



The Actuary

The Newsletter of the Society of Actuaries

VOLUME 11, No. 3

MARCH, 1977

VALUATION AND NON-FORFEITURE LAWS

by John K. Booth

The last major change in the Valuation and Non-forfeiture Laws occurred during the 1940's when the work of the Guertin Committee resulted in the adoption by the National Association of Insurance Commissioners (NAIC) of the Standard Valuation and Non-forfeiture Laws. While there have been a number of amendments to these laws since their adoption, both insurance department and company actuaries have concluded that there is need for a general overhaul of these standard laws to make them more responsive to today's business and regulatory needs.

The Society of Actuaries established a Special Committee on Valuation and Non-forfeiture Laws and the NAIC established a Technical Task Force to review these laws. The report of the Society's Committee was published in January 1976 (see *The Actuary*, March 1976) and was reviewed by the NAIC Technical Task Force and the Actuarial Committee of the American Council of Life Insurance (ACLI). Subsequently, the Society's Committee made further studies covering items not previously reviewed and enlarging some of the recommendations of the original report.

The conclusions reached by the Society's Committee have proven generally acceptable to the other committees realizing that, in some instances, details have yet to be agreed upon before the recommendations become law.

Some of the subjects of major interest are as follows:

Basic Framework of Laws — The existing system has worked well over the period of its use and has in practice preserved reasonable equity between terminating and persisting policyholders. The Committee endorsed the principles underlying the present law and urged the retention of its basic framework, at the same time recommending a number of changes intended better to achieve its objectives.

Mortality Tables — The Society Special Committee made a number of test calculations of non-forfeiture benefits using a modern mortality table, but made no recommendations to replace the 1958 CSO Mortality Table. They did suggest an age setback of six years for females as a reasonable approximation to values developed from a separate female table. Subsequently, both the NAIC Technical Task Force on Valuation and Non-forfeiture Regulation and the American Council of Life Insurance asked the Society of Actuaries to develop new life insurance mortality tables separately for males and females in order to recognize mortality differentials by sex more pre-

cisely. The Society of Actuaries has appointed a Committee to Establish New Mortality Tables.

Linkage Between Valuation and Non-forfeiture Assumptions — One of the important recommendations of the Society of Actuaries Special Committee is the elimination of the linkage between non-forfeiture values and reserves. This recommendation was subsequently supplemented by a special analysis of the problem — see article by John R. Gardner in the November issue of *The Actuary*.

The Committee emphasized in this area and elsewhere that equity is best served by cash value factors that are closest to asset share assumptions and that reserves are not relevant in this regard.

Expense Allowances — The Society Special Committee examined the excess initial expense allowance used in the determination of minimum non-forfeiture benefits and concluded there was no urgent need to update it but that revisions could take the form of higher percentages of premiums and lower per thousand amounts. One of the members of the NAIC Technical Task Force did extensive work on this subject with the cooperation of the Life Office Management Association and the assistance of the Special Committee. He concluded that an updated initial expense allowance for all plans should be based upon 125% of premium plus \$10 per \$1000 of insurance rather than upon the present formula which is 65% of premium plus \$20 per \$1000 of insurance for the whole life plans. Because of the shift away from higher premium forms of insurance such as endowment and limited payment life plans, it was felt desirable to simplify the formula rather than to retain the characteristic of the current formula which grades down expense allowances as a percent of premium for the higher premium plans.

The new recommended formula is based on a functional cost analysis of expense data submitted to the Life Office Management Association by 25 large insurers and is more or less representative of the median results of this group of companies. No allowance is made for future inflation in excess first year costs largely because of the conclusion by the Society Special Committee that companies would make provision for such increases when establishing premium rates. The Society Special Committee verified the conclusions of this study but at the same time noted that it marked a significant departure from the approach of the Guertin Committee which attempted to set excess initial expense allowances at a level which would accommodate high cost companies.

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Published monthly (except July and August) by the SOCIETY OF ACTUARIES.
 208 S. LaSalle St., Chicago, Illinois, 60604, Robert T. Jackson, President, Jean-Jacques
 Deschênes, Secretary, and Ms. Anna M. Rappaport, Treasurer.

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 articles, criticisms, and discussions in this publication.

EDITORIAL

WE trust that the delay in sending out the February issue did not deter any of our readers from paying attention to Thomas Walsh's review of Barbara Lautzenheiser's article *Sex and the Single Table: Equal Monthly Retirement Income for the Sexes?* and that, as a consequence, Miss Lautzenheiser was deluged with requests for (free) reprints of the article which appeared originally in the *Employee Benefits Journal*.

