AMERICAN ACADEMY *of* ACTUARIES

Fundamentals of Current Pension Funding and Accounting For Private Sector Pension Plans

An Analysis by the Pension Committee of the American Academy of Actuaries

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FUNDAMENTALS OF CURRENT PENSION FUNDING AND ACCOUNTING FOR PRIVATE SECTOR PENSION PLANS

In general, pension plan sponsors are concerned with two primary financial issues:

- **Pension Funding** – the cash contributions that are made to the pension plan. Pension funding is governed by laws described in the Internal Revenue Code (IRC), which determine the annual minimum required contribution and the annual maximum tax-deductible contribution.

- **Pension Accounting** – the annual pension expense calculation and disclosure of a pension plan's assets and liabilities in a company's financial statement. The Financial Accounting Standards Board (FASB) governs pension accounting under generally accepted accounting principles (GAAP) in the U.S.

Amounts calculated under pension funding rules are completely different than those calculated for pension accounting, and one must be careful not to mix the two topics.

PENSION PLAN COST: THE BASICS

The cash contribution and pension expense calculations are both often referred to as the cost of a pension plan – one as a cash outlay and the other as a reduction (or increase) in company earnings. Both are calculated using similar principles, although the rules for calculation are very different.

Pension plan formulas are generally designed to tie the participants' benefits at retirement to their **compensation** and/or **service** with the employer. Each employer chooses how to reflect compensation and service based on their individual business needs and the needs of their workforce. Pensions are a form of **deferred compensation**. Participants trade compensation today for future pensions tomorrow. Both the pension funding rules and pension accounting rules require that the cost of that deferred compensation be recognized as it is earned.

An actuary takes the plan's pension formula and determines how to reflect the cost of the plan over each participant's working lifetime. There are three basic principles used:

- Active participants earn new benefits each year. Actuaries call that the **normal cost**. The normal cost is always reflected in the cash and accounting cost of the plan.

- Actuaries must consider the difference between the **actuarial liability**, which is the value of benefits already earned, and the assets. An unfunded liability, when the actuarial liability exceeds the assets, will increase cost. An asset surplus, when the actuarial liability is less than the assets, will decrease cost.

- Actuaries set **assumptions** to measure the normal cost and the actuarial liability. Measuring assets is relatively easy, because we have markets to set a value to the equity and bond investments held in the pension trust. However, there is no market of freely traded pension liabilities. Actuaries and plan sponsors are given very specific, and different, guidance by the IRS and the FASB about how those assumptions are chosen, who chooses them, and what conditions they must reflect.

The rest of this paper will deliver more detail on:

- How assumptions are usually selected;
- How the normal cost and actuarial liability are typically calculated;
- How funding rules use the normal cost and actuarial liability to determine cash contributions; and
- How accounting rules use the normal cost and actuarial liability (called service cost and benefit obligation in Statement of Financial Accounting Standard (SFAS) No. 87) to determine pension expense.

ACTUARIAL ASSUMPTIONS

Why do actuaries set assumptions? Pension benefits are paid far out into the future, but how and when they'll be paid is uncertain.

- Today's 70-year old retirees are promised payments for the rest of their (and perhaps their spouse's) lifetime. How long will they live? How long might their spouse survive them?
- Today's 30 year-old active participants will earn additional benefits, terminate employment, and receive payments for the rest of their lifetimes. How long will 30-year olds work for their employer? How might their pay increase? When will they start to receive their retirement benefits? How long will they live after retirement?

Both pension funding and accounting require assumptions to be made about the future. These assumptions are called **actuarial assumptions** and they, along with current plan participant data and the benefit formula described in the pension plan, are used to project future benefits. For pension funding, the law gives the plan's actuary responsibility for the selection of actuarial assumptions. For pension accounting, the plan sponsor selects the actuarial assumptions, with guidance from the actuary. Actuarial assumptions for pension accounting are also generally reviewed by and approved by the company's external auditors in their general auditing of a company's financial statements.

