Overview of Public Pension Plan Amortization Policies

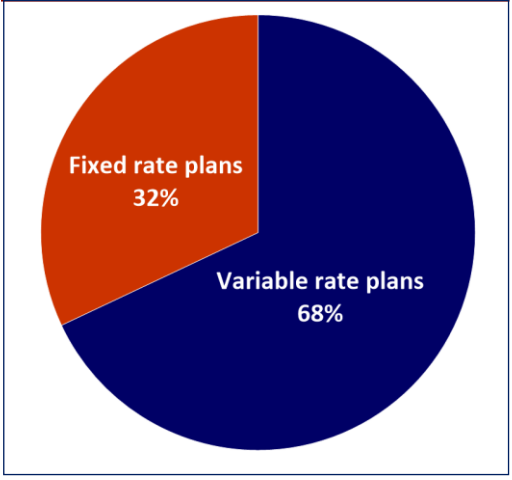
April 2022

A pension plan's amortization policy is a central feature of its funding policy[1], and the effectiveness of the amortization policy can have significant effects on a pension plan's long-term cost. An amortization policy is defined as the rules and processes that determine the length of time and the structure of payments required to systematically eliminate a funding shortfall, known as the unfunded actuarial accrued liability (UAAL). The UAAL, or unfunded liability, is the difference between a plan's actuarial value of assets and its liabilities, which are the accumulated value of benefits earned by plan participants.

Nearly every public pension plan has an unfunded liability; some plans have an actuarial surplus, which also is referred to as a negative unfunded liability. As financial obligations, public pension unfunded liabilities sometimes are likened to debt. As with other government obligations, unfunded liabilities typically are amortized, or paid, in a systematic manner over a period of time.

Amortization policies are characterized by several factors described in this brief. NASRA compiled data on elements of public pension plan amortization policies of 104 statewide and 20 locally administered public pension plans as of the latest fiscal year date for which this information was broadly available, generally FY 2020.[2] Collectively the plans in this sample represent nearly $4.0 trillion in assets and nearly $1.5 trillion in unfunded liabilities to be amortized. For purposes of comparing amortization policies, this paper distinguishes plans by the basis of employer contributions: variable or fixed.

Figure 1. Percentage of plans funded by variable or fixed employer contributions



Basis of Employer Contributions: Variable or Fixed

An overarching distinction driving differences in interpretation of public pension plan amortization policies is whether or not the period over which the unfunded liability is expected to be paid is fixed or variable. Although exceptions exist, in general, this distinction coincides with differences in the characteristics of the employer contributions received by the plan. The legal basis for employer contributions, which are used to pay down unfunded pension liabilities, is an important driver of amortization policies. Actuarially determined employer contributions to public pension plans have two primary components: the normal cost, which is the expected cost of a year of benefit accrual; and an amortization payment, i.e., an amount to pay down any unfunded liability in accordance with the plan's amortization policy.

A pension plan's funding policy can produce differences in the how the amortization policy is applied, depending on the characteristics of the employer contributions the plan receives. With some exceptions, amortization policies are interpreted differently depending on whether the employer contributions are variable or fixed. For plans whose employer contributions are *variable*, such as plans whose contribution rates fluctuate in accordance with changes to actuarially determined

[1] A pension plan funding policy describes how pension benefits will be financed. State pension funding policies typically come in the form of statutes and retirement system board policies and practices. Core elements of a public pension funding policy are the actuarial cost method, the asset smoothing method, and the amortization policy.

[2] Seven plans in the sample use the aggregate cost funding method, which does not identify an unfunded liability. These plans are not included in the analysis.

contribution rates, the amortization period is an *input*, or driving factor, in the plan's funding policy. For these plans, the amortization period is selected in advance and serves as an input into the calculation of the plan's cost, as the amortization payment is determined in part on the basis of that target period.

