

**TRANSACTIONS OF SOCIETY OF ACTUARIES
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EXPENSE IN RELATION TO SIZE OF POLICY

- A. What methods are being used to identify expenses directly dependent upon number of policies, new and renewal?
- B. To the extent that expense related to number of policies can only be approximated, is there a tendency for the allocated amounts to be consistently too large or too small?
- C. In what measure are per policy expenses a factor in determining premium rates and dividend scales either (1) as between various plans and issue ages or (2) as between policy series with different minimum amounts?
- D. On the assumption that average policy size as between companies has an influence on comparative net costs, to what extent does the same principle operate within a company?
- E. What reasons are there for and against assessing per policy expenses to the individual policyholder in the form of an annual policy fee or other charge which is not proportionate to policy size?
- F. In what ways do differences in mortality, persistency, option selection and commissions modify the problem of equitable assessment of per policy expenses?
- G. What methods are in use in United States, Canada and other countries to provide gradation of premiums by size of policy?

MR. J. A. CAMPBELL announced that the London Life Insurance Company introduced a new scale of premium rates at the beginning of 1955 involving for all plans of insurance a systematic grading of premiums by amount groups. The highest amount group includes policies of \$10,000 and over; the second, policies of \$5,000 to \$9,999; and the third, policies of \$2,000 to \$4,999. There are, in addition, graded premiums for policies of the exact amounts of \$1,500, \$1,000 and \$500. The choice of these amount groups arose, in part, from the organization of the company's sales force into Ordinary and Industrial branches. Since the Ordinary branch sells chiefly to the "white collar" group, their average policy was considerably higher than that sold by the Industrial men. Such a difference created a problem for which preferred policies provided one solution.

The London Life's first preferred policy, adopted in 1922, was on the Whole Life plan with a minimum amount of \$5,000. Other preferred plans have been added from time to time until in 1954 there were preferred policies with a minimum amount of \$5,000 for all term plans and for all life and limited payment life plans. The average of this preferred class was pulled down by the very large number of policies for exactly \$5,000 written by the Industrial field organization. It became apparent that

some adjustment would be necessary in order to provide satisfactory premium rates for the larger amounts of insurance. An examination of the distribution of policy amounts showed that average policies issued by the two branches of their sales organization were not too far apart when considered for each of the three amount groups of the new premium structure. The decision to retain \$5,000 to make a second preferred class was based on the experience with this amount and its value to the Industrial staff. The choice of \$2,000 as the lower limit for the third amount group was influenced by a desire to include the highest Industrial amount policy, which by law is \$2,000, within this classification. Policies under \$2,000 were intended to be issued chiefly on the debit and the amounts were limited to \$1,500, \$1,000 and \$500 and all benefits standardized. An expense investigation of regular Ordinary policies indicated that expenses which varied directly with the number of policies were in the neighborhood of \$5.00 per year per policy in force. This amount covered expenses in connection with both new business and renewal business on the assumption that the organization was going forward at about the same rate of progress year by year. The new scale contains premium differential between a \$10,000 and a \$5,000 policy of \$.50 per \$1,000; between a \$10,000 and a \$2,000 policy of \$1.75 per \$1,000; and between a \$10,000 and a \$1,000 policy of \$3.50 per \$1,000.

The interest and mortality assumptions in the premiums and the percentage expense charges remained unchanged. The only variation from the previous premium rates was the modification in the constant loadings. Since the premium differentials represent the difference in expenses, it was possible to calculate dividends for all policies on the basis of the \$10,000 premiums.

All plans have been included in the new system and the same policy contracts are used for all amounts of \$2,000 and over. The new system of premiums has been accepted with considerable enthusiasm by the field force. There seems to be some indication in the records for the last few weeks that there is an increase in the number of policies of larger size in each series. If the number of policies for exactly \$10,000 becomes excessive, however, it might be necessary on some future occasion to establish a further amount group at some higher level, and there seems to be no practical difficulty in doing so. An examination of the policies issued for various amounts indicates that at present the amount groups chosen seem to be natural divisions with few policies in the top \$1,000 range of any amount group.

Mr. Campbell noted the important problem of whether the expense charge of \$5.00 per policy which was used will remain reasonably con-

stant. If necessary, dividend differentials could be provided to offset excessive premium differentials. With regard to section E, one advantage of an annual policy fee would be the ease with which dividend variations could be made as required. However, a policy fee system would raise even more directly the question of consolidating new and existing contracts. Furthermore, at the young ages the amount of the policy fee in relation to the premium might cause considerable difficulties. The policy fee might be a satisfactory solution for a company which can limit its business to policies of \$5,000 and over, but any company which attempts to cover the whole field in the way an Industrial-Ordinary company must do would probably find the policy fee system unworkable.

