



SOCIETY OF ACTUARIES

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resolved until regulations are written by the Treasury.

In these instances, one of our client companies asks three sensible questions. First, do we have to make a decision on this issue? If we do, is our position a reasonable one? And finally, what is the risk — what's the worst that can happen if we take this approach? If the answers to these questions suggest an answer is needed and the risk reasonable, then go ahead.

Poppel: What new legislation or clarifications to existing legislation do you expect in the short and long term?

Lakenbach: One rumor floating around is that, partly because of the demand for more revenue, certain favored tax treatments of life insurance are at risk. One is the deductibility for corporations of the first \$50,000 of life insurance; another is the treatment of any distributions from a life insurance contract, whether or not it is a MEC. Last, although I don't hear much talk about this one, maybe because of fear, is the tax treatment of the inside build-up. I've heard there may be some major tax changes next year.

We have to deal with the law and the environment as it is now. If you're going to wait until everything has been settled, you'll never come out with products, and you'll never develop solutions to the client's current needs.

Summary outline

Ghislain Nadeau has published a summary outline for part I-542. For more information, write him at 195 Begin, St-Romuald, Quebec, Canada G6W 2W8, or call (416) 644-8096.

Correction

In the color insert to the July/August issue of *The Actuary*, there was an error in a photo caption identifying Robert Hoskins and Ken Clark. Clark is at the far left of the photo; Hoskins is third from the left.

Book review

Text is pedagogically impeccable

by Jean Lemaire

Actuarial Mathematics by N. Bowers, H. Gerber, J. Hickman, D. Jones and C. Nesbitt. Published by the Society of Actuaries, 1986. 624 pages.

(Ed. Note: The following review is a condensation of a review that appeared in the April 1989 IAA Bulletin.)

The monumental new textbook, *Actuarial Mathematics*, published by the Society of Actuaries, has finally arrived after years of preparation by its five authors.

From a pedagogical point of view, the presentation of the book is impeccable. Interesting examples illustrate each new concept. Interpretations are provided for the most important formulas. Each chapter concludes with a lengthy series of exercises. The solutions of most exercises, without derivation, are to be found in an appendix. Among the seven appendices, appendix 4 is especially noteworthy, since it presents a comprehensive survey of the international actuarial notation.

The major innovation introduced by the book is the totally probabilistic approach to the mathematics of life contingencies. This breakthrough is definitely not going to facilitate the task of actuarial students, but it is long overdue. It is best illustrated by the very first example in the life insurance chapter. Example 4.1 reads, "The density function of the time-until-death random variable is assumed to be uniform over the range (0, 80). At a given force of interest δ , calculate the net single premium, the variance and the 90th percentile of the claim random variable for a whole life insurance of unit amount issued to (x)."

A basic knowledge of financial mathematics is assumed at all times, as well as a solid background in undergraduate calculus and probability theory. A three-page appendix reminds the reader of the most common probability distributions and of some formulas from the calculus of finite

differences. Otherwise, many theorems from calculus and probability theory are routinely used without restatement. The reader should be prepared for a constant use of conditional expectations, moment-generating functions, integration by parts, etc. Quite often only the key steps of a mathematical derivation are provided, and some computation is required to "move from one line to the next."

The book does not cover the following:

- Stochastic interest rates — the interest rates used to convert future payments to a present value are considered deterministic at all times and are usually taken as constants.
- Estimation of parameters — for example, the construction of mortality tables.
- Computing methods — issues like the optimal organization of input data, simulation, and computation in actuarial models.

The study of chapters 3 to 10, 14 and 15 is required for all SOA students as preparation for their most important examination on life contingencies. Chapter 2 and chapters 11 to 13 cover the material of the examination on risk theory. Students of the Casualty Actuarial Society must study chapters 3 to 7 and chapter 9 for their Part 4 examination. Since very little of the material is specifically geared to the United States or Canada, the book could be adopted by other actuarial associations and non-American universities.

Chapter 1 introduces the economics of insurance, using utility theory. It serves as a background for the remainder of the book, but it is not essential, since utility theory is not used in the sequel.

Chapters 2, 11, 12, and 13 provide an excellent and modern introduction to risk theory, despite some important recent developments that had to be bypassed. Chapter 2 gives a welcome survey of important probabilistic concepts, presented in an insurance framework. Chapter 11 focuses on the

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Actions of the Board of Governors — May 17, 1989 — Vancouver, B.C.

by Anthony T. Spano

AIDS Reports. The Board approved the report of the Committee on HIV Research, on projected AIDS mortality rates for the U.S. general population, and the report of the Task Force on the Financial Implications of AIDS. The Board urged appropriate public relations and publications efforts for these reports.