The article is an excellent summary of the equality situation as it exists *today*—it may be worse *tomorrow*! If some of the court decisions were expanded, the logical conclusion would be the abolition of any selection or risk classification not only in life insurance but possibly in all forms of insurance. The industry and the actuaries have many problems to worry about but the reading of some of the courts' reasoning causes us to wonder if this problem of equality may not be the most serious one with which we are confronted.

To be concerned about the problem is easy but lamentation is no substitute for action and it is very difficult to decide what action we should take bearing in mind that basically the industry is faced with court interpretations of an existing law. To make matters more difficult, some of the states are trying to control the insurance operations of the insurers on this problem of equal rights. Fortunately, some of these proposed state regulations are being challenged by some of the insurers.

Could the actuaries be more helpful in educating the public and the courts? Have we done as well as we could in explaining the basic concepts of insurance? Take, for example, the expression "Expectation of life" which seems to crop up in all the arguments. "Expectation of life" was an unfortunate choice of words and we are still struggling to explain it to the lawyers and the laymen after many years. Perhaps it is impossible to avoid use of the terms but maybe we should try a little harder.

Another item that concerns us is the apparent lack of emphasis on the cooperative nature of any form of insurance. Sometimes, as we read the court decisions, we wonder if the court has even an elementary concept of what insurance is. The court seems to want to treat the individual as a separate entity without reference to the other policyholders. Maybe we should remind the public more often of the elementary principles of life insurance. As examples we quote two paragraphs from J. B. Maclean's *Life Insurance*.

"Every plan of insurance is, in its simplest terms, merely a method of spreading over a large number of persons a possible financial loss too serious to be conveniently borne by an individual."

The second quote is

"The first and most essential feature of every insurance plan, of whatever kind, is the cooperation of large numbers of persons who, in effect, agree to share the particular risk against which insurance is desired."

The current public relations activities of the life insurance industry are to be commended. Our suggestions are merely supplementary.

A.C.W.

PENSION PLAN TERMINOLOGY

The Terminology Report of the Committee on Pensions of the Society of Actuaries was initially undertaken to assist the Academy's Principles and Practices Committee with recommendations it had been preparing. As indicated in the exposure draft of the Terminology Report distributed in March 1975, the scope of the project was subsequently broadened.

Responses to the exposure draft were reviewed and resulted in a Modified Report which was submitted to the Board of Governors with the recommendation that it be adopted. At the Toronto meeting of the Society, the Board unanimously resolved that the Pension Committee should:

(1) Issue the Report entitled "Actuarial Terminology for Pension Plans" as an Opinion of the Pension Committee pursuant to Article X, paragraph 2 of the Constitution;

(2) Refer the Report to the Committee on Standard Notation and Nomenclature, and to the Board of Publications, to encourage the use of the new terminology in Society publications;

(3) Issue the Report to the membership;

(4) Refer the Report to appropriate committees of the American Academy of Actuaries and the Canadian Institute of Actuaries with a recommendation that these bodies encourage the use of the new terminology; and

(5) Continue discussions with Federal administrative officials about an extension of terminology definition, with particular emphasis on terms found in the Pension Reform Act and related issuances, working with appropriate committees of the American Academy of Actuaries.

The Report is offered to promote better understanding of and more consistent use of, pension terminology. Where the existing terminology may be misleading, the Committee has developed preferred terms. This is particularly true with respect to the term "liability." The Report also comments upon characteristics of valuation methods.

With regard to item 5, efforts are being made to work with government officials and as they progress reports will be made to the members.

Copies of the report can be obtained from the Pension Committee. □

FAR TOO MANY OLD PEOPLE?

by Wilbur M. Bolton

In Arthur Pedoe's article in the December 1976 issue, he quotes the U.S.H.E.W. Actuarial Study No. 72 (Bayo and McKay, July 1974) as projecting a downward trend in mortality for the next 25 years in the United States, such that "the assumed expectation of life for the year 2000 (males) is 13.59 years for age 65 as against 12.99 years for the years 1969-71; for female lives the corresponding figures are 18.12 and 16.83."

After flattening out in the 1960's, mortality at the middle and older adult ages has begun to improve again; and the improvement since the 1969-1971 U.S. population tables were constructed has been substantial: a 10% reduction for both males and females at ages 65 and up in the half dozen years from 1970 to 1976. This has profound implications in fields of interest to actuaries, and has been implicitly recognized by the appointment of a Society Committee (special) to establish new mortality tables.

