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Double Rate Collar Implementation
## Oregon Public Employees Retirement System

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Introduction

- In November, employer contribution rate setting for 2011-2013 was discussed in light of the market downturn, with focus on rate collaring methodology
- Key points from that meeting and from our September presentation:
  - System liabilities display modest, predictable annual growth
  - System asset levels have been highly volatile
  - Funded status has improved modestly due to 2009 returns
    - Estimate excluding side accounts: 75% funded; $14 billion shortfall
      - Including side accounts: 85% funded status and $9 billion shortfall
    - Improvement will be insufficient to avoid a "double rate collar" increase for most employers for the 2011-2013 biennium
  - Even in a good investment return scenario, base rates would increase for several future biennia
  - Employers with side accounts have greater net contribution rate volatility than employers without side accounts
  - Revising the implementation of the double rate collar should be considered

Revised Implementation of the Double Rate Collar

- A revised implementation would phase in the double rate collar starting at 80% funded status, with full implementation at 70% funded status

    – A symmetrical approach would be used between 120% and 130%
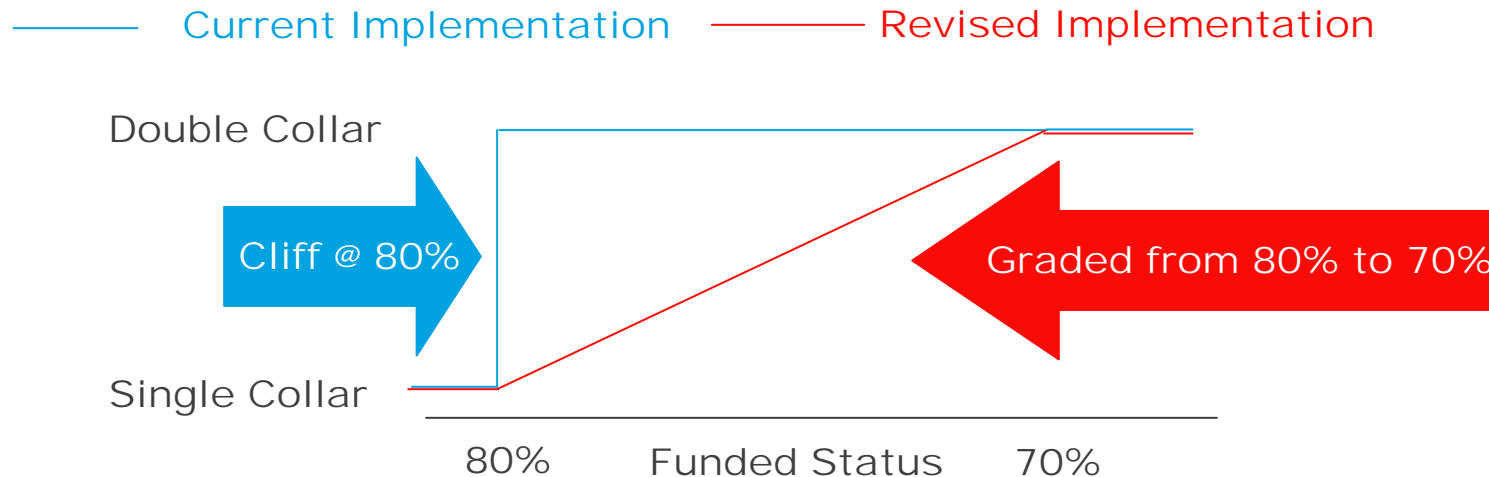
- The current and revised implementations would be identical above 80% funded status and below 70% funded status

- The revised implementation would:

    – Eliminate the arbitrary cliff increase at 80% funded status

    – Better align rate increases with employer funded status

Guiding Principles

- The Public Employees Retirement Board (PERB) has established the following principles to guide employer rate-setting methodology:
  - *Transparent*
  - *Predictable and stable rates*
  - *Protect funded status*
  - *Equitable across generations*
  - *Actuarially sound*
  - *GASB compliant*

- A revised implementation for the double rate collar is under consideration

> *Would adopting a revised implementation for the double rate collar be consistent with the principles noted above?*

Guiding Principles

Principle: Transparent

- The current rate collaring approach was first established effective with the December 31, 2004 valuation
  - The rate collar is used in combination with the reported fair market value of system assets to develop contribution rates
  - Rate collaring is used in lieu of an asset smoothing method
- The fair market/rate collar approach is more transparent and understandable to stakeholders than asset smoothing
- A revised implementation approach would maintain the transparency that is derived from using fair market asset values
- The rate collar calculation that would be used in a revised implementation would be as transparent and as understandable as the current approach

Guiding Principles

Principle: Predictable and Stable Rates

- To assist with predictability, biennial rates are set well in advance, with advisory rates provided to employers in non-rate-setting valuation years

- Stability is provided by the rate collar, which spreads the effects of a significant market upturn or downturn across more than one biennium

  - In a market downturn, rate stability is necessarily limited when investment returns are volatile as this principle must be balanced against the competing principle of protecting funded status

