ACTUARIAL STANDARDS BOARD

● SECOND EXPOSURE DRAFT ●

Proposed Revision of
Actuarial Standard of
Practice No. 27

Selection of Economic Assumptions for Measuring Pension Obligations

Comment Deadline:
May 31, 2012

Developed by the
Pension Committee of the
Actuarial Standards Board

Approved for Exposure by the
Actuarial Standards Board
January 2012

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APPENDIXES

January 2012

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: Proposed Revision of Actuarial Standard of Practice (ASOP) No. 27

This document contains a second exposure draft of proposed revisions to ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations.*

Please review this second exposure draft and give the ASB the benefit of your comments and suggestions. Each written response and each response sent by e-mail to the address below will be acknowledged, and all responses will receive appropriate consideration by the drafting committee in preparing the final document for approval by the ASB.

The ASB accepts comments by either electronic or conventional mail. The preferred form is e-mail, as it eases the task of grouping comments by section. However, please feel free to use either form. If you wish to use e-mail, please send a message to **comments@actuary.org**. You may include your comments either in the body of the message or as an attachment prepared in any commonly used word processing format. **Please do not password-protect any attachments.** Include the phrase "ASB COMMENTS" in the subject line of your message. Please note: Any message not containing this exact phrase in the subject line will be deleted by our system's spam filter. Comments will be posted in the order that they are received. **Comments received after the deadline will not be posted**.

If you wish to use conventional mail, please send comments to the following address:

ASOP No. 27 Revision
Actuarial Standards Board
1850 M Street, NW, Suite 300
Washington, DC 20036

The ASB posts all signed comments received to its website to encourage transparency and dialogue. Unsigned or anonymous comments will not be considered by the ASB nor posted to the website. The comments will not be edited, amended, or truncated in any way. Comments will be posted in the order that they are received. Comments will be removed when final action on a proposed standard is taken. The ASB website is a public website and all comments will be available to the general public. The ASB disclaims any responsibility for the content of the comments, which are solely the responsibility of those who submit them.

Deadline for receipt of responses in the ASB office: **May 31, 2012**

Background

The ASB has provided coordinated guidance through a series of ASOPs for measuring pension obligations and determining pension plan costs or contributions:

1. ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*;

2. ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;

3. ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*; and

4. ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*.

In January 2011, the ASB issued the first exposure draft of ASOP No. 27 (http://www.actuarialstandardsboard.org/pdf/asops/asop27revision_exposure_2011_updated.pdf). Twenty comment letters were received and reviewed (http://www.actuarialstandardsboard.org/comments/asop27_comments.asp). The comment letters reflected diverse viewpoints and the Pension Committee found them to be helpful; the ASB thanks all those who took the time to comment.

Also in January 2011, the Pension Committee issued a discussion draft of ASOP No. 4. The discussion draft contained a limited number of changes on which the Committee requested input from interested parties. Several comment letters were received and the Pension Committee found them to be helpful; the Committee thanks all those who took the time to comment.

The Pension Committee is continuing its work on several standards. As detailed in the transmittal memo of the first exposure draft of ASOP No. 27, the Committee is focused on the following issues:

- Addressing economic value issues regarding both actuarial methods and actuarial assumptions, thus requiring revisions to both ASOP Nos. 4 and 27, and possibly to ASOP No. 35 as well.

- Coordinating changes to ASOP No. 35 that may be required due to changes in ASOP No. 27 so the two standards provide consistent guidance.

- Developing guidance for the assessment, disclosure, and management of pension risk. The Pension Committee believes that an entirely new standard on risk is the best vehicle for providing such guidance.

- Reviewing ASOP No. 4 in its entirety, not just with regard to economic value issues. This review includes funding methods, contribution policy, funded status, projections, terminology, and valuation of certain types of plan provisions.

- The Pension Committee noted that a review of ASOP No. 6, *Measuring Retiree Group Benefit Obligations*, was also necessary since ASOP No. 6 incorporates by reference much of the guidance contained in the pension standards. The ASB appointed a new Retiree Group Benefits Subcommittee, under the jurisdiction of the Pension Committee, to address ASOP No. 6.

The Pension Committee has been proceeding on all of these endeavors. At this time, the ASB is issuing the following items:

- Exposure draft of a revision of ASOP No. 4

- Second exposure draft of a revision of ASOP No. 27

An exposure draft of a revision of ASOP No. 6 is expected to be issued in 2012, as well as a discussion draft of a proposed new standard on risk.

Changes to ASOP No. 35 that align with a revised ASOP No. 27 are also likely to be exposed for comment after a revised ASOP No. 27 is adopted. The Pension Committee will take into account comments received on this second exposure draft for ASOP No. 27 before issuing anything for comment on ASOP No. 35.

Key Changes in Second Exposure Draft of ASOP No. 27

Some of the changes in the second exposure draft of ASOP No. 27 introduce new concepts while others are refinements to language in the first exposure draft. Readers are encouraged to review the transmittal memo to the first exposure draft for a discussion of all the changes introduced.

Section Order
A significant amount of text has been reordered in the second exposure draft with the goal of improving the flow of the standard. The reader will see significant reordering of language in sections 3.2 through 3.14.

Reasonable Assumption Standard
The second exposure draft contains a new definition for a reasonable assumption. The first exposure draft considered assumptions to be reasonable if they were not anticipated to produce significant actuarial gains or losses over the measurement period. This approach was consistent with the current definition of "reasonable" used in ASOP No. 35.

The second exposure draft states that an assumption is reasonable if it:

a. is appropriate for the purpose of the measurement;

b. reflects the actuary's professional judgment;

c. takes into account historical and current economic data that is relevant as of the measurement date;

d. reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in financial market data, or a combination thereof; and

e. is unbiased (i.e., neither optimistic nor pessimistic), except when provisions for adverse deviation are included and disclosed under section 3.5.1 of this second exposure draft, or when alternative assumptions are used for the assessment of risk.

The Pension Committee felt this principles-based definition was an improvement over the rules-based definition of no gain/loss. The Pension Committee looked at standards from Australia, Canada, and the United Kingdom in developing this definition.

The second exposure draft also contains new language in section 3.6 that acknowledges a range of reasonable assumptions is possible.

Estimates and Observations
The reasonable assumption language in section 3.6 contains some examples on how actuaries might obtain estimates from market observations. The language also states that observations may include estimates of future experience as well as other considerations and that making adjustments to observations may be appropriate.

Geometric and Arithmetic Returns
The second exposure draft continues to draw the actuary's attention to the fact that investment return expectations are sometimes quoted as forward looking expected arithmetic returns and other times quoted as forward looking expected geometric returns. Section 3.8.3 lists geometric and arithmetic returns as a factor that the actuary should consider in setting an investment return assumption. The second exposure draft does not promote one type of return over the other but does indicate that the actuary needs to understand what type of return is used.

The Pension Committee feels that the revised definition of a reasonable assumption better accommodates assumptions based on both arithmetic and geometric returns.

Appendix 3 contains some background material on arithmetic and geometric returns.

Adverse Deviation (*previously titled *Conservatism)
Section 3.5.1 of this second exposure draft replaces "Conservatism" with "Adverse Deviation." One of the challenges with the word "Conservatism" is that it can depend on the viewpoint of the reader. The Pension Committee feels that the term "Adverse Deviation" describes the goal of the standard language better than "Conservatism."

Rate of Payroll Growth
The Pension Committee added language in section 3.11.3 that discusses an assumption for payroll growth for an entire covered population. The rate of payroll growth for an entire covered population is often different than the payroll growth experienced by an employee who remains in

service with the plan sponsor. The actuary will sometimes need an overall payroll growth assumption for cost projections or, in some instances, amortization methods.

Assumption Rationale

The second exposure draft retains the requirement for the actuary to disclose the rationale used in selecting each non-prescribed assumption or any changes made to non-prescribed assumptions. The language has been modified slightly to make it clear that brief rationale statements are sufficient.

Request for Comments

The ASB is issuing a second exposure draft of ASOP No. 27 to provide members of actuarial organizations governed by the ASOPs and other interested persons an opportunity to comment.

The Pension Committee would appreciate comments on the proposed changes and would like to draw the readers' attention to the following areas in particular:

1. Is the guidance as to a reasonable assumption in section 3.6 clear and appropriate? If not, what changes do you suggest?

2. Are the examples in 3.6.1 regarding market observations clear and sufficient? Is the language regarding observations including estimates of future experience as well as other considerations clear and appropriate? If not, what changes do you suggest?

3. Is the language in section 3.6.2 regarding a range of reasonable assumptions clear and appropriate? If not, what changes do you suggest?

4. Do you agree that the guidance on arithmetic and geometric returns in section 3.8.3(j) is appropriate? Is the language about the proper incorporation of forward looking expected geometric returns into a building block exercise clear?

5. Is the language regarding payroll growth in section 3.11.3 clear and sufficient? If not, what changes do you suggest?

The ASB reviewed this draft and voted in January 2012 to approve its exposure.

Pension Committee of the ASB

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The ASB establishes and improves standards of actuarial practice. These ASOPs identify what the actuary should consider, document, and disclose when performing an actuarial assignment. The ASB's goal is to set standards for appropriate practice for the U.S.