For social insurance programs, it is vital that changing trends of this type be recognized; the U.S. social security system has retirement benefits currently "locked in" to a fixed retirement age of 65, set about 40 years ago. Life expectancies have lengthened as follows since 1940:

Year	o 21	o 65	T65/T21
1940	47.64	12.80	17.6%
1950	50.27	13.83	19.5
1960	51.64	14.39	20.7
1970	52.07	15.00	21.5
1976(est.)	53.40	16.00 !!	23%+?

I submit that it is unreasonable, at a time of ZPG and lengthening life span, to retain a fixed retirement age which becomes a "mandatory retirement age" for much of our population. The present OASDI taxes take a "moderate" tax from five workers to provide "reasonable" minimum income to one retired worker. (When disability beneficiaries, spouses and orphans are added in, the ratio of beneficiaries to active workers is about 1 to 3).

If no change is made in the benefit design of OASDI, within a few years we will be in a system where a severe tax has to be collected from three active

workers to support one retired worker at a subsistence level.

I'd like to see a nationwide poll to choose among these alternatives:

(1) Continue current retirement age at 65, increase employee (and employer) OASDI tax from 5.85% to 9% or 10%.

(2) Increase "usual" retirement age from 65 to 70, in steps; (i.e., to 66 in January 1979; to 67 in January 1983; etc.) and continue employee/employer tax in the 6-7% range.

The current OASDI structure is becoming an engine of inflation:

(A) Congress increases benefits to retired and disabled lives;

(B) This induces more people to retire early (or, in some cases, to develop marginally disabling illnesses);

(C) Which causes actual outgo to exceed projected outgo, and OASDI tax payments to fall short of projected taxes; so

(D) Congress increases the employer/employee tax;

(E) Employees react to reduction in living standards by seeking pay raises; unions go on strike;

(F) Employers raise pay to employees; increased tax and pay increase reduce profit margins; so employer increases prices to customers;

(G) Some customers are OASDI beneficiaries, suffer decline in living standards, write their Congressman. (Return to A, and recycle).

On a macroeconomic level, this recurrent cycle is increasing the prices of U.S. goods beyond levels competitive with other nations; and is accompanied by a gradual decay in the strength of our national economy compared to nations with more stable currencies or less active social welfare politicians. This decay and gradual reduction in the ability of employers to invest in new, more efficient equipment will not be rectified unless the U.S. Congress takes some corrective action along the lines of either reducing OASDI benefits, or (and this amounts to the same thing) increasing the age to which you have to work for a specified retirement income.

To return to the questions from Mr. Pedoe's article which launched this letter, perhaps the answer to "too many old people" is to re-define the breakpoint age

ANNUAL REPORT, SGLI AND VGLI

by Donald C. Pailler

This is the eleventh in a series of annual reports by the Veterans Administration on the Servicemen's Group Life Insurance Program. The report gives general information on the Programs including a brief history from the inception in 1965 through the Veterans Insurance Act of 1974 and the introduction of the VGLI and Retired Reserve coverages, and details on the coverages and operation of the SGLI Program for the year ending June 30, 1976.

Financial statements are given of the operation of the Program, separately for SGLI (the group insurance coverage for active servicemen, ready reserves and part-time reserves and the individual term to age 60 coverage of retired reserves) and for VGLI (the individual insurance on a five year term plan serving as a low-cost postponement of the original SGLI conversion privilege). A printing error introduced a certain amount of confusion for failing to label the second of these statements as applicable to VGLI.

Of special interest is the study of mortality experience for the period 1973 through 1975. This covers all service personnel on active-duty. The results are presented by age group and by branch of service, with accidental death rates shown separately. Exposure and deaths for Vietnam are excluded. Similar information is also shown separately for officers and enlisted personnel. Overall experience for each calendar year under the Program for the 120 day extension period following separation from active duty is also presented.

Copies of this report have been distributed to companies participating in the Servicemen's Group Life Insurance Program. Single copies may be obtained by writing to N. J. Prendergast, Chief, Insurance Actuarial Staff, Veterans Administration Center, P. O. Box 8079, Philadelphia, PA 19101. □

as to what constitutes old, say from 65 to 68 or 70; and if the dip in mortality from 1970 to 1976 is not just a fluctuation, we already have a longer expectation of life than was forecast in U.S.H.E.W. Actuarial Study No. 72, for the year 2001. □

Valuation and Non-Forfeiture Laws

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Single Premium Life Insurance Policies and Paid-up Non-forfeiture Benefits — Under current conditions, new money yields would produce gross single premiums lower than the minimum cash surrender value required by law. The Society Special Committee recommended the adoption of a higher non-forfeiture interest rate for single premium life insurance than that for annual premium life insurance but for conservatism suggested the use of an interest rate to set minimum reserves for single premium life insurance lower than that for single premium annuities.