There are two primary types of assumptions selected:

- **Economic assumptions** dealing with current interest rates, salary increases, inflation and investment markets. How will market forces affect the cost of the plan?
- **Demographic assumptions** about the participant group make-up and expected behavior and life expectancy. How will participant behavior affect the cost of the plan?

Several key actuarial assumptions are described in more detail below.

- **Economic Assumptions**
    - **Interest Rate** – For pension funding, this assumption is used to discount future benefits to determine plan liabilities and it should be a reasonable expectation of the future rate of return on the pension plan's assets. It is often called the **valuation interest rate**. Different plans

will have different valuation interest rates, reflecting different investment strategies and varying opinions of future rates of return. It is typically selected as a long-term reflection of plan assets and liabilities.

For pension accounting, this is called the **discount rate** and must reflect either the market rates currently applicable to settling the benefit obligation or the rates of return on high quality fixed income securities at the **measurement date**. The measurement date is a date selected by the company that is generally the last day of the company's fiscal year but may be up to three months earlier. For example, if a company's measurement date is the end of a calendar year fiscal year, each 12/31 the company selects a discount rate based on applicable external interest rates as of that date. The selected discount rate is used to disclose the benefit obligations as of that 12/31 and then used to determine the pension expense for the next fiscal year. The discount rate does not change until the next 12/31 unless a significant event occurs requiring a remeasurement of the benefit obligations.

- **Expected Long-term Rate of Return on Assets** – This assumption is only used for pension accounting. It is used to determine the expected return on assets during the year. This assumption reflects the average rate of earnings expected on current and future investments to pay benefits. It is a long-term assumption that is reviewed regularly but generally changes when the long-term view of the market changes or with shifts in the plan's investment policy.

- **Salary Scale** – This assumption is used to project an individual's future compensation in pension plans that provide benefits based on compensation. The salary scale assumption reflects expected inflation, productivity, seniority, promotion and other factors that affect wages.

- **Inflation** – For pension accounting, this is used to project items, such as IRC limitations on benefits and compensation, which increase with the Consumer Price Index (CPI).[1] Inflation is also used as a basis for determining other economic assumptions because inflation is a fundamental component of each of the economic assumptions.

- **Demographic Assumptions**: Actuaries use rates (probabilities) to model the uncertainty of participant behavior. For example, because some participants will retire early, some will retire at 65, and some will work to age 70, an actuary might assume that each individual has some probability of retiring early, at 65, and working to 70. Sometimes assumptions will be the same for many plans (e.g., mortality rates) and sometimes assumptions are very specific to a given employer's workforce (e.g., rates of terminating employment before retirement). Some typical demographic assumptions are:

  - **Withdrawal or Termination Assumptions** – how long will participants continue to work for this employer?

  - **Mortality Assumptions** – how long will people live?

  - **Retirement Assumptions** – when will participants retire and begin receiving benefits?

[1] IRC funding rules prohibit the actuary from projecting increases in IRC limitations on compensation and benefits when calculating the minimum required or maximum tax-deductible contributions to the plan.

- **Disability Assumptions** – will participants become disabled and no longer be able to work?

BASIC PENSION LIABILITY PRINCIPLES

A pension plan's liabilities can be calculated in different ways, but the same principles always apply.

The actuary calculates the expected future pension payments for each participant in the plan using the company's participant data and plan provisions. These future benefit payments consider the individual's compensation and service history, and when that individual might be expected to die, quit, become disabled or retire. Each future payment is discounted from the date of payment to today using the actuarial assumptions. Actuaries call this discounted amount the **present value of future benefits** (PVFB) and it represents the present value of all benefits expected to be paid from the plan to current plan participants. If assumptions are correct (and if it were allowed), the company could theoretically set aside that amount of money in a plan today and it would cover payments from the plan, including those for service not yet rendered. Note this amount considers future service the participant is expected to earn and future pay increases.

