

**1988 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

U.S. CASUALTY TOPIC:

A LOOK AT THE CURRENT STATE OF CASUALTY VALUATION PRINCIPLES

MR. ROBERT A. MILLER III: The Society of Actuaries (SOA) always has invited the Casualty Actuarial Society (CAS) to participate in the Symposia on the Valuation Actuary. The CAS has been glad to take part.

At the 1987 and 1988 symposia, I have been here mainly because I am the Chairman of the CAS Committee on Valuation Principles and Techniques. This should not be construed as meaning that I am in any way an official spokesman for the CAS. In the course of my remarks, I will be discussing the June 9, 1988, draft of a CAS Statement of Valuation Principles -- the work product of the CAS Committee on Valuation Principles and Techniques.

In discussing the draft, I will be giving my own opinions about its wording and substance. The CAS and the other members of the Committee do not necessarily share my opinions.

History and Background

Valuation is a term that has been used for many years by life actuaries in referring to the determination of the policy reserves that make up such a large part of the liabilities of a life insurance company. For more than one hundred years these reserves have been calculated by formulas established by law. The law has been up-dated on a fairly regular basis. The law has required conservative assumptions as to interest and mortality rates to be used in the formulas. It was generally assumed that reserves calculated in accordance with these formulas were "adequate."

Beginning about in the middle 1950s, market interest rates started gradually to increase. As interest rates rose, market values of fixed-income assets fell.

In the middle 1970s, life policyholders began to be interested in withdrawing the guaranteed cash values of their contracts. The policyholders wanted to use the funds in ways that would effectively produce greater interest credits than those developed by life contracts. The market values of assets were then well below their book values. So the companies could not meet the demands for cash by selling assets without incurring severe reportable capital losses, thus forcing the companies to use current premium income to meet the cash demands of the withdrawals. The cash diverted in this way could not be invested at the interest rates anticipated in pricing. In short, a serious

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problem had arisen out of a mismatch between asset and liability cash flows, and it looked as though it was not going to be easy to eliminate the mismatch in the future.

This raised questions about the adequacy of reserves calculated in accordance with the Standard Valuation Law, which led to the formation of the Society of Actuaries Committee on Valuation and Related Areas in 1977. The committee is still in existence and is now referred to as COVARA.

The early work of this committee is summarized in its first report published in 1979. The report made it plain that the statutory reserve formulas were not at all conservative under then current conditions. This revelation raised concern about insurance company solvency and caused a demand for a better method of valuation which would assure that a company's reserves made "good and sufficient" provision for funding the company's liabilities as they matured.

After 1979, interest rates continued to rise until they reached the peaks of 1980 and 1981. The life insurance industry was in serious trouble by that time, and the property/casualty (P/C) insurance business was afflicted by "cash-flow underwriting" aimed at taking advantage of the high-interest yields on traditional forms of investment.

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The P/C industry had a problem, similar to that of the life industry, which arose out of the fact that the average time to maturity of existing P/C investments was so long that those investments were not producing enough current cash to pay the maturing losses that arose out of earlier years of exposure. This in turn meant that premiums produced by "cash-flow under-writing" had to be diverted from being invested at high yields. Instead the premium cash flow had to be used to make up for the inadequacy of cash flowing from existing investments. In short, a serious problem had arisen out of a mismatch between asset and liability cash flows, and it looked as though it was not going to be easy to eliminate the mismatch in the future.

In response to the demand for a better method of valuation, a joint committee of the Society of Actuaries and the American Academy of Actuaries in 1983 proposed a method that involved the creation of a special staff position responsible for valuation in every insurance company. The person occupying this position was to be known as the "valuation actuary." It was to be his responsibility to provide assurance that the company's assets would provide adequate funds to pay the company's obligations as they matured.

However, it was envisioned that the scope of this assignment would involve more than merely assuring suitable matching of assets and liabilities. The valuation actuary was also to assure that sound methods and assumptions were used in projecting cash flows

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from assets and in projecting outflows of cash needed to pay for losses and expenses. The methods and assumptions used to assess the match between assets and liabilities and to develop the projections of cash flows were to take relevant risks into account.

In 1984 the CAS and the Academy then set up a joint committee to consider whether the recommendations of the SOA/Academy committee were relevant to the P/C industry. The CAS/Academy committee decided that the recommendations were generally relevant. However, they had one flat disagreement with the SOA/Academy committee. The SOA said that the valuation actuary must be Board appointed, and the CAS said the valuation actuary must be appointed by senior management. This has since been resolved in favor of the position taken by the CAS/Academy committee.

