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**PHILOSOPHY AND PRACTICE OF  
INVESTMENT INCOME ALLOCATION**

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*Panelists: CHARLES E. FARR, THOMAS C. SUTTON.*

1. Philosophy and implications of investment income allocation for individual and group products.
  - (a) Equity among classes.
  - (b) Appropriate degree of pooling.
  - (c) Administration/cost/benefit.
  - (d) Variation of investment strategy by line of business (immunization).
  
2. Bases available for subdivision of investment income by line and within lines of business, including treatment of federal income taxes for qualified and non-qualified plans, capital gains or losses, and rollover of funds.
  - (a) Mean assets/mean liabilities.
  - (b) Investment year method.
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3. Applicability of "new money" rates to individual and group products.
  - (a) Determination of the "new money" rates.
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  - (b) Application to products, including appropriate investment strategy, guaranteed rate period, and withdrawal values.
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4. Regulatory restraints.
  - (a) New York Regulation 33; any other similar state requirements.
  - (b) Valuation (excess interest reserves).
  - (c) Dividend illustrations and cost disclosure.
  - (d) Other accounting and reporting requirements.

MR. CHARLES E. FARR: Appropriateness of Investment Year Method. The use of an investment year method for group annuity plans has been stimulated by characteristics peculiar to group pension business. Under these plans the policyholder can vary considerably the amount and timing of deposits, he can select between the insured plan and an outside investment medium where his return will reflect current new money rates, and he has no right to withdraw funds or only a limited right in that the company has the right to spread the payments over a period of years. If the insured plan is on the investment year basis, however, the opportunities for selection against the Company will be mini-

mized. In contrast, under individual level premium life insurance and annuity contracts the policyholder has little freedom to vary the amount or timing of premium payments, he is usually required to pay premiums regularly over a long period, and there are usually guaranteed cash values available on demand. Also, the annual increase in the individual contract fund is regular and relatively small so that the application of the investment year method would be cumbersome and costly. If these individual contracts are on an investment year basis, selection can be exercised by the policyholder who surrenders his policy in a period of high new money rates and replaces it with a similar policy which will then receive benefit of the high current investment rate. Single premium life insurance and annuity contracts do involve substantial control by the contractholder over the amount and timing of premium payments. However, the nonforfeiture guarantees under these contracts are essentially the same as under other individual contracts. It would, therefore, be impractical to use an investment year method in determining interest factors for single premium business. In any event, the volume of individual single premium business in force is so small that the question, whether or not to use an investment year method, is de minimis.

Group life insurance, group accident and health insurance, and individual accident and health insurance also differ significantly from group annuity business. For the most part they are on a one-year term basis with relatively small reserves and little interest income. The mechanical problems and administrative cost involved in using the investment year method would be disproportionate to the results achieved, and completely impractical and unfeasible.

Immunization. The term "immunization" was first used with respect to investment policy by F. M. Redington, a British actuary, in a paper called "Review of the Principles of Life Office Valuations." This paper was published in the Journal of Institute of Actuaries, Vol. 78, 1952. It was extensively discussed, and the subject received some subsequent treatment by British actuaries.

A very fine paper on immunization was published twenty years later in the United States. Its title is, "The Interest Rate Assumption and the Maturity Structure of the Assets of a Life Insurance Company," written by Irwin Vanderhoof and published in TSA XXIV. This paper also includes a good bibliography.

More recent papers have been written by Canadian actuaries. They appeared in 1975, and are "An Actuary's Contribution to Investment Policy," by Christopher Chapman, and "Immunization - Some Practical Aspects," by David Ezra.

New Money Rates. I use the term "new money" rate to refer to the new money rate itself, as opposed to the process of allocating investment income, which is sometimes referred to as the new money rate method, or as opposed to the entire family of interest rates.

New money rates can be classified into two types. The first is the more familiar new money rate normally based upon the investments closed during a calendar year. For reasons that will appear in a moment, this can be referred to as the annual new money rate. In its pure form it can be computed as the anticipated yield rate, weighted by amounts invested, for the long-term investments closed in the calendar year.

Several decisions must be made in computing this weighted average rate. For example, what should be the treatment of investments in such things as re-writes of commercial loans, real estate or common stocks? What should be the treatment of voluntary switches, such as from common stock to convertible bonds? Or of GNMA pass-throughs? And, there are many other transactions where decisions need to be made as to handling in the calculation of the annual new money rate.

Opposed to the traditional annual new money rate is a current new money rate related to a period shorter than a year. The period may be a few months, or a month, or even shorter. The calculation of this rate is less precise than that of the annual new money rate. The purpose of developing this rate is to get at the current worth of money. Just how this concept is defined needs careful attention. If the rate is based on investments closed during a short period of time, it is subject to the investment climate of various periods in the past when the commitments were made. Basing the rate on commitments currently being made is not totally satisfactory either. Current commitments may lead to investments closed several months in the future. However, money received as the result of a currently-quoted interest rate is immediately available for investment at rates committed sometime earlier.

All things considered, a current new money rate which is based on current, or very recent past, commitments produces an acceptable estimate of the current worth of money. Such a current new money rate could be based on the commitment rates in three major investment types: fixed income securities, commercial mortgages and residential mortgages. Various approaches to its determination are possible.

One approach is to use the best estimate from investment people of the current commitment rate in each of the three major investment types. Then these current commitment rates are weighted by the planned proportions of cash flow intended for each in the current year. An advantage of this approach is that the weighting factors either do not change during the year or change by not very much. A disadvantage is the highly subjective nature of the estimate of the current commitment rates. However, therein lies another advantage, which is that revisions of this new money rate can be made at any time.