MR. J. T. BIRKENSHAW reported that, prior to 1954, the Confederation Life Association had two methods in Canada of providing gradation of premiums by size of policy. One was through the medium of two different series of policies, one with a minimum of \$1,000 and the second with a minimum of \$5,000. The other method was in the form of a \$.50 reduction in the premium per \$1,000 for policies sold in the large policy series in amounts of \$10,000 and over. A separate dividend scale for each series reflected the level of premiums charged and the savings in expense obtained from the larger average policy on the series with a higher minimum.

In 1954 a new special low rate nonparticipating policy with a \$25,000 minimum was introduced, at which time the reduction at the \$10,000 level was eliminated. At the same time, however, a \$3.00 per policy extra for policies issued for amounts of under \$2,500 was introduced in Canada, after experimentation in other countries.

Since a very large proportion of their field force in Canada operates in rural areas and produces relatively small average size policies, this extra on the small policies was initially considered by the field force to be a very severe blow. However, he felt that the \$3.00 extra had turned out to be really a blessing in disguise because it enabled his company to make its premium rates for the \$2,500 and higher levels, where the bulk of Ordinary insurance is likely to be sold, more competitive, and also the sights were materially raised on those representatives who had previously had a tendency to work in the under \$2,500 policy area. Some of those representatives now are producing, with fewer policies, more insurance than they had previously been able to produce.

Mr. Birkenshaw noted that through the use of the \$3.00 extra it did not appear necessary at the present time to differentiate in the dividend scale for policies over or under \$2,500.

MR. J. T. PHILLIPS felt that the apparent sudden interest in special

policies is somewhat strange in view of the fact that one or more of the major companies have been issuing such policies for many years, one company for 46 years. The New York Life has been issuing policies with various minimum amounts higher than \$1,000 since 1931, and, with the recent introduction of 5 plans with a \$10,000 minimum, is currently issuing 15 plans and 8 riders with minimum amounts ranging from \$2,000 to \$10,000.

In reply to the feeling that the issuance of special policies is a discrimination against the buyer of \$1,000 policies, he observed that certain expenses are a function of the number of policies and not of the amount of insurance or premium, and that to completely ignore this fact is practicing discrimination against the buyers of policies for larger amounts. "Cheaper by the dozen" represents a basic principle in business generally. The life insurance industry has long recognized this principle. On the one hand, group insurance coverage is sold at a lower rate than corresponding ordinary insurance because group insurance is provided under a mass coverage deal. On the other hand, industrial insurance costs *more* than ordinary insurance partly because of the small units involved.

He did not believe that the "special policies" being issued today raise any legal or equitable problems. The development of special policies or premium rates may have been different in other countries but this does not necessarily mean that one system is right, the other wrong.

With regard to section A, Mr. Phillips noted that, in the first year, underwriting costs depend on face amount as well as number of policies issued, while issue costs depend mainly on number of policies, and in renewal years it is apparent that a very high proportion of expenses relate to number of policies rather than face amount. Referring to section F, he stated that for many years now mortality has varied by size of policy. During the depression years mortality on large amount policies was unfavorable compared with policies for smaller amounts, but intercompany studies show that in recent years mortality on large amounts has been more favorable than on small amounts. Similarly, his company's studies show that persistency is more favorable on policies with high minimum amounts than on other policies. His company reflects different lapse rates on some plans but currently applies average mortality to all plans.

He felt that the assessment of expenses should reflect actual commission scales. With respect to the cost of option selection, an examination showed that for policies below \$10,000 face amount the proportion of death claims with settlements was 20% and for policies of \$10,000 and over the proportion was 42%. Hence, if the average cost of establishing supplementary contracts is about \$20, the cost per death claim in the lower

amount group is about \$4, and in the higher amount group about \$8.40. However, the cost per \$1,000 in the two groups is, respectively, about \$1.30 and \$.60.

Settlements tend to be more complicated with increase in size, but settlements for the larger amount group could absorb something like two times the clerical time to come out even in unit cost per thousand with the smaller amount group, while a further factor in favor of the large size policy is the margin of net interest earned in excess of that actually paid on a supplementary contract.

In any event, a difference in cost of \$1.00 per \$1,000 of death claim would be in the general area of about \$.01 per \$1,000 annually in asset shares or dividends. Therefore, he did not believe that the cost of option settlements is of sufficient significance to be reflected by size of policy.

With reference to section E, Mr. Phillips observed that a policy fee would specifically recognize certain per policy expenses, particularly in the first policy year. However, there may be some complications in policy form requirements, particularly for nonforfeiture options. Also, the use of a fee may run counter to regulations of some states. Furthermore, a policy fee designed to reflect expenses presumably would have to be paid every year, since "per policy expense" is significant in renewal years. Of course, if the fee were made part of premium loading this would mean in effect some gradation of premium per \$1,000 by size of policy. This may be a more realistic approach to the problem of per policy expense and may well become the ultimate practice.

MR. W. J. NOVEMBER commented, with regard to the wording on sections A and B, that the inference might be drawn that approximations in expense work were somewhat a last resort method. He pointed out that the use of approximations is both necessary and appropriate in working in this field.