The CAS in 1985 formed a committee to determine how the CAS should respond to the concept of valuation actuary. The recommendation of this committee was that the CAS should defer working on the valuation actuary concept as such. However, the committee also recommended that the CAS should go ahead immediately with the formation of a CAS Committee on Valuation Principles and Techniques -- and this was done in 1986.

The immediate job of the Committee on Valuation Principles is to develop a statement of principles that will ultimately be useful in setting up standards of practice for valuation of P/C business. Standards of practice are intended to assure that sound

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methods and assumptions are chosen for making actuarial valuation projections and that the work is done in a professional manner.

Definitions and Principles

A copy of the June 9 draft (now revised) of the CAS Statement of Valuation Principles is available from the CAS.

On September 16, 1988, in my capacity as Chairman of the CAS Committee on Valuation Principles and Techniques, I met with the CAS Board of Directors to review the June 9, 1988, draft with them. The purpose of the review was to enable them to determine whether the draft should be released as an "exposure draft" for review by the general membership of the CAS. I'm happy to say that the Board approved the exposure of the draft.

The definitions used in the Statement are set out in Section I of the draft. The definition of *insurer* is intended to make it clear that the principles apply to noninsured, risk-management programs as well as to insurance companies. My remarks are in the context of insurance companies because it's easier for me and perhaps for you. Please do not take my doing so as diminishing in any way the intended scope of the principles.

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The purpose of the definition of *cash flow* is to emphasize that insurance is a cash-flow business. Premiums, losses, investment income and expenses are all paid in cash. We have referred to receipts and disbursements so as to draw attention to the offsetting nature of these two types of cash flow.

Obligations, considerations and assets are defined as groupings of certain sets of cash flows.

The principles are set out in Section II of the draft statement. The first draft listed nine principles. Some of them have been eliminated from the current draft because they were thought to be standards of practice rather than principles. This is the second draft of the statement. It reflects comments made by the general membership on the first draft and some revisions made by the Committee on Valuation Principles to bring the statement into closer conformity with the content and format of the CAS statements on ratemaking and reserving principles.

The *first principle* relates assets, obligations and considerations to cash flows. It underlines the basic position of cash flows in relation to valuation.

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The *second principle* identifies the four variables that affect the value of an item of cash flow. I think these variables are basic to the theory of valuation, and the list of variables is exhaustive -- that is, it's as long as it's going to get.

The *third principle* states that the degree of uncertainty involved in each of the valuation variables connected with an item of cash flow depends upon the nature of the asset, obligation or consideration with which the item is associated and upon the environment within which the valuation is performed. The nature of the asset, obligation or consideration reflects decisions of the insurer.

Assets are affected by investment strategies. The insurer may invest in U.S. Treasury bonds and bills or it may invest in "junk" bonds.

Obligations are affected by marketing and underwriting strategies. The insurer may write only property insurance, personal lines, or commercial lines.

The insurer's decisions in these areas are reflected in valuation by assumptions. These decisions and the related assumptions affect the degree of uncertainty to be reflected in the valuation variables.

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The environments within which the valuation is performed are described in scenarios which also affect the valuation variables and the uncertainty inherent in them.

The *fourth principle* seems to be a simple statement of fact. One reason we made it explicit is because of the conceptual distinction between the cash-flow events on the one hand and their values on the other. Probably our most important reason for stating it explicitly is that we thought that it would not be enough to say, for example, that the value of an obligation was equal to the algebraic sum of the expected values of its constituent cash flows. This statement would have failed to allow room for the difference in the degree of uncertainty between the stream of cash flows making up the obligations arising out of the general liability line and the stream making up the obligations arising out of the auto/physical-damage line.

We also wanted to reflect in the fourth principle the facts that some of the cash flows connected with an asset could be negative as well as positive (real estate taxes netted against rental income) or cash flows connected with an obligation could be positive as well as negative (subrogation and salvage).

The *fifth principle* effectively asserts that the first four principles apply to every valuation whether it involves all of an insurer's assets, obligations and considerations or only identified segments of the insurer's assets, obligations and considerations.

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The principle is intended to emphasize the need for establishing a notional relationship among the sets of an insurer's assets, obligations and considerations to be valued when less than all of those items are to be valued. This need arises out of the nature of the valuation process which is that of "determining and comparing" the values of obligations and assets.

The fifth principle also effectively asserts that the first four principles apply to every valuation whether it involves cash flows arising out of all commitments already made or projected to be made or only those cash flows arising out of identified segments of those commitments. This aspect of the principle introduces the concept of "commitment." A commitment is a promise or guarantee to carry out some action in the future.

Commitments may relate to receipts or disbursements. The timing of a commitment relative to the scope in time of a valuation affects whether the commitment should be reflected in the valuation.

