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ISSUE BRIEF

AMERICAN ACADEMY of ACTUARIES

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P/C Actuarial Communication on Reserves Ranges and Variability of Unpaid Claim Estimates

Uncertainty in the value of loss and loss expense reserves has significant impact on financial reporting for property and casualty insurance enterprises, directly affecting earnings and book value and ultimately influencing the views of those who monitor and regulate the industry and management's business decisions. Actuaries often calculate a range of estimates, commonly referred to as a "reserve range," rather than just a single estimate, as a way of dealing with and/or communicating this uncertainty. However, the question becomes, what does the range represent: a range of possible outcomes, or a narrower range of estimates, one in which the actuary would deem a recorded reserve to be reasonable? The type and breadth of range developed may vary depending on the audience or the intended use of the range.

The term "reserve range" is commonly used in actuarial work and communications, as well as in financial publications. However, its use is sometimes marred by significant confusion and ambiguity because many of the key issues associated with the use and communication of this term are not always well-understood.

The term "reserve" can also add to the confusion, as it is commonly used to refer to both the estimated value and the provision booked in the financial statements. In this issue brief, we will restrict the use of the term "reserve" to the value used for financial reporting purposes. We will use the terms "unpaid claim estimates" or "estimates of unpaid claim liabilities" to refer to the actuarial evaluation of the value of these liabilities. In addition, we will use the term "range" broadly, including where the reserve variability is communicated in terms of multiple unpaid claim estimates, regardless of whether the amounts were derived from deterministic methods or statistical approaches.

This issue brief is directed primarily toward actuaries with the goal of ultimately improving casualty actuaries' communications with regard to ranges of unpaid claim estimates. The brief explores some of the major themes in the calculation and use of ranges of unpaid claim estimates, including, in particular, the term "reasonable range." Clear communication of an insurance entity's or other organization's risk and recorded reserve with respect to a range of unpaid claim estimates can assist regulators, management, investors, auditors, and policyholders in determining strategies in their evaluation of such entities or organizations.

This issue brief is organized as follows:

- An introduction section describing why a range may be used and, in particular, the use of a "reasonable range;"
- A description of the types of ranges that exist and why and how such estimates are developed;

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- *Characteristics that define transparent and understandable disclosures of unpaid claim estimate ranges.*

In addition, the appendix contains a discussion of the interaction of uncertainty, conservatism, and bias when a single estimate needs to be selected with respect to a range of unpaid claim estimates.

Purpose and Use of Ranges

Frequently, a casualty actuary will use a range as an expression of the degree of uncertainty in the unpaid claim estimate. The approach used to develop a range of unpaid claim estimates may vary or be dictated by the intended purpose and use or by the perspective of the actuary.

Ranges of unpaid claim estimates are used in a variety of circumstances, including:

- Internal communications and risk management;
- Securities and Exchange Commission (SEC) filings;
- Mergers and acquisitions;
- Audits of insurance companies; and
- Reports supporting the Statement of Actuarial Opinion (SAO) and the Actuarial Opinion Summary.

For internal communications, there is no limitation on the type of range to be produced. Typically, the type of estimate is tailored to the intended use. For risk-management purposes, it might be appropriate to determine a range of possible outcomes, including values in very unlikely but possible and potentially extreme scenarios. Other internal users may want a range of reasonable estimates,¹ perhaps with certain parameters specified. Knowing how a range of unpaid

claim estimates will be used is important to an actuary when deciding whether to produce a range of possible outcomes, a range of reasonable estimates, or a range defined in some other manner.

Actuaries frequently produce ranges of *reasonable* unpaid claim estimates as an aid to management in determining its best estimate.² In communicating such a range, actuaries frequently discuss the key drivers for various points in the range. The resulting range may also be used in the appointed actuary's analysis, in determining whether or not the reported reserves make a reasonable provision for the unpaid claim liabilities.

