



SOCIETY OF ACTUARIES

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LETTERS

Probabilities

Sir:

My fellow students may enjoy these new additions to actuarial notation:

$10/45P_{20}$ = Probability that a life age 20 will cease living for 10 years while struggling to pass actuarial exams, then will live to age 75.

$10P_{20} \cdot 2/43P_{30}$ = Probability that a life age 20 fails exams for the next 10 years, then stops living for 2 years to reach at least Associateship, then lives to age 75.

$10P_{20} \cdot q_{31}$ = Probability of a life age 30 living for one year while sitting for the same exam twice, is unsuccessful both times, commits suicide upon being deprived of study time.

$1/P_{30} \cdot q_{31}$ = Probability that a life age 20 gives up living for 10 years while studying for exams, then gets hit by a truck.

Some questions come to mind that other students must be wondering about. Why does it take up to two months to grade SOA multiple choice tests? Why should students be tested on material that is not available until a few months before the test? Why is there not a step-by-step solutions manual?

* * * * * Rick Edwards

Gross Premiums

Sir:

In conjunction with the New York spring meeting, both the Reinsurance and the Product Development Sections sponsored all-day seminars. The Reinsurance Section charged \$25. The charge for the Product Development seminar, including continental breakfast and luncheon, was \$60. At the same meeting, the Financial Reporting Section announced a one-day seminar in Chicago at a charge of \$100-\$150.

The Product Development Section priced their seminar to break even, and actually made a slight profit. It is my

understanding that the Reinsurance Section lost money. The fee for the Chicago seminar seems to reflect very conservative pricing on the part of the Financial Reporting Section.

The pricing results seem to indicate accurate pricing within the Product Development Section, inadequate pricing on the part of the Reinsurance Section, and a significant overcharge by the Financial Reporting Section. One wonders, is there any correlation to real life?

Gregory J. Carney

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JAI ALAI in Hartford

Sir:

Michael R. Weiler's win-place-show frequencies (April issue) assumed an equal probability for tie-breakers. Professors Richard Wright and Norman Bau at Georgia Tech have simulated jai alai using the exact playoff rules, demonstrating that the Weiler percentages remain substantially correct.

Using a data base of 100,000 games over 45 different seasons at 9 different fronts, we have the following frequency comparison:

TEAM	FIRST PLACE		SECOND PLACE		THIRD PLACE	
	Theoretical	Actual	Theoretical	Actual	Theoretical	Actual
1	16.3%	13.3%	17.7%	16.7%	15.1%	14.6%
2	16.3	14.7	17.7	17.3	15.1	15.4
3	13.9	2.8	16.5	16.6	14.4	15.1
4	12.4	11.6	13.4	13.4	13.7	14.0
5	10.2	11.9	10.9	11.7	13.0	13.2
6	10.2	11.9	7.9	8.1	11.2	10.9
7	8.9	10.9	8.3	8.7	9.1	8.8
8	11.8	12.9	7.6	7.5	8.4	8.0

The differences are attributable to: (a) handicapping, i.e., placing stronger teams in the fourth to eighth positions; and (b) disadvantage inherent in serving in double games which are more frequent than singles. Although Teams 1 and 2 have equal theoretical probabilities, the fact that all games begin with Team 1 serving to Team 2 gives the latter an edge.

To generate a simulation that better approximates reality, probabilities should be adjusted so that Teams 5, 6 and 7 are 10% stronger than Teams 1, 2 and 3, while Teams 4 and 8 are 5% stronger than 1, 2 and 3, i.e., oddsmen of roughly 52-48 and 51-49 instead of 50-50. Additionally, place the serving team at a 5% disadvantage in doubles, but the reverse in singles.

It is rare among professionals for one team to have as much as a 60-40 advantage over another. My experience says that if you can select players well enough to maintain a 55-45 edge, you can win as a bettor, even over an 18% gross receipts tax.

Kenneth P. Veit

Sir:

My son Timothy, who is an actuarial student, and I have collaborated on a computer-aided venture to understand more about jai alai — or to strike it rich — but really to introduce him to probability theory and interest him in serious programming.

Instead of writing mathematical questions, we programmed the computer to calculate, on the run, the probability of each possible outcome. Our numerical results are the same as those given by Messrs. Weiler and Shur.

Some statistics are of interest. There are 422,384 different sequences ending with a winner (first place only), and it took 20 hours to do half the job at 3 sequences per second on the Apple II Plus. Only half the job is necessary since the process for the event that begins with Player 1 winning the very first game is exactly the same as that which begins with Player 2, one substituting for the other.