The Committee also recommended that, in computing minimum non-forfeiture benefits and the minimum cash surrender value of such benefits, companies be permitted to use an interest rate higher than that used to determine cash surrender values for the basic policy. This would enable an insurer to offer more liberal amounts or terms of insurance as a paid-up non-forfeiture benefit on the basis of its current single premium life insurance rates without having to increase cash surrender values.

Legislation — In October 1976, draft legislation incorporating the recommendations of the Society Special Committee was submitted to the NAIC Technical Task Force on Valuation and Non-forfeiture Value Regulation and was released by the NAIC as an exposure draft in December 1976. Meanwhile a number of other changes in the Standard Valuation and Non-forfeiture Laws were developed by the NAIC Technical Task Force and the Council Actuarial Committee. The following important recommendations come under this head:

Standard Non-forfeiture Law for Individual Deferred Annuities — In recent years the rise in investment yields and the favored treatment of Individual Retirement Annuities under ERISA have increased the market for deferred individual annuities dramatically. About the time the Society Special Committee finished its report, the NAIC Technical Task Force and a Sub-committee of the ACLI began working on a non-forfeiture law for individual deferred annuities. The result of over a year's effort is the Standard Non-forfeiture Law for Individual Deferred Annuities which was proposed by the NAIC Task Force and adopted by the NAIC in December, 1976.

The new law marks a significant departure from past non-forfeiture legislation inasmuch as it is the first such law to base minimum non-forfeiture values directly on gross annuity considerations. The retrospective approach was adopted since many annuities sold today are of the flexible premium variety which makes it difficult to use a prospective approach because of lack of knowledge of future premiums and benefits. The proposal defines minimum non-forfeiture values in terms of an accumulation at 3% interest of 65% of the net considerations for the first contract year and 87½% of net considerations for the second and later contract years. Net considerations are defined as gross considerations less an annual contract charge of \$30 and less a collection charge of \$1.25 per consideration credited. For single premium deferred annuities,

non-forfeiture values are defined as an accumulation at 3% interest of 90% of the net consideration where the net consideration is equal to the gross consideration less a single contract charge of \$75. The level of minimum non-forfeiture values appears to meet the guidelines expressed by the Society of Actuaries Special Committee which suggests a conservative long-term interest accumulation rate, allowance for policy fee and accumulation percentages which provide ample margin for covering reasonable acquisition and administrative costs and also reasonable provision for profit and dividend margins and the cost of annuity guarantees.

Increase in Statutory Interest Rates and Other Changes In The Standard Valuation Law and In The Standard Non-forfeiture Law For Life Insurance — Of all the proposed changes in the valuation and non-forfeiture laws, the most urgently needed are increases in the statutory interest rates. Insurers are hindered in recognizing current yields in pricing life insurance and annuity products by reserve requirements based on too low a statutory interest rate. Excessive reserve requirements cause surplus strains, unless insurers either limit their sales or increase prices. For those policies for which non-forfeiture values are required, unrealistic statutory interest rates prevent insurers who wish to do so from offering contracts with lower gross premiums and lower non-forfeiture values than those used for their current policies.

Along with the rise in insurers' investment earnings which averaged about 6.5% for the industry in 1975, has come a greater refinement in the pricing of different products to recognize the higher yields on new investments as compared to the average portfolio yield. For 1975 the yield on new fixed-income investments by 60 companies accounting for about 65% of assets held in general accounts of life insurance companies averaged 9.87%.

The NAIC Technical Task Force assisted by the ACLI developed specific recommendations to increase and refine the structure of statutory interest rates in the Standard Valuation and Non-forfeiture Laws which were approved by the NAIC in December 1976. These recommendations will:

- (1) Increase the statutory valuation interest rate for newly purchased group annuities and for newly issued single premium individual immediate annuities from 6% to 7½%.
- (2) Increase the statutory valuation interest rate for newly issued life insurance and individual deferred annuities from 4% to 5½% for single premium business and to 4½% for annual premium business.
- (3) Increase the statutory non-forfeiture interest rate for newly issued life insurance from 4% to 6½% for single premium business and to 5½% for annual premium business.
- (4) Remove the provisions in the Standard Valuation and Non-forfeiture Laws which stipulate that all statutory valuation and non-forfeiture interest rates shall be 3½% on and after January 1, 1986.