ACTUARIAL STANDARD OF PRACTICE NO. 27

SELECTION OF ECONOMIC 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) economic assumptions—primarily investment return, discount rate, post-retirement benefit increases, and compensation increases—for measuring obligations under defined benefit pension plans;

b. enhances those provisions of Actuarial Standard of Practice (ASOP) No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*, that relate to the selection and use of economic assumptions; and

c. enhances those provisions of Actuarial Standard of Practice (ASOP) No. 6, *Measuring Retiree Group Benefit Obligations*, that relate to the selection and use of economic assumptions.

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 Nos. 4 or 6, ASOP Nos. 4 or 6 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.

If the actuary departs from the guidance set forth in this standard in order to comply with applicable law (statutes, regulations, and other legally binding authority) or for any other reason the actuary deems appropriate, the actuary should refer to section 4.

This standard does not apply to the selection of prescribed assumptions, although the actuary should use the principles set forth in this standard whenever the actuary has an obligation to assess the reasonableness of a prescribed assumption. The actuary's obligations with respect to prescribed assumptions are governed by ASOP Nos. 4, 6, or 41, *Actuarial Communications*, which address prescribed assumptions and methods.

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 under US GAAP or Governmental Accounting Standards, 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 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 work product with a measurement date on or after twelve months after adoption by the Actuarial Standards Board (ASB).

Section 2. Definitions

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

2.1 Inflation—General economic inflation, defined as price changes over the whole of the economy.

2.2 Measurement Date—The date as of which the value of the pension obligation is determined (sometimes referred to as the "valuation date").

2.3 Measurement Period—The period subsequent to the measurement date during which a particular economic assumption will apply in a given measurement.

2.4 Merit Adjustments—The rates of change in an individual's compensation attributable to personal performance, promotion, seniority, or other individual factors.

2.5 Prescribed Assumption or Method Set by Another Party—A specific assumption or method that is selected by another party, to the extent that law, regulation, or accounting standards gives the other party responsibility for selecting such an assumption or method. For this purpose, an assumption or method selected by a governmental entity for a plan that such governmental entity or a political subdivision of that entity directly or indirectly sponsors is a prescribed assumption or method set by another party.

2.6 Prescribed Assumption or Method Set by Law—A specific assumption or method that is mandated or that is selected from a specified range or set of assumptions or methods that is deemed to be acceptable by applicable law (statutes, regulations, or other legally binding authority). For this purpose, an assumption or method selected by a governmental entity for a plan that such governmental entity or a political subdivision of that entity directly or indirectly sponsors is not a prescribed assumption or method set by law.

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.

Section 3. Analysis of Issues and Recommended Practices

3.1 Overview—Pension obligation values incorporate assumptions about pension payment commencement, duration and amount. They also require discount rates to convert future expected payments into present values. Some of these assumptions are economic assumptions covered under this ASOP No. 27 and some are non-economic assumptions covered under ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*. In order to measure a pension obligation, the actuary will need to select or evaluate assumptions underlying the obligation.

3.2 Identification of Economic Assumptions Used in the Measurement—The actuary should consider the following factors when identifying the types of economic assumptions to use for a specific measurement:

a. the purpose 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.); and

c. materiality of the assumption to the measurement (see section 3.5.2).

The types of economic assumptions used to measure obligations under a defined benefit pension plan may include inflation, investment return, discount rate, compensation increases and other economic factors (for example, Social Security, cost-of-living adjustments, rate of payroll growth, growth of individual account balances, and variable conversion factors).

3.3 General Selection Process—After identifying the economic assumptions to be used for the measurement, the actuary should follow the general process set forth below for selecting each economic assumption for a specific measurement:

a. identify components, if any, of the assumption;

b. evaluate relevant data (section 3.4);

c. consider factors specific to the measurement;

d. consider other general factors (section 3.5); and

e. select a reasonable assumption (section 3.6).

After completing these steps for each economic assumption, the actuary should review the set of economic assumptions for consistency (section 3.12) and make appropriate adjustments if necessary.

3.4 Relevant Data—To evaluate relevant data, the actuary should review appropriate recent and long-term historical economic data. The actuary should not give undue weight to recent experience. The actuary should consider the possibility that some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying environment. Appendix 4 lists some generally available sources of economic data and analyses.

3.5 Other General Considerations—The following issues may also be considered when selecting economic assumptions:

3.5.1 Adverse Deviation—Depending on the purpose of the measurement, the actuary may determine that it is appropriate to adjust the economic assumptions to provide for adverse deviation. Any such adjustment made should be disclosed in accordance with section 4.1.1.

3.5.2 Materiality—The actuary should establish a balance between refined economic assumptions and materiality. The actuary is not required to use a type of economic assumption or to select a more refined economic assumption when in the actuary's professional judgment such use or selection is not expected to produce materially different results.

3.5.3 Cost of Using Refined Assumptions—The actuary should establish a balance between refined economic assumptions and the cost of using refined assumptions. While all material economic assumptions must be reflected, more refined assumptions are not required when they are not expected to produce materially different results. For example, actuaries working with small plans may prefer to emphasize the results of general research to comply with this standard. However, they are not precluded from using relevant plan-specific facts.

3.5.4 Rounding—Taking into account the purpose of the measurement, materiality, and the cost of using refined assumptions, the actuary may determine that it is appropriate to apply a rounding technique to the selected economic assumption. In such cases, the rounding technique should be unbiased.

3.5.5 Changes in Circumstances—The actuary may change the economic assumption that otherwise would have been selected due to an event occurring after the measurement date. For example, a collective bargaining agreement ratified after the measurement date may lead the actuary to change the compensation increase assumption that otherwise would have been selected.

3.5.6 Views of Experts—Economic data and analyses are available from a variety of sources, including representatives of the plan sponsor and administrator, investment advisors, economists, accountants, and other professionals. The actuary may benefit from becoming familiar with a range of views on the factors underlying each chosen assumption. When the actuary is responsible for selecting or giving advice on selecting economic assumptions within the scope of this standard, views of experts may be considered but the selection or advice must reflect the actuary's professional judgment.

3.6 Selecting a Reasonable Assumption—Each economic assumption selected by the actuary should be reasonable. For this purpose, an assumption is reasonable if it has the following characteristics:

a. It is appropriate for the purpose of the measurement;

b. It reflects the actuary's professional judgment;

c. It takes into account historical and current economic data that is relevant as of the measurement date;

d. It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in financial market data, or a combination thereof; and

e. It is unbiased (i.e., neither optimistic nor pessimistic) – except when provisions for adverse deviation are included and disclosed under section 3.5.1, or when alternative assumptions are used for the assessment of risk.

3.6.1 Reasonable Assumption Based on Future Experience or Market Data—The actuary should develop a reasonable economic assumption based on the actuary's estimate of future experience, the actuary's observation of the estimates inherent in financial market data, or a combination thereof. Examples of how the actuary may observe estimates from financial market data include the following:

a. comparing yields on inflation-indexed bonds to yields on equivalent non-inflation-indexed bonds to estimate the market's expectation of future inflation;

b. comparing yields on bonds of different credit quality to determine market credit spreads;

c. observing yields on U.S. Treasury debt of various maturities to determine a yield curve free of credit risk; and

d. examining annuity prices to estimate the market price to settle pension obligations.

The items listed above, as well as other market observations or prices, include estimates of future experience as well as other considerations. For example, the difference in yields between inflation-linked and non-inflation-linked bonds may include premiums for liquidity and future inflation risk in addition to an estimate of future inflation. The actuary may want to adjust estimates based on observations to reflect the various risk premiums included in market pricing.

3.6.2 Range of Reasonable Assumptions—The actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions equally reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop across actuarial practice.

3.7 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 3.3 to select an inflation assumption.

3.7.1 Data—The actuary should review appropriate inflation data. These data may include consumer price indices, the implicit price deflator, forecasts of inflation, yields on government securities of various maturities, and yields on nominal and inflation-indexed debt.

3.7.2 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 (for example, inflation of 3% for the first 5 years following the measurement date and 4% thereafter).

3.8 Selecting an Investment Return Assumption—The investment return assumption reflects the anticipated returns on the plan's current and, if appropriate for the measurement, future assets. This assumption is typically constructed by considering various factors including, but not limited to, the time value of money; inflation and inflation risk; illiquidity; credit risk; macroeconomic conditions; and growth in earnings, dividends, and rents.

In developing a reasonable assumption for these factors and in combining the factors to develop the investment return assumption, the actuary may consider a broad range of data and other inputs, including the judgment of investment professionals.

3.8.1 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, GDP growth, and total returns for each asset class;

c. historical and current investment data including, but not limited to, real and nominal returns, the inflation and inflation risk components implicit in the yield of inflation-protected securities, dividend yields, earnings yields, and real estate capitalization rates; and

d. historical plan performance.

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

3.8.2 Components of the Investment Return Assumption—The investment return assumption can be developed using various methods consistent with the principles set forth in this standard, including combining estimated components of the assumption. Where the assumption is determined as the result of a combination of two or more components or factors, care should be taken to ensure that the combination of these factors is logically consistent.