A second approach relates to the actual commitment rates for a period in the recent past. From records of commitments made during this period, a weighted average commitment rate is developed. The best judgment of the investment people is then used to project this weighted average to the current period in which it will be used. A period of perhaps three months would be used to avoid biasing the average by heavier investments than normal in a particular investment type during the short period. An advantage of this method is that the accuracy of the estimated, projected commitment rate may be tested as each month of the averaging period becomes current. A disadvantage, once again, is the highly subjective nature of the projection of the average to the current date.

Federal Income Tax. There is probably considerable variation between companies in the degree of sophistication of their treatment of federal income tax. One philosophy to adopt is that the charge for federal income tax should relate to the reason for the federal income tax. Thus, the charge for the individual life insurance line could differ from that for the group pension line. It could differ between qualified and non-qualified status of the

particular pension plan involved. It could differ between products within a given line such as between a conventional group annuity and a guaranteed interest contract, which perhaps uses the interest paid deduction.

Capital Gains and Losses. Capital gains and losses may or may not affect the new money rate. The annual new money rate may be affected if trouble is taken to allocate any realized or unrealized capital gains of the current year to the annual new money rate based upon the new investments of that year. Even if there is no attempt to allocate current year capital gains and losses in this way, there may be an advance allocation of anticipated capital gains if new money is invested in part in common stocks, and, in computing the traditional annual new money rate, common stocks are included at an assumed yield in excess of the dividend rate.

This latter point raises an equity question of some importance in connection with recognition of common stocks in the calculation of the annual new money rate. A reason for investment in common stocks with general account money is the anticipation that the long-term return on that investment will exceed the return on fixed income securities. There may be other reasons but this certainly is one. The greater yield is expected to arise from the combination of dividend income and asset appreciation. Dividend income varies from year to year, while appreciation trends over a span of time. How then should this anticipated long-term yield be reflected in the annual new money rate?

One approach is to ignore any anticipated appreciation, recognizing only dividends in developing the annual new money rate. Having gone this far, one continuation of this approach is to let the future appreciation (or depreciation) affect only the surplus of the line. Alternatively, such future gains or losses may be used to adjust the original rate in future years, either directly or on an averaged basis. Or such subsequent gains or losses can be pooled with those arising from investments in other years and spread across the entire family of investment generation rates.

The effect of these approaches is that the higher long-term yield is delayed. Money deposited in the current year is credited with a lower annual new money rate because of the current investment in common stocks. Such customers may never receive the benefits of such investments if for any reason they withdraw their funds before the delayed gains are credited. But for those who stay, and if the anticipated higher long-term yield is realized, there is a reward.

Another way to treat investment in common stocks in the annual new money rate is to apply to such moneys an anticipated yield rate higher than the dividend rate, perhaps as high or higher than the rate used for fixed income securities. Such an artificial level of income assumed from this investment is in line with the anticipated long-term return. This method credits investment income to a generation before it is earned by that generation, giving current year depositors a higher current yield.

At this point there is a critical question; namely, where does the investment income for this higher current yield come from? It may arise from capital gains previously achieved but not distributed and, therefore, held in the surplus of the line. This would seem an appropriate use of surplus under this theory. A less appropriate approach would involve the consequent adjustment downward of other members of the family of rates to compensate for the higher annual new money rate. The effect of this approach is small in its first year of use, but gets larger as time goes by. The practice is subject to criticism.

Rollover. There are various degrees of pooling possible in the determination of reinvestment rates. Reinvestment rates are of some importance in investment generation methods because they determine the extent of the change of old members of the family of rates under a fixed index investment generation method, and they determine the amount of old money subject to the annual new money rate under the declining index investment generation method.

One approach is the use of a single overall average reinvestment rate applicable to all years of investments. Another approach is to maintain records in sufficient detail to permit the calculation of reinvestment rates by year of original investment.

There are several questions that need to be answered. One is how do the mechanics differ between the declining index and the fixed index investment generation method? Another is how should common stocks be treated? How should voluntary sales be treated, such as sales of common stocks followed by reinvestment in convertible bonds, or sales and immediate repurchases to produce realized gains and losses?

Application to Group Pensions. For our purposes here, group pension products will be classified into four categories. The first category consists of regular participating products. Examples might be conventional group annuity and perhaps deposit administration group annuity. The insurer maintains an experience fund which is reflective of the contractholder's share of the company assets. There is a dividend declared once a year, such dividend including excess interest allocated to that contract.

The second category is immediate participation guarantee or direct rated products. In this instance the experience fund or the asset share equals the contractholder fund under the contract. There is direct and immediate recognition of investment generation interest, where immediate means once a year crediting of total interest.

A third category consists of nonparticipating products of the single premium type. There are several examples included in this category. Single premium closeouts in terminating plan situations are one example. Other examples include the layoff of retired lives from uninsured plans, either in bulk or as they occur, vested quits from uninsured plans or the transfer of total uninsured plan assets to an insurer followed by continuing plan deposits to the insurer. A last example in this category, which has received considerable attention in the press and trade press in recent months, is the transfer by an uninsured plan of part of the assets to an insurer into a guaranteed interest contract paying high guaranteed interest for a term of time, followed by book value cashout of the proceeds.

A fourth category is one that may be called market value products. These are contracts issued in connection with defined contribution plans. They are plans involving allocations to individuals, with the vested portion of a participant's account available to him in lump sum at death, quit, disability, or retirement. The lump sum is usually intended for annuity purchase at retirement, and sometimes in the event of disability.

One way to group these four categories further is into book value products (which include the first three categories) and market value products (which is the fourth category). Another way to group them, which is more in keeping with the subject at hand, is into those using annual new money rates and those

using current new money rates. The first two categories are in the former classification and the last two categories fall into the current new money rate classification.

Discussing first the products utilizing annual new money rates, it is doubtful that any unusual or special investment strategy is needed. These products receive annually-declared dividends involving excess interest or annually-credited interest. The primary investment strategy is the traditional one of highest yield consistent with safety of investment. Interest guarantees are normally not extravagant, leaving room for participation in excess of the guarantee to be credited in the form of dividends.

