

**TRANSACTIONS OF SOCIETY OF ACTUARIES
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**LIFE INSURANCE POLICIES, PREMIUMS
AND DIVIDENDS**

- A. To what extent have increased yields on new investments affected premiums, dividends, or policy values?
- B. What criteria of equity should be observed when different basic assumptions or underwriting standards are employed for different plans or series of policies?
- C. To what extent does the size of the premium required place a practical maximum on the mortality limits on substandard policies for various ages at issue and plans?
- D. What is a practical way of answering the complaint of a policyholder whose premium payments, after a relatively short period, aggregate more than the face amount? To what extent may this situation be minimized by age limits for various plans of insurance?
- E. How can the secular trend in mortality best be recognized in determining settlement options? What legal and practical problems are involved?

MR. B. T. HOLMES, speaking on section A, pointed out that the ratio of net investment earnings to assets of all United States legal reserve Life companies has moved up from an all-time low of 2.88% in 1947 to an estimated 3.63% in 1956 before Federal Income Taxes. The average net rate of interest reported by the 10 largest Canadian companies has climbed steadily from 3.38% in 1948 to 4.40% in 1956. Throughout this period, yields on new investments have been substantially above these rates. For the Confederation Life during this period, the excess of the yield on new investments of a given year over the average yield for the year has varied between $\frac{1}{2}$ % and 1%. Figures published by other companies, both in the United States and in Canada, reveal a similar situation. Between 1947 and 1952, the excess of the rate on new investments was due to an expansion in the field of investment, from largely Federal Government bonds to a wide range of mortgages, public utility, industrial and other purchases. From 1952 to 1956, the structure of market interest rates has itself generally moved upwards.

In 1939, when the average yield on investment portfolios had been declining for a decade, the field of investments had narrowed, and the yield on new investments was much below the average portfolio earnings, Mr. Holmes and Mr. White, in a paper to the British Institute of Actuaries, commented: "In the past perhaps too much emphasis has been placed on the interest rate earned on the funds of the company as a whole, and too little emphasis upon the rate obtainable on current investments and the

prospect of future movements in this rate." This statement is still true, but, in the changed context of today, there are three practical considerations that modify it. First, the uncertainty of the course of future market rates of interest is greater than that of mortality or expense. Second, the effect of quite possible variations in this field on profit or loss is greater. Third, there is a widely used convention in the North American system of dividend distribution that interest is assigned to all participating policies without reference to variation by year of issue.

Turning to the question of how far premiums, dividends, or policy values have been affected, Mr. Holmes' impression was that the interest rates that actuaries are using internally to test results in all these fields have moved up as much as $\frac{1}{2}\%$ in the last 10 years. However, in the calculation of premiums, dividends and nonforfeiture values, other changing factors such as mortality, expense and minimum amount conditions enter in, and it is impossible to extricate the sole effect of the interest assumption. Mr. Holmes felt that his impression about the trend of interest rates used by actuaries tended to be borne out by decreases in nonparticipating single premium annuity rates between 1947 and 1956, developments in the Canadian Group Annuity field, where recognition of lowering mortality has been accompanied by the use of a higher interest rate for premium calculation purposes, widespread recent liberalizations of Ordinary dividend scales, and the decline in premium rates for nonparticipating insurance below the level of CSO $2\frac{1}{2}\%$ or 3% net premiums.

In the field of nonforfeiture values, Mr. Holmes could not detect as yet any noticeable result of the increased yields. Whether the adoption of a new mortality table or the general extension of premium grading by size would induce a reconsideration in this area as well, is hard to say. The arguments that seemed so cogent in the report on cash surrender values, etc., of 1933 seem to have been largely forgotten in the desire to quote low surrender net costs.

In summary, Mr. Holmes felt that the policyowner is receiving and will receive the full benefit of increased interest yields, but the results are intermingled with those of other important factors.

MR. T. H. KIRKPATRICK felt that the recent increase in yields on new investments has not yet greatly affected premiums and policy values. Factors to be considered include:

1. Most contracts provide for annual premiums. Accordingly, we are not so much interested in the yields we receive on money invested today as in those applicable during the premium-paying period.
2. Higher interest yields on all investments are delayed for a substantial period after yields increase on new investments. Initially, an increase in yields gives

the company little extra money and, therefore, company executives hesitate to make changes in the premiums and values.