Conversely, for plans whose employer contributions are *fixed* (typically in statute), or whose increase is capped or limited to a specified level, the resulting funding period is an *outcome* of the actuarial valuation, fluctuating in accordance with the experience of the plan. For these plans, the funding period is an expression of the length of time it will take to pay off the unfunded liability given the plan's actuarial value of assets, statutory contributions, and actuarial assumptions. The funding period could fall below or above the plan's target or maximum funding period, and a funding period above the target or maximum may require either or both an increase to the statutory contribution rate, or benefit adjustments necessary to maintain compliance with a maximum funding period.

As Figure 1 identifies, of the 117 plans in this analysis, 80, or 68 percent, are funded with variable employer contributions. The remaining 37 plans, or 32 percent, are funded with contributions that are either fixed in statute or otherwise capped or limited.

Plan Type: Variable Employer Contributions with Fixed Amortization Periods

Plans funded by variable employer contributions includes plans whose employer contribution rate is tied to an actuarially determined contribution rate produced in an annual actuarial valuation. In these cases, the contribution rate is subject to change, typically based on the plan's actuarial experience, as necessary to maintain actuarial soundness.

Open vs. Closed Period

A closed amortization period calls for the unfunded liability to be eliminated within a specified timeframe that declines annually by one year. A fixed amortization period, as the name implies, is static. Conversely, an open, or rolling amortization period resets each year to match the period set in the amortization policy. A plan with a closed amortization period may amortize the entire unfunded liability over a single period, or may instead use layered amortization. Layered amortization blends elements of both open and closed amortization, by establishing a closed, single-layer period for an initial unfunded liability (e.g., the UAAL that exists at the time of the adoption of the layered approach), and new, closed periods for each year's actuarial experience and changes to assumptions and benefits. Of the plans in this analysis whose employer contribution rates are variable, all but one plan uses closed amortization.

Below are examples of amortization policy descriptions for plans using open and closed (single-layer and multi-layered) amortization:

- ***Open:*** *The actuarial contribution rate is calculated using a 20-year open period, level percentage of payroll amortization method. The remaining amortization period will be reset to 20 years in each future actuarial valuation.*

- ***Closed (single-layer):*** *The unfunded liability for each State System is being amortized over a single closed 25-year period beginning July 1, 2014 and ending June 30, 2039.*

- ***Closed (multi-layer):*** *The legacy unfunded actuarial accrued liability, the unfunded actuarial accrued liability as of June 30, 2013, is amortized over a closed 30 year period beginning June 30, 2013. The amortization period of the legacy unfunded will decrease by one year in each subsequent valuation until reaching 0 years. The actuarial gains and losses and other changes in the unfunded due to benefit and actuarial assumption and method changes for each valuation subsequent to the June 30, 2013 valuation will be amortized over a closed 20-year period.*

According to the Conference of Consulting Actuaries Public Plans Community (CCA PPC), a closed single-layer policy introduces the potential for contribution rate volatility, particularly toward the end of the single-layer period, as the remaining unfunded liability – and subsequent experience losses or assumption changes – would be amortized over a very short timeframe unless the period was reset. In contrast, closed multi-layer amortization manages this volatility more effectively, though some volatility can be expected as older layers of unfunded liability are fully eliminated.[3]

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

The publication, *Actuarial Funding Policies and Practices for Public Pension Plans*, produced in 2014 by the Conference of Consulting Actuaries Public Plans Community (CCA PPC), provides guidance to policymakers and others on the development of actuarially based funding policies for public pension plans. This advisory document provides general policy objectives pertaining to the funding policies and practices, and specific policy objectives for each subject area, including amortization policies.

Among others, the CCA PPC document's general funding policy objectives stress a) the importance of contributions including the cost of current service (normal cost) plus amortization payments to eliminate any unfunded liability or surplus; b) advancing intergenerational equity, which occurs when each generation taxpayers incur the cost of benefits for the employees who provide services; and c) minimizing year-to-year cost volatility.