The cashout provisions of the insurer's contracts usually give the contract-holder an option. He can take the market value of his assets immediately in a lump sum or he can take the book value of his assets in payments spread over a period of time.

The advent of market value lump sum cashout was in the 1960's. It was probably largely the result of the use of investment generation methods. With lump sums of money available to the contractholder, there may have been some thoughts triggered as to a need for greater investment liquidity, but it is doubtful that there was any significant change in investment strategy for this reason.

The other option, that of book value payments spread over a period of time, has not yet caused significant problems, because of heavy pension line positive cash flow. However, competitive pressures tend to shorten this payout period and any significant volume of cashouts leaves less to invest. This will influence amounts of interest credited in the future. Furthermore, if book value exceeds market value, which is a strong possibility during periods of heavy cash drain for this reason, the excess assets disbursed are ultimately spread to the detriment of those customers who stay. Of course the reverse is also true.

Another item of some importance relates to cash payments to individual participants. The cash option at retirement age is a prime example because of the size of the lump sum payment. The traditional value paid to the participant at retirement is the net purchase price of the normal form of his annuity. The amount of the payment changes, of course, when the assumptions entering the purchase price change. Under this traditional approach the book value payment always differs from the market value, and the gain or loss is ultimately spread over the other participants in one way or another.

Another approach to such payments, which obviates most of the problem, is the payment of a market value of sorts. Under this approach the payment made is the discounted benefits stream, with the discount rate being based on the current new money rate. Thus the participant taking the cash option payment stands the loss or benefits from the gain when this discounted value differs from the book value.

Proceeding now to the products utilizing current new money rates, the first category consists of those previously described as non-participating products of the single premium type. The guaranteed interest contracts may be the only ones of these that affect investment strategy. Such contracts involve a high interest guarantee related to the current new money rate; they may or may not involve the compounding of this high interest; and the high interest rate

sometimes also applies to continuing plan deposits made during the guarantee period. This characteristic plus that of a book value payment at the end of the guarantee period probably forces the application of the principles of immunization.

As to the other book value products for non-par single premium situations, pricing and product design are combined to make the risks manageable. Use of the current new money rate is basic to the pricing function. For example, deferred annuities may involve an interest assumption declining from the current new money rate. Withdrawal values may be designed using a percentage of the premium for the individual plus a lower, level interest rate credited to date of termination, or the withdrawal value may involve a declining interest rate which declines until retirement age. In these closeout situations, events subsequent to the purchase of the group contract are the insurer's risk for which he may charge an adequate and competitive premium, and they do not affect the equities of the plan participants after purchase.

The last category to take up consists of the products utilizing current new money rates and under which participants' accounts are carried at their market value. These products have two primary characteristics, the first of which is that the interest accrual rate for the participants' accounts is a derivative of the current new money rate. The current new money rate could be determined monthly or less frequently. The pure rate could be reduced for various reasons, such as for the possibility of error in its determination, FIT, expense support, estimated cost of guarantees, if any, or contribution to surplus funds.

A second characteristic of these products is that the participants' account values change whenever the current new money rate changes. Some background for this characteristic comes from the development during the 1960's of the market value lump sum cashout. In such lump sum cashout, the market value paid differs from the book value held, depending on the relationship between the aggregate interest rate being credited to the funds subject to cashout, and the current new money rate. The market value in relation to the book value depends not only on the difference between the aggregate and the new money rates, but also on the absolute level of these rates.

Most insurers providing lump sum market value cashout are hesitant to divulge their exact formula but are willing to illustrate the results of its application. Such results usually show a change in asset value somewhere in the neighborhood of 6% to 6½% for each 1% change in the interest rate, and in the opposite direction. For products under which individual participants' accounts are carried at the market value, convenience and practicality are served if a single average asset change rate is used. A relationship of 6 to 1 appears reasonable. Thus, for example, if the current new money rate changes .1%, the account value is changed .6% in the opposite direction.

The change in a participant's account value for a single period of time is the combination of the new money interest rate credited and the change in the asset value, if any. Account values are thus always maintained at their market value. There is no impact on other participants' equities when a participant's account value is paid for any reason such as for benefit payment or transfer to separate account. In its purest form there are no guaranteed values for participants until retirement and annuity purchase.

State Regulation. New York Regulation No. 33 permits the use of an investment year method in accordance with certain rules and restrictions. These include:

- (1) the method distributes net investment income to the major annual statement lines of business,
- (2) to the extent feasible, the same method is used to distribute net investment income within these lines of business,
- (3) capital gains and losses are distributed by the same method,
- (4) some net investment income, from assets with sufficiently different characteristics, may be allocated by a different method, and
- (5) insurers can deviate from these rules, with the deviations requiring the approval of the superintendent as being equitable and as being necessary for reasons of feasibility.

Various states are issuing special rules and regulations for insurers. These rules arise because of concern over high interest yields from investments which are translated into high interest guarantees in products. At least three different types exist.

- (1) New York issued stop-gap minimum reserve requirements, for the 1975 year-end, concerning high interest rate guarantees on deposit administration funds. The minimum reserve held during the guarantee period must be based on an adjusted industry-average new money rate, if this average is less than the guarantee or the company's own net new money rate. This is an aggregate test, applying to funds received in calendar year 1975. Reserves cannot be less than transfer value.
- (2) The Texas regulation of August 1975 has as its three purposes to "Encourage a company's awareness that imprudent guarantees on annuity contracts and miscellaneous funds may lead to a hazardous financial condition, and to call attention to the fact that the Commissioner of Insurance may wish to make use of the Early Warning System.

"Provide for proper disclosure of benefits provided by annuity contracts and miscellaneous funds.