With regard to section C he stated that the Equitable Life Assurance Society recognized average size of policy for certain large broad classes that have sufficiently different characteristics, term insurance being differentiated in their actuarial analysis work from permanent insurance and single premium policies from annual premium policies. He described the recent adoption by his company of a special \$10,000 minimum size policy as an extension of an idea already in use in his company inasmuch as their term policies already had a special minimum size. He felt it was a necessary step for a company which writes both small and large policies. The new special minimum policy has produced a definite tendency on the part of applicants to upgrade the amount of insurance.

With regard to section F he felt that the adoption of a dividend class

for a particular group of policies ought to require consideration of any important factors other than expense that might also affect cost and recognition of these factors if sufficiently different from the average. He noted that this principle has been applied in reverse in the case of insurance on women, the much lower mortality of women being balanced by the much higher expense rate of that class due to small average size.

MR. E. G. FASSEL quoted, as the former reason against assessing per policy expenses to the individual policyholder by a charge which is not proportionate to policy size, the fact that the variation would be insignificant and offset by mortality, which used to increase with amount. However, the expense variation by size needed in the premium rate is no longer insignificant, the annual per policy expense being in the neighborhood of \$7.50. Also, in recent years mortality of large amounts has been favorable.

The need for recognition of policy size is evidenced by the prevalence of the specials and is firmly established. He felt that the size should be openly recognized and premium rates per \$1,000 should be determined by three independent variables—plan, age and amount. One expression for the premium to be charged on a policy, if the premium is to vary by policy amount, is $Sa + b$, where S is the amount of the policy, a is the basic premium rate for the particular plan and age, and b is a constant. This method, which he termed a system of policy fee, adds a basic constant per policy to the premium. By changing this expression into the form $S(a + b/S)$, he showed that the method was mathematically equivalent to a second method which he termed a system of quantity discount, under which the premium rate per \$1,000 decreases with increasing size. Thus, if b is \$7.50, the premium rate per \$1,000 would be \$2 less for a \$15,000 policy, and \$1 less for a \$5,000 policy, than for a \$3,000 policy. In practice, the rate is held level over given ranges, the premium rate per \$1,000 being constant, for example, for policies of \$3,000 to \$4,999, decreasing \$1 for \$5,000 to \$14,999, and by another \$1 for \$15,000 and over.

He stated that 64 of the 94 companies operating in Great Britain vary the premium rate by size of policy, all of them using the system of quantity discount. This system is also used by five Swiss companies and is common in certain other European countries. The only current use of the system of policy fee that he was aware of is by two Swiss companies. The Prudential of England formerly used what was in effect this method, but gave it up years ago in favor of quantity discount. The method of quantity discount apparently has been in use in Great Britain at least since 1914 and the earliest reference in actuarial literature seems to be in the paper on expenses by Mr. H. J. Rietschel in *JIA* XLIV in 1910.

He felt that the experience abroad appeared to clearly demonstrate the superiority of the method of quantity discount. The policy fee method has the mathematical appeal of continuity but he suspected that there might well be practical advantages in rates that stood still for substantial blocks of business.

He felt that the introduction of amount as a third variable in the computation of premium rate should be subject to definite legal limitations, since it could have a serious effect on company security through error in judgment in its recognition.

MR. ARTHUR PEDOE seconded Mr. Fassel's discussion and strongly deplored the recent tendency in the insurance press and in insurance advertisements to emphasize competition and cost as opposed to basic principles. He agreed strongly with the concept of varying premiums by size but felt that this variation was in no way due to a reduction in unit costs (which are actually on the increase) but rather a recognition of a valid principle in assessing expenses which had become dominant in recent years because of inflation of costs. He referred to his paper on expenses in the *Transactions* in which four expense formulas were developed. He had worked out premium rates consistent with these expense formulas and developed the difference between a \$1,000 and a \$5,000 policy of as much as \$6.50 per \$1,000 in the premium rates. His company, the Prudential of England, considered the introduction of a step-rate system in Canada more than fifteen years ago but did not want to be the leader in such a move. He stated that they would now reconsider this system, following the action of the London Life, having already introduced this system in England.

He agreed strongly with Mr. Fassel as to the desirability of legal limitations on the degree of differentiation in premium rates by size, fearing the impact of competition in the absence of legal restrictions.

MR. H. F. ROOD, in rebuttal to Mr. Fassel and Mr. Pedoe, argued emphatically against the utilization of government intervention. He expressed confidence in the ability of management of the life insurance companies to work out this problem utilizing the natural force of competition rather than governmental restriction.

MR. D. M. ELLIS, speaking on section B, emphasized that unless a very complete and detailed functional breakdown of expenses is made, an insurance company is apt to exaggerate the proportion of the expenses which are properly allocated on a per policy basis. He stated that a very large portion of acquisition expenses cannot be directly related to any specific index and it would be erroneous to arbitrarily assign them on a per policy basis.