

**PREMIUMS AND DIVIDENDS FOR INDIVIDUAL  
ORDINARY INSURANCE**

1. What philosophy and techniques govern the determination of modern participating and nonparticipating premium rates and dividend scales?

*Philadelphia Regional Meeting*

MR. JOHN E. HEARST: Although setting premiums on a basis to maximize profits might be the logical philosophy for a stock insurance company to follow, most of our companies do not attempt to do this, and none have done it with the elegance of Mr. Bragg in his address entitled "Prices and Profits."

The companies we meet as consulting actuaries tend to specialize by selling to certain groups, such as the clergy, blue-collar workers, retired persons, and so on. Their philosophy in setting premium rates and dividend scales depends largely on this specialization. The company selling primarily to the clergy tries to maximize the benefits it can provide for each dollar of premium. Its gross premiums are the valuation net premium. Its nonforfeiture value grades into the net level premium reserves at the end of the eighth year. Its gross premium at age 35 is about \$18 per thousand for the ordinary life policy, and its average dividends is about \$2 per thousand in the first twenty years.

The philosophies are also governed by considerations of adequacy and competition. These two conditions tend to impose a third condition of equity. Our clients are not large enough to differentiate in the dividend factors for their older policies, so there is a rough equity between old and new policies.

Several companies follow the philosophy of preserving the status quo. Premiums are set at a level to maintain their particular competitive ranking or their level of profit.

For example, a company selling primarily to blue-collar workers constructs its premiums as a constant percentage of the valuation net premium. Its philosophy is to maintain the same level of profits in its life operation that it has experienced in the past.

Another company selling weekly premium insurance to the Negro blue-collar market constructs its ordinary products with much lower margins of profit in order to replace the dying industrial business by ordinary business and in order to increase its agents' earnings. Another company selling by mail to retired persons sets its premiums to produce a predetermined level of profit.

The techniques of calculating premiums vary. Some companies use a constant percentage of the valuation net premium. Others use the net premium itself. Others use an extrapolation of gross premiums charged at certain ages. Still others construct premiums by means of asset shares to yield a constant level of profit.

One technique, which may not be attractive to larger companies, is to develop premiums which fall within the range of those of some well-known companies. At times the rates of only one company will be used. These usually are tested by an asset share using the client's rather than the competitor's assumptions.

Although sophisticated methods of calculating premiums are available, such as that of James Anderson in "Gross Premium Calculations and Profit Measurement for Nonparticipating Insurance" or that of Mel Stein in "A Direct Comprehensive Approach to the Calculation of Gross Nonparticipating Premiums," the procedure that we generally follow is to pick some sample premiums arbitrarily, test them by an asset share study, and then extrapolate the premiums on the basis of a constant plus percentage of the valuation table. For a number of companies the asset share testing is ignored if there is no change in the loading factors from other plans.

MR. J. ROSS GRAY: I am connected with a Canadian company which mutualized eight years ago. Although we are now issuing only participating policies in the United States, we do have many nonparticipating policies in force; and in Canada and the British Isles we issue both participating and nonparticipating policies.

In my opinion this establishes our participating policyholders in a dual capacity, as holders of participating policies in a mutual company and as issuers of nonparticipating policies to other persons. Any deficiency in nonparticipating premiums would eventually be reflected in the dividends on the participating policies, and, correspondingly, any profit would eventually enhance those dividends.

In the calculation of nonparticipating premiums, it would seem proper that our participating policyholders should not promise to other persons better results than we can reasonably foresee for the participating policies. As the participating policies are standing the risk of loss on the nonparticipating policies, it would seem proper that we should build a small margin of profit into the nonparticipating premiums. This margin may well be less than a stock company would employ, but it should be there.

We have found it essential to determine nonparticipating premiums and participating premiums and dividends which reflect the conditions in each of the three geographic areas in which we operate. To help us in our

dividend distribution, we make studies of the surplus earnings in each area. To use an average approach could result in becoming temporarily very competitive in one area at the expense of writing practically no business elsewhere.

In Canada and the United States the use of a policy fee is common. In the British Isles it is common to decrease the premium rate by various amounts, depending on the size of the policy. Either method takes some of the pressure off the accurate determination of average policy size.

There has been some attention given in recent papers to the accurate determination of average policy size. I have wondered whether average size is really usable without considerable adjustment. I shall give a few examples of what I mean.

If you have two policies with a \$10,000 minimum and all the others have a \$1,000 minimum, can you make the full difference in premium rate which would result from the different average sizes? If there are two plans with the same minimum policy but with different average-size policies issued, how far can you go in reflecting those different sizes? Obviously, you stop short of creating inconsistencies which will be apparent.

An applicant may choose among plans, but he cannot choose his age. A possible course of action is to determine average policy by age at issue irrespective of plan, as seems to be inherent in Mr. Stein's approach in his recent paper. We at once run into trouble because a ten-year endowment at a young age will be more expensive than one at an older age. However, if we determine average policy without respect to age or plan, profit margin can be greatly affected by a change in the distribution of new business being issued.

Switching briefly to the matter of dividend distribution, I believe that all the Canadian companies operating in the British Isles use a "contribution" method and do not follow the British companies in the use of uniform reversionary bonuses. I know that in our company we consider that we have a much better control over the matter of seeing that each country obtains its own proper share of the surplus earnings. It must be admitted, however, that a uniform reversionary bonus system of dividend distribution might well permit recognition of higher interest rates now available on new investments. This would be contingent upon not being locked into guaranteed cash values on old business, which would lead to surrender and replacement.

MR. WILLIAM M. WHITE, JR.: I will try to discuss the philosophy of a large stock company by way of comparison with what you have just heard.

We want to offer quality products and services at a competitive cost,

providing fair value to the customer and affording attractive compensation to the producing agent and an attractive return to the stockholders. How is that for Utopia?

We recognize that we cannot maximize these, and we must strike a practical compromise. Obviously, as a stock company we are concerned with the profit contribution to stockholders. This is not the only objective, but it is one of the governing ones.

We have been attempting to get a better fix on how our various lines of business generate profit; we have been trying to arrive at certain standards of performance relative to the profit that we can expect from each operation. Granted that we do not have unlimited funds for the expansion of all endeavors simultaneously, we are seeking a tool which will assist us in the allocation of our resources toward those areas which will produce the greatest expected profit, on the thesis that profits constitute an absolute test of our over-all effectiveness in serving the public.

Absolute dollars of profit are important. However, of even greater help would be some measure of the dollars of profit relative to the amount of resources invested. We are attempting to develop a practical approach to return on investment for use in measuring different lines of insurance, and, hopefully, we will be able to use a modification of this technique in the pricing of specific coverages within the individual line. In the pricing of specific policy benefits, we feel that, theoretically, it would make sense to have a minimum return which would be equivalent to that which we could expect from a normally conservative investment in securities. The excess over this minimum level of return could represent an additional return considered as potential profit earned for the risk undertaken in providing the coverage. The greater risks should logically yield a greater profit potential. This sounds fine, but I will have to admit that we have not perfected this technique and still look to an average annual margin of profit per thousand as a guide in determining our premium levels.

Of course, competitive considerations are another vital factor in setting premium levels. One of the problems is trying to define with whom we are competing, and this is particularly difficult when you are doing business on a national scale. A company must have a philosophy on where it wishes to be positioned relative to the price of its product and the nature of the services provided. Another factor is the timing of the change in your price relative to the timing of changes in prices of competitors. A price change quite frequently can have a chain-reaction effect, and, although a company might attempt to be a price leader, it probably will not remain one very long.

What is the philosophy of participating business being written by a

stock company? Theoretically, one could question whether participating coverages should be written, since they could not contribute proportionately to the return to the stockholders.

Our basic objective in writing participating insurance is to provide as complete a portfolio of products as possible to assist our agents in better serving the public. It can be useful as a tool in combating participating competition by helping to establish the agent's credibility when he makes a nonparticipating recommendation.

Until three years ago the major contribution to the stockholders from the participating line at our company was indirect, through a sharing of some of the overhead burden and possibly helping in agency recruitment and retention. For the past three years, however, we have been specifically taking 50 cents per thousand as a transfer from the participating department to the nonpar line. This is one of the legal maximums imposed upon such a transfer.

MR. B. FRANKLIN BLAIR: I am with a mutual company that sells only participating insurance; even our term riders—both level and decreasing—are participating. All my remarks, therefore, will be from a more limited viewpoint than those of the other panelists.

The underlying philosophy should, in my opinion, require that participating premiums and dividends have the following characteristics:

1. Be adequate to protect the financial soundness of the company and to provide enough expense margins to pay adequate compensation to the home office and the field.
2. Be competitive enough to obtain reasonable sales volume. This requires premiums low enough to be attractive to the buyer yet high enough to provide commissions attractive to the field representatives. This point is particularly important to companies operating in New York State, where the percentage commission rate is limited by law.
3. Be equitable among ages, sexes, plans, amounts, and underwriting classifications and between old and new business.