"To clarify the requirements for the computation of reserves for annuity contracts and miscellaneous funds."

This regulation is stringent, requiring departmental review of products involving guaranteed rates higher than that in the standard valuation law, including submission of sales material and a statement of compliance with the regulation by a qualified actuary. Reserves on flexible premium deferred annuities, for example, must be strengthened from the guaranteed rates to the maximum valuation rate, and must never be less than the corresponding cash value.

- (3) Tennessee, Pennsylvania, and perhaps other states by now, have issued orders concerning the strengthening of reserves for individual accumulation-type annuities during the years when guaranteed interest accumulation rates exceed the maximum reserve interest rate specified in the standard valuation law.

MR. JAMES G. BRIDGEMAN: Mr. Farr commented that perhaps products with high-interest guarantees and book value withdrawal rights require an application of immunization techniques. The classical techniques seem not to recognize the whole investment year situation in that they assume a single interest rate and take a derivative with respect to that. Has anyone taken partial derivatives with respect to past new money rates to see what happened?

MR. THOMAS C. SUTTON: Nobody that I know of, but that might be worthwhile doing. I don't know of any particular impact on immunization that has come out of it.

MR. ALAN C. LELAND: One problem that we have encountered at New England Life is the short-term investment for the short-term position will vary from year to year, and if we allocate the long-term commitment rate to the amount of money that was received during that year, there's a misallocation that results. For instance, if one million dollars were taken in and committed at a ten percent rate, and, in fact, only \$900,000 was taken down in the long-term rate, and the rest of it was short-term, that excess \$100,000 might actually be taken down in the next year at a lower long-term rate. Now, if we allocate based on the money that comes in, and use the long-term rate, we're going to allocate that ten percent long-term rate to the entire one million. I was wondering what different systems there are of handling that?

MR. FARR: I'm not really aware of any specific adjustments made for that. I do know that in developing the current new money rate our investment people take recognition of the fact that part of their money is not currently invested, except at short-term rates at a lower yield currently, which used to be different, but on your specific question, I don't believe I can shed any light.

MR. THOMAS H. DANCY: I'm very intrigued with the method described for the defined contribution plans for the asset value that's kept at a market value. I'm wondering how you explain to a participant a situation where from one year to the next the change in capital value may be downward at a greater amount than the interest credited to the account.

MR. FARR: To answer very quickly, with great difficulty. This was one of the things that we were most concerned with. How would the reporting to the individual be made, and how successful would we be in explaining understandably to the individual why his value did go down, despite the fact there was a high new money rate, which was getting higher? We handled this in the group area, feeling that we were dealing primarily with a contractholder who had his vice president of finance, etc., who could advise him as to what was going on. He then would understand the concepts, and could then talk with the participants and at least explain to them that management understood it, and in the long run, they thought they would be well off. Now, this works pretty well when we're dealing with a corporation; it doesn't work so well when we're dealing with a union, and we have had difficulty. One of the advantages of this method is that, when an individual reaches retirement age, the annuity that is purchased involved the interest assumption that was current at the time of retirement, so that if the interest rate has been going up and the asset value has been going down shortly before retirement, the annuity purchased at the higher interest rate provides an amount of annuity commensurate with the assets.

MR. JEROME S. GOLDEN: What happens to surplus when you have this market value change in your liability? Is there a plus or minus surplus effect?

MR. FARR: There is a plus or minus effect. An annual comparison of what might be termed a single big experience fund for this type of contract on a book value basis, using investment year interest is made. The total value of the accounts under this type of product is compared with the book value of the funds which has been developed using investment year interest methods, and, in that way, it can be determined what the plus or minus effect is on surplus.

MR. SCOTT C. OTERMAT: I have a question on the single premium fixed interest guarantees using a current new money rate. Under New York regulation how can you segregate your funds so that you don't end up allocating this excess interest to your other clients?

MR. FARR: We are unaware of there being a problem in this area. We don't feel that this segment of our policyholders is getting any better interest crediting than any other segment of our policyholders.

MR. SUTTON: Conflicting Objectives. One of the most challenging and interesting features of the actuary's job is the use of judgment and ingenuity in striking a practical balance between objectives which are essentially in opposition. There are a number of these pairs of opposing objectives, but I would like to mention two by way of quotations:

1. "The two predominant principles of mutual life insurance, first - pooling of risks and second - individual equity, are essentially opposites. If we gave complete recognition to the pooling principle, we would have absolute uniformity of cost for all classes of policyholders. If, on the other hand, we gave complete recognition to the individual equity principle, our operation would degenerate into an individual trust operation and could no longer even be called insurance." Ed Matz, TSA XIII, page 320.
2. "The actuary has two often-conflicting objectives, insurer solvency (or profit) and the maintenance and improvement of a competitive marketing position. Both are dictated by economic necessity." Casualty Insurance. Kulp & Hall.

These two pairs of opposites are well-known and they have been widely discussed. What perhaps has not been discussed as often is their relationship: that is, the effect of competition in setting a balance between equity and pooling.

Equity and Pooling. Suppose that in the market place for a particular type of insurance there were only one classification of insureds and thus complete pooling. That fact alone would not imply equity or inequity as to the treatment of individuals in that group. To make a judgment about equity we would have to consider a number of questions, for example:

1. How homogeneous is the class with respect to the exposure or hazard present for the risk insured against? For a truly homogeneous class, all members are clearly treated "equitably."

2. How practical or costly is it to distinguish characteristics that contribute to any possible inhomogeneity? Some characteristics may not be susceptible to physical measurement or, if they are, the expense or inconvenience of doing so may far outweigh the improvement gained in equity.
3. How equitable or inequitable is the classification thought to be by insureds, sales persons, consumer advocates and regulatory officials? This is a consideration of ever-growing importance.
4. Are there considerations of social desirability which could overshadow theoretical equity? Clearly, this is a concern in automobile insurance, and it is a growing influence toward unisex tables.

