

Actuarial method and assumptions used in measuring accumulated plan benefits in defined benefit pension plans

The AICPA Employee Benefit Plan Audit Quality Center (EBPAQC) has developed this primer to provide Center members with a general understanding of the actuarial method and assumptions used in measuring the actuarial present value of accumulated plan benefits under FASB ASC 960, *Employee Benefit Plan Accounting—Defined Benefit Pension Plans*. This primer addresses accumulated plan benefits, the actuarial method, actuarial valuation, actuarial valuation inputs, actuarial assumptions, and the actuarial valuation report.

Accumulated plan benefits

ASC 960 defines participants' accumulated plan benefits as those future benefit payments that are attributable under the plan's provisions to employees' service rendered to the benefit information date. The total of the accrued benefit for each participant (i.e., the dollar amount that an employee can expect to receive after retiring) is used to determine accumulated plan benefits. Depending on the plan provisions, pension benefits may be paid upon retirement, death, disability, or withdrawal from the plan. Generally, retirement benefits represent the most significant accumulated plan benefit.

The benefit information date is the date as of which the actuarial present value of accumulated plan benefits is presented in the financial statements. ASC 960 provides for a benefit information date that is either the beginning of the current plan year (i.e., end of the prior plan year) or the end of current plan year. As ASC 960 specifies that use of an end-of-year benefit information date is considered preferable, a plan that wishes to change from an end-of-year benefit information date to a beginning-of-year benefit information date would need to determine, based on facts and circumstances, whether the change is permissible under ASC 250-10-45.

The presentation of the actuarial present value of accumulated plan benefits includes categories for (1) vested benefits of participants currently receiving payments, including benefits due and payable as of the benefit information date, (2) other vested benefits, and (3) nonvested benefits. Additional subcategories include (a) retired or terminated employees or their beneficiaries, (b) beneficiaries of deceased employees, and (c) present employees or their beneficiaries.

Actuarial method

The present value of accumulated plan benefits is determined using the unit credit cost method as specified by ASC 960. The unit credit cost method is a benefit allocation cost method that takes into account current pay and current service used to determine plan benefits. Under this method, each period of service results in an additional unit of benefit entitlement that is measured separately, and the total of all measurements make up the accumulated plan benefits.

Actuarial valuation

According to ASC 960, “The primary information regarding participants’ accumulated plan benefits reported in plan financial statements will be their actuarial present value.” The present value of accumulated plan benefits is a discounted value of projected accrued benefit cash flows. The actuarial assumptions discussed below (other than the discount rate) and the census data and plan provisions inputs discussed below are used to develop the projected accrued benefit cash flows. The discount rate is then used to discount the projected accrued benefit cash flows to the benefit information date.

Actuarial valuation inputs

The actuarial present value of accumulated plan benefits is measured as of the benefit information date based on appropriate plan provisions, census data, and assumptions using the unit credit cost method. Assumptions and the unit credit cost method are discussed in more detail in the “Actuarial assumptions” and “Actuarial valuation” sections.

Plan provisions

Plan provisions should apply in recognizing accumulated plan benefits. The provisions of plan documents that are relevant to measuring the present value of accumulated plan benefits include eligibility to participate; definitions of compensation and service; types of benefits available (e.g., retirement, termination, death, and disability); eligibility requirements to commence benefits; benefit formulas (for active, terminated vested, and those in pay status, as well as accrued benefits for terminated vested); and available forms of benefit.

Common benefit formulas in single employer plans include dollars times service, career average pay, and final average pay. Examples of these common benefit formulas are:

- Dollars times service: \$20 per month per year of service
- Career average pay: The sum of 1.5% of plan year compensation for each plan year in which service is earned
- Final average pay: 1.5% times the average of five out of the last ten years of compensation times years of service

A cash balance plan is a special case of a career average pay plan that bases its benefits on the accumulation of pay credits and interest credits (i.e., calculated as a percentage of current earnings plus an annual interest accrual) in a hypothetical account balance. See EBPAQC Primer, [Cash balance plans](#), for more information about the nature and characteristics of cash balance plans.

In addition to the dollars times service formula discussed above, multiemployer plans commonly use a “percent of credited contributions received by the plan” formula, where the percentage is based on the actual years in which the hours were worked.

The plan document is amended or restated from time to time for changes to provisions or to conform to new regulatory requirements. Some plan amendments can affect the measurement of accumulated plan benefits. Per ASC 960, those plan amendments adopted after the benefit information date are not

recognized currently. Amendments adopted prior to the benefit information date are recognized when adopted even if the effective date is in the future.

Census data

Various census data are used in measuring the actuarial present value of accumulated plan benefits, such as the classification of plan participants (active employees, terminated vested employees, participants receiving benefit payments (e.g. retirees and beneficiaries)); demographic data (birth date, hire date, participation date, termination date, benefit commencement date, compensation, gender, form of payment, accrued benefit for terminated vested participants and benefit payment for those in pay status, etc.); participant eligibility; and benefit eligibility. The census data should reflect the accurate number of employees covered; the number of participants who are eligible to participate in the plan; accurate demographic data; accurate participant classification; and the accurate payment amount for those vested and those receiving payments; and for cash balance plans, the notional cash balance accounts.

