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Understanding the Basics of Actuarial Methods

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Understanding the Basics of Actuarial Methods

Introduction

This paper is designed to make the theories and language of actuarial methods related to public pensions in the State of Texas more understandable. Present conditions in public finance on both the state-wide and local governmental levels require a more complete understanding of how pensions are structured and how actuarial language describes that structure. Public pension trustees and administrators deal with actuarial information in their duties to manage their pension plans and carry out their fiduciary duties. Government officials are charged with setting policy for public pensions. Plan members must understand the impact of choices by decision-makers on their own retirements. Taxpayers provide the revenue for governments to contribute to public pensions and are increasingly concerned about the stewardship of public pensions.

This paper is structured to distinguish between plans that use actuarial concepts in a limited fashion and those that rely on actuarial concepts more heavily. First, the paper introduces the fundamental equation of pension plan financing to show the similarities in pension goals of all different types of plans. Next, the paper explains the different types of pension plans and how actuarial concepts apply more to certain types of plans. Lastly, this paper describes concepts that apply to actuarially-funded defined benefit plans and gives examples to help understand these actuarial concepts.

Fundamental Equation of Pension Plan Financing

To understand the basics of actuarial methods of valuing pension plan liabilities, consider the fundamental equation of pension plan financing:

$$C + I = B + E:$$

Contributions (C) + Income (I) = Benefits (B) + Expenses (E).



Employers and Employees **contribute** to a fund in regular intervals. The fund invests these contributions and earns a return on that investment. Return from investments (fixed income, equity, mutual fund, etc.) are considered **income**. Contributions and Income combine to add to the fund.

Retirement plans pay **benefits** to members who have met plan requirements. Retirement plans also pay **expenses** for maintaining the plan: administrative, investment, auditing, etc. Benefit payments and expenses combine to decrease the amount in the fund.

Over time, the inputs to the fund are contributions and income, while outputs from the fund are benefits and expenses. Therefore, over time, contributions and interest must equal benefits and expenses.

Defined Benefit or Defined Contribution?

The fundamental equation holds true whether the pension plan is a **defined benefit plan**(DB plan) or a **defined contribution plan** (DC plan)

Defined Benefit Plan: a pension plan where a monthly benefit, payable at a certain retirement age, is defined in the plan. A traditional pension with predetermined monthly annuity payments, payable until death, is an example of a DB plan. Actuarial methods are used to calculate and predict benefits, expenses and income in the equation.

DB Plan Example
 Retirement Benefit: 2.3% of final pay times years of service
 Retirement Age: 65
 Level monthly payment after retirement.

In regards to the equation $C + I = B + E$, a defined benefit plan is affected in the following ways: First, actuaries will calculate the amount required for future benefits (B). With this information, the fund is able to determine required contributions (C), when combined with assumed investment income (I). If benefits or market conditions change, adjustments must be made to contributions. If contributions or investment income falls, the stability of the plan may be affected and benefits may be adjusted.

Defined Contribution Plan: a pension plan in which specified contributions are made to each participant's account. The contributions and interest earned on the investments serve as the total retirement amount for the retiree. In a DC plan, the contributions and income determine the amount of benefits available, net of expenses. In regards to the equation $C + I = B + E$, a defined contribution plan is affected in the following ways. Benefits (B) or the account balance at retirement, are equal to the contribution (C) and the investment income (I) minus any expenses (E) incurred for management of the funds. Individual Retirement Accounts (IRAs) and 401(k) plans are two examples of DC plans.

DC Plan Example:

Employer contribution: 3% of pay

Employee contribution: 3% of pay

Retirement benefit is account balance at retirement

The structural differences of defined benefit and defined contribution plans leads to a different way of calculating benefits as derived from the equation $C + I = B + E$. Because there is a definite amount in a retirees' account from a defined contribution plan, a straightforward $B = C + I - E$ results from the operation of the plan. The retiree and plan know that the benefit is the account balance, which the retiree must manage over his retirement period. Conversely, a defined benefit plan is structured to provide level benefits at retirement over a varying amount of time. Because of the complexity of this problem, actuarial principles are applied in order to calculate this level benefit over a varying timeframe.

Another fundamental difference between defined contribution plans and defined benefit plans is that by their structure (because the only benefits come from contributions actually made to an individual's account), defined contribution plans must be funded and never have an unfunded actuarial accrued liability (UAAL). In defined benefit plans, insufficient contributions or bad plan experience, such as a market downturn, can increase the UAAL.

Defined Benefit Plans: Pre-funding vs. Pay-as-you-go

Pre-funding allows for assets to be built up to "fund" future benefits. Pay-as-you-go funding, in contrast, makes contributions as benefits become due. Pay-as-you-go plans are not actuarially funded, as there is no attempt to level the required contributions. It is possible, however, to estimate the annually required future contributions to a pay-as-you-go plan. All actuarially sound plans are pre-funded. With respect to the fundamental equation of pension plan financing ($C+I = B+E$):

Pay-as-you-go means income (I) equals zero, requiring greater contributions (C) to fund benefits and expenses (B+E). The focus for a pension plan or its sponsoring entity is on budgeting or projecting the benefit payments without the advantage of investment income. These contributions are passed through to pay for current benefits. Judicial Retirement System of Texas Plan One is a pay-as-you-go plan.

