



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 35**

**Selection of Demographic and
Other Noneconomic Assumptions
for Measuring Pension Obligations**

Revised Edition

**Developed by the
Pension Committee of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
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September 2007

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in the Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 35

This document contains the final version of the revision of Actuarial Standard of Practice No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*.

Background

Pension Plan Recommendations A, B, and C were adopted and amended by the American Academy of Actuaries (Academy) during the period 1976 to 1983. In 1988, *Recommendations for Measuring Pension Obligations* was promulgated as an ASOP by the Interim Actuarial Standards Board and the Board of Directors of the American Academy of Actuaries. In 1990, the ASB republished that standard as ASOP No. 4, *Recommendations for Measuring Pension Obligations*. In October 1993, ASOP No. 4 was reformatted and published in the uniform format adopted by the ASB, with a title change, *Measuring Pension Obligations*.

The selection of economic and noneconomic assumptions, the actuarial cost method, and the asset valuation method are all key elements in the valuation of pension obligations. The evolution of actuarial practice made it necessary to update the guidance in these areas. The following provide such guidance:

1. ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;
2. This ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*;
3. ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*; and
4. ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*, which ties together the other three standards, provides guidance on

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actuarial cost methods, and addresses overall considerations for measuring pension obligations and determining plan costs or contributions.

ASOP No. 35

The Actuarial Standards Board adopted ASOP No. 35 in 1999 as one of several standards designed to provide guidance on key elements in measuring pension obligations.

The original ASOP No. 35 contained a statement to the effect that, in case of a conflict between the guidance in ASOP No. 35 and ASOP No. 4, ASOP No. 35 will govern. However, the ASB has adopted a revision of ASOP No. 4 and intends that the revision of ASOP No. 4 should govern in any such conflicts.

The revision of ASOP No. 4 conflicted with the original ASOP No. 35 in one substantive way, its treatment of prescribed assumptions selected by the plan sponsor. The ASB released an exposure draft highlighting proposed wording changes that would resolve the conflict regarding which standard governs.

The original ASOP No. 35, including the Transmittal Memorandum and the appendix that summarized the significant issues and questions received in response to the exposure draft and the Pension Committee's responses, can be found on the ASB website among the "Superseded Standards."

Exposure Draft

The exposure draft of this revision was issued in March 2005 with a comment deadline of October 31, 2005. The Pension Committee reviewed the three comment letters received and concluded that they raised no substantive issues. There were no significant changes from the exposure draft.

Note that the section on Prescribed Statement of Actuarial Opinion (formerly section 4.4) has been deleted due to the amended *Qualifications Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* promulgated by the American Academy of Actuaries.

The Pension Committee thanks everyone who took the time to contribute comments and suggestions on the exposure draft.

The ASB voted in September 2007 to adopt this standard.

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ACTUARIAL STANDARD OF PRACTICE NO. 35

**SELECTION OF DEMOGRAPHIC AND
OTHER NONECONOMIC ASSUMPTIONS FOR
MEASURING PENSION OBLIGATIONS**

STANDARD OF PRACTICE

Section 1. Purpose, Scope, Cross References, and Effective Date

- 1.1 **Purpose**—This standard does the following:
- a. provides guidance to actuaries in selecting (including giving advice on selecting) demographic and other noneconomic assumptions for measuring obligations under defined benefit pension plans; and
 - b. expands upon and, in some areas, modifies those provisions of Actuarial Standard of Practice (ASOP) No. 4, *Measuring Pension Obligations*, that relate to the selection and use of demographic and other noneconomic assumptions.
- 1.2 **Scope**—This standard applies to actuaries when they are selecting demographic and all other assumptions not covered by ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, to measure obligations under any defined benefit pension plan that is not a social insurance program as described in ASOP No. 32, *Social Insurance* (unless an actuarial standard of practice on social insurance explicitly calls for application of this standard). Measurements of defined benefit pension plan obligations include calculations that assign plan costs to time periods, actuarial present value calculations, and estimates of the magnitude of future plan obligations. Measurements of pension obligations do not generally include individual benefit calculations or individual benefit statement estimates.

Throughout this standard, any reference to *selecting* demographic and other noneconomic assumptions also includes *giving advice on selecting* demographic and other noneconomic assumptions.

To the extent that the guidance in this standard may conflict with ASOP No. 4, ASOP No. 4 will govern.

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When applicable law, regulation, or other binding authority conflicts with this standard, complying with such law, regulation, or other binding authority shall not be deemed a deviation.