Some kind of commitment underlies each item of cash flow. The agreement to issue an insurance contract involves a commitment to provide benefits in connection with events that occur during a period of exposure. If the issue of the contract is agreed to on or before the valuation date, the obligations arising out of that contract are appropriate subjects of a valuation involving cash flows arising out of commitments made on or

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before the valuation date without regard to the time of occurrence of the cash flows connected with the obligations.

Commitments, which are projected to be made after the valuation date, arise out of new business. These commitments are often the subject of valuations connected with mergers and acquisitions. Note that in the case of projected commitments, it is appropriate to take into account both obligations and the corresponding considerations.

Commitments are often made with regard to the purchase or sale of assets. Futures and options are examples. Here, the time of the commitment is decisive in determining whether to reflect it in a valuation.

The *sixth principle* is closely related to the fourth principle, which speaks of the combined values of items of cash flows underlying an asset, obligation or consideration. The sixth principle expands upon the statement of the fourth principle to say something about the combined values of assets, obligations and considerations.

The sixth principle recognizes, too, that there may be correlation, positive or negative, among different segments of assets, different segments of obligations and segments of assets and obligations and that this correlation affects the degree of uncertainty affecting the result of the valuation.

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The principle also recognizes the offsetting nature of receipts and disbursements.

Future Steps

I have already told you that the CAS Board approved the release of the June 9, 1988, draft as an exposure draft to be reviewed by the CAS membership. The draft will be distributed to the CAS membership by the Executive Council late in October 1988. The deadline for comments from the membership will be about ninety days after the distribution date.

When the exposure draft is distributed, the members will be asked to send their comments directly to me. I will arrange for their further distribution to the members of the Committee on Valuation Principles and Techniques. It may be necessary to provide an opportunity for the membership to comment directly to the committee at a workshop at a regularly scheduled meeting of the CAS. In any event, I will set up a meeting of the committee for the specific purpose of discussing the comments and considering how, if at all, they should be reflected in a new draft.

The committee will respond individually to the commenters explaining whether, how and why their comments were or were not reflected in the new draft. When these steps have been completed, the new draft will be forwarded to the Board through the Executive Council.

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The committee will make available to the Council and the Board copies of the written comments received by the committee, and how and why it decided to reflect or not reflect the comments in the new draft and copies of the individual responses to the commenters. The Executive Council will then decide whether to forward the new draft to the Board.

If the Council does forward the new draft, we should then be close to promulgation of the Statement of Principles by the Board and the end of the committee's work. If the Council doesn't forward the new draft to the Board, the committee will have to go through the last few steps again.

Comparison of Casualty and Life Valuations

The third paragraph of the June 9, 1988, draft of the CAS Statement of Valuation Principles says that:

The valuation principles in this statement relate to the financial implications of contingencies of the types falling within the scope of the professional practice of members of the Casualty Actuarial Society.

This says unequivocally that the CAS Committee on Valuation Principles intends to deal only with the kinds of business with which the CAS is concerned.

On the other hand, there is nothing in the wording of the definitions and principles in the June 9, 1988, draft of the Statement that would limit their applicability to only the

P/C business. Another way of saying this is that, as they are stated, the principles can be related to both the P/C and life businesses.

I think this concept is good. If the principles could not be related to the life business, I would wonder why. In saying this, I do not mean to imply that there are not substantial differences between the P/C and life businesses. There are important differences.

There are also important similarities.

I think it will be useful to discuss some of the important differences and similarities in the context of the valuation variables identified in the June 9, 1988, draft of the CAS Statement and the so-called C-1, C-2 and C-3 risks. These three broad classes of risk were identified more than ten years ago by COVARA.

The C-1, C-2 and C-3 risks are inherent in the insurance business. Some persons say that, in addition, there is a C-4 risk or ordinary business risk. I agree that insurance companies are subject to ordinary business risk. However, I think that analysis of this risk lies outside the scope of the professional practice of the CAS.

The second principle in the June 9, 1988, draft reads as follows:

The value of every item of cash flow, whether it is associated with an asset, obligation or consideration, depends upon the following valuation variables, each of which may involve uncertainty:

- a. the occurrence of the item of cash flow,

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- b. the amount of the item of cash flow,
- c. the interval of time between the valuation date and the date of occurrence of the item of cash flow, and
- d. a rate of interest related to the interval of time between the valuation date and the date of occurrence of the cash flow.

Every one of these variables relates to both P/C insurance and life insurance. This is one of the reasons why these variables are basic to the theory of valuation, and, why there are no other valuation variables for either form of insurance.