However, pension plan sponsors can't recognize the cost of unearned future service; it would be equivalent to recognizing a cost for compensation before it is paid. Actuaries have developed **cost methods** to divide the PVFB into the following three pieces:

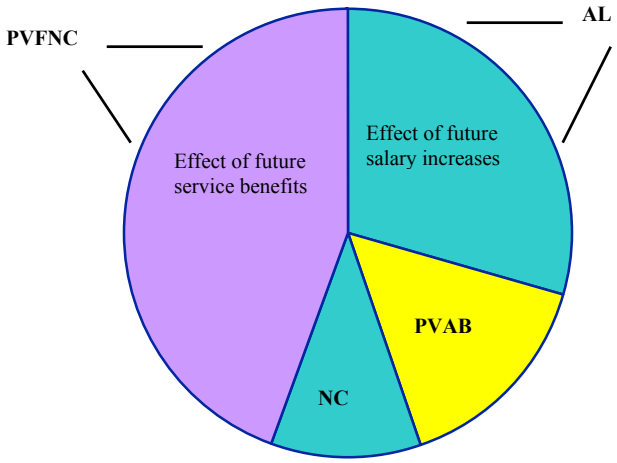
- **Actuarial Liability** (AL) – The portion of the PVFB that is attributed to past service. This is the current value of the compensation that was deferred in prior years. For pension accounting, this is referred to as the **projected benefit obligation** (PBO). Different cost methods calculate the AL differently, but it always reflects only past service. Sometimes the AL reflects expected future pay increases because many pension plans are designed so that the retirement benefit is based on the pay at retirement. To allow the plan sponsor to recognize the cost of the plan gradually over the participant's lifetime, the actuary considers the portion of the future benefit due to past service to already include expected future pay increases.

  The portion of the PVFB that only recognizes benefits accrued to date (i.e., without future pay increases) is called the **present value of accumulated benefits** (PVAB). This reflects current service and current salary. For pension funding, this may also be called the **current liability**; however, the current liability is calculated using IRS mandated interest and mortality assumptions. For pension accounting purposes, this is referred to as the **accumulated benefit obligation** (ABO).

- **Normal Cost** (NC) – The portion of the PVFB that is attributed to the current year of service. This is the current value of the compensation that is being deferred this year. For pension accounting purposes, this is referred to as the **service cost** (SC). Different cost methods calculate the NC differently, but generally it reflects the current year of service and may reflect expected future pay increases.

- **Present Value of Future Normal Costs** (PVFNC) - The portion of the PVFB that will be attributed to future years of service. Quite simply, it covers compensation that hasn't yet been earned. This number is not disclosed and is rarely used in any cost calculations.

The composition of the PVFB can be illustrated as follows:



To understand the differences between the calculations, consider the following example. Joe participates in a pension plan that gives him 1 percent of final salary for each year of service he earns under the plan (1 percent times salary times service). Joe is currently age 55, has worked for 20 years for the company, and his current pay is $50,000. The actuary assumes Joe will retire at 65, after working 30 years for the company, with an estimated future pay of $75,000.

- Joe's present value of future benefits or PVFB is based on what he's actually expected to get from the plan at the end of all of his years of service. His PVFB is the actuarial present value of his projected age 65 benefit. That projected age 65 benefit is calculated as 1 percent times his projected salary at 65 times his projected service at 65, or 1 percent times $75,000 times 30 years ($22,500).

- Joe's actuarial liability or AL can be calculated using several methods. In our example, we'll use a method based on past service and expected future pay (called the Projected Unit Credit cost method). The liability is based on his expected future salary, but only takes into account the service he's earned today. The AL is the actuarial present value of 1 percent times his projected salary at 65 times his service today (at age 55), or the actuarial present value of 1 percent times $75,000 times 20 years (actuarial present value of $15,000).

- The normal cost or NC is calculated under the same method as the actuarial liability, but only reflects the current year's service. So, we'll continue using the Projected Unit Credit Cost method, which uses projected salary but we'll only reflect one year of service. The NC is the actuarial present value of 1 percent times his projected salary at 65 times 1 year of service, or the actuarial present value of 1 percent times $75,000 times 1 year (actuarial present value of $750).