3.8.3 Measurement-Specific Considerations—The following factors should be considered in developing an investment return assumption:

a. 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) a target allocation of plan assets among different classes of securities; and (iv) permissible ranges for each asset class within which the investment manager is authorized to make investment decisions. The actuary should consider whether the current investment policy is expected to change during the measurement period.

b. Effect of Reinvestment—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.

c. 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.

d. Investment Manager Performance—Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). The actuary should not assume that superior or inferior returns will be achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy unless the actuary has reason to believe, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the measurement period.

e. Investment and Other Administrative Expenses—Investment and other administrative expenses may be paid from plan assets. To the extent such expenses are not otherwise recognized, the actuary should reduce the investment return assumption to reflect these expenses.

f. Cash Flow Timing—The timing of expected contributions and benefit payments may affect the plan's liquidity needs and investment opportunities.

g. 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.

h. 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.

i. 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 or by a separately identified assumption.

j. Arithmetic and Geometric Returns—The use of a forward looking expected arithmetic return as an investment return assumption will produce a mean accumulated value. The use of a forward looking expected geometric return as an investment return assumption will produce an accumulated value that generally converges to the median accumulated value as the time horizon lengthens. The actuary should consider the implications of a forward looking expected arithmetic return and a forward looking expected geometric return when constructing an investment return assumption.

In some instances, the actuary will receive forward looking expected returns by asset class from an investment professional. The actuary should ensure that the type of forward looking expected returns received from the investment professional is known (i.e., forward looking expected geometric returns or forward looking expected arithmetic returns) and that the forward looking expected returns are used appropriately. For example, when determining a forward looking expected geometric return for an entire portfolio, the actuary generally should not take the weighted average of the forward looking expected geometric return for each of the asset classes. In this instance, to determine the forward looking expected geometric return for an entire portfolio, the actuary should take the weighted average of the forward looking expected arithmetic return for each of the asset classes and adjust such determination to reflect the variance of the entire portfolio.

Appendix 3 includes general background on arithmetic and geometric returns.

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

b. Benefit Payments Covered by Designated Current Assets—One investment return rate is assumed for benefit payments covered by designated current plan assets on the measurement date, and a different

investment return rate is assumed for the balance of the benefit payments and assets.

3.9 Selecting a Discount Rate—The discount rate is used to measure the present value of expected future plan payments. The discount rate may be a single rate or a series of rates, such as a yield curve. The actuary should consider the purpose of the measurement as a primary factor in selecting a discount rate. Some examples of measurement purposes are as follows:

a. Contribution Budgeting—An actuary evaluating the sufficiency of a plan's contribution policy may choose among several discount rates. The actuary may use a discount rate that reflects the anticipated investment return from the pension fund. Alternatively, the actuary may use discount rates appropriate for defeasance, settlement or market measurements.

b. Defeasance or Settlement—An actuary measuring a plan's present value of benefits on a defeasance or settlement basis may use a discount rate equal to rates implicit in annuity prices or other settlement options.

c. Market Measurements—An actuary making a market measurement may use a set of discount rates based on market yields for a hypothetical bond portfolio whose cash flows reasonably match the pattern of benefits that are expected to be paid in the future. The type and quality of bonds in the hypothetical portfolio may depend on the particular type of market measurement.

d. Pricing—An actuary measuring the price of plan amendments may use a discount rate implicit in the prices for obligations with similar characteristics in financial markets. An actuary who wants to determine a plan sponsor's future contributions that are expected to support the plan amendment may use rates described in section 3.9(a).

The present value of expected future pension payments may be calculated from the perspective of different parties, recognizing that different parties may have different measurement purposes. For example, the present value of expected future payments could be calculated from the perspective of an outside creditor or the entity responsible for funding the plan. The outside entity may desire a discount rate consistent with other measurements of importance to the creditor even though those other measurements may have little or no importance to the entity funding the plan.

3.10 Selecting a Compensation Increase Assumption—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 increase over the long term in accordance with inflation, productivity growth, and merit adjustments. The assumption used to measure the anticipated year-to-year change in compensation is referred to as the compensation increase assumption. It may be a single rate, it may vary by age or service, or it may vary

over future years. The actuary should consider the following factors when selecting a compensation increase assumption.

3.10.1 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 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 increases and productivity growth.

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 increase assumption. For small plans or recently formed plan sponsors, industry or national data may provide a more appropriate basis for developing the compensation increase assumption.

3.10.2 Measurement-Specific Considerations—The actuary should consider factors specific to each measurement in selecting a specific compensation increase assumption. 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 increase assumption, 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. In some circumstances, this may be accomplished by adjusting the base amount from which future compensation elements are projected (for example, the projected bonuses might be based on an adjusted average of bonuses over the last 3 years). In some other circumstances, an additional assumption regarding an expected increase in pay in the final year of service may be used.

e. Expected Plan Freeze or Termination—In some situations, as stated in section 3.8.3(h), the actuary may expect the plan to be frozen or terminated at a determinable date. In these situations, the compensation increase assumption may reflect a shortened measurement period that ends at the expected termination date.

3.10.3 Multiple Compensation Increase Assumptions—The actuary may use multiple compensation increase assumptions in lieu of a single compensation increase assumption. Three examples are as follows:

a. Select and Ultimate Assumptions—Assumed compensation increases vary by period from the measurement date (for example, 4% increases for the first 5 years following the measurement date, and 5% thereafter) or by age or service.

b. Separate Assumptions for Different Employee Groups—Different compensation increases are assumed for two or more employee groups that are expected to receive different levels or patterns of compensation increases.

c. Separate Assumptions for Different Compensation Elements—Different compensation increases are assumed for two or more compensation elements that are expected to change at different rates (for example, 5% bonus increases and 3% increases in other compensation elements).

3.11 Selecting Other Economic Assumptions—In addition to inflation, investment return, discount rate, and compensation increase assumptions, the following are some of the types of economic assumptions that may be required for measuring certain pension obligations. The actuary should follow the general process described in section 3.3 to select these assumptions. The selected assumptions should also satisfy the consistency requirement of section 3.12.

3.11.1 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.

3.11.2 Cost-of-Living Adjustments—Plan benefits or limits affecting plan benefits (including the Internal Revenue Code 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 (for example, 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 certain IRC limits.

3.11.3 Rate of Payroll Growth—As a result of terminations and new participants, total payroll generally grows at a different rate than does a participant's salary or the average of all current participants combined. As such, when a payroll growth assumption is needed, the actuary should use an assumption that is consistent with but typically not identical to the compensation increase assumption. One approach to setting the payroll growth assumption may be to reduce the compensation increase assumption by the effect of any assumed merit increases. The actuary should apply professional judgment in determining whether, given the purpose of the measurement, the payroll growth assumption should be based on a closed or open group and, if the latter, whether the size of that group should be expected to increase, decrease, or remain constant.

3.11.4 Growth of Individual Account Balances—Certain plan benefits have components directly related to the accumulation of real or hypothetical individual account balances (for example, so-called floor-offset arrangements and cash balance plans). Further guidance regarding these types of benefits is included in ASOP No. 4.

3.11.5 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 (for example, recalculated each year based on a stated mortality table and interest rate equal to the yield on 30-year Treasury bonds).

3.12 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 for the measurement period, unless the assumption, considered individually, is not material, as provided in section 3.5.2. A number of factors may interact with one another and may be

components of other economic assumptions, such as inflation, economic growth, and risk premiums. In some circumstances, consistency may be achieved by using the same inflation, economic growth and other relevant components in each of the economic assumptions selected by the actuary.

Consistency is not necessarily achieved by maintaining a constant difference between one economic assumption and another. For each measurement date, the actuary should reevaluate both the individual assumptions and the relationships among them, and make appropriate adjustments.

Assumptions selected by the actuary need not be consistent with prescribed assumptions, which are discussed in section 3.13.

3.13 Prescribed Assumption(s)—The actuary should use the principles set forth in this standard whenever the actuary has an obligation to assess the reasonableness of a prescribed assumption. The actuary's obligations with respect to prescribed assumptions are governed by ASOP Nos. 4, 6, or 41 as applicable, which address prescribed assumptions and methods.

3.14 Changing Assumptions—An actuary's assumption with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experience. 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.

Section 4. Communications and Disclosures

4.1 Communications—Pension actuarial communications should contain the following disclosures:

4.1.1 Economic Assumptions—The actuary should describe each economic assumption used in the measurement, including whether the assumption represents an estimate of future experience, the actuary's observation of the estimates inherent in financial market data, or a combination thereof. Sufficient detail should be shown to assess the level and pattern of each assumption.

Depending on a particular measurement's circumstances, the actuary may give information about specific interrelationships among the assumptions (for example, investment return: 8% per year, net of investment expenses and including inflation at 3%). The description should also include a disclosure of any adjustment for adverse deviation made in accordance with section 3.5.1.

4.1.2 Rationale for Assumptions—The actuary should disclose the information and analysis used in selecting each non-prescribed economic assumption that has a significant effect on the measurement. The disclosure may be brief but should be

pertinent to the plan's circumstances. For example, the actuary may disclose any specific approaches used, sources of external advice, and how past experience and future expectations were considered. The disclosure may reference any actuarial experience report or study performed, including the date of the report or study.

4.1.3 Changes in Assumptions—The actuary should disclose any changes in the non-prescribed economic assumptions from those previously used for the same type of measurement. For assumptions that were not prescribed, the actuary should include an explanation of the information and analysis that led to those changes. The general effects of the changes should be disclosed in words or by numerical data, as appropriate. The disclosure may be brief but should be pertinent to the plan's circumstances. The disclosure may reference any actuarial experience report or study performed, including the date of the report or study.

