Agenda

- What is asset smoothing?
- How does asset smoothing really apply to a retirement system?
- Key components of asset smoothing
  - Smoothing Period
  - Corridor
  - Amortization Period
- What do other Systems use?
- Measuring Risk versus Reward
Dow Jones Industrial Average:
Over the last year
Dow Jones Industrial Average: Over the last year

- July: -28%
- August: +15%
- September: +20%
- October: -27%
- November: +20%
- December: -22%
- January: +15%
- February: +35%
- March: +35%
- April: +35%
- May: +35%
- June: +35%
- July: +35%
Asset Smoothing

- Annual fluctuation in the investment performance is averaged over a period of years
- Smoothing is a method used to focus the decision making process on the long term
  - Consistency in funding
  - Consistency in reporting
  - Consistency in benefit provisions
- However, smoothing does not impact long term costs or funded positions
  - Only impacts timing
Market and Actuarial Values of Assets
(Sample retirement system)

<table>
<thead>
<tr>
<th>Year</th>
<th>Market</th>
<th>Actuarial</th>
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<tbody>
<tr>
<td>1998</td>
<td>$66.5</td>
<td>$60.4</td>
</tr>
<tr>
<td>1999</td>
<td>$79.9</td>
<td>$69.4</td>
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<tr>
<td>2000</td>
<td>$90.0</td>
<td>$79.3</td>
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<tr>
<td>2001</td>
<td>$79.4</td>
<td>$86.4</td>
</tr>
<tr>
<td>2002</td>
<td>$71.7</td>
<td>$86.0</td>
</tr>
<tr>
<td>2003</td>
<td>$77.6</td>
<td>$89.0</td>
</tr>
<tr>
<td>2004</td>
<td>$84.2</td>
<td>$88.8</td>
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<tr>
<td>2005</td>
<td>$93.7</td>
<td>$89.3</td>
</tr>
<tr>
<td>2006</td>
<td>$100.2</td>
<td>$94.2</td>
</tr>
<tr>
<td>2007</td>
<td>$112.1</td>
<td>$103.4</td>
</tr>
<tr>
<td>2008</td>
<td>$104.9</td>
<td>$110.2</td>
</tr>
</tbody>
</table>

AVA is currently 105.1% of MVA, was 92.2% last year
Estimated Yields Based on Actuarial and Market Value of Assets
(Sample retirement system)

6.9% average compound return (on market value) over last 10 years. 9.8% over last 20 years.
8.4% average compound return (on actuarial value) over last 10 years.
Optimal Scenario
(Sample retirement system)

Projection with Assumptions Exactly Matched

- Expected Funded Ratio at each valuation date based on expected return during each year
- Contribution rate expected to be equal to the actuarial determined rate
- Assumes all other assumptions are exactly met
Stochastic Scenario – expected return met over 25 years, no smoothing

Projection with Assumptions Exactly Matched
No smoothing

- Expected Funded Ratio at each valuation date based on simulated return during each year
- Contribution rate expected to be equal to the actuarial determined rate
- Assumes all other assumptions are exactly met
Stochastic Scenario – expected return met over 25 years, 3 year smoothing

Projection with Assumptions Exactly Matched 3 year Smoothing

- Expected Funded Ratio at each valuation date based on simulated return during each year
- Contribution rate expected to be equal to the actuarial determined rate
- Assumes all other assumptions are exactly met
Stochastic Scenario – expected return met over 25 years, 5 year smoothing

Projection with Assumptions Exactly Matched 5 Year Smoothing

- Expected Funded Ratio at each valuation date based on simulated return during each year
- Contribution rate expected to be equal to the actuarial determined rate
- Assumes all other assumptions are exactly met
Stochastic Scenario – expected return met over 25 years, 10 year smoothing

Projection with Assumptions Exactly Matched 10 Year Smoothing

- Expected Funded Ratio at each valuation date based on simulated return during each year
- Contribution rate expected to be equal to the actuarial determined rate
- Assumes all other assumptions are exactly met
Stochastic Scenario – expected return met over 25 years, 15 year smoothing

Projection with Assumptions Exactly Matched 15 Year Smoothing

- Expected Funded Ratio at each valuation date based on simulated return during each year
- Contribution rate expected to be equal to the actuarial determined rate
- Assumes all other assumptions are exactly met
Three components of smoothing

- **Asset smoothing period**
  - How long an assets gain/loss is to be reflected in the Actuarial Value of Assets (AVA)
    - Funding value of assets

- **Corridors**
  - Keeps the AVA within a certain range of the Market Value

- **Amortization period**
  - Determines how quickly the gain/loss is “paid for”
An appropriate asset valuation method is likely to produce actuarial values of assets:

- that are sometimes greater than and sometimes less than the corresponding market values
- that fall within a reasonable range around the corresponding market values
- that will recognize any differences between the actuarial value of assets and the market value within a reasonable period of time
What are other Systems using?

