2015 Public Pension Funding Forum

A Fresh Look at Actuarial Tools to Address Pension Funding Issues

Paul Angelo, Segal Consulting
Elizabeth Wiley, Cheiron

Berkeley, California
August 25, 2015
What are possible funding issues?

• Unwillingness of plan sponsor to pay contributions needed to fund the promised benefits
• Unfunded amounts growing despite paying calculated contributions
• Inability of plan sponsor to sustain revenue growth needed to pay contributions within their budgets
• Contributions growing as a percentage of payroll due to lack of active payroll growth
• Budgetary stress from contribution volatility due to investment risk
• Overly optimistic assumptions resulting in funding needs greater than anticipated
• Cost shifting from one generation to another
• Funding concerns resulting in inadequate retirement security
Topics

• Pension Funding 101
• Funding Risk Management Process
  – Identify Objectives
  – Define Key Risks to Objectives
  – Develop Policies to Manage Risks
  – Monitor Policies relative to Objectives and Risks
  – Revise Policies as Needed
• Conclusion
Pension Funding 101
Funding - Visually

(from Harvard Business Review 1985)

Segal Consulting
Funding – The Basic Equation

\[ C + I = B + E \]

**Contributions + Investment Income equals Benefit Payments + Expenses**

- Actuarial valuations determine the current or “measured” cost, not the ultimate cost
- Assumptions and funding methods affect only the timing of costs (unless benefits are affected!)
- Funding policy manages the relationship between the two sides of the equation
Funding Risk Management Process
Managing Funding Issues

• **Define** the key funding objectives
• **Identify** what are the key funding risks threatening meeting those objectives
• **Develop** policies to manage these risks
• **Monitor** these policies and the risks
• **Revise** policies in response to experience and changing situations
Define Objectives
Funding Objectives

• Funding a pension plan requires balancing competing objectives for the plan.
• Key objectives typically include:
  – Benefit security
  – Generational equity
  – Predictable and stable contributions
  – Transparency and accountability
• Most common policy conflict is between Generational Equity and Stable Contributions
• Funding objectives should be clearly identified
Identify Key Risks to Objectives
Sources of Funding Risk

• Consider risks that can result in funding issues:
  – Investment risk and increased sensitivity
  – Economic and demographic assumptions risk
  – Growth of salary and/or membership
  – Sustained revenue relative to required contributions
  – Governance risks
    • Inappropriate contribution policy
      – e.g., inconsistent with policy objectives
    • Inadequate monitoring
    • Revision of pension governance
Sources of Funding Risk

• Review specific plan and sponsor history and features for risks that may be particular to the system such as:
  – A history of not receiving the actuarially determined contributions from the sponsor
  – A history of members increasing their final average salary dramatically in their last few years of employment
  – Plan features with hidden or deferred costs
    • Subsidized annuity or service purchase options
    • “Gain sharing” provisions
Develop Policies to Manage Risks
Pension Funding Management Policies

• Benefit Policy
  – Determines benefit amounts payable many years into the future
  – Typically negotiated between employers and employee groups

• Investment Policy
  – In combination with the benefit policy, determines the ultimate cost of the plan
  – Affects the expected cost and the range of potential costs

• Funding Policy
  – Determines timing and amount of contributions
  – Includes actuarial methods -- and also assumptions

• While the benefit and investment policies determine the ultimate cost, actuarial tools impact them only indirectly, so this session will focus on funding policy
GASB Changes Expanding Funding Policy Void

• GASB Statements 67 and 68 make a clear separation between accounting cost (expense) and funding cost (contributions)
  – Contrast with Statements 25 and 27, where expense was the “ARC”: Annual Required Contribution

• No longer look to GASB for funding policy guidelines
  – Not that we ever should have
  – Resulting regulatory void inviting discussion

• Important change in terminology: No more “ARC”
  • New GASB standards include an “Actuarially Determined Contribution” (ADC), but it is neither required nor defined
  • Should be based on a written funding policy
CCA White Paper – Tool for Establishing and Evaluating a Funding Policy

• Conference of Consulting Actuaries (CCA PPC) October 2014 “white paper” on Actuarial Funding Policies and Practices

• Evaluates and categorizes policy alternatives for each component of funding policy
  – Model, Acceptable, Acceptable with conditions, Non-recommended, and Unacceptable