Among the modern techniques helpful in carrying out the desired philosophy, the use of the following might be mentioned:

1. Premiums (or dividends) graded by size of policy. The policy fee method (or some variation thereof) gives smoother results than the band method of grading premiums by size and seems to have no really serious disadvantages.
2. Cash values graded by size of policy. Personally, I am not enthusiastic about this technique, because in many companies only a small proportion of the total amount of insurance is usually issued in policies falling in the smaller size group. For example, in Provident Mutual less than 10 per cent of our

insurance by amount is issued in policies for less than \$10,000. The savings through paying lower cash values on these smaller policies seems to me unjustified by the expense and administrative difficulties of having different cash values for policies for different face amounts.

3. Terminal dividend scales.
4. Complex and flexible computation formulas made practicable by the rapid development of computers. The ability to use such formulas has freed us from our former dependence on artificial techniques to give reasonable results from simple formulas.

One of the actuaries in our company, J. Alan Lauer, recently made a survey of the formulas used by a number of companies for the interest and mortality elements of dividends calculated by the three-factor contribution method for policies issued on a continuous function reserve basis. Out of twenty companies surveyed there were seven different formulas used for the interest gain and eleven different formulas used for the mortality gain. Of course, the differences between some of these formulas were negligible, but this is nevertheless a striking illustration of how many differences in technique there can be.

MR. PHILLIP A. TURBERG: We have heard reference to policy fees by several members, and we seem to have a \$10 maximum. I was wondering if there were any indication that policy fees may be higher in the future.

MR. GRAY: For our ordinary life and endowment plans we use a \$9 policy fee; for our term plans, a \$15 fee; for single-premium insurance, a \$40 fee; and for immediate annuities, a \$100 fee. We have not encountered any difficulties in connection with these different-sized policy fees.

MR. TURBERG: How does this relate to your actual expenses?

MR. GRAY: I would say that there is still some policy expense that has to be dealt with in terms of average policy. The higher ones on the term policies, I think, reflect the considerably shorter period of time available to recover the initial expense.

MR. WHITE: Ross, you mentioned that your participating policyholders share in the cost of issuing the nonpar policies and that you build a smaller margin of profit into your nonparticipating policies than a stock company would. Why do you write nonparticipating insurance at all?

MR. GRAY: I think we could put it down to competitive reasons. There are many Canadian and British companies selling nonpar business, and I think we have to be in a position to offer nonpar policies in competition

in the same way that you offer participating policies. It is partially a hang-over from the time when we were a stock company issuing both par and nonpar. It did not make sense to the Canadian and British field organizations to cut off the nonpar simply because the company was mutualized.

**MR. JOHN J. STEVENS:** We have heard about return on investment. How is the actual investment in the sale measured?

**MR. WHITE:** That is one of the unsolved problems that I mentioned. One can look at it as the surplus drain resulting from the sale. I would be interested in any thoughts that other people may have.

**MR. HEARST:** We try to measure this with some of the new companies. We construct a model office according to their specifications of production and determine the capital which they will need initially to meet the capital strain of the first twenty or thirty years. We then accumulate that at a saturated interest, say, 10 or 15 per cent, as a measure of what it costs to start an insurance company.

**MR. J. STANLEY HILL:** We have a somewhat different approach to this. We removed from our asset shares all agency-development expense and worked the asset share which results merely from the money spent to produce current business.

We think there should be quite a difference between the return on investment in agency development, which is at best highly speculative, and the return on investment in new business, which we think is not particularly speculative in a mutual company.

We also attempt to measure the return on the investment in agency development. In this matter I become very humble, for either our measures so far are imperfect or our return is not very good. We are still scratching our heads over this.

**MR. CHARLES H. PAGE:** We use a three-factor dividend formula. The interest contribution is based on the current net earned interest rate (adjusted for long-range capital gains and losses) after federal income taxes. The mortality contribution is based on current ultimate mortality rates.

The loading contribution is a combined factor reflecting expenses and a contribution to surplus. This factor is obtained through use of asset shares. That is, asset shares are computed using the current earned interest rate before federal income taxes (income taxes are a separate item), current select mortality rates, current expense rates, current withdrawal rates,

and "trial" dividends which have the proper interest and mortality contributions. The formula for the loading contribution factor is then modified until the desired characteristics are obtained. These characteristics include a suitable amount of total dividend distribution and a suitable pattern of asset share surpluses for all plans, ages, and durations.

For our current life and endowment policies, a different dividend scale is used for policies of \$10,000 or more and for smaller policies. Dividends for female lives (as well as premiums and nonforfeiture values) are generally the same as those for a male three years younger. Our asset share calculations on female lives, however, reflect actual mortality experience of females. A blend of asset share results for male and female lives, based on the relative proportions of each, is used in determining the dividend scales.

For all policy series, special formulas are applicable for term insurance, single-premium policies, and paid-up policies. For policies included in pension trusts and related programs, an increased interest contribution element reflects the special reserve credit allowed on such policies in computing the company's federal income tax. Additional dividend elements are applicable on certain policies on account of provisions for accidental death benefits, waiver of premium disability benefits, or child protection benefits. For policies issued on a guaranteed issue basis, under which our mortality experience has been less favorable than our regular mortality, dividends are generally less than those applicable to corresponding policies issued on a regularly underwritten basis.

The process of making a change in dividend formulas starts with an early estimate of the earnings for the current calendar year and a comparison of this with the estimated dividend liability for the following year that would result if dividend scales were unchanged. From these figures, management decides on a target change in the total dividends payable in the following year. While we do not change life insurance dividend scales every year, we do make periodic changes so that dividends will essentially reflect current conditions.

The calculation of trial dividend scales and asset shares is done for a grid of policy series, plans, ages, and years of issue representative of the entire business. For older policies, the starting points for these asset shares are retrospective accumulations, that is, "historical asset shares," which indicate the current status of these policies.

The volume of calculations needed to make a change in dividend scales is very great. Practically all such calculations are performed by electronic computers.

We are very much concerned with equity, including equity among policy series. We believe that the adoption of consistent asset share factors



for all policy series and taking account of the historical asset shares for older policies are our most important tools in producing equity.

MR. JOHN M. BRAGG: I feel that I should make a brief statement about what happens when you really try to apply this, as we have in our company. From some of the discussions you may have gotten the impression that this calls for lower rates; that is what impels me to make this contribution. Generally speaking, it calls for higher rates. Some of them are reduced, yes, but as a general rule it seems to call for higher rates, higher commissions, and much higher sales-attempt quotas.

*Los Angeles Regional Meeting*

CHAIRMAN RAYMOND A. BIERSCHBACH: Profit and competition are among our prime concerns when we set premiums for nonparticipating policies. This raises the question, "What is a proper profit objective?" When profit-testing a policy form, we determine the present value of twenty years' profit per \$1,000 of the initial amount of insurance, using conservative estimates of mortality, lapse, interest, expenses, and average sizes. The profit margin for the plan is a weighted average composite of the present value of profits at various ages and for each of our branch offices and general agencies. This measuring rod for profit margins has two very real advantages. First, our management is accustomed to it and can therefore very quickly weigh the advantages and disadvantages of various profit and premium combinations. Second, it helps bring policy forms with various size requirements into their proper relationship.

Recently we have had reason to question our "per \$1,000 of insurance" measuring rod of profits. We are considering measuring profit in terms of a projected rate of return on investment, since this involves a more familiar concept in the minds of shareholders. Obviously our "investment" is the strain resulting from new business. It is possible to express the emerging profits as a rate of return on that investment. There are, however, certain problems, particularly if the same rate is required for all policy forms.

When revising premiums for an existing policy form, we insist that the new premiums be such that the present value of future profit on the projected sales of the plan for the following year be at least equal to and preferably greater than the present value of future profit expected from the known sales of the plan in the past year. Suppose, for example, that our premiums for a particular plan have become noncompetitive. We know what our profit margin is for the existing premiums; we therefore tentatively establish a premium scale and find the profit margin for that scale.

We then take the ratio of the old profit margin to the new profit margin and conclude that sales will have to increase by that percentage in order to maintain our aggregate profit position. If the sales people feel that such an increase is possible and that premiums are sufficiently competitive, the new rates will be introduced. There is a danger in this reasoning: if the distribution of sales by age or size group should shift as a result of the change in rates, our anticipated profit margin becomes inaccurate and subsequent revisions may become necessary.

With regard to participating policies, the actuary of a stock company issuing participating policies has one problem that does not exist in a mutual company—the stockholders have a right to the share of the earnings from the participating policies. Frequently, this share will be set by a resolution of the board of directors; in our case it is a percentage of the earnings before dividends. We must, therefore, be careful to see that our dividends are such that the earnings before and after dividends bear the proper relationship to each other, while giving due consideration to a contribution to participating surplus. When setting participating premiums and projected dividends, we work with the following formula: present value of profits before dividends *minus* present value of dividends *minus*  $x$  per cent of the present value of profits before dividends *equals* present value of contribution to participating surplus.

We realize, of course, that it is not sufficient to look at present value alone, since the incidence of the before-dividend profits and the dividends themselves are extremely important.