4.1.4 Changes in Circumstances—The actuary should refer to ASOP No. 41 for communication and disclosure requirements regarding changes in circumstances known to the actuary that occur after the measurement date and that would affect economic assumptions selected as of the measurement date.

4.2 Additional Disclosures—The actuary should include the following, as applicable, in an actuarial communication:

a. the disclosure in ASOP No. 41, section 4.2, for any material prescribed assumption or method set by law, as defined in section 2.6;

b. the disclosure in ASOP No. 41, section 4.3 for any material prescribed assumption or method set by another party, as defined in section 2.5;

c. the disclosure in ASOP No. 41, section 4.3, if the actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and

b. the disclosure in ASOP No. 41, section 4.4, if, in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

Appendix 1

Background and Current Practices

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

Background

Economic assumptions have a significant effect on any pension obligation measurement. Small changes of 25 or 50 basis points in these assumptions can change the measurement by several percentage points or more. Assumptions such as compensation increases or cash balance crediting rates are often used to determine projected benefit streams for valuation purposes. The discount rate assumption, arguably the most critical economic assumption in determining a pension obligation, is used to determine the discounted present value of all benefit streams that are part of such obligation measurement.

Historically, actuaries have used various practices for selecting economic assumptions. For example, some actuaries have looked to surveys of economic assumptions used by other actuaries, some have relied on detailed research by experts, some have used highly sophisticated projection techniques, and many actuaries have used a combination of these.

The first decade of the 21st Century contained a significant amount of debate inside and outside the actuarial profession regarding the measurement of pension obligations. Much of the debate centered on the economic assumptions actuaries use to measure these obligations. The decade also saw the emergence of a financial economic viewpoint on pension obligations. Applying financial economic theory to the measurement of pension obligations has been controversial and has produced a significant amount of debate in the actuarial profession.

Current Practices

The actuary's discretion over economic assumptions has been curtailed in many situations. In the private single employer plan arena, the IRS, PBGC, and FASB have promulgated rulings that have limited or effectively removed an actuary's judgment regarding the discount rate used for current year funding or accounting. Actuaries can still set other economic assumptions, such as compensation increases, inflation or fixed income yields.

For plans other than private single employer plans (for example, church plans, multiemployer plans, public plans), the discount rate for current year funding requirements may or may not be prescribed by other entities. Funding valuations for these types of plans often use a discount rate related to the expected return on plan assets. In practice, this discount rate (return on asset) assumption may be set by the legislative body, plan sponsor, a governing board of trustees, or the actuary. The actuary may advise the plan sponsor about the selection of the discount rate.

As in the single-employer situation, the actuary may have discretion over other economic assumptions used to measure obligations for plans other than private single-employer plans. Alternatively, the actuary may be in an advisory position, helping the legislative body, plan sponsor, or governing board of trustees select the assumptions.

The focus on solvency in the private single employer plan arena has come along with prescribed economic assumptions that are linked to capital market indices. Actuaries practicing in this area are becoming accustomed to changing assumptions frequently. In non-prescribed situations, practice is still dependent upon the individual actuary. Many actuaries change assumptions infrequently while other actuaries reevaluate the assumptions as of each measurement date and change economic assumptions more frequently. In the public plan arena, many entities perform assumption reviews every few years and the reviews may or may not lead to assumption adjustments.

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

Appendix 2

Comments on the First Exposure Draft and Responses

The first exposure draft of this proposed revision of this ASOP, *Selection of Economic Assumptions for Measuring Pension Obligations*, was issued in January 2011 with a comment deadline of April 30, 2011. Twenty comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term "commentator" may refer to more than one person associated with a particular comment letter. The Pension Committee carefully considered all comments received, and the ASB reviewed (and modified, where appropriate) the proposed changes.

Summarized below are the significant issues and questions contained in the comment letters and the responses to each.

The term "reviewers" includes the Pension Committee and the ASB. Unless otherwise noted, the section numbers and titles used below refer to those in the first exposure draft.

GENERAL COMMENTS	
Comment	Two commentators suggested modifying the standard to indicate that the methods and assumptions an actuary uses would fall into two separate categories. One category would be characterized as market-consistent. The other category would be characterized as best estimate or budgetable.
Response	The reviewers believe the standard allows for this conceptual categorization but did not make any changes to formally adopt it. The reviewers note that the standard also provides for assumptions to be a combination of these two categories.
Comment	One commentator expressed concern regarding the disparate guidance provided by ASOP Nos. 6 and 27 with respect to the selection of economic assumptions for a retiree group benefit plan valuation. The commentator suggested the guidance in ASOP No. 6 pertaining to certain non-pension economic assumptions be moved to ASOP No. 27 and that ASOP No. 27 be renamed.
Response	The reviewers agreed that the guidance provided by ASOP No. 27 might differ in some respects from that provided by ASOP No. 6 due to the different types of plans being valued. They concluded that providing additional guidance within ASOP No. 6 instead of within ASOP No. 27 would be more helpful to users of the standards. The reviewers modified ASOP No. 27 to make it clear that, if there is a conflict between ASOP No. 6 and ASOP No. 27, then ASOP No. 6 would govern.
Comment	One commentator noted that the terms significant and material were used in the Exposure Draft without being defined. The commentator suggested these terms be defined.
Response	The Actuarial Standards Board is in the process of reviewing the Introduction to the Actuarial Standards of Practice. As part of this review, the Actuarial Standards Board will consider this comment.
Comment	One commentator opined that the ASOPs should not be written or interpreted in a manner that allows readers to presume that actuaries serve the "general public." This commentator felt that any ASOP that explicitly provides for or allows a presumption that actuaries perform work for the general public will expose actuaries to unwarranted and unmanageable risk.
Response	The reviewers note that the Code of Professional Conduct identifies the responsibilities that actuaries have to the public. The reviewers do not believe that the proposed ASOP No. 27 is inconsistent with those responsibilities.

Comment	One commentator opined that the ASOPs should not impinge upon the terms of the engagement between an actuary and a Principal. The commentator stated that actuarial work is highly regulated and felt that the ASOPs should not require the actuary to perform additional work that is outside the scope of the engagement, is not requested by the Principal, and for which the actuary is unlikely to be compensated.
Response	The reviewers recognize that our professional standards need to strike a balance between having mandates that promote appropriate actuarial practice and that avoid requiring work that may not be requested by Principals. The reviewers believe the proposed ASOP No. 27 is suitably balanced.
Comment	One commentator suggested that the term "liability" should only be used when market-consistent assumptions are used for the measurement. The commentator suggested that if "best estimate" assumptions are used for the calculation, the term "actuarial present value" should be used and the term "liability" should be avoided.
Response	While the reviewers agreed that the use of the term "liability" has created confusion regarding actuarial work products, the reviewers believe that certain terminology in the actuarial community is ingrained and that the restriction of the use of certain terms is impractical.
Comment	One commentator suggested that if "best estimate" assumptions are used for the calculation the economic risk implications of that calculation should be disclosed.
Response	A potential new Actuarial Standard of Practice regarding pension risk disclosures and measurements is in the process of being drafted.
Comment	One commentator suggested that the current title of the ASOP may be inappropriately limiting. The commentator suggested renaming the ASOP to better reflect the broader circumstances to which it applies.
Response	The reviewers disagreed that the title of ASOP No. 27 is inappropriately limiting.
Comment	One commentator suggested that the standard be adjusted to cover economic assumptions for both pension and retiree group benefit valuations, with an accompanying change in title.
Response	The reviewers acknowledge that there are advantages and disadvantages associated with combining guidance into one standard, but at this time believe that providing guidance in separate standards is reasonable.
Comment	One commentator questioned the purpose of having the standard indicate that the actuary "may" do something without providing guidance as to when the actuary may or may not do it.
Response	ASOPs are intended to provide actuaries with a framework for performing professional assignments and to offer guidance on relevant issues, recommended practices, documentation, and disclosure. However, the ASOPs are not intended to be narrowly prescriptive. Therefore, the reviewers believe that the use of the word "may" without providing more prescriptive guidance conforms with the purpose of the ASOPs.
TRANSMITTAL MEMORANDUM	
Question 1: Is the language in section 3.1 of ASOP No. 27, indicating that assumptions can be based either on the actuary's estimate of future experience or on the actuary's observation of the estimates inherent in financial market data, clear? Do you agree that either approach produces a reasonable assumption? If not, what change do you suggest?	
Comment	Most commentators agreed that the proposed language was clear and that either approach produces a reasonable assumption. One commentator suggested that the second paragraph of section 3.1 should be deleted from the ASOP and instead added to a practice note because it is primarily educational. One commentator suggested that the ASOP should clarify that the reasonable assumption standard is not a single-point best estimate standard, and that two different assumptions may both be considered reasonable. One commentator suggested that the ASOP should clarify that a reasonable assumption for some measurements may be based a combination of the two approaches, and that section 3.1 be modified to specifically permit the adjustment of an assumption based on market observations for other factors in the financial market data that should not be included as part of the assumption. One

