SOCIETY OF ACTUARIES

Article from:

The Actuary

February 1969 – volume 3 - Issue 2

The Actuary

The Newsletter of the Society of Actuaries

VOLUME 3, NO. 2 FEBRUARY, 1969

FURTHER PERSPECTIVES ABOUT LONGEVITY

by Arthur Pedoe

Actuaries have been indebted to the Statistical Bureau of the Metropolitan Life for studies in vital statistics associated with the names of Dublin, Lew and Spiegelman and a recent study by Quint and Cody is in this tradition. It is headed *Preeminence and Mortality* and was presented to the Annual Meeting of the American Public Health Association last November. Jules V. Quint is Research Associate of the Company and retires next May after over 40 years in the Statistical Bureau.

The first sentence of the paper starts a train of thought: "It has been recognized since the early 1800's that there were wide differences in mortality by social class." I have a reference to a work by F. Corbaux in 1833: *On the natural and mathematical laws concerning population, vitality and mortality* which I understand deals with the mortality rates of different socioeconomic groups but on what statistics it is based I do not know. The first study known to actuaries is that by Dr. William Farr, Honorary Fellow of the Institute of Actuaries, and was made in 1851 as part of the work of the Registrar General's Office in England.

It does not require much prescience to recognize that education, standard of living, occupation and attitude towards healthy living determine the mortality of men and their families; these are all associated with the phrase "Social Class."

Some of the early life insurance companies were organized to take advantage of this. Andrew Webster has drawn my attention to J.I.A. 26.306 referring to an early prospectus of the *University Life* founded in 1825 which stated that of the

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GUIDELINES FOR PAPERS FOR THE TRANSACTIONS

by Josephine W. Beers
Chairman, Committee on Papers

Are you satisfied with the scope and the quality of the papers appearing in the *Transactions?*

If your answer is "yes," you need not read further; if it is "no," what are you going to do about it?

The Committee on Papers is charged with evaluating the papers submitted. We can do nothing about papers which are needed but which have not been written. Individual members might be asked to share their knowledge of particular subjects, but we believe that our Committee should not do the asking. It would be difficult for us to judge a paper fairly if we knew the identity of the author.

The Society members who, from time to time, have served on the Committee on Papers have expressed deep concern over both the gaps in our literature and the quality of the papers submitted. Various analyses have been made without, however, providing any suggestions for filling the gaps or improving the quality.

It may not surprise the members to learn that a very small percentage of our members, roughly 1%, submit papers. Even allowing for pressure of other duties, the percentage might well be a little higher.

The Committee is open to complaints from the members—we have had lots of complaints and few suggestions. Many of the complaints relate to the papers which are accepted and published, in particular to the large number of highly technical papers. The Committee has

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WASHINGTON STATE REGULATION GOVERNING REPLACEMENTS

by F. E. Huston
Chief Actuary,
Washington Insurance Department

This discussion of the cost comparison formula is prompted by the following key observations in Stuart Robertson's excellent article in the November 1968 issue of *The Actuary.*

"Quite independently from the question of what interest rate the policyholder could earn, a case could be made for a 5% annual rate on the grounds that it is the rate specified in most policies for policy loan interest. The use of a 5% rate in the regulation's formula produces, except for the approximations noted (*), precisely the policyowner's cost for the insurance as it would be if he were to maintain a full policy loan. This is a cost figure that has meaning to the owner, and it is arrived at without subjective consideration such as the rate of interest that an investor might reasonably earn."

(*Possible minor refinements have offsetting effects, particularly since they apply also to the "proposed replacement." See final footnotes for details.)

The following interest bases are briefly discussed below in relation to replacement regulations: (1) The above "full policy loan" basis, (2) the bases used in this department's regulation, and (3) the "rate of interest that an investor might reasonably earn."

I. *Full Policy Loan Basis*

This basis, which gives the cost of the "decreasing term" element of the policy, was adopted by this department in September 1967 for a specific temporary purpose. A footnote required the net unit costs (after federal income tax) based on illustrative tax brackets of

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20% and 40% (i.e. net loan interest rates of 4% and 3% respectively). Replacement proposals coming to our attention indicate relatively high tax brackets, and mainly replacements of participating permanent policies by nonpar reducing term insurance.

The formula is expressed as follows where P' is the annual premium (less dividend, if any), CV' and CV" are the cash values for the preceding and current policy years respectively, AMT RISK is the face amount less CV", and .05 is the loan interest rate. (This formula is used also in the "regulation" except for the specified interest basis.)

$$\frac{P' + .05\ CV'' - (CV'' - CV')}{AMT\ RISK} = \frac{P' + CV' - .95\ CV''}{AMT\ RISK}$$

SUMMARY FOR POLICYHOLDER may be expressed as follows where P', CV' and CV" are $20, $80 and $100 respectively.