This standard does not apply to the selection of an assumption where the actuary is precluded from exercising independent judgment by an applicable law, regulation, or other binding authority (i.e., when a specific assumption is mandated or when only a specified range of assumptions is deemed to be acceptable). For example, this standard does not apply to the selection of a current liability mortality assumption under Internal Revenue Code (IRC) section 412, because the mortality assumption is governed by the IRC and regulations.

- 1.3 Cross References—When this standard refers to the provisions of other documents, the reference includes the referenced documents as they may be amended or restated in the future, and any successor to them, by whatever name called. If any amended or restated document differs materially from the originally referenced document, the actuary should consider the guidance in this standard to the extent it is applicable and appropriate.
- 1.4 Effective Date—This standard will be effective for any actuarial valuation with a measurement date on or after March 15, 2008.

Section 2. Definitions

The definitions below are defined for use in this actuarial standard of practice.

- 2.1 Assumption Format—The form in which a particular demographic assumption will be used or expressed. In some cases, the assumption will take the form of a table where the probability of the occurrence of a given event depends on parameters such as gender, age, service, or calendar year. In other cases, the assumption may be a point estimate, implying 100% probability of occurrence of a given event at the stated point. An example of a point estimate assumption is an assumption that 100% of the population will retire at age 62. The assumption format may include different tables or point estimates for different segments of the covered population.
- 2.2 Assumption Universe—For each demographic assumption, a universe consisting of the possible options that the actuary might reasonably use for the specific assumption. For example, an assumption universe for a mortality assumption might reasonably include relevant published or proprietary mortality tables and possible adjustments, such as projections of mortality improvement. For some pension plans, an assumption universe for a specific assumption might reasonably include a table or factors developed specifically for that plan.

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- 2.3 Demographic Assumptions—Demographic and all other noneconomic assumptions (i.e., those assumptions not covered in ASOP No. 27), unless explicitly stated otherwise.
- 2.4 Measurement Date—The date as of which the value of the pension obligation is determined (sometimes referred to as the *valuation date*).
- 2.5 Measurement Period—The period subsequent to the measurement date during which a particular demographic assumption will apply in a given measurement.
- 2.6 Prescribed Assumption—A specific assumption that is mandated or that is selected from a specified range or set of assumptions that is deemed to be acceptable by law, regulation, or other binding authority.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—The actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period. For any given measurement, the actuary may be able to identify two or more reasonable assumptions for the same contingency. In some instances, the actuary may present several results to illustrate the effect of alternative reasonable assumptions.
- 3.2 Types of Demographic Assumptions—The types of demographic assumptions used to measure pension obligations may include, but are not necessarily limited to, the following:
 - a. retirement;
 - b. mortality;
 - c. termination of employment;
 - d. disability and disability recovery;
 - e. election of optional forms of benefits; and

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- f. other assumptions, such as administrative expenses; household composition; marriage, divorce, and remarriage; open group assumptions; transfers; hours worked; and assumptions regarding missing or incomplete data.

3.3 Demographic Assumption Selection Process—The actuary should follow the general process for selecting demographic assumptions, as discussed below. It is not necessary that the actuary follow this complete process at each measurement date for each assumption if, in the actuary’s professional judgment, previously selected assumptions continue to be reasonable (see section 3.9).

3.3.1 Identify the Types of Assumptions—The actuary should consider the following factors when identifying which types of demographic assumptions to use for a specific measurement:

- a. the purpose and nature of the measurement;
- b. the plan provisions or benefits and factors that will affect the timing and value of any potential benefit payments;
- c. the characteristics of the obligation to be measured (such as measurement period, pattern of plan payments over time, open or closed group, volatility);
- d. the contingencies that give rise to benefits or result in loss of benefits;
- e. the materiality of each assumption; and
- f. the characteristics of the covered group.

It is not necessary that every contingency should give rise to a separate assumption. For example, for a plan that is expected to provide benefits of equal value to employees who voluntarily terminate employment, become disabled, retire, or die, the actuary may use an assumption that reflects some or all of the above contingencies in combination rather than selecting a separate assumption for each.

3.3.2 Consider the Relevant Assumption Universe—The actuary should consider the assumption universe relevant to each type of assumption identified in section 3.3.1. This may include tables or factors particular to the given plan as well as general tables, factors, and modifications to the tables that are available to actuaries. Sources of information relevant to many demographic assumptions include the following:

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- a. experience studies or published tables based on experience under uninsured plans and annuity contracts, or based on any other populations considered representative of the group at hand;
- b. relevant plan or plan sponsor experience, to the extent that it is credible, which may include analyses of gains or losses by source;
- c. studies or reports of the effects of plan design, specific events (for example, shutdown), economic conditions, or sponsor characteristics on the demographic assumption under consideration; and
- d. studies or reports of general trends relevant to the type of demographic assumption in question (for example, mortality improvement in the United States).