3. Before making any changes in premiums and values, it is very important to consider such items as company surplus, the Federal Income Tax and the liquidity of the company's investment portfolio. For example, most companies now have a substantial difference between the book and market values of bonds. This is no problem from the point of view of solvency but it is a good reason for accumulating extra earnings from the improved interest yields.
4. Any change in premiums and values is an important management decision and investment yields are only one factor involved. Recent changes may have been influenced more by competition than by a rise in interest rates. A very important factor in this regard is the company's sales objectives. Interest rates affect different plans differently. Sales objectives in certain areas place greater emphasis on the interest factor, whereas in other areas interest is of minor importance.
5. Another factor which should be taken into consideration by management is the company's attitude with regard to sources of funds for expansion. To some extent, increased yields are an unexpected gain which some companies might use for expansion purposes.

There are other considerations and it should be emphasized that the relationship between increased yields and premiums and values is not a simple one.

A change in interest rates can affect other items besides premiums, dividends and policy values. For example, a higher yield can be allowed on policyholders' deposits.

MR. D. N. WARTERS pointed out that the factors which cause a fluctuation in the rate of interest obtainable on new investments are such as to make a forecast of the interest rates to be experienced in the future extremely hazardous. The interest rate is sometimes considered to depend on the law of supply and demand. In this case, demand for investment money depends not only on the amount of capital goods desired but also on the proportion of current earnings which people are willing or able to use in paying for the capital goods. Supply depends on the rate of savings. Both the demand and the supply which influence the interest rate, therefore, are greatly affected by mass psychology and, hence, are not readily predictable. The situation is complicated further by the fact that the Federal Reserve Board and the Government can and do intervene and greatly affect interest rates. The difficulty of forecasting interest rates with a great amount of assurance makes very advisable the use of conservative assumptions that allow sufficient margin for fluctuations.

MR. E. G. FASSEL pointed out an important distinction between the

United States and Canada that affects the interest rate. Canadian companies pay a two percent premium tax to the Canadian Federal Government and no tax to the provinces. United States companies pay such a premium tax to the various states in which they operate and, in addition, pay a Federal Income Tax. This Federal Income Tax is a tax on the interest earnings of the companies and in recent years there has been a good deal of uncertainty as to the precise formula which would determine the tax to be paid. This has complicated the problem of giving appropriate recognition to trends in interest earnings in the determination of premium rates, dividends and values.

MR. E. F. BUCKNELL, speaking on section B, said that the search for new and improved plans and methods for providing insurance for the greatest possible number of people, at a price which properly reflects the *real cost* of the coverage and the service rendered, has focused increased attention on the question of equity among policyholders.

We have been supported in our efforts to better serve the American people by the principle of "managerial discretion" established by the courts and by the cooperation of the insurance supervisory officials and others in the interpretation of state laws.

We are fully aware of our responsibility to maintain equity among the various classes of our policyholders and avoid discrimination between the members of a particular class, and we are also aware that the determination of proper equity is not an exact science.

In our search for an over-all basic principle to guide us in placing our policyholders into proper classes, it seems clear that we must look to the relative *total costs* of providing the coverage and service.

The use of different underwriting standards for different plans places those policies in a different class if those underwriting standards produce different total costs for such policies. In a mutual company, surplus earnings should be distributed accordingly.

MR. C. F. B. RICHARDSON said that this question is part of a much broader one. In order to maintain equity in Ordinary dividends, his company constructs a network of asset shares to determine that the contribution to surplus is consistent as between plans and ages. He mentioned, as an example of the application of this technique, recent studies made in the Mutual Life in connection with guaranteed acceptance business. This is a type of business which differs from other Ordinary in the way that it is underwritten, in the average size, in the lapse rates, and in the commission rates. By the use of asset share studies, they were able to develop a modification of the Ordinary dividend scale that led to asset shares which were consistent with those for the rest of their Ordinary business.

MR. E. J. MOORHEAD, speaking on section C, found an indication of the discouraging effect that substandard ratings have on sales in the contrast between the proportion of regular basis policies issued substandard and the proportion of Pension Trust policies issued substandard. In the New England Life, very few policies are sold at the highest rating. One percent of all sales are at ratings in excess of 200 percent of standard mortality and only 15 percent of substandard issues are rated in excess of 200 percent of standard. Their experience has been that a reasonable number of people are willing to pay an extra premium of up to \$30 per \$1,000. But they have had no sales recently where the extra premium was in excess of \$60 per \$1,000, even though their manual includes extra premium rates as high as \$100 per \$1,000.

MR. D. J. VAN KEUREN pointed out that the practical limitation on the underwriting of substandard lives which is dictated by the size of premiums is related to antiselection. When the only persons who will be attracted are those who will grasp at anything, antiselection, speculation, and overinsurance will be so severe that assumed rates of mortality will be exceeded by experience.

