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GRS PERSPECTIVES

The Rise of Layered Amortization

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Arising in a Retirement Plan Near You...

For most retirement plans, the overriding primary objective is to pay promised benefits when they become due. In plans whose accrued liabilities exceed plan assets (resulting in an Unfunded Actuarial Accrued Liability (UAAL)), a secondary objective should then be to achieve and maintain a funded status of 100%. To do this, plans should have a strategy to pay off their current UAAL and also to pay off future UAAL as it "arises."

As set forth in our December 2023 *GRS Perspectives* on funding policies, another primary objective is to have annual contributions which remain approximately level from year-to-year and generation-to-generation. Stabilizing contributions is instrumental in keeping the commitment to fund the plan without unexpected disruptions to the budgeting process. This is particularly important in the public sector where the Plan Sponsor has to allocate sufficient resources for contributions in an environment where budgets are inherently inelastic and intergenerational equity is sought.

In theory, the primary objectives of paying off the UAAL and stabilizing contributions can be met using a single amortization period. However, in practice, this may not be easily attainable due to gains and losses that will continue to occur each year. These gains and losses may make eliminating the UAAL more difficult than expected, especially for fixed rate plans.[1]

In addition, keeping a 100% funded status (once achieved) may be difficult using one amortization period for all of the UAAL. As the single amortization period shortens, tail volatility arises and can make the contribution resulting from a single closed period untenable. Dealing with tail volatility while attempting to meet the primary funding objectives gives rise to a concept known as ***"layered amortization."***

As we will discuss in more detail in this *GRS Perspectives*, layered amortization can reduce tail volatility that would otherwise occur and, in doing so, can convert impossible objectives into possible ones. In fact, layered amortization provides the mechanism for achieving the two primary objectives of: 1) paying off the existing UAAL; and 2) stabilizing annual contributions.

"Volatility" is a term used in finance to describe uncertainty or instability, generally resulting in unfavorable outcomes. In this *GRS Perspectives* article, volatility refers primarily to retirement plan contributions increasing faster than anticipated. "Tail volatility" is a special kind of volatility that can occur near the end of a single closed period amortization.

Whenever the Plan Sponsor's contributions increase significantly from one year to the next, it is disruptive to the budgeting process. However, if this causes the Plan Sponsor to temporarily contribute below actuarially determined levels in an effort to limit disruptions, the deferred amounts may eventually increase future contribution requirements to unaffordable levels. Also, contributions below actuarially determined levels (even if allowed by law) may result in the retirement plan ultimately not having sufficient assets to adequately pay for promised benefits. Thereby, the most important plan objective to pay promised benefits when due would not be met.

The purpose of this article is to explore layered amortization which is one of the actuarial tools that can be used to manage contribution tail volatility. It has a characteristic in operation

[1] Fixed rate plans are required to determine an actuarially determined employer contribution amount as part of the annual valuation process. However, for these plans, the potential for contribution amounts that are not synchronized with the plan's amortization policy create circumstances which are beyond the scope of this article. If your plan has a statutory or otherwise fixed contribution rate, the reader should keep in mind that applying methods and approaches suggested in this article may require modification.

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which creates scheduled (or known) contribution volatility (rather than unexpected volatility) as various layers are initiated and other layers are paid off.

Understanding that not all volatility can be avoided, scheduled volatility through layered amortization may help a plan avoid some unscheduled volatility. Using layered amortization for this purpose may be appropriate if:

- The Stakeholders understand it;
- The Plan Sponsor's budgets can accommodate the scheduled fluctuations; and
- The layers are actively managed.

It should be noted that the details of this process will depend on the retirement plan's funding policy, which outlines the retirement plan's objectives and funding target. The core components of a funding policy include (but are not limited to):

- The actuarial cost method;
- Asset smoothing method;
- Amortization policy; and
- Surplus management policy.

Importantly, all of these components can help mitigate contribution volatility.

