



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 27**

**Selection of Economic Assumptions
for Measuring Pension Obligations**

Revised Edition

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

**Adopted by the
Actuarial Standards Board
September 2007**

(Doc. No. 109)

ASOP No. 27 – September 2007

TABLE OF CONTENTS

Transmittal Memorandum iv

STANDARD OF PRACTICE

Section 1. Purpose, Scope, and Effective Date	1
1.1 Purpose	1
1.2 Scope	1
1.3 Effective Date	2
Section 2. Definitions	2
2.1 Best-Estimate Range	2
2.2 Inflation	2
2.3 Measurement Date	2
2.4 Measurement Period	2
2.5 Merit Scale	2
2.6 Prescribed Assumption	2
2.7 Productivity Growth	2
2.8 Real Return	2
2.9 Real Risk-Free Return	3
2.10 Risk Premium	3
Section 3. Analysis of Issues and Recommended Practices	3
3.1 Overview	3
3.2 Identifying Types of Economic Assumptions	3
3.3 General Considerations	3
3.4 General Selection Process	4
3.5 Selecting an Inflation Assumption	4
3.5.1 Data	4
3.5.2 Select and Ultimate Inflation Rates	4
3.6 Selecting an Investment Return Assumption and a Discount Rate	4
3.6.1 Data	5
3.6.2 Constructing the Investment Return Range	5
3.6.3 Measurement-Specific Factors	7
3.6.4 Multiple Investment Return Rates	8
3.6.5 Form of Benefit	9
3.7 Selecting a Compensation Scale	9
3.7.1 Data	9
3.7.2 Constructing the Compensation Scale Range	10
3.7.3 Measurement-Specific Factors	10
3.7.4 Multiple Compensation Scales	11
3.8 Selecting Other Economic Assumptions	11

ASOP No. 27 – September 2007

3.8.1	Social Security	11
3.8.2	Cost-of-Living Adjustments	11
3.8.3	Growth of Individual Account Balances	12
3.8.4	Variable Conversion Factors	12
3.9	Individual Assumptions	12
3.10	Consistency among Economic Assumptions Selected by the Actuary	12
3.11	Prescribed Assumption(s)	12
3.12	Changing Assumptions	13
3.13	Sources of Economic Data	13
3.14	Other Considerations	13
3.14.1	Materiality	13
3.14.2	Cost Effectiveness	13
3.14.3	Knowledge Base	14
3.14.4	Advice of Experts	14
Section 4. Communications and Disclosures		14
4.1	Disclosures	14
4.1.1	Economic Assumptions	14
4.1.2	Changes in Assumptions	14
4.1.3	Changes in Circumstances	14
4.2	Prescribed Assumption(s)	14
4.3	Deviation	15
Appendix 1—Background and Current Practices		16
Appendix 2—Selected References for Economic Data and Analyses		17

ASOP No. 27 – September 2007

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 Economic Assumptions for Measuring Pension Obligations

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice No. 27

This document contains the final version of the revision of Actuarial Standard of Practice No. 27, *Selection of Economic 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. This ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;
2. 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 actuarial cost methods, and addresses overall considerations for measuring pension obligations and determining plan costs or contributions.

ASOP No. 27 – September 2007

ASOP No. 27

The Actuarial Standards Board adopted ASOP No. 27 in 1996 as one of several standards designed to provide guidance on key elements in measuring pension obligations.

The original ASOP No. 27 contained a statement to the effect that, in case of a conflict between the guidance in ASOP No. 27 and ASOP No. 4, ASOP No. 27 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. 27 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. 27, including its Transmittal Memorandum and the appendix that summarized the significant issues and questions received in response to the final 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.

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.

Pension Committee of the ASB

David R. Fleiss, Chairperson

Mita D. Drazilov

David P. Friedlander

Peter H. Gutman

A. Donald Morgan

Timothy A. Ryor

Frank Todisco

ASOP No. 27 – September 2007

Actuarial Standards Board

Cecil D. Bykerk, Chairperson

Albert J. Beer

William C. Cutlip

Alan D. Ford

David R. Kass

Robert G. Meilander

Godfrey Perrott

Lawrence J. Sher

Karen F. Terry

ACTUARIAL STANDARD OF PRACTICE NO. 27

**SELECTION OF ECONOMIC ASSUMPTIONS
FOR MEASURING PENSION OBLIGATIONS**

STANDARD OF PRACTICE

Section 1. Purpose, Scope, and Effective Date

1.1 Purpose—This standard does the following:

- a. provides guidance to actuaries in selecting (including giving advice on selecting) economic assumptions—primarily investment return, discount rate, and compensation scale—for measuring obligations under defined benefit pension plans;
- b. amplifies those provisions of Actuarial Standard of Practice (ASOP) No. 4, *Measuring Pension Obligations*, that relate to the selection and use of economic assumptions; and
- c. provides information to enhance non-actuaries’ understanding of the process by which actuaries select economic assumptions for measuring the obligations of defined benefit pension plans.