• Develops a comprehensive Level Cost Allocation Model (LCAM) based on funding policy principles and objectives
  – Does not address other actuarial issues:
    • Assumption selection
    • Investment policy

• Includes transition policies for funding policy changes
Three Funding Policy Components

• **Actuarial cost method** allocates present value of member’s future benefits to years of service
  – Defines Normal Cost and Actuarial Accrued Liability (AAL)

• **Asset smoothing method** manages short term market volatility while tracking MVA.
  – Defines the Unfunded Actuarial Accrued Liability (UAAL)

• **Amortization policy** sets contributions to systematically pay off the UAAL.
  – Length of time and structure payments

• CCA PPC guidance also discusses “direct rate smoothing"
  – Phase-ins and Contribution “collars”
Three Funding Policy Components

PRESENT VALUE OF FUTURE BENEFITS

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

Normal Cost
Actuarial Cost Method

Present Value of Future Benefits

Current Year Normal Cost

Actuarial Accrued Liability

Present Value of Future Normal Costs

Entry Age  Current Age  Retirement Age
Asset Smoothing Methods

• Objectives
  – Reflect market value of assets
  – Smooth out short-term fluctuations in market values
  – Produce smoother pattern of liability measures and contributions
Rates of Return: Market and Actuarial

Year Ending June 30,

- Market Value of Assets (MVA)
- Assumption (7.5% starting 1994/1995)
- Actuarial Value of Assets (AVA)
Asset Smoothing Method

![Graph showing Market Value of Assets (MVA) and Actuarial Value of Assets (AVA) from June 30, 1997 to June 30, 2013. The graph demonstrates the trend of asset smoothing method, with a clear increase in market value over the years.](image-url)
### Unfunded Actuarial Accrued Liability and Funded Ratio

<table>
<thead>
<tr>
<th>Valuation Date</th>
<th>UAAL at Valuation Value</th>
<th>Actuarial Value Funded Ratio</th>
<th>Market Value Funded Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 31, 2004</td>
<td>$2,158,151</td>
<td>70.9%</td>
<td>72.8%</td>
</tr>
<tr>
<td>December 31, 2005</td>
<td>$2,303,010</td>
<td>71.5%</td>
<td>73.1%</td>
</tr>
<tr>
<td>December 31, 2006</td>
<td>$2,298,960</td>
<td>73.8%</td>
<td>77.7%</td>
</tr>
<tr>
<td>December 31, 2007</td>
<td>$2,549,786</td>
<td>74.1%</td>
<td>78.4%</td>
</tr>
<tr>
<td>December 31, 2008</td>
<td>$3,112,335</td>
<td><strong>71.3%</strong></td>
<td><strong>57.5%</strong></td>
</tr>
<tr>
<td>December 31, 2009</td>
<td>$3,703,891</td>
<td>68.8%</td>
<td>62.9%</td>
</tr>
<tr>
<td>December 31, 2010</td>
<td>$3,753,281</td>
<td>69.8%</td>
<td>67.3%</td>
</tr>
<tr>
<td>December 31, 2011</td>
<td>$4,458,623</td>
<td>67.0%</td>
<td>62.6%</td>
</tr>
<tr>
<td>December 31, 2012</td>
<td>$5,675,680</td>
<td>62.5%</td>
<td>63.2%</td>
</tr>
</tbody>
</table>
Amortization Policy for Unfunded Liability

• Source of Unfunded Liability
  – Plan changes
  – Assumption or method changes
  – Gains / losses

• Amortization period
  – Fixed period (closed) or rolling (open)
  – One layer (uniform) or multiple

• Amortization method
  – Level dollar amount (corporate)
  – Level percentage of pay (public)

• Balance between generational equity and stable contributions
Amortization Policy - Payments

Annual Payment on $1 Million UAAL ($000s)

- 30 Years Level Dollar
- 30 Years Level Percent
- 25 Years Level Percent
- 20 Years Level Percent
- 15 Years Level Percent

End of Year
Amortization Policy - Unfunded Balance

$1 Million Initial UAAL Balance

Outstanding UAAL Balance

Beginning of Year
### Model amortization periods

<table>
<thead>
<tr>
<th>Source</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Plan Amendments</td>
<td>Demographics or 15 years</td>
</tr>
<tr>
<td>Inactive Amendments</td>
<td>Demographics or 10 years</td>
</tr>
<tr>
<td>Experience Gain/Loss</td>
<td>15 to 20</td>
</tr>
<tr>
<td>Assumption Changes</td>
<td>15 to 25</td>
</tr>
<tr>
<td>Early Retirement Incentives</td>
<td>5 or less</td>
</tr>
</tbody>
</table>
READ and USE the CCA PPC White Paper!
(And See Appendix B for more details)

