

## Developing a Pension Funding Policy for State and Local Governments

By David Kausch and Paul Zorn<sup>1</sup>

Over the past decade, the Annual Required Contribution (ARC) as described in the Governmental Accounting Standards Board's (GASB's) Statements No. 25 and No. 27 has become a de facto funding policy for many public-sector retirement systems. The GASB is currently revising public pension accounting standards and has communicated an important message in the process: accounting standards are not funding standards. In the Exposure Drafts (EDs) of the new Statements No. 25 and No. 27, the GASB has removed all references to the ARC. At the same time, the EDs require disclosure of elements of a plan's funding policy and the actual funding pattern must be taken into account to determine the plan's financial disclosures. Now more than ever, public retirement systems need to have a sound, written funding policy to secure member benefits – and a strong funding policy may improve a plan's financial disclosures as well.

### Funding Policy Goals

The idea of having a written funding policy is not new. In its Best Practice, “Sustainable Funding Practices of Defined Benefit Pension Plans,” the Government Finance Officers Association (GFOA) states that the main financial objective of public employee defined benefit plans is to fund the long-term costs of promised benefits to plan participants.<sup>2</sup> Moreover, the GFOA recommends that this be done through a systematic and disciplined accumulation of resources (i.e., contributions and related investment earnings) which are sufficient to the pay promised benefits to plan members over their lifetimes.

In addition to this objective, the GFOA's Best Practice cites other goals as well. To be consistent with the governmental budgeting process, efforts should be made to keep the employer's pension contributions relatively stable from year to year. Moreover, to satisfy the principle of intergenerational equity, pension costs should be allocated to taxpayers on an equitable basis over time, i.e., not pushed into the future or immediately imposed on current taxpayers. In addition, to help offset related risks, efforts may be made to provide a reasonable margin for adverse experience. Developing a written funding policy can help decision-makers understand the tradeoffs related to reaching these goals and document the reasoning that underlies their decisions. By clarifying the funding policy, decision-makers can come to a better understanding of the principles and practices that help sustain benefits over the long-term.

### Risk-Management Framework

These funding principles can be thought of in a risk-management framework. In an effort to keep the employer's pension contribution relatively stable from year to year, a funding policy should: (1) identify key

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<sup>2</sup> Government Finance Officers Association, “Sustainable Funding Practices for Defined Benefit Pension Plans,” 2009.

risk areas that add to contribution volatility and (2) identify ways to manage each of those risks. The primary risk areas in funding retirement systems are investment risks, demographic risks within the covered population, benefit or plan design risks, and governance risks. In response to this:

- Investment risks can be managed with diversification of asset classes and asset smoothing.
- Demographic risks can be measured and managed through the use of regular actuarial valuations and actuarial experience studies.
- Benefit or plan design risks are often outside the purview of a retirement system's board, but may include setting the interest rate on member contributions and deciding when to provide ad-hoc COLAs or thirteenth checks.
- Governance risks can be managed with clear policies and controls regarding the major administrative practices of the retirement system.

A written funding policy addresses all of these risks and recognizes tradeoffs between mitigating contribution volatility and recognizing gains and losses over a reasonable period. To help decide these tradeoffs and document the reasoning behind the decisions, the GFOA's Best Practice recommends that plans adopt a written pension funding policy describing the principles and practices that guide the funding decisions. These would include: (1) the reasons for selecting the actuarial methods and assumptions, and (2) the policies related to risk sharing and responding to changes in plan experience. Key elements of a funding policy include decisions related to:

- Actuarial cost method and assumptions
- Asset valuation method
- Amortization method
- Funding target
- Risk management regarding:
  - Frequency of actuarial valuations,
  - Process for reviewing and updating actuarial assumptions,
  - Responding to legislative proposals and changes,
  - Responding to favorable/unfavorable investment experience,
  - Sensitivity analysis and forecasting, and
  - Asset/Liability modeling.

### **Elements to Consider in Developing a Funding Policy**

#### **Actuarial Cost Method**

Different actuarial cost methods produce different patterns of normal costs and actuarial accrued liabilities. Some actuarial cost methods are more useful for determining contributions to an ongoing plan, and some are more useful for closed plans. While a detailed description of each cost method is beyond the scope of this report, the following three methods illustrate key distinctions. A more detailed discussion of actuarial cost methods is presented in Appendix A.

- Traditional Unit Credit (TUC) – Under this actuarial cost method, the normal cost for a given year reflects the increase in the benefit earned due to increases in service and salary for the year, but not to service and salary projected to be earned in future years. Generally, this method is not used to fund ongoing public pension plans.
- Projected Unit Credit (PUC) – Under this method, normal cost is calculated using benefits based on increases in service for the year, but with salary projected to the retirement date. This method is used by about 10% of public pension plans.