The removal of the provision for automatic reversion of statutory interest rates to 3½% in 1986 is especially important. Since a drop of statutory interest rates in any state to

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Valuation and Non-Forfeiture Laws

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the 3½% level would affect all companies doing business in that state, the provision threatens to produce such abrupt surplus strains as to severely dislocate or curtail the sale of new life insurance and annuity products.

In addition to the changes in statutory interest rates, the proposal of the NAIC Technical Task Force eliminates the linkage between valuation and non-forfeiture interest rates, defines the commissioners reserve valuation method for most individual deferred annuities and makes a change in the computation of minimum reserves for policies which have heretofore been subject to the deficiency reserve statute.

Annuity Reserve Valuation Method — The new definition of the Commissioners Annuity Reserve Valuation Method is designed to clarify the intent of the existing statute. The method would require the comparison of the present value of future guaranteed benefits at each duration with the present value of future required premiums to that duration. The greatest excess revealed by these comparisons would be the minimum reserve for the contract. Thus, if an intermediate non-forfeiture value under an individual deferred annuity, when compared with required premiums to that point, produced an excess with a greater present value than the excess of the present value of the normal annuity benefits over all scheduled future premiums, the former excess would establish the minimum reserve.

Deficiency Reserves — The change in computation of reserves for policies which have heretofore been subject to deficiency reserve requirements, would define the minimum required reserve on such a policy as the present value of future benefits less the present value of future valuation net premiums calculated by the method (commissioners or net level) actually used in computing the reserve for that policy but using the minimum valuation standards of mortality and rate of interest. However, the gross premium on the policy would be substituted in this reserve calculation at each contract year where it is less than the valuation net premium described above. If the reserve calculated according to the mortality table, rate of interest and valuation method actually used for the policy were a greater reserve, it would become the minimum reserve for that policy. Thus, a company could strengthen its reserve without being subject to additional reserve requirements if its gross premiums are less than actual net valuation premiums but greater than minimum net valuation premiums.

Increase in Statutory Valuation Interest Rate for Existing Group Annuities — Another recommendation under consideration by the NAIC would increase the statutory valuation interest rate used in determining minimum reserve requirements from 3½% to 5% for group annuities purchased prior to the operative date of the 1972 NAIC Amendments to the Standard

Valuation Law. This change would recognize that maturities and reinvestments of the funds underlying much of the old group annuity business which was purchased in the 1940's and 1950's, have raised the average yield on this block of business to about 6%. Any destrengthening of group annuity reserves to the new minimum standard would have to be approved by the insurance commissioner just as any other reserve destrengthening. If excessive reserve requirements on old blocks of group annuity business were reduced, pension writers would have increased capacity either to write non-par group annuity business to fund terminated pension plans or to increase dividends to group annuity contract holders. One principal argument for reducing excessive reserve standards for pension business is that if the private sector, because of too conservative reserve standards, is unable to provide coverage for terminated pension plans, the federal Pension Benefit Guaranty Corporation will have to provide it, and an important segment of the insurance market will be lost to the government.

Prospects For the Future — The recommendations of the Society of Actuaries Special Committee and of the NAIC Technical Task Force are probably the most significant proposed changes in the Standard Valuation and Non-forfeiture Laws since they were adopted in the 1940's. As already mentioned, the NAIC adopted or is expected to adopt certain of these recommendations.

When these changes are enacted into law, they should have a material effect on pricing and on the availability of insurance products in the years ahead. However, periodic changes in statutory interest rates represent only a partial solution to the problem of keeping the valuation and non-forfeiture laws in concord with changes in the economy. At a time when the pricing of many life insurance and annuity products is closely related to yields on life insurers' new investments, it is essential to develop a valuation system which can respond to changes in interest rates in a timely manner without being retarded by the years-long process of changing 50 state laws. Although it has been suggested that the valuation and non-forfeiture laws might be abolished so that this objective could be accomplished by regulation, there is no guarantee that such regulation would be uniform throughout the states. What is needed is a new form for the Standard Laws that will make them respond uniformly, automatically, and appropriately to changes in the economy. This could require a complete overhaul of the valuation system and the methods of determining solvency that have been used throughout the past century in the United States. Already committees of the Society of Actuaries and the American Council of Life Insurance have begun to work on this project, but because of its complexity any solution may be several years away. A better means to keep the valuation and non-forfeiture laws both uniform and current would restore and maintain the industry's ability to respond more effectively to the insurance needs of the public. □

Actuarial Meetings

May 12, The Baltimore Actuaries Club
May 25, Joint Meeting of Boston and
Hartford Actuaries Clubs

Death

Dennis N. Warters

LETTERS

Cost Comparisons

Sir:

Mr. Corbett was, I think, headed in the right direction in his letter (January 1977) supporting "event-specific" cost comparison methods as opposed to "group-average" methods. But he failed to reach the clinching point that lies at the end of his argument.