The document's specific policy objectives relating to amortization policy emphasize policies that

- promote a level percentage of pay;
- will result in fully eliminating the unfunded liability over the policy's funding period;
- recognize (but not necessarily avoid) negative amortization;
- employ layered, rather than open or closed, amortization; and
- eliminate unfunded liabilities over a period of 15 to 20 years.

The CCA PPC document observes that an amortization period of less than 15 years can result in too much volatility; and that a period of longer than 20 years results in both a loss of intergenerational equity and also entail negative amortization, which, the document points out, starts at around 16 to 18 years.
See more: Actuarial Funding Policies and Practices for Public Pension Plans, CCA PPA, 2014

Layered vs. Non-layered

A plan with a closed amortization period may eliminate the entire unfunded liability over a single period, or may instead use layered amortization, an approach that creates a new amortization schedule for each year's actuarial experience. Layered amortization is a tool for reducing volatility in the required amortization payments, as each year's experience produces a new layer with its own amortization period, effectively distributing the effects of actuarial gains and losses over the funding period. Amortization periods under the layered approach may differ depending on the source of the unfunded liability, such as actuarial experience, changes to actuarial assumptions or methods, or benefits changes. Layered amortization policies typically isolate the so-called "initial" unfunded liability, which is the unfunded liability as of the time of adoption of the layered amortization policy, from unfunded liabilities accrued in subsequent years.

Of the 79 variable rate plans in the sample that use closed amortization, 58, or 73 percent use layered amortization, with the remaining 21, or 27 percent using a single-layer amortization period. Among plans using layered amortization, the median amortization period for actuarial experience is 20 years, and the average is 20.9 years. Figure 2 identifies the range of policy amortization periods for actuarial gains and losses among this group of plans. Figure 3 presents an example amortization schedule from the actuarial valuation of a plan using layered amortization.

[3] CCA PPC, October 2014

Figure 2. Distribution of policy amortization periods for actuarial gains and losses, layered plans

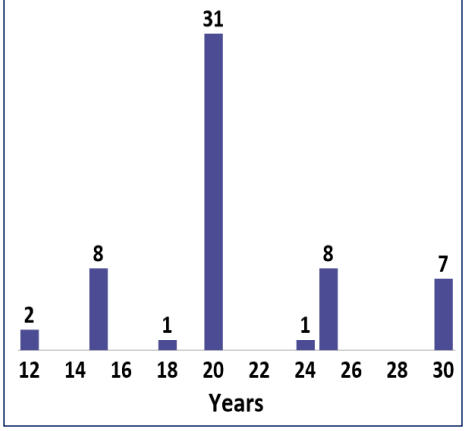


Figure 3. Example amortization schedule for plan using layered amortization

Amortization Base	Original Amount	Remaining Payments	Projected June 30, 2023 Balance	Annual Payment*
2015 Legacy UAL	$ 805,072,157	12	$ 733,445,203	$ 80,322,725
2016 Assumption Changes	138,527,291	21	141,148,055	10,553,592
2016 Experience	(30,061,574)	16	(29,266,586)	(2,605,987)
2017 Experience	(48,125,421)	17	(47,384,829)	(4,050,400)
2018 Experience	87,214,152	18	86,560,998	7,126,447
2019 Assumption Changes	(1,864,370)	24	(1,877,863)	(129,983)
2019 Data Refinements	(24,321,613)	19	(24,262,017)	(1,929,484)
2019 Experience	56,254,496	19	56,116,653	4,462,787
2020 Experience	(87,236,781)	20	(87,236,781)	(6,719,103)
Total			**$ 827,242,833**	**$ 87,030,594**

Kansas Public Employees' Retirement System Valuation Report as of December 31, 2020, Cavanaugh Macdonald Consulting, LLC

Below are selected non attributed examples of layered amortization policies:

- *The unfunded actuarial accrued liability as of June 30, 2013 (Transitional UAAL) will be amortized as a level dollar amount over a closed 25-year period. In each subsequent valuation, all benefit changes, assumption and method changes, and experience gains and/or losses that have occurred since the previous valuation will combine to determine a New Incremental UAAL. Each New Incremental UAAL will be amortized as a level dollar amount over a closed 25-year period from the date it is established.*
- *Beginning with the 12/31/16 valuation, the unfunded actuarial liability (UAL) is amortized using a "layered" approach. The UAL in the 12/31/15 valuation, which was projected to June 30, 2018 for the State/School group and to 12/31/17 for the Local group, serves as the initial or "legacy" amortization base and continues to be amortized over the original period, set at 40 years beginning 7/1/93 (13 years remaining in the 12/31/19 valuation.) Changes in the UAL that result from assumption changes are amortized over a closed 25-year period. Changes in the UAL that result from actuarial experience each year are amortized over a closed 20-year period beginning with the fiscal year in which the contribution rates will apply.*
- *Closed, layered amortization as follows: 22 years for the initial UAAL (2010), 20 years for assumption and method changes, 15 years for actuarial gains and losses, benefit changes amortized over the remaining expected working lifetime of affected plan participants.*

The CCA PPC recommends the following layered amortization periods depending on the source of unfunded liability[4]:

Table 1. Level Cost Allocation Model Practices, CCA PPC

Source	Period
Plan amendments	Lesser of plan demographics (i.e., average remaining service of active members), or 15 years
Inactive plan amendments	Lesser of plan demographics (i.e., average remaining service of active members), or 10 years
Actuarial experience gain/loss	15 to 20 years
Changes to actuarial assumptions or methods	15 to 25 years
Early retirement incentives	5 years or less

[4] CCA PPC, October 2014

Length of the Amortization Period

The length of the amortization period establishes the timeframe over which the unfunded liability is expected to be paid, whether in total or in layers as described previously. All else equal, as with an individual mortgage, a longer amortization period will produce lower amortization payments as compared to a shorter period. A longer amortization period, however, may delay actual amortization of the plan's obligations and will result in higher total costs to amortize the unfunded liability. Conversely, a shorter amortization period will result in higher payments, but more rapid elimination of the unfunded liability and a lower cost overall.

Plans with open amortization periods typically report a single, rolling amortization period that resets each year. Use of open amortization is declining among public pension plans. A look-back to FY 2010 reveals that 25 plans in this sample used open amortization, with just one plan today using a rolling (20-year) amortization period as of FY 20. Generally, using an open amortization method and a period longer than 20 years will result in very slow progress, if any, in actually reducing a plan's unfunded liability. This is because, as with a 30-year home mortgage, the predominant portion of the contribution to amortize the UAL is used to pay accumulated interest and not to actually reduce the unfunded liability The funding policy of the plan in this sample using open amortization permits contributions in excess of the actuarially determined contribution, which allows for genuine progress in reducing the UAAL with a rolling amortization period.

By contrast, the relevant metric for plans with closed, nonlayered amortization periods is the remaining amortization period, which identifies the number of years remaining in the period under the current policy. The remaining amortization period for a plan with a closed amortization period will decline annually by one year, until either the unfunded liability is fully paid off or the amortization period is reset. Among plans using closed, single-layer amortization, the median remaining amortization period is 19 years, and the average is 20 years.