With **pre-funding**, income (I) reduces the amount of contributions (C) needed to fund benefits and expenses (B+E). A pension plan or its sponsoring entity must still consider benefit payments when making contributions to the plan, but investment income is also considered.

Also, when a plan is prefunded, the contributions to the plan are made over the working careers of the employees earning the benefits. Thus, the taxpayers being served by those employees are bearing the cost of those employees' benefits. With pay-as-you-go funding, the cost for an employee's benefit is borne by the subsequent generation of taxpayers.

Pre-Funding vs. Pay-as-you-go...

Theoretical differences between pre-funding vs. pay-as-you-go center on two things:

First, from the employer side, pre-funding is based on future payments while pay-as-you-go funding is a pass-through to pay current benefits.

Second, from the employee contributions side, pre-funding is seen as contributing to your own pensions while pay-as-you-go funding can be seen as paying for present day retiree pensions.

Actuarial Valuations of Pre-funded Defined Benefit Plans

In previous sections, we discussed the difference between a defined benefit plan and a defined contribution plan. As a reminder, the defined contribution plan only provides an amount or account balance upon retirement. Contributions (C) and income (I) that is earned, less expenses (E), become the benefit (B) or account balance for the retiree at retirement.

Pre-funded public sector defined benefit plans provide a generally level benefit to the retiree after retirement. A number of variables, before and after retirement (salary level, life-span, etc.), affect the calculation of future benefits for retirees. Mathematical principles are applied to calculate the cost of future benefits. Retirement systems typically budget present contributions to meet future benefit obligations.

In order to calculate the value of future benefits in a defined benefit plan, an actuarial valuation is performed. Generally, an actuarial valuation is used to assess the funded status and calculate a recommended contribution. The equation $C + I = B + E$ holds true over time and an actuarial valuation is a measure taken or "snapshot" at a single moment in time (i.e., the valuation date).

An actuarial valuation includes many factors when making a basic determination. This includes:

- Employer and Employee Contributions with comparison to expected contributions
- Return on Investment with comparison to assumed investment return
- Benefit payments to beneficiaries and future benefit payments with respect to retirement age
- Rate of salary increase, mortality and disability rates, inflation assumptions, and discount rate
- All assets and liabilities for the plan

One main piece of an actuarial valuation is the discount rate. Actuaries, guided by plan trustees and investment professionals, use a discount rate to determine the value of future benefits. Public plans generally use the expected rate of return on plan assets as the discount rate because present money is

assumed to grow over time to pay for the benefits. The discount rate is typically based on a long time horizon to match member lifespan.

Actuaries apply a discount rate to future benefit payments in order to calculate a present value or value in today's dollars. A key fact about the discount rate is that the higher the discount rate, the lower the present value, and vice versa.

This fact is explained by the following example:

Discount Rate vs. Present Value

Assume John has promised to pay Susan \$100, to be paid five years from now. What is the present value of that \$100 payment? In other words, "What is the value in today's dollars of \$100 in five years?" ...ie: **present value.**

The present value depends on the interest rate at which the \$100 is discounted. Say John has a fund which will earn 5% per year. How much would he have to put in the fund now in order to accumulate \$100 after five years? The answer is \$78.35, because this amount, if accumulated for five years at 5%, will reach \$100: **$\$78.35 = \$100 / 1.05^5$**

Instead, say John's fund earns 8% per year. Now how much would he have to put in the fund? The answer is \$68.05, because this amount, if accumulated for five years at 8%, will reach \$100: **$\$68.05 = \$100 / 1.08^5$**

Discounting a deferred payment with a higher (lower) discount rate will produce a lower (higher) present value, due to the higher (lower) expected interest to be added to a hypothetical fund for the payment.

Benefits or Pension Obligations

In our equation $C + I = B + E$, actuaries calculate pension benefits (B) using terms outlined in the plan designs of each plan. Each year, there are values for pension benefits already accrued from past years, benefits accruing from the current year, and benefits projected for future years. The value of benefits accrued in past years is called the actuarial accrued liability or AAL. The value of benefits accruing for the present year is called the Normal Cost. The value of benefits for present year and all future years are called the present value of future normal costs or PVFNC (this includes Normal Cost). The total amount of all benefits (AAL + PVFNC) is called present value of future benefits or PVFB.