Yuan Chang

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*(Continued from page 5)***Social Security System**

Sir:

The editorial (May issue) about the financial status of the U.S. Social Security system, based upon the recently published 1984 Trustees' Reports, may give readers a false sense of security.

The editorial suggests there may be problems with Medicare but does not report the Trustees' findings that HI benefit payments are projected to rise from 2.71% of taxable payroll in 1984 to over 9% of payroll by 2040; while total HI taxes from employers and employees are scheduled to rise from 2.6% of payroll in 1984 to only 2.9% in 1990 and later. Accordingly, scheduled taxes will pay for only about 40% of the projected benefits during the first half of the next century.

This "medical-care annuity" provided by Medicare is only part of the total benefits received by retired persons, who also receive "cash annuities." The Trustees' Reports indicate that the total cost of these cash annuities and medical-care annuities, as well as the other benefits provided by Social Security taxes, i.e., the total cost of the OASDI and HI program, will rise steadily from 14% of taxable payroll in 1984 to 25% of payroll by 2040 when all the baby boomers have retired. This is in marked contrast to scheduled financing from taxes and general revenue that is projected to rise from 14% of payroll in 1984 to 16% of payroll in 1990 and later.

All the preceding figures are based upon the Alternative II-B assumptions. Based upon the less optimistic Alternative III assumptions, the total cost of the OASDI and HI program would rise eventually to some 40% to 45% of taxable payroll; while scheduled income would still be only about 16% of payroll. On the average, during the first half of the next century, scheduled income would pay for only about 50% of projected OASDI and HI benefits.

In addition, the Supplementary Medical Insurance benefits, which now cost the equivalent of about 1% of taxable payroll, are projected to rise to at least 3% of payroll, and even more if the "deductible" is not increased as medical costs rise (although these figures are not published in the

Trustees' Reports which project SMI costs for only three years).

Granted, the general population may not be much interested in information of this type. But a Social Security program that may cost as much as 40% to 50% of payroll by the time today's youth retire, while scheduled income is estimated at only about 16% of payroll, should be portrayed as a major news event in an actuarial publication, whose readers are capable of understanding and acting upon such information.

A. Haeworth Robertson

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Belt Benchmarks

Sir:

One can easily see that yearly prices of protection (YPPs in Mr. Hunt's letter) are highly interest-sensitive, being high at high interest rate assumptions unless policies are participating and dividends are sufficiently increased.

The first year YPP would certainly be high compared with the corresponding ART, but later YPPs might be relatively low (even negative), perhaps decreasing through some policy durations.

The differences between YPP, ROR and IAC (interest-adjusted cost) arise mainly from different treatment of acquisition expenses applicable to cash value policies. The ROR method assumes that these expenses are to be amortized out of interest earned on the asset share. IAC lumps them together with the cost of term insurance on the amount at risk, and deducts them as a level amount from the gross premium. YPP also lumps them with term costs, but brings out their incidence realistically. But if we compare the YPPs of two competing cash value policies with each other and with ARTs we cannot tell which is the better buy because of their differing incidences by duration.

What we need is a method of separating acquisition expenses from term insurance costs and showing their discounted values at issue, given ARTs on the one hand and the interest assumption on the other.

Dinkar B. Koppikar

Ed. Note: Mr. Koppikar also points out an error, which was ours not Mr. Hunt's, in the formula for YPP. The denominator is divided into the entire expression to its left, not just into (CV + D).

A Stimulating Travelling Companion

Sir:

In regard to the Peterson article (March, 1984) we use tapes from the Enrolled Actuaries and the Conference meetings. We have variable speech control machines which run on batteries, in the car, or through a regular outlet. The machine controls the pitch of a voice, and makes possible increase in machine speed without affecting the pitch. With practice it is easy to listen to tapes running at 1½ to 2 times normal speed, so that those driving short distances can maximize their listening.

These machines are available through catalogues and some local stores.

Shepherd M. Holcombe

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Touché

Sir:

A common grammatical error is when "is when" is misused, as I believe was the case in your editorial sentence (June issue), "The worst case is when COULD is not just inelegant, but wrong, . . .". I do not consider your error egregious, and I support the Moorhead approach to punctuation of certain sentence ends.

Elmer Billman

Ed. Note: Mr. Billman kindly showed us the admonition in Archibald C. Jordan's *The Writer's Manual*, "Adverbial *is when*, *is where*, and *is because* clauses cannot be used as predicate nominatives in statements or definition". We live and gratefully learn.

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Elapsed Vs Effective

Sir:

I was unpleasantly surprised upon seeing the statistics in the April issue on the average time to attain Fellowship. It was my impression that the time had been reduced over the years.

Perhaps another study could be made giving allowance for interruptions, such as military service, sabbaticals, remotivation of a stalled candidate, marriage, divorce, or whatever.