Constitutional Amendment on College Credit. The Board finished setting procedures in connection with a proposed amendment to the Society's Constitution regarding credit based on a course taken at a college, university, or other educational institution. The amendment would prevent the Society's Board from allowing a student to obtain credit for material in the educational syllabus based on such a course rather than by Society

examination, unless the procedure has first been approved by a majority of the Fellows voting in a referendum.

Elimination of Secretary and Treasurer Positions. The Board approved a resolution proposing amendments to the Society's Constitution that would eliminate the Secretary and Treasurer positions following the Society's 1990 Annual Meeting. The Secretary and Treasurer functions would then be assigned to two of the Society's Vice Presidents.

Society Meeting Dates and Sites. The Board approved guidelines for selecting Society meeting dates and sites that were prepared by a task force of the Continuing Education Policy Committee. The Board also approved a proposal to hold an upcoming Society spring meeting in late June or early July at a resort location to allow members to schedule family vacations around the meeting.

Expansion of Publications Services. The Board ratified actions taken by the Society's Executive Committee on March 9 and 10, 1989, to expand the Society's publications services. The expansion would involve publishing special volumes of the *Record* as necessary, expanding the *Reports* volume of the *Transactions* to include reports of committees other than experience studies committees, and publishing a comprehensive annual index of material published by the Society.

Waiver of Dues for Child Rearing. The Board extended from three to five the maximum number of years for which membership dues would be waived on account of child rearing.

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Impeccable text cont'd

computation of the aggregate claims distribution. The surplus process is analyzed in chapter 12. Some interesting applications of risk theory are outlined in chapter 13. How to compute net stop-loss premiums using the recursive formula of chapter 12 is shown, along with how stop-loss reinsurance is linked to a dividend formula in group insurance.

Chapter 3 introduces the basic random variables that will be used throughout the text. These include the survival function, the (continuous) time until death for a person aged x , the (discrete) curtate future lifetime, and the force of mortality. An illustrative mortality table, used in many exercises in the sequel, is presented and discussed.

Chapter 4 develops models for the most common insurances payable at the moment of death, including term, whole life and endowment. Classical variants are also presented. Chapter 5 focuses on similar developments for annuities. Some practitioners may regret the rather theoretical presentation of these and other chap-

ters. The continuous approach, based on integrals, is always presented before the discrete approach. Readers need to thoroughly study several chapters before getting acquainted with insurance practice.

Chapter 6 deals with net premiums and focuses on the financial loss random variable. This probabilistic approach allows the computation of not only net annual premiums, but also variances for the major contracts. The random variable "prospective future loss on a contract already in force" is investigated, in chapter 7, for both the continuous and the discrete case. The reserve is defined to be the expected value of this loss and is obtained for all usual types of policies.

Chapter 8 introduces multiple-life functions. In chapter 9 a single life is considered, but with multiple contingencies like withdrawal, retirement, death, and disability. The construction of multiple-decrement and associated single-decrement tables is applied to calculating actuarial present values of benefits and contributions for a participant in a pension plan in chapter 10.

Expenses are, at last, introduced in chapter 14. The individual model is

extended to incorporate acquisition and administrative expenses and accounting requirements. Nonforfeiture benefits and dividends are the subjects of chapter 15.

Chapters 16 through 19 develop special topics and are not included in examination material. They are nevertheless of extreme importance for practitioners. Chapter 16 computes actuarial present values, net and gross premiums, and net premium reserves for a wide variety of policies providing special annuity and insurance benefits. In chapter 17 elementary models for plans involving two lives are extended to a larger number of lives and to more complicated benefits. Chapter 18 provides a most welcome introduction to population theory. In chapter 19 aggregate models are applied to the evolution of retirement income benefits provided on a group basis. The major actuarial cost, or funding, methods for defined benefit plans are presented and analyzed.

Jean Lemaire is the Joseph Wharton Term Professor of Actuarial Science at The Wharton School of the University of Pennsylvania. He is Chairperson of ASTIN, the nonlife section of the International Actuarial Association (IAA). He is also Editor-in-Chief of the *IAA Bulletin*.