In reserve disclosures for SEC reporting purposes, a range of *reasonable estimates* may be viewed as a statement about the reliability of current earnings, e.g., how much of current earnings are a function of judgments or assumptions. On the other hand, a range of *possible outcomes* might also be considered meaningful, as it could be viewed as a statement about the risk to future value and earnings. Hence, both types of ranges may have value in the financial reporting and disclosure contexts, but they serve different purposes. Therefore, a presentation of a range without context could be misinterpreted, and unknowingly misused, by the user of the financial statements.

During merger and/or acquisition evaluations and negotiations, various questions could lead to the need for ranges. Some parties may want a simple range of expected cash flows in the first few years. Others may be more interested in a range of possible outcomes, including worst-case or other extreme scenarios. Such outcomes might be considered useful when evaluating potential

¹A definition of the term "reasonable estimate" can be found in the next section of this issue brief.

²Statutory accounting principles recognize that management may consider ranges of reserve estimates when determining the amount to record. Statement of Statutory Accounting Principles No. 55, *Unpaid Claims, Losses and Loss Adjustment Expenses* (SSAP 55), Paragraph 10, states the following:

"For each line of business and for all lines of business in the aggregate, management shall record its best estimate of its liabilities for unpaid claims, unpaid losses, and loss/claim adjustment expenses. Because the ultimate settlement of claims (including IBNR for death claims and accident and health claims) is subject to future events, no single claim or loss and loss/claim adjustment expense reserve can be considered accurate with certainty. Management's analysis of the reasonableness of claim or loss and loss/claim adjustment expense reserve estimates shall include an analysis of the amount of variability in the estimate. If, for a particular line of business, management develops its estimate considering a range of claim or loss and loss/claim adjustment expense reserve estimates bounded by a high and a low estimate, management's best estimate of the liability within that range shall be recorded. The high and low ends of the range shall not correspond to an absolute best-and-worst case scenario of ultimate settlements because such estimates may be the result of unlikely assumptions. Management's range shall be realistic and, therefore, shall not include the set of all possible outcomes but only those outcomes that are considered reasonable."

deal breakers for acquisition or consideration by the buyer and seller when negotiating terms of a reserve guarantee.

Actuaries employed by external auditors typically produce a range of unpaid claim estimates during their audits. The purpose of their range is generally to determine whether or not the reserve amount recorded by management is reasonable. The recorded amount is considered reasonable if it falls within the audit firm's range. If the recorded reserves fall outside of the auditor's range, this might affect the opinion rendered by the external auditor.

Finally, in preparing a statutorily prescribed SAO on loss reserves, the appointed actuary will often develop a range of *reasonable estimates* and consider the recorded amounts to be reasonable if they fall within this range. As described above, such ranges of unpaid claim estimates are generally narrower, sometimes substantially, than a range of possible outcomes.

These are just a few examples of the potential circumstances where a range of unpaid claim estimates might be used. In all cases, clarification of the meaning of the range of unpaid claim estimates is particularly important to ensure that the range is developed by the actuary and considered by the user in an appropriate manner.

Reasonable Range and Range of Possible Outcomes

What is a "reasonable range" in the context of property/casualty unpaid claim estimates? This term, and the more generic "reserve range," has been used in many ways in reserving guidance and actuarial practice. In the United States, property/casualty companies are required to file an SAO, wherein the actuary opines on whether the stated reserves "make a reasonable provision."³ Actuarial Standard of Practice (ASOP) No. 36, *Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment*

Expense Reserves, refers to a "range of reasonable reserve estimates."⁴

A "range of possible outcomes" of unpaid claim estimates can be used to evaluate company solvency, downside risk, or the valuation of a company in a sale situation. A "range of possible outcomes" is estimated when the user wants to see the full spectrum of possibilities.

Various financial reporting standard-setters and/or regulators have expressed interest in ranges, which may or may not be classified as ranges of "reasonable" estimates.⁵ Many actuarial reports and analyses also include a discussion of the unpaid claim estimates as ranges. However, it is not always clear what the term "reserve range" represents in many of these discussions, leading to the potential for misinterpretation, misunderstanding, and, potentially, misuse.