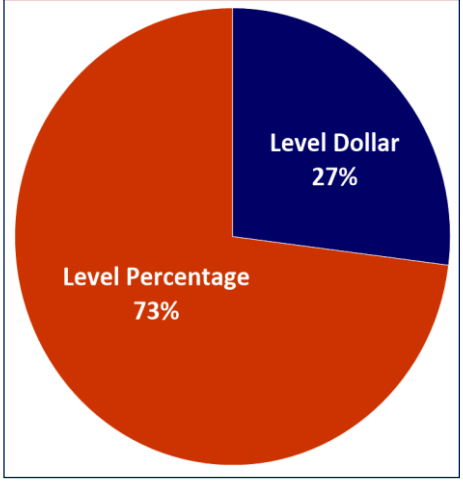
For plans with layered amortization policies, there are two ways of interpreting the length of the amortization period: one is the policy amortization period, which represents the number of years over which new increments of unfunded liability are scheduled to be amortized. Some plans use different policy amortization periods, with longer or shorter periods applied to different sources of unfunded liability, such as gains and losses, changes to assumptions or methods, or changes to benefits policy. Another relevant metric of amortization progress for plans with closed, layered amortization policies is the liability-weighted amortization period. This approach identifies a single amortization period, weighted by the size of the UAAL (or surplus) assigned to each layer, for plans that utilize multiple amortization layers of gains and losses with different corresponding periods and amounts. Of the plans in this sample that use layered amortization and report this metric, the median liability-weighted amortization period is 18 years, which is lower than the median policy amortization period. This indicates that most of the unfunded liability for these plans is their initial unfunded liability.

Amortization Method

Another consequential component of the amortization policy, the amortization method specifies whether amortization payments are to be made as a constant percentage of payroll, with payments increasing over time commensurate with payroll growth, or as a level dollar approach, which produces amortization payments that are a consistent dollar amount. This factor is relevant to determining the expected amount of the amortization payment for plans funded by variable employer contributions. Plans funded by fixed statutory contributions may specify a level percent or level dollar approach for purposes of calculating an actuarially determined contribution rate.

As mentioned in the call-out box describing the CCA PPC recommendations for amortization policy, the paper expresses a policy preference for the level percentage of pay method, which the CCA PPC contends promotes key policy objectives of managing cost volatility and maintaining intergenerational equity. The paper does, however, also identify scenarios and circumstances in which the use of a level dollar approach would be appropriate, and further notes that level dollar is appropriate for those who are particularly averse to future cost increases, and those who seek "an extra measure of conservatism or protection against low or no future payroll growth."

Figure 4. Percentage of variable rate plans using level percentage of pay and level dollar funding methods



The level dollar approach is more aggressive, producing larger amortization payments in earlier years and resulting in more rapid elimination of the unfunded liability. Figure 4 identifies the percentage of plans in the sample using the level percentage of pay and level dollar methods.

Use of the level percent approach requires a payroll growth assumption, which introduces another source of actuarial variance that may impact the UAAL if there is a mismatch between the plan's actual and assumed rate of payroll growth. If the plan's actual rate of payroll growth falls below its assumed rate, the payroll will fail to generate the level of funding for amortization that was expected to be available had the payroll growth assumption been met. The payroll growth assumption can also be characterized as the rate at which the amortization payment is expected to increase. A plan using the level dollar approach effectively has a payroll growth assumption (and assumed rate of amortization payment increase) of zero.

Of the plans in this sample with variable contribution rates, 74 percent use the level percentage of payroll amortization method; 26 percent use the level dollar approach; and the remaining plans use the aggregate cost funding method, for which this factor is not relevant.

One retirement system that administers both open and closed plans requires closed plans to amortize their unfunded liability using the level dollar approach, while open plans may use level percentage of payroll. Two plans currently using level percentage of payroll have announced an eventual switch to level dollar amortization at a prescribed future date.

Amortization of an Actuarial Surplus

Not every plan has an unfunded actuarial liability: some plans have actuarial assets whose value exceeds their actuarial value of liabilities. These plans have a *negative unfunded liability*, or an *actuarial surplus*. Such a plan is considered *overfunded*. Overfunded public pension plans were not unusual in the late 1990s and early 2000s, after which market and economic forces caused most overfunded plans to become underfunded. Strong investment gains since early 2020 are helping to drive the funding level of some plans toward an actuarial surplus. This raises the question of how an actuarial surplus should be amortized.