Some of you may think that neither of these points is valid, but let me go on to a discussion of the C-risks that will help to develop the reasons I think both points are valid.

I like to define the C-1 risk, or asset risk, as follows:

It is the risk that the occurrence, amount or timing of items of cash flow connected with assets will differ adversely from that anticipated as of the valuation date independently of any change in the interest environment.

This is not the original definition of the C-1 risk. It is a translation of that wording into terms of the four valuation variables.

The wording originally used by COVARA appears on page 260 of Volume 5, Number 1 of the *Record of the Society of Actuaries*. That wording reads as follows:

Loss can occur through default on indebtedness, decrease in the value of common stocks, or physical destruction of the security behind a mortgage.... Changes in market value of fixed income securities due solely

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to changes in the prevailing interest rates are considered to be provided for under C-3 -- and hence not a factor in C-1.

The important points are that my translation is somewhat more general; it specifically states that the valuation variables of occurrence, amount and timing of cash flows are involved in the risk, and it specifically states that the fourth -- interest -- is excluded as a factor in the risk. However, the COVARA definition and my translation are essentially the same in concept.

Both P/C and life insurers make substantial investments in securities, mortgages (mostly life), real estate and other investment vehicles. So both types of insurer have asset risk regardless of how it is described.

How can the occurrence, amount or timing of asset cash flows be adversely affected?

Think of a bond default.

The issuer of the bond may become bankrupt. After the bankruptcy, the issuer may miss making some or all of the scheduled payments. If this happens, occurrence has been adversely affected. The issuer may, in fact, make some or all of the scheduled payments after the bankruptcy, but the amount of the payments may be reduced. If this happens, amount has been adversely affected. Finally, the issuer may make all the

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payments at the full amount but at dates later than originally scheduled. If this happens, timing has been adversely affected.

Of course, sometimes all three variables may be adversely affected.

All of these things can happen independently of the interest environment. The default on the Washington Public Power Service System bonds had nothing to do with interest rates.

Interest, by definition, is assumed not to affect the risk. It is true that variations in the interest rate affect the prices of bonds and other forms of assets, too. This can cause a gain or loss on the liquidation of the bond, but it has nothing to do with the issuer's ability to pay. The valuation variables that affect the C-1 risk are connected with that ability.

I recognize that in the real world it is often difficult to be sure that a loss is attributable purely to the C-1 risk; there may be a strong element of interest risk also. However, distinguishing between the types of risks facilitates analysis.

Now let's turn to the C-2 risk which can be called the obligation risk, the pricing risk, or the reserving risk.

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I like to define the C-2 risk as follows:

It is the risk that the occurrence, amount or timing of items of cash flow connected with obligations will differ adversely from that anticipated as of the valuation date independently of any change in the interest environment.

This definition, too, differs from the COVARA original which reads as follows:

The possibility that the insurance enterprise may be subject to loss through pricing inadequacy, or other expression of the so-called insurance risk, is also well recognized. Any factor which causes premium levels to be inadequate, temporarily or permanently, is to be considered as a part of C-2. Claim fluctuations are one element, but more important are likely to be the practical reasons why premium rates are sometimes insufficient -- competition, regulation, guarantees, inflation, or simply lack of knowledge as to risk characteristics.

I believe that my translation is a fair interpretation of COVARA's original concept.

Notice, however, that the original definition makes no reference to interest. This implies that pricing inadequacy could result from an overoptimistic estimate of future interest earnings. Such a possibility is not excluded from the translation of the definition which excludes only "change in the interest environment."

However, it is worth noting that an overoptimistic estimate of future interest earnings has nothing to do with obligation cash flows; it simply overestimates future asset cash flows and so is not a part of the C-2 risk.

Notice that the only difference in the wording of the C-2 translation from that of the C-1 translation is that the word *obligations* has been substituted for the word *assets*. This

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means that, in the definition of both of the C-1 and the C-2 risks, the valuation variables of occurrence, amount and timing of cash flows are specifically mentioned as being involved in the risks, and the fourth variable, interest, is specifically excluded as a factor in the risks.

P/C actuaries are familiar with the basic roles of frequency and severity in pricing. Timing has not been a factor, probably because interest has not been an explicit factor in the traditional P/C pricing process. If interest were an explicit factor in the pricing process, timing would be a factor also because interest is simply the means for recognizing the time value of money.

Note that the definitions of the C-1 and C-2 risks do not imply that interest is or is not involved in the pricing of assets or the pricing of or reserving for obligations; the definitions simply say that *change* in the interest environment is not considered to be a factor in these risks. In other words, for purposes of analysis of these risks, the level of interest rates is assumed to be fixed; it is assumed to be a certainty, and there is no risk with a certainty.