1.2 Scope—This standard applies to the selection of economic assumptions to measure obligations under any defined benefit pension plan that is not a social insurance program (unless ASOPs on social insurance explicitly call for application of this standard). Measurements of defined benefit pension plan obligations include calculations such as funding valuations or other assignment of plan costs to time periods, liability measurements or other actuarial present value calculations, and cash flow projections or other estimates of the magnitude of future plan obligations. Measurements of pension obligations do not generally include individual benefit calculations or individual benefit statement estimates.

To the extent that the guidance in this standard may conflict with ASOP No. 4, ASOP No. 4 will govern. If a conflict exists between this standard and applicable laws or regulations, the actuary is obligated to comply with the laws or regulations.

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, the standard does not apply to the selection of a current liability interest rate range under Internal

ASOP No. 27 – September 2007

Revenue Code (IRC) section 412, because the determination of such a range is governed by the IRC. In addition, the standard does not apply to the selection of the current liability interest rate within the specified range if, as is the case at the date this standard was published, the Internal Revenue Service deems any rate within the range to be acceptable.

Throughout this standard, any reference to *selecting* economic assumptions also includes *giving advice on selecting* economic assumptions. For instance, the actuary may *advise* the plan sponsor on selecting economic assumptions for Statement of Financial Accounting Standards (SFAS) Nos. 87 and 88 or Governmental Accounting Standards Board (GASB) Statement Nos. 25 and 27, but the plan sponsor is ultimately responsible for selecting these assumptions. This standard applies to the actuarial advice given in such situations, within the constraints imposed by the relevant accounting standards.

- 1.3 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 Best-Estimate Range—For each economic assumption, the narrowest range within which the actuary reasonably anticipates that the actual results, compounded over the measurement period, are more likely than not to fall.
- 2.2 Inflation—General economic inflation, defined as price changes over the whole of the economy.
- 2.3 Measurement Date—The date as of which the value of the pension obligation is determined (sometimes referred to as the *valuation date*).
- 2.4 Measurement Period—The period subsequent to the measurement date during which a particular economic assumption will apply in a given measurement.
- 2.5 Merit Scale—The rates of change in an individual’s compensation attributable to personal performance, promotion, seniority, or other individual factors.
- 2.6 Prescribed Assumption—A specific assumption that is mandated or that is selected from a specified range that is deemed to be acceptable by law, regulation, or other binding authority.
- 2.7 Productivity Growth—The rates of change in a group’s compensation attributable to the change in the real value of goods or services per unit of work.
- 2.8 Real Return—The sum of the risk premium and the real risk-free return. It can also be expressed as the nominal return less inflation.

ASOP No. 27 – September 2007

- 2.9 Real Risk-Free Return—The return on an investment that is completely secure as to principal and yield in an environment with no inflation.
- 2.10 Risk Premium—The portion of real return that reflects uncertainties of future payments and appreciation.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—Because no one knows what the future holds with respect to economic and other contingencies, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes based on past experience and future expectations, and to select assumptions based upon that application of professional judgment. Therefore, an actuary's best-estimate assumption is generally represented by a *range* rather than one specific assumption. The actuary should determine the best-estimate range for each economic assumption, and select a specific point from within that range. In some instances, the actuary may present alternative results by selecting different points within the best-estimate range.

The remainder of section 3 provides guidance for identifying which types of economic assumptions to use and for selecting the economic assumptions (i.e., the values) that will be used.

- 3.2 Identifying Types of Economic Assumptions—The types of economic assumptions used to measure obligations under a defined benefit pension plan may include the following:
- a. inflation;
 - b. investment return (sometimes referred to as the *valuation interest rate*);
 - c. discount rate;
 - d. compensation scale; and
 - e. other economic factors (e.g., Social Security, cost-of-living adjustments, growth of individual account balances, and variable conversion factors).
- 3.3 General Considerations—The actuary should consider the following factors when identifying which types of economic assumptions to use for a specific measurement and when selecting those economic assumptions that will be used:
- a. the purpose and nature of the measurement;
 - b. the characteristics of the obligation to be measured (measurement period, pattern of plan payments over time, open/closed group, materiality, volatility, etc.);

ASOP No. 27 – September 2007

- c. materiality of the assumption to the measurement (see section 3.14.1); and
- d. appropriate recent and long-term historical economic data.