- Entry Age Normal (EAN) – Under this method, normal cost is calculated using benefits based on projected service and salary at retirement and is allocated over an individual's career as a level percent of payroll. This method is used by about 75% of public pension plans.

Funding policy issues related to the actuarial cost method include:

- Is the cost method appropriate for the plan?
- Does the cost method produce normal costs that are reasonably stable and therefore consistent with the government's budgeting process?

For ongoing plans, the popularity of the EAN cost method is not surprising given governments' need to limit volatility in contribution rates. Moreover, since contribution rates are initially higher under the EAN method than other cost methods, the EAN method accumulates assets more quickly than the other methods. As a result, the assets can be invested earlier to help offset future contributions. By contrast, the TUC and PUC methods start with lower contributions which increase over time.

For closed plans, other actuarial cost methods may be more appropriate. The lack of new entrants into the plan and the shorter service lives of the remaining active members may make it appropriate to fund the plan more rapidly than under the EAN method. This could be done using the Aggregate actuarial cost method. The Aggregate cost method allocates the difference between the value of benefits and assets over the future service of the closed active population as a level percent of payroll.

### **Actuarial Assumptions**

Actuarial assumptions also play a key role in determining the plan's normal costs and actuarial accrued liabilities. The assumptions can be categorized into two groups: (1) economic assumptions (including inflation, wage growth, and long-term expected investment returns); and (2) demographic assumptions (including rates of mortality, disability, retirement, and termination). All assumptions should be consistent with Actuarial Standards of Practice and reflect professional judgment regarding future outcomes.

Although all assumptions are important, the investment return assumption plays an extremely important role in the actuarial valuation, and strongly influences the calculations of normal costs and actuarial accrued liabilities. For funding purposes, the Actuarial Standards Board's Actuarial Standards of Practice (ASOP) No. 27 supports the use of discount rates based on the plan's long-term expected investment return.<sup>3</sup> Funding policy issues related to the discount rate include:

- Does the long-term expected investment return accurately reflect likely investment returns?
- What variations in the actual investment return will likely occur over the long-term?

In order for the actuarial valuation to properly fund the benefits, it is important that the discount rate accurately reflect the long-term investment return. If the assumption is too high, the contributions and actuarial liabilities determined by the valuation will be too low. If the assumption is too low, the contributions and actuarial liabilities will be too high. It is also important to understand that the assumption is intended to reflect an average expected return. In given years, actual returns will vary from the expected return.

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<sup>3</sup> Actuarial Standards Board, ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, May 2011.

## Asset Valuation Method

The actuarial methods that are used to determine the plan's actuarial value of assets (AVA) also play a role in the funding policy. The difference between the actuarial accrued liability (AAL) and the AVA is the plan's unfunded accrued liability (UAL). To the extent that the plan has a UAL, it must be amortized and included in the contribution rate. Key funding policy issues related to asset valuations include:

- Should the actuarial value of assets be smoothed? If so, over what period?
- Should a corridor be applied to the smoothed value of assets to prevent it from diverging too far from the market value?

**Smoothed vs. Market Value of Assets.** Investment gains and losses are often “smoothed” into the AVA in order to mitigate the impact of investment volatility on employer contributions. In many cases, this is done by taking the difference between the actual annual investment earnings and the expected annual investment earnings and recognizing a portion of that difference each year over a set number of years. This evens out the impact of investment gains and losses that would otherwise be immediately recognized in the UAL.

**Smoothing Period.** In cases where assets are smoothed, the smoothing period is often 5 years, although some plans use shorter or longer periods. While the smoothing period for governmental plans is not limited by federal laws or regulations, the Actuarial Standards Board has set out principles for asset smoothing in ASOP No. 44.<sup>4</sup> Under these principles, when a smoothed asset valuation method is used, the actuary should select a method so that:

- The smoothed asset values fall within a reasonable range of the corresponding market values; and
- Any differences between the actuarial value and market value of assets should be recognized within a reasonable period.

**Asset Corridors.** To satisfy these principles, many plans that smooth assets over periods longer than 5 years also include corridors that limit the extent to which the smoothed value of assets can diverge from the market value. Appendix B provides an illustration of how asset smoothing and asset corridors interact.