As noted, the PVFB can be divided into the AL, NC and PVFNC under many different actuarial **cost methods.** The two most common cost methods are the Projected Unit Credit cost method (PUC) and the (Traditional) Unit Credit (UC) cost method. The PUC cost method considers expected future pay increases in the calculation of liability and normal cost. The UC cost method does not reflect expected future pay increases in the liability, and only reflects one year's expected growth in pay in the normal cost. The PUC and UC cost method are prescribed for use in certain accounting cost calculations. Other cost methods can be used for funding cost calculations, as noted below.

The various measurements discussed so far can be summarized as follows:

General Term	Also known as for Funding	Also known as for Accounting	Cost Method for Funding	Cost Method for Accounting	Salary Basis	Service Basis
Present Value of Future Benefits	Not Defined	Not Defined[2]	N/A	N/A	Projected	Projected
Actuarial Liability	Actuarial Liability	Projected Benefit Obligation	Not prescribed[3]	PUC or UC only, depending on benefit formula	Projected	Current
Present Value of Accumulated Benefits	Present Value of Accumulated Benefits or Current Liability	Accumulated Benefit Obligation	UC	UC	Current	Current
Normal Cost	Normal Cost	Service Cost	Not prescribed[2]	PUC	Projected	One year only

BASIC PENSION FUNDING PRINCIPLES

Companies prefund their pension obligations for a variety of reasons, including:

- Prefunding is required by ERISA for all U.S. tax qualified pension plans.
- Prefunding attempts to equitably allocate to each year the cost of the pension benefits.
- Benefit security is increased when pension benefits are prefunded.
- Investment earnings on assets held in a qualified pension plan's trust are tax-free.
- Contributions up to the maximum generate a tax deduction.

[2] Sometimes informally called the "Expected Benefit Obligation," although this term is never formally defined in the accounting statement.

[3] The actuary is allowed to select the funding cost method used to calculate the actuarial liability and normal cost. For pay-related benefits, the method must consider expected future pay. The PUC method is allowed, and widely used, but there are other methods (e.g., entry-age normal, aggregate) that are used and beyond the scope of this paper. The same cost method must be used to calculate the normal cost and actuarial liability.

- Participants do not pay taxes on benefits earned under the plan until they are received.

- Intergenerational equity is preserved by paying for benefits as they are earned.

Because plan sponsors get a tax deduction for contributions, the IRC mandates certain minimum required and maximum tax-deductible contributions. In general, the basic minimum required contribution is equal to:

- Normal cost, plus

- Amortization of the **unfunded actuarial liability** ("UAL"), which is the actuarial liability ("AL") less the **actuarial value of assets** ("AVA").[4] The UAL to be amortized generally has two components:

    - **Prior service liability** – Prior service liability arises if the plan improves benefits for service already earned. It can arise when the plan is established (if participants are given credit for time with the employer before the establishment of the plan) or when the plan is amended. This liability increase can generally be funded by amortizing over a period of thirty years.

    - **Actuarial gains or losses** – A pension plan has actuarial gains or losses each year because the actual events during the year ("experience") do not exactly match the long-term assumptions previously made. Gains or losses on plan assets occur because the actual investment returns were higher or lower than anticipated. Gains or losses on actuarial liabilities can occur because long-term assumptions (e.g., mortality, salary increases, termination, retirement, economic) were not met. These gains or losses can generally be funded by amortizing over five years.

    Changes in the UAL may also be amortized if they are due to changes in actuarial assumptions or methods.

Other considerations are important in determining the minimum required contribution, including:

- To the extent that the funding rules result in a negative number, then no contribution is required, but assets cannot be withdrawn from the pension trust.