	commentator suggested that the practice of setting assumptions based on estimates inherent in financial market data is limited to discount rate and inflation assumptions, and therefore would be more appropriately discussed in those sections of the ASOP rather than the overview. One commentator suggested that the approach of basing assumptions on the observation of estimates inherent in financial market data is inconsistent with U.S. pension law, and if the dual approach is retained, that the ASOP elaborate on limitations of using this approach. Another commentator also suggested that this approach is much less well understood than basing the assumptions based on the actuary's estimate of future experience, and that the standard should provide examples of the specific assumptions for which the financial market data approach is appropriate.
Response	The reviewers generally agreed with the comments regarding the second paragraph of section 3.1 and have redrafted section 3.6 of the second exposure draft to reflect many of the above comments.
Question 2: Section 3 clarifies that there is no explicit link between an investment return assumption and discount rate. Does this create challenges for any existing actuarial processes? If so, please provide a description of the actuarial practice and how the new standard creates a problem. Is the removal of the material in section 3.6.2 of the current standard, which addresses the building-block method and the cash flow matching method, appropriate? Are the examples in section 3.7 of ASOP No. 27 sufficient to communicate the various purposes for which actuaries may need to choose a discount rate?	
Comment	Most commentators did not suggest any challenges for existing actuarial processes. One commentator did not agree with the concept of eliminating the link, and suggested that the link be maintained but with additional clarification that the link depends on the context. Another commentator stated that asserting that no explicit link exists between an investment return assumption and a discount rate assumption overstates the degree of separation between the two, and may create challenges for some actuarial practices outside the single-employer corporate plan sponsors. Several commentators agreed that removal of the material in section 3.6.2 was appropriate provided that it is subsequently addressed in a practice note. One commentator suggested that the material in section 3.6.2 could be removed if subsequently included in a practice note, but stated that the information is important and relevant to actuaries and other users of the ASOPs, and recommended that the language not be removed until the practice note is published. One commentator stated that the building block approach remains applicable and should not be removed. One commentator suggested specific modifications to section 3.7 to further clarify that the discount rate examples either anticipate investment earnings or reflect current market measurements. One commentator stated that additional examples of the different purposes would be helpful.
Response	The reviewers made no changes to the proposed standard as a result of the comments. The reviewers believe that the proposed standard allows current practice to continue and provides room for new practices to evolve.
Question 3: Do you agree that a reasonability standard is an appropriate way to set economic assumptions? If not, why not?	
Comment	Most commentators agreed that a reasonability standard is appropriate. One commentator expressed concern that the standard as written is circular and does not provide sufficient specificity to allow an actuary to know in advance whether the selected assumption is reasonable or not. Another commentator expressed concern that elimination of the best-estimate range concept may cause "actuary-shopping" among plan sponsors, and may have the effect that the actuary's assumptions would be more likely to be challenged and more difficult to defend. One commentator expressed concern that the reasonability standard conflicts with the best-estimate range approach contemplated by statute for Internal Revenue Code and ERISA purposes, and suggested that the proposed framework for setting assumptions will require an actuary to caveat the choice of an assumption on the conservative end of the "best estimate" range methodology, and suggested that the revision may result in a compliance nightmare that would outweigh the benefits of the revision. One commentator expressed concerns about including the criteria of not anticipating significant cumulative gains or losses to be produced over the measurement period in the reasonableness standard, and suggested that the definition be expanded to a separate section discussing the various factors that might be considered.
Response	After consideration of these and other comments received, the reviewers redrafted the language on

	reasonable assumptions. The proposed standard retains reasonability, but does not define a reasonable assumption in terms of actuarial gains and losses. The reviewers do not see the standard as circular, nor do they feel the need to provide specificity as to what significant or time period means. The standard relies on the actuary's professional judgment to make these determinations. The reviewers are not concerned with any disparity between how the IRS sets its assumptions and the reasonability standard, given the exemptions for use of prescribed assumptions.
Question 4: Do you agree that the guidance on arithmetic and geometric returns is appropriate? Should the consequences of the use of geometric or arithmetic returns be disclosed?	
Comment	While some commentators agreed that the guidance is appropriate, opinions on this topic vary widely. Several commentators stated a belief that either approach may be reasonable depending on the purpose of the measurement. One commentator stated that the language as written gives greater credence to the geometric average, and suggested that the language be reworded to portray both types of return as equally reasonable. Another commentator also suggested further emphasis that the arithmetic return continues to be reasonable and allowable. Several other commentators stated that all economic assumptions should be geometric and that arithmetic averages have no merit, that an actuary using arithmetic averages should disclose the fact and also disclose the equivalent geometric average, and that the standard should be clarified to explicitly state when the use of arithmetic averages is appropriate. One commentator requested further clarification on the appropriate investment horizon to consider when setting this assumption. One commentator did not support disclosure of the consequences of the use of geometric or arithmetic returns because there is no compelling reason for this particular choice to be singled out for additional disclosure that is not required of other assumption decisions.
Response	The second exposure draft does not promote forward looking expected geometric returns or forward looking expected arithmetic returns, but allows for either. The reviewers believe that further educational efforts are needed in this area and have included an appendix on this topic. The reviewers agreed with the commentator who pointed out that the forward looking expected geometric return depends on time horizon (ties to the concept of "variance drain") but believe that further clarification of the appropriate investment horizon to consider is beyond the scope of this standard. The reviewers encourage additional study and education on this issue.
Question 5: Do you agree the guidance in section 3.6.3(d) regarding active investment management is appropriate?	
Comment	Most commentators agreed that this guidance was appropriate. One commentator suggested that this section be removed as it is educational and adds nothing worthwhile to the ASOP that is not already obvious to most actuaries. One commentator suggested clarifying language for this section.
Response	The reviewers agreed with the clarifying language suggested, and the section has been modified accordingly.
Question 6: Is the guidance in section 3.15.6 on the use of expert advice clear and sufficient?	
Comment	Most commentators agreed that this guidance was clear and sufficient. One commentator suggested the language be broadened by substituting the phrase "expert views" for "expert advice" to reflect the fact that information can be obtained from experts without specifically obtaining their advice. Another commentator recommended changing the title of this section to "Reliance on Other Experts" to acknowledge that the actuary may rely on information that is not restricted to advice, and suggested that investment advisors, other actuaries and economists be added to the current list of possible experts. One commentator suggested that this section is educational and should be removed. One commentator expressed concern that the guidance may imply that the selection and advice is only being endorsed by the actuary rather than the actuary doing the selecting and advising.
Response	The reviewers agreed with the suggestion to broaden the language from advice to views, and the second exposure draft has been revised accordingly

Question 7: Do you agree that it may be appropriate for the actuary to include conservatism in his or her assumptions? Are the disclosure requirements for a conservative assumption sufficient?	
Comment	Most commentators agreed that conservatism may be appropriate provided it is disclosed. One commentator suggested that a wider ranging discussion of risks should also be required. One commentator suggested that some sensitivity analysis also be required to indicate the impact of the conservatism on the results. One commentator expressed concern that an adjustment for conservatism may not be reasonable because risk may not be perceived similarly by all interested parties, and that such an adjustment might conflict with the reasonableness concept. One commentator suggested that the standard should be drafted to incorporate a requirement that an element of conservatism or optimism must be within the range of reasonability.
Response	The reviewers agreed with the comment that risk may not be perceived similarly by all interested parties. The phrase "conservatism" has been changed to "adverse deviation" in the second exposure draft. While this change does not eliminate the concern about risk perception, the reviewers believe the new phrase better describes the intent of the language.
Question 8: Do you agree it is appropriate to require the actuary to provide rationale for assumptions or changes in assumptions? If so, do you agree that the proposed changes represent the appropriate approach?	
Comment	Several commentators agreed that requiring the actuary to provide rationale for assumptions and changes in assumptions is appropriate, and that the proposed changes represent an appropriate approach. One commentator that agreed with the proposed approach also suggested clarifying this section to specifically allow actuaries to reference prior communications to comply with these requirements. Other commentators oppose this additional disclosure and believe the requirement would add a significant burden on the profession. Concerns expressed include increased compliance and litigation risk, possible interference with contractual arrangements with the principal that prohibit disclosure of confidential information, and substantial additional work not requested by the principal and therefore for which the actuary may not be compensated. One commentator opposing the additional disclosures suggested that this type of disclosure is in the realm of ASOP No. 41, that the costs associated with the required disclosures should be considered relative to the cost of the underlying assignment, and that the detail required in a disclosure should be tempered by the needs of the principal or user and the nature of the assignment. Another commentator suggested that disclosures about rationale should be limited to assumption changes.
Response	The reviewers believe that, in spite of the possible drawbacks of requiring disclosure of assumption rationale, the proposed language will lead to a more thorough actuarial assumption setting process. The proposed language in the second exposure draft has been changed to indicate the rationale can be brief and the actuary can reference a previously published work product. The reviewers note that precept 9 of the *Code of Professional Conduct* states that the actuary should not disclose confidential information and this standard should not be interpreted to invalidate the *Code of Professional Conduct*. The standard does not require disclosure of confidential information.
SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.1, Purpose	
Comment	One commentator expressed support for the exposure draft's removal of paragraph 1.1(c) from this section of the current ASOP.
Response	The reviewers agreed and removed the paragraph.
Section 1.2, Scope	
Comment	One commentator expressed concern that ASOP No. 27 defers to ASOP No.4 if conflicts arise between the ASOPs.
Response	ASOP No. 4 is the umbrella standard for all pension measurements including cost and contribution determinations, and the reviewers believe it should govern in the event of a possible conflict between the two standards.