- A revised implementation enhances predictability and stability

  - The improvement is derived from eliminating the arbitrary "cliff" at 80%

  - For a sample employer, decreasing from 80% to 79% funded status would

    - For current implementation: Increase collar width by 3.0% of payroll

    - For revised implementation: Increase collar width by 0.3% of payroll

      - The collar would widen by 0.3% of payroll for each additional 1% decrease in funded status until funded status reached 70%
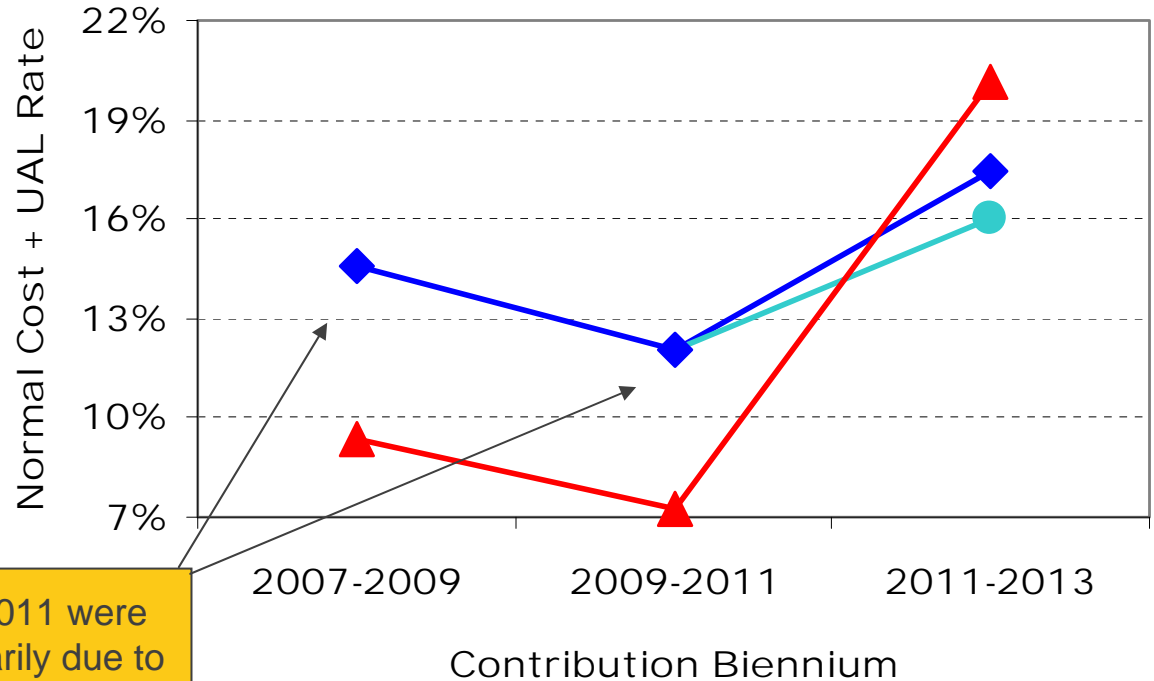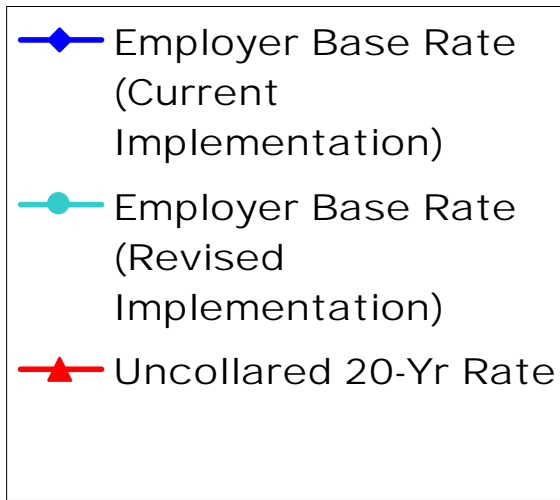
Guiding Principles

Principle: Predictable and Stable Rates

- In a volatile environment, a rate setting approach that upholds this principle should spread needed changes in employer rates across several biennia
  - One way to assess effectiveness is to compare actual employer rates against an actuarial "uncollared" rate based on fair market assets
    - The next page compares, for the two most recent biennia and the upcoming (2011-2013) biennium:
      - The rate determined by the PERB-enacted approach, and
      - An uncollared rate based on a 20-year amortization of all shortfalls
- The chart illustrates that for the period illustrated base rates have been above those of an uncollared 20-year rate in aggregate
  - This holds true for either the current or revised implementation
  - The movement in actual rates has been significantly more stable than the movement in the uncollared 20-year rate

Principle: Predictable and Stable Rates

Legend:
- Employer Base Rate (Current Implementation)
- Employer Base Rate (Revised Implementation)
- Uncollared 20-Yr Rate

Y-axis: Normal Cost + UAL Rate (7%, 10%, 13%, 16%, 19%, 22%)

X-axis (Contribution Biennium): 2007-2009, 2009-2011, 2011-2013

Base Rates for 2007-2009 and 2009-2011 were above the uncollared 20-year rate primarily due to amortizing a portion of the shortfall over 3 years

2011-2013 rates are estimates. Actual rates will depend on the results of the 12/31/2009 Actuarial Valuation, including asset levels as reported by OIC/PERS. The base rate excludes contributions to the IAP, retiree healthcare programs, debt service on Pension Obligation Bonds, and side account rate offsets.