But let us for the moment assume that the weight of opinion in the past has been that there is a reasonable degree of equity in the classification. Further, let us suppose that premiums are adequate so that profit is probable and that premiums are not excessive so that competition is active.

Now consider what happens if one company, for whatever reason, "refines" its classification, and thus has two classes - each with a different premium. If the distribution of business between the two classes is undisturbed, the average premium paid will be the same as it was before the "refinement," increased by the added expense of differentiating between the two classes. So what has been accomplished? If judgment and statistics indicate that the premiums for the two classes provide a more reasonable recognition of the respective profits or risks, then it would be appropriate to say that the degree of equity has increased. Further, the price for this increase in equity is the difference in average premiums before and after the change.

Since the classifications have been enlarged and equity increased, does it go without saying that pooling has decreased? Probably it does, but I think that depends on what is meant by pooling:

-If pooling means averaging of results among insureds, then certainly the degree of pooling has been decreased.

-If pooling means averaging of random fluctuations among insureds, then perhaps pooling has not suffered as much as it first would appear. In practice, the truly random cannot be completely distinguished from total experience, but it can be approximated. The degree of error in the approximations would then reflect a decrease in pooling.

So the conflict I first mentioned between individual equity and pooling is clearly a conflict between equity and averaging of results, and it is a conflict between equity and averaging of random fluctuations only to the extent of the errors arising from measuring what may be random.

Interplay of Competition and Equity. Now back to the example. Under the conditions described, the distribution of business between the two newly-recognized "sub-classes" would not stay the same. Competitive forces would generate change. The "refined" premium company would be very competitive for the class with lower than average premiums and would attract more sales from among that class. The other companies would sell less to that better class and more to the worse class. But their rate for the worse class would be

inadequate so they would face simultaneous problems of negative profits and poor competitive position. Some of these companies might simply price products for the worse class and abandon the better class market; others would want to maintain a position in both markets and this latter group of companies would be forced to adopt the same or a similar refinement of classes as the first "refined" premium company.

All this is quite obvious, and the conclusions are probably obvious too, but let me state them anyway:

-Competition is the vehicle which conveys judgments made concerning equity throughout the industry. So equity and competition are interrelated, not necessarily antithetical. It is certainly true that a change prompted by competition could have either positive or negative impact on equity; but the nature of the impact should be judged on its own merits, and, overall, competition should generate greater equity.

Applications to Investment Income Allocation. The refinements in the allocation of investment income which have occurred since the 1950's have largely been prompted by competition, but with considerable support from competition's paired opposite: profit. During World War II the few companies marketing group annuities were crediting dividends based on a portfolio rate in excess of the rate available on new investments. The sophistication of the policy-owners and the permitted flexibility of premium deposits led to some clear investment selection against the companies thereby threatening their profits. In the fifties, with increasing interest rates, competition became the prod to refine interest allocations which would enable the companies to better compete with other investment media. Finally, by the late sixties, the great bulk of group pension business was being written by companies using an investment generation or equivalent method of allocating investment income. Now, in the seventies, such approaches are almost universally accepted in group pensions, as being practical in application and providing reasonable and necessary recognition of the sources of investment gains. The current concerns relate to details of treatment rather than to the propriety of the general approach.

In the Ordinary lines, the questions of propriety, equity and practicality are current topics. The pressures arising from cost comparisons, greater sophistication of agents, and alternative investments are prompting consideration of greater refinement in interest allocation to Ordinary products, and in some companies consideration has blossomed into implementation. Concern about equity in this matter has been voiced by actuaries as well as others.

Such concerns should be addressed. The questions of equity should be spoken to, and judgments should be made independent of the fact that attention has been focused in this area by competitive pressure during a period of, what may turn out to be, temporary market conditions.

Factors in Refining Allocation to Ordinary. Nothing is wrong actuarially, philosophically, or perhaps even legally with the application of a new money theory to ordinary dividend distribution. However, there are a number of specific questions or problems which should be recognized:

1. Investment Return Pooling - The buyer of an individual policy with values expects, in some sense, a pooling of investment return. But

judging from the stiff competition in annuities based largely on the highest interest rate, the buyer does not expect pooling to mean that all insureds receive the same rate of return. Instead the buyer wants to obtain a share of a diversified and stable portfolio of assets and to avoid sharp effects of random fluctuations.

2. Capital Guarantees - Another apparent desire of the buyer is guaranteed principal and to some extent guaranteed rates of return. This desire is in obvious conflict with seeking the highest possible rate of return, and this conflict is one which poses the greatest potential financial risks for an insurer. Hence the pricing should include a specific risk charge for this hazard, which increases as the level of guarantees increases. If the dividend interest rate of a given company based on portfolio interest is deemed appropriate, then clearly the maximum risk charge could be computed as the new-money dividend interest rate before risk charge, less the portfolio dividend interest rate. A timely paper in the Transactions might be one that devised a systematic way for one company to quantify the degree of guarantees under various contracts and to use such results in setting appropriate risk charges, at least in a relative sense.
3. Practicality of Application - The use of the usual 10 to 25 cell interest rate/rollover rate approach on a seriatim basis for individual contracts is quite mind-boggling even with the use of modern computers. The level of costs, the possibilities of errors, the potential for manipulation, the difficulties of auditing make such an approach impossible to imagine. Some practical simplifications are necessary and they will be discussed under the next topic.
4. Use of Surplus - For ordinary dividends, the pattern of surplus strain "repayment," the interest rate charged on such repayment, and how the strain is defined are elements to consider. Further, the degree to which interest earnings on accumulated surplus may be used to increase dividends might add another factor.
5. Replacements - There can clearly be added expense and investment selection exercised by some policyowners by replacing old policies with new. But it may also be true that many of the later duration lapses occurring now arise from replacing permanent insurance with term and a certificate of deposit. In any case, the impact on profitability must be recognized.
6. Illustrated Dividends - If a company using an investment year approach illustrates dividends for new issues on its "current" scale, the results will probably be different than the corresponding actual dividend just paid. This multiplies the problems of cost disclosure and policy comparisons beyond their already tangled web.
7. Policy Loans - The availability of loans, the rates at which they are made, and the degree to which they are made must be considered carefully. The use of new money approaches for ordinary might add to the pressure to specifically adjust each policy dividend based on actual loans on that policy.
8. Federal Income Tax - The marginal tax rate increases dramatically as the average earnings rate increases. If an investment year approach is