P/C actuaries are familiar with the role of timing in loss reserving. The traditional loss development triangles recognize explicitly that loss payments vary over the development period and that, in practice, they vary from exposure year to exposure year.

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The convenient feature of the term *exposure year* is that it can refer to an accident, a report, a policy, or an underwriting year. Sometimes reserve analyses recognize both accident and report years in what might be called three-dimensional reserve triangles.

Loss reserve analyses that take into account both counts and amounts of claims recognize the variability of both items and that they may both affect the adequacy of reserves.

A fixed rate of interest may also be recognized as applicable to streams of loss payments; at least, the federal income tax law says it must be.

For life actuaries, mortality rates relate to claim frequency. The fact that many mortality studies are based on amounts of insurance rather than numbers of insured lives reflects the importance of the concept of severity in life insurance. It might be argued that for a given claim the amount of insurance is determined completely by the contract and is not subject to variability at the time of claim. But the same is not true of claims for medical expense benefits, and many life actuaries devote much, if not all, of their careers to that form of coverage.

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Life actuaries are completely familiar with the effect of timing on net loss costs. As a matter of fact, the timing variable might be said to be the fundamental risk factor for life insurance. It is certain that every one will die; it is only a question of when.

Many persons believe that there is a greater degree of uncertainty in the frequency, severity and timing variables for P/C insurance than there is in those variables for life insurance. I see several possible reasons for this belief. (The following observations are qualitative in nature. I have not quantified the differences; I am not even sure any valid quantification is possible at this time, given the current state of the art of valuation.)

First, there is the fact that the exposure base for life insurance is much better defined, larger and more homogeneous than that for most, if not all, of the many exposure bases for P/C insurance. In other words, the experience underlying a major mortality table is more credible than the experience underlying automobile insurance premium rates in Illinois, Massachusetts or New Jersey. The differences are even more important for coverages like medical malpractice or other forms of general liability insurance.

Second, there is the appearance that the inherent variability of frequency and severity are greater for many P/C coverages than for life insurance. It is true that the extended periods over which life insurance policies are in force add a great deal of uncertainty to

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the estimation of future mortality rates. However, the stability of claim severity remains in favor of life insurance.

Of course, competition is forcing the life insurance industry to cope with greater uncertainty in its pricing. As one example, the need for smoker/nonsmoker rating reduces the scope of the exposure base. Because of antiselection, it also reduces the assurance that the probable experience of persons actually insured is closely related to the experience on which the smoker/nonsmoker rates were based. There is substantial uncertainty about the reserves of both types of business.

The great bulk of the reserves of a P/C company is made up of loss and loss expense reserves. Reserving risk for a P/C company is essentially the same in character as the pricing risk. However, loss and loss expense reserves can take into account how experience with past periods of exposure has developed up to the valuation date so that the uncertainty is significantly less than that affecting pricing.

The great bulk of the reserves of a life company is made up of policy reserves. In a sense these are like the unearned premium reserves of a P/C company. However, the life reserves relate primarily to future periods of exposure, while the P/C reserves relate primarily to partially expired periods of coverage.

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C-2 reserving risk for a life company is also essentially the same in character as the pricing risk. However, because life reserves are not adjusted to reflect developing experience, the uncertainty in reserving may be just as large as it is in pricing.

Finally, let's take a look at the C-3 risk which can be called the interest risk.

I like to define the C-3 risk as follows:

It is the risk that adversely different amounts (1) of change in the anticipated values, and the degree of uncertainty therein, (2) of obligations and (3) of the assets, with which the obligations are being compared, will occur:

- a. simply because of a change in the interest environment, or
- b. because a change in the interest environment causes a change from anticipated experience as to the occurrence, amount or timing of items of cash flow making up the assets and obligations.

This definition, too, is a translation of the original that was provided by COVARA.

COVARA's definition reads as follows:

C-3 is the possibility of change in the rate of interest. ... Depending on the direction of the change in i , and on the relative "length" of assets as opposed to liabilities, the difference $D = A - L$ may be affected in one direction or the other. ... Obviously C-3 is closely related to the choice of an interest rate (or rates) for the valuation of assets or liabilities.

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COVARA's definition seems to take into account only the aspect of the C-3 risk addressed in item a in my translation. This definition describes the effects of that aspect in more detail than my translation does, referring also to the choice of a valuation interest rate or rates.

My translation asserts that there are two aspects to the C-3 risk. Only the change in the level of interest rates is involved in the first aspect. In the second aspect, there is not only risk of change in the level of interest rates but also the risk of consequential change in all three of the other valuation variables relating to the occurrence, amount and timing of cash flows.