Layered Amortization

- **Helps control volatility that can occur near the end of a single closed amortization period (tail volatility)**
- **Is more intuitive to have bases separated by source and year of origin for transparency and institutional knowledge**
- **Is employed by approximately 73% of the largest public defined benefit plans in the U.S.***
- **Is considered a model practice by many in the public plan actuarial community**

****NASRA, "Overview of Public Pension Plan Amortization Policies," April 2022.***

This article focuses on amortization policy. The other core components of a funding policy are covered in the December 2023 *GRS Perspectives* article, "A Comprehensive Funding Policy: The Recommended Instrument for Navigating Public Plan Funding."[2]

The Tail Volatility Menace

Typically, required contributions are calculated by the plan's actuary in annual actuarial valuations. In order to estimate future benefit disbursements, actuaries make assumptions regarding life expectancy, investment return, pay increases and other future unknowns concerning plan members. The financial effect of differences between these assumptions and actual observed experience is referred to as an actuarial gain or loss. For example, if the plan's investment return is more than assumed for the year, it is considered a gain. If retirees are living longer than expected, the effect is considered a loss because benefits remain in pay status longer than expected.

In each valuation cycle, the gain or loss impacts the plan's UAAL, which is then amortized (financed) over a period of time called the "amortization period." As shown in Chart 1, a gain decreases the UAAL and a loss increases the UAAL.

Chart 1: Adding a Gain or Loss to the Expected UAAL

Amortization payments are made each year by the Plan Sponsor in order to pay off the UAAL, similar to a home mortgage. Shorter amortization periods pay off the UAAL sooner and coincide with higher amortization payments in the same way that a shorter mortgage pay off period produces a higher mortgage payment. The converse is also true.

An amortization period can be either "open" or "closed." If the amortization period is open, the UAAL is amortized over the same period each valuation cycle. While there are certain situations where this might be useful (such as amortizing a

[2] https://www.grsconsulting.com/wp-content/uploads/2023/12/GRS-Perspectives_December_2023_FINAL.pdf

surplus for an overfunded plan or cases where contribution stability is an overriding concern), it is not an effective and reliable way to pay off the UAAL.

Further, using an open period (e.g., 20 or more years with level percent-of-payroll) could result in negative amortization (a situation where less than interest-only payments are made toward reducing the UAAL). It is comparable to refinancing a mortgage each year over the same initial period, but with a higher interest rate each year, resulting in increased debt.

The most basic amortization policy is closed and has a single base that decreases by one year each valuation cycle until the UAAL is paid off and the retirement plan reaches its funding target of 100%. Amortization payments can become erratic as the amortization period declines since gains and losses are pooled with the remaining UAAL and amortized over ever-shortening periods. Therefore, paying off the UAAL using a single closed amortization period is theoretically ideal in terms of eliminating the UAAL, but it is likely to be untenable in actual practice. This is because using a single closed amortization period creates a new menace as the amortization period nears its end known as "***Tail Volatility***."

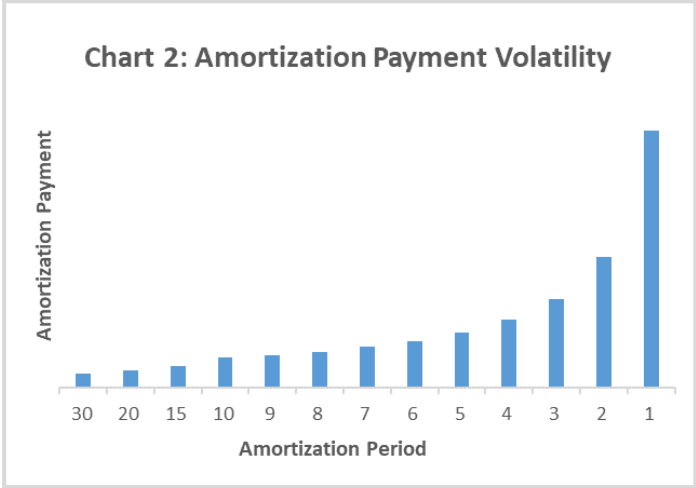
The Tail Volatility Awakens

One way to envision the effect of volatility associated with a shortening amortization period is to imagine spinning a top on a flat surface. In the beginning, the top remains stable while it spins at a fast rate. When it slows down, the top begins to wobble from side-to-side more dramatically, creating an unstable finish as it approaches the end and eventually flops over and stops.

