

# SOA members prepare for IACA '92

by Mary Hardiman Adams



**T**he preparations for the biennial meeting of the International Association of Consulting Actuaries (IACA), May 25 through 28, are truly an international effort.

Because of IACA '92's location, Vancouver, British Columbia, several Canadian actuaries head arrangements for lodging, program planning, and social activities. They include former SOA President Robin Leckie, John M. Christie, and Kenneth T. Ransby. Christopher J. White (Australia) is general chairman of the meeting. White, A. David Wilkie (U.K.), and I are members of the Professional Committee, chaired by Frank Livsey of Toronto. The Professional Committee is responsible for program content and papers.

Most of the IACA meeting is comprised of national reports and discussions of papers. National reports are expected from 16 countries, and more than 30 papers are to be presented. Papers are discussed by topic in formal sessions where it is assumed that the material has been read in advance. The "opener" summarizes the topic and lists the discussion points. An open discussion by session attendees follows. The "closer," who has the most difficult job of all, summarizes the debate and the conclusions of the discussion.

Canadian authors and their topics are:

- Peter Hirst, on the looming crisis in Canadian pension coverage
- J. Bruce MacDonald, on the future cost of the Canadian public pension plans
- Crawford E. Laing, on index-linked investments in Canada
- David F. Howe and Paul Saunders, on an international perspective on pension surpluses

Frank Livsey wrote the Canadian National Report, which includes a discussion of issues of immediate interest and importance to Canadian actuaries, such as life insurance company insolvency, the new responsibilities placed on the appointed actuary, and revisions in the Code of Professional Conduct.

From the United States, papers have been written by two former SOA Presidents. Thomas P. Bowles, Jr., discusses the role of the actuary as an arbitrator. Jack M. Bragg's paper is an update of a paper presented to AFIR in 1991 and covers historical real interest rates and the insolvency crisis.

Other U.S. papers were written by:

- F. Roger Atkins, on FAS 87 assumptions for non-U.S. deferred benefit plans
- Lawrence Mitchell, on the actuary in terms of the law, the attorney, the public, and the expert
- Kenneth G. Buffin and Josh G. Windsor, on stock option and equity participation plans from an international perspective
- Anna Rappaport, on retirement plans (defined benefit compared to defined contribution) structure in the 1990s
- Robert Dymowski, an overview of nonpension employee benefit programs
- David L. Hewitt, former president of the Conference of Consulting Actuaries, on the actuarial progress in continuing care retirement communities with notes concerning tensions among the different professions

John J. Haley and Arnold M. Malasky wrote the U.S. National Report, which provides an update on the general economy, the national social insurance systems, and current consulting issues.

All is not work, however, at the IACA meetings. One of the goals of the IACA sessions is to allow for informal meetings to exchange ideas with consulting actuaries from around the world. Some of the most pleasurable moments include seeing old friends who return to IACA every two years. Sightseeing, the guest speaker session, and farewell banquet are other enjoyable events.

Mary Hardiman Adams is consulting actuary with Buck Consultants, Inc. and past president of the Conference of Consulting Actuaries (formerly Conference of Actuaries in Public Practice).

## Risk aversion, rational insurance purchase in the long run

by Tapen Sinha  
and Jay Souderpandian

**T**he use of risk aversion assumption in insurance is widespread. The original resolution of the St. Petersburg paradox by Daniel Bernoulli in 1738 relied on an implicit logarithmic utility function. It is well known that such a utility function exhibits risk aversion. In this article, we investigated the long-run consequence of risk aversion on wealth distribution.

### Textbook explanation of insurance purchase

Economics of insurance starts with the assumption that individuals buying insurance are risk averse. For example, in *Actuarial Mathematics*, Bowers et al. give a series of examples where insurers and insureds both have concave utility of wealth. They prove that a mutually advantageous insurance contract will ensue if the maximum premium the insureds are willing to pay is at least as large as the minimum insurance premium the insurers are willing to charge. However, long-run consequences in wealth distribution of such an arrangement never are explored.

### Risk-averse, risk-loving buyers model

Consider an economy with three individuals: *A*, *B*, and *C*. Each is endowed with \$100. *A* is the insurer. He has no chance of losing any wealth, but *B* and *C* do. Therefore, *B* and *C* are potential insurance buyers. There is an exogenous risk with the potential of losing \$100 with probability of 0.50 in the first time period by both *B* and *C*. Let's look at how the economy evolves over time.

Let us assume that *B* is risk loving and *C* is risk averse. *A*, *B*, and *C* all have \$100 each in period 1. *A* can offer an actuarially fair insurance policy at a premium of \$50 each without a transactions cost.

### Evolution of economy

*B* is risk loving. He will buy policies only if the premium is less than \$50. Therefore, *B* will not buy policies

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### Risk aversion cont'd

offered by A even at \$50. B is facing a geometric distribution of losses over time: loss of \$100 in period 1 with probability  $1/2$ , loss of \$100 in period 2 with probability  $1/2^2$ , etc. B may be ruined by a single strike of loss. As B does not participate in the insurance game, his loss is independent of what happens to A or C.