3.3.3 Consider the Assumption Format—The actuary should consider the appropriate format for each demographic assumption. Factors that affect format specification include the following:

- a. the degree to which the assumption format may affect the results;
- b. the availability of tables, data, or information relevant to the assumption being selected;
- c. the degree to which the assumption format has the potential to model anticipated plan experience;
- d. the size of the covered population; and
- e. the degree to which a parameter (such as gender, age, service, or calendar year) is anticipated to affect experience.

In many situations it is appropriate for the format to include assumptions for different segments of the covered population. For example, it may be appropriate to have different mortality tables for males and females or different turnover tables for salaried and hourly employees.

3.3.4 Select the Specific Assumptions—The actuary should select each demographic assumption from the appropriate assumption universe. In all cases, the actuary should consider the materiality of each assumption selected and the consequences of experience deviating significantly from the selected assumption. The actuary

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should consider measurement-specific factors when selecting assumptions. Examples of such factors are the following:

- a. the purpose and nature of the measurement; for example, a cash flow projection may require more refined assumptions than a liability measure;
- b. any features of the plan design or change in the plan design that may influence the assumption; for example, the introduction of an early retirement subsidy could influence the plan's incidence of retirement; under these circumstances, in order to measure the incremental cost associated with this change, the retirement assumption for the proposed plan provision may differ from the retirement assumption for the current provision;
- c. appropriate experience from the specific plan and other relevant sources; and
- d. relevant factors known to the actuary that may affect future experience, such as the economic conditions of the area or industry, availability of alternative employment, or the human resources policy or practices of the employer.

Specific experience of the covered group or other groups with similar characteristics may be useful in forming a judgment about future expectations. However, the actuary should not give undue weight to past experience or to experience that is not sufficiently credible. For example, if recent rates of termination and retirement were largely attributable to a one-time work force reduction, it may be unreasonable to assume that such rates will continue over the measurement period.

3.3.5 Evaluate Reasonableness of the Selected Assumptions—The actuary should evaluate the reasonableness of each material demographic assumption selected. Unless facts and circumstances clearly warrant otherwise, the actuary should base this evaluation on the following criteria:

- a. The assumption is expected to appropriately model the contingency being measured. For example, a reasonable retirement assumption for a plan with a large number of retirements expected to occur at different ages should generally be a set of decrements at a variety of ages instead of at a single age. On the other hand, in a plan with a small number of expected retirements, it may not be possible to model experience any better using rates that vary by age than by using a single age. As a second example, for

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a plan where a significant portion of the liability is attributable to a single individual, a single retirement age may be appropriate.

- b. The assumption is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

3.4 Individual Assumptions—Each individual demographic assumption selected by the actuary should satisfy this standard.

3.5 Specific Considerations—When performing the assumption selection process described in section 3.3, the actuary should be aware of specific considerations that may apply to the selection of individual assumptions, as discussed below.

3.5.1 Retirement Assumption—The actuary should consider factors such as the following:

- a. the plan design, where specific incentives may influence when participants retire;
- b. the design of, and date of anticipated payment from, social insurance programs (for example, Social Security or Medicare); and
- c. the availability of other employer-sponsored postretirement benefit programs (for example, postretirement health coverage or savings plan).

3.5.2 Termination of Employment Assumptions—The actuary should consider factors such as the following:

- a. employer-specific or job-related factors such as occupation, employment policies, work environment, unionization, hazardous conditions, and location of employment; and
- b. plan provisions, such as early retirement benefits, vesting schedule, or payout options.

3.5.3 Mortality Assumption—The actuary should consider factors such as the following:

- a. the possible use of different mortality assumptions before and after retirement (for example, in some small plan cases a reasonable model for mortality may be to assume no mortality before retirement);

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- b. the likelihood and extent of mortality improvement in the future;
- c. the use of a different mortality assumption for disabled lives, which in turn may depend on the plan's definition of disability and how it is administered; and
- d. the use of different mortality tables for different participant subgroups and beneficiaries.

3.5.4 Disability and Disability Recovery Assumption—The actuary should consider factors such as the following:

- a. the plan's definition of disability (for example, whether or not the disabled person is eligible for Social Security benefits); and
- b. the potential for recovery. For example, if the plan requires continued disability monitoring and if the plan's definition of disability is very liberal, an assumption for rates of recovery may be appropriate. Alternatively, the probability of recovery may be reflected by assuming a lower incidence of disability than the actuary might otherwise assume.