As stated above, the actuary should consider recent economic data. However, the actuary should not give undue weight to recent experience. For example, if the recent investment return was largely attributable to a significant change in bond yields or inflation, it may be unreasonable to assume that such investment returns will continue over the measurement period.

3.4 General Selection Process—The general process for selecting economic assumptions for a specific measurement should include the following steps:

- a. identify components, if any, of each assumption and evaluate relevant data;
- b. develop a best-estimate range for each economic assumption required for the measurement, reflecting appropriate measurement-specific factors; and
- c. further evaluate measurement-specific factors and select a specific point within the best-estimate range.

With respect to some (or all) of the components of an economic assumption, the actuary is not required to identify the explicit best-estimate range before selecting the specific point, provided that the actuary is satisfied that the selected point would be within the best-estimate range had such range been explicitly identified.

After completing steps (a) through (c) for each economic assumption, the actuary should review the set of economic assumptions for consistency (see section 3.10).

3.5 Selecting an Inflation Assumption—If the actuary is using an approach that treats inflation as an explicit component of other economic assumptions, or as an independent assumption, the actuary should follow the general process set forth in section 3.4 to select an inflation assumption. The following are two matters for consideration:

3.5.1 Data—The actuary should review appropriate inflation data. These data may include consumer price indexes, the implicit price deflator, forecasts of inflation, and yields on government securities of various maturities.

3.5.2 Select and Ultimate Inflation Rates—The actuary may assume select and ultimate inflation rates in lieu of a single inflation rate. Select and ultimate inflation rates vary by period from the measurement date (e.g., inflation of 3% for the first 5 years following the measurement date, and 4% thereafter).

3.6 Selecting an Investment Return Assumption and a Discount Rate—The investment return assumption reflects anticipated returns on the plan's current and future assets.

ASOP No. 27 – September 2007

The discount rate is used to determine the present value of expected future plan payments. Generally, the appropriate discount rate is the same as the investment return assumption. But for some purposes, such as SFAS No. 87 or unfunded plan valuations, the discount rate may be selected independently of the plan's investment return assumption, if any. In such cases, the discount rate reflects anticipated returns on a hypothetical asset portfolio, rather than on the plan's expected investments.

For brevity, the remainder of section 3.6 refers only to the investment return assumption. The same selection process applies to the discount rate, except where necessary the hypothetical portfolio is substituted for the plan's expected investments.

3.6.1 Data—The actuary should review appropriate investment data. These data may include the following:

- a. current yields to maturity of fixed income securities such as government securities and corporate bonds;
- b. forecasts of inflation and of total returns for each asset class;
- c. historical investment data, including real risk-free returns, the inflation component of the return, and the real return or risk premium for each asset class; and
- d. historical plan performance.

The actuary may also consider historical statistical data showing standard deviations, correlations, and other statistical measures related to historical returns of each asset class and to inflation. Stochastic simulation models may be used to develop expected investment return ranges from this statistical data.

3.6.2 Constructing the Investment Return Range—The best-estimate investment return range can be constructed using various methods consistent with the principles set forth in this standard. Two examples of acceptable methods are provided below:

- a. Building-Block Method—Under the building-block method, the expected future investment return of each asset class is the combination of the components of investment return. These components include factors such as inflation and real return for the class.

The best-estimate investment return range is determined as follows: (i) derive a best-estimate range of expected future real returns (either directly or as the combination of best-estimate ranges for the components of real return) for each broad asset class applicable to the plan, such as cash and cash equivalents, fixed income securities (government and corporate bonds), and equities; (ii) compute an average, weighted real-return range

ASOP No. 27 – September 2007

reflecting the plan's expected asset class mix; and (iii) combine the range determined by step (ii) with the expected inflation range.

For purposes of step (iii), it is not generally appropriate to simply combine the low endpoints and combine the high endpoints of the inflation and real-return ranges, since this approach is likely to produce an overly broad best-estimate investment return range. Stochastic simulation models that take into account correlations among returns of different asset classes and inflation may be used to develop a best-estimate range with explicit confidence levels.