Motivation:
If these model policies had always been adopted and funded -- we might not be having this conference!
Monitor Policies relative to Objectives and Risks
Monitoring Funding Issues

• It is important to monitor your funding process to assess how it is meeting your objectives and managing risks
  – Monitoring includes risk metric analysis

• Consider both historical trends and projections of risk metrics that relate to identified sources of risk
  – Extent and methodology of measurements should consider a balance between information gained and cost incurred
  – Consider regular long-term projections where assumptions are met as well as stress testing of assumptions

• The Board (and other parties at interest) should ensure they are receiving clear, regular information on risk
Risk Metric Analysis

• Steps in a risk metric assessment:
  – Identify key risks and metrics that may provide information about progress relative to that risk
  – Evaluate current measurements in the context of historical trends
  – Consider future changes in the metrics, including:
    • Regular, long-term projections based on assumptions being met
    • Stress testing projections to help assess sensitivity
• For a risk assessment to be successful, it is important to keep it relatively **simple** and intuitive
  – Just identifying and presenting key metrics is a good start
  – Trends and patterns are more important than the absolute value of any given metric
Key Metrics – Contribution Policy

• Consider Interest Cost: compare actual contribution to Normal Cost + Interest on UAAL
  – Highlights actual negative amortization whether as part of the ADC or due to contributions less than the ADC
  – Comparison should cover fairly long period of time
    • Short-term negative amortization may not be an issue, but persistent negative amortization probably is
• Additional contribution policy metrics in appendix
Key Metrics – Contribution Policy

An Illinois Plan

Historical Actuarially Determined Contributions (ADC)

Fiscal Year Ending

A California Plan

Historical Actuarially Determined Contributions (ADC)

Fiscal Year Ending
Key Metrics – Growth

• Growth can address many problems by making them more affordable
  – Persistent negative amortization can still lead to lower interest costs as long as payroll growth is sufficient
  – Even seemingly solid contribution policies can be inadequate if growth is negative

• For the pension plan, growth of active payroll is key, but the sponsor’s growth in terms of revenue is also critical

• Monitoring historical trends in various demographic metrics is thus critical to managing funding risk
Key Metrics – Growth

- Most amortization policies are designed as a level percent of pay assuming a stable population (and increasing average pay)
- If the population actually grows (as well as average pay), the amortization payments become a smaller percent of pay
- If the population declines, the amortization payments become larger as a percentage of pay, so are more likely to present a “funding issue”
Key Metrics – Volatility Ratios

• Volatility ratios provide information to help predict the sensitivity of a system’s funding status to various events

• The two most commonly used as risk metrics: Asset volatility ratio and Liability volatility ratio

• Asset volatility ratio = Market value of assets ÷ Payroll
  – Measures sensitivity of contribution requirements to investment volatility

• Liability volatility ratio = Actuarial liability ÷ Payroll
  – Measures sensitivity of contribution requirements to remeasurements of liability
Key Metrics – Volatility Ratios

• Consider two plans with asset volatility ratios of 5 and 10
  – A 10% investment loss compared to the assumed rate of return represents a loss equal to 50% and 100% of payroll respectively for these employers

• Consider two plans with liability volatility ratios of 5 and 10
  – An assumption change that increases liabilities by 10% represents an additional cost equal to 50% and 100% of payroll respectively for these employers
Reviewing historical experience of gains and losses can indicate trends and areas of risk.
Projections for Risk Assessment

• These were covered in a session yesterday, so just highlights provided here

• In addition to monitoring historical trends, pension plans should consider the use of projections to evaluate future risk
  – Regularly look at risk metrics in future deterministic projections based on policies enacted
  – Consider if any stress testing is appropriate to improve understanding of levers impacting risk metrics
  – Consider if any stochastic projections are justified to see the likely range of results on any of the metrics

• “Where the plan is likely going” should be combined with “where the plan has been” from the historical trends in evaluating the results
• City contribution rates have been increasing steadily since 2009, but are now expected to gradually decrease
• Investment returns, however, could cause City contribution rates to continue to increase or to decrease more rapidly
Revise Policies as Needed
Revising Funding Policies

