LACERS January 2010 Board Workshop

Actuarial 101 and LACERS Funding Policies

LACERS Board of Administration
Tuesday, January 26, 2010
Paul Angelo, FSA
The Segal Company
San Francisco

Outline of Upcoming Decision Issues

1. Overview of Actuarial Valuation & Funding Policies
   January 26 Regular Meeting – Discussion Only
2. Focus on Cost Method and Amortization Policy
   February 11 Board Offsite – Discussion Only
3. Cost Method and Amortization Policy:
   Discussion and Possible Action
   February 23 Regular Board Meeting
Basic Questions

- Purposes of an actuarial valuation
  - Primary:
    - Contribution requirements
    - Funded status
  - Secondary:
    - Disclosure requirements
    - Basis for pricing plan changes
    - Analysis of demographic experience
    - Analysis of financial experience

Basic Questions

- Why fund?
  - Legal requirements
  - Security of benefits
  - Allocation of cost to appropriate time period
    - Inter-generational equity
    - Includes pattern of cost
  - Reduction in pension costs
Valuation Input

- Member Data
  - Member Status
  - Sex
  - Date of Birth, Date of Hire
  - Pay, Contributions
  - Beneficiary Data
  - Benefit Amount
  - Payment Form/Duration

Financial Data

Actuarial Assumptions

Funding Policies

Actuarial Valuation

Member Data

Plan Provisions
Valuation Input

- Financial Data
  - Statement of Account
  - Reconciliation from Prior Year
    - Employer Contributions
    - Member Contributions
    - Benefit Payments & Expenses
    - Investment Return
  - Market Value
  - Actuarial Value

Valuation Input

- Plan Provisions
  - Who Can Get Benefits
  - Under What Conditions
  - How Much, and
  - For How Long
Valuation Input

- Actuarial Assumptions
  - Demographic – what benefits will be paid
  - Economic - how assets and salaries grow

Valuation Input

- Demographic Assumptions
  - Rates of “Decrement”
    - Turnover, Disability, Retirement
    - Mortality:
      - before and after retirement
      - service, disability, beneficiary
  - Percent married
  - Member/Spouse age difference
  - Reciprocity
Valuation Input

- Economic Assumptions
  - Inflation - component, plus COLA
  - Investment Return
    - Real return
  - Salary Increases
    - Real wage increases ("across the board")
    - Merit and promotion
      (included with demographic assumptions)

Valuation Input

- Funding Policies – Three Components
  - Actuarial Cost Method - allocates costs to periods of service periods, past vs. future
  - Asset Smoothing Method - assigns a value to assets for determining contribution requirements
  - Amortization Policy - defines pattern and duration of payments to fund any difference between liabilities and assets
Pension 101

Actuarial Liability
Normal Cost

Actuarial Concepts and Terminology

- Present Value (PV) of Future Benefits
- PV of Past Contributions (i.e., Assets)
- PV of Future Contributions
- PV of Future Normal Costs
- Actuarial Accrued Liability
- Unfunded Actuarial Accrued Liability (UAAL)
- Normal Cost
- Amortization of UAAL/Surplus
- Actuarial Gains and Losses
Present Value (PV)

- Promise to pay $100 in ten years to each of 10 subscribers
- Investments will double in ten years (interest rate is 7.2%)
- 3 out of 10 subscribers will survive to collect
Present Value Example

- Consider Interest only
  - Collect $50, invest it, pay $100
  - We say $50 is the “present value” of the $100 “discounted at 7.2% interest” for 10 years

- Consider Survival only
  - Collect $30 from each, use $300 to pay each of the 3 survivors
  - We say $30 is the “present value” of the $100 “discounted at survivorship” for 10 years

- Consider both Interest and Survival
  - Collect $15 from each subscriber
  - Invest the $150, have $300 in 10 years
  - Pay $100 to each of the 3 survivors
  - We say $15 is the “present value” of the $100, “discounted at interest and survivorship” for 10 years
PV of Future Benefits

Past Service vs. Future Service
Actuarial Cost Method

Present Value of Future Benefits

Current Year Normal Cost

Actuarial Accrued Liability  Future Normal Costs

Entry Age  Current Age  Retirement Age

Actuarial Accrued Liability

Present Value of Future Normal Costs
Unfunded Actuarial Accrued Liability

Present Value of Future Normal Costs

Unfunded Actuarial Accrued Liability

Actuarial Value of Assets

PV of Future Contributions

Unfunded Actuarial Accrued Liability

Present Value of Future Normal Costs

Actuarial Value of Assets
Current Contribution

- Actuarial Value of Assets
- Present Value of Future Normal Costs
- Normal Cost
- Unfunded Actuarial Accrued Liability
- Amortization of Unfunded Actuarial Accrued Liability

Benefit Increases or Actuarial Losses

- Actuarial Value of Assets
- Present Value of Future Costs
- Unfunded Actuarial Accrued Liability
### Unfunded Liability Leverage

- For well funded plans, small increases in Accrued Liability can cause big (percentage) increases in UAAL.