The clincher is that if one takes for granted, as Mr. Corbett correctly urges, that people who are at all interested in comparing prices are very unlikely to surrender their policies in any of the early years, and if therefore one uses voluntary termination rates that are close to zero up to at least the tenth policy year, the results produced by "group-average" and "event-specific" methods resemble each other like Tweedledum and Tweedledee.

My own most serious criticism of the work done by the C.I.A. Committee is that it failed to define clearly enough what it was trying to do, and hence it fell into the trap of comparing results by using indexes of rank correlation. The purpose of cost comparison is *not* to help people make close distinctions among policies that are close to each other in price attractiveness; if that were the purpose, none of the methods is precise enough to do the job. The purpose, properly conceived, is to protect buyers from inadvertently acquiring policies that are seriously overpriced in relation to others that are available. The Committee would, I believe, have found the 20-year interest-adjusted index adequate for this limited but necessary task.

E. J. Moorhead

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Administrative Costs Ratios

Sir:

Mr. Jeffery is struck by the fact that company rankings sometimes change with a change in the rate of interest expected by the prospective purchaser. Since interest is a cost to the policyowner, cost should increase with the interest rate and the increase will be steeper for the company with higher reserves per thousand unless offset by larger net increases in reserves or by a credit to poli-

Aggregate Administrative Costs Ratios

Sir:

My first reaction on reading Hillary Fisher's article, (*The Actuary*, January 1977) was one of skepticism. The author himself describes several drawbacks to the method which would render inter-company comparisons of doubtful value. Others could be mentioned. In my mind one of the most serious criticisms is that the choice of mean insurance in force as the basis for reducing the aggregate cost to a unit value unduly favors companies with a high average-size policy in force.

However, the proof is in the pudding. As a brief test I chose to apply the method to the 1975 Ordinary Insurance Participating results of my company and two other prominent Canadian companies of similar maturity and size. Detailed results are contained in the table below. Since I had some difficulty in choosing an appropriate interest rate for the calculations, I chose to complete them using a range of rates which would surely bracket the most appropriate. The following table shows the rankings which are produced by the cost per thousand at three different interest rates and by the actual yield rate:

	Company A	Company B	Company C
Cost per thousand: $i = 4\%$	3	1	2
$i = 6\%$	2	1	3
$i = 8\%$	1	2	3
Actual yield rate	3	2	1

Perhaps the complete inconsistency of the rankings produced is one of the most telling blows against using this method as a basis for inter-company comparison. Nor are the differences small; the cost per thousand for Company C is 42¢ or 11% lower than Company A at 4%, and \$2.55 or 33% higher than Company A at 8%. Analysis suggests that different rankings are produced by different interest rates because of the average reserve per thousand of insurance in force is different between the companies.

The author suggests that the proper interest rate to use is one which a policyholder can realistically expect to earn. However, the rate chosen can dramatically affect company rankings for reasons which have nothing to do with the policyholders' ultimate net cost.

From a knowledge of the relative expense levels of the three companies gained from other kinds of inter-company expense comparisons, it appears that the cost per thou-

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cyowners of investment income on the corresponding increase in assets.

If a prospective purchaser does not have a definite interest rate in mind, he is bound to obtain results that are indefinite. At present, and possibly for the next few years, money can be saved or invested at a long-term rate of around 8%, with safety and liquidity commensurate with life insurance equities. A net after-tax rate, therefore, would be, perhaps, 6% for the average person. Company B, then, appears to have a clear edge over A and C, although if a full allowance for inflation were added in, Company A might rank first.

Mr. Jeffrey's comments do raise the question whether cost rankings due to differences in reserves per thousand are valid. Other factors being equal, will a

young company rank higher than an old one — and should it? Or, if reserves per thousand are lower in one company because it has more term insurance on its books, is the comparison between companies or between kinds of insurance? More interest on high reserves is offset to some extent by larger reserve increases, which in turn are offset by larger reserves released. Therefore it is hard to tell.

Mr. Jeffery concludes that a 6% interest rate is about right because the rankings correlate with the expense levels of the companies. To a policyowner costs depend not only on company expenses but also on company investment return, the slopes of dividend and cash value scales, as well as the

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Aggregate Administrative Cost Ratios

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sand at or around the 6% level is a reasonably good approximation to the companies performance in this respect. Is it a coincidence that this just happens to be in the neighborhood of the dividend interest rates in force around that time?