The *Purpose and Use of Ranges* section above focuses on two general types of ranges of unpaid claim estimates by actuaries:

- Ranges of possible outcomes; and
- Ranges of reasonable estimates.

(1) Ranges and Distributions of Possible Outcomes

A range of possible outcomes focuses on the range of possible results of the claim process. Actuaries use ranges of possible outcomes (sometimes in the form of a probability distribution or confidence interval) as an expression of the breadth of the possibilities of the future payout of unpaid claim estimates. These ranges are important in reviewing surplus and capital needs, as in enterprise risk management analysis, or to give the user of financial information an understanding of the potential for variability in results.

Statistical distributions, also referred to as a distribution of possible outcomes, reflect a range of possible outcomes in which probabilities are associated with each of the possibilities. Such distributions can be estimated using a probabilistic model that simulates a

³2007 Statement of Actuarial Opinion Instructions (NAIC), Property and Casualty Actuarial Practice Note, American Academy of Actuaries' COPLFR, December 2007 (updated annually), page 91.

⁴ASOP No. 36, *Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves*, Actuarial Standards Board, March 2000, page 9.

⁵2007 Statement of Actuarial Opinion Summary Instructions (NAIC), Property and Casualty Actuarial Practice Note, American Academy of Actuaries' COPLFR, December 2007 (updated annually), page 92.

large number of possible outcomes, with the outcomes providing estimates of statistical properties such as the mean, mode, percentiles, etc.

A range of possible outcomes can also be estimated without statistical analysis. One way to do so is through the use of scenario testing, in which different assumptions create the range of possibilities using a deterministic model. Another approach is to look at the range of past observed outcomes.

STATISTICAL DISTRIBUTIONS

Developing statistical distributions involves estimating a predictive distribution of future possible outcomes. The statistical distribution reflects probabilities associated with various outcomes due to the expected randomness of the loss process. Such distributions of possible outcomes are typically developed from historical information, which the actuary uses to make judgments about the type of distribution and key parameters (e.g., mean, standard deviation, etc.). Statistical distributions are also sometimes used to infer probabilities around a point estimate made from another set of data, perhaps from a different time period, or based on benchmark data. For example, the results of a statistical analysis done in a prior quarter are sometimes used to estimate a probability interval surrounding a point estimate developed in the current quarter.

PROBABILISTIC MODELS (OTHERWISE KNOWN AS “SIMULATIONS”)

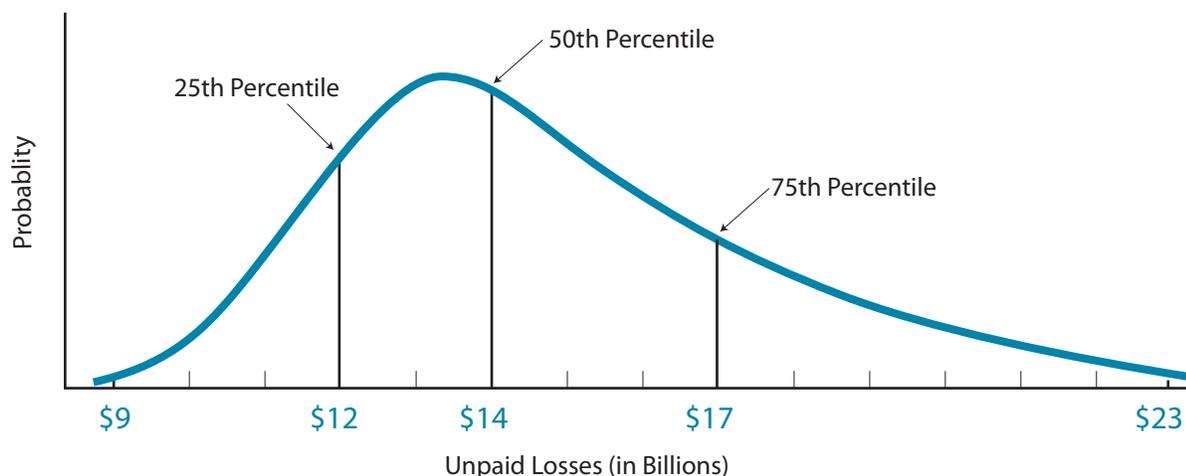
Developing distributions of possible outcomes using probabilistic models involves estimating a predictive model of either the individual claim transactions or of the aggregated claim transactions (i.e., claim development triangles). Probabilistic models simulate a large number of possible outcomes that reflect probabilities associated with various outcomes due to the expected randomness of the loss process and, in some cases, the uncertainty of the parameters.