Practice varies widely among retirement systems

Most common is a 5 year smoothing period without a corridor

Many systems use smoothing periods between 4 and 8 years with corridors ranging from 10% to 30%

► CalPERS employs a 15 year smoothing period with a 20% corridor, although they are reconsidering this policy

► TRS uses 5 year smoothing with a 20% corridor
Smoothing Periods used by other Systems

Source: The 2007 NASRA Public Fund Survey
Correlation of Smoothing Periods and Corridors

- Some Retirement Systems establish an asset ‘corridor’ (Example: using a 20% corridor – Funding Value cannot be greater than 120% of Market Value or lower than 80% of Market Value)

- The longer the smoothing period, the stronger the need for a tighter corridor

- The shorter the smoothing period, the less need for a tight corridor and perhaps no corridor is needed

- Corridor can be “hard” or “soft”
  - Recognize “all” or “some”
Sample retirement system
(Assumes -10% return for 2009-2014, 7.5% per year thereafter)

15 Year Smoothing, Corridor Comparison

- Green line: Smoothed with Corridor
- Black line: Smoothed
- Red line: Market
Ramifications of a Corridor

- Provides some downside protection to the funded status
- More volatility in contribution rates
- Objective of stable contribution rates more difficult to achieve
- Once funding value exceeds corridor, effect of asset smoothing is negated
Reward vs. Risk/Cost

- When deciding between methods/policies, a given reward will come with a certain level of risk
  - increased risk should be offset by a greater reward
- In choosing a smoothing method, the reward is less volatility in the contribution rate
  - But what is the risk?
  - And what is the cost?
Future investment returns are uncertain, therefore, future funding outcomes are also uncertain.
Range of Expectations
(Sample retirement system)

For risk management, we want to focus on downside risk, and the bottom ¼ of possibilities. Corridors provide some protection on the downside.
Impact of Periods/Corridors combinations
(Sample retirement system)

Projected Funding Ratio based on Market Value of Assets – 75th percentiles

- No Smoothing
- 5 Year, No Corridor
- 5 Year, 20% Corridor
- 10 Year, No Corridor
- 10 Year, 20% Corridor
Impact of Periods/Corridors combinations
(Sample retirement system)

Projected Funding Ratio based on Market Value of Assets – 95th percentiles

Axis Title

- No Smoothing
- 5 Year, No Corridor
- 5 Year, 20% Corridor
- 10 Year, No Corridor
- 10 Year, 20% Corridor
## Reward vs. Risk
(sample retirement system)

<table>
<thead>
<tr>
<th>Smoothing Period</th>
<th>Corridor</th>
<th>Average Rate Volatility</th>
<th>75th Percentile of Funded Ratio</th>
<th>95th Percentile of Funded Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Reward</td>
<td>Risk</td>
<td>Risk</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
<td>+/- 1.53%</td>
<td>56.3%</td>
<td>43.0%</td>
</tr>
<tr>
<td>5 Year</td>
<td>None</td>
<td>+/- 0.52%</td>
<td>51.1%</td>
<td>36.9%</td>
</tr>
<tr>
<td>5 Year</td>
<td>20%</td>
<td>+/- 0.55%</td>
<td>52.5%</td>
<td>39.3%</td>
</tr>
<tr>
<td>10 Year</td>
<td>None</td>
<td>+/- 0.34%</td>
<td>46.9%</td>
<td>30.5%</td>
</tr>
<tr>
<td>10 Year</td>
<td>20%</td>
<td>+/- 0.44%</td>
<td>51.8%</td>
<td>39.0%</td>
</tr>
</tbody>
</table>

Numbers above reflect a more typical plan structure, they do not necessarily reflect the results based on a TMRS structure.
Sample retirement system
(Assumes -10% return in 2009, 7.5% return per year thereafter)
Sample retirement system
(Assumes -10% return in 2009, 7.5% return per year thereafter)
Sample retirement system
(Assumes -10% return in 2009-2014, 7.5% return per year thereafter)

Employer Contribution Rate

- **Market, No Smoothing**
- **5 Year AVA, No Corridor**
- **10 Year AVA, No Corridor**
- **15 Year AVA, No Corridor**
Sample retirement system
(Assumes -10% return in 2009-2014, 7.5% return per year thereafter)

Funding Ratio (AVA)
Sample retirement system
(Assumes -10% return in 2009-2014, 7.5% return per year thereafter)

15 Year Smoothing, Funding Ratio Comparison

Does this meet the standard?

Does this meet the standard? AVA/MVA = 185%!
Sample retirement system
(Assumes -10% return in 2009-2014, 7.5% return per year thereafter)
Reward vs. Risk/Cost

- The reward is less volatility in the contribution rate
- The risk is more downside exposure
- The cost is paying more later with interest if there is no recovery
In Summary

- Pension Plan funding is a long term financial arrangement.
- Using the market value of assets as of a specific date may place too much emphasis on the short term.
  - Emotion and short term budgets may then control the decision making process.
    - Can cause over-reaction and instability.
In Summary

- Assets Smoothing is a method used to focus the decision making process on the long term
  - Consistency in funding
  - Consistency in reporting
  - Consistency in benefit provisions