Based on information collected by NASRA, amortization policies for most public pension plans do not distinguish between an unfunded actuarial liability and a surplus. Without a policy to distinguish an unfunded liability from a surplus, the surplus would be amortized in the same manner as an unfunded liability, with one important difference: instead of increasing the plan's contributions above the normal cost so as to eliminate the unfunded liability over a designated timeframe, the surplus would result in a credit against the normal cost. Such a policy would result in an employer contribution rate of less than the normal cost, including potentially a contribution rate of zero.

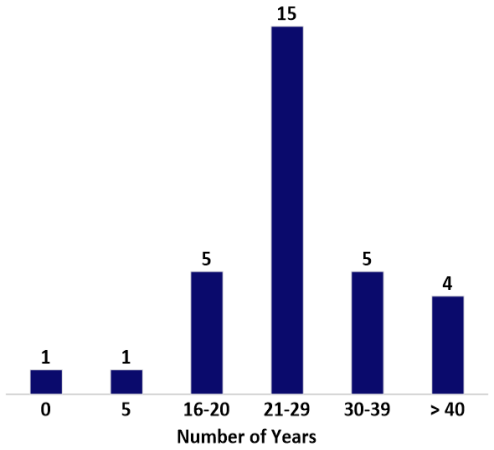
An employer contribution rate below the normal cost can produce unintended negative consequences. In the late 1990s, employer contributions to some plans with an actuarial surplus declined to very low levels, including zero, creating budgetary and actuarial problems when the surplus turned to an unfunded liability.

The CCA PPC paper, discussed previously, finds that amortizing an actuarial surplus in the same manner as an unfunded liability "is not good public policy." Instead, the paper suggests amortizing a surplus over a longer period than would be considered appropriate for an unfunded liability. This approach would minimize the effect of having contributions less than the plan's normal cost. Alternatively, the CCA paper suggests ignoring the surplus altogether, so at least the normal cost is contributed. In that case, the CCA says, if the surplus grows large, a policy to deal with the surplus in some other manner could be developed.[5]

[5] CCA PPC, October 2014

Plans Funded by Fixed Employer Contributions

Figure 5. Funding period based on contribution type, fixed rate plans



As mentioned previously, the funding period for plans funded by fixed statutory employer contributions is variable, fluctuating in accordance with the plan's actuarial experience. The funding period for these plans represents the period until the unfunded liability is projected to be eliminated given the actuarial value of assets, statutory contribution rate, and actuarial assumptions as of the valuation date. In general, plans funded by fixed employer contribution rates effectively direct what remains of their contribution, after accounting for the employer portion of the normal cost, to pay down any existing UAAL. These plans may have target funding periods, expressed either in statute or board policy, which may or may not be satisfied by the existing contribution levels, and which may require either or both an increase to contribution rates or benefit adjustments to restore compliance. Funding periods for this group of plans range from zero, reflecting a fully-funded plan, to infinite, which means that as of the valuation measurement date, the plan's UAAL would be projected to never be eliminated given the plan's current statutory contribution rate and benefit obligations. Figure 5 identifies the distribution of funding periods identified in FY 20 actuarial valuations, for plans funded by fixed statutory contribution rates.

Changes to funding periods for fixed-rate plans tend to be incremental, depending on the magnitude of the plan's actuarial experience. As indicated in Figure 6, three-quarters of the plans in this sample subject to variable funding periods experienced a change in FY 20 from the prior year's funding period, within a range of a four-year reduction to a one-year gain. Factors that may lead to a plan experiencing a change to its funding period outside this narrow range include a) changes to actuarial assumptions and methods; b) ad hoc benefit increases; and c) significant variations in actuarial experience compared to actuarial assumptions, especially when paired with a short asset smoothing period. Figure 7 presents the attribution of changes to the funding period in an actuarial valuation of a plan funded by level employer contributions. In this example, the funding period increased from 17.7 years in FY 19 to 21.7 years in FY 20, largely due to actuarial experience and a change to actuarial methods.

