

## VALUATION ACTUARIES AND PROPERTY-CASUALTY INSURANCE

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### BIOGRAPHY:

Ms. Witcraft is an Associate Member with Milliman & Robertson, Inc., Consultants and Actuaries, in their Minneapolis office. She has spent her entire career with Milliman & Robertson, having worked in both their Pasadena and San Francisco offices before establishing a casualty practice in Minneapolis. She received a Bachelor of Science degree, with distinction, in Statistics from Stanford University in 1981. She became a Fellow of the Casualty Actuarial Society in 1986 and a Member of the American Academy of Actuaries in 1984. She has previously written a CAS Discussion Paper and has been a member and Part Chairman of the Casualty Actuarial Society Examination Committee.

### ABSTRACT:

The concept of a valuation actuary (more recently referred to as an appointed actuary) has evolved more quickly for life insurance companies in the United States, Canada and Great Britain and, to a lesser extent, for property-casualty insurance companies in Canada than for property-casualty insurance companies in the United States. This paper provides background information regarding the evolution and current status of the concept for United States and British life insurers and property-casualty insurers in Canada. The paper then evaluates the application of this concept to property-casualty insurance companies in the United States, including the areas in which casualty actuaries, as a group, will need to expand their knowledge to be able to address the pertinent issues.

## VALUATION ACTUARIES AND PROPERTY-CASUALTY INSURANCE

Solvency of property-casualty insurance companies has received increasing attention by many parties - the media, regulators, insurance companies, stockholders, and policyholders. During the 1980s, a record number of property-casualty insurance companies became insolvent, thereby stretching the abilities of guarantee funds to meet their obligations and raising the specter of increased regulation, particularly at the Federal level. The causes of these insolvencies were many, including understatement of loss reserves, uncollectability of reinsurance, poor quality assets, mismanagement and outright fraud.

At the same time, the life insurance industry was facing similar issues regarding insolvency. For life insurance companies, many of these problems were exacerbated by significant changes in the economic environment, such as high interest rates, junk bonds, and new investment vehicles. In response to the concerns of all, the life insurance industry and its regulators have been working on a concept referred to as the valuation or appointed actuary. The function of the appointed actuary is to evaluate the solvency of an insurance company, including both asset and liability risks, under a broad range of economic and insurance assumptions. This concept was first brought to the fore in the United States for life insurance companies in the mid-1980s. Since that time, many issues have been addressed and a model regulation was adopted by the National Association of Insurance Commissioners (NAIC) in June, 1991. Regulations with similar purpose, but less breadth, have evolved in Canada with respect to both life and property-casualty insurance companies and, with much greater depth, for life insurance companies in Great Britain.

In the United States, casualty actuaries still primarily focus on the liability side of the balance sheet, particularly with respect to the types of

information provided to regulators. The objective of this paper is to provide background information regarding the role of appointed actuaries and to evaluate its application to casualty insurance.

## UNITED STATES LIFE INSURANCE COMPANIES

### *Background*

Life insurance companies in the United States have been subject to the Standard Valuation Law for more than 100 years. Under that regulation, minimum reserves are established based on specified methods and mortality and interest rate assumptions which vary by product. Because of the relatively stable, low interest rates and the limited investment vehicles available, this approach for establishing minimum reserves sufficed until the 1980s.

Since the early 1980s, interest rates have increased significantly and have become quite volatile. This led many policyholders to withdraw the guaranteed cash values of their life insurance policies to attain higher returns on their investments. Simultaneously, because of the increase in interest rates, the market values of many life insurance company assets decreased significantly below their book value. Thus, if an insurance company wanted to meet the demand for cash values from existing assets, surplus was reduced by the difference between the book and market values of liquidated assets. An alternative source of cash for meeting policyholder demands was current premium. In order to sell their products, however, insurance companies needed to reflect the current, high investment yields in pricing. When cash flow from premium was used to meet policyholder demands, the existing assets that remained had much lower interest yields than were used for pricing. Therefore, as policies matured and interest was credited, insurance companies showed operating losses because actual investment income was less than the amount that was credited to policyholders.

### *Appointed Actuaries*

The resulting impact of this problem on life insurance companies has led regulators, insurance companies and actuaries to develop the appointed actuary concept. Appointed actuaries focus their analyses on cash flow tests, particularly the sensitivity of the future cash flows of an insurance company to changes in interest rates. In practice, many of these cash flow tests extend for 40 years, covering the expected time until maturity of the bulk of the expected liabilities of life insurance companies. Most such tests currently only include existing business and its renewals, but not newly written business. Table 1 provides a list of the variables which appointed actuaries allow to vary with changes in interest rates.