The same can be said for the amortization payment made to pay off the UAAL. If the UAAL is amortized over a longer period of time, a gain or loss is less likely to dramatically change the amortization payment in the beginning. This should result in relatively stable UAAL payments while still making funding progress, similar to the top spinning at a higher rate.

As the amortization period decreases, a large gain or loss will have more of an impact on the amortization payment in the same way that variations in the top's spin cause it to oscillate in an unpredictable manner as it winds down. This is because a gain or loss is combined with the UAAL each year, which is being amortized over a shorter and shorter time frame as the amortization period draws to a close.

The effect of amortization payment tail volatility is displayed in Chart 2, which shows the correlation between the amortization payment and the amortization period for the same magnitude of gain or loss. All things being equal, a longer amortization period results in a smaller payment and vice versa. Therefore, the same loss/(gain) will create a larger and larger amortization payment charge/(credit) as the amortization period gets closer and closer to 1. This begs the question: How do you avoid contribution tail volatility while still making sure to pay off the UAAL? The answer may be found with ***Layered Amortization***.



A New Base

Layered amortization uses separate amortization bases for different portions of the UAAL and amortizes them over different periods of time. The sum of the outstanding balances of the layered amortization bases equals the UAAL. For example, if a plan is using two amortization bases to pay off the UAAL, it might use one base until the amortization period reaches 10 years, and then create a second base over a longer period of time (i.e., 15 years) for all future gains and losses.

This process ensures the first/initial amortization base is eliminated, paying off its balance according to a set payment schedule while making sufficient funding progress. Once the second base is created, it will reflect any unexpected changes in the UAAL generated by the plan in the future and should reduce overall volatility. One downside of this approach is that using a layered approach will (theoretically) delay funding progress.

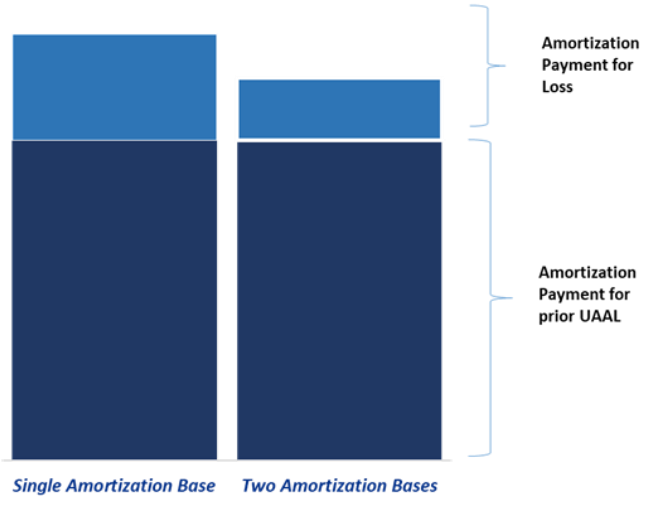
However, it can be a practical solution to an otherwise difficult problem and, if all amortizations periods remain relatively short, funding progress can still be made.

Since the second base has a longer amortization period, it is less likely to produce substantial contribution tail volatility until the amortization period for that base starts to near its conclusion. At that point, the first base (with the majority of the UAAL) will be completely paid off and the plan should be closer to being 100% funded. The second base now becomes a new first base and can then lock-in the current UAAL with all future gains or losses flowing into a new second base.

This process can continue to cycle the UAAL through two bases for as long as needed. When establishing the period for the second base, it is important to consider the effective amortization period (i.e., the weighted average remaining amortization of the entire UAAL) and funded status of the plan. Shorter amortization periods are strongly recommended for plans that still need to make considerable progress towards being 100% funded.

