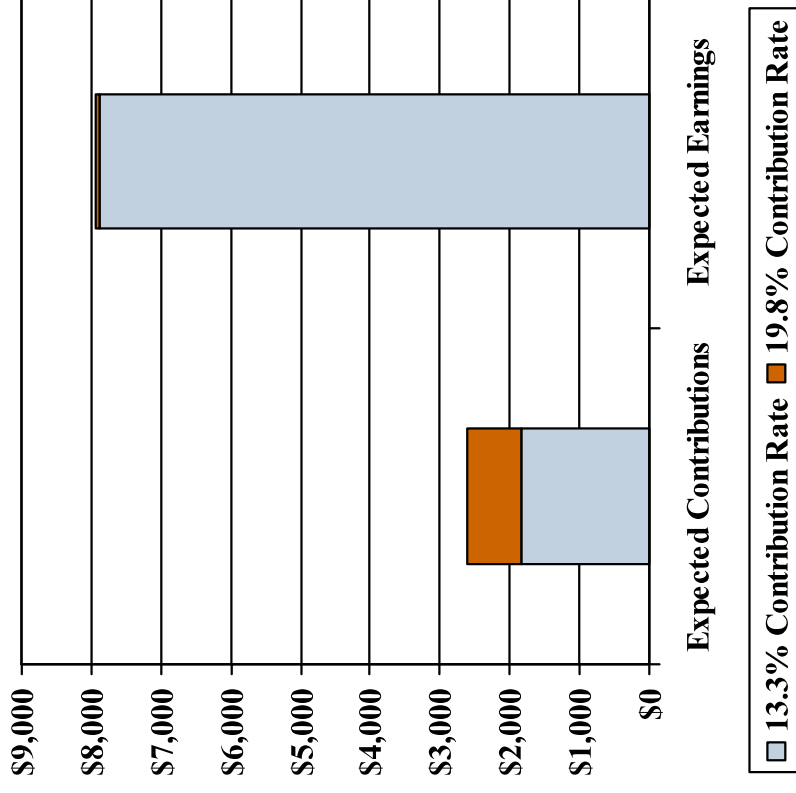
All rates shown are based on Projected Unit Credit and the market value of assets.



Consideration of Proposed Changes Expected Contributions vs. Expected Earnings

- Reducing the contribution rate from 19.8% to 13.3% reduces expected employer contributions during the next biennium by approximately \$775 million.
- By comparison, expected earnings for the biennium are approximately \$8 billion with a minor difference in expectation depending on the contribution rate
- Expected earnings are about four times as large as expected contributions