## Amortization Method

In addition to the normal cost, the other major component of the annual contribution is the portion needed to amortize the UAL. Consequently, when setting the funding policy, the structure of the amortization payments and the length of the amortization period are important issues. It should also be noted that during the amortization period, interest accrues on the outstanding UAL at a rate reflecting the long-term expected investment return. In setting up an amortization policy, the following decisions should be made:

- Should the amortization period be open or closed?
- Should the amortization be on a level-dollar basis or a level-percent-of-pay basis?
- What should be the length of the amortization period?
- Should there be separate amortization bases for annual gains/losses, benefit changes, and other components of the UAL?

A key issue in setting the amortization policy is the possibility of negative amortization. This occurs when the amortization payments are less than the interest accrued on the UAL during the year, and so the outstanding UAL increases rather than decreases. However, this depends on the length of the amortization period, as well as assumptions related to expected investment return and payroll growth. It is important to

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<sup>4</sup> Actuarial Standards Board, ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*, May 2011.

note that while the UAL increases when there is negative amortization, it is typically not expected to increase faster than the projected rate of payroll growth and is expected to be fully paid by the end of the period. However, an open amortization period which allows negative amortization may be inconsistent with reaching a funding target of 100% in a reasonable period of time.

***Closed Amortization vs. Open Amortization.*** Another issue is whether the UAL should be amortized over a closed amortization period or an open amortization period. If a closed amortization period is used, the UAL will be fully paid by the end of the period. By contrast, under an open amortization period, the period is reset each year. For example, under a 25-year open amortization period, the UAL is refinanced each year over a new 25-year period.

Closed amortization periods pay down the UAL more rapidly and limit negative amortization, but produce more volatility in the contribution rate as the period gets shorter. An open period results in a more gradual decline of the UAL and helps to control volatility in the contribution rate, but takes substantially longer to pay down the UAL. Moreover, an open amortization period is more likely to produce negative amortization, at least when the period is 15 to 20 years or longer. Appendix C provides illustrations of the amortization patterns under closed and open amortization periods.

***Level-dollar vs. Level-percent-of-pay.*** Another issue is whether the UAL should be amortized on a level-dollar basis or as a level-percent-of-pay. Level-dollar amortization is similar to a fixed-rate home mortgage with a constant dollar payment. Level-percent-of-pay amortization initially has lower dollar payments, but these increase each year. Since level-dollar amortization pays a greater portion of the UAL in earlier years, it is more conservative than level-percent-of-pay amortization. However, level-percent-of-pay-amortization may be more consistent with the budgeting process of most governmental entities.

***Length of the Amortization Period.*** Generally, for public pension plans, amortization periods range from 15 to 30 years, although some plans use shorter or longer periods. Shorter amortization periods result in the UAL being paid off sooner, but require higher and likely more volatile contributions. Longer amortization periods require lower contributions, but may shift some of the pension costs beyond the working careers of active employees and on to future generations.

***Single Amortization vs. Separate Amortization Bases.*** So far the discussion of amortization has focused on amortizing the UAL as a whole over a single amortization period. This approach is straightforward, since there would be no need to track separate amortization bases. However, the UAL is made up of amounts that come from different sources, including: (1) actuarial gains and losses due to differences between actual and assumed plan experience, (2) benefit changes, and (3) changes in actuarial methods and assumptions. As a result, the plan may wish (or in some cases be required) to amortize the UAL from these sources over different periods. For example, changes in the UAL due to benefit changes could be amortized over a shorter period than changes in the UAL due to changes in actuarial assumptions. However, a disadvantage to using multiple amortization periods is that they may increase the volatility of contribution rates.

## **Funding Target**

The funding target is the funded ratio that the plan is trying to reach and maintain through its funding policy. The GFOA's Best Practice "Sustainable Funding Practices for Defined Benefit Pension Plans" recommends a funding target of 100%. Setting the funding target to anything other than 100% means establishing a policy of making contributions that are greater or less than the amounts theoretically needed to fund the plan. However, funding targets of more than 100% may provide a margin for adverse experience. On the other hand, funding targets of less than 100% may help mitigate pressure for benefit increases.

## **Risk Management**

As noted at the beginning of this report, there are a variety of risks associated with defined benefit plans, including investment risks, demographic risks, benefit design risks, and governance risks. To manage the risks, it is important to first identify the potential impact of a specific risk on plan funding, and then to identify ways to manage the risk. Pension funding policy should include a discussion of the steps needed to monitor and address the risks facing the plan.

Investment risks involve both the risks that investment returns will not meet actuarial expectations and that the volatility of the returns will make contribution rates difficult to budget. Generally, investment risks are managed through changes in asset allocations which, in turn, are based on asset allocation studies and asset/liability analyses. If changes are made to asset allocations, the long-term investment return assumption should also be reviewed and, if necessary, changed to reflect the new asset allocation.