PRESENTING RESULTS OF DISTRIBUTIONS

Once completed, a distribution of possible outcomes based on statistical analysis or probabilistic modeling can be provided in a graphical format. The graph below provides an illustration of a hypothetical distribution of possible outcomes.

This graph shows that, for this hypothetical example, it is estimated that there is a 50 percent probability that unpaid claims will ultimately result in payments between \$12 billion and \$17 billion. These estimates also indicate that there is a 25 percent probability that future payments will be less than \$12 billion and a 25 percent probability that future payments will be greater than \$17 billion. Furthermore, in this example, it is estimated that there is only a remote possibility that the ultimate future payments will

Graph of Hypothetical Distribution of Possible Outcomes



be either less than \$9 billion or more than \$23 billion.

It is sometimes helpful in a presentation like this one to narrow the displayed distribution of outcomes to those that have a higher probability of occurrence. Such narrower ranges focus on the middle of the distribution, not the entire distribution and, therefore, avoid the more problematic, extreme, and speculative outcomes in the tails.

ISSUES IN ESTIMATING STATISTICAL DISTRIBUTIONS AND PROBABILISTIC MODELS

Many actuaries do not use statistical or probabilistic models in determining ranges of outcomes for unpaid claim estimates. In many cases, there are challenges in determining appropriate distributions and parameter assumptions due to the unavoidable existence of both parameter risk and model risk.

Statistical distributions are generally designed to consider process risk, which is the variability due to the inherent randomness of various factors in the loss process. However, there are additional uncertainties that are much more difficult to measure, including parameter risk and model risk. Parameter risk is the risk that the parameters (like the mean, standard deviation, correlation among coverages, etc.) used in methods or models are not appropriate to the loss process and do not represent potential future outcomes. Similarly, model risk is the risk that the models chosen do not correctly represent the loss process.

Parameter risk and model risk typically increase for unpaid claim estimates where there is little meaningful historical experience. The structure of the model and parameters can be very difficult or impossible to identify in such situations—in particular, in cases in which ultimate payout of the li-

abilities relies heavily on a rapidly changing statutory, regulatory, or legal environment. Currently, considerable literature exists on a variety of statistical and probabilistic models for the analysis of unpaid claim estimates, but the actuarial community has not reached a consensus about which models are best.⁶

SCENARIO TESTING

Scenario testing can also be used to create a range of outcomes. For example, assumptions and/or methods could be varied to estimate the largest and smallest realistically possible outcomes. The endpoint of the range of outcomes could be calculated by varying inflation, development factors, claim severity and/or frequency assumptions, expectations as to judgments or settlements, or changes in government regulation or legislation. A range of outcomes can be based on varying methods of calculating ultimate losses (paid development, incurred development, etc.). While these endpoints of the range do not have probabilities assigned to them, they might be considered the lowest and highest realistically possible outcomes, and, along with the amounts in between, they thus represent the entire range of realistically possible outcomes.