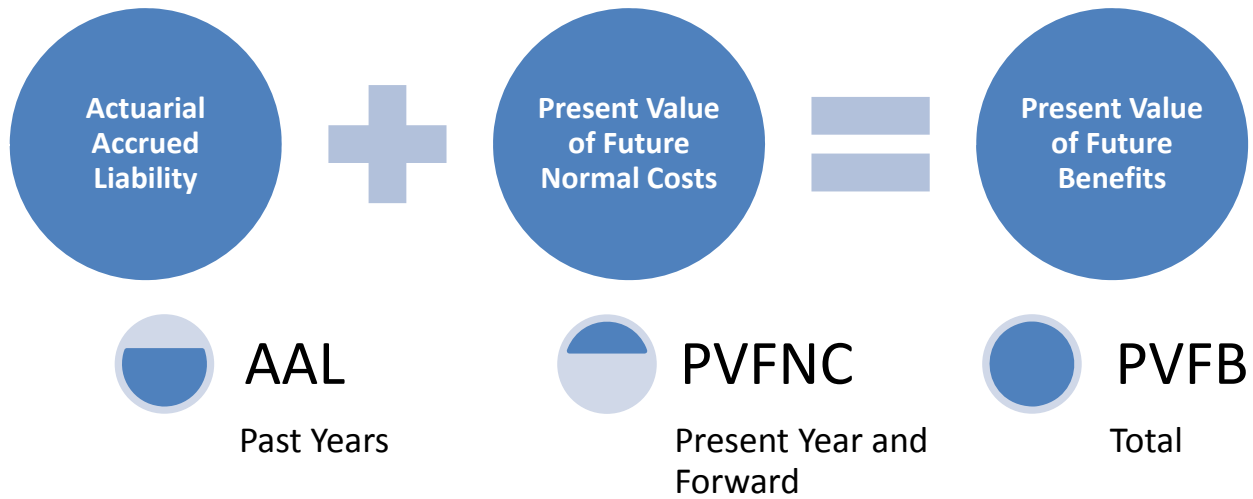
The concept here is to project the benefits for an entire group of people and give that projection a numerical value. It is as if the projected benefit calculation for one member of the group is repeated for the entire group. However, each member is at a different age, number of years worked, projected retirement age, etc.

The **present value of future benefits** (PVFB) is calculated as of the actuarial valuation date. PVFB is the present value of all benefits expected to be paid from the plan to current participants. This amount considers future service and pay participants are expected to earn.

PVFB is split into two parts: the **actuarial accrued liability** (AAL) and the **present value of future normal costs** (PVFNC).

AAL is the portion of PVFB attributed to past service.

PVFNC is the portion of PVFB that will be attributed to present and future years of service.



Normal Cost (NC) is the portion of PVFB that represents the current year’s benefit accruals. The current year is the first year of PVFNC. Typically, contributions in a given year are enough to cover that same year’s normal cost with additional contributions applied to past year’s obligations, if not fully funded.

Assets and Asset Smoothing

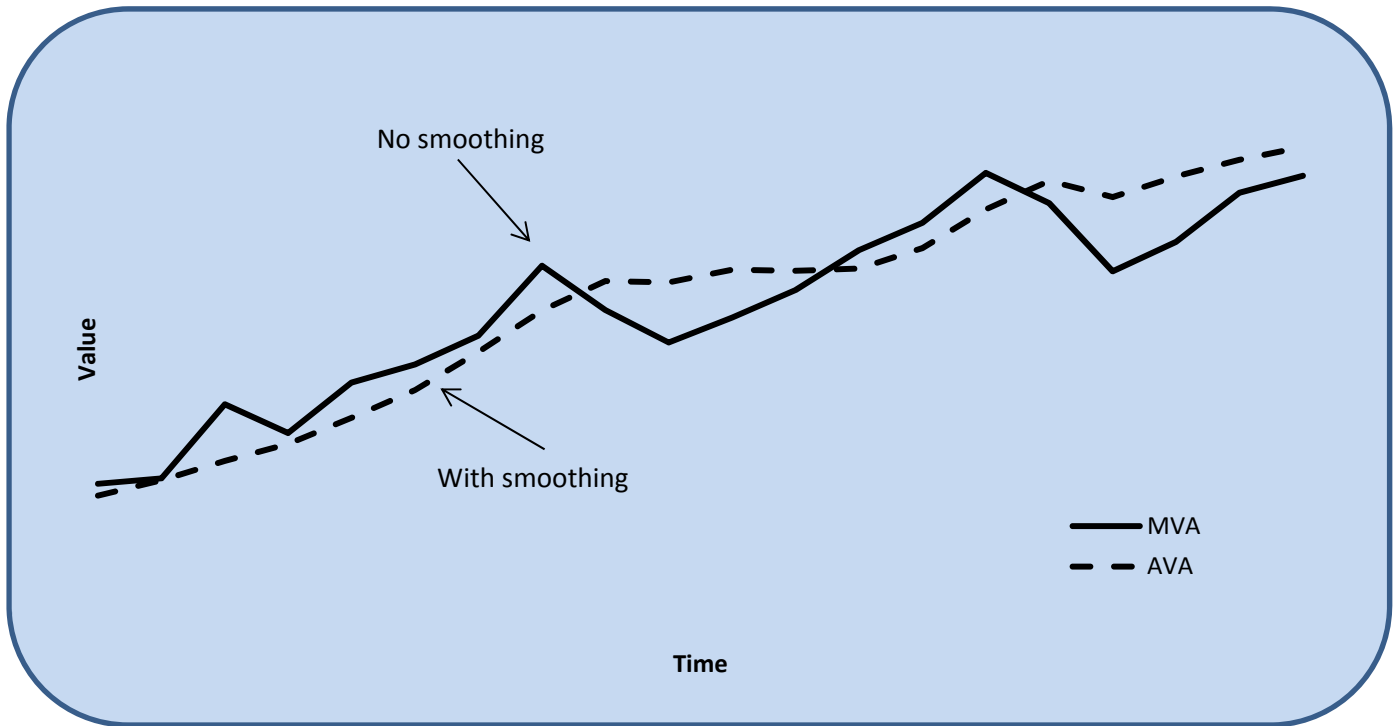
In pre-funded defined benefit plans, assets are calculated using different methodologies. The Market Value of Assets (MVA) is the value at which assets could be traded on the market. The Actuarial Value of Assets (AVA) is the value of assets used for the actuarial valuation. The AVA can be either the market value (MVA) or a smoothed value of assets. The smoothed value phases-in gains and losses to reduce volatility. The AVA is used to calculate the Unfunded Actuarial Accrued Liability (UAAL).