Demographic risks involve the risks that the plan's actual experience related to mortality, retirement patterns, and other demographic factors do not match the actuarial assumptions. It is considered best practice to do experience studies at 5-year intervals to monitor and update the assumptions.

Benefit design risks include the risks that benefit changes will result in future contributions that are unaffordable for the sponsoring government. One way to examine these risks is to have an actuarial valuation of the benefit changes done before the changes are approved by the government, an approach recommended by the GFOA. Benefit design risks can also be examined using stochastic projections that compare future benefits with future contributions and investment returns, as well as scenario (stress) tests which examine changes in funding that result from specific changes in assumptions.

Changes in benefits may require a change in actuarial assumptions. For example, it may be necessary to lower the investment return assumption if benefit increases are based on favorable investment experience (i.e., actual investment returns that are higher than expected returns). As discussed in the section on actuarial assumptions above, the long-term investment return assumption reflects the actuary's estimate of the average return. Using excess earnings rather than additional contributions to provide increased benefits reduces the earnings available to pay current benefits. This, in turn, may require a lower investment return assumption be used, thereby increasing the actuarial accrued liability of the plan. Similarly, when investment gains result in lowered contributions, care should be taken to ensure the contributions do not fall to unreasonable levels.

Governance risks relate to the risks that the plan's administrative policies and procedures are appropriate for carrying out the functions of the plan. Funding policy can address governance risks by discussing the administrative structures that should be in place for monitoring compliance with the funding policy and ensuring that the actuarially determined contributions are made. In addition, funding policy can help ensure that the long-term costs of benefit changes are determined before legislative action is taken.

## **Conclusion**

In funding defined benefit pension plans, governments must satisfy a range of objectives. In addition to the fundamental objective of funding the long-term costs of promised benefits to plan participants, governments also work to: (1) keep employer's contributions relatively stable from year to year; (2) allocate pension costs to taxpayers on an equitable basis; and (3) manage pension risks.

Developing a written funding policy can help decision-makers understand the tradeoffs involved in reaching these goals and document the reasoning that underlies their decisions. By clarifying the funding policy, decision-makers can come to a better understanding of the principles and practices that produce sustainable benefits.



### Summary of Funding Policy Elements

Element	Policy Function	Issues to Address
Actuarial Cost Method	Determines accrual patterns of normal costs and actuarial accrued liabilities	<ul style="list-style-type: none"> <li>Is the actuarial cost method appropriate for the plan?</li> <li>Does the cost method produce normal costs that are reasonable stable and consistent with the budgeting process?</li> </ul>
Actuarial Assumptions	Determines the assumptions used in the actuarial valuation and other studies	<ul style="list-style-type: none"> <li>Does the long-term expected investment return accurately reflect likely investment returns?</li> <li>How will actual investment returns likely vary from the assumed return over time?</li> <li>Do the demographic assumptions, including the mortality assumptions, accurately reflect the ongoing experience of the plan?</li> <li>How often should studies be done to evaluate the actuarial assumptions?</li> </ul>
Asset Valuation Method	Determines the actuarial value of assets and, by extension, the unfunded accrued liability	<ul style="list-style-type: none"> <li>Should the actuarial value of assets be smoothed? If so, over what period?</li> <li>Should an asset corridor be applied to prevent the smoothed value of assets from diverging too far from the market value?</li> </ul>
Amortization Method	Determines the portion of the unfunded accrued liability that is amortized in the contribution rate each year	<ul style="list-style-type: none"> <li>Should the amortization period be open or closed?</li> <li>Should it be on a level-dollar basis or level-percentage-of-pay basis?</li> <li>What should be the length of the amortization period?</li> <li>Should there be separate amortization bases for different components of the unfunded accrued liability?</li> </ul>
Funding Target	Determines the funded ratio targeted by the funding policy	<ul style="list-style-type: none"> <li>Should the funding target be other than 100%?</li> </ul>
Risk Management	Aligns the funding policy with the risk management framework	<ul style="list-style-type: none"> <li>How should risks be monitored with regard to investments, demographics, and plan design?</li> <li>What actions should be taken to address the risks?</li> <li>How should favorable investment experience be treated?</li> <li>How should unfavorable investment experience be treated?</li> </ul>
Governance	Monitors plan administration and contributions	<ul style="list-style-type: none"> <li>What administrative structures should be in place to monitor compliance with the funding policy and ensure actuarially determined contributions are made?</li> <li>What governance structures should be in place so that the long-term costs of benefit changes are determined before legislative action is taken?</li> </ul>

## Appendix A – An Overview of Actuarial Cost Methods

In order to make sound decisions related to pension funding, it is important to understand how the actuarial cost methods work and how the employer's actuarially determined contributions are calculated.