Guiding Principles
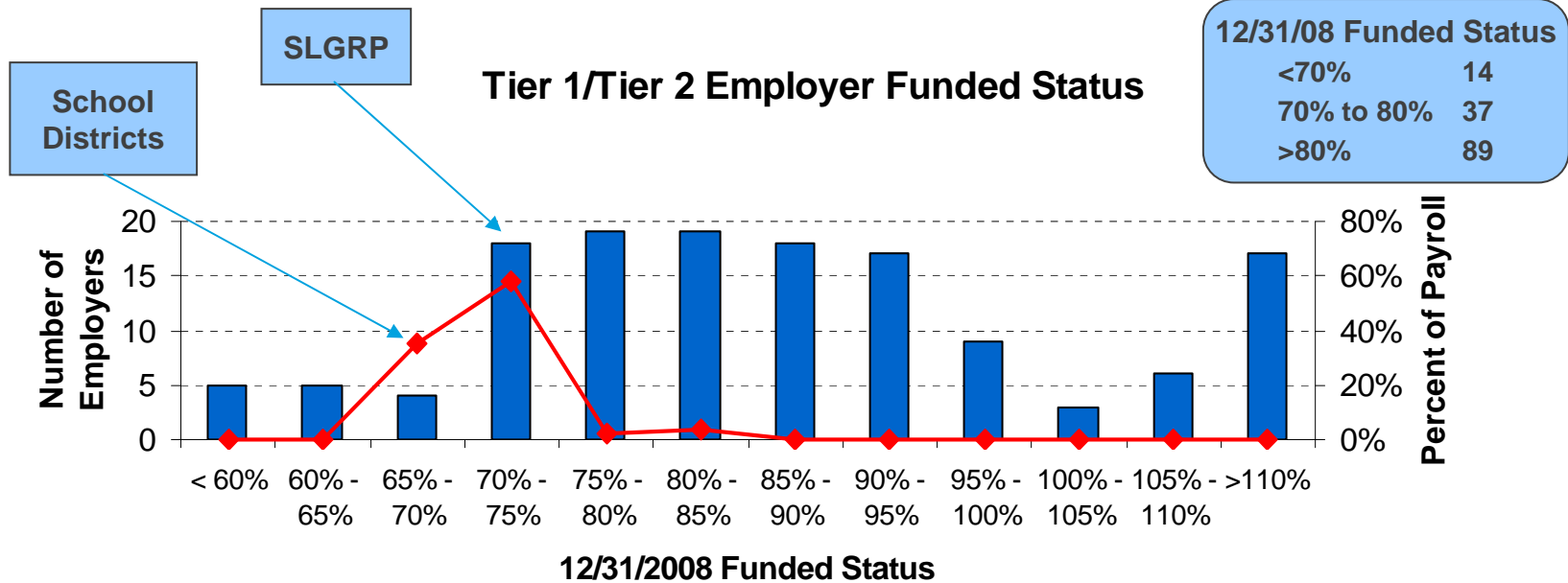
Principle: Predictable and Stable Rates

- The impact of a revised implementation is modeled on a systemwide basis, with the system treated as one employer with one funded status

- In reality, the system is not a monolith

  - PERS has hundreds of contributing employers, divided into 2 rate pools and 138 non-pooled independent employers

    - The two rate pools are School Districts and SLGRP (State and Local Government Rate Pool)

    - Funded status varies from rate pool to rate pool and employer to employer

      - As such, elimination of the 3% cliff is not just of academic interest

There will be employers just above and just below 80% as of December 31, 2009

- The next page illustrates the funded status distribution of the various employers and rate pools as of December 31, 2008

Guiding Principles

Principle: Predictable and Stable Rates

Tier 1/Tier 2 Employer Funded Status

12/31/08 Funded Status	
<70%	14
70% to 80%	37
>80%	89

School Districts

SLGRP

12/31/2008 Funded Status

The blue bars show the number of employers in each funded status range (left axis)
The red line shows the share of valuation payroll attributable to those employers (right axis)
School Districts & SLGRP are each treated as one employer in this chart

Funded status at December 31, 2009 will vary from the 2008 distribution shown above, but will generally reflect the estimated 4% improvement in overall system funded status from 2008 to 2009

Guiding Principles

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Principle: Protect Funded Status

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- In the event of a downturn, rates should be set in a manner that will allow the system's funded status to be restored over time as investments recover

  – The double collar allows for sufficient responsiveness in rates to protect funded status if a downturn is significant

- Questions to help assess adherence to this principle after a downturn:

  – If the system meets or exceeds the actuarial investment return assumption (currently 8%), does funded status improve?

  – In the event of prolonged poor investment performance, does funded status either stabilize or, at the very least, display a slower rate of decline?