used for pre-tax interest rates, these rates should be reduced by the marginal tax rate computed with an average earnings rate equal to the pre-tax investment year rate.

9. Other Elements - It seems silly to use a micrometer to measure a part of a road, then to pace off the rest and add the results together. That is, the degree of refinement in the various elements comprising the dividend scale should be of the same general order of magnitude. This is clearly a matter requiring great judgment.
10. New Cash Flow - Finally, any new-money method used to determine dividend interest rates should reflect actual new cash flow whether on new or old contracts. Going somewhat further, a change from a portfolio to an investment year basis should be applied only to new cash flow occurring after the time of change. If this principle were adhered to, there would be no marketing advantage to be gained by a company changing from investment year to portfolio in a period of decreasing interest rates.

Immunization. I would agree that immunization by line could reduce uncertainty and therefore risk charges made in pricing new products. The easiest to understand and most practical explanation of immunization that I've seen is a paper by D. D. Ezra on "Immunization - Some Practical Aspects," that was presented to the Canadian Institute of Actuaries in 1975.

MR. DALE R. GUSTAFSON: I have put together a very simple model office in order to look at the implications for dividend illustration methods of the application of the investment year method. The model shows some other very interesting aspects of the concept as well.

The Model Assumptions and 1975 Results. The model assumes that a company has issued exactly \$1 million of ordinary life insurance at age 35, male, each year for 45 years, that the reserve basis is 58 CSO, 3%, and that the Commissioners Reserve Valuation Method is used. Thus the numbers for the reserve per thousand are simply taken from the appropriate column in the table of curtail functions. Each year the business is subject to a total termination rate of a little over 9% (in force at end of year  $t$  for business issued  $t$  years ago =  $1,000,000 (1.1)^{-t}$ ), except for the 46th year when the termination rate is assumed to be 100%. Each year's issues have become so small after 45 years that the cutting off of those years does not introduce any significant effect on this simple model. It is further assumed that the pricing, mortality experience, and expense experience are unimportant for the purposes of this model, and thus they are left entirely out, and we will look at only the interest element in the dividend scale.

It is assumed that in the year 1975 the company's net portfolio earned interest rate after expenses and taxes for dividend purposes was 4.885%. Thus the interest factor in the dividend scale is assumed to be 1.885% of the terminal reserve which made the calculations a little simpler.

To summarize the model at this point, a company is issuing and has been issuing \$1 million of new ordinary life insurance at age 35, male, each year. It has been in business long enough to have reached a stable condition having almost exactly \$10 million of life insurance in force with aggregate reserves on that business of \$1,540,286. Because this company has reached a

stable condition, these numbers will all remain constant as time goes by. Now the interest element in the dividend scale in actual course of payment amounts to \$29,032 and it, too, will remain stable unless and until something changes.

Let us further assume that the 20 year interest-adjusted net surrender cost index (IAC) based on the company's current dividend scale, except for the interest element in the dividend scale which we are considering here, is \$6.00. There is no significance to this number other than enabling us to talk about the index in a familiar frame of reference. As can be seen from the tables attached, the interest element in the 1975 dividend scale reduces that 20 year index by \$2.32. Thus the 20 year IAC is \$3.68 for the year 1975.

1976 Results and Analysis. For the purpose of analyzing 1976, assume that we have two identical companies in 1975 which have the same operating results as in the model, but have an increase in net portfolio earned interest rate from 4.885% to 5.000% for 1976. Company A decides to reflect that entire increase in the interest factor in its 1976 dividend scale, and thus increases the dividend interest rate from 4.885% to 5.000% at all policy durations. This increases the dividend payout by \$1,772. Note that this increase in dividend payout is allocated among all policies. Its 20 year IAC is decreased by \$.14 and is now \$3.54.

Now assume that Company B analyzes its results and decides that because the investment rates in recent years have been substantially higher than in earlier years, equity calls for some recognition of this in its dividend scale. It applies some sophisticated investment year method analysis to its business and decides that the net earned interest rate for dividend purposes on business issued in the last ten years is 5.385%, and that the corresponding net earned interest rate for dividend purposes on all prior issues is 4.885%. The model shows that this produces almost exactly the same total dividend payout as for Company A, but with the entire increase being allocated to policies in their first ten policy years.

The realism of this highly simplified model may be questioned. Apparently the application of the very sophisticated investment year methods produced exactly the same dividend interest rate for policies more than ten years old as was actually being paid in the previous year when the company was still on a portfolio basis. I would submit, however, that this is a realistic assumption. From analysis of publicly available information, it appears that at least five of the major mutual life insurance companies have introduced different interest rates in their dividend scale for different calendar year blocks. Only one of these companies has identified its action as being based on the investment year method. The others have made no public statements about the rationale of their actions. Nevertheless, in each case, it appears that in the year the different interest rates were introduced, the interest rate applicable to the oldest block of business was the same as the rate paid on all business in the preceding year.