### Present Value of Future Benefits

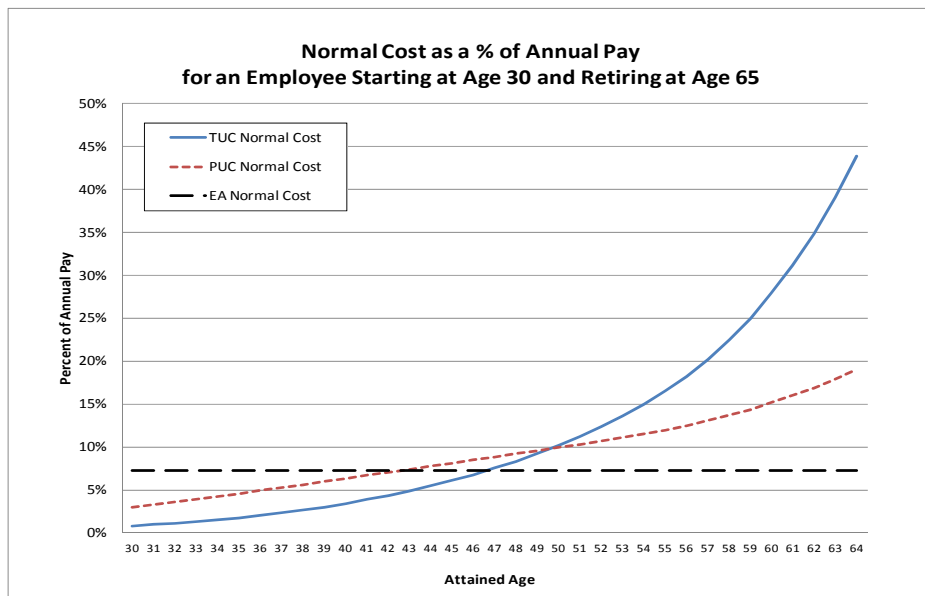
To determine the contributions needed to fund the plan, the value of benefits to be paid in the future must be converted to amounts as of the valuation date. This is done by projecting the future benefits owed to current plan members based on the plan's benefit provisions and actuarial assumptions. These projected future benefits are then discounted using a rate that represents the expected long-term rate of investment return on plan assets. The resulting "projected value of future benefits" (PVFB) is the sum of the discounted values of the projected benefits. Essentially, this is the amount on the valuation date which, if invested at the discount rate, would pay all of the projected future benefits (provided the actuarial assumptions are met).

### Normal Cost

An individual's normal cost is the portion of the PVFB that is allocated to a given year of employee service under the actuarial cost method. The plan's total normal cost in a given year is the sum of each individual's normal cost for that year.

There are a variety of actuarial cost methods and different methods take different approaches to allocating the normal cost over an individual's career. Chart 1 illustrates how normal costs vary under three actuarial cost methods: the Traditional Unit Credit (TUC) method, the Projected Unit Credit (PUC) method, and the Entry Age Normal (EAN) cost method. The three lines show the normal cost patterns for an individual employee who begins coverage under the plan at age 30 and retires at age 65, assuming the same benefit and same assumptions. The normal costs are shown as a percent of annual pay.

Chart 1



- The TUC method recognizes salary and years of service in the benefit only when earned. As a result, normal costs under this method increase at an accelerating rate as the employee approaches retirement age and as salary increases.