• Even funding policies carefully developed based on funding objectives is likely to need revision due to:
  – Adopted policy not producing intended outcomes
  – Circumstances have changed the desired outcomes
• Critical to regularly review the monitoring of risks and objectives and revise funding policies as necessary to achieve identified policy objectives
• Important to make sure that the governance of the pension allows for this process
  – While also considering how to best limit risk that the process itself (or other agency risks) negatively impact the system
Conclusion
Conclusion

• Funding issues cannot be addressed with a single silver bullet
• Addressing funding issues is a process of continuous and ongoing engagement, awareness, and management
• The process of managing funding issues will vary for each fund, but there are common considerations and approaches
  – Start with policy objectives
  – Obtain clear and regular information on risk
• Hard lesson: Ultimately, actually improving funding means higher contributions, lower benefits
  -- or higher returns with more risk
  – No free lunch
  – Remember: $C + I = B + E$
Appendix A – Additional Risk Metrics
Additional Contribution Policy Metrics

• Percentage of Actuarially Determined Contribution (ADC) Contributed
  – Indicates discipline (willingness and ability) to make contributions
  – Not all ADCs are equal – consider plans contributing 100% of ADC
    • based on 30-year rolling amortization, versus
    • based on 15-year layered amortization

• Compare the contribution that goes towards paying the UAAL to the total contribution

• Amortization Period of UAAL – particularly for
  – Fixed rate plans
  – Plans with layered amortization periods
Additional Growth Metrics

• Pensionable payroll
• Ratio of actives to inactives
• Ratio of active liabilities to inactive liabilities
• Ratio of average benefits to average salary
• Net non-investment cash flow
• Net non-investment cash flow as a ratio of assets, liabilities, payroll, or contributions
• If possible, monitoring sponsor’s revenue can be useful
  – Consider revenue in absolute terms, or
  – Consider annual pension contributions and/or UAAL as a percentage of sponsor’s total revenue
Additional Growth Metrics

Actuarial Liability 2014

- Active: 40%
- In Pay Status: 58%
- Deferred: 2%
- Vested: 2%

Actuarial Liability 2004

- Active: 67%
- In Pay Status: 32%
- Deferred: 2%
- Vested: 2%
Additional Asset Volatility Ratio Analysis

• There is a significant range in asset volatility ratios among public pension plans depending on the benefit levels, plan maturity, and funded status.

• All other things being equal, a plan with an asset volatility ratio of 9 (95th percentile) should not be able to tolerate the same level of investment risk that a plan with an asset volatility ratio of 2 (5th percentile) can.
  – A 10% investment loss compared to the assumed rate of return represents a loss equal to 90% and 20% respectively for these employers.
Additional Key Metric – Sponsor Revenue

Total Pension UAL as % of Tax Revenues

Appendix B – Additional Funding Policy Information
Let’s Really Talk About Funding Policy

• Starts with the governance issues (more on this later)
  – Independent determination of an “actuarially determined contribution”
    • Including actuarial assumptions and actuarial funding policy
  – **Legally enforceable contribution demand on employer**
    • If you are not going to fund it, it matters less how you measure it

• California provides a good model for both
  – Proposition 162 (1992)
    – “Retirement board ... shall have the sole and exclusive power to provide for actuarial services ...”
  – Almost all CA systems require actuarially determined contributions
So What Exactly is an “Actuarial Funding Policy”? 

• Three components to the standard “level cost model”
  – Actuarial cost method
  – Asset smoothing method
  – UAAL amortization policy (this is where the action is!)
• Recent renewed industry focus on such funding policies
• New GASB standards separate accounting cost (expense) and funding cost (contributions)
  – No longer look to GASB for funding policy guidelines
    • No more “Annual Required Contribution” (ARC)
    • New GASB standards include an “Actuarially Determined Contribution” (ADC), but it is neither required nor defined
  – Resulting policy guidance void inviting discussion
Recent Guidance on Funding Policies and Practices

• Academy of Actuaries Public Plans Subcommittee
  – Feb. 2014 Issue Brief on Objectives and Principles

• Conference of Consulting Actuaries Public Plans Community (CCA PPC)

• Government Finance Officers Association (GFOA)
  – Oct. 2013 Best Practices: Core Elements of Pension Funding Policy