7/1/2007 -- 6/30/2009 Biennium





SLGRP Pooling Methodology

Overview

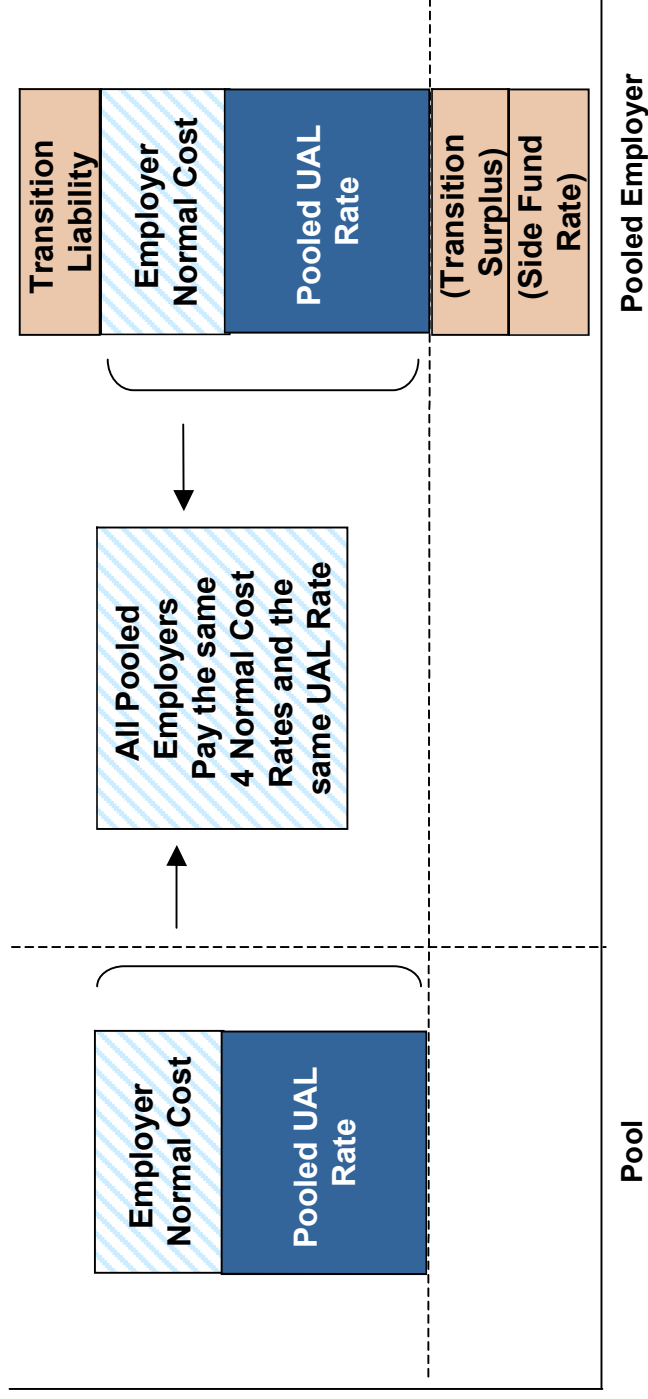
- Milliman's approach created a separate pool for each year and assigned a portion of the UAL attributable to that year to each employer who participated in the pool that year.
- UAL payments were allocated to each year in proportion to the absolute value of the UAL allocated for that year.
- Result was a complex web of contribution rates that were difficult for employers to follow and produced unexpected increases or decreases in transition liabilities due to the use of absolute values.
- Alternative approach assigns one UAL rate to every employer in the SLGRP regardless of when they join. The balance of an employer's UAL (fair value basis) is the employer's transition liability or surplus (or pre-SLGRP pooled liability for the state, community colleges, and LGRP members).
- Contributions are allocated to normal cost, UAL, and transition liability based on actual payroll and the contribution rates in effect.



SLGRP Pooling Methodology

Development of Pooled Rates

- Employer rates are made up of a few components:
 - Normal Cost Rate (Weighted Average of 4 Pooled Normal Cost Rates)
 - Pooled UAL Rate
 - Transition Liability/(Surplus) Rate
 - Side Fund Rate





SLGRP Pooling Methodology

Fresh Start Methodology

- Establish initial SLGRP UAL Rate on 1/1/2004
 - Initial SLGRP UAL rate set based on current SLGRP assets, liabilities and transition liabilities.
 - Side funds are not considered part of the SLGRP assets.
- All pooled employers are treated as joining the pool on 1/1/2004 with their prior pooled assets and liabilities as reported in the 12/31/2003 actuarial valuation
 - The SLGRP's fair value UAL is allocated to each employer based on their payroll from the 12/31/2003 valuation.
 - A new transition liability is established equal to the employer's fair value UAL from the 12/31/2003 valuation less the portion of the SLGRP's fair value UAL allocated to the employer.



SLGRP Pooling Methodology

Conclusions

- In addition to simplicity, the result is a greater pooling of liabilities than under the prior method. That is, for the vast majority, transition liabilities have been reduced.
- The LAC has been very supportive of this change, however, one issue has arisen that affects a small number of employers.
 - Employers who issued bonds in 2004 or 2005 with the intent of paying off their transition liability may instead have a side account established
 - Instead of a fixed reduction in borrowing costs between the interest rate of the bonds and the interest rate of the transition liability, they now have an investment in the PERS portfolio with an underlying borrowing expense.