Guiding Principles

Principle: Protect Funded Status

The assumptions behind the projections are detailed in the Appendix
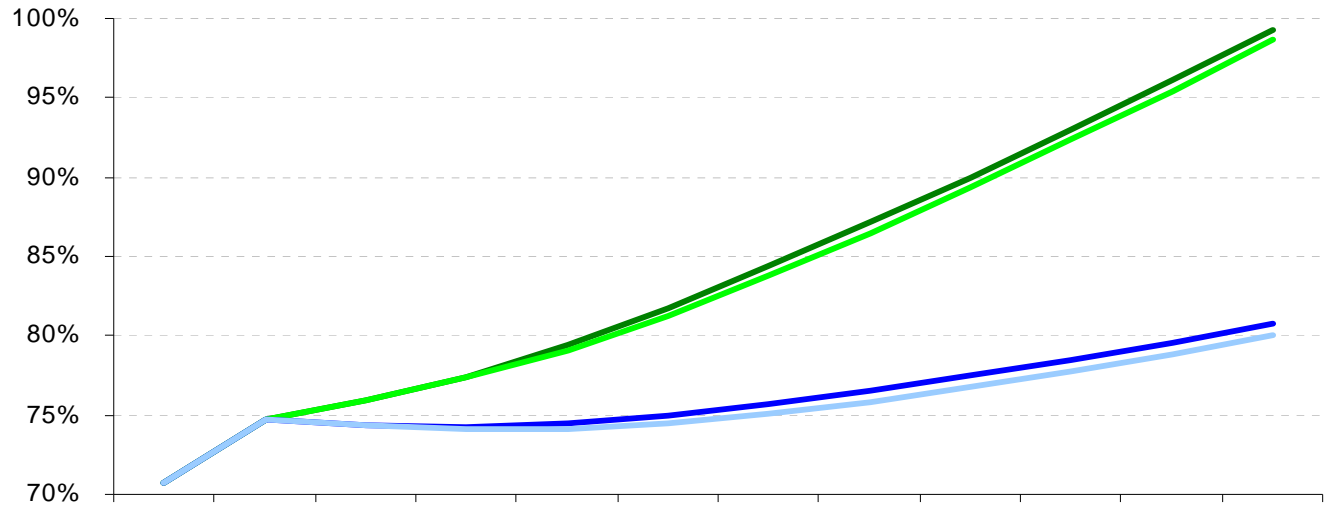
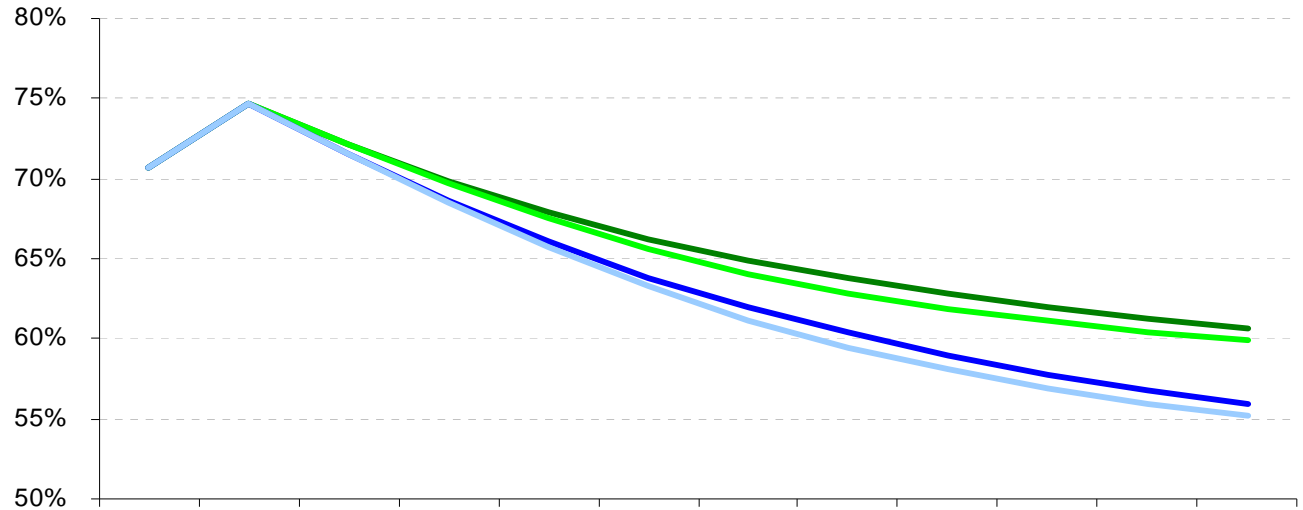| As of 12/31		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Current Implementation, 10.5% Return		71%	75%	76%	77%	79%	82%	84%	87%	90%	93%	96%	99%
Revised Implementation, 10.5% Return		71%	75%	76%	77%	79%	81%	84%	86%	89%	92%	95%	99%
Current Implementation, 8.0% Return		71%	75%	74%	74%	74%	75%	76%	77%	78%	79%	80%	81%
Revised Implementation, 8.0% Return		71%	75%	74%	74%	74%	74%	75%	76%	77%	78%	79%	80%

Both the current and revised implementations move funded status upward if the investment return assumption is met or exceeded, with the ten-year funded status projection about 1% lower under a revised implementation

Guiding Principles

Principle: Protect Funded Status

3.5% annual return is a proxy for a 5th percentile return over 10 years

Comparing the 2009-2014 period to the 2014-2019 period, the rate of funded status decline decreases 40-60%

As of 12/31		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Current Implementation, 4.5% Return		71%	75%	72%	70%	68%	66%	65%	64%	63%	62%	61%	61%
Revised Implementation, 4.5% Return		71%	75%	72%	70%	68%	66%	64%	63%	62%	61%	60%	60%
Current Implementation, 3.5% Return		71%	75%	72%	69%	66%	64%	62%	60%	59%	58%	57%	56%
Revised Implementation, 3.5% Return		71%	75%	72%	69%	66%	63%	61%	59%	58%	57%	56%	55%

The current and revised implementations are identical below 70% funded status, and thus exhibit similar funded status stabilization ability in the event of prolonged poor investment performance

Guiding Principles

Principle: Equitable Across Generations

- To help achieve generational equity, any Unfunded Actuarial Liability (UAL) shortfalls under the system are amortized over the following periods as a level percentage of projected employer payroll
  - Tier 1/Tier 2 UAL: 20 years
  - OPSRP UAL: 16 years
- Employer base rates are calculated to assess for both:
  - The shortfall amortizations noted above (i.e., the "UAL Rate"), plus
  - The Normal Cost Rate, which is the economic value of new benefits earned during the year
- In a significant downturn, the calculated UAL Rate increases substantially
  - The collar can spread the UAL Rate change across several biennia
- The prior funded status projections show a revised implementation would not significantly affect the principle in place under the current approach

Guiding Principles

Principles: Actuarially Sound; GASB Compliant

- We believe both the current and revised implementation approaches are actuarially sound

  - Evidence of this is the improvement in funded status under either approach if the 8% actuarial investment return assumption is met

- We also believe that either implementation approach is compliant with Governmental Accounting Standards Board (GASB) directives