• Society of Actuaries
Comparison of Recent Actuarial/GFOA Guidance

• Remarkable consistency on Funding Policy Objectives
  – Fund the expected cost of all promised benefits
    \((i.e., \text{fund normal cost plus 100}\% \text{ of any unfunded actuarial liabilities})\).
  – Match funding cost of benefits to years of service
    \((i.e., \text{target demographic matching or generational equity})\).
  – Have costs emerge stably and predictably
    \((i.e., \text{manage contribution volatility})\).
  – Balance competing funding-policy objectives.
    \((i.e., \text{balance demographic matching against contribution volatility management})\).
  – Actually contribute the “actuarially determined contribution” as determined by the plan’s funding policy.
Comparison of Recent Actuarial/GFOA Guidance

• General consistency on funding policy specifics
  – Entry Age cost method
  – Five year asset smoothing preferred
  – 15 to 20 year UAAL amortization preferred
    • Perhaps longer for assumption changes
    • Much shorter for plan amendments
  – “25 is the new 30” for maximum UAAL amortization period
• CCA PPC White paper provides by far the most detailed discussion and analysis
  – Evaluates and categorizes policy alternatives
  – Detailed, empirical rationales for all recommendations
Conference of Consulting Actuaries (CCA PPC)  
Funding Policies and Practices – October 2014

• Policy structures and parameters evaluated as:
  – Model (not “best”) – most consistent with the LCAM
  – Acceptable
  – Acceptable with conditions
  – Non-recommended
  – Unacceptable

• Does not address other actuarial issues
  – Assumption selection
  – Investment policy and related risk analysis
  – Settlement obligations and other “market-consistent” measures

• Transition policies – should be developed consistent with principles and objectives
General Policy Objectives in the CCA PPC Guidance

1. Future contributions plus current assets sufficient to fund all benefits for current members
   – Contributions = Normal Cost + full UAAL payment
2. Reasonable allocation of cost of benefits and required funding to years of service
   – Both expected costs and variations from expected cost
3. Reasonable management and control of future employer contribution volatility
   – But only as consistent with other policy objectives
General Policy Objectives in the CCA PPC Guidance

4. Support public policy goals of accountability and transparency
   – Clear in intent and effect
   – Allow assessment of whether, how and when sponsor will meet funding requirements
   – Enhance credibility and objectivity of cost calculations

5. Governance issues
   – “Agency risk” – interested parties will seek to influence results
     • Separate model parameters from resulting costs
   – Need for a sustained budgeting commitment
     • Avoid diverting resources needed to support ongoing cost calculations
Key Balancing of General Policy Objectives

- Policy objectives 2 and 3 reflect two aspects of the general policy objective of “interperiod equity” (IPE).
  - Objective 2 promotes “demographic matching”
    - intergenerational interperiod equity
  - Objective 3 promotes “volatility management”
    - period-to-period interperiod equity
- These two aspects of IPE tend to move funding policy in opposite directions.
  - policy objectives 2 and 3 combine to seek to balance intergenerational and period-to-period IPE,
  - Balance demographic matching vs. volatility management
Actuarial Cost Method

• Specific policy objectives (partial list)
  – The Normal Cost for a member reasonably related to the expected cost of that member’s benefit.
  – Expected cost of each year of service emerges as a level percentage of member compensation.
  – Allow for comparison between plan assets and the accumulated value of past Normal Costs for current participants, AKA the Actuarial Accrued Liability

• Leads to Entry Age method as model practice

• For DROPs, allocate Normal Cost until expected retirement
  – This is not the Entry Age variation adopted by GASB
Entry Age Method – Multiple tiers

• Model practice bases each member’s Normal Cost on that member’s benefit

• Alternative “Ultimate Normal Cost” (aka Ultimate Entry Age) bases all Normal Costs on current open tier
  – Contribution impact depends on amortization periods

• Is this an acceptable funding method?
  – Arguments in favor: plan-wide Normal Cost stability, policy issues
  – Arguments against: delinks Normal Cost from benefit
    • Reallocates NC vs AAL unrelated to benefit
    • Mixes cost method and amortization policy
Actuarial Cost Method

• Model practices
  – Entry age, level percent of pay, funding to retirement
  – Normal cost based on benefit for each member’s tier
  – Replacement life Normal Cost for changes within tier