The first aspect of the risk applies equally to the P/C and life businesses. It assumes that only interest rates are subject to change and that the occurrence, amount and timing of the cash flows underlying assets and obligations are not affected by changes in interest rates.

Every actuary knows that the present value of a fixed stream of cash flows changes when interest rates are changed. If there are two streams of cash flows with exactly matching amounts and timing, a change in interest rates will change the present values of both streams by the same amounts.

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However, if the amounts and timing of one of the streams are different from that of the other, then the present value of one of them will be changed more than that of the other. If the difference in change is adverse to the insurer, the insurer suffers a loss.

P/C insurers suffered serious losses from this aspect of the C-3 risk when interest rates spiked in the period running from late in 1979 to late in 1981.

As I said earlier, the insurers' problem was that they had invested long in 1978 and 1979 to take advantage of high interest rates which they believed would never go higher. This created a serious mismatch between their asset and obligation cash-flow streams.

When interest rates spiked, the insurers could not liquidate their investments without taking prohibitive reportable capital losses. As a result, the insurers had to use much, if not all, of the premium cash flow from new policies for paying losses under old policies instead of investing that cash flow in new, higher yielding assets.

In the second aspect of the risk, it is implied that the occurrence, amount and timing of the cash flows underlying an insurer's assets and obligations may be changed by a change in interest rates.

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First, let's assume that interest rates go down. Persons who borrowed at the higher rates will tend to want to reduce their borrowing costs by repaying their existing debts and replacing them with new debts carrying the new lower interest rates. The greater the difference between the old and new rates, the greater the tendency to want to repay existing debts early. Early repayment affects all three of the variables relating to occurrence, amount and timing of cash flows. Under these circumstances, lenders will suffer losses.

Both P/C and life insurers are lenders. Both are adversely affected by calls of bonds and early repayments of mortgages when interest rates go down.

Now let's assume that interest rates go up. Persons who invested at the lower rates will tend to want to increase their income by liquidating their existing investments and reinvesting the proceeds at the new higher rates. The greater the difference between the old and new rates, the greater the tendency to want to liquidate existing investments promptly. Early liquidation affects all three of the variables relating to occurrence, amount and timing of cash flows. Under these circumstances borrowers will suffer losses.

Both P/C and life insurers are, for purposes of the analysis of this aspect of the C-3 risk, borrowers from their policyholders. However, P/C policyholders usually don't have

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effective options for liquidating their investments in their policies. They may cancel midterm to replace their policies with those carrying low rates, but the costs are most often prohibitive when compared with the benefits.

Life policyholders quite often have effective options for liquidating their investments in their policies. In a large percentage of liquidations, policyholders don't even have to terminate the insurance protection afforded by their policies.

Even matching cash flows will not give protection against the adverse effects of this aspect of the C-3 risk. Life insurers have substantial exposure to loss no matter which way interest rates go. P/C insurers have the same exposure to loss because of declines in the interest rate but much less exposure related to increases in interest rates. Under these circumstances, P/C insurers are in a better position to control losses related to the C-3 risk.

Life insurers also suffered serious losses from this aspect of the C-3 risk when interest rates spiked in the period from late in 1979 to late in 1981. The insurers' problem was that their policyholders wanted to liquidate their investments in their policies. This produced a heavy demand for cash from life insurers that effectively changed the occurrence, amount and timing of their obligation cash flows with no compensating

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change in their asset cash flows. As with the P/C insurers, this created a serious mismatch between the life insurers' asset and obligation cash-flow streams.

When interest rates spiked, life (like P/C) insurers could not liquidate their investments without taking prohibitive reportable capital losses. As a result, the life insurers had to use much, if not all, of the premium cash flow from new policies for paying losses under old policies instead of investing that cash flow in new higher yielding assets.

On the basis of the factors I have discussed, I believe it is plain that both P/C and life insurance are subject to the C-1, C-2 and C-3 risks. These three broad classes of risk encompass all of the types of risk that directly affect insurance operations.

If these three broad classes encompass all of the types of risk directly affecting insurance operations, and if the "translation" versions of the COVARA definitions of the risks concerning the four valuation variables are valid, then it follows that the list of the four valuation variables named in the June 9, 1988, draft statement of principles is exhaustive.

The draft statement of principles recognizes that the degree of uncertainty affecting these variables, as they relate to any item of cash flow, reflects the nature of the transaction underlying the cash flow. Broadly speaking, an insurer's obligation cash

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flows involve greater uncertainty than its asset cash flows. However, the differences in the natures of transactions do not add to the number of variables used in valuing the cash flows arising out of the transactions.