- If the plan is well funded, contributions may be limited to the **full funding limitation**. When a plan is very well funded, this limitation can be zero. This limitation applied to many plans in the 1990s; however, due to poor investment experience of many pension plans and the unusually low interest rates in the early 2000s, many of those plans have significant required plan contributions in the early 2000s.

- An additional set of calculations is required comparing the plan's current liability to the AVA. If the value of the AVA is significantly below the current liability, the plan sponsor must pay an

[4] The AVA is a value of plan assets calculated for funding purposes. This value may be equal to the fair market value of the assets, or it may be an asset value that gradually recognizes unexpected asset returns over a period of time (not to exceed 5 years). The AVA must be between 80% and 120% of the fair market value of assets.

additional funding charge. These additional contributions have the goal of quickly increasing a plan's funding so that plan assets become at least 90 percent of the plan's current liability.

- If a company contributes amounts to its pension plan in excess of the minimum required contribution, a **credit balance** is established for that excess. The credit balance grows with interest in future years and can be used to decrease the minimum required contribution in a future year.

There is a similar calculation of the maximum tax-deductible contribution: the normal cost plus an amortization (over 10 years) of the unfunded actuarial liability. There is a full funding limitation (after it is reached no deductible contributions can be made); however, a company can always contribute and deduct the minimum required contribution. There is an override to this limit that permits most companies with more than 100 employees to contribute and deduct the full amount of the plan's unfunded current liability.

Plan sponsors generally do not contribute more than the maximum tax-deductible contribution. Any amounts contributed in excess of the maximum tax-deductible contribution are not deductible and generally are subject to an excise tax, although there are exceptions to the application of this excise tax.

Please note that some plans are not funded at all, such as plans covering only executives or employees in some foreign countries.

BASIC PENSION ACCOUNTING PRINCIPLES

Pension accounting principles require pension costs to be recognized in a specific pattern to attribute the value of the benefits over a work life and require clear and consistent disclosure of pension costs, along with the plan's assets and obligations in a company's financial statements. Statement of Financial Accounting Standard No. 87 prescribes the single method that a U.S.-based company following GAAP must use to reflect the cost of pension plans in its income statement and on its balance sheet.[5]

As noted earlier, each company selects a measurement date, generally equal to the last date of the fiscal year.[6] As of that date, the company sets assumptions and gathers the participant data used to measure its obligations and determines the fair value of assets in the pension trust. It uses these amounts to calculate the cost of the plan in the future year. It also determines if additional amounts must be recorded on its balance sheet.

The basis for calculations is the benefit obligations (as noted above the projected benefit obligation (PBO), the accumulated benefit obligation (ABO) and the service cost (SC)) and the **market related value of assets** (MRVA)[7]. These are used to calculate the **net periodic pension cost** (NPPC), which is the annual accounting expense or income a company must recognize in their income statement, and

[5] Other accounting regimes apply to certain industries such as Statements of Statutory Accounting Principles for insurance companies and Cost Accounting Standards for government contractors. If a company lists its securities in another country, the accounting standards of that country or the International Accounting Standards must be followed.

[6] Companies may elect to use an alternate date within 90 days of the end of the fiscal year as its measurement date. The use of an earlier measurement date allows companies to know the year-end results sooner and helps in budgeting for future years.

[7] The MRVA is either the plan's market value of assets ("fair value") or a calculated asset value that recognizes changes in fair value in a systematic and rational manner over not more than five years Companies may choose to smooth investment returns to decrease volatility of annual accounting expense. This concept is similar, but not identical, to the AVA previously described.

direct adjustments to the plan sponsor's balance sheet, if applicable. The NPPC cost is made up of several components:

- **Service cost** – The actuarial present value of the projected benefits attributable to employees' service in the current year (similar to normal cost).

- **Interest cost** – Increase in PBO associated with the passage of time during the year. This is generally the discount rate multiplied by the beginning of year PBO adjusted for current year expected benefit payments.