3.5.5 Optional Form of Benefit Assumption—The actuary should consider factors such as the following:

- a. the benefit forms and benefit commencement dates available under the plan being valued;
- b. the historical or expected experience of elections under the plan being valued and similar plans; and
- c. the degree to which particular benefit forms may be subsidized.

3.6 Other Demographic Assumptions—The actuary should follow the general selection process outlined in section 3.3 when selecting other assumptions relevant to the measurement. Such assumptions may include the following:

3.6.1 Administrative Expenses Charged to the Plan—The actuary should consider expenses such as investment advisory, investment management, or insurance advisory services, to the extent that the costs of these services are not reflected in the investment return assumption; premiums paid to the Pension Benefit Guaranty Corporation (PBGC); accounting and auditing services; actuarial services; plan administration services; legal services; and trustee services. Formats for this

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assumption may include a dollar amount, a specific percentage of assets, a specific (and explicitly disclosed) reduction in the investment return assumption, or a percentage of benefit obligation or normal cost.

- 3.6.2 Household Composition—If household composition affects the payment of benefits, the amount of benefits, or other demographic assumptions, the actuary should make assumptions for household composition and for the demographic characteristics of the household members in the measurement. For example, some plans provide annuity death benefits to surviving children under a stated age. In that case, an assumption as to the number and ages of the potential beneficiaries may be needed.
- 3.6.3 Marriage, Divorce, and Remarriage—The actuary should consider whether marriage, divorce, or remarriage affects the payment of benefits, the amount or type of benefits, or the continuation of benefit payments. If such an assumption is selected, it may also be necessary to make an assumption regarding beneficiary ages.
- 3.6.4 Open Group—Certain assumptions, such as the number and characteristics of new entrants, are applicable in open-group measurements.
- 3.6.5 Hours of Service—Assumptions for hours of service are generally plan- or industry-specific. Separate assumptions may also be needed for such purposes as benefit accrual and total employer plan contributions.
- 3.6.6 Transfers and Return to Employment—The assumptions for transfers or return to employment are generally plan- or industry-specific. Transfers and return to employment may be one-time events, or may be continual if employees are required or permitted to move between groups that are covered by the same or different plans.
- 3.6.7 Missing or Incomplete Data—At times, the actuary may find that the data provided are incomplete due to missing elements such as birth dates or hire dates. Provided that the actuary has determined, in accordance with ASOP No. 23, *Data Quality*, that the overall data are of sufficient quality to complete the assignment, the actuary may need to make reasonable assumptions for the missing data elements. In making such assumptions, the actuary should consider the relevant data actually supplied. For example, it may be appropriate to assume a missing birth date is equal to the average birth date for other participants who have complete data and who have the same service credits as the participant whose date of birth is missing.

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- 3.7 Consistency Among Demographic Assumptions Selected by the Actuary—With respect to any particular measurement, each demographic assumption selected by the actuary should be consistent with the other assumptions selected by the actuary unless the assumption, considered individually, is not material (see section 3.10.1). For example, if an employer’s business is in decline and the effect of that decline is reflected in the turnover assumption, it should also be reflected in the retirement assumption.
- 3.8 Prescribed Assumptions—When an assumption is prescribed, the actuary is obligated to use it. Examples of prescribed demographic assumptions include the required mortality assumption for determining the present value of vested benefits for PBGC variable-rate premiums and for current liability; and demographic assumptions selected by the plan sponsor for purposes of compliance with *Statement of Financial Accounting Standards No. 87, Employers’ Accounting for Pensions*. As indicated in section 1.2, Scope, this standard does not apply to the selection of prescribed demographic assumptions, although it does apply to the advice that the actuary gives to the party responsible for selecting the prescribed assumptions.

All nonprescribed demographic assumptions should satisfy this standard. Selection of a demographic assumption that does not satisfy this standard in order to offset the effect of one or more prescribed assumptions is a deviation to which the disclosure requirements of section 4.5 apply.

- 3.9 Reviewing Assumptions—At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable. The actuary is not required to do a complete assumption study at each measurement date. However, if the actuary determines that one or more of the previously selected assumptions are no longer reasonable, the actuary should follow the general process described in section 3.3 and select reasonable new assumptions as appropriate.
- 3.10 Other Considerations—The following issues may also be considered when selecting demographic assumptions:
- 3.10.1 Materiality—The actuary should establish an appropriate balance between refined methodology and materiality. The actuary is not required to use a particular type of demographic assumption or to select a highly refined demographic assumption when it is not expected to affect results materially. For example, the actuary is not required to use termination rates that vary by both age and service when the actuary does not expect them to produce materially different results from rates that vary by age or service alone.
- 3.10.2 Cost Effectiveness—The actuary should also establish an appropriate balance between refined methodology and cost effectiveness. Although all material

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demographic assumptions should be reflected, highly refined methodology is not required when it is not expected to affect results materially.