**Table 1: Dependent Variables**

Investment Strategy
Yield on Assets
Market Value of Assets
Interest Rate on Borrowed Money
Asset Prepayment
Credited Interest
Policy Lapse Rates
Premium Suspension
Expense Inflation

While developing these relationships, life actuaries identified four types of risks, referred to as contingent or "C" risks. C-1 Risk is the risk of asset default. Many actuaries rely on the expertise of the investment department or investment advisors in projecting asset defaults. C-2 Risk is defined as pricing risk. That is, it is the risk that one of the assumptions, such as mortality, expense levels or interest rates, underlying the premium rate calculation proves to be inaccurate. The third risk, C-3 Risk, is interest rate risk and includes disintermediation and reinvestment risks. Disintermediation occurs when a company's assets are invested longer than its liabilities and it loses the opportunity to invest at currently high interest rates because current premium is used to meet cash flow demands. An example of this situation is that described above as having happened in the mid-1980s. Reinvestment risk is the

result of assets being invested with shorter maturities than liabilities, resulting in the risk that, when assets mature, the company may not be able to reinvest them at the promised liability interest rates. C-4 Risk is mismanagement risk and is considered to be beyond the scope of an appointed actuary's analysis.

As will be described in the next section, the current NAIC model regulation specifies a range of interest rate scenarios to be tested. Before these scenarios were identified, life actuaries considered two different ranges of variations in interest rate scenarios: those that could be reasonably anticipated and those that were plausible deviations. "Valuation reserves" were defined as the assets needed to assure a good and sufficient provision for contract obligations at a specified probability of ruin, such as 5%. "Contingency surplus," in combination with valuation reserves, was defined as the assets needed to assure a good and sufficient provision for contract obligations at a much lower probability of ruin, such as 1% or 0.1%. That is, reserves were established at a level sufficient to cover reasonably anticipated deviations in interest rates, while surplus was required to meet plausible deviations.

#### *NAIC Model Regulation*

The NAIC has adopted a model regulation regarding appointed actuaries for life insurance companies. It is anticipated that this regulation will be enacted in most or all states as early as for the 1992 Annual Statements. The regulation applies to the life insurance business of all life and health insurance companies.

The appointed actuary is to be appointed by or at the direction of the Board of Directors. Once appointed, the Commissioner of Insurance is to be notified of the appointment and of any changes. The qualifications for an appointed actuary are that he is:

- A member in good standing of the American Academy of Actuaries.
- Qualified according to the American Academy of Actuaries to sign opinions regarding life and health insurance Annual Statements.
- Familiar with the applicable valuation requirements.

In addition, the appointed actuary can not have violated insurance laws, been found guilty of fraud, and the like.

Many companies can be exempted because of their size and business mix. Table 2, summarizes the criteria for an exemption. As can be seen, in addition

	<u>A</u>	<u>B</u>	<u>C</u>
Admitted Assets	< \$20 million	\$20 million to \$100 million	\$100 million to \$500 million
Capital & Surplus/ Cash & Invested Assets	> 0.10	> 0.07	> 0.05
Reserves & Liabilities for Annuities & Deposits/Admitted Assets	< 0.30	< 0.40	< 0.50
Book Value of Non- Investment Grade Bonds/Capital & Surplus	< 0.50	< 0.50	< 0.50

to meeting the size requirements based on admitted assets, companies must pass certain ratio tests regarding capital and surplus, reserves, and invested assets. In addition, regardless of the category, the NAIC cannot have designated the company a first priority company in either of the two years preceding the analysis or a second priority company in each of the two years preceding the

analysis, unless such status has been satisfactorily resolved. Companies that fall into Categories A or B are exempted in all years. Those in Category C are exempt, as long as they have filed a complete valuation report in one of the two prior years. Exempt companies need to file an alternative opinion which focuses solely on liabilities. The minimum liabilities under either the alternative opinion or the full valuation report are those based on the Standard Valuation Law.

The model regulation outlines seven interest rate scenarios to be tested, as shown in Table 3. Other scenarios can be tested, subject to an overall maximum interest rate of 25% per annum and a minimum rate of 4% per annum.

The actuary must disclose in the opinion letter any other professional upon whom he has relied. Two types of professionals are expected to commonly be included in this paragraph. The first professionals are auditors who

have audited the underlying data. The second professionals are those qualified to make projections of the default risk of individual investments. Many actuaries feel that this is outside of the realm of their expertise.

The model regulation states that, in the opinion letter, the actuary should include the statement that the reserves and related actuarial values "are computed in accordance with presently accepted actuarial standards, consistently applied, and are fairly stated, in accordance with sound actuarial principles."