MR. CLEMENT B. PENROSE, JR.: Speaking from the point of view of a mutual company, we certainly want to bring into company philosophy the matter of equitable treatment of different classes and different generations of policies.

I think most mutual companies would also take into account the historical level of their gross premiums. That can be changed, but a dramatic change in the company's level of gross premiums would be made only after giving consideration to the impact on, among other things, agents' commissions.

In special plans or sales packages other considerations might come into play. Our company offers a one-year term dividend option under which the entire amount of the dividend is used to purchase one-year term insurance. One of the plans with which this dividend option is available is five-year renewable term. In considering a change in gross premium levels on the five-year renewable term plan, we could not overlook the fact that we would also be reducing dividends and that would drastically reduce the

total protection (including one-year term insurance purchased by dividends) that the policyowner would have under his policy.

MR. HAROLD J. DEUTSCHER: I have a question for Mr. Bierschbach. In preparing statements for participating and nonparticipating business are you allowed to recover your investment in the participating business before you start paying dividends, or is it preferred that you pay out some part of your profits at the same time you are recouping the initial investment?

CHAIRMAN BIERSCHBACH: If you are writing both participating and nonparticipating business, you have to keep the surpluses separate. In some states it is necessary to file separate statements. The transfer from participating surplus is made after the gain from operations is determined but before dividends, so you would presumably be paying dividends before having captured the initial strain.

2. What differences in philosophy or techniques arise in designing the following:
  - a) Policies for only a segment of the general population, such as the segment that has refrained from smoking for a period?
  - b) A generalized income replacement policy with premiums and retirement benefits changing to reflect the policyowner's needs and income level?
  - c) Coverages that vary in accordance with the cost-of-living changes or the results of investment in equities?

*Philadelphia Regional Meeting*

MR. J. ROSS GRAY: With respect to question 2a, the basic problem is whether we should move in the direction of the fragmentation of our premium rates or whether we should try to make life insurance as freely and uniformly available to every person as we can. Tied in with this is the competitive situation where, if some companies grant a somewhat better rate to a desirable segment of the population, they can attract the more desirable lives and make a considerable profit on them (provided that they have not overdone the rate differential), leaving the rest of the companies with the less desirable lives.

As one who used to have considerable contact with the underwriting end of the business, I fully appreciate the necessity of rating underaverage lives. If a person presents a considerable extra hazard—one that he recognizes—and because of it may apply for greater amounts of insurance than he otherwise would, the companies must rate him in fairness to other policyholders. However, when the extra hazard is of a fairly minor amount, or when it is very widespread, or when the applicant does not recognize it as a hazard and does not apply for an inordinate amount of insurance, we do not need to, and perhaps we should not, charge extra for the hazard.

After my delivery of that "holier than thou" speech, it may come as a surprise to you to be told that from 1949 to 1962 we tried to pick out a select group of applicants if they applied for policies on the ordinary life type of plan in amounts above a certain minimum. Unfortunately, we found that it was not feasible to make a corresponding increase in the rates charged to applicants who could not qualify and who were switched to the counterpart endowment at 85 plan, because they would move to some other average-mortality plan. We also received complaints from the field force, so we discontinued the practice in 1962. Incidentally, the original setting of such premium rates is largely a matter of guesswork, because there are no worthwhile statistics from which to proceed.

We have no contract of the type mentioned in question 2b, but it seems to me that antiselection would be a big problem. Presumably it would be provided that the sum assured and the premium would be increased if it

were determined that the policyholder's income had gone up and had stayed up sufficiently long so as to be established. The initiative would remain with the policyholder, and we would certainly hear from those who had become impaired. Those who were eligible for new standard insurance might well go elsewhere for standard rates, if they were to seek increased insurance at all.

On an income replacement type of policy there would seem to be very little problem connected with reserves, and loadings for expenses would not present much of a problem either, as far as this provision for increase is concerned.

A policy varying with cost-of-living changes, as contemplated in question 2c, would be outside the control of the policyholder and thus largely free from antiselection. The man who was in good health could refuse to accept the increased premium and increased protection by lapsing the policy or requesting its reduction, but this is not likely. Once again, if the policy were on the income replacement type of plan, there should be no problems with respect to reserves and few problems with respect to premiums.

We might give a moment's thought to a type of policy where the sum assured could go up only and not down, with or without a change in premiums. The calculation of premiums for such a policy would surely have to be done on a basis which anticipated a certain rate of increase, and the policy probably would carry a safeguarding clause limiting the amount of increase. If the increase in cost of living did not occur, the premiums would be quite redundant, but a participating approach might take care of the situation.

A policy which would reflect the results of investment in equities presents problems in the United States which I would much rather leave to others. I think that it could be done in Canada, although it might be necessary to spell out separately the provision for loading and that for mortality and to make a statement with regard to the anticipated interest earnings. This would prevent the transfer of earnings on, say, mortality, to offset losses on expenses, or vice versa, so that greater margins would be needed. Presumably we would not be concerned with establishing a margin in the assumed interest rate, because I would expect that the return on the investments would be treated in such a way as to reflect the dividend earnings as well as the market values. I can visualize a policy where the sum assured would reduce each year, and a certain amount of paid-up insurance would be purchased each year with the amount thereof to vary subsequently according to the return on, and the value of, investments in equities.

In the British Isles there is a quite different approach in fairly common use. Each year an amount equal to, say, 90 per cent of the premium, is invested in units of a mutual fund, or in an equity fund, on the policyholders' behalf. The amount which he otherwise would have received is increased or decreased according to the experience of the units. Some British companies guarantee that the amount at settlement will not be less than the sum originally assured expressed in pounds. The most recent budget of the Chancellor of the Exchequer gives a very large shove in this direction. This comes about because one's income tax is reduced with respect to 40 per cent of life insurance premiums paid. The new budget says that, for credit to be obtainable with respect to premiums, the death benefit must be at least 75 per cent of the gross premiums paid.

Perhaps some companies will attempt to cover the risk of this guarantee merely by adequate loading in participating premiums. Otherwise, it would appear to be necessary to assess a term insurance charge against the investment results.

**MR. WILLIAM M. WHITE, JR.:** Unless one considers potential buyers of H.R. 10 policies to be a segment, we have not been tailoring our contracts or our underwriting for any one segment of the population. For H.R. 10 business we are considering a special policy series reflecting the characteristics of this type of business as distinct from our regular pension business. Mortality and persistency, among other things, would be on a different basis.

We are continuing to explore newer coverages which might serve a specific need, but in general we have found that most needs can be met by a creative combination of the more traditional coverages. Our entry into the equity product area with the more traditional mutual fund is an example of this. We searched quite a long time in an effort to find some way of combining an equity base with more traditional types of insurance guarantees and options, only to find that this did not seem feasible because of the various legal and regulatory problems.

**MR. B. FRANKLIN BLAIR:** In my opinion the philosophy of premiums and dividends for special types of insurance should be the same as that for regular plans. However, it would seem to be almost impossible to maintain equity between old and new business when new underwriting classifications are introduced, as in a special nonsmoker's policy. Policies already on the books cannot be divided into new subgroups to take into consideration a new underwriting standard, such as whether the insured smoked at the time of issue or not. Since credit for not smoking is to be

given in the dividends illustrated in new policies currently being sold, replacement may be a problem despite the additional acquisition costs of the new policy.

I believe it would be greatly in the interest of the country to fight the progress of inflation rather than to encourage it by increasing the number of people who profit by and hence may have a subconscious desire for inflation. We may have an obligation to the long-term welfare of the country not to develop cost-of-living or equity-funded policies even though the current inflationary situation makes it easy to sell these policies.

In regard to techniques for a generalized income replacement policy, increased flexibility in the nonforfeiture law apparently will be necessary. Difficulty has arisen in the past in showing how complicated products comply with the nonforfeiture law, because the law is prospective and requires that every future possibility be examined in detail with values of such possibilities related to values of more imminent happenings. In determining minimum values, the "adjusted premium" must be the same percentage of the gross premium in all policy years. The net result of this prospective approach can be unrealistic. The crux of the problem seems to be the inability under the law to view premiums and benefits from the retrospective and the "moment of happening" points of view.

Increased flexibility in laws or regulations dealing with dating back may also be needed if a true "life cycle" policy is to be developed. Another area where increased flexibility may be needed is that of the New York laws dealing with expense limits, particularly as they apply to commissions.

Of course a generalized income replacement policy will require rules to control mortality antiselection and financial antiselection; I believe that the drafting of such rules should be left to the judgment of company management and that companies should not be forced into a straitjacket of antiselection rules by the state or other regulatory authorities.

MR. JOHN E. HEARST: Our experience in developing policies for special segments of the population has been limited. We did calculate rates for a life insurance policy for total abstainers, but we had no statistics indicating a significant difference in mortality for this group. Consequently, the techniques were not unique. Although limiting sales to abstainers may have lacked underwriting significance, it seemed to increase sales significantly.

We have developed policies to be sold to seminarians. Loading tends to be minimal. Generally much of the premium is used to buy one-year term coverage.