The problem is also encountered in underwriting risks at high ages, and is one of the reasons why companies have hesitated to continue to push higher the limiting age for insurance. If we are to avoid attracting only the desperate risks, Mr. van Keuren felt that premiums should not accumulate to the face amount in less than 8 or 10 years. Thus, for a given class of risk, the low premium plans might be issued in cases where the high premium plans would not be advisable. There is a limit to such maneuvering since the annual premiums for level amount insurance tend to the same figure as the mortality rate increases.

MR. F. H. DAVID, speaking on sections C and D, said that any policyholder is apt to be unhappy if his premium payments less dividends total much more than the face amount of his policy. About the only thing to tell him is that insurance premiums are not like deposits paid into a bank account, and that he is part of a group, many of whose members died after having paid only a few premiums. This explanation is not likely to satisfy him and it is, therefore, a good idea to minimize the chance that this type of situation will occur.

Mr. David noted that the not-taken rate increases rapidly as the extra premium goes up. In the highest substandard classes, a not-taken rate of 60% is not unusual. To go beyond that would mean a lot of waste motion and very high underwriting and issue costs per policy placed.

Around age 60, on plans calling for premium payments for 20 years or more, it would seem that the annual premium should not exceed \$150 to

\$175 per \$1,000. This is about the level of gross premiums for a class of 400 to 500 percent mortality. Somewhat higher premiums are reasonable on plans with shorter premium-paying periods. It is not practical to go beyond 500 percent mortality at these ages, where the premium would go well over \$200 per \$1,000. When premiums reach that level there is reason to suspect that those who buy are speculating.

Plan limitations help to control the problem. For example, at age 60 in the highest substandard class, there is very little difference between the premium for Life Paid-up at 85 and 20 Year Endowment. Thus, it may be better not to offer Life Paid-up at 85 above, say, age 55, particularly if commission rates on this plan are higher than those on 20 Year Endowment.

If the risk is such that it can be covered by a temporary extra premium, there is an automatic limit on the total amount of extra premiums that will be collected. A higher limit may, therefore, reasonably apply to temporary extra premiums than to permanent ones.

At the younger ages it would be possible to go beyond 500 or 600 percent mortality without reaching premiums that are unreasonably high, though it must be anticipated that sales resistance would become very strong if the premium exceeded double the standard premium. Resistance to high extras may be less if they are assessed for some obvious hazard, such as test flying, than if they are due to medical reasons. Classification in these high mortality ranges is made difficult by the fact that there is little experience. It seems reasonable to expect, however, that statistics becoming available from sources such as Pension Trust business and clinical data will make possible further advances in substandard acceptance limits.

MR. E. G. FASSEL's answer to the complaint that premium payments have exceeded the face amount of insurance would be to explain that insurance is a pooling of lives of which some may fail early and others late. For the early deaths, the pool pays more than was received; hence for the late deaths it should be expected to pay less than it received. However, the pool is supported not only by the premiums less dividends, but also by interest earned in excess of expenses. Therefore, even for many of the late deaths, the pool will nevertheless pay more than it received from premiums less dividends and it is only for a reduced number of the late deaths that less may be paid than was received.

In the Northwestern Mutual, with standard insurance this question arises only occasionally and is not regarded as a difficulty. However, in the case of substandard lives the problem may be aggravated by substantial extra premiums, and when introducing substandard in 1956 the com-

pany adopted the following measure. Whenever the class extra rates per \$1,000 for the basic plan are \$15.00 or over, they are so calculated as not to be payable more than half-way to age 94. For example, for Ordinary Life at age 51 the Class C extra is \$15.08 limited to 21 years, ceasing at age 72. This feature adds very little to the extra premium because remote premiums discounted at high mortality rates have small present values.

MR. W. L. RUGLAND, speaking on section E, mentioned the abundance of suggestions relating to this question already in the literature.

The method suggested by Mr. McCarter in his paper presented in *TSA VIII*, 127, appears to have some very definite advantages of simplicity and understandability over some of the others. Also, it has the advantage of meeting the problem of reserve strengthening by a direct approach (assuming that the "yearly adjustment factors" in his table are adequate). Under his proposal the legal and practical problems would seem to be reduced to a minimum.

In explaining the importance of this subject Mr. Rugland pointed out that with the increasing volume of business being issued today on the lives of juveniles we are automatically stretching our projections farther and farther into the future. Billions of dollars of proceeds of life insurance being issued today will be converted into life income supplementary contracts seventy-five or more years from now.