Trustees of the retirement plan are responsible for the investment of fund assets. The income from these investments, (I) in our equation $C + I = B + E$, is projected at a rate comparable to the lifetime of the average retiree. Actuaries use an assumed rate of return to calculate the projected income from these investments. Actuarial smoothing of actual returns allows for more manageable budgeting of plan contributions. Once assets are smoothed, the plan actuary calculates the projected income (I) and projected benefits (B) in order to find the appropriate contribution level (C).

AVA smoothing methods are used to “smooth” the effect of short-term volatility in the MVA. Smoothing reduces the volatility of the MVA and keeps contributions more stable, and thus more predictable. Short-term asset gains and losses are recognized over a period of years. Smoothed value

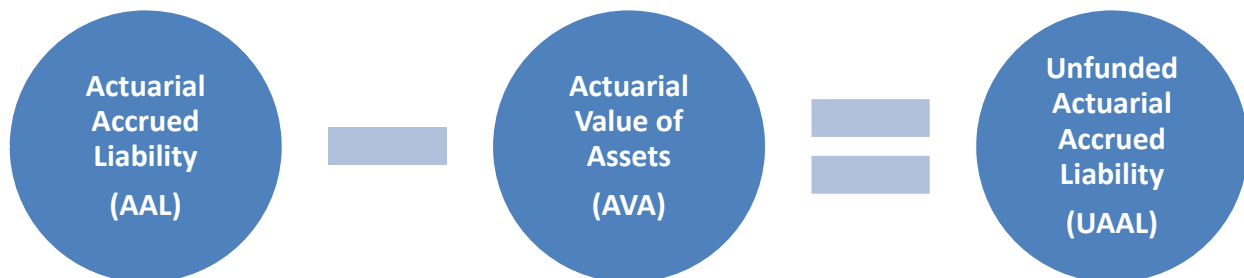
may be subject to a corridor around the market value, such as plus or minus 20% of the MVA. Such a corridor puts an upper limit on the amount of deferred gains and losses included in the AVA. (That is, $AVA = MVA + \text{deferred losses} - \text{deferred gains}$.) The most frequent method of smoothing is the five-year phase-in of gains and losses.

The following chart illustrates the effect of asset smoothing:



UAAL and Funded Ratio

The AAL is the total actuarial valued amount of liability for all pension benefits earned as of the valuation date. The AVA is the total actuarially valued amount assets held by the fund. The Unfunded Actuarial Accrued Liability (UAAL) is the difference between the AAL and the AVA. Therefore **the UAAL** is the amount that is still “owed” to the fund for past obligations.



The **Funded Ratio** is the ratio of actuarial value of assets to actuarial accrued liability or a ratio of the plan's current assets to the present value of earned pension obligation. The funded ratio is calculated by dividing the AVA by AAL.



Contributions

In our equation $C + I = B + E$, actuaries calculate benefits (B) and projected and smoothed income (I) so that plans can choose the appropriate amount of contributions (C). Contributions usually come from two sources: the Employer and the Employee. In public pension plans, the employer is the government sponsoring entity. This could be as large as the State of Texas or as small as a local fire department. Plans vary in contribution. Some plans have equal contributions between employer and employee, others are unequal. Usually, both employer and employee contribute a percentage of take home pay. Again, these vary widely with some contributions being 0%.

Initially, contributions are credited to the normal cost. After normal cost is paid, the remainder is credited toward the Unfunded Actuarial Accrued Liability (UAAL). Another calculation occurs at this point. When contributions (C) are combined with income (I) and benefits (B) are projected and paid, the discount rate and rate of payroll growth are used to calculate the amortization period for the plan. The amortization period is the number of years required to pay-off the unfunded actuarial accrued liability.

Amortization Period

The amortization period is the expected period of time for UAAL to be paid-in-full. Under PRB Guidelines for Actuarial Soundness, the amortization period must be 40 years or less to be considered actuarially sound (with 15-25 years being the preferable target). Public plans use one of three amortization period methods: open, closed or recalculated.

- Open amortization period: A period that begins again each time a new actuarial valuation is performed. This is analogous to getting a new 30 year mortgage every year for the unpaid balance of the mortgage started the previous year.
- Closed amortization period: A specific number of years that is counted from one date and decreases by one each year. This is analogous to a 30 year mortgage (with no re-financing).
- Recalculated amortization period: A period that is recalculated each time a new actuarial valuation is performed. This type of amortization commonly applies to plans with a fixed contribution rate (e.g., set in statute).

Amortization Methods

The plan's funded ratio is the ratio of the assets to the plan's Actuarial Accrued Liability (AAL). It can be calculated using the actuarial value of assets (AVA) or the market value of assets (MVA). If the plan is less than 100% funded, there is a UAAL, and an amortization method is needed to systematically pay down the UAAL.