MR. ROBERT G. MAXON: In August, 1962, INA Life introduced a nonparticipating ordinary life policy called the "consumer price index policy." Each year a CPI benefit was determined by multiplying the face amount by the percentage increase in the consumer price index from the date of issue to the preceding November 1. One-year term insurance equal to the CPI benefit was then purchased.

The policy was not a success and was withdrawn in December, 1965. It seems that the policy was a failure because, even though the basic concept was simple, it was difficult to explain and our agents could not get the concept of the policy across.

It seems to me that people are more interested in possible equity appreciation than in a fixed-dollar contract which provides protection against a decrease in the real value of the coverage.

MR. WILLIAM D. BERG: My comments refer to question 2a. I feel it is correct to say that there was no "difference in philosophy" in designing the premium reduction that Phoenix Mutual introduced on certain plans in August, 1967, to male nonsmokers who meet certain build requirements. The method used was the traditional method for pricing life insurance for a class of risks on the basis of what is thought to be reliable and acceptable statistical evidence that sets the class apart from the standard risk. By smoking we refer only to cigarette smoking. The extra mortality of pipe and cigar smokers is insignificant; this is true also for female cigarette smokers.

We accept as nonsmokers males 22-65 who, at the time of application, have not smoked for the preceding twelve months. The build requirement, which is simply an upper limit on weight for a given height, was added to make the class even more select and to gain competitive advantage from the larger premium reduction that results.

The smoker and nonsmoker data were obtained from the study by E. Cuyler Hammond. Although very extensive, the data are not what would result from a group of underwritten lives; they are not in select and ultimate form and they are not classified according to build. Nevertheless, in our opinion the evidence is convincing.

The Surgeon General's study gave 68 per cent as the ratio of smokers to the general population; we assumed the ratio would be two-thirds for all ages. The Hammond rates for smokers and nonsmokers were combined in these proportions to arrive at a total rate for the attained age. We then assumed our nonsmokers would be only 90 per cent pure, that they would contain 10 per cent smokers and recidivists. These attained-age ratios of nonsmoker to total mortality rates were replaced by a constant ratio for



each (decennial) issue age and applied to the 1955-60 Select and Ultimate Basic Tables. These we called our "best guess" rates. The compound effect on the rate for build was then applied (we assumed that nonsmokers meeting the build requirement would enjoy at least the same mortality improvement as would the entire group of standard risks). We added 5 per cent of the 1955-60 Select and Ultimate Tables rate to our "best guess" rate for conservatism.

The premium reductions are available on only five whole life type plans. This permitted a single reduction for all the plans. The reduction increases with issue age to about \$2 per \$1,000 face at ages 45-55 and tapers off slightly at higher ages. Policies must be at least \$15,000 (or \$25,000 where that is the plan minimum), and substandard and nonmedical applicants are acceptable if otherwise eligible. The reduction is not extended to riders.

A smoking statement form must be signed by applicant and agent, and the inspection report provides an independent check for nonsmoker applications. Recent issues of the current series are eligible upon producing acceptable medical or nonmedical evidence (depending on the underwriting facts at time of application) and payment of a \$15 charge.

MR. ROBERT L. COLLETT: Can a nonsmoker policy be contested within the contestable period on account of smoking contrary to the representation made in the nonsmoker's statement?

MR. BERG: A copy of the statement is attached to and consequently becomes part of the policy. However, the company is on record with a few states that raised the question that, at most, only the premium reduction would be contested.

#### *Los Angeles Regional Meeting*

MR. CLEMENT B. PENROSE, JR.: In response to question 2a, to the extent that company philosophy in pricing its products is defined in very general terms—such as "equitable treatment of various categories of insureds"—or primarily in terms of profit margins or aggregate profit, one can say that there is no difference in philosophy and little, if any, in the technique required. If, however, in looking at our philosophy, we consider that it includes a broad standard mortality assumption applicable to as much of the general population as is practicable, the offering of this type of policy will require a significant change in philosophy, whether the segment of the general population chosen for favored treatment consists of those who have refrained from smoking for a period of time, some other specifically defined group, or, more generally, those who can qualify as

preferred risks on the basis of any defined set of underwriting criteria.

Whether or not it requires a change in philosophy, the assumption in the pricing process that a certain policy will be issued only to lives subject to a lower force of mortality than experienced by the general population clearly affects the pricing of that policy. It will also require careful consideration of the mortality assumption applicable to other plans of insurance which may be issued primarily to those who do not qualify as preferred risks under whatever definition of "preferred risk" is being followed. For example, fifteen years ago my company offered a preferred life at 85 plan, the pricing of which reflected a better-than-standard mortality assumption. We also offered an ordinary life plan which, while it had a slightly lower minimum face amount, was offered to essentially the same applicants. The dividend scale for the latter plan reflected the assumption that mortality would be slightly higher than standard because those who could qualify as preferred risks would take the other plan. My company withdrew the preferred risk plan in 1958, and at the present time we do not have any preferred risk class of policy or any nonsmoker policy.

**MR. HAROLD J. DEUTSCHER:** My company came out with a nonsmoker's policy when it first started, in 1962. We do not have a great exposure on it at this point (sales on this policy have been less than 5 per cent of total sales), but we have had no claims on the nonsmoker's policies, so the direction is favorable. The plan has been something to talk about, and total profit has probably been improved by the fact that we have been able to knock on a few more doors than we could otherwise.

**MR. RICHARD H. TALLMAN:** Since the first nonsmoker policy appeared two years ago, my company has several times considered introducing such a policy. Our medical director felt emphatically that we should introduce such a policy to reflect the better mortality of nonsmokers. Our agency vice-president, however, did not want to see the rates raised on other policies. We made some calculations of aggregate profit margins and came up with a guess as to the increased volume of business that would have to be sold in order to maintain the aggregate profit of the company. Our agency department felt that the requirement was beyond anything they could reasonably achieve by way of increased sales. As a result we finally decided not to introduce a nonsmoker's policy.

This decision reflects to some extent the philosophy my company had on this question. The same reasoning would apply to other preferred types of risk. One other consideration was the matter of whether this class is narrow enough to be considered a special class. Moreover, why pick this particular characteristic?

In our calculations we assumed that the mortality of nonsmokers would be approximately 60 per cent of standard mortality. This assumption was based essentially on government statistics plus other studies (many of which may be repetitions of the same statistics); we did not have any study of our own on which to base our assumption.

MR. CHARLES J. SETER: I recently reviewed the Surgeon General's report and concluded that there definitely is extra mortality on smokers, varying between 1.5 and 2 times standard, over all. The problem is different for different types of smoking. The extra mortality varies on how much smoked, how long smoked, and when started. Another problem is that smokers are always changing their smoking habits; they are smoking one day and not the next or they were smoking last year but not this year.

Everyone has talked about nonsmoker specials. I think the only equitable way to handle smokers is to rate them just as people with heart conditions are rated. It may be impractical, but it is probably the most equitable approach, since the ratio of smoker mortality to nonsmoker mortality seems to vary from 125 per cent to 500 per cent, depending on the type of smoker. A company might even decline a risk because of the smoking habit. Groups of individuals who smoke five packs a day might be expected to experience 10 times standard mortality. How can we justify issuing standard insurance to such a risk?

We use occupational ratings on people who have nothing really wrong with them but tend to experience extra mortality as a class. I think this same thinking could apply to smokers. Of course, there are practical difficulties involved in basing rates on the extent of smoking habits. One is that applicants may not tell the truth about how much they smoke and how long they have smoked. Another problem is the question of rate reductions for reformed smokers.

MR. JAMES L. COMPERE: One problem with the nonsmoker policy concerns the question of what to do for existing policyholders who are nonsmokers. In other words, if you offer a nonsmoker policy, what do you do about nonsmokers who purchased policies in previous years? If you have a classified situation and you had rated people, say, for cancer, and a cure was found for cancer, you would reconsider all those people and put them in a standard class. However, for prior insureds, you do not know who are the smokers and who are not. From an equity standpoint, what can or should you do for the nonsmokers among your prior insureds?

MR. SETER: How did you recognize the better mortality for women when you introduced lower rates on new issues for women?

MR. COMPERE: As far as females are concerned, we have a female credit in the dividend as well as in the premium. We also vary dividends by the amount of insurance, thus passing on to existing policyholders the advantage of volume discount introduced for new policyholders.

MR. ERNEST J. MOORHEAD: This procedure of extending volume discounts to existing policyholders has been referred to as "Robin Hood in reverse." The point is that you are changing the rules retroactively so as to give an extra credit to the more affluent of your policyholders at the expense of the less affluent.

MR. CHARLES W. McMAHON: One obvious answer to this situation is that an existing policyholder who is a nonsmoker or a preferred risk or a female can go into the market and buy new insurance at the lower rate offered if he or she chooses to do so. This does create replacement problems. You could perhaps restrict commissions on the new policy. However, you have this problem to face any time you make an important change in your rate structure.