<table>
<thead>
<tr>
<th></th>
<th>Before Amendment</th>
<th>After Amendment</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accrued Liability</td>
<td>$100 million</td>
<td>$110 million</td>
<td>+10%</td>
</tr>
<tr>
<td>Assets</td>
<td>$90 million</td>
<td>$90 million</td>
<td>+0%</td>
</tr>
<tr>
<td>Unfunded Liability</td>
<td>$10 million</td>
<td>$20 million</td>
<td>+100%</td>
</tr>
</tbody>
</table>

### Actuarial Gains and Losses

- **Gain** - experience that is financially more favorable to the plan (e.g., more deaths than expected)
- **Loss** - experience that is financially less favorable to the plan (e.g., higher salaries than expected)
- Results in a larger (for a loss) or smaller (for a gain) UAAL than expected
- Cost is recognized through amortization of UAAL
Funded Status

- Funded ratio = assets / liabilities
- Funded status = assets - liabilities

- Assets > liabilities ==> surplus
- Assets < liabilities ==> unfunded liability

Funded Status

- Assets
  - Market value
  - Funding: Actuarial value ("smoothed" value")
- Liabilities
  - Accrued Benefit Obligation
    - current service, current pay
  - Funding: Actuarial Accrued Liability
    - Allocated cost, Projected Unit Credit method
The one thing to remember:

\[ C + I = B + E \]

- Contributions + Investment Income equals Benefit Payments + Expenses

- Actuarial valuation determines the current or “measured” cost, not the ultimate cost
- Assumptions and funding methods affect only the timing of costs
Funding Policies – Three Components

- Actuarial Cost Method allocates Normal Cost and Actuarial Accrued Liability to years of service
  - Projected Unit Credit
  - Asset smoothing method
    - Five-year smoothing
    - 50%-150% market value corridor
- Amortization policy/periods
  - 30 years for plan changes (except recent ERIP)
  - 30 years for assumption/method changes
  - 15 years for actuarial gains/losses

Current Contribution

- Actuarial Value of Assets
- Unfunded Actuarial Accrued Liability
- Present Value of Future Normal Costs
- Normal Cost
- Amortization of Unfunded Actuarial Accrued Liability
Amortization of Unfunded Liability

- Source of Unfunded Liability
  - Plan changes [LACERS: 30 years]
  - Assumption or method changes [30 years]
  - Gains (credits) / losses (charges) [15 years]

- Amortization structure and period
  - Fixed period (closed) or rolling (open) [closed]
  - One layer [through 1997] or multiple [after 1997]

- Amortization method
  - Level dollar amount
  - Level percentage of pay [LACERS]

Recent events at LACERS

- LACERS combined bases, reamortized in 1997 (15 years) and again in 2005 (30 years)
- Since then, new layers from gains/losses (annual) experience and assumption changes (see p. 22 of Pension actuarial report)
- Special issues for Health plan (p. 7 of Health report)
  - Restarted in 2005, same as Pension
  - GASB rules required combining in 2006, 2007
  - Harder to separate annual experience and assumption changes
Recent events at LACERS

- Current Early Retirement Incentive Program (ERIP)
  - Current program started in 2009, actual retirement elections to be completed in early 2010
  - Retirement Board elected to use 15 years to amortize UAAL for this ERIP
    - Instead of current policy of 30 years for plan changes
    - After discussion of shorter periods based on ERIP specific benefit and cost structure