- b. **Cash Flow Matching Method**—Under the cash flow matching method, the expected future investment return range is viewed as the combination of (i) the internal rate of return on a bond portfolio with interest and principal payments approximately matching the plan's expected disbursements, and (ii) a risk adjustment range.

The best-estimate investment return range is determined as follows: (i) project the plan's benefit and expense disbursements to be valued in the measurement; (ii) identify a highly diversified portfolio available as of the measurement date of noncallable, high-quality corporate or U.S. government bonds with interest and principal payments approximately matching the projected disbursements; (iii) compute the bond portfolio's internal rate of return; (iv) establish a risk adjustment range for the plan that reflects the following: uncertainties in the projected benefits and expenses, expected returns on future contributions, reinvestment of interest and principal payments not fully needed to pay current benefits, any mismatches between the benefit disbursement stream and the high-quality bond portfolio's interest and principal payment stream, and current and expected future plan investments in equities or other asset classes besides high-quality bonds; and (v) combine the figures derived in steps (iii) and (iv).

Acceptable variations exist concerning constructing the bond portfolio in step (ii). For example, the portfolio may be limited to U.S. government securities, or the portfolio may include callable securities with adjustments for the value of the call feature. Alternatively, a hypothetical yield curve may be created based on average yields of high-quality corporate bonds at numerous maturities; this yield curve may then be used to create a hypothetical matching bond portfolio, without identifying specific bonds.

It is not generally possible to construct an appropriate portfolio by choosing those bonds with the highest yield at each maturity, because this method typically produces a nondiversified portfolio or one with bonds that are incorrectly classified or have unusual risk characteristics.

ASOP No. 27 – September 2007

The cash flow matching method does not identify an explicit inflation component of investment return. The actuary using this method will generally need to estimate the inflation rate implicit in the bond portfolio's internal rate of return to test for consistency with other economic assumptions, such as the compensation scale used to project plan disbursements. If these inflation rates are not consistent, additional iterations of the cash flow matching method may be required.

3.6.3 Measurement-Specific Factors—There are factors specific to each measurement that should be considered in constructing the best-estimate investment return range derived in section 3.6.2 and/or in selecting an investment return assumption within the range. Examples of such factors are as follows:

- a. Purpose of the Measurement—The purpose of the measurement is a primary factor. For example, an actuary measuring a plan's termination liability may use an investment return rate reflecting interest rates implicit in current or anticipated future annuity purchase rates. This investment return assumption may differ from an investment return assumption used to measure the same plan's present value of accumulated benefits on an ongoing basis. This latter assumption may reflect a longer time horizon and a diversified investment portfolio.
- b. Investment Policy—The plan's investment policy may include the following: (i) the current allocation of the plan's assets; (ii) types of securities eligible to be held (diversification, marketability, social investing philosophy, etc.); (iii) risk tolerance; (iv) a target allocation of plan assets among different classes of securities; and (v) permissible ranges for each asset class within which the investment manager is authorized to make strategic asset allocation decisions.
- c. Reinvestment Risk—Two reinvestment risks are associated with traditional, fixed income securities: (i) reinvestment of interest and normal maturity values not immediately required to pay plan benefits, and (ii) reinvestment of the entire proceeds of a security that has been called by the issuer.
- d. Investment Volatility—Plans investing heavily in those asset classes characterized by high variability of returns may be required to liquidate those assets at depressed values to meet benefit obligations. Other investment risks may also be present, such as default risk or the risk of bankruptcy of the issuer.
- e. Investment Manager Performance—Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). Few investment managers consistently achieve significant above-market returns net of expenses over long periods. The plan sponsor

ASOP No. 27 – September 2007

may replace managers who consistently underperform market indexes. However, in some situations an investment manager who consistently underperforms under varying market conditions is unlikely to be replaced (e.g., when the plan sponsor is the investment manager), so continued underperformance may be expected.