Also, conditions external to the insurance business, such as the general state of the economy, can affect both the expected values and the degree of uncertainty in those expected values of the variables. However, differences in environmental conditions do not add to the number of variables used in valuing the cash flows affected by those conditions. If these conclusions are correct, then valuation principles are basically the same for both the P/C and the life business.

Principles are not the same as practices. Valuation practices for the two types of business may be different without conflicting with the underlying principles. In fact, it is almost certain that the practices will be different. Life insurers are unlikely to spend much time in refining valuation processes for loss reserves, and P/C insurers are unlikely to give much time to the valuation of policy reserves.

Valuation is more than the process of simply determining the expected values of assets and obligations under the uncertainties arising out of each of the three types of risk. There is also the process of determining the degree of uncertainty arising out of the combined effect of the risks. Although much good work has been done on the subject,

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the development of a satisfactory process for measuring this uncertainty is still in its early stages.

Principles Versus Standards of Practice

I have found that one of the trickiest jobs in preparing a statement of principles is distinguishing between principles and standards of practice.

You've already heard me say that the CAS Committee on Valuation Principles and Techniques has tossed out three of the "principles" that appeared in the first draft of the statement because those principles were really standards of practice.

The SOA Committee on Life Insurance Company Valuation Principles reports that it has had similar difficulties, so at least we are not alone.

In anticipation of this problem, the CAS Board developed tentative working definitions of a principle and of a standard of practice:

1. The basic characteristic of a principle is that it has universal acceptance by the general membership of the CAS. Is the statement that assets, obligations and considerations consist of cash flows universally accepted by the membership of the CAS? I don't know yet.

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One commenter on the June 9, 1988, draft didn't say this statement wasn't valid, he simply thought the definitions of assets and obligations should be consistent with the views of accountants. I don't necessarily agree with this premise.

Most would agree, nonetheless, that if a principle is valid, it is the best guide as to how to make a choice in a difficult situation in which the principle is involved.

2. Another characteristic of a valid principle is it will be constant over time. There is a difference between a principle being constant and our perception of the principle being constant. The principle of gravity has been constant over time; however, our understanding of the principle has changed. What does this say about the validity of the principles enumerated in our statement?
3. A principle is valid under all conditions. This implies that statements of principles should be completely general. For example, I think our first principle is completely general, so if it's valid under one condition, it's valid under all.
4. A principle is valid for all procedures. This doesn't say that a principle must be applied in all procedures in which it is involved. That would be a standard of practice. What it does say is that if the principle is applied in a procedure, the application produces an appropriate result. One of the principles in our

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statement recognizes the time value of money. The principle does not say that the time value of money must be taken into account in every procedure.

5. A principle may not be changed by fiat or by the agreement of the persons whose work is affected by it. The law of gravity cannot be repealed by Congress.

Let's also consider an abbreviated list of the characteristics of a standard of practice:

1. A standard may be accepted or changed by agreement among the members of the profession whose work is affected by the standard. What does this say about the wording "generally accepted accounting principles"? Would the word *standards* be better than *principles* in this case, specially when the words *generally accepted* appear in the phrase.
2. A standard may change with conditions. An example is the difference between statutory and GAAP accounting standards.
3. A standard may change with procedures. In the statutory statement for P/C companies, bonds are booked at amortized values. This procedure gives at least some recognition to the time value of money. In the same statement, loss and

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loss expense reserves are stated at ultimate value which gives no recognition to the time value of money.

The purpose of a standard is to promote uniformity of practice and comparability of results. I think most people would agree that these are worthy goals as long as the practice and results are generally acceptable, like GAAP.

One difference between standards of practice and principles that seems not to be captured by these lists is that standards of practice relate to behavior while principles identify relationships.

A standard says "should" or "must."

A principle identifies relationships between concepts like "assets" and "cash flows" or like "value" and certain "variables." A principle could identify a relationship between things as the law of gravity does.

Note that I have not said that principles "specify" relationships. At one time, I suggested that we should specify the mathematical relationship between "value" and the valuation variables. I am now persuaded that other members of the committee were right in urging that we should make our statements of principles as general as possible.

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Development of P/C Valuation Standards of Practice

I am a member of the valuation subcommittee of the Casualty Committee reporting to the Actuarial Standards Board.

The work of this subcommittee can't begin in earnest until a Statement of Valuation Principles has been approved by the Board of Directors of the CAS. It is the position of the Board that standards of practice must be based upon a sound foundation of principles. Standards of practice that ignore relationships identified by principles can lead to producing unacceptable results.