1. Net cost to maintain a full policy loan, $5.00.

2. Net death benefit it provides for the year, $900.00.

3. Unit cost per $1,000 death benefit (1) ÷ (2), $5.55.

4. Unit cost after tax (40% tax bracket), $3.33.

Thus, the advantages of this basis are (1) its simplicity, (2) its practical meaning to the policyholder, (3) it is determined without subjective consideration such as the interest rate that an investor might reasonably earn, and (4) since it gives practically the precise cost of the decreasing term element of the policy, an "indoctrinated mutual funds" policyowner may intelligently decide whether to retain the policy on that basis, or to replace it by the proposed reducing term policy. However, for interest to be tax deductible on relatively large policies, it may be necessary to limit the amount of loan during the early policy years. (See IRS regulation on tax deductibility of policy loan interest.)

In a possible typical case, a successful doctor replaces four substantial life policies by a "reducing term to age 65" policy so as to invest "the difference" in mutual funds through a dually licensed agent who may continue to serve the affluent policyholder in such dual capacity.

II. *Regulation Interest Bases.*

The unit cost in the regulation is based on the interest rate specified in the policy for nonforfeiture values plus (for participating policies) the excess interest rate included in the dividend. As such excess interest rate is not readily available, the regulation specifies the use of 4% for all participating policies, as it was the average rate obtainable from the 1967 Annual Statements on file with this department (i.e. use .96 in the above formula for all participating policies).

A footnote on the cost comparison form states that said interest on cash values is not currently taxable to the policyholder (i.e. for illustrative tax bracket of 30% and 50% the above 4% rate for participating policies is equivalent to taxable interest rates of 5.7% and 8% respectively).

The regulation was adopted because of the recent increase in replacements due to the increase in dually licensed agents, the increased public interest in mutual funds and equity programs, and the need for a method of meaningful comparisons between life insurance policies.

After months of consideration and exchange of information, the regulation as adopted was generally acceptable to both dually licensed agents and life only agents. As stated in the ORDER FOR REGULATION: The regulation is not directed against ever replacing a life insurance policy, nor would it be in public interest for the legislature or this administrative agency to *restrict unfairly* the free exchange of such competitive forces.

III. *Interest Rate an Investor Might Reasonably Earn with Comparable Safety.*

This method is advocated by Dr. J. M. Belth of Indiana University in his excellent book *The Retail Price Structure in American Life Insurance.* It is an effective method under normal conditions when the interest rate to be used is selected by the person making the cost calculation, in the light of his own purposes.

This basis was not used in the regulation because (1) for "permanent to term" replacements, the interest ra affects the cost of only the existing policy under the abnormal condition of being replaced, (2) it therefore seemed impossible that this department could specify an interest rate that would not "restrict unfairly" the competitive position of either policy, and (3) quite independently from such subjective considerations, the interest rate on high grade tax-exempt bonds (which such affluent policyholder could purchase) currently exceeds 4.5%, compared to 4% specified in the regulation for participating policies. Said regulation basis may be considered, for this purpose, as an adaptation of the full policy loan method based on the scant 20% tax bracket.

If the regulation had been adopted a few years ago, subsequent net unit cost calculations would have been (1) unfavorably affected under the above basis due to increased interest rates on tax exempt bonds, and (2) favorably affected under the full policy loan basis due to increased federal income tax rates. Such changes have no effect c cost figures for decreasing term to a 65 insurance.

In contrast, under the "full policy loan" basis the policyholder may decide to retain the policy on that basis in lieu of replacing it by the proposed reducing term policy. The "regulation" method is effective by showing the unit cost based on the nontaxable 4% interest rate being generally earned on cash values of participating policies, which is equivalent to taxable interest rates of 5.7% and 8% based on 30% and 50% tax brackets respectively. Such important information is not disclosed under the third basis (the policy generally indicates only 2.5% interest on cash values). Thus, for this purpose, such basis would further "restrict unfairly" the cost competitive position of the existing policy.

Footnotes to opening comments. Principal technical refinements which, for this objective purpose, are not included in the formula; (1) dividends are not discounted to the first of the policy year, and (2) interest calculations are made on the fund at the e of the policy year rather than at th beginning of the year. Such combined corrections in representative unit costs

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of an "existing" whole life policy issued in 1968 at age 35 and a decreasing term to age 65 policy to be "proposed" in the 5th policy year are practically offsetting (with an approximate net annual difference of only 5¢).