J. E. Jeffery

**Study of 1975 Aggregate Administrative Costs
Three Prominent Canadian Companies
Ordinary Insurance, Participating**

(000's omitted)

	Company A	Company B	Company C
(P) Payments by policyholders (note 1.)	\$ 175,820	\$ 120,585	\$ 102,271
(B) Benefits (note 2.)	102,496	85,937	75,065
P - B	73,324	34,648	27,206
(Ro) Initial Reserve (note 3.)	1,072,421	854,751	731,638
(ΔRo) Reserve Increase (note 4.)	77,873	52,879	43,220
(C ⁱ) Administrative Cost: i=4%	39,046	16,333	13,531
i=6%	60,201	33,102	27,864
i=8%	80,927	49,529	41,905
(M) Mean Insurance in force (note 5.)	10,427,276	6,165,047	4,065,501
(C ⁱ /.001M) Cost per thousand: i=4%	3.745	2.649	3.328
i=6%	5.773	5.369	6.854
i=8%	7.761	8.034	10.307
(j) Actual Yield rate	0.4%	2.1%	2.1%

- Note 1. Premiums and Considerations; Analysis of Revenue Account by Line, Line 1
+Considerations for Sett. Annuities; Analysis of Revenue Account by Line, Line 2
+Net Increase in Prem. Deposits; Exhibit 11, Column 3, Line 7
- Note 2. Claims Incurred; Analysis of Revenue Account by Line, Line 10
+Payments under Sett. Annuities; Analysis of Revenue Account by Line, Line 11
+Dividends to policyholders; Analysis of Revenue Account by Line, Line 23
- Note 3. Net Reserve Liability; Exhibit 15, Section 1 (Ord. Insurance - Par)
+Liability for Premium Deposits; Exhibit 11, Column 3, Line 8
+Provision for Dividends; actual dividends paid in following year
- Note 4. See note 3. Includes increase in provision for dividends
- Note 5. Mean Net Amount; Exhibit 15, Section 1

References are to the Annual Report to the Canadian Superintendent of Insurance.

Administrative Cost Ratios

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company "retention" for surplus contributions, contingencies and, in a stock company, dividends to shareholders.

While aggregate cost ratios are not precise measures, they have the advantage of being based on recent actual statistics and of indicating most of the companies which may warrant detailed calculations of individual policy costs.

Hillary Fisher

* * *

Actuarial Cost Methods and Projections

Sir:

Recent discussions among pension actuaries regarding actuarial cost methods have prompted me to lend some perspective to the dialogue.

Traditionally the Normal Cost under a pension plan has been determined from the equation:

$$f(NC)_n PVP_n = PVB_n - AI_n$$

WHERE: $f(NC)_n$ has generally been the percentage that should be applied to

current payroll to determine current Normal Cost. Under all actuarial cost methods, except the Unit Credit Method, $f(NC)_n$ is expected to remain constant from year to year, either by individual or for the group of active participants. Under the Unit Credit Method the value of $f(NC)_n$ varies by duration to retirement, etc.,

WHERE: PVP_n is the value at time n of future payrolls to be paid to active participants at time n ,

WHERE: PVB_n is the value at time n of future benefits to be paid to all participants at time n , and

WHERE: AI_n is the value at time n of future benefits to all participants at time n less the future Normal Costs for active participants at time n . For all but the Unit Credit Method the only distinction among the traditional methods has been the method for determining AI_n . Among the Frozen Initial Liability Method, the Attained Age Normal Method, and the Aggregate Cost Method the only difference in determining the value of AI_n is the method of determining its value at the inception of the Plan.

During the years there have been various suggestions for modifying the traditional actuarial equation. One common proposed modification might be termed the "funding goal" modification. This generally consisted of a proposal to replace PVB_n in the equation by a present value of a "funding goal". During the early 1950's it was commonly argued that the union negotiated plans would only last for the duration of the labor contract. Therefore, it was argued that PVB_n should be replaced by (1) the present value of benefits that would be paid before the expiration of the union contract or (2) the present value of benefits to be paid to people who would retire before the expiration of the union contract. Although these two early proposals were discredited long ago the basic concept of a "funding goal" persists to this day and may have been influential in the adoption of an "alternative minimum funding standard" in ERISA.