• Non-recommended practice
  – “Ultimate Normal Cost” where Normal Cost for member in closed tier based on open tier benefit
Asset Smoothing Method - Considerations

• Unbiased relative to market
  – Same smoothing period for gains and for losses
  – “Market value corridors” symmetrical around market value

• Not selectively reset at market value only when market value is greater than actuarial value

• Incorporates the actuarial standards concepts related to smoothing period and range from market value
  – “market value corridors”

• Prefer methods that fully recognize deferred gains and losses in the UAAL by some date certain – i.e., not “rolling”
Asset Smoothing Method – Model Practices

• Deferrals based on total return gain/loss relative to assumed earnings rate
• Fixed smoothing periods not less than 3 years
• Maximum market value value corridors:

<table>
<thead>
<tr>
<th>Smoothing Period</th>
<th>MVA Corridor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or fewer years</td>
<td>50% - 150%</td>
</tr>
<tr>
<td>7 years</td>
<td>60% - 140%</td>
</tr>
<tr>
<td>10 years</td>
<td>70% - 130%</td>
</tr>
</tbody>
</table>

(acceptable)
Amortization of Unfunded Liability

• Source of Unfunded Liability (UAAL)
  – Plan changes
  – Assumption or method changes
  – Gains / losses

• Amortization method
  – Level dollar amount
  – Level percentage of pay

• Amortization structure
  – One layer (uniform) or multiple layers
  – Fixed period (closed) or rolling (open)
### Illustration of Amortization Methods and Periods

<table>
<thead>
<tr>
<th>Interest Rate</th>
<th>30 years</th>
<th>30 years</th>
<th>25 years</th>
<th>20 years</th>
<th>15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.75% interest</td>
<td>Flat dollar</td>
<td>% of pay</td>
<td>% of pay</td>
<td>% of pay</td>
<td>% of pay</td>
</tr>
<tr>
<td>4.00% salary incr.</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</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>
<td>1,000,000</td>
</tr>
<tr>
<td>Amortization factor (first year)</td>
<td>11.5286</td>
<td>17.4526</td>
<td>15.6672</td>
<td>13.5359</td>
<td>10.9916</td>
</tr>
<tr>
<td>Amortization factor (first year)</td>
<td>0.086741</td>
<td>0.057298</td>
<td>0.063827</td>
<td>0.073878</td>
<td>0.090979</td>
</tr>
<tr>
<td>Amortization amount Year 1</td>
<td>$86,741</td>
<td>$57,298</td>
<td>$63,827</td>
<td>$73,878</td>
<td>$90,979</td>
</tr>
<tr>
<td>Amortization amount Year 15</td>
<td>$86,741</td>
<td>$99,222</td>
<td>$110,529</td>
<td>$127,932</td>
<td>$157,546</td>
</tr>
<tr>
<td>Amortization amount Year 20</td>
<td>$86,741</td>
<td>$120,718</td>
<td>$134,475</td>
<td>$155,649</td>
<td>$0</td>
</tr>
<tr>
<td>Amortization amount Year 25</td>
<td>$86,741</td>
<td>$146,872</td>
<td>$163,609</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Amortization amount Year 30</td>
<td>$86,741</td>
<td>$178,692</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Total amount paid Principal</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Total amount paid Interest</td>
<td>1,602,221</td>
<td>2,213,555</td>
<td>1,658,153</td>
<td>1,199,933</td>
<td>821,719</td>
</tr>
<tr>
<td>Total</td>
<td>2,602,221</td>
<td>3,213,555</td>
<td>2,658,153</td>
<td>2,199,933</td>
<td>1,821,719</td>
</tr>
</tbody>
</table>
Amortization Policy - Payments

Annual Payment on $1 Million UAAL ($000s)

End of Year

Annual Payment

30 Years Level Dollar
30 Years Level Percent
25 Years Level Percent
20 Years Level Percent
15 Years Level Percent

Segal Consulting
Negative Amortization

- $1,000,000 liability, 7.75% interest
- First year interest only is $77,500
- With level dollar payments, payments are always greater than interest
- With level percentage payments, early payments can be less than interest
  - UAAL increases (but not as a percentage of payroll!)
  - Eventually larger payments cover interest plus increased UAAL
**Amortization Policy - Unfunded Balance**

- **Beginning of Year**
- **Outstanding Balance**
- **Outstanding UAAL Balance**
- **$1 Million Initial UAAL Balance**

- **30 Years Level Dollar**
- **30 Years Level Percent**
- **25 Years Level Percent**
- **20 Years Level Percent**
- **15 Years Level Percent**

![Graph showing amortization policy with different levels and percentages over time.](image-url)
What About Open or “Rolling” Amortization?