Summary / Conclusions

- The single and double rate collars reflect a balance of competing principles
  - The single rate collar limits rates to a predictable and stable range in a transparent manner that uses a fair market asset value
  - The double rate collar widens the range to protect funded status, uphold generational equity and maintain actuarial soundness in a downturn
- In our view, a revised double rate collar implementation would not substantially alter the balance between these principles
  - Ten year projected funded status would differ by no more than 1% compared to the current implementation under the modeled scenarios
- A revised implementation would improve predictability and stability by eliminating the arbitrary "cliff" at 80% funded status in the current approach
  - In addition, rate increases would be better aligned with employer funded status
- Either implementation approach would not affect the level of rate offsets generated by side accounts, as side account rate offsets are not collared
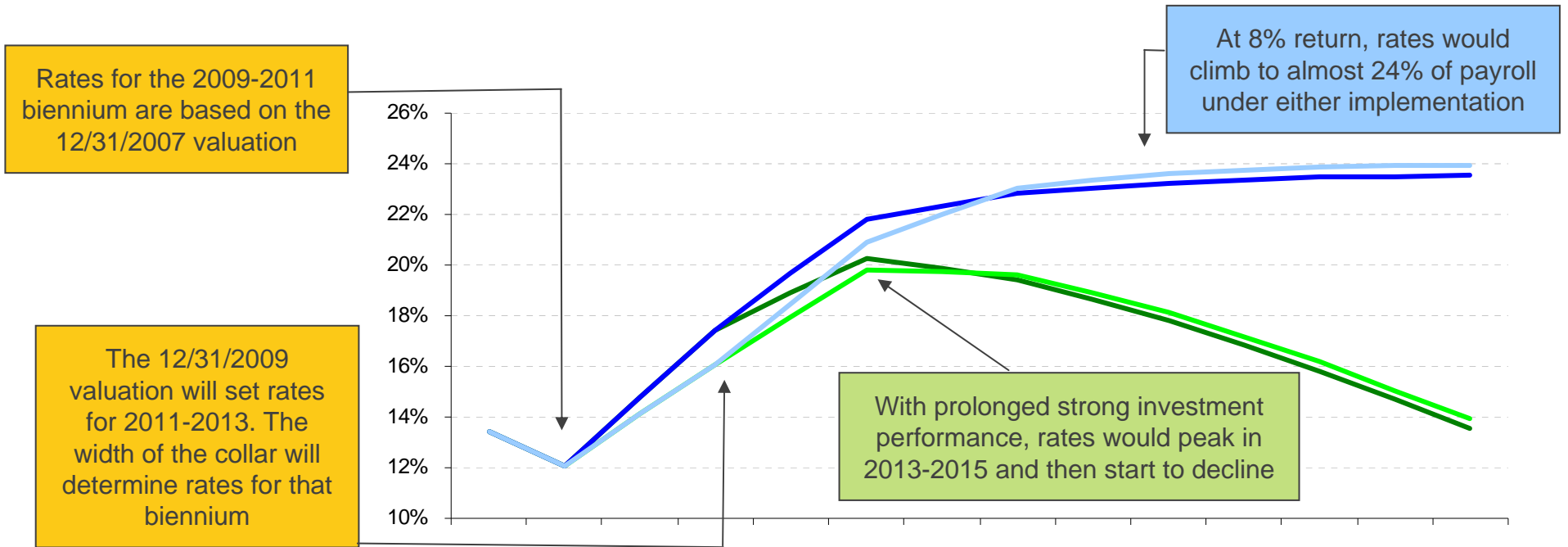
Financial Impact

Financial Impact

- We have presented the funded status impact of a revised implementation

- Financial impact depends on actual employer rates and contribution amounts

- The following two measures help assess the financial impact:

  - Contribution rate projections

    - Use "base" rates – excluding the effect of side account rate offsets

    - Modeled on a systemwide basis

  - Estimated actual employer contributions for the 2011-2013 biennium

    - Uses "net" rates and contribution amounts

      - Includes effects of side account rate offsets based on estimated December 31, 2009 asset levels

    - Employers were grouped into three categories

- Details on the assumptions and methodology behind the estimates and projections are in the Appendix

Financial Impact - Projections of Base Rates
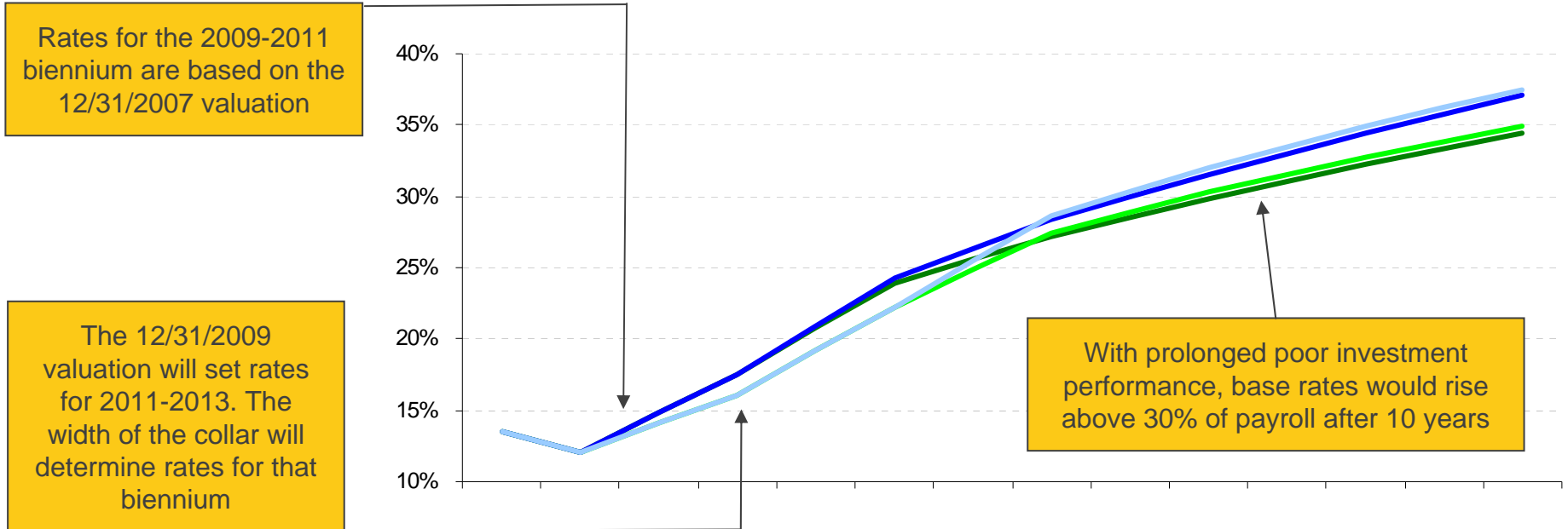## Combined Payroll Weighted (Tier 1/Tier 2, OPSRP) Base Contribution Rate

Rates for the 2009-2011 biennium are based on the 12/31/2007 valuation

At 8% return, rates would climb to almost 24% of payroll under either implementation

The 12/31/2009 valuation will set rates for 2011-2013. The width of the collar will determine rates for that biennium