**Table 3: Interest Rate Scenarios**

1. Level with no deviation.
2. Uniformly increasing over ten years at 0.5% per year, then level.
3. Uniformly increasing at 1% per year for five years, then decreasing at 1% per year for five years, then level.
4. An immediate increase of 3%, then level.
5. Uniformly decreasing over ten years at 0.5% per year, then level.
6. Uniformly decreasing at 1% per year for five years, then increasing at 1% per year for five years, then level.
7. An immediate decrease of 3%, then level.

In theory, the actuary is not to sign the letter if that statement can not be included. There is a three-year phase-in period after the regulation becomes effective which allows insurers to avoid making up any initial reserve deficiency all in one year.

#### CANADIAN PROPERTY-CASUALTY INSURANCE COMPANIES

In recent years, Canada has introduced a reserve opinion requirement for property-casualty insurance companies. Reserve opinions have been required for life insurance companies for a longer period of time. For property-casualty companies, the opinions focus primarily on liabilities and do not yet encompass an evaluation of the adequacy of existing assets to meet those liabilities. Current regulations for life insurance companies require a broader scope and include such testing.

As for United States life companies, actuaries are appointed by or at the direction of the Board of Directors. If an actuary resigns or his appointment is revoked, a written statement must be submitted to the directors and the Superintendent of Insurance giving the actuary's reasons for the termination. This statement must be requested by the next appointed actuary for that company. The appointed actuary must be a Fellow of the Canadian Institute of Actuaries or another professional as approved by the Superintendent. The latter provision is only for a transition period which ends in 1992.

The scope of the reserve opinion for property-casualty insurance companies is somewhat broader than the current opinion for property-casualty insurance companies in the United States in that it includes policy reserves (unearned premium reserves and provisions for additional or return premiums on retrospectively-rated policies, both direct and reinsurance). The actuary is required to discuss any unusual problems and/or delays expected to be encountered in collecting balances due from reinsurers. Pending legislation would expand the

scope of the opinion to include an evaluation of the future condition of the insurance company over the next year. Future condition encompasses such factors as the adequacy of rates to be used for writing new business during the subsequent year.

In addition to an opinion letter, each property-casualty insurance company must submit two reports to the Superintendent of Insurance, one regarding policy reserves and one regarding claim reserves. The two reports can be combined, but all required topics relating to both types of reserves must be addressed in that report. The reports must include the amounts of the reserves and related liabilities included in the Annual Statement, the actuarially indicated amounts, and a reconciliation of any differences. In addition, the report must provide the details of the analysis underlying the derivation of the actuarially indicated amounts.

The opinion statement regarding unearned premium reserves must give the actuary's opinion as to whether the Statement reserve, less any deferred acquisition expenses, is greater than the amount needed to pay claims on the unearned portion of policies, when combined with amounts receivable from reinsurers and any other reserve that makes provision for those claims. With regard to loss reserves, the actuary must state his opinion as to whether the net reserves reported on the Annual Statement and anticipated recoveries from reinsurers are at least as great as the direct plus assumed liabilities.

#### **LIFE INSURANCE COMPANIES IN GREAT BRITAIN**

Great Britain has had regulations governing appointed actuaries for life insurance companies since the mid-1970s. The issues addressed by appointed actuaries in Great Britain are not dissimilar to those in the United States. In Great Britain, however, the appointed actuary has a greater role in advising the Board of Directors on all matters relevant to financial condition, providing more

than a status report once a year. In addition, the appointed actuary has greater discretion with regard to premium rates, reserves and dividend schedules, because, among other factors, these do not need to be filed in advance with regulatory authorities. The duty of the appointed actuary is to assess the limits within which the company must act regarding factors within their control and to so advise the company. In addition, it is the appointed actuary's duty to consider external factors and recommend any action necessary to avoid insolvency.

Appointed actuaries are responsible to both the company and the Department of Trade and Industry. If the company proposes a course of action that may lead the actuary to find that the financial condition of the company is not satisfactory, he must first notify the Board of Directors of the company. If the company persists with that course of action, the appointed actuary is then responsible for notifying the Department of Trade and Industry. As such, it is necessary that the appointed actuary have direct access to the Board of Directors.

It is the appointed actuary's responsibility to determine whether he is qualified, based on his previous experience, to accept an appointment. In addition, the appointed actuary must be a Fellow of the Institute of Actuaries or of the Faculty of Actuaries and must be at least 30 years old.