The two most common amortization methods are the Level Dollar and the Level Percent of Payroll.

The Level Percent of Payroll is the most common amortization method used in Texas. The Level Percent of Payroll method makes use of an assumed annual rate of payroll increase (i.e., both the payroll and the amortization payment are projected to increase annually at this rate.) The amortization payment is determined, which is used to pay the UAAL. The normal cost (NC) plus the amortization payment determines the total contribution amount.

Amortization Illustration: Fixed-rate mortgage

Level Dollar Amortization is similar to a fixed-rate home mortgage.

Say you are borrowing \$100,000, to be paid in monthly payments over 30 years, with a 7% interest rate.

The monthly payment is \$665.30.

After making monthly payments of this amount for 30 years, the loan will be fully repaid.

Level Percent of Payroll uses an annually increasing payment amount instead of a constant payment amount.

As above, say the loan amount is \$100,000, to be paid monthly over 30 years, with a 7% interest rate.

The monthly payment, however, increases by 3% each year, rather than remaining level for 30 years.

In this case, the initial monthly payment would be \$486.85. (In the 30th year, the monthly payment would be \$1,147.32).

Cost Methods

Actuarial cost methods differ by the way that the AAL and NC are calculated. The two most common cost methods in Texas public plans are **Entry Age Normal Cost** and **Projected Unit Credit**.

- **Entry Age Normal (EAN) – most common in Texas**
 - The AAL is based on projected pay and current service
 - The method defines the normal cost as a level percent of pay from entry age until retirement
 - Generally puts more of the liability into the AAL and less into PVFNC than other methods
- **Projected Unit Credit (PUC) – second most common in Texas**
 - The AAL is based on projected pay and current service
 - The normal cost for each member increases as a percent of pay as the member approaches retirement age
 - Generally puts less of the liability into the AAL and more into the PVFNC than EAN

This table shows the PVFB, AAL and NC for an employee hired at age 35 who works 30 years until his retirement at age 65. He has annual 3% pay increases, and an ending pay of \$50,000:

Age	Service	PVFB	EAN AAL	EAN NC	PUC AAL	PUC NC
35	0	\$43,464	\$0	\$2,385	\$0	\$1,449
45	10	\$85,500	\$39,769	\$3,206	\$28,500	\$2,850
55	20	\$168,191	\$131,678	\$4,308	\$112,128	\$5,606
64	29	\$309,213	\$303,591	\$5,621	\$298,906	\$10,307
65	30	\$330,858	\$330,858	\$0	\$330,858	\$0

Notice how the present value of future benefits (PVFB) grows over the years until the retirement age of 65. In the Entry Age Normal (EAN) cost method, the AAL is higher than the AAL under the Projected Unit Credit cost method (PUC AAL). Also, Normal Cost in the EAN model (EAN NC) starts at a higher level per year but does not grow as quickly as the PUC NC. Normal Cost in the PUC model (PUC NC) starts lower but surpasses the level of Normal Cost in the EAN model and is weighted towards the final years of service. Both EAN and PUC arrive at the same level in the final year of service but the costs are allocated differently over the years.

Assumptions

Pension funding requires assumptions to be made about the future. These assumptions are called actuarial assumptions, which along with current plan participant data and the benefit formula, are used to project future benefit obligations. The plan sponsor selects the actuarial assumptions, with guidance from the actuary.

Actuarial assumptions for pension plans can be broken down into two categories: Economic and Demographic.

- Economic assumptions include interest rates, salary increases, and inflation.
- Demographic assumptions include rates of retirement, turnover or withdrawal rates, rates of disability, and mortality rates.

Economic Assumptions

Key economic assumptions used for pension actuarial valuations, in roughly decreasing order of importance, are:

Economic Assumption	Why It's Important	Description	Higher Assumption Causes:
Rate of return on plan assets	This is the discount rate used for calculating the PVFB, the AAL and the NC.	Based on invested plan asset categories and their historical rates of return.	Lower liability and cost
Salary increases	This assumption affects the NC and the AAL for active employees; thus also the PVFB.	The expected rate of future salary increases for employees at various stages of their careers.	Higher liability and cost
Inflation	A component of both rate of return on plan assets and salary increases. Also used for plans having an indexed COLA.	The rate at which price levels are rising, and purchasing power is falling.	For plans with an indexed COLA, higher liability and cost
Payroll growth	Used only for calculating the amortization of the UAAL.	The projected overall annual rate of increase in covered payroll.	Lower initial cost, higher ultimate cost

Demographic Assumptions

Key demographic assumptions used for pension actuarial valuations, in roughly decreasing order of importance, are:

Demographic Assumption	Why It's Important	Description	Cost Impact:
Expected retirement age, or rates of retirement by age or service	This assumption affects the NC and the AAL for active employees; thus also the PVFB.	The age (or ages) when employees are expected to retire.	Earlier assumed retirement usually increases cost.
Turnover (rate of withdrawal – i.e., pre-retirement termination of employment)	This assumption affects the NC and the AAL for active employees; thus also the PVFB.	The annual rate of employment termination of employees at various stages of their careers.	Greater assumed turnover decreases liability and cost.
Mortality	This assumption affects the NC and the AAL for active employees; thus also the PVFB.	The probability of dying within one year at each age.	Lower mortality increases liability and cost.
Disability	This assumption affects the NC and the AAL for active employees; thus also the PVFB.	The probability of disablement from active employment within one year at each age.	With a high disability benefit, a high assumed rate of disability can increase liability and cost.
Percent Married, Spouse Age Difference, and Optional Form of Benefit Elected	Affects costs in plans where spousal survivor benefits are subsidized.	Assumptions regarding the payment of a subsidized form of benefit	Correctly applied, these assumptions account for the cost of subsidized benefits

Experience Studies and Reasonable Assumptions

How do plan sponsors assess whether the assumptions used for the actuarial valuations are reasonable (i.e., realistic over the projected careers and lifetimes of current members)?

Actuaries are guided by the following Actuarial Standards of Practice (ASOPs), issued by the Actuarial Standards Board of the American Academy of Actuaries:

- ASOP #4 – Measuring Pension Obligations and Determining Pension Plan Costs of Contributions;
- ASOP #27 – Selection of Economic Assumptions for Measuring Pension Obligations

Pension plan actuaries can also conduct experience studies, measuring the actual incidence of events covered by actuarial assumptions (e.g., retirement age, turnover, salary increases, and disability). Experience studies provide pension trustees with information to compare their plan's actual experiences with the assumptions used in the plan's actuarial valuations. This allows trustees to make changes to assumptions when plan experience turns out different from the assumptions.

Summary

- Defined Benefit and Defined Contribution Plans are both subject to the fundamental equation of pension plan financing: $\text{Contributions (C)} + \text{Income (I)} = \text{Benefits (B)} + \text{Expenses (E)}$.
- Defined Contribution Plans and Pay-as-you-go Defined Benefit Plans use the fundamental equation in a straightforward way; whereas Pre-funded Defined Benefit Plans require a periodic Actuarial Valuation to determine the recommended contribution amount.
- Cost methods split the total liability or Present Value of Future Benefits (PVFB) between the Actuarial Accrued Liability (AAL) and the Present Value of Future Normal Costs (PVFNC).
- The cost method should include all liabilities and reflect projected pay.
- Smoothing methods can be used to determine the Actuarial Value of Assets (AVA).
- The assets should be within a reasonable range around market value recognizing gains and losses in a time period.
- The AAL minus the AVA is the Unfunded Actuarial Accrued Liability (UAAL)
- The contribution is the NC plus the amortization of the UAAL plus interest.
- The UAAL is amortized over a period of time as determined by the actuary.

Pension Review Board Guidelines for Actuarial Soundness (revised September 2011):

1. The funding of a pension plan should reflect all plan obligations and assets.
2. The allocation of the normal cost portion of the contributions should be level or declining as a percent of payroll over all generations of taxpayers, and should be calculated under applicable actuarial standards.
3. Funding of the unfunded actuarial accrued liability should be level or declining as a percent of payroll over the amortization period.
4. Funding should be adequate to amortize the unfunded actuarial accrued liability over a period not to exceed 40 years, with 15 - 25 years being a more preferable target. Benefit increases should not be adopted if all plan changes being considered cause a material increase in the amortization period and if the resulting amortization period exceeds 25 years.
5. The choice of assumptions should be reasonable, and should comply with applicable actuarial standards.

Pension Terminology

Actuarial Accrued Liability

Computed differently under different funding methods, the actuarial accrued liability generally represents the portion of the Present Value of Future Projected Benefits attributable to service credit earned (or accrued) as of the valuation date.

Actuarial Assumptions

Factors which actuaries use in estimating the cost of funding a defined benefit pension plan. Examples include: the rate of return on plan investments; mortality rates; and the rates at which plan participants are expected to leave the system because of retirement, disability, termination, etc.

Actuarial Cost Methods

An actuarial method which defines the allocation of pension costs (and contributions) over a member's working career. All standard actuarial cost methods are comprised of two components: normal cost and the actuarial accrued liability. An actuarial cost method determines the incidence of pension costs, not the ultimate cost of a pension plan; that cost is determined by the actual benefits paid less the actual investment income.

Actuarial Equivalent

A benefit having the same present value as the benefit it replaces. Also, the amount of annuity that can be provided at the same present value cost as a specified annuity of a different type or a specified annuity payable from a different age.

Actuarial Gain or Loss

Experience of the plan, from one year to the next which differs from that assumed results in an actuarial gain or loss. For example, an actuarial gain would occur if assets earned 10 percent for a given year since the assumed interest rate in the valuation is 8 percent.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of actuarial assumptions (i.e. interest rate, rate of salary increases, mortality, etc).

Actuarial Value of Assets

The value of pension plan investments and other property used by the actuary for the purpose of an actuarial valuation (sometimes referred to as valuation assets). Actuaries often select an asset valuation method that smoothes the effects of short-term volatility in the market value of assets.

Actuarially Reduced

The method of adjusting a benefit received at an early date so that the expected total cost to the retirement system is equivalent to the cost if the benefit did not begin until later.

Actuary

A business professional who analyzes the financial consequences of risk. Actuaries use mathematics, statistics and financial theory to study the cost of future events, especially those of concern to insurance and pension programs. They evaluate the likelihood of those events, design creative ways to reduce the likelihood and decrease the impact of adverse events that actually do occur.