Treatment of Rate Guarantee Reserve

- Inclusion of rate guarantee / deficit reserve in actuarial asset value
 - Fails to treat rate guarantee reserve as a true reserve with a single purpose
 - Creates mismatch between plan liabilities and actuarial asset value, by assuming reserve will provide benefit increases which are not included in plan liabilities
 - Increases contribution volatility
- Therefore, the rate guarantee / deficit reserve should be excluded from assets when determining actuarial asset value



Summary Next Steps

- April Board Meeting – Decision on actuarial methods
- June Board Meeting – Experience study
- September Board Meeting – 12/31/2005 system-wide valuation results
 - OPSRP
 - PERS T1/T2



Summary

Decisions to be Made

Method or Assumption	Alternatives		
Cost Method	Projected Unit Credit		Entry Age Normal
Amortization Period for Change in Cost Method	Rolling 3 Years	Rolling 4 Years	Rolling 5 Years
Contribution Rate Stabilization Method	Market Value of Assets with Collar on Contribution Rate Changes		4-Year Asset Smoothing
Amortization Period at 12/31/2005	20 Years		22 Years
SLGRP Pooling Method	New Method with Fresh Start 1/1/2004		
Rate Guarantee Reserve	Exclude from Valuation Assets		
Technical Changes	Adopt Technical Changes in Appendix		

Appendix





Appendix Method and Assumption Changes

- Strunk/Eugene
 - Tier 1 member accounts earn 8.0% for all years
 - COLA applied for all retirees (i.e., no freeze)
 - Assets and benefits adjusted to reflect:
 - 1999 earnings of 11.33% instead of 20.00%
 - 2003 Tier 1 member account earnings of 8.0% instead of 0.0%
 - 2004 Tier 1 member account earnings of 8.0%
 - Retiree benefits adjusted for missed COLAs



Appendix

Method and Assumption Changes

- Transition Changes
 - Assume beginning of year decrements instead of mid-year decrements
 - Entry age defined as valuation date minus credited service
 - Valuation pay is defined as prior year pay increased for a year of salary scale instead of half a year increase
 - Amortization factor based on monthly interest instead of continuous interest
 - UAL is amortized over combined OPSRP and PERS payroll for members who are under the maximum assumed retirement age instead of all payroll
 - BIF assets are allocated to pools/employers in proportion to their BIF liability instead of in proportion to Member Accounts + Employer Accounts + BIF liability
 - Assets in the Rate Guarantee Reserve are excluded from valuation assets
 - In applying the smoothing method, actual earnings are reduced by any transfers to the Contingency, Capital Preservation, or Rate Guarantee reserves
 - The 10% corridor for the smoothing method is applied based on the valuation assets instead of total assets (including reserves)
 - Transfers from side accounts are calculated equal to actual payroll times the rate relief increased for interest at the rate credited to employer accounts



Appendix

Method and Assumption Changes

- SLGRP Pooling Methodology
 - One UAL rate is charged to all employers in the pool instead of a different UAL rate for each year of the pool
 - Employer contributions are allocated to normal cost, UAL and transition liability based on actual payroll and the contribution rates in effect instead of based on a proportion of the absolute value of the amount outstanding
 - Transition liability or surplus is calculated such that employers joining the pool pay the same pooled UAL rate and a transition rate to make up for the difference between the employer's and pool's market value funded status
 - The transition to the new pooling methodology was accomplished through a fresh start calculation of the pool as of 1/1/2004 reflecting the assets and liabilities allocated to each employer under the prior pooling methodology as of 12/31/2003
 - The new pooling methodology and fresh start transition approach were presented to and discussed with the LAC on 11/4/2005 and 1/5/2006

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