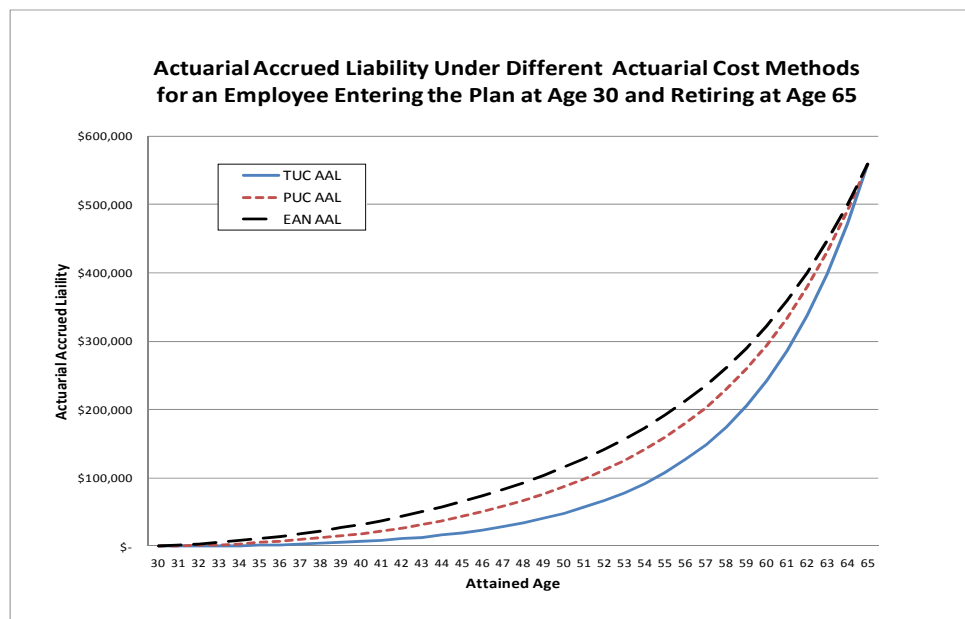


- The PUC method recognizes years of service when earned, but projects salary to retirement age. As a result, normal costs also increase under this method as an employee approaches retirement, but at a slower rate than under the TUC because future increases in salary are recognized in advance.
- The EAN cost method immediately recognizes both projected salary and service. As a result, it allows normal costs to be calculated as a level-dollar amount or as a level-percent-of-pay over the employee's career.

## Actuarial Accrued Liability

The actuarial accrued liability (AAL) is the accumulated amount of the normal costs attributed to years of service before the valuation date. Given that the different actuarial cost methods result in different normal costs, it follows that they also result in different accrual patterns for the AAL over a member's employment. Chart 2 shows the accrued AAL for an individual employee who begins coverage under the plan at age 30 and retires at age 65. As with Chart 1, the three lines reflect the different actuarial costs methods applied to the same employee earning the same benefit under the same assumptions.

**Chart 2**



Since the employee will receive the same benefit at retirement, the actuarial cost methods converge to the same actuarial accrued liability. However, the paths they take are different.

- Under the TUC method, the AAL starts out low and increases over time as each year's accumulating salary and years of service are recognized in the AAL. Much of the AAL under the TUC is accrued in the last 5 years before retirement.
- Under the PUC method, the AAL increases somewhat more rapidly than under the TUC, but the PUC method still shifts recognition of much of the AAL toward the end of the employee's career.
- Under the EAN cost method, a larger portion of the AAL is recognized in earlier years, which in turn, helps provide for more level contribution rates over the employee's career.

Note that Chart 2 shows only the liability accrual pattern for one employee over time. The accrual pattern for the plan as a whole will depend on the age and service characteristics of all employees in the plan.

## Appendix B – An Example of Asset Smoothing and Asset Corridors

As discussed in the report, investment gains and losses are often “smoothed” into the actuarial value of assets (AVA) in order to mitigate the impact of investment volatility on contributions. While most public plans use 5-year smoothing periods, plans that smooth over longer periods often use asset corridors to limit the extent to which the value of smoothed assets can diverge from the market value.

For example, under an “80/120” corridor, the smoothed value of assets is not allowed to fall below 80% or rise above 120% of the market value. This helps keep the actuarial value of assets within a reasonable range of the market value. However, during a major market decline or increase, the smoothed value of assets may exceed the corridor. If so, the amount of assets exceeding the corridor must be immediately recognized, adding to the volatility of the UAL and contributions.