The subcommittee has met a couple of times to discuss the question of what aspects of the P/C business are related to valuation. We have also discussed what organizational concepts should guide the development of a coherent set of standards of practice. Some of us have even tried to develop an outline of a comprehensive valuation procedure to get a picture of what needs to be done to produce a valuation.

Bob Miccolis, who is a member of the CAS Committee on Valuation Principles and Techniques but not a member of the subcommittee, has written an excellent paper on how to produce a P/C valuation. It begins on page 281 of the CAS publication on the 1987 Discussion Paper Program on *Financial Analysis of Insurance Companies*.

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There are many other papers in actuarial and financial literature on the subjects of how to perform a valuation of an entire company or an analysis of risks related to assets or interest. The most serious shortage in the literature seems to be in the area of material relating to analysis of the C-2 risk. Work on this subject is just getting under way.

I understand that the subcommittee will probably meet again in the fall of 1988. Now that the CAS Board has approved release of an exposure draft of the Statement of Valuation Principles, the subcommittee may be able to start more intensive work on developing a set of valuation standards of practice. It is hard to estimate when we will have a final product even if we are able to start that work in the fall of 1988; but it looks like it will take a couple of years to finish the job completely.

The Valuation Actuary

For several years, there has been an effort to establish a legal requirement throughout the United States that each life insurance company should appoint a valuation actuary to be responsible for providing assurance that:

- a. the company's reserves adequately reflect the value of the obligations undertaken by the company in its insurance contracts, and
- b. the assets held in support of the reserves are adequate to provide cash in the amounts and at the times when it is needed to liquidate those obligations.

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A couple of years ago the CAS Board adopted the view that the effort to establish this requirement would not be successful before 1990.

The Board further decided that in the meantime the CAS would:

- a. monitor the progress of the effort in the area of life insurance, and
- b. at the same time support an effort to identify principles and set up standards of practice applicable to the valuation of P/C obligations and assets.

I have just given you a brief progress report on the CAS effort to identify P/C valuation principles and establish P/C valuation standards of practice. I believe that by 1990 the CAS may well have achieved its goal in this area.

The most serious work toward the establishment of the legal requirement of a valuation actuary for every life insurance company doing business in the United States is being done by a committee of life insurance industry actuaries and lawyers that is charged with the development of a new Standard Valuation Law.

The Standard Valuation Law, which has been subject to frequent revision in recent years, has been the vehicle through which regulators of the life insurance industry have sought assurance that the companies' reserves were adequate to assure payment of their obligations.

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Since late in the 1970s regulators have realized that conservatively stated reserves were not enough to assure payment of life company obligations. Regulators have come to understand that the statutory valuation of assets has often produced book values that were well above market values and that it is the market values that measure the availability of cash when it is needed. Because of the options available to life policyholders under their contracts, the demand for cash has exploded when interest rates have gone well above the average rate of investment income being realized on life company investments.

In the light of these considerations, regulators are seeking to revise the Standard Valuation Law so as to require the assurance of a valuation actuary that each life company's reserves and corresponding assets are at least adequate to liquidate its obligations. In fact, the regulators are looking for assurance that the companies have adequate margins in their reserves and supporting assets to provide for some degree of adverse deviation in experience.

As a result, the committee working on the revision of the Standard Valuation Law has a two-fold problem.

First, the committee has to draft a law that will satisfy regulators' desire for assurance of reserve/asset adequacy without raising the strongest kind of opposition from the

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industry. There is some evidence that managements may feel they are being deprived of their ability to use their independent judgments in determining the adequacy of the reserves and surplus of their respective companies.

Second, the committee has to develop standards of valuation practice for life insurance that will assure regulators that they can reasonably rely upon the opinion of the valuation actuaries as to reserve/asset adequacy.

Both aspects of this problem are difficult.

In particular, with regard to the development of valuation standards of practice, the committee is working without a set of valuation principles that has the approval of the SOA Board of Governors.

It is too early to tell whether the committee will ever succeed in its assignment.

However, it seems unlikely that a new law will be in effect in any state early enough to affect the life valuation procedure in that state before the end of 1990. Given the need to win approval for revision of the Standard Valuation Law in each of the fifty states and the District of Columbia, it seems unlikely that nationwide approval will be effective before the end of 1992. And right now I think these are optimistic estimates from the point of view of the committee.

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This implies that it is unlikely that it will be as early as 1990 that the P/C industry will have to begin to cope with the question of a requirement of having a valuation actuary for each P/C company. So the CAS should be well-prepared when and if the time comes. If the time of the P/C valuation actuary never comes, there will nevertheless still be a strong demand for valuations of P/C companies, and the CAS will have given its membership reliable guidance as to how to carry out those valuations on a sound basis.

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