Comment	One commentator suggested that the language be modified to indicate that a plan sponsor may be ultimately responsible for selecting the assumptions, within the constraints imposed by relevant accounting standards or statutory requirements.
Response	The reviewers believe the language in the exposure draft regarding prescribed assumptions in the exposure draft is clear and sufficient and did not make any changes.
Section 1.4, Effective Date	
Comment	Several commentators suggested that the standard be effective for actuarial valuations based upon a measurement date as opposed to the production date of the actuarial valuation. One commentator suggested that the effective date of the standard be structured so that it would not require the actuary to use a different standard to establish the economic assumptions during a plan year.
Response	The reviewers agreed with these comments and changed the effective date to apply to the plan's measurement date.
SECTION 2. DEFINITIONS	
Section 2.4, Merit Scale	
Comment	Several commentators opined that the term "scale" was out of date. One commentator suggested the phrase to be changed to "Merit Increase Assumption."
Response	The reviewers agreed with the concerns and, taking into account the use of the phrase in the standard, changed the phrase to Merit Adjustments.
Section 2.5, Prescribed Assumption	
Comment	One commentator suggested that the standard clarify that a prescribed assumption is a specific assumption that is mandated or selected by a principal.
Response	The reviewers believe that the current definition was adequate and retained it.
Section 2.6, Productivity Growth	
Comment	One commentator pointed out that the standard references productivity growth and productivity increases and wondered if there were two different concepts.
Response	The reviewers made changes in section 3 to consistently address productivity growth. No changes were made to the definition in section 2.
Section 2.7, Real Return	
Comment	Commentators noted that this section was obsolete.
Response	The reviewers agreed and removed it from the standard.
Section 2.8, Real Risk-Free Return	
Comment	Commentators noted that this section was obsolete.
Response	The reviewers agreed and removed it from the standard.
Section 2.9, Risk Premium	
Comment	Commentators noted that this section was obsolete.
Response	The reviewers agreed and removed it from the standard.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Overview	
Comment	Several commentators suggested language changes to this section.
Response	The reviewers deleted the second paragraph and moved the guidance contained therein to the body of the standard.

Section 3.2, Identifying Types of Economic Assumptions	
Comment	One commentator suggested that the term "compensation scale" be changed to "compensation increase assumption."
Response	While the reviewers agreed and made wording changes, the reviewers note that section 3.2 has been completely rewritten.
Comment	One commentator suggested that the "rate of payroll growth" be listed as a separate economic assumption in this section.
Response	The reviewers agreed and added section 3.11.3 in this second exposure draft.
Section 3.3, General Considerations	
Comment	One commentator suggested that section 3.3(d) and the concluding paragraph of section 3.3 be moved to section 3.4, General Selection Process.
Response	The General Selection Process section has been rewritten.
Comment	One commentator requested clarification of what constituted "appropriate" recent and long-term historical economic data.
Response	The reviewers note that an actuary should use professional judgment in determining what recent and long-term historical data is appropriate given the circumstances of the situation.
Section 3.4, General Selection Process	
Comment	One commentator suggested some rewording to this section.
Response	The reviewers agreed, and this section has been rewritten.
Section 3.5, Selecting an Inflation Assumption	
Comment	One commentator suggested that this section differentiate between the process of selecting a market-consistent inflation assumption and a best estimate inflation assumption.
Response	The reviewers note that significant parts of section 3 have been rewritten. The reviewers believe the proposed language in section 3.6.1 of the second exposure draft provides the actuary with sufficient guidance on estimates and market observations without being overly prescriptive.
Comment	One commentator suggested that section 3.5 was educational and that it should be removed. The commentator believed that the principles of section 3.4 applied.
Response	The reviewers believe that the guidance in this section is not merely educational and have retained the section.
Section 3.5.2, Select and Ultimate Inflation Rates	
Comment	One commentator suggested that this section be clarified to indicate that an actuary may choose a single inflation rate or select and ultimate inflation rates.
Response	The reviewers believe that the existing wording is clear in this regard and made no changes.
Comment	One commentator questioned whether the inclusion of this section indicated a preference of the ASB for an actuary to use select and ultimate inflation rates.
Response	The reviewers believe that the current wording of the section does not convey a preference.
Section 3.6, Selecting an Investment Return Assumption	
Comment	One commentator questioned why there was a list of considerations in this section when section 3.6.3, Considerations, already has a list of considerations.
Response	The reviewers agreed with this comment and changed the wording in this section.

Comment	One commentator indicated that the investment return assumption should correspond to a time horizon and that the standard is silent in this regard. The commentator noted that the standard discusses a measurement period that may or may not be a time horizon over which an investment assumption is or should be made. The commentator suggested replacing measurement period with time horizon.
Response	The reviewers disagreed with the suggestion to replace the phrase "measurement period." The reviewers note that assumptions need to apply for the entire measurement period. Section 2.4 of the proposed standard defines the measurement period as the period subsequent to the measurement date during which a particular economic assumption will apply in a given measurement
Comment	One commentator suggested that the section be clarified to indicate that anticipated returns on future assets be considered only if appropriate for the purpose of the measurement.
Response	The reviewers agreed and revised the language accordingly.
Section 3.6.1, Data	
Comment	One commentator suggested that the last sentence of this section relating to the development of investment return ranges using stochastic simulation models is now obsolete since the notion of "ranges" has been removed from the standard.
Response	The reviewers disagreed with the commentator's interpretation of the standard's language. While the notion of a best estimate range has been removed from the standard, under the proposed standard an actuary may choose a reasonable investment return assumption from a range of alternatives. The use of stochastic simulation models may still be used by an actuary to assist in determining this reasonable range. However, to avoid confusion, the term "range" has been deleted from the last paragraph of this section.
Section 3.6.3, Considerations	
Comment	Many commentators indicated that the wording in section 3.6.3(j), Arithmetic versus Geometric Return, needed clarification. Many commentators indicated a strong preference for a geometric return assumption and saw no place for an arithmetic return assumption. Other commentators suggested that either type of assumption was reasonable depending on the purpose of the measurement, but thought that the current wording could be construed as indicating preference of one type over the other. One commentator suggested that the standard indicate what the preferred time horizon should be if the actuary selects a geometric return assumption.
Response	The reviewers have changed the language in this section and have added appendix 3. The reviewers believe that the current wording of the section does not convey a preference.
Comment	One commentator indicated that the wording in section 3.6.3(d), Investment Manager Performance, was educational and should be removed.
Response	The reviewers disagreed. The language is retained in the proposed standard.
Comment	Two commentators suggested that administrative expenses be added to section 3.6.3(e), Investment Expenses. One commentator suggested that the standard make clear that explicit recognition of these expenses would be also permitted.
Response	The reviewers agreed and changed the language accordingly.

Comment	One commentator stated that an asset's value is its market value and describing a value as depressed is not economically valid. The commentator stated that the fact that assets may have to be sold at depressed values due to illiquid markets should not be a consideration in selecting the investment return assumption.
Response	The reviewers understand the commentator's view that an asset's value is its market value and that describing a value as depressed is purely subjective. However, the reviewers believe that volatility is an important consideration for setting an investment return assumption. The actuary may wish to include a margin for adverse deviation and volatile investments may require more adverse deviation than less volatile investments.
Comment	One commentator suggested that the removal of the best estimate range and the fact that actuaries can rely on the advice of investment professionals in the determining the investment return assumption may make the assumption more difficult to defend.
Response	The reviewers disagreed. While the actuary may consider the advice of investment professionals in selecting an investment return assumption, the actuary must still meet the requirements of the standard for selecting the assumption.
Comment	One commentator suggested that this section include only considerations relating to the actuary's unbiased estimate of the investment return assumption. Any conservatism that the actuary may consider incorporating should be covered under section 3.15 of the standard.
Response	The reviewers agreed with this comment and have addressed this issue in 3.6 (e) of the second exposure draft.
Comment	One commentator suggested that section 3.6.3(b), Reinvestment Risk, be renamed Expectations for Reinvestment. One commentator suggested that this section be deleted as it currently stands or, if not deleted, be reworded to include a more detailed discussion of the issues involved.
Response	The reviewers agreed that the title of this section should be changed and have changed it to "Effect of Reinvestment." The reviewers disagreed with the suggestion to delete or rewrite the section.
Comment	One commentator suggested wording changes to section 3.6.3(d), Investment Manager Performance.
Response	The reviewers believe the section is sufficient as drafted and made no changes.
Section 3.6.4, Multiple Investment Return Rates	
Comment	One commentator suggested that this section be reworded to indicate that different investment return rates may be used for separates pools of assets and that any reference to obligations be removed.
Response	The reviewers agreed with this comment and made appropriate changes.
Section 3.6.5, Form of Benefit	
Comment	Two commentators questioned whether this language was appropriate in a section covering the considerations for an investment return assumption. The commentators suggested that references to investment return in this section be changed to discount rate and that the language be moved.
Response	The reviewers agreed that the guidance in Section 3.6.5 of the exposure draft was better placed elsewhere in the standard. The reviewers believe the guidance in section 3.9 and 3.11 of the second exposure draft provides guidance for the topics contained in Section 3.6.5 of the exposure draft.
Section 3.7, Selecting a Discount Rate	
Comment	One commentator felt the standard should state that anticipated investment return should be used to determine pension expense for state and local governmental retirement plans. Another commentator felt the standard should state that the discount rate for determining the present value of a payment stream that has a cash flow matched by a portfolio of assets should be the explicit return on those assets.
Response	The reviewers believe the actuary should have the discretion to determine the discount rate appropriate for the purpose of the measurement and made no change.