However, scenario testing has its own limitations, with a key limitation being that the breadth of the range produced is dependent on the selected scenarios and the models/methods that are used to estimate unpaid amounts. Some events later understood to be realistically possible, or even events that were not initially considered, may not have been anticipated in advance. Similarly, given a certain scenario, the models/methods might not contemplate certain areas of potential loss due to oversight or other factors

⁶The Casualty Actuarial Society (CAS) established a working party on reserve variability, which published a detailed report discussing issues surrounding distributions of unpaid claims. The report focuses on distributions rather than ranges and does not address accounting issues. The report covers the distribution issues more rigorously and in greater depth than this paper. In addition, it provides a classification of approaches and bibliography of the actuarial literature. One of the observations in the paper is that, “Much work has been done, but in our view, the actuarial community does not yet have the answer to the fundamental question [regarding the exact distributions of unpaid losses].” It is highly recommended that anyone interested in a more rigorous discussion of these issues refer directly to the CAS paper. *The Analysis and Estimation of Loss & ALAE Variability: A Summary Report by the CAS Working Party on Quantifying Variability in Reserve Estimates*; CAS Actuarial Forum, Fall 2005 pp. 29-146 (<http://www.casact.org/pubs/forum/05fforum/05f29.pdf> [last visited on Aug. 25, 2008]).

HISTORICAL OBSERVATION

Another approach used to estimate a range of possible outcomes is to look at past actual outcomes. This approach is generally very easy to communicate to outside observers. It also avoids many issues associated with model and parameter risk, which are the greatest unknowns with statistical and probabilistic models. A weakness of this approach is that it assumes that the process that will influence the ultimate outcome for current unpaid claims is unchanged from the process observed in the past. It may require the past process to be adjusted or recalibrated to future conditions. Lastly, it can be viewed as overstressing the future likelihood of any recent extreme event and underrepresenting tail risk in circumstances in which no tail events occurred in the recent past.

(2) Ranges of Reasonable Estimates

Ranges of *reasonable estimates* are often estimated by actuaries as part of a process for determining the reasonableness of recorded reserves. A range of *reasonable estimates* focuses on different views or opinions as to what might be considered reasonable assumptions, methods, and/or models for determining estimates of unpaid claim liabilities. ASOP No. 36 describes a range of reasonable estimates as “a range of estimates that could be produced by appropriate actuarial methods or alternative sets of assumptions that the actuary judges to be reasonable.”⁷

In practice, this range is usually derived by using different assumptions or models/methods, frequently focusing on traditional actuarial techniques. The range of *reasonable estimates* consists of the difference between estimates made from different methods or assumptions that are reasonable but produce different results.

Since a range of *reasonable estimates* represents the range of only those opinions or assumptions that are considered reasonable, a range of reasonable estimates would typically be narrower than a range of possible outcomes. As with scenario testing, de-

scribed above, these estimates do not have probabilities associated with them. Since a range of reasonable estimates typically requires a range of opinions, and often does not require the use of a probability distribution, the resulting range is also not presentable using a statistical framework.

A discussion of ranges of *reasonable estimates* of reserves may raise issues concerning measurement objectives, range endpoints, and speculative outcomes.

Issues in Communicating and Estimating Ranges

Measurement Objectives

While the phrase “measurement objectives” could apply to both ranges of reasonable estimates or possible outcomes, identification of the measurement objective is essential to the effective communication of a range of reasonable estimates. Unfortunately, ranges of reasonable estimates are often communicated by actuaries without clearly specifying the measurement objective, i.e., identifying the metric that the actuary is attempting to measure. What should the measurement objective be? If the measurement objective is defined as a “best estimate,” this leads to a natural follow-up question: what does “best estimate” mean? Is the measurement objective the probability-weighted average (i.e., the mean) of “all” potential future outcomes? Other possibilities may include, but are not limited to, a mode, a median, mean plus a risk margin, or a set percentile. Depending on the intended purpose and use of the range, or even the perspective of the actuary, any of these could be the desired objective.