- **Expected return on assets** – Increase in plan assets associated with the passage of time during the year. This is offset against the other cost items and is generally the expected long-term rate of return on assets multiplied by the beginning of year MRVA adjusted for current year expected benefit payments, contributions and possibly for expected administrative expenses paid from the trust, if applicable.

- **Amortization amounts** – Systematic recognition of certain changes:

    - **Transition obligation or asset** – Phased recognition on the income statement of the difference between the plan's funded status (PBO less plan assets) and the accrued or prepaid cost on the company's balance sheet when companies first transitioned to this statement - typically in the late 80s. For many plans, this amount has either been fully recognized or will be in the next few years.

    - **Prior service cost** – Phased recognition on the income statement of changes in the PBO associated with a plan amendment. This amount is generally amortized over the average remaining service period of plan participants.

    - **Unrecognized gains or losses** – Phased recognition of actuarial gains or losses. Actuarial gains and losses that have not yet been reflected on the company's income statement are accumulated each year and amortized over the average remaining service period of plan participants only to the extent their total exceeds a corridor. The corridor may be up to 10 percent of the greater of the plan's PBO or MRVA.

The total of the above pieces of the NPPC can produce a negative expense, which appears as income on a company's financial statements.

The **accrued or prepaid pension cost** is the amount on a company's balance sheet that is equal to the accumulated difference between past net periodic pension costs and past plan contributions (for unfunded plans, such as for executives, substitute "benefit payments" for "plan contributions"). A prepaid pension cost arises when the plan contributions exceed the NPPCs and/or the NPPCs are less than zero. An accrued pension cost arises when the NPPCs exceed plan contributions and/or the NPPCs are greater than zero.

For certain plans whose fair value of assets is less than the ABO, there may be additional amounts the company must reflect on its balance sheet. Note that these amounts are reflected on the balance sheet only and do not affect the company's income statement.

- **Additional minimum liability** ("AML") – At a company's measurement date, the company must record a liability on their balance sheet at least equal to the excess, if any, of the plan's ABO over the plan's assets (unfunded ABO). Therefore, if the plan has an unfunded ABO that is greater than the accrued pension cost, the company must set up an additional balance sheet liability (the AML) equal to that excess. If the plan has an unfunded ABO and a prepaid pension cost, the company must set up an additional balance sheet liability (the AML) equal to the total of the prepaid pension cost and the unfunded ABO. If the plan's unfunded ABO is less than the accrued pension cost, or if the plan has no unfunded ABO, no AML is set up.

- **Intangible Asset** – If a company has to set up an AML, an offsetting intangible asset can be set up, but it is limited to the total of the unrecognized prior service costs and transition obligations. It theoretically reflects the future "goodwill" from employees arising from the promise to provide past service benefits under the plan.

- **Reduction to Other Comprehensive Income** – If the intangible asset is less than AML, the difference is a reduction to the company's Other Comprehensive Income. This reflects the impact on the "value" of the company due to the underfunded pension benefits in excess of any anticipated future goodwill.

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The items described in this paper are merely the basics. These rules have exceptions and special rules exist for many situations, such as plan terminations, freezing of benefit accruals, purchasing of annuities and plans sponsored by unions or public sector employers.

SUMMARY OF CURRENT PENSION FUNDING AND ACCOUNTING FOR PRIVATE SECTOR PENSION PLANS

	Pension Funding	**Pension Accounting**
Purpose	Cash contributions to the pension plan	Accounting cost and disclosure of pension plans' benefit obligations
Who Sets the Rules	IRS/Congress	Financial Accounting Standards Board
Interest rate used to discount benefits	Valuation interest rate – based on expected future rate of return on pension plan assets	Discount rate – reflects market rates currently applicable for settling the benefit obligation or rates of return on high quality fixed income securities at the measurement date
Expected Rate of Return on Assets	N/A	Based on expected future rate of return on pension assets
Interest Rate Volatility	Because assumptions are long-term, costs are generally stable, unless additional funding charges apply	Because the discount rate is a short-term "snapshot" rate, it changes often resulting in volatility from year to year