Some fixed rate plans may calculate and report an amortization contribution, consistent with that of a plan funded by variable employer contributions, for purposes of identifying an actuarially determined contribution rate, against which the adequacy of the fixed statutory contribution rate is assessed. This figure may be calculated on the basis of an amortization period that is open, rolling, or closed, and also possibly layered.

Figure 6. Change in funding period from prior year based on contribution type, fixed rate plans

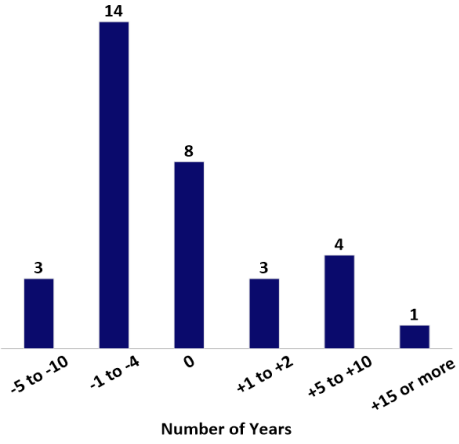


Figure 7. Example attribution of changes to funding period

Previously Reported Period	17.7 years
Change due to:	
Normal amortization	(1.0)
Actuarial experience	2.3
MVR fee assumption change	0.0
Method change	2.7
Contribution experience	0.0
Computed Period	21.7 years

Report on the Annual Valuation of the Mississippi Highway Safety Patrol Retirement System, prepared as of June 30, 2020, Cavanaugh Macdonald Consulting, LLC

Target Funding Periods

Some fixed-rate plans target elimination of the UAAL by a specific future date. Such a policy may be expressed as follows:

> *The unfunded actuarial accrued liability is amortized as a level percentage of payroll each year to the statutory amortization date of 6/30/48, assuming payroll increases of 3.0% per year (effective with the 2018 valuation).*

Rather than identify a specific funding period in the actuarial valuation, a plan operating with a target-date funding policy may report whether or not the unfunded liability is projected to be eliminated by the end of the legally required or target period.

Another way of expressing a target funding period is to establish a maximum allowable funding period, which if exceeded, may trigger either or both increases to contributions or benefit adjustments. Following are selected non-attributed examples of these policies:

- *Statute states that the employer contribution rates are subject to adjustment when the funding period is in excess of 30 years.*

- *The board shall establish a period of not more than thirty years to amortize the public employees retirement system's unfunded actuarial accrued pension liability. If in any year the period necessary to amortize the unfunded actuarial accrued pension liability exceeds thirty years, as determined by the annual actuarial valuation, the board shall prepare and submit a report that includes the following information: (A) The number of years needed to amortize the unfunded actuarial accrued pension liability as determined by the annual actuarial valuation; (B) A plan approved by the board that indicates how the board will reduce the amortization period of unfunded actuarial accrued pension liability to not more than thirty years.*

In some cases, funding periods below the maximum must be attained in order to reduce contributions or grant benefit increases, including cost-of-living adjustments. For example,

- *The granting of a cost-of-living adjustment is dependent upon the actuary's certification that the amortization period is in excess of 30 years to pay unfunded liabilities prior to any reversal of the compounding of the COLA. Subsequent legislation allows the right to reverse the 2009 compound COLA when unfunded liabilities exceed an 18-year amortization. The act also allows a phase in of the change during months in which a COLA raise is given to prevent any retiree or option beneficiary from having an actual reduction in monthly benefit payments.*

- *Each member's contribution must be reduced to 6.90% (from 7.90%) on January 1 following the system's annual actuarial valuation if the valuation determines that reducing the employee contribution would not cause the system's amortization period to exceed 25 years.*

Conclusion

Since all pension plans nearly always have an unfunded liability (whether positive or negative), a plan's amortization policy, i.e., the manner in which that unfunded liability is eliminated, is a consequential part of a plan's funding policy. NASRA's dataset of public pension plan amortization policies is useful in understanding the amortization policies that are in use among public pension plans, and may be helpful as a basis of future research into the effectiveness of different amortization approaches and methods.

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