- f. **Investment Expenses**—Transaction, custodian, and management fees may be paid from plan assets. Such investment expenses expected to be paid from plan assets may be reflected by a reduction in the investment return assumption.
- g. **Cash Flow Timing**—The timing of expected contributions and benefit payments may affect the plan’s liquidity needs and investment opportunities.
- h. **Benefit Volatility**—Benefit volatility may be a primary factor for small plans with unpredictable benefit payment patterns. It may also be an important factor for a plan of any size that provides highly subsidized early-retirement benefits, lump-sum benefits, or supplemental benefits triggered by corporate restructuring or financial distress. In such plans, the untimely liquidation of securities at depressed values may be required to meet benefit obligations.
- i. **Expected Plan Termination**—In some situations, the actuary may expect the plan to be terminated at a determinable date. For example, the actuary may expect a plan to terminate when the owner retires, or a frozen plan to terminate when assets are sufficient to provide all accumulated plan benefits. In these situations, the investment return assumption may reflect a shortened measurement period that ends at the expected termination date. The form of benefit (see section 3.6.5) may reflect anticipated annuity purchase rates or lump-sum distribution interest rates at the expected plan termination date, where these forms are payable.
- j. **Tax Status of the Funding Vehicle**—If the plan’s assets are not kept in a tax-exempt fund, income taxes may reduce the plan’s investment return. Taxes may be reflected by an explicit reduction in the total investment return assumption and/or by a separately identified assumption.

3.6.4 **Multiple Investment Return Rates**—The actuary may assume multiple investment return rates in lieu of a single investment return rate. Two examples are as follows:

- a. **Select and Ultimate Investment Return Rates**—Assumed investment return rates vary by period from the measurement date (e.g., returns of 8% for the first 10 years following the measurement date, and 6% thereafter). When assuming select and ultimate investment return rates, the actuary

ASOP No. 27 – September 2007

should consider the relationships among inflation, interest rates, and market appreciation (depreciation).

- b. **Obligations Covered by Designated Current Assets**—One investment return rate is assumed for obligations covered by designated current plan assets on the measurement date, and a different investment return rate is assumed for the balance of the obligations and assets.

3.6.5 **Form of Benefit**—The amounts of some benefit forms, such as lump-sum benefits and early-retirement benefits, may be based on interest rates defined by the plan that are unrelated to the assumed investment return. The actuary should reflect such required interest rates in determining the amount of benefits expected to be paid, rather than as an adjustment to the investment return rate used to measure the obligation. (See section 3.8.4 regarding variable conversion factors.) Similarly, if the actuary expects the plan to purchase annuities when participants retire or upon expected plan termination, the interest rates implicit in expected annuity purchase rates should be reflected in determining the expected annuity purchase price rather than as an adjustment to the investment return rate.

3.7 **Selecting a Compensation Scale**—Compensation is a factor in determining participants' benefits in many pension plans. Also, some actuarial cost methods take into account the present value of future compensation. Generally, a participant's compensation will change over the long term in accordance with inflation, productivity growth, and merit scale. The assumption used to measure the anticipated year-to-year change in compensation is referred to as the *compensation scale*. It may be a single rate; alternatively, it may vary by age and/or service, consistent with the merit scale component; or it may vary over future years, consistent with the inflation component.

3.7.1 **Data**—The actuary should review available compensation data. These data may include the following:

- a. the plan sponsor's current compensation practice and any anticipated changes in this practice;
- b. current compensation distributions by age and/or service;
- c. historical compensation increases and practices of the plan sponsor and other plan sponsors in the same industry or geographic area; and
- d. historical national wage and productivity increases.

The actuary should consider available plan-sponsor-specific compensation data, but the actuary must carefully weigh the credibility of these data when selecting the compensation scale. For small plans or recently formed plan sponsors, industry or national data may provide a more appropriate basis for developing the compensation scale.

ASOP No. 27 – September 2007

- 3.7.2 Constructing the Compensation Scale Range—The best-estimate compensation scale range is generally constructed using a building-block method, which combines the best-estimate ranges for the components of compensation scale. These components include factors such as inflation, productivity growth, and merit scale. When the actuary combines these ranges, it is not generally appropriate to simply combine the low endpoints and combine the high endpoints of the ranges, since this is likely to produce an overly broad best-estimate compensation scale range.
- 3.7.3 Measurement-Specific Factors—The actuary should consider factors specific to each measurement in constructing the compensation scale range derived in section 3.7.2 and/or in selecting a specific compensation scale assumption within the range. Examples of such factors are as follows:
- a. Compensation Practice—The plan sponsor’s current compensation practice and any contemplated changes may affect the compensation scale, at least in the short term. For example, if pension benefits are a function of base compensation and the plan sponsor is changing its compensation practice to put greater emphasis on incentive compensation, future growth in base compensation may differ from historical patterns.
 - b. Competitive Factors—The level and pattern of future compensation changes may be affected by competitive factors, including competition for employees both within the plan sponsor’s industry and within the geographical areas in which the plan sponsor operates, and global price competition. Unless the measurement period is short, the actuary should not give undue weight to short-term patterns.
 - c. Collective Bargaining—The collective bargaining process impacts the level and pattern of compensation changes. However, it may not be appropriate to assume that future contracts will provide the same level of compensation changes as the current or recent contracts. For example, if the current contract provides for a compensation freeze, it would generally be inappropriate to assume that such a policy would continue indefinitely after the contract expires.
 - d. Compensation Volatility—If certain elements of compensation, such as bonuses and overtime, tend to vary materially from year to year, or if aberrations exist in recent compensation amounts, then volatility should be taken into account. This may be accomplished by adjusting the base amount from which future compensation elements are projected (e.g., the current bonus might be replaced by the average of bonuses over the last 3 years).