Comment	Some commentators felt that actuaries who prepare pension "liabilities" should do so using only the "observed" market-place discount rates.
Response	The reviewers discuss the challenges with the word "liability" in the transmittal memo to the exposure draft of ASOP No. 4 that was published concurrent with this exposure draft. The reviewers appreciate the comment but have not made any changes in the exposure draft as a result.
Comment	One commentator suggested that the standard identify two main purposes driving the selection of a discount rate. One purpose is to anticipate investment earnings and the other purpose is to reflect market conditions.
Response	The reviewers believe the Actuarial Present Value Type language in the exposure draft of ASOP No. 4 published concurrently with this exposure draft addresses this comment.
Comment	Some commentators accentuated the connection between the purpose of the measurement and the selection of the discount rate.
Response	The reviewers agreed and believe the exposure draft makes this point sufficiently.
Comment	One commentator suggested that the standard should require the actuary to use a discount rate equal to rates implicit in the annuity market when that actuary is doing a settlement or defeasance measurement.
Response	The reviewers believe the language in the exposure draft indicates it would be reasonable for an actuary to use the discount rate suggested by the commentator in settlement or defeasance measurements, but the reviewers believe the language leaves appropriate room for the actuary to use judgment in the measurement, and made no change.
Comment	One commentator felt that "prices for obligations with similar characteristics in financial markets" do not exist (section 3.7(d) of the first exposure draft).
Response	The reviewers acknowledge that transparent market prices for exact or very close replicas of pension obligations do not exist. The reviewers believe that marketplace annuities or debt instruments are sufficiently similar to pension obligations and have sufficiently transparent prices that the actuary can follow the guidance in the exposure draft, and made no change.
Comment	One commentator suggested that the standard include more guidance on scenarios where non-market discount rates would be appropriate.
Response	The reviewers believe that more guidance in this area is provided in the exposure draft of ASOP No. 4 that was published concurrently with this second exposure draft.
Comment	One commentator suggested the standard outline two groups of assumptions. One group consists of market-consistent assumptions and the other group consists of budgeting assumptions used for funding purposes.
Response	The reviewers believe that there are many purposes of a measurement. Depending upon the purpose of a measurement, the second exposure draft provides for reasonable assumptions to be based upon the actuary's estimate of future experience, on the actuary's observation of the estimates inherent in financial market data, or on a combination of the two.

Comment	One commentator pointed out that the actuary who wants to develop a market discount rate will need guidance on the following items: ▪ How to set discount rates when there is no deep and liquid market in securities whose cash flows match the cash flows of the liabilities; ▪ Whether perceived anomalies in the markets justify a departure from using the discount rates implicit in marketable securities; ▪ How to extend a yield curve to time periods where no securities are being traded; ▪ Whether swaps, Treasury bonds, or some other securities are most appropriate for setting a yield curve; and ▪ How to value embedded options.
Response	The reviewers believe this information is educational and is better handled outside of the standard.
Section 3.8, Selecting a Compensation Scale	
Comment	Two commentators suggested language changes to this section.
Response	The reviewers believe that the existing language was appropriate and clear.
Comment	One commentator suggested that the merit and seniority component of the compensation increase assumption has more in common with a demographic assumption as opposed to an economic assumption and therefore this portion of the compensation increase assumption should be covered under ASOP No. 35.
Response	The reviewers acknowledge that the compensation increase assumption does have both demographic and economic assumption characteristics. However, the reviewers believe that keeping the assumption in ASOP No. 27 is reasonable and made no changes.
Section 3.8.2, Measurement-Specific Factors	
Comment	One commentator suggested section 3.8.2(d), Compensation Volatility, use the term "might" rather than "may." The commentator felt "might" better conveys the idea that this is one possible option among many, rather than a preferred or prescribed approach.
Response	The reviewers note that the use of "may" in ASOPs is consistently meant to imply a choice and does not indicate a preference. Therefore, no change was made.
Comment	One commentator questioned whether section 3.8.2(e), Expected Plan Termination, should be expanded to cover situations where a plan is frozen.
Response	The reviewers agreed and expanded the language to cover situations where a plan is expected to be frozen.
Section 3.8.3, Multiple Compensation Scales	
Comment	One commentator suggested that this section be clarified to indicate the use of a single compensation scale is acceptable.
Response	The reviewers believe that the existing language with respect to single and multiple compensation scales is adequate.
Comment	One commentator suggested the inclusion of a subsection d that covers "salary spiking."
Response	The reviewers agreed with the salary spiking comment and changed language to reflect possible increases in compensation late in a participant's career.
Section 3.9, Selecting Other Economic Assumptions	
Comment	One commentator suggested that this section is educational and should be deleted.
Response	The reviewers disagreed and made no change.

Section 3.9.2, Cost-of-Living Adjustments	
Comment	One commentator suggested minor language changes to this section.
Response	The reviewers believe that the existing language is clear and made no changes.
Section 3.9.3, Growth of Individual Account Balances	
Comment	One commentator suggested including language that discusses optionality (greater of two or more credit rates) and the complex valuation issue for floor-offset plans.
Response	Guidance in this area is provided in the exposure draft of ASOP No. 4 that was published concurrently with this second exposure draft.
Section 3.11, Consistency among Economic Assumptions Selected by the Actuary	
Comment	Two commentators suggested including language that discusses the consistency among components of the actuary's economic assumptions other than the inflation assumption. A few commentators also suggested some other minor language changes.
Response	The reviewers agreed and made appropriate changes.
Section 3.15.1, Conservatism	
Comment	One commentator wondered whether conservatism should apply to market-consistent measurements.
Response	The reviewers note that for some measurement purposes, like measuring a settlement present value, the actuary may want to include a provision for adverse deviation in a market-consistent measurement.
Comment	One commentator suggested that section 3.6.3 be expanded to include risk-related adjustments and that conservatism be included in that section.
Response	The reviewers changed the title, Conservatism, to Adverse Deviation but believe that adverse deviation is a consideration applicable to all economic assumptions and therefore did not change the placement of this language.
Comment	One commentator suggested that, if conservatism is used, some sensitivity analysis should be disclosed indicating the impact of the conservatism on the results.
Response	The reviewers note that section 4.1.1 of the exposure draft was changed to require the actuary to disclose any provision for adverse deviation.
Comment	One commentator suggested that the reasonability standard was broad enough and that an additional level of conservatism was not appropriate.
Response	The reviewers disagreed and made no change.
Comment	One commentator suggested including language in this section to indicate that, unless an actuary discloses that conservatism was used in the selection of an assumption, it would be understood that no conservatism was used in the selection of such assumption.
Response	The reviewers disagreed and made no change.
Comment	One commentator endorsed the use of conservatism in the selection of assumptions but viewed the Exposure Draft as biased towards selecting aggressive or optimistic assumptions.
Response	The reviewers disagreed and made no change.
Section 3.15.3, Cost Effectiveness	
Comment	One commentator suggested changing the guidance in this section from "should" to "may" since an end user could ask for work that is not cost effective.
Response	The reviewers do not believe that current language precludes the actuary from fulfilling end user requests for work of this nature. The language directs the actuary to balance refined assumptions with cost effectiveness.

Section 3.15.4, Rounding	
Comment	One commentator suggested including language to make it clear that the rounded assumption should meet the reasonability standard.
Response	The reviewers have redrafted the language regarding reasonability and believe this issue is addressed appropriately in the second exposure draft.
Section 3.15.5, Subsequent Events	
Comment	Two commentators suggested deleting the phrase "that is unique to a plan or plan sponsor" from this section.
Response	The reviewers agreed and deleted "that is unique to a plan or plan sponsor" from this section.
Comment	One commentator suggested adding language to make it clear that subsequent events should not be recognized if it would result in a violation of the law. In addition, the same commentator suggested adding language that makes it clear that an actuary is not required to disclose a subsequent event if it would violate proprietary or confidential information.
Response	The reviewers believe that the existing language in this ASOP and ASOP No. 41 is sufficiently clear on this point. The reviewers also note that precept 9 of the Code of Professional Conduct addresses the actuary's responsibility regarding confidential information.
Section 3.15.6, Advice of Experts	
Comment	One commentator thought this section is educational and should be removed.
Response	The reviewers disagreed and made no change.
Comment	One commentator suggested substituting the phrase "expert views" for "expert advice." One commentator suggested changing the title to "Reliance on Other Experts." In addition, the commentator suggested additions to the list of experts.
Response	The reviewers agreed and changed the title of this section to "Views of Experts." The reviewers believe the sample list of professionals does not need to be lengthened and that the phrase "other professionals" provides flexibility.
Comment	One commentator suggested rewording the section to make it clear that the actuary is doing the selecting of and advising on the assumptions, and not just endorsing others.
Response	The reviewers believe the existing language in this ASOP, ASOP No. 4 and ASOP No. 41 make it clear that the actuary is still responsible for following standards when assumptions are selected by the actuary or by another party, and made no change.
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.1.1, Economic Assumptions	
Comment	One commentator suggested that the standard state clearly that there may be some measurements for which a reasonable assumption would be based on a combination of estimates and observations and that section 4.1.1 on disclosures should be modified accordingly.
Response	The reviewers agreed and made changes accordingly.