Regarding several other items that have been questioned; (1) terminal dividends do not increase policy loan values and therefore should not be treated as cash values for this purpose, and (2) all expense, in effect, "are allocable to the net amount of risk" also in the full policy loan basis.

The regulation includes NOTICE TO POLICYHOLDER-IMPORTANT CONSIDERATIONS (other than cost). Such other considerations are included "for the policyholder's protection before effecting replacement of existing insurance with new insurance," and "This notice to you is for your protection and is required by Regulation No.R-68-1 of the Washington Insurance Commissioner." □

Guidelines for Papers

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found from experience that these highly technical papers are generally the most carefully prepared and we should remember that the activities of the Society members are tending to become more specialized.

Many papers submitted are rejected because of quality rather than subject. In the hope that more authors may be encouraged, the Committee submits the following guides to acceptability.

(1) *The subject should be of continuing interest to a reasonable number of actuaries.* We have declined a few papers which were well prepared, but either of only temporary interest (and more suited to informal discussion) or in a field too remote from actuarial pursuits.

(2) *The title and introductory statements should clearly define the purpose of the paper.* All of us specialists can appreciate an indication, at the beginning of the paper, whether this is a paper we want to study, skim over, or pass by.

(3) *The balance of the paper should be written with the stated purpose in mind.* Too many authors do not take the time to organize their thoughts into a logical order. It will often be easier for the author to make his thesis clear to others if he will make an outline in advance . . . and follow it faithfully. Rambling and interesting but irrelevant thoughts can leave his readers more confused than enlightened.

(4) *Each point to be made should be expressed precisely, and as simply as possible.* Symbols which are not in common use should be precisely defined. The thoughts should be expressed in a logical order. Most actuaries do not have the time or the inclination to struggle to discover what the author is trying to say. If the subject is outside the field of knowledge of most actuaries and not expressible in common language, it may be worthwhile to give enough background to the theory to make the paper comprehensible to the band of actuaries who are almost well enough versed to understand the language.

Whether writing in special terms or common English, the author should prove his conclusions, usually prior to stating them. Unsupported statements will not convince many actuaries.

(5) *Illustrations should appear reasonably realistic.* Unrealistic examples tend to make readers suspect that the theory might not work for the majority of cases in real life.

(6) *The paper should be carefully checked for accuracy.* Typographical errors impose a burden on our Committee and on our Editor. Accuracy of formulas and of stated conclusions are of supreme importance because of the measure of authority which, rightly or wrongly, attaches to a paper published in the *Transactions.*

There are probably a number of our members who could make very valuable contributions to our literature but lack the time to produce well-prepared papers, or who find it difficult to express themselves in language which would be easily understood by more than a few others. In conclusion, I would urge such members to consider enlisting friends or associates to assist them, either as ghost writers or as co-writers, so that our membership need not be deprived of the fruits of their experience. □

Letters

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out of insurance companies know, for example, that the funding of pension plans with individual insurance policies is inimical to the sponsor's best interests (except in an infinitesimal percentage of cases); yet insurance companies seldom dare take the initiative in advising policyholders to switch to the vastly less expensive group or self-insured vehicles; they continue to support the agents' bonanza.

The amount of contingency reserves held by the larger companies is determined in arbitrary ways not related to the policyholder's interest in lower premiums. If the larger companies were to run a simulation experiment to determine the amount of contingency reserves actually needed for, say, 99% chance of survival, I doubt that they would need as much surplus as they carry (and this after loading every liability heavily for contingencies beforehand). If such contingency funds were held in a common pool for all insurance companies, the aggregate of all companies' surplus could be reduced still further.

It is an affront to the intelligence of your readers to imply that the prospective policyholder should not ask the cost of insurance, but should trust his insurance company to look after his interests. He knows better: all companies have similar claim experience, but there are great differences in efficiency and the willingness of managements to share with him the fruits of such efficiency. It is the attempt to measure this willingness that concerns the insurance buyer. He wants to protect his survivors against the risk of mortality, but how can he, at the same time, protect his premium dollar against the very real risk of disappearing forever into contingency reserves, or commissions? This is the question. And we actuaries should help the consumer to define his question precisely—then find the answer; inasmuch as we may be the only ones who can unravel the complicated provisions of policies and compare monetary values with prices, this is our moral obligation.

I resent, moreover, the persistent attempts of certain elements to erode the dignity of the actuarial profession by making the Society into a lobbying or-

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