MR. JOHN W. LINCOLN: In defense of the practice of adjusting dividends for existing policyholders, it should be stated that, if we want to maintain the persistency of our business, we have no choice but to make such adjustments.

MR. GEORGE M. SHERRITT: Have those companies that have introduced nonsmoker policies modified their dividend scales for policies other than the nonsmoker policy? If not, have they modified their forecasts, or do they intend to rely on increasing interest earnings to cover excess mortality on smokers?

MR. TALLMAN: To the best of our knowledge, the companies we have studied have not made any change in their dividends for policies other than nonsmoker policies.

On the matter of what to do with old policies, the policy we were considering would have been a nonparticipating policy, so we would not have made any changes at all for our existing policyholders.

One other practice that may have some bearing on this discussion is my company's practice of keeping one eye on the smoking habits when underwriting risks. If we do see an impaired life and there is a heavy smoking situation which our medical director feels could have some connection, he will add something to the rating. Thus, in a very indirect way, certain smokers are being penalized somewhat.

MR. PENROSE: With regard to "a generalized income replacement policy with benefits and premiums changing to reflect the policyowner's needs and income level," we need to clarify the type of coverage we are discussing. Conceivably, this could be a policy under which the designer of the contract decides in advance when the buyer's needs are going to change and builds in that kind of flexibility. However, I believe what is intended is the more general case, where in one policy we would provide contractually that the amount of death benefits and, later on, retirement benefits would change as the policyholder's circumstances changed.

This would seem to present us with problems of mortality selection and also quite difficult problems in the area of nonforfeiture values, if we provide these benefits within one contract rather than by issuing additional policies as the needs change.

From the point of view of pricing philosophy, it would seem to be rather difficult to determine the present value of profit under a policy providing this much flexibility with regard to benefits and premiums in the future. In order to provide this type of flexibility, it may be necessary to separate to a greater extent than we have usually done the pure protection element from the savings element of the policy.

With regard to "coverages that vary in accordance with the cost-of-living changes or the results of investment in equities," there are several types of coverages that fall into this category.

As I understand it, in the Netherlands a considerable portion of the permanent life insurance sold is of the type that varies with the results of an equity investment pool. The death benefits, premiums, and cash values for these policies are expressed in terms of units or fractions of units. The assets developed from such policies are invested in a fund consisting primarily of common stock. The monetary value of the unit or fraction thereof then varies with the performance of the fund, and individual policyholders' death benefits, premiums currently due, and cash values vary accordingly.

Another variation is one that I believe is followed in Finland. There the policies are tied to the cost-of-living index, with the face amount, premiums currently due, and cash values all varying with the cost of living. This is made possible by the fact that insurance companies can invest in bonds, mortgages, and perhaps other types of investment that are also indexed to the cost of living (that is, both the principal amount and interest vary with changes in the cost of living).

Finally, a third type would be a policy in which the benefits alone are tied to the cost of living. The simplest case would be a one-year renewable

term policy, with the amount of death benefits tied to changes in the cost of living.

**CHAIRMAN RAYMOND A. BIERSCHBACH:** There are at least two forms currently available of the type mentioned by Mr. Penrose in his third category. One of them is an annual renewable term policy offered by a California company, with a cost-of-living feature built in. The cost of living is measured by the consumer price index. As the cost of living increases relative to what it was at the inception of the policy, coverage under the policy increases. There is a maximum limit to the increase, and, although the coverage could decrease from one year to the next because of a decrease in the consumer price index, the death benefit can never go lower than the face amount of the policy. The insured does not directly pay for the increased coverage; the premium increases each year but only because the plan is an annual renewable term policy. If the premium was \$4.25 when the policyholder bought the policy, and it was scheduled to increase to \$4.39 the next year, the premium that he will pay in the second year is \$4.39 multiplied by the original face amount, even though the death benefit may have increased. The basic premiums, therefore, must carry sufficient margin to cover the additional mortality coverage that will be offered. This plan has the one real advantage that there is no anti-selection; the increases are automatic.

The second plan is in the nature of an annual renewable term rider, which can, I believe, be added to any policy in the company's portfolio. There is a yearly charge, I believe, of \$2, for including the rider in the policy. If the consumer price index increases, the insured may purchase additional term coverage through the payment of a yearly renewable term type of premium. The unit charge thus increases with age, and the premium is the product of the unit charge and the amount of additional coverage provided. This plan is a kind of marriage of an annual renewable term rider and a guaranteed insurability rider.

My company has given some consideration to the development of such a coverage but has, at least for the time being, tabled it, pending solution of what we feel to be some major problems. We all tend to look upon an increase in the consumer price index of something like 4 per cent as being significant, but would an insured look upon an additional \$400 of coverage on a \$10,000 policy as significant? Can the premium for this relatively small increase in coverage be loaded sufficiently to cover the cost of calculating the benefit increase and the premium for the increase and then informing the insured of the amount of the additional coverage and the premium for it? Is it possible that this plan could be a deterrent to future

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sales in that an insured with such coverage may feel that he has all the insurance he needs since his coverage keeps up with the cost of living?

We feel that this coverage would be free of SEC regulation, because the benefits are not related to the performance of any set of securities but are related only to the fluctuations in the consumer price index. This must be defined in the policy. I have no idea how the various insurance commissioners would receive this policy.

3. To what extent and in what manner are profit-analysis studies employed?
4. What viewpoints do actuaries hold on the soundness of using marginal expense rates in determining the profitability or price structure of an added volume of business?

*Philadelphia Regional Meeting*

MR. WILLIAM M. WHITE, JR.: The third topic may make more sense if "asset share" is substituted for "profit analysis." With improved computer facilities we have been able to use "asset fund" calculations with much more refined premium assumptions. This allows us to test the impact of modified assumptions on the final rate and on the level of profit. We also test the pattern of cash values and withdrawal assumptions and include the federal income tax as a direct expense rather than as an adjustment in the interest assumed. Through this approach we have been able to reflect any anticipated Phase II taxes as an expense.

Our asset fund calculation has enabled us to experiment with an approximation to Anderson's gross premium method. In addition, we have been attempting to estimate the present value of future profits from a given plan of insurance.

Theoretically, we could set minimum standards of profit return for all our products; however, competition will not always permit this. As part of our planning process, we do set specific profit objectives for the sales of each line of business. Recognizing that our various policies will have different profit expectations, we create a specific plan for the product mix which in total will meet our objective and then we seek to manage our agency operation so that relative product results by plan will be obtained.

In regard to question 4, theoretically we think that the application of a marginal approach to the cost of selling additional business does make sense. Additional business which can be written without incurring greater overhead expense should certainly be able to increase the total profit emerging, even if the business is sold at reduced rates which would cover only the additional expenses related to that business plus a small margin. There are some dangers in this approach. We must be careful that we recoup the total expenses of the operation from somewhere, and we must be sure that this marginally priced product is not written in replacement of business that would otherwise have been written at higher rates.

We feel that the expense-allocation process is difficult enough on a fully allocated basis and that there are serious practical problems in measuring the relative contribution of the respective coverages if we should adopt a marginal expense approach in the individual pricing. We feel that a more direct approach is to use fully allocated expenses and to accept compro-



mises in the profit margins. We think this is a safer way of keeping fully aware of the relative contribution from each product and of not losing track of any expenses that we want to recover.

**MR. B. FRANKLIN BLAIR:** We find that asset shares are very useful in the development of our dividend scales. We have recently introduced a theoretical refinement into their computation by using two after-tax interest rates in the accumulation of the asset share. The first rate is applied to the reserve and varies slightly according to the tabular interest rate. A second lower rate is applied to the excess, positive or negative, of the asset share over the reserve. This rate represents the after-tax rate on the company's surplus.

The expense and time required for asset share calculations in our company are almost negligible, since they are a by-product of the computer program which calculates our test dividends for a new dividend scale.

Turning to marginal expenses, I have serious doubts regarding the application of marginal expense rates to a block of business. It may work all right in a stock company, but I do not think you can apply marginal expense rates in a mutual company without being unfair to different blocks of policyholders.

**MR. JOHN E. HEARST:** It comes as a surprise to me that several of the companies for whom we construct premiums do not ask us to construct asset shares.

The primary problem we have with the smaller companies is determining asset share assumptions which are realistic. It is difficult not to be extremely conservative about these. We tend to be conservative with respect to the interest and mortality assumptions and, I am afraid, liberal in the expense and production assumptions.

In an effort to show the effects of inflation, we have constructed asset shares increasing expenses a constant percentage each year. The results are sometimes startling, because the underwriting gains tend to decrease by duration or to become negative.

In our asset share projection, the accumulated operating gains are shown. This is the difference between the assets generated by the business and the liabilities. The underwriting gains are then calculated by reducing the total operating gains by the interest on the accumulated gains.

With respect to marginal expense rates, occasionally we project business for a company using marginal expense rates as a means of estimating its capital requirements. The marginal cost is useful in determining the amount of production needed to justify adding a new line. However, a possible pitfall in using this technique is that initial costs are not accounted

for. Therefore a company might offer too many plans of insurance to recoup its initial investment. Nor does the method provide for adjustment in agents' sales. For example, life production frequently suffers when accident and health products are introduced.