ASOP No. 27 – September 2007

- e. Expected Plan Termination—In some situations, as stated in section 3.6.3(i), the actuary may expect the plan to be terminated at a determinable date. In these situations, the compensation scale may reflect a shortened measurement period that ends at the expected termination date.

3.7.4 Multiple Compensation Scales—The actuary may use multiple compensation scales in lieu of a single compensation scale. Three examples are as follows:

- a. Select and Ultimate Scale—Assumed compensation increases vary by period from the measurement date (e.g., 4% increases for the first 5 years following the measurement date, and 5% thereafter) or by age and/or service.
- b. Separate Scales for Different Employee Groups—Different compensation scales are assumed for two or more employee groups that are expected to receive different levels or patterns of compensation increases.
- c. Separate Scales for Different Compensation Elements—Different compensation scales are assumed for two or more compensation elements that are expected to change at different rates (e.g., 5% bonus increases and 3% increases in other compensation elements).

3.8 Selecting Other Economic Assumptions—In addition to inflation, investment return, discount rate, and compensation scale assumptions, the following are some of the other types of economic assumptions that may be required for measuring certain pension obligations. The actuary should follow the general process described in section 3.4 to select these assumptions. The selected assumptions should also satisfy the consistency requirement of section 3.10.

3.8.1 Social Security—Social Security benefits are based on an individual's covered earnings, the OASDI contribution and benefit base, and changes in the cost of living. Changes in the OASDI contribution and benefit base are determined from changes in national average wages, which reflect the change in national productivity and inflation.

3.8.2 Cost-of-Living Adjustments—Plan benefits or limits affecting plan benefits (including the IRC section 401(a)(17) compensation limit and section 415(b) maximum annuity) may be automatically adjusted for inflation or assumed to be adjusted for inflation in some manner (e.g., through regular plan amendments). However, for some purposes (such as qualified pension plan funding valuations), the actuary may be precluded by applicable laws or regulations from anticipating future plan amendments or future cost-of-living adjustments in IRC limits.

ASOP No. 27 – September 2007

- 3.8.3 Growth of Individual Account Balances—Certain plan benefits have components directly related to the accumulation of real or hypothetical individual account balances (e.g., so-called floor-offset arrangements and cash balance plans).
- 3.8.4 Variable Conversion Factors—Measuring certain pension plan obligations may require converting from one payment form to another, such as converting a projected individual account balance to an annuity, converting an annuity to a lump sum, or converting from one annuity form to a different annuity form. The conversion factors may be variable (e.g., recalculated each year based on a stated mortality table and interest rate equal to the yield on 30-year Treasury bonds).
- 3.9 Individual Assumptions—Each economic assumption selected by the actuary should individually satisfy this standard.
- 3.10 Consistency among Economic Assumptions Selected by the Actuary—With respect to any particular measurement, each economic assumption selected by the actuary should be consistent with every other economic assumption selected by the actuary over the measurement period, unless the assumption, considered individually, is not material, as provided in section 3.14.1. Often this requirement can be met by using the same inflation component in each of the economic assumptions selected by the actuary. For example, if the actuary has chosen to use select and ultimate inflation rates, the actuary should ordinarily choose select and ultimate investment return rates, discount rates, and compensation scales, and both the periods and levels of select and ultimate inflation rates should be consistent within each assumption. If different inflation components are used (or implicitly included) in two or more economic assumptions selected by the actuary for a particular measurement, the actuary should be satisfied that such assumptions are consistent.