Chart 3

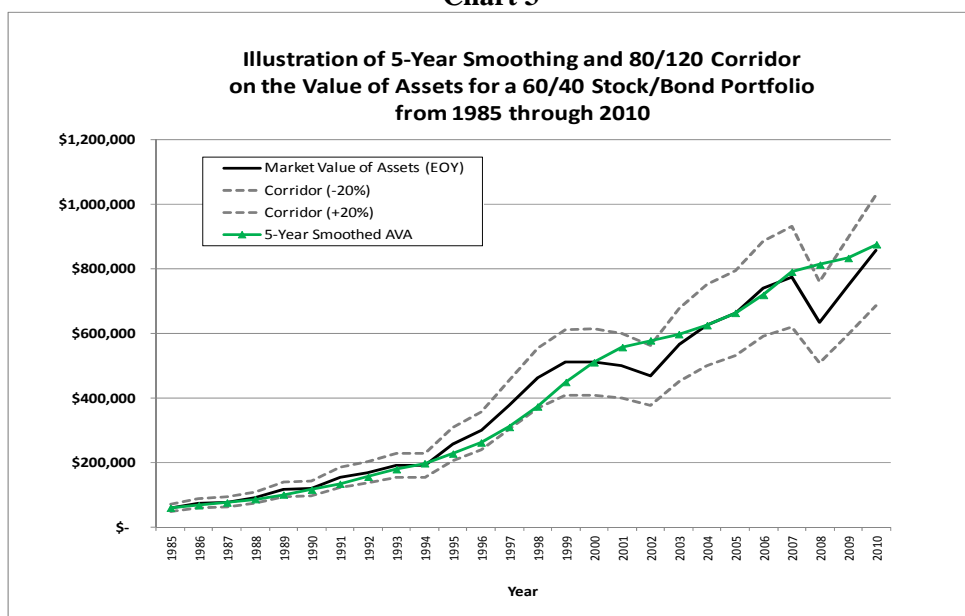


Chart 3 shows the growth of a hypothetical plan’s investment portfolio with a 60% mix of large cap stocks and a 40% mix of high-quality corporate bonds over the period from 1985 to 2010. The solid black line shows the market value of assets (MVA) at calendar year-end and the gray dotted lines show the 80/120 corridor boundaries. The green line (marked with triangles) shows the 5-year smoothed AVA.

Several things are interesting about the chart. First, during most of the 1990s, the 5-year smoothed AVA was below the MVA. This is because actual investment returns were substantially higher than expected returns for most of the decade, and the MVA outpaced the AVA. In fact, the 5-year smoothed AVA was very close to the 80% corridor in 1997 and 1998.

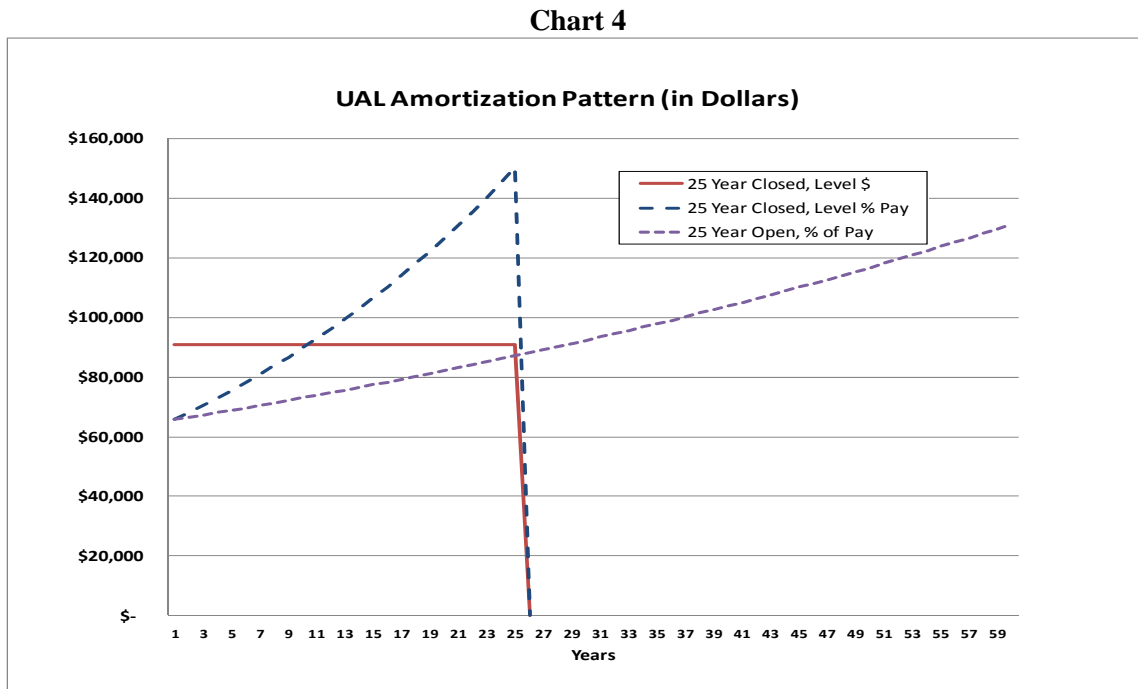
When the financial markets declined during 2000-2002, the 5-year smoothed AVA continued increasing, due to continued recognition of gains from the 1990s. When the financial markets picked up again in 2003, the asset losses from 2000-2002 offset part of the asset gains and the 5-year smoothed AVA moved closer to the MVA. However, the financial crisis of 2008 caused the MVA to decline sharply, causing a similar fall in the corridor boundaries. Consequently, in 2008, the 5-year smoothed AVA would have been greater than the upper boundary of the corridor. If the corridor had been in place, the plan would have had to lower its AVA to match the corridor’s upper boundary, increasing its UAL and the amount of the UAL amortized in its contribution rate.