Illustration of Amortization Methods

<table>
<thead>
<tr>
<th>8.00% interest</th>
<th>30 years</th>
<th>30 years</th>
<th>25 years</th>
<th>15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.25% salary incr.</td>
<td>Flat dollar</td>
<td>% of pay</td>
<td>% of pay</td>
<td>% of pay</td>
</tr>
<tr>
<td>Increase in AAL</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Amortization factor: (first year)</td>
<td>11.6648</td>
<td>18.0562</td>
<td>16.2068</td>
<td>11.3665</td>
</tr>
<tr>
<td>Amortization amount</td>
<td>0.085728</td>
<td>0.055383</td>
<td>0.061702</td>
<td>0.087978</td>
</tr>
<tr>
<td>Year 1</td>
<td>$ 85,728</td>
<td>$ 55,383</td>
<td>$ 61,702</td>
<td>$ 87,978</td>
</tr>
<tr>
<td>Year 15</td>
<td>$ 85,728</td>
<td>$ 99,183</td>
<td>$ 110,501</td>
<td>$ 157,557</td>
</tr>
<tr>
<td>Year 25</td>
<td>$ 85,728</td>
<td>$ 150,383</td>
<td>$ 167,544</td>
<td>$ 0</td>
</tr>
<tr>
<td>Year 30</td>
<td>$ 85,728</td>
<td>$ 185,174</td>
<td>$ 0</td>
<td>$ 0</td>
</tr>
<tr>
<td>Total Amount Paid</td>
<td>$ 1,000,000</td>
<td>$ 1,000,000</td>
<td>$ 1,000,000</td>
<td>$ 1,000,000</td>
</tr>
<tr>
<td>Principal</td>
<td>$ 1,571,833</td>
<td>$ 2,239,083</td>
<td>$ 1,657,926</td>
<td>$ 794,718</td>
</tr>
<tr>
<td>Interest</td>
<td>$ 2,571,833</td>
<td>$ 3,239,083</td>
<td>$ 2,657,926</td>
<td>$ 1,794,718</td>
</tr>
</tbody>
</table>
Negative Amortization

- $1,000,000 liability, 8.0% interest
- First year interest only is $80,000
- With level dollar payments, payments are always greater than interest
- With level percentage payments, early payments can be less than interest
  - UAAL increases
  - Eventually larger payments cover interest plus increased UAAL
- Results when remaining period is over 18 yrs

Selecting Amortization Periods

- Balance of multiple considerations
  - Also can depend on the source of the new UAAL
- Matching with period of benefit or service
  - Average future working lifetime
  - Average retiree life expectancy
  - Special considerations for ERIPs
- Reducing contribution volatility
  - Basis for CalPERS policy (April 2005)
  - Not relevant for plan changes
- Controlling negative amortization
Funding Policies – Three Components

- **Actuarial Cost Method** allocates Normal Cost and Actuarial Accrued Liability to years of service
  - Projected Unit Credit
  - Asset smoothing method
    - Five-year smoothing
    - 50%-150% market value corridor
  - Amortization policy/periods (pension)
    - 30 years for plan changes (except recent ERIP)
    - 30 years for assumption/method changes
    - 15 years for actuarial gains/losses

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Actuarial Cost Method

**Present Value of Future Benefits**

- **Current Year Normal Cost**
- **Actuarial Accrued Liability**
- **Future Normal Costs**

- **Entry Age**
- **Current Age**
- **Retirement Age**

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Actuarial Cost Methods

- Unit Credit
  - Accrue costs as benefits are earned
  - Actuarial Liability = PV of accrued benefits based on past service and contributions.
  - Normal Cost = PV of benefits to be earned this year
- Used for FASB #35 Disclosure
  - Sometimes called “Accrued Benefit Obligation”
- Normal Cost increases as member gets older
  - Higher salaries increase benefit for all past service
  - Same benefit costs more as member ages
Normal Cost as a Percentage of Pay

- Cost % vs Age
- Unit Credit

Actuarial Cost Methods

- Projected Unit Credit: Costs based on allocated benefit
  - Accrue costs as benefits “earned”, but level out effect of future pay increases
  - Actuarial Liability = PV of accrued benefits based on past service and projected pay.
  - Normal Cost = PV of benefits to be earned this year based on projected pay.
Liability Cost Methods

- Projected Unit Credit (continued)
- Formerly required by GASB #5
  - Actuarial Accrued Liability called Projected Benefit Obligation (PBO).
- Can be used for funding (LACERS)
- Normal Cost increases as member gets older
  - Same benefit costs more as member ages
  - Especially important for new tier benefits
    - Ultimate normal cost will be higher than initial cost

Projected Unit Credit Method

<table>
<thead>
<tr>
<th>Retirement Age</th>
<th>Pay $</th>
<th>Entry Age</th>
<th>Years of Service</th>
<th>Actuarial Accrued Liability</th>
<th>Normal Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Normal Cost as a Percentage of Pay

![Graph showing the relationship between age and normal cost percentage]