Perhaps the secular trend in mortality can best be recognized in determining settlement options by eliminating settlement option guarantees beyond a limited period in the future. Mr. Henry Jackson made a similar suggestion in 1946 (*RAIA XXXV*, 164) in a discussion of the then declining interest rate. While such a radical suggestion may not involve serious legal problems, the practical problems appear very formidable.

MR. P. A. ALEXANDER said that the London Life introduced settlement option tables providing for the secular improvement in mortality with new policy forms commencing January 1, 1957. Since considerable agency stress is placed on programming for monthly income, it was considered that the form of the new tables should be as similar as possible to the conventional form with which the agents were familiar. There were no particular legal problems involved.

Since 1952, the London Life has been using the 1950 Prudential Group Annuity Table with Projection B in connection with Group Annuity rates and valuation. The Prudential table was taken as defining 1951 calendar year mortality at ages before retirement and as providing the correct maturity values in 1951 at the retirement ages. Subsequently generation tables were developed, using five-year office year of birth groups. Female mortality was obtained by rating the male mortality down five

years. The same basis was used to calculate the settlement option figures. Three percent interest was used, and interest participation is provided for during the guaranteed period.

The new policy form contains a single table showing the monthly income purchased by \$10,000 of proceeds, 10-year and 20-year guarantees only, according to attained age of payee when policy proceeds are payable, for the years "Before 1960," "1960 through 1964," "1965 through 1969," etc., up to "1985 through 1989" and a final column showing the reduction for each five-year period after 1989. Annual, semiannual and quarterly installments are provided for "on the same actuarial basis." The 15-year guarantee period is available, but was omitted from the policy itself since its use tends to be restricted to the intermediate ages; at younger ages child dependency tends to cause the use of the 20-year period, while at older ages the need is for maximum income. Further, of course, with reducing mortality the 10-year and 20-year guaranteed figures tend to close up.

A problem that arises is the fact that the agent will find his programming more difficult because he must enter the table not only with age and sex, but also with the calendar year of maturity or possible claim. It is felt, however, that the form of the table should make this understandable and acceptable to the policyholder. Another effect of the adoption of a program of this kind is that unless a company is prepared to change policy forms and rates each year (or for one-fifth of the ages each year if five-year office year of birth groups are used) the Insurance Pension Policy must be abandoned. The London Life has substituted an Optional Retirement Insurance Policy providing a death benefit, per unit, of \$1,000 or the cash value if greater, and having a cash value of \$2,000 at age 65. Retirement may take place at any age from 50 to 70 provided the policy has been in force at least ten years, the cash value at the time of retirement being applied against the regular settlement option tables. Joint and last survivor and cash refund annuity retirement options have been omitted because of complexities. In the Special Series Policies (those providing face amounts of \$500, \$1,000, and \$1,500) the life income settlement privilege is not available.

MR. H. F. PHILBRICK said that effective January 1, 1957, the Massachusetts Mutual commenced the payment of income dividends under all life income settlement options arising from policies issued since May 1, 1943 and under matured retirement income and retirement annuity policies issued since May 1, 1943. Although this procedure was not developed explicitly for the purpose of recognizing the secular trend in mortality, it would seem to be an excellent method for such recognition.

Income dividends are payable with each monthly instalment (including both the certain period and thereafter) during the lifetime of the annuitant upon whose life the income is based. These income dividends are in addition to the normal annual interest dividends payable during the certain period.

Income dividends are not guaranteed and must be voted each year. The method of computing income dividends is such that the amount of the dividend will remain level during the lifetime of the annuitant unless there is some change in the basic factors used to compute these dividends. The primary purpose of income dividends is to permit up-to-date recognition of mortality and interest rates in connection with the "involving" portion of life income options.

In connection with settlement options, the effective date of the option is unknown at the time the policy is issued and, consequently, it is essential to be fairly conservative in establishing the guaranteed return under life income settlement options. The payment of income dividends has the following advantages:

1. More equitable treatment is provided by relating the income to the value of the option at the time it is entered upon.
2. If the guarantees are sufficiently conservative, the plan avoids the assessment of losses under any block of settlement options against dividends under policies in that block (which means assessment against some policyholders who could never use the options), or against other blocks of business.
3. It should be attractive from a sales point of view, since incomes so determined should generally be larger than those conservatively fixed some time before.

Proper use of this device would probably require an even more conservative estimate of life income option payments than that currently used. However, since the 10-year certain option is frequently the criterion for determining the level of premiums under retirement income policies, competition will prevent application of this procedure to the fullest extent possible.