## Appendix C: Amortization Patterns under Closed and Open Periods

An important pension funding policy issue is whether the UAL should be amortized over a closed amortization period or an open amortization period. Closed amortization periods pay down the UAL more rapidly and limit negative amortization, but produce more volatility in the contribution rate as the period gets shorter. Open amortization periods help control volatility in the contribution rate, but take longer to pay down the UAL.

Another amortization issue is whether the UAL should be amortized on a level-dollar basis or as a level-percent-of-pay. Level-percent-of-pay amortization initially has lower dollar payments, but these increase each year. Since level-dollar amortization pays a greater portion of the UAL in earlier years, it is more conservative than level-percent-of-pay amortization. However, level-percent-of-pay amortization is more consistent with the budgeting process of most governmental entities.

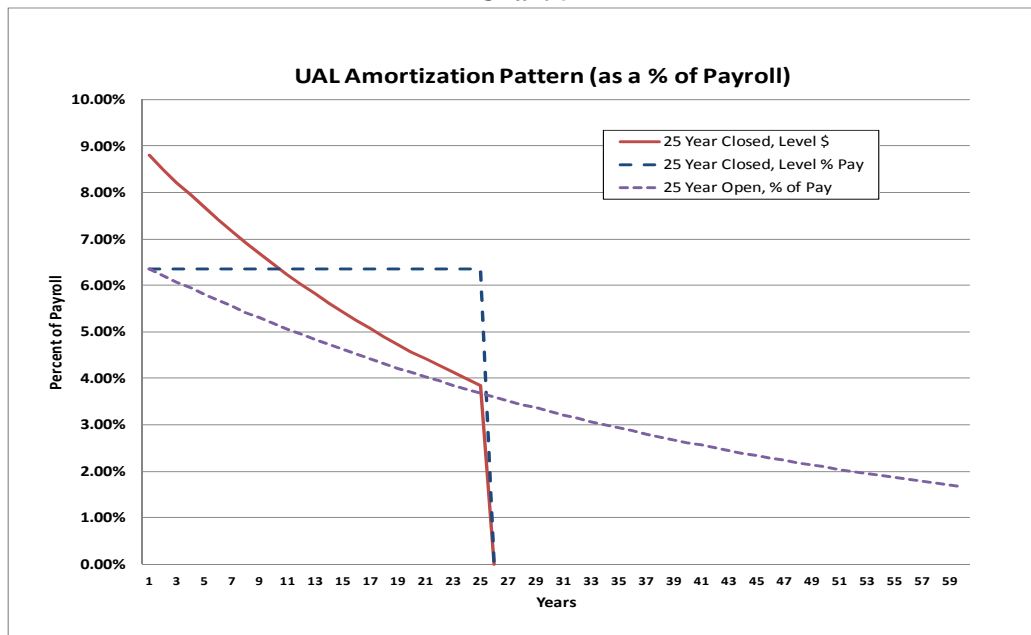
Chart 4 shows the UAL amortization patterns for: (1) a 25-year closed level-dollar amortization approach; (2) a 25-year closed level-percent-of-pay approach; and (3) a 25-year open percent-of-pay approach. The amortization payments are expressed in dollars.



- Under the closed, level-dollar approach, the dollar payments start higher than under the level-percent-of-pay approaches, and remain level until the end of the amortization period, at which time the UAL is completely amortized.
- Under the closed, level-percent-of-pay approach, the dollar payments are initially below the payments made under the level-dollar approach, but exceed the level-dollar payments after approximately 10 years, and ultimately become substantially more than the payments under the level-dollar approach.
- Under the open percent-of-pay approach, the dollar payments start at the same amount as the closed, level-percent-of-pay approach, and remain below the dollar payments under the closed approach. However they continue to increase even after the end of the 25-year period and may continue for several decades.

The dynamics appear different when the same amortization payments are expressed as a percentage of covered payroll, as in Chart 5:

**Chart 5**



From this perspective, the closed level-dollar payments decline rapidly as a percent of payroll. Under the closed level-percent-of-pay approach the payments remain level until they are fully amortized at the end of the period. However, under the open percent-of-pay approach, the amortization payments extend beyond the 25-year period and continue to decline for decades thereafter. The rate at which they fall depends on a number of factors, including the expected investment return and payroll growth assumption.