Could Dr. Holmberg poll the 211 new Fellows of 1983 as to the number of effective years involved in elapsed time? I would define effective years as those during which the student was seriously studying. My own elapsed time was

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seven years because of recall to active Navy duty, but my effective time was about four. I would have been turned off at the prospect of an actuarial career if it meant studying for over eight years. Life is too short as it is!

Robert C. Tookey

To which Dr. Holmberg replies in part as follows:

"I am planning to examine the progress toward Fellowship of a cohort of candidates in terms of effective as well as elapsed time, but this project must await its turn. I would favor a stricter and more objective measure than Mr.

Tookey's "studying seriously". At present I would consider effective time to be that time spent actively writing the actuarial exams. This stricter criterion eliminates the need for polling, the results of which are subject to the vagaries of human memory and subjective judgement."

Oxymorons Sir:

I am an avid collector of oxymorons. My favorite is "government worker". After reading your June editorial concerning STYLE, I have developed a new favorite—"stylish actuary".

Jack R. Wahlquist

Common Stock Performance

Sir:

If the Real Annual Growth Rates in your column (8) ("Preparing For Retirement With Common Stocks", June issue) are rearranged according to the last year of the Period Observed, the result is:

<u>Last Year of Period Observed</u>	<u>Real Annual Growth</u>	<u>Last Year of Period Observed</u>	<u>Real Annual Growth</u>
1960	13.8%	1975	-2.5%
1965	9.6	1978	-3.1
1968	8.9	1980	2.1
1970	4.3	1983	6.5

In terms of purchasing power, the Dow Jones Industrial Average began to decline at the beginning of 1966, reaching a low point at about 26% of the 1966 level just before the bull market began in August 1982. There's still a long way to go before the 1966 purchasing power is won back, if it ever is.

Robert A. Nix

AN ACTUARY ELECTED TO PUBLIC OFFICE

We all know of actuaries in public service, but it is a bit unusual for one to be elected to public office. *The Actuary* has recently run across one such situation, and would be pleased to give recognition to others.

Robert E. Pung is a full-time executive and actuary of a life insurer, but he is also starting his fourth two-year term on the seven member Council of the City of Oshkosh, Wisconsin. In both 1982 and 1983 he was elected by his fellow Council members to serve as mayor. In 1984 he was succeeded by the first woman to serve as mayor of Oshkosh, after Mr. Pung had proposed her for the office.

Oshkosh is a city of 50,000 on the

bank of Lake Winnebago in east central Wisconsin, perhaps best known as the home of an overall manufacturer. The government is of the council-manager form, where the council election is at-large and non-partisan.

Readers may find one paragraph of Mr. Pung's letter of particular interest: "My actuarial training and experience were certainly helpful in my duties as a city father. My background was especially useful in analyzing budgets and projections. Economic downturn has forced many cities to cut back in services to meet financial squeezes; fortunately Oshkosh has been able to weather the storm. The ability to explain finances in an understandable way to an electorate is an important ability in this day and age."

C.L.T.

A NEW PUBLICATION

The Pension Section has notified its membership that a new publication, to be known as the *Pension Journal*, will make its first appearance in March, 1985. The Journal will provide a forum for the timely exchange of ideas and information of interest to pension actuaries.

Articles written by actuaries will provide the principal content; but the *Pension Journal* will also print letters to the editor, and will serve as a newsletter for the Pension Section. The August release of the Council of the Pension Section has more detail.

The September issue of *The Actuary* carries an article by Robert B. Likins entitled "Ideas for Potential Authors". To the list of "author-friendly" actuarial publications there listed, the *Pension Journal* is a welcome addition.

UNRIDDLING

Five readers have responded to David H. Raymond's proposal (May issue) for a contest in simplifying convoluted wordings in Society study material.

Richard M. Wenner undertook to simplify the Part 8 wording originally offered by Mr. Raymond, thus:

Original: In a stochastic world, it is impossible to determine ex ante which sequence of (investment) portfolio choices will realize the highest terminal value ex post.

Simplified: The game isn't over until it's over—and the final score isn't known until then either. (Courtesy of Yogi Berra).

Walton C. Achoy offered for simplification this sentence from Reinsurance Pricing, 10LB-411-84/10GB-307-84, p. 7:

Thus, the proposition that cost is the excess of the reinsurer's charges for expenses and profit plus the ceding company's expense of handling the reinsurance over the margin for profit in the ceding company's premium lies behind the rationale of the table, that the principal company's gain or loss (on the basic assumption that amounts reinsured would otherwise be declined) consists of the accumulated value at the end of thirty years, after surrender of any insurance then in force, of the annual cash increments or decrements.

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