For dividend illustration purposes, Company B decides to use the higher interest rate, that is 5.385%, to calculate illustrated dividends for all policy durations. This improved its 20 year interest-adjusted index by \$.61, or \$.47 more than the improvement reported by Company A. Company B's 20 year IAC is now \$3.07.

Company B's dividend illustrations are so substantively different than Company A's, that a consumer cannot be expected to make usable comparisons with them. There is a way out of this problem. If Company B had continued to base its dividend illustrations on the dividend interest factors duration by duration on its actual dividend scale in course of payment, then its interest-adjusted index would be \$3.50, an improvement of \$.18. This result is quite comparable to the improvement shown by Company A.

The 10 year IAC numbers are also interesting. Company A's 10 year IAC improves by \$.07 in 1976 as compared to 1975, while Company B's 10 year IAC improves by \$.30. This improvement appears quite reasonable because Company B is actually paying higher dividends and its 10 year dividend illustration is merely based on those higher actual payments.

What About the Future? Consider first Company A. If current investment returns are significantly higher than the company's portfolio rate, and the fact that the overall portfolio rate improved 1 1/2 basis points in one year is evidence that that must be the case, and if it is further assumed that the current new money rate remains stable in the future, then it is fair to assume that Company A's portfolio rate will continue to improve in the future, and it is likely that it will be able to declare additional dividend scale increases as time goes by.

Consider now for a moment the case of Company B. For policies issued in the past ten years, it has taken full current account of the current new money rate and each year's new business will be assigned that higher rate. Thus, at the end of ten more years, Company B will have 20 years of dividends all being calculated at the dividend interest rate now applicable just to the first ten policy years. Thus Company B has built in automatic dividend scale increases each year into the future as long as it maintains its current dividend scales.

In fact, after 10 more years, Company B's actual dividend payout will have increased by \$2,702 with no change in scale, to a total of \$33,519. On the other hand, Company A's dividend payout for the interest factor will remain at \$30,806 in the unlikely event that it declares no further increases.

Note, however, that these current dividend scales are based on current expense levels. What will happen to unit costs if the current new money rate stays at a level significantly above traditional levels? I would suggest that experience indicates that there will be an inevitable inflationary impact on expenses. Thus, it is fair to question the ability of Company B to maintain the current dividend scale. This scale fully accounts for the increase in investment yield that will accrue from a continuation of the current high new money rate, but gives no allowance to the impact of inflation on unit costs. In any event, it is clear that the dividend illustrations used in 1976 by the two companies would not give the consumer a meaningful basis for comparison.

Summary. It seems apparent from this simplified model office that the introduction of an investment year method of allocating investment income and the incorporation of the higher rate in all durations of dividend illustrations introduces a substantive difference in the character of that dividend illustration as compared to a portfolio dividend illustration. Secondly, the model seems to indicate that there is a serious question as to

Company B's ability to maintain its current dividend scales, even under the assumption of an indefinite continuation of the current high new money rates.

Data for Basic Model

Policy Year	Reserve Per Thousand	Reserve In Force	Dividend Interest Factors	
1	-	-	On all reserves	\$29,034
2	\$ 14.86	\$12,281	at 1.885%	
3	30.04	22,569		
4	45.53	31,098		
5	61.30	38,062	On all reserves	\$30,806
6	77.33	43,650	at 2.000%	
7	93.63	48,047		
8	110.18	51,400		
9	126.99	53,856	On first ten years	- \$ 8,503
10	144.05	55,538	at 2.385%	
11	161.34	56,549	On all other business	- <u>22,314</u>
12	178.84	56,984	at 1.885%	\$30,817
13	196.56	56,936		
14	214.45	56,471		
15	232.51	55,661	On first twenty years	- 21,390
16	250.70	54,560	at 2.385%	
17	269.02	53,224	On all other business	- <u>12,129</u>
18	287.45	51,700	at 1.885%	\$33,519
19	305.97	50,029		
20	324.57	48,245		
21	343.22	46,380		
22	361.91	44,459		
23	380.60	42,505		
24	399.26	40,535		
25	417.87	38,568		
26	436.40	36,616		
27	454.82	34,693		
28	473.11	32,807		
29	491.25	30,968		
30	509.19	29,181		
31	526.90	27,450		
32	544.33	25,781		
33	561.43	24,173		
34	578.15	22,630		
35	594.45	21,153		
36	610.34	19,744		
37	625.85	18,405		
38	641.02	17,138		
39	655.95	15,942		
40	670.65	14,818		
41	685.12	13,762		
42	699.32	12,770		
43	713.17	11,839		
44	726.58	10,965		
45	739.47	<u>10,144</u>		
Total		\$1,540,286		

MR. SUTTON: I would certainly agree that dividend scale changes are likely to be more frequent if you use the investment year method than with the portfolio method. The investment year method does not prohibit taking into account inflation of future expenses. You can certainly do that in the process of setting your dividend scale even with the investment year method. The idea of using or calculating illustrated dividends using the same factors for a given duration as those used in calculating dividends actually in course of payment doesn't really appeal to me very much. It seems overly artificial. It certainly does put constraints on the company and makes it almost impossible to do any cheating on dividend illustrations, "cheating" in the sense of illustrating a dividend greater than what you might consider reasonably possible. However, it results in an unrealistic actual dividend, but I may be influenced in that, or anybody may be influenced in that by what their judgment holds as to the future. Even with a portfolio basis, while we may say that this is the dividend scale that is in effect if the portfolio rate stays the same, at the time that we're saying that, we know perfectly well that it's going up every year and that it's going to continue to go up for a period of time. If we go even further and use the investment year approach, but go backwards and use the rate that we're paying now on a policy that is in its fourth year, and if we use that interest rate in calculating an illustrated dividend for a policy that we now issue three years from now, then that isn't terribly logical. The main advantage of that method is it puts a constraint on the company as to the degree of judgment that may be employed in illustrating dividends.