Section 4.1.2, Rationale for Assumptions; Section 4.1.3, Changes in Assumptions	
Comment	The language below is repeated from the discussion of Question 8 of the transmittal memo. Several commentators agreed that requiring the actuary to provide rationale for assumptions and changes in assumptions is appropriate, and that the proposed changes represent an appropriate approach. One commentator that agreed with the proposed approach also suggested clarifying this section to specifically allow actuaries to reference prior communications to comply with these requirements. Other commentators oppose this additional disclosure and believe the requirement would add a significant burden on the profession. Concerns expressed include increased compliance and litigation risk, possible interference with contractual arrangements with the principal that prohibit disclosure of confidential information, and substantial additional work not requested by the principal and therefore for which the actuary may not be compensated. One commentator opposing the additional disclosures suggested that this type of disclosure is in the realm of ASOP No. 41, that the costs associated with the required disclosures should be considered relative to the cost of the underlying assignment, and that the detail required in a disclosure should be tempered by the needs of the principal or user and the nature of the assignment. Another commentator suggested that disclosures about rationale should be limited to assumption changes.
Response	The reviewers believe that, in spite of the possible drawbacks of requiring disclosure of assumption rationale, the proposed language will lead to a more thorough actuarial assumption setting process. The proposed language in the second exposure draft has been changed to indicate the rationale can be brief and the actuary can reference a previously published work product. The reviewers note that precept 9 of the Code of Professional Conduct states that the actuary should not disclose confidential information and this standard should not be interpreted to invalidate the Code of Professional Conduct. The standard does not require disclosure of confidential information.
Section 4.1.4, Changes in Circumstances	
Comment	Some commentators felt this language was inappropriate and should be deleted. Some commentators noted that this issue was already handled by ASOP No. 41.
Response	The reviewers agreed and changed the language to direct the actuary's attention to ASOP No. 41.
Section 4.2, Prescribed Assumption(s)	
Comment	One commentator suggested that the language be coordinated with guidance in ASOP No. 41.
Response	The reviewers changed the language to be consistent with the proposed revision of ASOP No. 4.

Appendix 3

Arithmetic and Geometric Returns

A. Introduction

One of the most important assumptions an actuary uses in measuring pension obligations is the discount rate. As part of the Exposure Draft of ASOP No. 27 issued in January 2011, the following question was included in the Transmittal Memorandum:

> "4. Do you agree that the guidance on arithmetic and geometric returns is appropriate? Should the consequences of the use of geometric or arithmetic returns be disclosed?"

Given the wide range of responses received to the above question, the Pension Committee of the Actuarial Standards Board determined that the inclusion of some educational material regarding arithmetic and geometric returns in ASOP No. 27 would be beneficial. The following material is not meant to be an exhaustive discussion of the matter. It is meant to give the actuary some direction as to the considerations that may be employed in determining whether the use of arithmetic or geometric returns is more appropriate in the selection of a discount rate. In many circumstances, as with the selection of other assumptions, the purpose of the measurement is one of the most important determinants.

The use of a *forward looking expected geometric return* as a discount rate will produce a present value that generally converges to the median present value as the time horizon lengthens (i.e., if the actuary determines a funding obligation using the *forward looking expected geometric return* to discount the obligation to produce a present value, it is expected that in the limiting case there will be enough money to fund the obligation 50% of the time). The use of a *forward looking expected arithmetic return* as a discount rate will generally produce a *mean* present value (i.e., there will be no expected actuarial gains and/or losses).

This appendix should not be construed as endorsing plan asset based present value measurements (i.e., traditional actuarial measurements) over non-plan asset based present value measurements (i.e., market consistent measurements).

B. Looking Back Versus Looking Forward

The discount rate used in the measurement of a pension obligation is a forward-looking assumption. For a plan asset based present value measurement, while the actuary may use some historical results in establishing expectations regarding the future, the discount rate is an expectation of events to come, not events that have already occurred. For a non-plan asset based present value calculation, the discount rate is a version of a yield curve as of the measurement date, not of a version of a yield curve that existed in the past.

One of the more confusing aspects of the debate regarding arithmetic and geometric returns is:

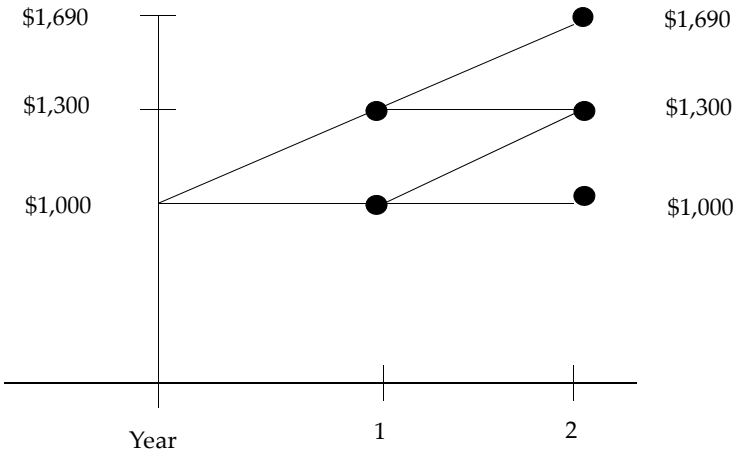
(a) determining if we are talking about using historical results to establish forward looking (i.e., future) expectations, or

(b) determining if we are talking about whether a *forward looking expected geometric return* or *forward looking expected arithmetic return* is a more appropriate discount rate

Note that a *forward looking expected geometric return* is not synonymous with compounding. That is, both a *forward looking expected geometric return* and a *forward looking expected arithmetic return* would be used in a compounding nature.

C. An Example

The following example illustrates the use of a *forward looking expected arithmetic return* to produce a *mean* present value. Assume that an asset class is expected to have a 50% probability of earning a return of 30% and a 50% probability of earning a return of 0% for each of the next two years and that these returns are the only possible outcomes. (The *forward looking expected arithmetic return* in this example would be 15%.) The chart below illustrates the totality of possible investment results for an initial $1,000 investment placed in this asset class:



The expected ending wealth values and a derivation of the *forward looking expected geometric return* is presented below:

Ending Wealth				Rate of Return			
$1,690	x 1/4	=	$ 422.50	$\left[\left(\frac{\$1,690}{\$1,000}\right)^{½} - 1\right]$	x 1/4	=	7.50%
$1,300	x 2/4	=	$ 650.00	$\left[\left(\frac{\$1,300}{\$1,000}\right)^{½} - 1\right]$	x 1/2	=	7.01%
$1,000	x 1/4	=	$ 250.00	$\left[\left(\frac{\$1,000}{\$1,000}\right)^{½} - 1\right]$	x 1/4	=	0.00%
Expected Value =	$1,322.50						14.51%

The *forward looking expected geometric return* in this example is 14.51%. The question then becomes what discount rate would take the expected value of $1,322.50 at the end of year 2 and produce a present value of $1,000? The answer is shown below:

$$\text{Mean PV Rate of Return} = \left[\left(\frac{\$1,322.50}{\$1,000.00}\right)^{½} - 1\right] = 15\%$$

which is the *forward looking expected arithmetic return*. Note however in this simple example, that if the actuary funded an obligation that is expected to be $1,322.50 at the end of year two with a one-time payment of $1,000 at the beginning of year 0, there would be insufficient funds at the end of year 2 three-quarters of the time.

D. Capital Market Assumptions from Investment Consultants

In many instances, the actuary will receive capital market assumptions from an investment consultant that the actuary will then use to determine the *forward looking expected arithmetic return* and/or the *forward looking expected geometric return.* The capital market assumptions can be broadly classified into the following categories:

(a) expected returns by asset class;

(b) standard deviations by asset class; and

(c) correlation coefficients between asset classes.

With respect to expected returns by asset class, some investment consultants will provide *forward looking expected arithmetic returns*, some will provide *forward looking expected geometric returns* and some will provide both. It is important to understand what was received from the investment consultant as well as the future time horizon to which the expectations apply.

In general, a *forward looking expected geometric return* for an asset class can be approximated by taking the *forward looking expected arithmetic return* and subtracting one-half of the variance of the asset class[1].

If the actuary is trying to determine the *forward looking expected arithmetic return* for an entire portfolio from individual asset classes, this can be accomplished by taking the appropriate weightings from the individual asset classes' *forward looking expected arithmetic returns.* However, if the actuary is trying to determine the *forward looking expected geometric return* for an entire portfolio from individual asset classes, this cannot be accomplished by taking the appropriate weightings from the individual asset classes' *forward looking expected geometric returns.* In approximating the *forward looking expected geometric return* for the entire portfolio, the actuary would first determine the *forward looking expected arithmetic return* for the entire portfolio and then subtract one-half of the variance of the entire portfolio.

[1] Investments, Bodie, Kane and Marcus, 2005, p. 864.

Appendix 4

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*. 3rd ed. Colorado Springs, CO: McGraw-Hill, 2008.

    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.

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.