- 3.10.3 Combined Effect of Assumptions—The combined effect of all nonprescribed assumptions selected by the actuary (both demographic assumptions selected in accordance with this standard and economic assumptions selected in accordance with ASOP No. 27) should be reasonable. For example, the actuary may have decided not to make any assumption with regard to four different types of future events, each of which alone is immaterial. However, the effect of omitting assumptions for all four types of future events may be a material understatement or overstatement of the measurement results. In these circumstances, the assumptions should be revised.
- 3.10.4 Knowledge Base—The demographic assumptions selected should reflect the actuary’s knowledge as of the measurement date. However, the actuary may learn of an event occurring after the measurement date (for example, plan termination or death of the principal owner), that would have changed the actuary’s selection of a demographic assumption. If appropriate, the actuary may reflect this change as of the measurement date.
- 3.10.5 Advice of Experts—Demographic data and analyses are available from a variety of sources, including representatives of the plan sponsor and administrator, demographers, economists, accountants, and other professionals. When the actuary is responsible for selecting demographic assumptions within the scope of this standard, external expert advice may be considered, but the selection should still reflect the actuary’s professional judgment.

Section 4. Communications and Disclosures

- 4.1 Disclosures—Pension actuarial communications should contain descriptions of the following:
- 4.1.1 Assumptions Used—Each material assumption used in the measurement. Sufficient detail should be shown to permit another qualified actuary to assess the level and pattern of the rates (for example, by supplying the name of a published decrement table or by showing turnover rates at every fifth age for an unpublished age-based table).
- 4.1.2 Changes in Assumptions—Any material changes in the assumptions from those previously used for the same type of measurement. The general effects of any such changes should be disclosed in words or by numerical data, as appropriate.

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- 4.1.3 Changes in Circumstances—Any significant event of which the actuary is aware that has occurred since the measurement date that would have materially changed any of the demographic assumptions selected. The likely effect of any such change should also be described.

- 4.2 Prescribed Assumptions—The actuary’s communication should identify and state the source of any prescribed assumptions.

- 4.3 Required Government Forms—The disclosure requirements in sections 4.1 and 4.2 do not apply to government forms. Instead, the actuary should comply with the instructions for such forms.

- 4.4 Deviation—An actuary must be prepared to justify the use of any procedures that depart materially from those set forth in this standard and must include, in any actuarial communication disclosing the results of the procedures, an appropriate statement with respect to the nature, rationale, and effect of such departures.

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Appendix 1

Background and Current Practices

Note: This appendix is provided for informational purposes, but is not part of the standard of practice.

Background

Actuaries have historically used various practices for selecting the demographic and other noneconomic assumptions they use to measure pension obligations. For example, some actuaries looked to surveys of assumptions used by other actuaries, some relied on detailed research by experts, some used experience studies, and other actuaries used a combination of these practices.

Before computer technology was widely available, actuaries commonly used simplified demographic assumptions that were not necessarily individually reasonable, but that in aggregate produced results the actuary believed to be reasonable. As technological developments made the use of individually reasonable assumptions feasible, many actuaries began selecting economic and demographic assumptions that were individually reasonable. This trend was accelerated by amendments to the Internal Revenue Code effective for plan years beginning after 1987. These amendments require actuaries to determine the minimum required contribution for a qualified pension plan (other than a multi-employer plan) using either individually reasonable assumptions or assumptions that reached the same total contribution determination as would have been reached had each assumption been individually reasonable.

Current Practices

Many actuaries change demographic assumptions infrequently when measuring obligations of ongoing pension plans. Other actuaries assess emerging experience and reevaluate the assumptions as of each measurement date and change demographic assumptions more frequently.

For some purposes, such as funding public employee pension plans, complying with financial accounting rules, or adhering to other requirements, the actuary may advise the plan sponsor about the selection of demographic assumptions. But these assumptions—particularly the mortality assumption or the retirement age assumption—may be prescribed by others. In some of these cases, it is possible that actuaries may have adjusted other assumptions to compensate for the effect of the prescribed assumption.

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In preparing calculations for purposes other than ongoing plan valuations, actuaries often use demographic assumptions that are different from those used for the ongoing plan valuation.