Consistency is not necessarily achieved by maintaining a constant difference between one economic assumption and another. If one particular economic assumption changes from one measurement to another (e.g., from year to year or from funding to financial accounting) due to a change in the inflation component, the actuary should review the impact of inflation on all other economic assumptions and make appropriate adjustments. But if an assumption change is due to a factor that is unique to that assumption (e.g., a change in the investment return rate reflecting a change in investment policy), modifying other economic assumptions merely to maintain constant differences would not be appropriate.

Assumptions selected by the actuary need not be consistent with prescribed assumptions, which are discussed in section 3.11 below.

- 3.11 Prescribed Assumption(s)—When an assumption is prescribed, the actuary is obligated to use it. Examples of prescribed economic assumptions include the required interest rate for determining the present value of vested benefits for Pension Benefit Guaranty Corporation (PBGC) variable-rate premiums, the current liability interest rate, and economic assumptions selected by the plan sponsor for purposes of compliance with

ASOP No. 27 – September 2007

SFAS No. 87. As indicated in section 1.2, Scope, this standard does not apply to the selection of prescribed economic assumptions, although it does apply to advice given to the party responsible for selecting the prescribed assumption.

All nonprescribed economic assumptions should nonetheless satisfy this standard. That is, each economic assumption selected by the actuary should be within the actuary's best-estimate range, should reflect relevant measurement-specific factors, and should be consistent with every other economic assumption selected by the actuary for the measurement. Selection of economic assumptions that do not satisfy this standard in order to accommodate the prescribed assumption(s) is a deviation subject to the requirements of section 4.3.

- 3.12 Changing Assumptions—An actuary's best-estimate range with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experience. The actuary might change one or more economic assumptions frequently in certain situations (e.g., annually), even if the best-estimate range has not changed materially. The actuary might change assumptions infrequently in other situations (e.g., only when the best-estimate range changes materially or when the specific assumption is no longer within the updated best-estimate range). Even if assumptions are not changed, the actuary should be satisfied that each of the economic assumptions selected for a particular measurement complies with this standard.
- 3.13 Sources of Economic Data—Appendix 2 lists some generally available sources of economic data and analyses the actuary may wish to consider in selecting economic assumptions. The actuary should consider the possibility that some historical economic data may not be applicable for the future because of changes in the underlying environment.
- 3.14 Other Considerations—The following issues may also be considered when selecting economic assumptions:
- 3.14.1 Materiality—The actuary needs to establish a balance between refined methodology and materiality. The actuary is not required to use a type of economic assumption or to select a more refined economic assumption when it is not expected to produce materially different results. For example, the actuary is not required to use an assumption regarding future compensation increases in an ERISA funding valuation when such an assumption is immaterial because the bulk of the obligation relates to participants whose current compensation exceeds the IRC section 401(a)(17) limit.
- 3.14.2 Cost Effectiveness—The actuary also needs to establish a balance between refined methodology and cost effectiveness. While all material economic assumptions must be reflected, more refined methodology is not required when it is not expected to produce materially different results. For example, actuaries working with small plans may prefer to emphasize the results of general research

ASOP No. 27 – September 2007

to comply with this standard. However, they are not precluded from using relevant plan-specific facts.

- 3.14.3 Knowledge Base—The economic assumptions selected to measure pension obligations should reflect the actuary’s knowledge base as of the measurement date. However, the actuary may learn of an event that is unique to a plan or plan sponsor (e.g., plan termination or death of the principal owner) occurring after the measurement date that would change the economic assumption selected. If appropriate, the actuary may reflect this change as of the measurement date.
- 3.14.4 Advice of Experts—Economic data and analyses are available from a variety of sources, including representatives of the plan sponsor and administrator, investment managers, economists, accountants, and other professionals. When the actuary is responsible for selecting or giving advice on selecting economic assumptions within the scope of this standard, external expert advice may be considered, but the selection or advice must reflect the actuary’s professional judgment.

Section 4. Communications and Disclosures

- 4.1 Disclosures—Pension actuarial communications should contain the following:
- 4.1.1 Economic Assumptions—Describe each economic assumption used in the measurement. When a single rate is assumed, the rate should be stated (e.g., investment return: 8% per year, net of investment expenses). When multiple rates are assumed, sufficient detail should be shown to assess the level and pattern of the rates (e.g., a table showing age-related merit scale rates for every fifth age).
- Depending on a particular measurement’s circumstances, the actuary may give information about specific interrelationships among the assumptions (e.g., investment return: 8% per year, net of investment expenses and including inflation at 3%).
- 4.1.2 Changes in Assumptions—Describe any changes in the economic assumptions from those previously used for the same type of measurement. The general effects of the changes should be disclosed in words or by numerical data, as appropriate.
- 4.1.3 Changes in Circumstances—Describe any significant event that has occurred since the measurement date that would change the economic assumption selected and about which the actuary has knowledge. The likely effect of any such change should be described.
- 4.2 Prescribed Assumption(s)—The actuary’s communication should state the source of any prescribed assumption(s).