A and C will engage in a mutually beneficial exchange of risk. Suppose C has a utility function  $u(x) = (x)^{0.5}$ . Then it is easy to see that C will be willing to pay 75% of his total wealth in premium no matter what the wealth level C has. (The result follows from the assumption about the form of the utility function. The assumption is made to simplify later calculations).

Several possibilities emerge. If no loss occurs in period 1, A will gain \$75. If loss occurs in period 1, A will end up with \$75 (= \$100 + \$75 - \$100). Therefore, we can think of the game restarting at period 2. The important point is that for C, it leads to reduction of wealth with certainty: C starts with \$100; he buys an insurance policy for \$75 and ends up with \$25. Then he spends another \$18.75 in the next round and ends up with \$6.25 and so on. However, for A that is not the case. At the end of period 1, A will have a probability distribution as follows  $P(A = \$175) = 0.5$  and  $P(A = \$75) = 0.5$ . At the end of period 2, the probability distribution is given by  $P(A = \$193.75) = 0.25$ ,  $P(A = \$168.75) = 0.25$ ,  $P(A = \$93.75) = 0.25$  and  $P(A = \$68.75) = 0.25$ , etc. Note that the expected wealth of A increases from \$100 to \$125 to \$131.25 and so on. In general, the wealth is getting redistributed from C to A.

#### Is there any escape from this diabolical process?

We conclude that in the long run, the risk-loving person is ruined because of lack of insurance purchase. But the risk-averse person buying insurance does not fare much better. He also is losing wealth over time. The only saving grace for C is that he never ends up with \$0. The wealth is redistributed to the insurer.

The process is very general. We can show, arguing along a similar line, that the wealth in such a model gets redistributed to the least risk-averse insurer. There does not appear to be any logical escape from this line of reasoning.

This begs the question of whether insurance purchase is actually

governed by any underlying optimizing decision process. Should we take the textbook analysis of demand for insurance seriously?

There is a cliché among insurance salesmen: insurance is never bought, but sold. Perhaps there is some truth to it.

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### Library cont'd

International Actuarial Association, *Bulletin* No. 13, Vol. 4, 1991, Index 1990-1991

Laboratory of Actuarial Mathematics, University of Copenhagen,

Working Papers:

- #87 - *A General Risk Process and its Priorities*, December 1990
- #88 - *A Boundary Crossing Result for the Brownian Motion*, December 1990
- #89 - *Empirical Bayes Estimation of the Binomial Parameter*, December 1990
- #90 - *Select Mortality and Other Durational Effects Modelled by Partially Observed Markov Chains*, December 1990
- #91 - *Numerical Evaluation of Markov Transition Probabilities Based on the Discretized Product Integral*, December 1990
- #92 - *Linear Prediction and Credibility in Continuous Time*, December 1990
- #93 - *Hattendorff's Theorem Generally Stated*, January 1991

Mulcahy, Richard, *Dealing with the Earnings Gap*, Staple Inn Actuarial Society, April 1991

*Report of the Committee on Professional Surveys*, Canadian Institute of Actuaries, 1990

*Taxation of Pensions*, William H. Aitken, paper presented at June 1991 meeting of Canadian Institute of Actuaries, 1991

### In memoriam

- R. Gordon Brown ASA 1925
- Paul W. Compeck ASA 1925
- A. Ross MacDonald FSA 1951, FCIA 1965, MAAA 1967

## Former Reagan adviser to speak at Chicago meeting



Dr. Beryl Sprinkel

The American public, still grappling with the 1991 recession that has spilled into 1992, is wondering how and when the country will get back on its feet. Keynote speaker Dr. Beryl Sprinkel, who served as chairman of the Council of Economic Advisers under the Reagan administration, will address this issue at the Society of Actuaries Chicago spring meeting, May 21-22, at the Chicago Hilton & Towers.

Sprinkel will speak at the Thursday morning general session, discussing prospects for economic recovery in 1992 and the probable impact on interest rates and other investment markets. He also will review monetary and fiscal policy developments in an election year and analyze inflation and growth prospects.

In addition, meeting participants can attend any of the more than 50 sessions that will focus on pension, investment, nontraditional marketing, and management topics. Sessions will feature topics such as the future of direct marketing, litigation risks of the pension actuary, whether GICs and other insurance company products are still alive, what service excellence means for actuaries, investment careers for actuaries, and how to hire actuaries. Meeting participants are encouraged to "Meet the Board" in an informal setting during Friday's continental breakfast.

Because the meeting hotel is centrally located in the famous Chicago Loop, attendees and their guests have several shopping and sightseeing options. The Chicago Hilton & Towers on Michigan Avenue overlooks Grant Park and Lake Michigan and is within walking distance of the Art Institute, Shedd Aquarium, and many shops and theaters along the Magnificent Mile.