• Very detailed discussion, based on:
  – Source of the UAAL
  – Length of period – is there negative amortization?

• For gain/loss (only):
  – Acceptable with Conditions if no negative amortization
  – Non-recommended if any negative amortization

• For assumption changes:
  – Non-recommended practice, even without negative amortization
  – Unacceptable practice if any negative amortization

• For plan amendments
  – Unacceptable practice, even without negative amortization
Model Layered Fixed Periods

• Model approach is layered fixed periods
  – Accountability and transparency
• Level percent of pay (for pay-related benefits)
• Amortization periods: tradeoff between demographic matching and volatility management
  – Two aspects of “interperiod equity”
    • see General Policy Objectives 2 and 3
  – Constraint: consideration of negative amortization
• For gains and losses
  – Under 15 years: too volatile (e.g., gains in the late 1990s)
  – Over 20 years: too much negative amortization
Model Layered Fixed Periods

• Assumption change amortization could be longer than gains/loss amortization
  – Assumption changes are long term remeasurements, so get longer amortization
  – However, longer than 25 years has substantial negative amortization

• Surplus amortization: not symmetrical with UAAL!
  – Normal Cost requires UAAL asymmetry
    • Avoid the contribution holidays of the late 1990s
  – 30 years reserved for surplus
  – Other approaches to Surplus management not precluded
    • Change asset allocation and/or set up non-valuation asset
Model Layered Fixed Periods

• For plan amendments, volatility management is generally not an issue, only demographic matching
  – Remaining active future service or retiree life expectancy
  – Could use up to 15 years as an approximation for actives
    • Any period that entails negative amortization is inconsistent with demographic matching and governance (goals 2 and 5)
  – Could use up to 10 years as an approximation for inactives
    • For retirees, control for (incremental) negative cash flow
  – For Early Retirement Incentive programs, use a period corresponding to the period of economic savings
    • Shorter than other plan amendments, typically around 5 years
  – For lump sums (13th checks) amortization may not be appropriate
Model layered fixed periods - summary

<table>
<thead>
<tr>
<th>Source</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Plan Amendments</td>
<td>Demographics or 15 years</td>
</tr>
<tr>
<td>Inactive Amendments</td>
<td>Demographics or 10 years</td>
</tr>
<tr>
<td>Experience Gain/Loss</td>
<td>15 to 20</td>
</tr>
<tr>
<td>Assumption Changes</td>
<td>15 to 25</td>
</tr>
<tr>
<td>Early Retirement Incentives</td>
<td>5 or less</td>
</tr>
</tbody>
</table>

- Minimum contribution:
  Normal Cost less 30 year amortization of surplus
Other Fixed Period Amortization Periods

• Fixed Period layers for all UAAL sources
  – Up to 25 years: Acceptable With Conditions (25 is the new 30!)
  – 26 to 30 years: Non-recommended
  – Over 30 years: Unacceptable

• Extraordinary method changes
  – Change from Projected Unit Credit to Entry Age
  – Starting of funding for a pay-go plan (e.g., OPEB plan)
  – Up to 30 years is Acceptable with Conditions

• Single fixed period combined layer for entire UAAL
  – With periodic restarts over new (longer) period
  – Non-recommended practice
Level Dollar Amortization

• Fundamentally different from level percent of pay amortization
  – No level dollar amortization period is equivalent to a level percent period.
    • Avoid trading off level dollar amortization for longer amortization periods

• Level dollar amortization is a separate policy decision
  – Could be appropriate when benefits are not pay related
  – Could be appropriate is sponsors is particularly averse to future cost increases, e.g., utilities setting rates for rate payers
  – Acceptable practice using same model periods
    • Ideally with stated rationale if used with pay related benefits
Transition policies

• Avoids undue disruption to plan sponsor budgets from immediate adoption of new funding policies
• Develop transition with advice of the actuary, consistent with policy objectives and other funding policy principles
• Example of transition policy for UAAL amortization
  – Continue current (declining) periods for current UAAL
  – Fix any rolling layer at its current period
  – Apply model periods for future changes in UAAL