MR. J. ROSS GRAY: I rather hope that the words "profit-analysis studies" are wider than the idea of asset share studies, because I have long regarded the latter with a very jaundiced eye. It all goes back to about the year 1933, when we were planning a new series of premium rates and values and I had the pleasure of working out by hand long tables of asset share accumulations. As I remember it, these indicated that most plans would go many years before the break-even point was reached. We then adopted cash values, which were higher than the asset shares. Strangely enough, we are still in business thirty-five years later and seem to have made some money in the interval.

We have made other asset share calculations since then. To my mind they are a useful guide as to the general shape of a set of cash values, but I wonder whether they are much of a guide as to the amount of profit which will be earned or as to the time when such profit will appear. I suppose the answer is that all the factors used in an asset share study must be very realistic, freed from all the conservatism we habitually work into our calculations. However, I should say that I am quite convinced that we should have some idea of the amount of profit to be expected from a volume of business. If we can estimate when the profit will arise, so much the better.

There is one point which I would like to make: we should make sure that some action which we decide to take as a result of the studies will not upset the assumptions which we made in setting up the studies. For example, it would be possible to determine termination rates from a block of business whose cash values might be described as the reserve less \$25 in the third year, grading to the full reserve in the twentieth year. If the resulting termination rates were used to determine the additional costs of having cash values equal to the full reserve in the third year, we might find that our calculations were completely thrown out by a change in the termination rates.

I think that it goes practically without saying that profit-analysis studies are much more important on nonparticipating business than on participating business.

Turning to the fourth topic, I think that using some form of marginal expense rates is very sound and is indicated, provided that means are retained for covering the basic expenses.

A recent author gave an example on the following order: If a given volume of business can be obtained at a cost of \$90,000, but double the volume of business could be obtained at a cost of \$140,000, should we not calculate premium rates and profit margins on the basis of \$50,000 being the cost, requiring the basic \$40,000 to be covered by some general allocation of expenses? We did a somewhat similar study some years ago. If we had continued our then volume of business, it is likely that the resulting expense rates would have left us in a noncompetitive position. Double the volume of business would produce expense rates which would permit a competitive price structure. This was not a matter of selling at the marginal expense rates but merely a matter of recognizing the expenses caused by the additional volume of business.

Establishing premiums for a plan or plans at the marginal expense rates is a completely different matter. As far as the law is concerned, it would seem that premiums should be self-supporting on reasonable assumptions as to mortality, expenses, and interest in order to comply with the New York requirement. The actuary of a company issuing participating business might have to examine his conscience carefully on the matters of equity and discrimination. There would be a real danger that nonparticipating premiums which covered only marginal expenses would appear sufficiently attractive in comparison with the remainder of the plans issued by a company that there could be a real swing of business away from the regular plans, thereby leaving inadequate funds to cover expenses. The use of marginal expense rates only appears possible if it can be anticipated that an additional volume of business will be generated without causing a reduction in the volume of regular business.

MR. JOE B. PHARR: Profit analyses are used quite extensively in our firm. Our analyses can take either the form of the traditional asset share calculation or the more recent technique of calculating book profits per Anderson's methods. All actuarial assumptions as to commissions, general insurance expenses, mortality, interest, and so on, are printed out from the computer along with either asset shares or book profits. Any item of computerized output which appears also includes a computerized, detailed narrative describing the computation of the item.

*Los Angeles Regional Meeting*

MR. WILLIAM M. BUCHANAN: As consulting actuaries, we are frequently asked to establish profit margins, depending on the company's preconceived notion of an adequate profit margin. New companies are very interested in the incidence of emergence of profit each year, as well as

the present value or present value per unit of profit. In this regard we have a general profit margin program which calculates the year-by-year incidence of emergence of profit on a profit-deducted or surplus-restored basis. From these figures the present value of profits, and a fund surplus carried forward (which is really the asset share less the reserve), may be easily determined.

Concerning the rate of return on invested surplus, problems can be encountered. If you have no surplus strain, there is in effect an infinite rate of return. Moreover, since the profit margin is a function of acquisition costs and commission patterns, the rate of return on invested surplus could be quite different from one company to another.

**MR. D. ALAN LITTLE:** The particular type of profit analysis study that we use is often referred to as a profit margin technique. Schedules of output at a plan age consist of two types of studies, both on a calendar-year basis. The upper portion of the schedule shows annually, for the period being studied, the profit per unit originally issued, with separate calculations for each component of profit. The bottom half of the schedule shows the cumulative year-by-year position discounted to issue. In addition, the schedules contain the present value of remaining future profit per unit remaining in force, amount of insurance remaining in force, asset share surplus, and reserve in force, as well as the following items that I find useful in setting rates: (1) the break-even premium for each year in the study, (2) the yield on surplus invested in the first year, and (3) the effect on the profit margin of both a \$1 change in premium and a \$1 change in expense.

A composite schedule combining all ages for a plan can also be run by incorporating age distribution weights. Similarly, by incorporating plan weights, a composite schedule can be run combining a number of plans. Projections of existing business can be easily made by incorporating weights available from reserve valuation runs. New-business projections are made by incorporating new-business amounts. The format of the schedules closely resembles that of the gain from operations in the annual statement and, as a result, can be shown to and understood by non-actuarial management.

I am always surprised that management of many small companies and even management of some larger companies have no idea whether their rate structure will yield a profit. Too frequently I have run across companies that feel secure in the fact that they are writing a substantial amount of business, even though analysis of their premium rates might show a loss. This lack may be caused by the failure of actuaries to communicate profit

analysis studies to management in a form that can be readily understood or, in some instances, the failure to make such studies. I find it useful to involve management from the start in the rate-making decisions and always urge that profit margins be calculated and reviewed with them. This is done in the following stages:

1. *Choice of assumptions.*—The assumptions are reviewed with management and their approval is sought before any calculations are made. This means that the assumptions must be presented in a fashion which management can readily understand and compare to actual past results.

2. *Determination of profit objectives.*—Management is asked to give their specific profit objectives in terms of a break-even point, a yield on the surplus invested in the first year, a mark-up as a per cent of premium over the study period, or some other goal. Frequently we find that management has given little thought to the idea of objectives in terms of profit.

After the calculations have been made, the results are then reviewed with management in terms of their previously established profit objectives. If these objectives are not being met or if rates are not as management might wish, alternate solutions can be presented and their effect on the profit objectives demonstrated. Since assumptions have been previously agreed to by management, we usually are seeking solutions to the underlying problems rather than arguing about assumptions.

One happy by-product of involving management in the rate-making decision has been the upgrading of the actuary into the area of corporate planning, of which rate-making is only one part. Other uses we have found for our profit technique are as follows:

1. Forecast studies to assist management in long-range planning, including tax planning.
2. Valuation of companies for merger and acquisition purposes.
3. Determination of one type of adjusted earnings.
4. A standard of performance for measurement of management results.
5. A standard of performance for measurement of agency return.

A rather novel use recently tried was a projection-type pension study treating current employees as existing business and incoming employees as new business in our projection routine.

MR. CLEMENT B. PENROSE, JR.: My company employs asset share calculations to a considerable extent in the pricing of new individual life policies, as well as in testing possible changes in the dividend scale applicable to currently issued policies. Our asset share calculations are computerized, which gives us a great deal of flexibility in carrying out asset share tests. For example, we can, if desired, calculate asset shares sepa-

rately for each mode of premium payment. Calculations for the monthly mode actually utilize month-by-month lapse rates within the first two policy years.

The output of our calculations is such that we can develop for a given block of new or existing business projections on a year-by-year basis of future premiums, increase in assets, increase in reserves, death benefit payments, dividend payments, and emergence of surplus. We have also used such calculations in testing the financial impact on the company of possible changes in agents' commission contracts.

MR. HAROLD J. DEUTSCHER: I think of marginal expense as that expense we incur by adding additional units of sales. If we sell an additional number of policies, we must provide for servicing these policies; if we sell an additional amount of insurance, we may incur additional costs in doing so; as our insurance in force increases, we begin to incur additional costs.

In setting premium rates, we must take account of the fact that additional expense will be incurred as we add staff to service an additional number of policies. We have to allow for some free time by the employees in this expansion project, but we have to cover the cost in the calculation of premiums.

I think it would be unwise to consider any policy that we are going to sell in terms of the fact that expenses on a marginal basis are going to be less than those for other policies. We must cover all direct and variable expenses, as well as the same contributions to general overhead and the same profit margins that we require for other policies, in the premiums for any policy which we intend to make available to the entire field force.

Almost the only situation in which the use of marginal expense rates would be justified would be the very restricted circumstances of attempting to attract an agency force to sell some special plan not available to the entire company. If marginal expense rates are to be used, this must be done for a plan that is just a little extra part of the business, not anything that will contribute to the total profit picture of the company.