Age (Retirement)

Normal retirement dependent upon attainment of a specified age.

Aggregate Funding Method

The aggregate funding method is a standard actuarial funding method. The annual cost of benefits under the aggregate method is equal to the normal cost. The method does not produce an unfunded liability. The normal cost is determined for the entire group rather than on an individual basis.

Amortization

Paying off an interest bearing liability by gradual reduction through a series of installments, as opposed to paying it off by one lump sum payment.

Annuitant

One who receives periodic payments from the retirement system. This term includes service and disability retirees, and their survivors.

Annuity

A series of periodic payments, usually for life, payable monthly or at other specified intervals. The term is frequently used to describe the part of a retirement allowance derived from a participant's contributions. Compare with "pension".

Beneficiary

The person designated to receive benefits under an employee benefit plan in the event of the death of the person covered by the plan.

Cash-Out

A lump sum payment of the member's contributions prior to retirement.

Credited Service

A period of employment which is recognized as service for purposes of determining eligibility to receive pension payments and/or determining the amount of such payments.

Death Benefit

A benefit payable by reason of a member's death. The benefit can be in the form of a lump sum, an annuity or a refund of the member's contributions.

Deferred Annuity

An annuity for which payments do not commence until a designated time in the future.

Deferred Compensation

Considerations for employment that are not payable until after the regular pay period. The most common form of deferred compensation are pension plans, but private employers may also offer bonuses, incentive clauses, etc.

Defined Benefit Plan (DB)

A pension plan providing a definite benefit formula for calculating benefit amounts -such as a flat amount per year of service; a percentage of salary; or a percentage of salary, times years of service.

Defined Contribution Plan (DC)

A pension plan in which the contributions are made to an individual account for each employee. The retirement benefit is dependent upon the account balance at retirement. The balance depends upon amounts contributed during the employee's participation in the plan and the investment experience on those contributions.

Disability Retirement

A termination of employment involving the payment of a retirement allowance as a result of an accident or sickness occurring before a participant is eligible for normal retirement.

Early Retirement

A termination of employment involving the payment of a retirement allowance before a participant is eligible for normal retirement. The retirement allowance payable in the event of early retirement is often lower than the accrued portion of the normal retirement allowance.

Entry Age Normal Cost Method (EANC)

The EANC method is a standard actuarial funding method. The annual cost of benefits under EANC is comprised of two components:

- Normal cost
- Amortization of the unfunded liability

The normal cost is determined on an individual basis, from a member's age at plan entry, and is designed to be a level percentage of pay throughout a member's career.

Equities

Ownership of a company (as opposed to debt). Examples include stocks, venture capital, and leveraged buy-outs.

ERISA

Employee Retirement Income Security Act acronym. This federal legislation sets minimum standards for pension design to increase the security of private sector employees' benefits. Most public plans are subject to a small portion of ERISA.

401(k), 403(b), and 457 Plans

These defined contribution plans allow employees to save for retirement on a tax-deferred basis. 401(k) plans are found in the private sector and the public sector in some states. 403(b) plans are for employees of public educational institutions and certain non-profit tax-exempt organization. 457 plans (also known as deferred compensation plans) are for governmental employees and non-church-controlled tax-exempt organizations.

Fiduciary

(1) Indicates the relationship of trust and confidence where one person (the fiduciary) holds or controls property for the benefit of another person; (2) anyone who exercises power and control, management or disposition with regard to a fund's assets, or who has authority to do so or who has authority or responsibility in the plan's administration. Fiduciaries must discharge their duties solely in the interest of the participants and their beneficiaries, and are accountable for any actions which may be construed by the courts as breaching that trust.

Funded Ratio

The ratio of a plan's current assets to the actuarial accrued liability (AAL). There are several acceptable methods of measuring a plan's assets and AAL. In financial reporting of public pension plans, funded status is reported using consistent measures by all governmental entities. According to the Governmental Accounting Standards Board (GASB), the funded ratio equals the actuarial value of assets divided by the actuarial accrued liability calculated under the plan's actuarial cost method.

Governmental Accounting Standards Board (GASB)

This governmental agency sets the accounting standards for state and local government financial reporting.

Individual Retirement Account (IRA)

A retirement account to which an individual can make annual tax-deductible contributions according to annual limits that are specified by the Internal Revenue Service.

Joint and Survivor Annuity

A provision that enables a plan participant to take annuity payments with continuing payments of all or part of the benefits after his or her death going to a designated beneficiary. The survivor annuity will automatically be provided to a married participant if he or she does not choose against it. The annual pension benefits of the participant electing to have such a survivor annuity are generally reduced to provide for the survivor.

Life Annuity

A monthly benefit payable as long as the annuitant is alive. There are no residual payments to survivors.

Life Expectancy

The average number of years a person of a given age might be expected to live.

Lump Sum Distribution

Payment within one taxable year of the entire balance payable to the participant from a qualified pension or employee annuity plan.

Money Purchase Plan

A type of pension plan where the employer agrees to make a fixed contribution each year for each eligible employee. The contribution is typically expressed as a percentage of the employee's pay and the contribution constitutes a non-discretionary commitment on the part of the employer. The contribution must be made each year, regardless of employer profits, and can only be varied by plan amendment. Although treated differently under federal tax law, money purchase plans are fundamentally defined contribution plans.