Range Endpoints

In a range of reasonable estimates, “reasonableness” is a subjective measure. There is no objective boundary line between an estimate that is reasonable and an estimate that is unreasonable; therefore, the endpoints of a range of reasonable estimates are not objectively determinable. Accordingly, it may be more appropriate to discuss “a”

⁷ASOP No. 36, *Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves*, Actuarial Standards Board, March 2000, page 9.

range of reasonable estimates, since it may be impossible to state “the” range of reasonable estimates.

Creating Aggregate Ranges from Individual Line Analysis

Many actuaries have created ranges of reasonable estimates by line of business and then combined these estimates to create an aggregate, or companywide, range of estimates. This requires some thought as to the correlation among the lines of business. Simply adding the endpoints of the estimates by line implies that all the high estimates for each line are 100 percent correlated, as are all the low estimates, which may be an unlikely scenario. Some actuaries make assumptions about the amount of correlation when estimating the companywide range.⁸

Speculative Outcomes and Reliability with Regard to Reasonable Estimates

When discussing ranges of reasonable estimates, it is natural to assume that the unpaid claim liabilities being measured are capable of reliable measurement. Unpaid claim liabilities may be considered to be reliably measurable if different actuaries would produce estimates that are not substantially different, given the same data and other information.⁹

Of course, the ability to produce an estimate does not necessarily imply that such an estimate is reliable.¹⁰ While it may be possible to produce an estimate, if the parameters used in its production cannot be verified, then consensus as to its reliability can never be reached. When an estimate is materially affected by such speculative outcomes, the tendency among accounting frameworks is either to exclude those outcomes from the estimate or to disclose the potential for such outcomes.

Transparent Disclosure With Regard to the Communicating of Ranges of Unpaid Claim Estimates

Transparency is viewed relative to the intended audience of the communication. A disclosure designed to communicate effectively to an actuarial audience might not be helpful for a non-actuarial audience. While the actuarial work product documentation should always be at a level of detail sufficient to allow another actuary to review, communication of the work product result is more meaningful when tailored to its intended audience.

Whether through public financial statement disclosures, private actuarial reports, or internal management communications, key details can provide for a transparent, understandable, and meaningful disclosure for ranges of unpaid claim estimates. Understanding these key points, described below, may aid the actuary in producing a transparent disclosure:

- **The understanding, knowledge, and perspective of the potential user of the range:** Who are the intended users of the information? What experience do the intended users have? Are there likely to be additional unintended users?

An effective disclosure is written in a manner that provides clear and understandable information targeted to the knowledge and experience of the user of the range and targeted to the manner in which that user intends to employ the information.

- **The type of range:** Is it a range of reasonable estimates? Is it a range of possible outcomes? Or is it a range of reasonably likely outcomes? How was the range

⁸Charles McClenahan, “Estimation and Application of Ranges of Reasonable Estimates,” 2003 Fall Forum, CAS.

⁹2007 Property and Casualty Actuarial Practice Note, American Academy of Actuaries’ COPLFR, January 2008 (updated annually), page 13 (last visited on August 26, 2008).

¹⁰A classic example of this is what is referred to by fans of science fiction as the Drake Equation (Sagan, Carl, Cosmos, Random House, New York, 1980, pp 298-302), reproduced below.

$$N = R^* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$$

This equation estimates the number of civilizations in our galaxy with which we might expect to be able to communicate at any given time, given such variables as the rate of star formation in our galaxy, the fraction of such stars that have planets, the fraction of those that can support life, the fraction of those that do support life, the fraction of those where the life is intelligent, etc. It produces an estimate, but there is currently no way of verifying several of the factors that go into the estimate, and hence no consensus as to the reliability of the estimate produced by the equation.

calculated? If it is a range of reasonable estimates, what is the measurement objective of the estimates?

The potential for misunderstanding and/or misuse of the disclosed range of unpaid claim estimates can be reduced by clear communication of the type of range, the manner of its calculation, and the measurement objective.