The appointed actuary is required to carry out, from time to time, and report on an investigation of the financial condition of the insurance company, including a valuation of liabilities. He must also ensure at all times that, if such an investigation were carried out, the results would be satisfactory. The scope of the investigation is required to include the following components of the company's financial position:

- The appropriateness of premium rates for new and renewal business.
- The nature of contracts in force and to be written.
- Existing investments and investment policy, including yields, cash flow, and the maturity schedules of both assets and liabilities.
- Marketing plans, including expected volume and cost of sales.
- Current and likely future levels of expenses.
- The extent of the company's ability to withstand capital losses on stocks without impairing the policyholder dividend scale.
- Reinsurance.
- The company's policy regarding the nature and timing of the allocation of profit among policyholders and/or stockholders.

With regard to the allocation of profits, the appointed actuary is required to report to the Board his observations and recommendations regarding any such allocations before they are approved. The appointed actuary is also required to annually provide a report, in a specified format, to the Department of Trade and Industry.

#### **UNITED STATES PROPERTY-CASUALTY INSURANCE COMPANIES**

##### ***1991 Annual Statement***

The requirements for the opinion letters to be filed with the 1991 Annual Statements for property-casualty insurance companies in the United States are not dissimilar to those for exempt life insurance companies in the United States in that they focus solely on liabilities. Actuaries preparing opinion letters for property-casualty companies must either be members of the Casualty Actuarial

Society or members of the American Academy of Actuaries who have been approved by its Casualty Practice Council.

The scope of the 1991 opinion for property-casualty companies in the United States encompasses loss and loss adjustment expense reserves. The actuary is now required to state his opinion on not only reserves net of reinsurance, but also direct and assumed reserves. If the company is expected to fail any of the NAIC's Insurance Regulatory Information System tests, the actuary is to include an explanation thereof in his opinion. The actuary is also required to comment on any problems anticipated in the collection of reinsurance recoveries for which the insurance company takes credit on their Annual Statement.

Actuaries' workpapers must be kept by insurance companies for seven years and must be made available to insurance examiners upon request. A brief description of the methods and assumptions used by the actuary are to be included in the opinion letter.

#### *Proposed Changes for the 1992 Annual Statement*

The NAIC Blanks Task Force has made several recommendations for changes to the requirements for property-casualty insurance companies' opinion letters to be effective with the 1992 Annual Statement. None of these recommendations affects the scope of the opinion. In fact, most of the recommendations are clarifications of previous changes. The two major exceptions include:

- The actuary is to be appointed by or by the authority of the Board of Directors, as is the case for life insurance companies in the United States and United Kingdom and for all insurance companies in Canada.
- The actuary is to provide the insurance company with an actuarial report as per Actuarial Standards Board Standard

No. 9. This report allows the descriptions of methods and assumptions to be removed from the opinion letter.

### *Possible Expansions*

From the requirements for life insurance companies in the United States, Canada and the United Kingdom and property-casualty insurance companies in Canada, several expansions of the scope of the current opinion letter for property-casualty insurance companies can be identified. These include:

- Addition of liabilities other than losses and loss adjustment expenses, such as unearned premium reserves and retrospective premiums.
- Comparison of the magnitude of the variability around the estimates of liabilities to capital and surplus.
- Complete cash flow testing, including runoff of both assets and liabilities.

Significant benefit would be provided to regulators, management, policyholders and investors, if the scope of actuaries' opinions were expanded to include these areas. Practical considerations affect the feasibility of implementing many of them, at least in the short term.

There are several liabilities, in addition to loss and loss adjustment expense reserves, that are subject to uncertainty. Frequently, the two largest such liabilities are unearned premium reserves and retrospective premiums. Actuaries currently have the tools available to evaluate the adequacy of the reserves for these liabilities. At present, however, statutory accounting rules regarding unearned premium reserves do not require that additional reserves be posted for any anticipated deficiencies. Thus, an evaluation of any projected unearned premium reserve deficiency would be of interest, but would not currently be included as an additional liability on statutory financial statements. The

additional liability could be recorded on GAAP financial statements, if the company prepares such statements.

Although much research has been done and much more is in progress regarding contingency margins for reserves, there has been consensus regarding neither the approaches to the measurement of variability nor the amount of contingency margin that should be required. This is illustrated by the difficulty that has existed in deriving minimum capital and surplus requirements for property-casualty insurance companies. This is an area in which there are significant opportunities for research, development, and discussion.

As for life insurance companies, there are serious ramifications to mismatch between assets and liabilities for property-casualty insurance companies. Cash flow testing, as described above for life insurance companies, can provide valuable information. As noted previously, however, measurement of the variability around estimates of loss and loss adjustment expense and unearned premium reserves is not well developed. Even less information has been developed regarding relationships between these liabilities and interest rates. Therefore, while cash flow testing for property-casualty insurance companies is beneficial, additional research and development is needed before it can be used as an effective regulatory tool. This is not to imply that such testing is not presently appropriate as a management tool, using currently available techniques.