Non-Contributory Plan

A retirement system in which no contributions are required of its members to aid in its financing.

Normal Cost

Computed differently under different funding methods, the normal cost generally represents the portion of the cost of projected benefits allocated to the current plan year. The employer normal cost equals the total normal cost of the plan reduced by employee contributions.

Normal Retirement Age

The age, as established by a plan, when unreduced benefits can be received.

Offset Plan

A pension plan in which the employer's participation in Social Security is used as "credit" against members' benefits.

Pay-As-You-Go

A method of recognizing the costs of a retirement system only as benefits are paid. Also known as the current disbursement cost method.

Pension

A series of periodic payments, usually for life, payable monthly or at other specified intervals. The term is frequently used to describe the part of a retirement allowance financed by employer contributions. Compare with "annuity".

Portability

The ability of an employee who changes jobs and joins a different retirement system to become a dual member, maintaining membership in both systems. Dual members may combine service for benefit eligibility. They may also use their highest salary from either system for benefit calculation.

Pre-Funding

To accumulate a reserve fund in advance of paying benefits. This is the opposite of "pay-as-you-go."

Present Value

The current worth of an amount or series of amounts payable in the future, after discounting each amount at an assumed rate of interest and adjusting for the probability of its payment or receipt.

Present Value of Future Projected Benefits (PVFB)

Computed by projecting the total future benefit payments from the plan, using actuarial assumptions (i.e. probability of death or retirement, salary increase, etc.), and discounting the payments to the valuation date using the valuation interest rate to determine the present value (today's value).

Projected Benefits

Pension benefit amounts which are expected to be paid in the future taking into account such items as the effect of advancement in age as well as past and anticipated future compensation and service credits.

Projected Unit Credit (PUC) Funding Method

The PUC funding method is a standard actuarial funding method. The annual cost of benefits under PUC is comprised of two components:

- Normal cost
- Amortization of the unfunded actuarial accrued liability

The PUC normal cost equals the difference between the accrued liability at the beginning and end of the year.

Projected Unit Credit (PUC) Liability

The portion of the Actuarial Present Value of future benefits attributable to service credit that has been earned to date (past service).

Prudent Man Rule

A requirement imposed by the Employee Retirement Income Security Act (ERISA) that plan fiduciaries carry out their duties with the care, skill prudence and diligence which a prudent man, acting in a like capacity and familiar with such matters, would use under conditions prevailing at the time.

Qualified Plan

An employee benefit plan approved by the Internal Revenue Service, meeting requirements set forth in IRS Code Section 401. Contributions to such plans are subject to favorable tax treatment.

Replacement Ratio

A calculation of the degree to which retirement income supplants a pre-retirement member's "take home" pay, less working expenses. To determine this ratio, several factors must be taken into account: a retiree's pre-retirement earnings; changes in tax liabilities after retirement; changes in Social Security tax liability; the elimination of work-related expenses -including contributions to the retirement system; and savings.

Reserve

A collection of assets set aside to meet future liabilities.

Roth IRA

A retirement account which an individual can make after-tax contributions according to annual limits that are specified by the IRS.

Service Retirement

Retirement dependent upon completion of a specified period of service. In some usages, the term has the same meaning as "normal retirement".

Supplemental Cost

A separate element of actuarial cost which results from future normal costs having a present value less than the present value of the total prospective benefits of the system. Such supplemental cost is generally the result of assuming actuarial costs accrued before the establishment of the retirement system. A supplemental cost may also arise after inception of the system because of benefit changes, changes in actuarial assumptions, actuarial losses, or failure to fund or otherwise recognize normal cost accruals or interest.

Thirteenth Check

An annual supplemental retirement payment arising from earnings on investments of the system in excess of those determined as needed.

Ultimate Entry Age Normal Cost Method (Ultimate EANC)

The Ultimate EANC method is a variation of EANC, where the normal cost is calculated for each active member based on the plan provisions applicable to a new or recent entrant to the plan. For a plan that has a lower cost tier for new or recent entrants, use of the Ultimate EANC method lowers the normal cost and increases the actuarial accrued liability, as compared to EANC.

Unfunded Actuarial Accrued Liability (UAAL)

The excess, if any, of the Actuarial Accrued Liability over the Actuarial Value of Assets. In other words, the present value of benefits earned to date that are not covered by current plan assets.

Unfunded Liability or Unfunded PBO

The excess, if any, of the pension benefit obligation over the valuation assets. This is the portion of all benefits earned to date that are not covered by plan assets.

Variable Annuity

A benefit whose payments vary from year to year depending upon the value of a portfolio of securities (usually common stocks).

Vesting

The right of an employee to the benefits he or she has accrued, or some portion of them, even if employment under the plan is terminated. An employee who has met the vesting requirements of a pension plan is said to have a vested right. Voluntary and mandatory employee contributions are always fully vested.

Withdrawal

The termination of employment prior to becoming eligible for any benefits. The term sometimes refers to subsequent termination of membership in a system by withdrawal of the employee's accumulated contributions from the system.



PENSION REVIEW BOARD

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