Actuarial Overview
Presented by
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NCPERS UNIVERSITY:
Program for Advanced Trustee Studies (PATS)
May 18 - 19
Austin, TX
What is an Actuary?

A person who is an expert in putting a price tag on risk

Typical Actuarial Roles

– Life Insurance
– Property & Casualty Insurance
– Health Insurance
– Retirement
– Nontraditional Roles (investments, sports, etc.)
Actuarial Designations

F.S.A. = Fellow of the Society of Actuaries

A.S.A. = Associate of the Society of Actuaries

E.A. = Enrolled Actuary (ERISA Practice)

M.A.A.A. = Member of the American Academy of Actuaries

Various Others
Actuarial Roles with Pension Boards

Develop annual contribution requirements
Perform cost studies showing impact of changes in benefits, assumptions, or methods
Speak on behalf of Board to the City Council or to plan members
Aid in administration of the plan by performing benefit calculations
Make projections of future plan costs
Fundamental Truth

B + E = C + I
Funding Basics

This is ideal....

\[ \text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Earnings} \]
What is an Actuarial Valuation

The balancing, as of the valuation date, of the present value of future benefit payments with the sum of the present value of future contributions and the present assets.

Purpose
- systematic recognition of costs of the retirement system
- point-in-time picture of the actuarial condition of the system

Components
- retirement plan provisions defining benefits and eligibility
- census of participants
- assets of fund
- actuarial assumptions
- actuarial methods

Bottom line
- does the system have an adequate contribution arrangement?
- what is the actuarially determined contribution rate?
Actuarial Assumptions

Two Types

– Demographic
  • Mortality
  • Termination
  • Disability
  • Retirement

– Economic
  • Salary increases
  • Inflation
  • Investment return
<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Benefit Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$ 250,000</td>
</tr>
<tr>
<td>2020</td>
<td>300,000</td>
</tr>
<tr>
<td>2022</td>
<td>360,000</td>
</tr>
<tr>
<td>2024</td>
<td>430,000</td>
</tr>
<tr>
<td>2026</td>
<td>500,000</td>
</tr>
<tr>
<td>2028</td>
<td>600,000</td>
</tr>
<tr>
<td>……</td>
<td>……</td>
</tr>
<tr>
<td>2050</td>
<td>1,600,000</td>
</tr>
<tr>
<td>……</td>
<td>……</td>
</tr>
<tr>
<td>2100</td>
<td>$0</td>
</tr>
</tbody>
</table>
Actuarial Valuation

- Present Value of Future Benefits
Actuarial Valuation

- Present Value of Future Benefits
- Actuarial Value of Assets
Actuarial Valuation

- Unfunded Actuarial Liability
- Actuarial Value of Assets
- Present Value of Future Normal Costs
Actuarial Assumptions

Perform regular experience studies

- At least every 3-5 years for most plans
- The difference between one “reasonable” assumption and another might make a material difference in funding requirements
- Actuarial assumptions should represent your best estimate of future experience
Investment Return Assumption

Does it matter what you assume?

– No!!
  • The ultimate cost of the plan is independent of all actuarial assumptions

– YES!!!
  • Every 0.5% drop in the assumption increases costs by 5-6% of payroll, on average!
The Truth About “Funded Status”

How do we define “funded status?”

– Present Value of Future Benefits vs. Assets
– Actuarial Accrued Liability vs. Assets
– Present Value of Accrued Benefits vs. Assets
The Truth About “Funded Status”

<table>
<thead>
<tr>
<th>Actuarial Value of Assets</th>
<th>Present Value of Future Benefits</th>
<th>Funded Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50,000,000</td>
<td>$100,000,000</td>
<td>50%</td>
</tr>
<tr>
<td>Actuarial Value of Assets</td>
<td>Actuarial Accrued Liability</td>
<td>Funded Ratio</td>
</tr>
<tr>
<td>$50,000,000</td>
<td>$60,000,000</td>
<td>83%</td>
</tr>
<tr>
<td>Actuarial Value of Assets</td>
<td>Present Value of Accd Bfts</td>
<td>Funded Ratio</td>
</tr>
<tr>
<td>$50,000,000</td>
<td>$50,000,000</td>
<td>100%</td>
</tr>
</tbody>
</table>
The Truth About “Funded Status”

• Changing the actuarial cost method could default the funded ratio to 100%!
• Changing the salary scale assumption could also have a dramatic effect (up or down)
• The age of the plan also matters!
• The health of any pension plan has far more to do with the ability of the plan sponsor to make the required contribution than any single metric or ratio
Asset Smoothing

• Starts with market value of assets (MVA)
• Smooths the volatility of MVA
• Asset gains and losses recognized over a period of years (5 most common)
• AVA = MVA + deferred losses – deferred gains
• May be subject to corridor around MVA
## Asset Smoothing Example

<table>
<thead>
<tr>
<th>Year</th>
<th>Gain (Loss) relative to assumption</th>
<th>Percent Deferred</th>
<th>Deferred Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$(50)</td>
<td>80%</td>
<td>$(40)</td>
</tr>
<tr>
<td>2017</td>
<td>$10</td>
<td>60%</td>
<td>$6</td>
</tr>
<tr>
<td>2016</td>
<td>$(5)</td>
<td>40%</td>
<td>$(2)</td>
</tr>
<tr>
<td>2015</td>
<td>$5</td>
<td>20%</td>
<td>$1</td>
</tr>
</tbody>
</table>
Asset Smoothing Example

MVA $150

Minus

Total Deferred Gains and Losses $ (35)

Equals __________

Preliminary AVA $185

Corridor for AVA

Maximum AVA equals 120% of MVA $180
Minimum AVA equals 80% of MVA $120

AVA $180
Unfunded Actuarial Accrued Liability (UAAL)

UAAL = PVFB – PVFNC – Assets

UAAL = Actuarial Accrued Liability – Assets

Measure UAAL in 2017

– Then projected UAAL for 2018 by adding NC, interest, and subtracting contributions made (with interest)

Remeasure UAAL in 2018

– Difference between UAAL in 2018 and projected UAAL in 2017 is called an actuarial gain or loss

Amortize gain or loss over period of up to 30 years
Decisions Needed When Amortizing UAAL

Length of the amortization period

– No longer than 30
– May depend upon the origin of the UAAL
  • Gains/Losses may be over a shorter period than assumption or benefit changes

Payroll growth assumption

– Assuming 0% payroll growth is like a typical mortgage
– Many plans assume up to 3% payroll growth, which may cause negative amortization
UAAL Amortization Example

Using 7.5% discount rate....

<table>
<thead>
<tr>
<th>Amort Period</th>
<th>0% Payroll Growth</th>
<th>3% Payroll Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st Payment</td>
<td>Last Payment</td>
</tr>
<tr>
<td>15</td>
<td>$105,383.48</td>
<td>$105,383.48</td>
</tr>
<tr>
<td>30</td>
<td>$78,763.94</td>
<td>$78,763.94</td>
</tr>
</tbody>
</table>
Actuarial Required Contribution

Normal Cost
  +
Administrative Expenses
  +
Payment on Unfunded Actuarial Liability (UAL)

Total Minimum Required Contribution
What should you ask your actuary?

Did the contribution requirements go up or down this year? Why?
Did we have a gain or a loss this year?
Which direction is the cost heading for next year?
Are there any assumptions/methods that you think we should revisit at this time?
How do our accounting numbers look this year?
Do you have any tools that can help our board/members/City?
What should you NOT ask your actuary?

Can you please offer me some dating advice?
Is it okay to wear these white socks with my navy pants and black shoes?
My glasses are broken...can they be fixed?
Questions?