It is important that complete and accurate census data are used and the prescribed benefit formula (discussed in the “Plan provisions” section above) is appropriately applied. The use of incorrect or incomplete census data, or inappropriate application of the benefit formula can result in a material misstatement of the plan’s actuarial present value of accumulated plan benefits.

Frozen plans require the use of census data elements that reflect the freeze to determine the “frozen” accrued benefits. In general, there are two types of freezes—a “soft” freeze and a “hard” freeze. Under a soft freeze, entry into the plan (i.e., participation) is closed to new employees while those employees who already participate in the plan continue to accrue future benefits. Under a hard freeze, both participation and accrued benefits are frozen. The frozen accrued benefit for each participant is used to determine the present value of accumulated plan benefits.

Other scenarios, such as plan mergers, plan spinoffs, grandfathered or prior protected accrued benefits, and business acquisitions, may also require the use of census data elements that reflect the particular situation.

The actuarial valuation report reflects census data that is appropriate for the plan’s year end. For example, if the plan uses a beginning of year benefit information date, the census data should be as of the end of the prior year, but if the plan uses an end of year benefit information date the census data used should be as of the end of the current plan year.

Actuarial assumptions

Computing an actuarial present value requires using actuarial assumptions to adjust accumulated plan benefits to reflect the time value of money (through discounts for interest), the probability of payment (by means of decrements such as for mortality, disability, turnover, or retirement), and the benefit payment cash flow (form of payment). The actuarial present value of accumulated plan benefits involves projecting accrued benefit cash flows and then discounting the projected accrued benefit cash flows back to the benefit information date. Some actuarial assumptions are more significant than others when computing the actuarial present value of accumulated plan benefits. Some of the significant assumptions include: discount rate, mortality, and retirement. Many plan sponsors perform experience studies every three to five years to validate assumptions used.

Economic assumptions

The most significant economic assumption in determining accumulated plan benefits is the discount rate determined as of the benefit information date.

The discount rate is the assumed rate of interest used to discount the projected benefit payment cash flow to a present value as of the benefit information date. Under ASC 960, there are two acceptable approaches to select the discount rate: (1) assumed rate of return on plan assets or (2) assumptions that are inherent in the estimated cost at the benefit information date to obtain a contract with an insurance entity to provide participants with their accumulated plan benefits (i.e., a settlement rate). The approach

should be consistent from year to year. A change from one approach to the other may be considered a change in accounting principle.

Under the assumed rate of return approach, the rate used for discounting expected future payment cash flows should reflect the rates of return expected on plan investments during the periods for which the benefits are deferred and should be consistent with returns realistically achievable on the type of assets held by the plan and the plan's investment policy.

The long-term expected rate of return on plan assets is often the same as, or similar to, the rate used to calculate the ASC 715-30 expected long-term rate of return on plan assets that is used when calculating pension expense for purposes of the plan sponsor's financial statements. If the long-term expected rate of return is used, various factors are considered in estimating rates to be used, including:

- rates of return expected from investments currently held or available in the marketplace,
- rates of return expected from the reinvestment of actual returns from those investments,
- anticipated expenses payable by the plan,
- active vs. passive investing, and
- the investment policy of the plan, including the diversity of investments currently held and expected to be held in the future.

Under a settlement rate approach (ASC 960-20-35-1A), the discount rate may be similar to the discount rate used under ASC 715 to discount the accumulated and postretirement benefit obligations. Generally, volatility and variations in this rate from year-to-year are expected.

Another economic assumption that can be significant is inflation or CPI to the extent a plan provides for automatic increases in benefits during retirement that are tied to inflation or CPI.

Demographic assumptions

Mortality assumptions

Pension benefits are paid to participants who survive to retirement, and they cease upon death unless there is a co-annuitant, as in the case of joint and survivor option. Therefore, accumulated plan benefits should be adjusted to reflect participants' (and beneficiaries') longevity using mortality assumptions.

A mortality rate is a measure of the number of deaths (in general, or due to a specific cause) in a certain population, scaled to the size of that population, per unit of time. The Society of Actuaries has developed mortality tables that show the rate of deaths occurring in a defined population during a selected time interval, or survival rates from birth to death. Current mortality tables that have been specifically designed for the retirement area generally contain no margin for future changes in mortality rates. However, mortality improvement scales (MP) are prepared annually to reflect updated mortality experience based on more current information for use in projecting future changes in mortality estimates.

There are two mortality tables that are commonly used in ASC 960 calculations (RP-2006 and Pri-2012). As noted above, various projection scales (MP 2019, 2018, 2017, 2016, 2015, or 2014) may be used in conjunction with the mortality tables to bring the mortality experience to a more current level. ASC 960 does not require the use of a particular mortality table and/or projection scale. Rather, it requires that the assumptions used, including mortality, represent a best estimate of the plan's future experience solely with respect to that individual assumption. It should be noted that some mortality tables, such as the 1971 GAM, 1983 GAM, UP 1984, and RP-2000, generally are considered out of date and should not be used except in rare instances such as plans that cover individuals in dangerous professions where the mortality rate is higher.