MR. WILBUR M. BOLTON: I know of one company which used the marginal expense idea in improving a life policy. The policy, which at the start accounted for perhaps 4 or 5 per cent of sales volume, suddenly found itself running 40, 50, and 60 per cent of the amount of insurance being sold. I think this is a good example of Gresham's law that bad money will drive good money out of circulation. In money markets, when people are convinced that the dollar is worth less than gold, they rush to buy

gold and get rid of dollars. In the same way, if the agency force finds that your product with the marginal expense allocation is very attractive in direct competition with your other products, you will sell a lot of the unprofitable plan and little of the more profitable products.

The marginal approach can be dangerous, except for a marginal-type product not competitive with major portions of the portfolio. Immediate annuities might be an example of such a product.

MR. THOMAS K. PENNINGTON: As a consultant, I have run into two areas where there is no choice but to use marginal costs. A typical young company cannot set its premiums to cover its costs until it is six to eight years old; it must in effect use marginal expense rates. Second, the only way a small company can compete on a larger term case is to provide only for out-of-pocket costs, reinsurance costs, and commissions.

MR. BUCHANAN: If you are making full utilization of your staff, you can get into situations where marginal costs are greater than average costs.

MR. RICHARD H. TALLMAN: As a result of competitive pressures, we recently introduced a decreasing term policy, with a \$50,000 minimum, with a rate which would not cover a fully allocated share of expense but would contribute something to overhead expense. The decision to introduce the policy was based on the assurance of our agency vice-president that a sufficient volume could be sold to maintain aggregate profits; sales have fully supported our agency vice-president's promises. The problem, of course, is that from time to time agents want to know why we cannot apply the same concept to other policies.

5. What concepts and methods are considered suitable and practical for making intercompany comparisons of "net cost"?

*Philadelphia Regional Meeting*

MR. B. FRANKLIN BLAIR: The traditional twenty-year ledger cost approach has two great advantages. It is simple and easy to calculate, both for illustrations and for histories, and it is easily understood. This approach, however, has the great disadvantage that the incidence of the net premium deposits and the loss of interest on them are not taken into consideration. Moorhead's one-thirtieth method overcomes this disadvantage and is almost as easy to calculate as the traditional method, but it is very difficult to rationalize to the prospect.

Any method using illustrations tends to overemphasize the current year's scale. Such a method is overinfluenced by whether the company has just changed its scale or is about to change, as well as by the optimism or conservatism of the management at the moment about paying out dividends. None of the methods used or proposed adequately reflect differences in the liberality of policy provisions or of company practices or differences in the adequacy of company service.

In Mr. Bragg's paper there is an interesting comment on net cost illustrations: "The rules for calculating such net costs are often quite illogical; furthermore they seem to involve the assumption that the buyer cares nothing about the absolute size of the premium."

In theory an ideal method should take into consideration a company's investment and underwriting policies, its expense levels (partly dependent upon size and location of the company), and the caliber of its management; then all these factors should be integrated by means of a computer to estimate its dividends for the next twenty, thirty, or forty years. Only then could one have the complete information on which to base a "rational consumer choice." Without such complete information one's choice might be even worse if based rigidly on cost figures developed under a system like that of Belth or Schwarzschild than on present, less formulistic methods of choosing, under which it is easier to give some weight to company characteristics whose effect on long-term results is difficult to measure quantitatively.

Dr. Joseph M. Belth, associate professor of insurance at the Indiana University Graduate School of Business, has been a frequent advocate of increased price competition among life insurance companies. In a trade press report of a recent speech by Dr. Belth, he is quoted as having made the following six points:



1. It is difficult to measure the price of life insurance protection because of the complexity of the policy contract.
2. Even when the facilities for life insurance price measurement are available, it is difficult to make the calculations because the necessary data frequently are not readily available.
3. The market for individual life insurance is characterized by price ignorance.
4. As a consequence of price ignorance, the market for individual life insurance is characterized by a lack of effective price competition.
5. Many policyholders are paying more than necessary for their life insurance protection, in the sense that some companies are charging much higher prices than others for essentially the same coverage.
6. The appropriate device for improving the effectiveness of price competition of life insurance is a rigorous system of price disclosure that would permit careful buyers to make reasonably informed purchase decisions.

I am inclined to agree with Dr. Belth in regard to four of these six points, but I disagree strongly in regard to the fourth and sixth points.

When Dr. Belth talks about "a lack of effective price competition," I think that he is overlooking the important part which price competition plays in the recruiting of agents. Price competition is not restricted solely to the competition when agents of two or more companies compete in selling insurance to one client or to instances where one agent is presenting the products of two or more companies to a client. There is also very effective price competition when a general agent or manager is trying to convince a prospective agent that he should work for the XYZ life insurance company rather than for the PDQ life insurance company.

In regard to his sixth point, I think it is impossible to develop "a rigorous system of price disclosure" because of the limited usefulness of either illustrations or histories as an indication of what the price will be for the next ten or twenty or thirty or forty years. Buying life insurance is not like buying a loaf of bread or a jug of wine. You cannot determine definitely today what the cost of life insurance will prove to be.

Overemphasis on price in selling has another danger; it would force companies to tighten their underwriting standards in order to remain competitive. This narrowing of the standard classification would be advantageous to a person whose rating is, say, 85 per cent ( $-15$  per cent) but would not be advantageous to the person whose rating is 115 per cent ( $+15$  per cent) and finds that he is changed from a standard to a sub-standard risk because of a narrowing of the standard classification.

We have found that Belth's basic method is useful for comparing costs at the same attained age on policies issued at different times or in different companies. By comparing costs at the same attained age on policies issued

on different series, this method is helpful in making sure that a situation does not develop where replacement is advantageous to the insured. There seem to be situations in some companies where replacement within a company can be shown to be actuarially advisable. Perhaps actuaries should be giving greater attention to this question of equity according to policy series.

Belth's level price method seems too complicated for practical use, although it might conceivably be adopted some day by a publication like *Flitcraft* or *Unique Manual*. Until that day comes, the level price method seems unlikely to obtain general acceptance because it is too complicated for use by agents or even by individual companies. But, even if the level price method were quoted extensively by a trade publication, there would still be the objections which I have mentioned earlier to figures based on the current scale, and there would still be the weaknesses of price competition focused on a single index.

A paper by Stuart Schwarzschild, professor of insurance at Georgia State College, on "A Model for Determining the Rate of Return on Investment in Life Insurance Policies" appeared in the September, 1967, issue of the *Journal of Risk and Insurance*. In this paper a method is developed for determining the investment yield on a separate fund so that a combination of a lower premium policy and a separate fund provides the same benefits as a higher premium policy. It is a generalized method which would fit many possible situations. Here again the method is too complicated for the layman. Another disadvantage is that the tax bracket of the insured is not taken into consideration explicitly.

Schwarzschild's method is essentially a comparison of two alternatives (one of which is unrealistic), and hence it does not give an absolute cost figure, as Belth's method does. Thus Schwarzschild's method is perhaps not as well suited for intercompany comparisons.

I understand that J. Stanley Hill has developed an approach using accumulated dividends which gives almost as good results as Professor Schwarzschild's method but which involves considerably less work. Mr. Hill's discussion of Schwarzschild's method will appear in a coming issue of the *Journal of Risk and Insurance*.

In closing my remarks, I want to stress the need for greater care in presenting illustrations of net costs and in avoiding irresponsible comparisons. Many proposals prepared by agents are lax about making it clear that dividend illustrations are based on the current scale and are not estimates or projections for the future. Moreover, most proposals do not make it clear—in fact they really try to cover up the point—that there is a

loss of interest to the insured on the money put into life insurance premiums which otherwise would be available for investment.

As an illustration of the need for greater care, I might mention one leaflet which I have recently seen that was put out by a leading company. This leaflet shows an intercompany comparison based on rankings of twenty-year illustrations on the current scale and uses the heading "Rank Projected for the Period 1967-1987." There would seem to be little reason why greater care should not be used in the preparation of company-sponsored leaflets than seems to be indicated by the misuse of a phrase such as "rank projected for 1967-1987." I doubt whether any actuary would feel, in periods like the present, that the dividend scale of his own company would be likely to last for more than two or three years; certainly the dividend scales of nineteen other companies will not all last for the period 1967-87.

**MR. J. ROSS GRAY:** Some companies compare costs on a net payment basis—premiums less dividends—while others use the surrender net cost basis—premiums less dividends less cash value. What is needed is some practical way of tying these two concepts together.

Mr. James R. Trimble presented a study of mutual benefit policies issued between 1845 and 1865 which showed that about 40 per cent of the policies matured as death claims and that the average duration of all policies was about sixteen years. Mr. Bassford pointed out that, if modern death rates and termination rates are substituted, the figure would still be about 40 per cent for death claims but the average duration would go up to over twenty years.

The first part of my suggestion is that the results on the net payment basis over twenty years should be averaged with the results on the surrender net cost over twenty years. You will see that I have recognized the entrenched position of the twenty-year period and have also recognized that people would never remember which figure they were to take 40 per cent of and which figure 60 per cent.