The effects of single and layered amortization are illustrated in Chart 3. In the case of a loss, a single amortization base amortized over 10 years produces a larger amortization payment than two amortization bases, in which the prior UAAL is amortized over 10 years and the current year's loss is amortized over a new 15-year base. If two amortization bases are utilized, the loss will cause the total amortization payment to increase by a smaller margin, which should help to control contribution volatility while still making funding progress. Although the opposite is true if the new base is a gain, the principle is the same and the additional layer should still help to control contribution volatility going forward.

Chart 3: Single vs. Layered Amortization



Revenge of the Downside

The benefit of using layered amortization is that it "locks-in" the amortization schedule for a portion of the UAAL, which establishes known payments until the base is paid off, or fully amortized. This achieves the goal of reducing contribution tail volatility for the portion of the UAAL in question, but only until the final year of the first base. In the year following the end of any credit or charge base, there will be an increase or decrease in the required employer contribution. However, this is inherently scheduled tail volatility and will be known many years in advance for planning purposes.

The downside is that the UAAL will take longer to be paid off. In the two-base example, after establishing the second amortization base, the UAAL will not be paid off until the first *and* second base both expire. After that, a new second base will be in effect, and so-on indefinitely.

However, the idea is that the majority of the UAAL will be held within the first/initial base and this legacy UAAL will be paid off in 10 years. If future gains and losses offset each other somewhat in the second base, the plan should still be closer to 100% funded when the first/initial base is paid off. There will always be gains or losses to be amortized unless the plan is completely closed and all benefit obligations are satisfied. However, this process will help the plan make funding progress and achieve more stable contributions over long periods of time.

Don't Presume Transparency

It may be easy to believe that transparency is an automatic attribute of layered amortization. While this is usually the case, it is because of the decision to separate bases into meaningful categories or sources rather than separating bases over differing periods.

For example, the aggregate UAAL can likewise be separated into meaningful categories or sources over a single period to achieve the same degree of transparency.

The appropriateness of layered amortization should be evaluated based on how well it helps the plan achieve the objectives set forth in its funding policy. If transparency is the main concern, there are likely less-complex ways to achieve it than through the amortization policy.

Attack of the Bases

A more elaborate form of layered amortization is to establish a new base each valuation cycle so that each gain or loss has its own amortization period. The length of each amortization period is usually established in the plan's funding policy and may depend on the source of the UAAL and the plan's funded status. In addition to experience gains and losses, the plan may have changes in actuarial assumptions or plan provisions that increase or decrease the UAAL. Returning to the spinning top example once more, now there would be many different tops spinning and stopping at different times.

For example, since the first/initial base usually contains the largest portion of the UAAL, it may be amortized over a pragmatic period of time (i.e., 10 to 15 years). Actuarial assumption changes may be amortized over a slightly longer time period in order to mitigate volatility and encourage prompt adoption of assumption changes whenever appropriate. The use of longer time periods for portions of the UAAL can be considered in light of the entirety of the UAAL; the impact on the effective amortization period; and the risk of the aggregate payments not being sufficient to avoid negative amortization. Finally, actuarial gains and losses or changes to plan provisions (i.e., changes in plan provisions (such as benefits or eligibility requirements) may be funded over a wider range of time periods.

Shorter time periods (i.e., 5 to 10 years) are more likely to meet objectives for changes in benefits adopted for closed plans, early retirement incentives, or benefit changes that impact retirees (i.e., ad hoc Cost-of-Living Adjustments (COLAs)). Longer periods of time may be acceptable for changes for active members with high average remaining future expected service. The length of the amortization bases will vary depending on the plan's funding policy; the governance and risk tolerances of the Plan Sponsor and Board of Trustees; and the circumstances of the individual plan.