Another common proposal to modify the traditional actuarial equation has been to include terms for both "costs" to be paid for prospective new participants and the benefits to be paid to

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prospective new participants. As long as these proposals include these provisions on the basis that the present value of the "costs" equals the present value of the "benefits" no harm is done to the basic actuarial concepts. Such proposals as have come to my attention, however, have proposed that the present value assigned to "costs" for prospective new participants greatly exceeds the present value assigned to "benefits" for prospective new participants. Frequently, this excess is so great that "costs" assigned to current periods are less than the traditional concepts of minimum current cost, i.e., normal cost plus interest on the unfunded liability. Under Social Security the assignment of excess costs to future generations has been defended by, among other things, the argument that the government has unlimited taxing power and will have no problem collecting the excess costs when they are needed. Increasingly, this argument is becoming suspect. Certainly, no corporation, or its actuary, can argue with validity that it can collect these prospective excess costs from future generations of customers.

Recently, there have been articles written about so called "projection" methods for actuarial valuations. All of the traditional actuarial methods involve the projection of both benefit payments and "costs" until the death of the last participant and the discounting of all these benefits and "costs" to a common point in time, ordinarily to time n , the date of the current valuation. If these values are "projected" to time $n + t$ the only change will be in each discount factor, caused by multiplying by $(1 + i)^t$. There will be no change in the computed values of $f(NC)_n$, PVB_n , or AL_n . Any apparent change in any of these values can only result from a calculating error or an inadvertent or advertent modification to the traditional actuarial equation. In my opinion any proposals for changes in the emerging incidence of actuarial cost that are supported by so called "projection" methods need further analysis as to the causal agent of the changing incidence of "cost" to determine whether or not it is consistent with the basic actuarial equation.

If the use of properly made projections can assist the actuary or his client or the public to properly understand pension costs, their use can only be applauded.

Keith B. Gibson

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Why Not An Abacus?

Sir:

After reading Mr. Bowman's letter (September, 1976) and Mr. Ingraham's letter (January, 1977) I still fail to see any need for electronic calculators on the examinations. I am currently a student and I have noticed no "emphasis on tedious arithmetic" in the examinations, as Mr. Ingraham charges.

If this crutch is allowed in the near future, I would hope that the calculators used will be standardized to include only the four basic functions. I assume the Society will provide replacement batteries and/or extension cords in the exam session.

Gary W. Parker

Sir:

While I agree with Mr. Ingraham and Mr. Bowman that actuarial examinations should have "minimum emphasis on tedious arithmetic," the current state of the art in pocket calculators presents some problems. Inexpensive (under \$50) pocket calculators are currently available with functions to solve basic problems in compound interest and/or statistics. For a person willing to invest more there are programmable pocket calculators with functions for solving a wider range of problems.

Since we are interested in testing the knowledge of the student rather than the capability of his calculator, it would probably be necessary to limit calculator use to those with the basic arithmetic functions. I see two possible ways of accomplishing this. First, we could allow students to bring their own calculators. This would require exam supervisors to inspect each calculator and determine whether it would be allowed. The second alternative would be to provide standard calculators at examination centers. This involves the cost of purchasing a few thousand calculators, maintaining and replacing them (including batteries) and transporting them to and from examination centers every six months. This cost

would presumably be borne by those sitting for the exams.

Either approach seems to present certain practical problems which will have to be considered by the E & E Committee.

David L. Renz

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How Accurate Are Approximations?

Sir:

I read Mr. Edelstein's article in the January 1977 issue with some interest. This article discusses the perils of using "Jordan's approximation" to obtain the value of an annuity payable monthly, in the situation where the interest rate is high.

At North American Life, we have to deal with a great number of annuities that are payable more frequently than annually in order to administer and value our sizeable Vested Annuity portfolio. This portfolio contains all sorts of interesting combinations of matched payment levels, initial and ultimate interest rates, certain periods, etc. To handle these via functions that are annually oriented (e.g. commutation functions) is at best a severe headache.

We have been able to solve the problems inherent in "Jordan's approximation" as well as those caused by portfolio complexity by the simple expedient of avoiding them. The value of any annuity is simply the sum of the present values of each payment possible under the contract. The present value of one due $(t+1)$ months hence is the present value of one due t months hence times the appropriate interest v to the one-twelfth power times any appropriate mortality p to the one-twelfth power. When life contingencies are involved, the same p value is used for 12 successive months so that annual functions would be accurately handled.

This idea is the brain-child of Nick Crouch, (no slouch). My involvement has been in training our computer to do this trick in a manner that is both efficient and applicable to our Vested Annuity portfolio. This is just one more example of the use of the number-crunching abilities of the computer to relieve the actuary of the burden of approximations.

Q. J. Malby