With prolonged strong investment performance, rates would peak in 2013-2015 and then start to decline

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Current Implementation, 10.5% Return		13.4%	12.1%	14.8%	17.4%	18.9%	20.3%	19.8%	19.4%	18.6%	17.8%	16.8%	15.8%	14.7%	13.6%
Revised Implementation, 10.5% Return		13.4%	12.1%	14.1%	16.0%	17.9%	19.8%	19.7%	19.6%	18.9%	18.1%	17.2%	16.2%	15.1%	13.9%
Current Implementation, 8.0% Return		13.4%	12.1%	14.8%	17.4%	19.7%	21.8%	22.3%	22.8%	23.0%	23.2%	23.4%	23.5%	23.5%	23.5%
Revised Implementation, 8.0% Return		13.4%	12.1%	14.1%	16.0%	18.5%	20.9%	22.0%	23.1%	23.3%	23.6%	23.7%	23.9%	23.9%	23.9%

Base rates do not reflect the effects of side account rate offsets, and do not include contribution rates for the IAP or retiree healthcare programs, debt service on pension obligation bonds, or any contributions that might be needed to address a 5-year Rate Guarantee Reserve deficit

Rates for the 2009-2011 biennium are based on the 12/31/2007 valuation

The 12/31/2009 valuation will set rates for 2011-2013. The width of the collar will determine rates for that biennium

With prolonged poor investment performance, base rates would rise above 30% of payroll after 10 years

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Current Implementation, 4.5% Return	13.4%	12.1%	14.8%	17.4%	20.7%	23.9%	25.6%	27.2%	28.5%	29.8%	31.0%	32.2%	33.3%	34.4%
Revised Implementation, 4.5% Return	13.4%	12.1%	14.1%	16.0%	19.2%	22.3%	24.9%	27.5%	28.9%	30.3%	31.5%	32.7%	33.8%	34.9%
Current Implementation, 3.5% Return	13.4%	12.1%	14.8%	17.4%	20.9%	24.2%	26.3%	28.4%	30.0%	31.6%	33.0%	34.4%	35.7%	37.0%
Revised Implementation, 3.5% Return	13.4%	12.1%	14.1%	16.0%	19.2%	22.3%	25.5%	28.6%	30.4%	32.1%	33.5%	34.9%	36.2%	37.5%

Base rates do not reflect the effects of side account rate offsets, and do not include contribution rates for the IAP or retiree healthcare programs, debt service on pension obligation bonds, or any contributions that might be needed to address a 5-year Rate Guarantee Reserve deficit

Financial Impact - Estimated 2011-2013 Net Rates/Contributions
Combined Payroll Weighted (Tier 1/Tier 2, OPSRP) Net Contribution Rate

Rates shown are estimates only. The actual 2011-2013 rates will be calculated in the 12/31/2009 actuarial valuation.

Estimated Net Employer Rates/Contributions (amounts in millions)						
			2011-2013 Implementation			
Employer Group	**2009-2011**		**Current**		**Revised**	
State Agencies	3.3%	$149	12.4%	$611	10.6%	$522
School Districts	5.3%	$310	13.1%	$823	12.5%	$785
Locals/All Others	6.5%	$421	13.1%	$912	11.0%	$766
Total	**5.2%**	**$880**	**12.9%**	**$2,346**	**11.4%**	**$2,073**

The net contribution rate increase is greater than the collar width due to the effect of changes in side account offsets, which are not collared

- The increase for State Agencies includes a 3.1% reduction in the side account offset rate, which is in addition to the collared base rate increase

Net rates do reflect the effects of side account rate offsets, but do not include contribution rates for the IAP or Retiree Healthcare Programs, debt service on Pension Obligation Bonds, or any contributions that might be needed to address a 5-year Rate Guarantee Reserve deficit

Actuarial Certification

Mercer has prepared this presentation exclusively for the Oregon PERS Board to inform the Board and other stakeholders on actuarial considerations related to implementation of the double rate collar. This presentation may not be used or relied upon by any other party or for any other purpose; Mercer is not responsible for the consequences of any unauthorized use.

This report material includes or is derived from projections of future funding and/or accounting costs and/or benefit related results. To prepare these projections or results, various *actuarial assumptions*, as described in the Appendix, were used to project a limited number of scenarios from a range of possibilities. However, the future is uncertain, and the system's actual experience will likely differ from the assumptions utilized and the scenarios presented; these differences may be significant or material. In addition, different assumptions or scenarios may also be within the reasonable range and results based on those assumptions would be different. This report has been created for a limited purpose, is presented at a particular point in time and should not be viewed as a prediction of the system's future financial condition. To prepare the results shown in this report, various *actuarial methods*, as described in the Appendix, were used.

Because actual system experience will differ from the assumptions, decisions about benefit changes, investment policy, funding amounts, benefit security and/or benefit-related issues should be made only after careful consideration of alternative future financial conditions and scenarios and not solely on the basis of a valuation report or reports.
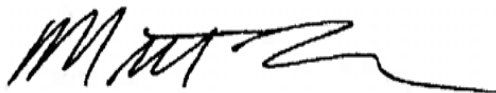
This report is based on data and system provisions as described in the Appendix. Oregon PERS is solely responsible for the validity, accuracy and comprehensiveness of this information. If the data or plan provisions supplied are not accurate and complete, the valuation results may differ significantly from the results that would be obtained with accurate and complete information; this may require a later revision of this report.