- **The reliability of the range:** How comfortable is the actuary with the reliability of the estimates that define the range or the models and/or model parameters that estimate the distribution? What approach was used to determine the endpoints? What is the likelihood of outcomes outside the disclosed range? Does the width of the range appropriately reflect the breadth of uncertainty, given the measurement objective?

While misinterpretations of the actuary's work are possible even when the actuary uses the utmost care in describing ranges of unpaid claim estimates, understanding the perspective of the intended users, describing the type of range provided, and identifying the level of uncertainty inherent in the range may reduce the likelihood of misinterpretation and/or misuse of ranges of unpaid claim estimates.

Summary

Confusion and ambiguity currently exist in the consideration of ranges of unpaid claim liabilities. This issue brief presents some of the major issues involved with the consideration of such ranges and provides recommendations intended to reduce misunderstanding in the communication of ranges of unpaid claim estimates. The disclosures concerning ranges of unpaid claim estimates may improve as a result, leading to improved comprehension of these issues among both actuaries and non-actuaries.

APPENDIX I

Selection of a Single Point Within a Range—Interaction of Uncertainty, Conservatism, and Bias

This issue brief focuses on the use of ranges to depict the inherent uncertainty in determining unpaid claim estimates and outcomes for property/casualty liabilities. ASOP No. 36 states that in determining a range of reasonable reserve estimates for a statement of actuarial opinion, “the actuary may include risk margins.” (The actuary is not required to do so unless discounting reserves.) However, for financial reporting purposes, management is required to determine and record a single reserve estimate, referred to under U.S. statutory accounting as management’s “best estimate.” Faced with such inherent uncertainty, how can one select a single point as a best estimate from a range of reasonable estimates? Should the point selected reflect the inherent uncertainty?

When setting loss reserves for companies reporting under U.S. Generally Accepted Accounting Principles (GAAP), the guidance is commonly interpreted such that companies are directed to record the most likely value of the unpaid claim costs in nominal (i.e., undiscounted) amounts. Statistically, this value can be viewed as the mode of a distribution. In addition, the recorded value is also generally interpreted to be an unbiased value that does not include an additional provision for uncertainty.

In the last few years, the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board

(IASB) began working together on a joint Conceptual Framework for Financial Reporting. The two groups recently addressed several issues surrounding the framework. **One issue was the concept of conservatism in general purpose financial statements (such as U.S. GAAP);** the conceptual framework document stated, “This framework does not include **prudence** or **conservatism** as desirable qualities of financial reporting information” (emphasis in original).¹¹

Globally, the accounting guidance addressing the uncertainty in property/casualty loss reserves is evolving as International Financial Reporting Standards (IFRS) are developed. In particular, the IASB is considering the use of fair value (or similar) measurement rules to account for unpaid claim estimates. Such rules would be designed to reflect an unbiased estimate of an amount that would be required to transfer the liabilities to another party. Fair value measurement would be determined using a probability-weighted estimate of undiscounted future cash flows as a starting point. Statistically, this value could be viewed as the mean of a distribution. This value would then be (1) reduced to reflect explicitly an estimate of the time value of money, and then (2) increased to reflect an estimate of the risk margin, which demonstrates that the ultimate amount and timing of payments are not fixed or certain. Each of these three estimates (undiscounted cash flows, time value of money, and the risk margin) would be disclosed individually. FASB has agreed to consider any such new IASB insurance accounting standard for possible adoption or adaptation in the U.S.¹³

¹¹From FASB’s “PRELIMINARY VIEWS, Conceptual Framework for Financial Reporting: Objective of Financial Reporting and Qualitative Characteristics of Decision-Useful Financial Reporting Information,” paragraph BC2.22. http://www.fasb.org/draft/pv_conceptual_framework.pdf (last visited on August 26, 2008).

¹²“Discussion Paper: Fair Value Measurements,” pages 67-68. <http://www.iasb.org/NR/rdonlyres/6C8AF291-EB14-4034-84F1-54305F72024D/0/DDFairValue.pdf> (last visited on August 26, 2008).