A company which defers the payment of its surplus earnings by using a steep dividend scale will appear in any net cost comparison to pay out a greater total of dividends than will a company which uses a more level dividend scale. A company which uses a termination dividend will appear more competitive on the surrender net cost basis.

One way to approach the situation is to use the accumulated dividends at the end of twenty years rather than the total of the dividends. The figures are published by most companies and are shown in the trade

journals. It will take some but not all of the advantage away from deferring the dividend payout.

One should not use accumulated dividends and cash values without also accumulating premiums. Mr. Moorhead suggests using 30 times the premium instead of 20 times the premium to allow for interest.

MR. ERNEST J. MOORHEAD: Almost this same question was on the Society's program six years ago. The discussion at that time was disappointing. Since that time there has been much activity. In my own case this activity consisted of inviting all the actuaries and actuarial students of my then company to furnish solutions to the problem. The answer given to me by Herbert S. Gardner, FSA, has become fairly well known under the name "One-Thirtieth Method."

Actuaries who consider that it lacks refinement should bear in mind that it was designed for use by field men and by trade publications and that tests have shown that it successfully accomplishes two major objectives. The first of these is to rank the companies very close to the correct order. The second is to show approximately the same net cost for different plans at the same age, in contrast to the apparently large differences in net cost that are erroneously shown by the traditional method.

It is particularly interesting to observe that, while most of the major mutual companies occupy roughly the same ranking regardless of the method used, there are a few striking and significant exceptions.

Meanwhile, there emerged Professor Belth's book *The Retail Price Structure in American Life Insurance*. In the context of today's discussion the book may be thought of as containing four principal parts: (a) a description of different methods for comparing net cost, (b) a method for calculating the net cost in any single policy year, (c) a method for averaging or leveling these one-year costs to produce a level cost over a period of years, and (d) an exposition of Professor Belth's view that price competition in many areas of life insurance is not effective.

The controversial elements in Professor Belth's book are items *c* and *d*. Certainly he has done all of us a service by stimulating actuarial study of this subject.

At least four actuaries have undertaken to criticize Professor Belth's approach and to suggest alternatives. These actuaries are Clair Lewis in Milwaukee, Paul Kahn in New York, Murray Projector in Los Angeles, and me. All of these suggestions differ from each other as well as from Professor Belth's method. What is sorely needed now is for some enterprising actuary to distill all these ideas and to present, possibly through a formal paper in the *Transactions*, a method or a range of methods that will be useful to the profession and to the industry. It is also much to

be desired that we actuaries shall express our opinions about the effectiveness or noneffectiveness of price competition in life insurance.

MR. J. STANLEY HILL: I would like to summarize what I think Professors Belth and Schwarzschild were saying about prices.

I believe that Professor Belth is saying that, given a certain interest rate, you determine the cost of insurance, whereas Schwarzschild is saying that, given the cost of protection, you can determine the investment yield of the policy. So comparing one method with the other and saying that one is better than the other is beside the point. Each of them has its purpose and serves it more or less admirably, depending on what your purpose is and what your computer capacities or other calculating capacities may be.

Frank alluded to my efforts in connection with Professor Schwarzschild's approach. It is merely an attempt to approximate by simple methods the results which he achieved. I believe the same type of approximation is possible in connection with Professor Belth's work, and the result in terms of accuracy and simplicity is intermediate between Professor Belth's relatively complex approach and the one-thirtieth approach, which is eminently simple.

When any of us undertakes to criticize either of these methods, we need to be very careful with regard to the posture in which we place ourselves if we are employees of a life insurance company. A layman studying the life insurance business, I believe, would find that we support the present surrender net cost approach through our subsidization of the various publications which provide these cost comparisons. I am not saying that that subsidy is good or bad; I am merely recognizing that it exists. If it does exist, then I think we need to be careful if we appear to criticize any attempts to improve it or refine it.

I happen to believe personally that it is in need of a great deal of improvement and refinement, and I am inclined to applaud the interest of our academic brethren and their attempts to improve and refine it and want to extend to them my hearty co-operation. This does not mean that our industry is necessarily the better for more intensive price competition in certain areas—I will leave Dr. Belth to his own argument there—but, when it comes to the process of the analysis of costs, we, as professionals in this field, should give some support and interest to the attempts of our academic brethren.

#### *Los Angeles Regional Meeting*

MR. HAROLD J. DEUTSCHER: From what I have seen, the traditional net cost comparison is not really a cost comparison at all. Cost is what is paid for something. Most net cost comparisons show a "net value" which

is not even net value, but what you pay for a policy less what it might be worth at some time if all the conditions are met, all the termination dividends are thrown in, and all the interest rates are met over a long period of time.

A sale based on these comparisons is permanent insurance which is not being sold on a permanent basis. You are saying, "Here is permanent insurance. Now, if you quit, this will be your cost." If I am going to buy life insurance for protection purposes, I might be more interested in cost on a straight premium basis, which throws out permanent plans and just sells term. Short of this, if you are going to use this kind of comparison, you should show figures for, say, the first five years, the tenth, fifteen, and twentieth years, rather than a figure which is available only to the less than 1 per cent who surrender in the twentieth year.

I think you might want to introduce contingencies other than surrender. You might want to know the condition of your estate at time of death, in which case premiums paid, or premiums less dividends received, would be a more meaningful figure than the surrender net cost. You might also make a presentation on the assumption that the policy is going to be continued for twenty years, which would be premiums less dividends if taken as premium reductions.

Net cost comparisons do not properly reflect the differences in the incidence of dividends, showing to advantage, as they do, the policy with the steep dividend scale compared to the policy with a level scale. Termination dividends are to some extent a result of the use of the traditional surrender net cost comparisons.

Net cost comparisons may not have all the advantages claimed for them, even in sales. A mutual fund salesman commented recently that such comparisons are the easiest thing to knock out, much easier than a nonpar presentation, the advantage to him being that the concept of accumulating dividends has already been presented to the applicant. All he has to do is to accumulate the differences between the premiums for the permanent plan and his low-cost term plan at the mutual fund accumulation rates, which are quite in excess of those used by life insurance companies. The fact that the large mutual companies have suffered a reduction in their percentage of the market is not only a result of an increase in the number of insurance companies; it is also evidence that the net cost comparisons have lost a lot of sales to the presentations involving equities in conjunction with life insurance.

**SPEAKER FROM THE FLOOR:** For many years the whole philosophy, the techniques, the training, and the development of the mutual com-

panies have been affected a great deal by the problem and the concept of net cost. The desire to produce a good twenty-year net cost has been a guiding force in the introduction of two interest rates tending to produce the highest, steepest dividend scale and the highest twentieth-year cash value.

We experimented in our company last year by offering our agents a stable of ordinary life policies. We kept our regular life policy—a relatively low-premium, fairly competitive, net cost policy. We added to that policy a dividend option to make the “enhanced protection” type of policy which competes with nonpar. Finally, we introduced a new ordinary life policy with a higher premium, a steep dividend scale, a 3–2 per cent cash value, and a very fine net cost. We continued to sell about the same amount of our regular policy. The new enhanced-protection type has taken off like wildfire. Our twenty-year net cost plan has hardly gotten off the ground. The reaction of our sales people is interesting: they are unhappy because the plan they have for years considered the best is not producing results. There must be something wrong with it, but they are not sure what. The real problem seems to be that there is no real need for this type of policy.

As to what concepts and methods are suitable for net cost comparisons, I think we have to face the fact that one agent will present one picture and another agent will present another picture, regardless of how much we cry and scream and beat our heads.

In the area of short-term plans, it is difficult for a mutual company to meet the competition with a high premium level and dividends. We recently took the low, practically nonpar, premium approach in short-term policies and have been very pleased with the results. The difficulty is that, even though everybody understands that this is practically a nonpar policy, sooner or later pressure arises for some kind of dividend illustration.

MR. CHARLES J. SETER: I would like to propose an approach that might help in competing with advocates of “buy term and invest the difference.”

1. Design a decreasing term plan to age 65 with amounts of insurance equal to average amounts at risk on \$1,000 of a whole life plan.
2. Determine the sum of (a) the difference between accumulated dividends (or cash values of paid-up additions) on the whole life and decreasing term plans and (b) the cash value on the whole life (less the cash value on the decreasing term, if any) for several durations (say, 10, 20, and at 65).
3. Determine the difference between the premiums on the two plans and the interest rate which would be necessary for this difference to accumulate to the sum defined in item 2. (The rate would vary by policy size if a policy fee or band system is used.)

The accumulated dividends could be replaced by the cash value of paid-up additions to point out the tax advantage of the latter. The calculation could also be used on nonpar business.

Because of the benefit of survivorship, the interest rates determined would be surprisingly high, particularly for longer durations and issue ages below 35. They would not be guaranteed, of course, but would be as valid as net cost illustrations.

MR. THOMAS K. PENNINGTON: A quick check of the major stock companies indicates that the current difference in tenth- and twentieth-year net costs between par and nonpar represents approximately a 7 per cent interest compounding of the extra premium for the par policy.