Actuarial Certification

Professional Qualifications

We are available to answer any questions on the material in this report or to provide explanations or further details as appropriate. The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services that could create a conflict of interest, that would impair the objectivity of our work.
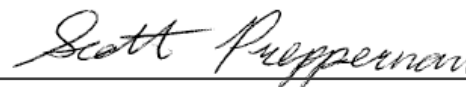
We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

(signature)	January 29, 2010	_(signature)_	January 29, 2010
Matthew R. Larrabee, FSA, EA, MAAA	**Date**	**Scott D. Preppernau, FSA, EA, MAAA**	**Date**
Enrolled Actuary No. 08-6154		**Enrolled Actuary No. 08-7360**	

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Appendix

Financial Projections
Overview

- Basis for modeling
  - 12/31/2008 Tier 1/Tier 2 and OPSRP actuarial valuations
  - Contribution rates and funded status are modeled on a system-wide basis, and do not include retiree healthcare or IAP contributions
  - **Based on published investment returns through November 30, 2009**
    - The OIC published November 2009 return on general account assets of +15.55% was treated as the 2009 12-month annual investment return
  - 2009 investment experience is assumed to improve funded status 4%

- Projected effects of 10.5%, 8.0%, 4.5%, 3.5% annual investment returns
  - Represents 25-year earnings average, valuation interest rate, 10-year earnings average and 5th percentile 10-year return, respectively

- Results model the impact of two double collar implementation approaches
  - Current implementation: Collar immediately doubles at 80% funded status
  - Revised implementation: Double collar phases in from 80% to 70%

Base rates & funded percentages shown are before consideration of side accounts

Base Rates Versus Net Rates

- The modeled base contribution rate consists of two parts:
  - Normal Cost Rate
    - Economic value of new benefits during a year
  - Unfunded Actuarial Liability (UAL) Rate
    - Amortization payment of shortfalls for benefits already granted

- Base rates exclude the effects of:
  - Side account rate offsets
  - Payments for Individual Account Program (IAP), retiree healthcare, and debt service on Pension Obligation Bonds (POBs)

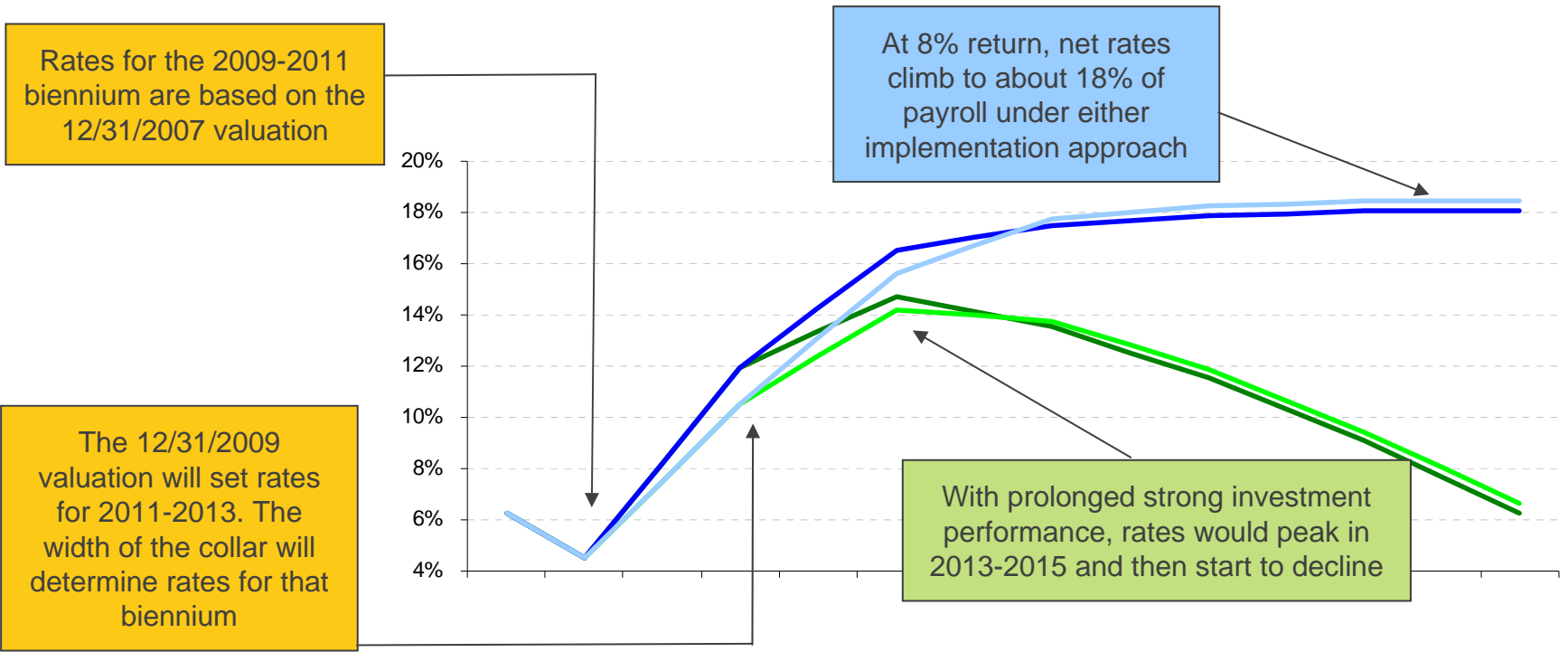- Net rates include the effect of side account rate offsets

Usefulness / Limitations of Models

- The recent downturn and subsequent partial recovery help to illustrate both the usefulness and limitations of actuarial modeling

- Models are useful because they can provide:
  - Long-term forecasting using "best estimate" assumptions
  - Sensitivity analysis on the effect of a key factor varying from assumption
    - Example: September 2009 Board meeting projections
  - An estimate of the likely range of possible outcomes (with percentiles) for a robust variety of possible future experience
    - Examples: Annual financial modeling presentations to the Board
  - The ability for policymakers and stakeholders to quantify the projected long-term effects of significant recent changes

- Models are limited because:
  - They are not a guarantee of future experience
  - Actual experience can fall outside of the range of even a robust model

"Computers are useless. They can only give you answers."   *-Picasso*

Rates for the 2009-2011 biennium are based on the 12/31/2007 valuation

At 8% return, net rates climb to about 18% of payroll under either implementation approach