A simplified way to think about the concept of layered amortization, where new bases are regularly established, is to envision a wooden marble run. Marbles are added at regular intervals at the top and wind their way down the track until they fall off, one by one. When one marble falls off, another is added at the top. There is a constant movement of marbles on and off the track. In some marble runs, one marble may follow a different path or take longer to reach the end than another.

This example is similar to a plan that has been using layered amortization for many years. When one base expires, another is added and every other base gets one year closer to dropping off. This provides a continuous process of paying off a portion of the UAAL using individual closed periods for each amortization base. Theoretically, having many bases at a time should limit contribution volatility even further because gains and losses are spread out over multiple bases. This means there is a greater chance of these bases offsetting each other if actuarial assumptions are close to experience as it occurs and actuarially determined contributions are being made.

However, there is a risk that the aggregate amortization payment may be insufficient to amortize the UAAL (or make funding progress) in a given year if there are *credits* (from gains) of a similar remaining amount to *payments* (from losses) and the *credits* have shorter remaining amortization periods than the *payments*.

One safety net that can be installed is to require that the minimum weighted average of the amortization periods (i.e., the effective amortization period) used to determine the aggregate amortization payment be no greater than the longest remaining single period among the layers and preferably short enough to eliminate any potential for negative amortization. Other safety nets are that the aggregate UAAL payment should neither be negative such that it results in a contribution that is less than the Normal Cost accrued during the year nor should this payment be less than the interest that accrued on the aggregate UAAL. All of these safety nets should be clearly addressed in the retirement plan's funding policy.

Volatility Strikes Back (The Last Payment)

Despite the use of layered amortization and multiple bases, tail volatility may still rear its ugly head if the amortization bases are not actively managed. Under the Actuarial Standards of Practice (ASOP), specifically ASOP No. 4[3], the actuary needs to consider sources of volatility in their calculations, which includes the end of amortization payments (tail volatility). If a plan utilizes several different amortization bases, it is possible

[3] A revised ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*, became effective on February 15, 2023 for all actuarial reports with a measurement date on or after February 15, 2023. *See:* http://www.actuarialstandardsboard.org/wp-content/uploads/2022/02/asop004_205.pdf

for the aggregate amortization payment to become volatile when the last payment of an amortization base is paid off.

For example, if an amortization base with a large loss is set to expire this year, the amortization payment will decrease by a large margin because that loss has now been fully paid. If there is also a large gain that will expire next year, the amortization payment for next year will increase dramatically again. This is because the gain will be fully recognized and is no longer offsetting the payments associated with the remaining bases.

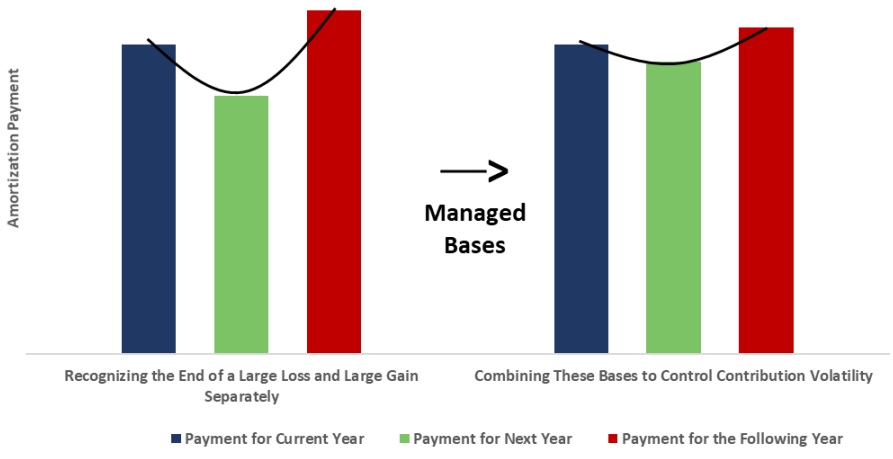
A recent example occurred with the market swings of 2021 and 2022. Huge investment gains were recognized in 2021, only to be rolled back by large investment losses in 2022. This volatility can be managed in a process called *actively managed bases*. If a plan uses an actively managed bases policy within its layered amortization funding policy, the actuary can combine two or more offsetting gains or losses into a single base to be amortized in a way that would manage this volatility (if sufficient funding progress is still expected).