The mortality assumption should reflect the best estimate of the plan's future experience for estimating the plan's obligation as of the benefit information date. Therefore, plan management should consider the specific demographics of their plan when evaluating the appropriate mortality assumptions to use. AICPA Technical Q&A 3700.01 provides guidance on how and when to consider updated mortality tables in financial statements that have not yet been issued at the time updated tables are published, including the effect when the plan obligations are presented as of the beginning of the plan year.

Retirement assumptions

The benefit that constitutes the largest portion of the present value of accumulated plan benefits is the benefit payable upon retirement. Other benefits may also be payable based on termination of employment (i.e., withdrawal), disability, and death prior to retirement.

Retirement rates are usually based on age. The plan's retirement assumption includes a rate presented for each year (commonly beginning at age 55 and extending through age 65 or later, such as age 70, with "bumps" at common retirement ages, such as age 62 and 65). Service may also be considered if early retirement subsidies differ significantly by service (e.g., if the plan provides for actuarially reduced early retirement benefits at age 55 with 10 years of service and unreduced early retirement benefits at age 55 with 30 years of service may lead to different retirement rates for those with 30 or more years of service and those with less than 30 years of service). Further, retirement rates for a less valuable benefit may be expected to decrease as the participant approaches eligibility for a more valuable benefit (e.g., in the above example, a participant age 55 with 29 years of service may be less likely to retire than a 55-year-old with 10 years of service, because he or she is likely to work an additional year to qualify for the unreduced benefit). Eligibility criteria for other post-retirement benefits that may make participants more likely to work longer is also considered, such as eligibility for significant postretirement medical benefits. Retirement rates may or may not reflect gender depending on whether gender differences are seen as material.

Depending on the size of the group, retirement rates may be based on the plan's experience, on experience of similar groups, on published tables, or on available tables developed at the consulting firm level, as appropriate. Where rates are based on existing tables, adjustments may be made to reflect the group's experience to the extent it is considered credible or other factors such as industry. In any case, it is important to consider the plan's benefit provisions and those of other post-retirement benefit programs, such as employer-provided health care, Social Security, and Medicare benefits. Factors that may influence observed experience may include the economic environment, the financial health of the employer, other plans of the employer (e.g. a 401(k) plan) and health of the participants (depending on the availability / eligibility provisions of disability retirement benefits).

ASC 960 requires that the retirement rate assumptions used should represent a best estimate of the plan's future retirement rates. As such, they should reflect the plan provisions and plan's experience. For example, if the plan provides for subsidized early retirement benefits for participants at age 60, then the retirement assumptions should reflect a "bump" in retirements at age 60. A single retirement age may be appropriate if early retirement benefits are approximately actuarial equivalent.

Form of payment assumptions

Plans may offer a variety of benefit payment options to plan participants, which are detailed in the plan document. For example, plans may offer a lump-sum option, whereby the participant receives a one-time payment from the plan upon retirement in lieu of monthly benefits. In addition, the plan may include provisions such as subsidized joint and survivor options. The form of payment assumptions affect the projected benefit cash flow timing.

ASC 960 requires that the form of payment assumptions used should represent a best estimate of the plan's future benefit payment elections. As such, they should reflect the plan's experience and future expectations.

In measuring the present value of accumulated plan benefits, assumptions regarding participant elections often are necessary. Consideration of the effect of lump sum and optional benefit elections is specifically required in the calculation of the present value of accumulated plan benefits for single-employer plans; if the plan provides for a lump-sum option, estimates of the percentage of people who will elect a lump sum benefit and those who will elect an annuity are made.

Actuarial valuation report

The actuarial valuation report serves as the actuary's documentation. The actuarial valuation report may have more than one purpose including contribution requirements, company accounting, and plan accounting. The actuarial valuation report may consist of multiple reports that may be in different formats (e.g., documents, presentations, email). It is important to understand which portions of the actuarial valuation report apply to the present value of accumulated plan benefits reported in the plan's financial statement.

Common elements of the actuarial valuation report include an actuarial certification, actuarial findings, and summaries of census data, actuarial methods and assumptions, and plan provisions. The actuarial certification may provide information that helps the intended user better understand the purpose and findings of the actuarial valuation report, including any disclaimers.

Other resources

FASB ASC 960, *Employee Benefit Plan Accounting—Defined Benefit Pension Plans*, provides guidance for determining accumulated plan benefits for plan financial reporting purposes.

The [Society of Actuaries website](#) includes information about experience studies and practice research performed that affect actuarial assumptions.

EBPAQC tool, [Documentation of Use of An Actuarial Report in an Audit of a Defined Benefit Pension Plan's Financial Statements](#), is intended to assist members in documenting their procedures and findings related to their review of actuarial reports prepared for plan management that are used as audit evidence in their defined benefit pension plan audits.

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