¹³According to FASB, “On August 2, 2007, the FASB issued an Invitation to Comment, *An FASB Proposal: Accounting for Insurance Contracts by Insurers and Policyholders*. That Invitation to Comment includes a Discussion Paper issued in May 2007 by the IASB, *Preliminary Views on Insurance Contracts*, setting forth its preliminary views on the main components of an accounting model for an issuer’s rights and obligations (assets and liabilities) under an insurance contract. The FASB has not discussed, deliberated, or reached any tentative conclusions about the IASB’s preliminary views. The FASB issued the Invitation to Comment to gather information from its constituents to help decide whether there is a need for a project on accounting for insurance contracts. The Invitation to Comment also asks whether the FASB should undertake this project jointly with the IASB. The Discussion Paper presents the IASB’s preliminary views on the main components of an accounting model for all contracts that meet its definition of an insurance contract. The principal focus of the preliminary views is the measurement of insurance liabilities. The FASB’s Invitation to Comment asks whether the IASB’s preliminary views would be a suitable starting point for a joint project. If the FASB were to take on this joint project, its objective would be to develop a common, high-quality standard that would address recognition, measurement, presentation, and disclosure requirements for insurance contracts. The project would provide accounting and reporting guidance for both the issuer and the holder of an insurance contract, although the preliminary views do not address accounting and reporting by the policyholder.” http://www.fasb.org/project/research_projects.shtml#insurance, last updated on May 30, 2008 (last visited on August 26, 2008).

Current U.S. statutory accounting guidance directs companies to record management's best estimate of the unpaid claim liabilities. In addition, this guidance permits management to include a provision for adverse deviation in management's definition of "management's best estimate," as the NAIC's Emerging Accounting Issues Task Force in Interpretation 01-28¹⁴ concluded the following:

"The working group reached a consensus that the concept of conservatism is inherent to the estimation of reserves and as such should not be specifically prohibited in the consideration of management's best estimate. On the other hand, the working group does not believe there should be a specific requirement to include a provision for adverse deviation in claims as the application of estimates varies greatly from company to company and requires the careful judgement [sic] of management."

The possibility of differing guidance between U.S. GAAP, U.S. statutory accounting, and other accounting bases may create confusion and conflict among actuaries, management, and users of financial statements with regard to the appropriate point within a range of reasonable estimates or a distribution of possible outcomes at which to record liabilities. In such cases, the need for transparency in the disclosure of the range may be even greater than would otherwise exist.

GLOSSARY

Coefficient of Variation – This is a measure of dispersion of a statistical distribution, scaled to the mean of the distribution. $CV = \sigma/\mu$ (standard deviation divided by mean).

Mean – The expected value of a probability distribution, or the average of the values in a set of observations.

Model Risk – The risk or variability due to the chance that the selected method or model does not correctly or completely represent the loss process.

Mode – The most likely value in a set of observations or probability distribution. It is possible to have more than one mode.

Median – The "middle" value or fiftieth percentile of a set of observations or probability distribution.

Process Risk – The risk or variability due to uncertainty in the loss process. Even if you have the correct model and parameters, you cannot accurately predict a future value due to the inherent randomness in insurance losses.

Parameter Risk – The risk or variability due to the potential error in the estimated model parameters, assuming the process generating the claims is known (or assumed to be known).

Standard Deviation – The square root of the variance of a probability distribution. Variance is a measure of statistical dispersion, indicating how possible values are spread around the mean.

Tail Risk – The risk or probability that the outcome of a random process will exceed a defined threshold, typically one that is sufficiently large to have an adverse outcome. Generally tail risk would refer to the right end or "tail" of a probability distribution.

¹⁴Paragraph 5 from Interpretation of the Emerging Accounting Issues Working Group, INT 01-28: Margin for Adverse Deviation in Claim Reserve, confirmed at the October 16, 2001 meeting.

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