In the example above, the actuary can combine the bases associated with the investment gain from 2021 with the investment loss from 2022 so that a more level amortization payment is produced for each year. Again, it is important to be mindful of the resulting effective amortization period and funded status of the plan. It may also be of concern that the transparency of the bases is lost, in which case the bases could remain separate, but both would have the same remaining amortization period. A simplified example of this process is shown in Chart 4. Separately recognizing the end of a large loss and the end of a large gain produces two amortization payments that are quite different. Combining these bases together and amortizing them over a single remaining period produces a less dramatic year-over-year change in the amortization payment. To envision this example, imagine a table filled with several spinning tops and removing the tops that are spinning out of control and replacing them with one stable top.

It should be noted that there is agency risk associated with actively managed bases. One way to think of agency risk is that different Stakeholders could disagree on certain aspects of the retirement plan funding such as the level of contributions, who pays them, and the level of benefits. It is imperative to have guidelines in the funding policy so there is not an incentive to reduce contribution requirements, nor is there an inherent bias that is inconsistent with the accumulation of assets to reach the plan's funding target of 100%. There are ways to manage agency risk by developing a formulaic approach for combining amortization layers, which removes some of the subjectivity. A common approach is to require that a combination of bases does not immediately reduce the contribution requirement if the combination had not occurred.

As time passes in an open retirement plan, the assets will become larger and larger relative to payroll. So even if the existing UAAL is paid off, future investment gains and losses will be increasingly more significant compared to the long-term average annual cost (Normal Cost). This means that even when utilizing a layered amortization approach, annual review and discussions are necessary to help the plan stay "on-top" of managing the potential volatility that may occur as a result of the plan's current funding and investment policies.

Chart 4: Ending Bases Separately vs. Managing Bases



Now that we have explored the topic of layered amortization, the following chart summarizes the pros and cons to be considered with this approach.

Pros	Cons
• **Helps avoid volatility** associated with a single closed amortization period	• **May be complicated** due to calculating multiple amortization payments
• **UAAL can be amortized by origin** using periods specific to the source (e.g., gains/losses, assumption changes, etc.)	• **May result in *scheduled* volatility** due to amortization bases expiring at different times
• **Assists with transparency** when identifying UAAL by source and year of origin	• **Requires proper management and monitoring** of the layered amortization bases
• **May be used indefinitely** with the proper management	

Return of the Actuary

Pension actuaries will return each valuation cycle to measure the plan's funding progress and develop a recommended contribution for the retirement plan. Part of this process involves analyzing the experience and changes that occurred since the prior valuation, and how they impact the liabilities and contributions of the plan.

In doing so, actuaries identify the causes of contribution volatility. The market swings and global disruption in the recent past from the COVID-19 pandemic, as well as the Great Recession of 2008-2009, are memorable examples that can cause contribution tail volatility if left unchecked.

Importantly, all actuarial reports are now required to separate investment and liability experience as well as provide risk measures for consideration.

If your plan utilizes layered amortization, does your actuary discuss in detail what it means to "manage" the amortization bases on a regular basis? GRS consultants can do just that. If you believe your plan could benefit from a layered amortization approach, contact us. We can help you establish and maintain such an approach for your plan. We can project various outcomes and suggest changes that will help to mitigate future contribution tail volatility.

Knowing that we cannot foresee the future or control plan experience, it is important that we have tools to manage inevitable contribution tail volatility. Tools such as layered amortization have a track record of smoothing out this tail volatility (when properly managed) while still making sufficient funding progress. It is our goal to help retirement plans understand when and how to use these tools in order to ensure the plan can meet its funding objectives in volatile times.

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