ASOP No. 27 – September 2007

- 4.3 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.

Appendix 1

Background and Current Practices

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

Actuaries have historically used various practices for selecting the economic assumptions they use to measure pension obligations. For example, some actuaries looked to surveys of economic assumptions used by other actuaries, some relied on detailed research by experts, some used highly sophisticated projection techniques, and many actuaries used a combination of these.

Before computer technology was widely available, actuaries commonly used economic 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 assumptions that were individually reasonable. This trend was accelerated by IRC amendments 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 multiemployer plan) using individually reasonable assumptions or using assumptions that produce the same total contribution that would have been determined if each assumption had been individually reasonable.

As for current practices, many actuaries change economic assumptions infrequently when measuring obligations of ongoing pension plans. Other actuaries reevaluate the assumptions as of each measurement date and change economic assumptions more frequently.

Many actuaries maintain a long-term conservative view, especially when selecting economic assumptions for funding purposes where adverse economic experience could jeopardize the delivery of plan benefits. Conservative assumptions require higher contributions initially, increasing the security of promised benefits and reducing the likelihood that future contributions will increase to unaffordable levels.

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 economic assumptions. But these assumptions—particularly the investment return assumption or the discount rate—may be prescribed by others. In some of these cases, actuaries have adjusted other assumptions to maintain consistency with the mandated assumption.

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

Appendix 2

Selected References for Economic Data and Analyses

The following list of references is a representative sample of available sources. It is not intended to be an exhaustive list.

1. General Comprehensive Sources
 - a. Kellison, Stephen G. *The Theory of Interest*. 2d ed. Homewood, IL: Irwin, 1991.
 - b. *Statistics for Employee Benefits Actuaries*. Committee on Retirement Systems Practice Education, and the Pension and Health Sections, Society of Actuaries. Updated annually.
 - c. *Stocks, Bonds, Bills, and Inflation (SBBI)*. Chicago, IL: Ibbotson Associates. Annual Yearbook, market results 1926 through previous year.
2. Recent Data, Various Indexes, and Some Historical Data
 - a. *Barron's National Business and Financial Weekly*. Dow Jones and Co., Inc. Available on newsstands and by subscription.
 - b. U.S. Bureau of the Census. *Statistical Abstract of the United States*. Published annually.
 - c. U.S. Department of Labor, Bureau of Labor Statistics. *Consumer Price Index*. Monthly updates of CPI-U and CPI-W by expenditure category and commodity and service group. Available by subscription from the U.S. Government Printing Office, Washington, DC 20402.
 - d. U.S. Federal Reserve Monthly Statistical Release G.13. Interest rate information for selected Treasury securities. Federal Reserve Board, Publications Services, Washington, DC 20551. Available by subscription.
 - e. U.S. Federal Reserve Weekly Statistical Release H.15. Interest rate information for selected Treasury securities. Available as above.
 - f. U.S. House of Representatives, Committee on Ways and Means. *Green Book: Background Material and Data on Programs within the Jurisdiction of the Committee*. Washington, DC: Government Printing Office. Published annually.
 - g. U.S. Social Security Administration. *Social Security Bulletin*. Annual Statistical Supplements, Trustee Reports, and quarterly Bulletin. Available by subscription from the U.S. Government Printing Office, Washington, DC 20402.

ASOP No. 27 – September 2007

- h. *The Wall Street Journal*. Daily periodical. Money and Investing (section 3); and stocks (6 indexes), bonds (4 indexes), and interest (4 indexes). Available on newsstands and by subscription.

- 3. Forecasts
 - a. *Blue Chip Financial Forecasts*. Published by Capital Publications, Inc., P.O. Box 1453, Alexandria, VA 22313-2053. March and October issues contain long-range forecasts for interest rates and inflation.

 - b. Congressional Budget Office's 5-year economic forecast. The forecast projects three-month Treasury Bill rates, 10-year Treasury Note rates, CPI-U, gross domestic product, and unemployment rates. Prepared annually. Washington, DC: Government Printing Office.