The 12/31/2009 valuation will set rates for 2011-2013. The width of the collar will determine rates for that biennium

With prolonged strong investment performance, rates would peak in 2013-2015 and then start to decline

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Current Implementation, 10.5% Return	6.2%	4.5%	8.2%	11.9%	13.3%	14.7%	14.1%	13.5%	12.5%	11.5%	10.3%	9.1%	7.7%	6.3%
Revised Implementation, 10.5% Return	6.2%	4.5%	7.5%	10.5%	12.4%	14.2%	14.0%	13.8%	12.8%	11.8%	10.6%	9.4%	8.0%	6.6%
Current Implementation, 8.0% Return	6.2%	4.5%	8.2%	11.9%	14.2%	16.5%	17.0%	17.5%	17.7%	17.9%	18.0%	18.0%	18.0%	18.0%
Revised Implementation, 8.0% Return	6.2%	4.5%	7.5%	10.5%	13.1%	15.6%	16.7%	17.8%	18.0%	18.3%	18.4%	18.4%	18.4%	18.4%

Net rates do reflect the effects of side account rate offsets, but do not include contribution rates for the IAP or Retiree Healthcare Programs, debt service on Pension Obligation Bonds, or any contributions that might be needed to address a 5-year Rate Guarantee Reserve deficit

Rates for the 2009-2011 biennium are based on the 12/31/2007 valuation

The 12/31/2009 valuation will set rates for 2011-2013. The width of the collar will determine rates for that biennium

With prolonged poor investment performance, net rates rise above 30% of payroll after 13 years

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Current Implementation, 4.5% Return	6.2%	4.5%	8.2%	11.9%	15.5%	19.0%	20.8%	22.6%	24.1%	25.6%	26.9%	28.3%	29.5%	30.8%
Revised Implementation, 4.5% Return	6.2%	4.5%	7.5%	10.5%	13.9%	17.3%	20.1%	22.9%	24.5%	26.0%	27.4%	28.7%	30.0%	31.2%
Current Implementation, 3.5% Return	6.2%	4.5%	8.2%	11.9%	15.7%	19.4%	21.7%	24.0%	25.8%	27.6%	29.2%	30.8%	32.3%	33.8%
Revised Implementation, 3.5% Return	6.2%	4.5%	7.5%	10.5%	14.0%	17.4%	20.9%	24.3%	26.2%	28.1%	29.7%	31.3%	32.8%	34.2%

Net rates do reflect the effects of side account rate offsets, but do not include contribution rates for the IAP or Retiree Healthcare Programs, debt service on Pension Obligation Bonds, or any contributions that might be needed to address a 5-year Rate Guarantee Reserve deficit

Data

We have based our ten-year financial projection of the liabilities on the data, methods, assumptions and plan provisions described in the December 31, 2008, Actuarial Valuation ("2008 Valuation Report") for the Oregon Public Employees Retirement System.

Assets as of December 31, 2008, were based on values provided by Oregon PERS reflecting the Board's earnings crediting decisions for 2008. Assets and year-to-date returns as of November 30, 2009 as published by the Oregon Investment Council (OIC) were used as the basis for estimating December 31, 2009 assets.

As the starting point for the financial projections, assets were updated based on year-to-date investment results through November 30, 2009 as published by the Oregon Investment Council (OIC). Year-to-date 2009 returns as of that date on regular accounts are +15.55%.

We have assumed that the active participant data reflected in the valuation of the Plan remains stable over the projection period (i.e. – participants leaving employment are replaced by new hires in such a way that the total counts, average age, and average service remain stable from year to year). No new members are assumed to be eligible for Tier 1 and Tier 2 benefits; all new entrants are assumed to become members under the OPSRP benefit formula.

Methods / Policies

Liabilities are based on the Projected Unit Credit method and are rolled forward according to the following rules:

Normal cost: Normal cost increases with assumed wage growth adjusted for wage experience, demographic experience and asset return experience (if applicable). Demographic experience follows assumptions described in the 2008 Valuation Report.

Accrued liability: Liabilities increase with normal cost and decrease with benefit payments. Results are adjusted for wage, demographic and asset experience (if applicable).

Contribution Rates: The projected contribution rates are calculated on each odd valuation date in accordance with methodologies described in the 2007 and 2008 Valuation Reports. Rates are applied 18 months after the biennial determination date.

Expenses: Administration expenses for ten-year financial projections were assumed to be equal to $6.6M plus .05% of Market Value of Assets.

Actuarial Value of Assets: Equal to Market Value of Assets excluding Contingency, Capital Preservation and Tier 1 Rate Guarantee Reserves

Appendix
Actuarial Basis

Assumptions

In general, assumptions for financial projections are as described in the 2008 Valuation Report.

The major assumptions used in our financial projections are shown below. They are aggregate average assumptions that apply to the whole population and were held constant throughout the projection period. The economic experience adjustments were allowed to vary in future years given the conditions defined in each economic scenario.

- Valuation interest rate — 8.00%
- General Accounts Growth — 8.00%
- Variable Account Growth — 8.50%
- Wage growth assumption — 3.75%
- Wage growth experience — inflation + 1.25%
- Demographic experience — reflects decrement assumptions as described in the 2008 Valuation Report.

Reserve Projections

Contingency Reserve as of 12/31/2008 is $653.2M. No future increases or decreases from this reserve were assumed.

Capital Preservation Reserve was assumed to be $0 throughout the projection period.

Tier 1 Rate Guarantee Reserve ("T1RGR") is a deficit of $0.98B as of 12/31/2008. The reserve was assumed to grow with returns in excess of 8% on Tier 1 Member Accounts plus T1RGR. When aggregate returns were below 8%, applicable amounts from the T1RGR were transferred to the Tier 1 Member Accounts to maintain the 8% target growth on the member accounts. No contributions were allocated to the T1 RGR and the 5-year call on a deficit was not modeled.

Provisions

Provisions valued are as detailed in the 2008 Valuation Report.

MERCER

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