Actuarial Cost Methods

- **Entry Age Normal**: Direct allocation of cost
  - Normal Cost Percentage = percentage of payroll over the working lifetime of active member that will provide for PV of projected benefits at retirement
  - Normal Cost = NC% times current pay
  - Actuarial Liability = Accumulated value of past normal costs
- Used for contribution calculation
Normal Cost as a Percentage of Pay

Liability

Actuarial Accrued Liability
Funding Policies – Three Components

- Actuarial Cost Method allocates Normal Cost and Actuarial Accrued Liability to years of service
  - Projected Unit Credit
- **Asset smoothing method**
  - Five-year smoothing
  - 50%-150% market value corridor
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  - 15 years for actuarial gains/losses

Actuarial Value of Assets

- To reduce the impact of short term asset volatility, plans use an Actuarial Value of Assets (AVA) which “smoothes” returns
- Each year, take the difference between:
  - Actual return on Market Value of Assets (MVA)
  - Assumed return on MVA (currently 8.00%)
- Difference is spread over (typically) five years
- Reduces volatility without reducing long term expected return
### Example: one good year

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVA return</td>
<td>13%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Deferred</td>
<td>(5%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognized</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>AVA return</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>8%</td>
</tr>
</tbody>
</table>

### Example: one good, then one bad year

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVA return</td>
<td>13%</td>
<td>3%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Deferred</td>
<td>(5%)</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognized</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVA return</td>
<td>(1%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td>7%</td>
</tr>
</tbody>
</table>

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Asset Smoothing and UAAL amortization

- MVA volatility is greater than other experience
  - Needs its own shock absorber to get its volatility down to a level comparable to other experience
- MVA cost volatility is dampened twice
  - Much of the volatility is removed by asset smoothing
  - Only AVA volatility affects UAAL
    - AVA gain/loss is amortized with other gains/losses
    - UAAL says: Deferred MVA G/L “hasn’t happened yet”

Asset Smoothing Mechanics

- When MVA return is greater than assumed
  - Smoothing “defers gains”
  - Smoothed value (AVA) is less than MVA
  - UAAL and contributions are larger
- When MVA return is less than assumed
  - Smoothing “defers losses”
  - Smoothed value (AVA) is greater than MVA
  - UAAL and contributions are smaller
### LACERS Actuarial Value of Assets

#### 6/30/2008 Valuation ($000s, Combined)

<table>
<thead>
<tr>
<th>Year-end</th>
<th>Return above (below) assumed</th>
<th>Percent not yet recognized</th>
<th>Amount not yet recognized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun-08</td>
<td>($1,549,293)</td>
<td>80%</td>
<td>($1,239,435)</td>
</tr>
<tr>
<td>Jun-07</td>
<td>$1,054,377</td>
<td>60%</td>
<td>$632,626</td>
</tr>
<tr>
<td>Jun-06</td>
<td>$366,479</td>
<td>40%</td>
<td>$146,592</td>
</tr>
<tr>
<td>Jun-05</td>
<td>$132,848</td>
<td>20%</td>
<td>$26,570</td>
</tr>
</tbody>
</table>

Net total LOSSES not yet recognized: ($433,647)

Market Value of Assets (MVA): $10,372,194

PLUS LOSSES not yet recognized: $433,647

Actuarial Value of Assets (AVA): $10,805,841

AVA/MVA Ratio: 104%

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### LACERS Actuarial Value of Assets

#### 6/30/2009 Valuation ($000s, Combined)

<table>
<thead>
<tr>
<th>Year-end</th>
<th>Return above (below) assumed</th>
<th>Percent not yet recognized</th>
<th>Amount not yet recognized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun-09</td>
<td>($2,964,832)</td>
<td>80%</td>
<td>($2,371,866)</td>
</tr>
<tr>
<td>Jun-08</td>
<td>($1,549,293)</td>
<td>60%</td>
<td>($929,576)</td>
</tr>
<tr>
<td>Jun-07</td>
<td>$1,054,377</td>
<td>40%</td>
<td>$421,751</td>
</tr>
<tr>
<td>Jun-06</td>
<td>$366,479</td>
<td>20%</td>
<td>$73,296</td>
</tr>
</tbody>
</table>

Net total LOSSES not yet recognized: ($2,806,395)

Market Value of Assets (MVA): $8,142,989

PLUS LOSSES not yet recognized: $2,806,395

Actuarial Value of Assets (AVA): $10,949,384

AVA/MVA Ratio: 134%
The one thing to remember:

\[ C + I = B + E \]
Contributions + Investment Income equals Benefit Payments + Expenses

- Actuarial valuation determines the current or "measured" cost, not the ultimate cost
- Assumptions and funding methods affect only the timing of costs

Questions