MR. HENRY B. RAMSEY, JR.: My prime concern relates to disclosure. Al Nelsen indicated in his National Underwriter article that dividend illustrations using Equitable's method are comparable with dividend illustrations of a company using the average-portfolio method because in both cases the dividends would be paid as the underlying experience was realized. However, the expectations of the consumer should be quite different when viewing dividends based on current experience as distinguished from dividends based on a pooled experience where that pooled experience was affected by periods of quite different results than current results. Thus, the philosophic basis for the dividend illustration, including the generation of experience which is reflected in the dividend scale, should be disclosed.

MR. SUTTON: I certainly agree with a full disclosure. I question that it is really possible to educate the buyer sufficiently so that he can tell or understand the difference between the two systems, particularly when because of the influx of new business or the age of the company, the actual difference between the portfolio rate and investment year rate blends together. It is an exceptionally difficult problem, and I really don't know the answer, but, certainly, I wouldn't mind disclosure at all in any sense.

MR. DANIEL J. McCARTHY, JR.: It seems as though, at least if you analyze the tax aspects of it, the differentials that have been quoted for standard nonqualified business really widen in the qualified area.

MR. BARTLEY L. MUNSON: Twelve companies responding to the philosophy of dividends questionnaire acknowledged that they have different interest assumptions for new business than old business and attributed it to something like an investment year method.

MR. CHARLES L. TROWBRIDGE: Many of us are bothered by investment year interest in the ordinary area, not from the theory that it's any better or any worse, or it's more equitable or less equitable, so much as from the point of view that just the way the competitive forces work, companies that believe in the way they are doing it now are going to be forced into doing it the way the Equitable is doing it now, simply because of competitive reasons. In other words, we don't really have the choice any more because the competitive forces will drive us that way. Just as if you refined your classification system in some other sense, we'd be forced to; otherwise we, in effect, get only those where it works disadvantageously. So, that presents a difficult choice for actuaries. In effect, some actuaries are going to be in this position. We really believe in the aggregate interest rate, but we have no choice any more. Equitable and other companies have gone the other way, and that really takes the choice out of our hands, and that's a tough position to be in. I would hate to be forced to use new money theories in the ordinary department if I didn't think it was necessary there, simply because I'm forced by the market place, and that's just exactly what's likely to happen.

MR. SUTTON: I agree but there are counter-examples. It won't necessarily happen. When a couple of the major companies came out with age last birthday rating, it was thought that over a period of time all companies would be forced to an age last birthday basis, but it didn't happen; so perhaps the forces aren't irresistible. Maybe it depends on the nature of the refinement.

MR. McCARTHY: Another example which appeared about twenty years ago was Mr. Fassel's paper on distinction in the policy premium rates according to policy size, and, of course, that has proliferated widely and virtually everybody has done it. So you can find examples both ways.

MR. RICHARD M. STENSON: I don't think there's anything necessarily wrong with the market force that forces a company or an industry in a particular direction, and it's not entirely a market force within the industry either. It's a market fact of life.

MR. CHARLES E. WILSON: I do hope that this approach has some levelizing effect by the fact that we do have a limit on the interest rates on a policy loan so there won't be too great a difference between the interest on the old policies and the interest on the new. Maybe this same approach would be much more powerful on individual annuity contracts if it became an important part of the approach of actuaries to crediting interest on individual policies. I do hope that in the consideration of this approach a great deal of care has been given in advance to what happens when interest rates start declining. Interest rates still go in cycles and every cycle goes higher and lower as it goes along, and I'm just wondering how much attention has been given to what happens when it goes the other way.

MR. J. EDWIN MATZ: One of the difficult philosophical questions involved in our business is the choice of which middle ground to stand on between the two extremes of pooling and equity. There are other opposing principles involved in interest allocations, especially when viewed in its application to dividend allocations. There is, for instance, the difficult choice between the use of current experience versus the use of projected experience. Even portfolio rates will eventually face us with this question and, if they ultimately climb to the neighborhood of 8%, we shall have to

ask ourselves whether a responsible actuary can reasonably furnish dividend allocations based on a continuation of that rate indefinitely. The adoption of new money theory for individual business would simply pose that question immediately rather than eventually.

Of course, this is a question that the actuary who computes nonparticipating premiums has always had to resolve to his satisfaction, for the financial integrity of his company may depend on it.

Then, too, there is the question of what goes into the mix of the actuary's attitude with regard to this new money theory--what proportion of emotion versus what proportion of logic. In my own experience there is something about new money theory which affronts the actuary who has been thoroughly steeped in the traditions of our business, and arouses some adverse emotions. Yet, I am sure that, in the long run, positions will be taken on logical grounds.

All of this is by way of prelude to the fact that the Society's Committee on Dividend Philosophy has a difficult assignment which has connections, close or tenuous, to many facets of actuarial theory. The members of the Committee will welcome any ideas which their colleagues may choose to advance to them.

MR. WILLIAM F. SUTTON, III: An obvious problem with the use of new money rates for ordinary dividends is that there are reduced margins from increasing interest to offset increases in expenses. Some discussion I have heard suggests this concern can be diminished by using projections of expenses. This certainly moves dividend illustrations away from the traditional basis of being based on the current dividend scale, that is, based on current experience and not on projected future experience. This is a subject that should be given serious consideration by the Matz Committee.

There is a basic concept, as I see it, that applies to the adoption of a new money basis, that is, once new money--always new money. What kinds of pressures will we actuaries have from our field forces at that time in the future - which I am certain will come some day - when new money rates drop a full percentage or two from the rates which have been prevalent? If we have been on a new money basis, we will have to come out with a new rate book with significantly increased net cost illustrations.

The alternative is something I would categorize as actuarially unsound. That would be never to close off the latest block of business with new money allocation of investment income in the dividend scale. That block would ultimately have interest earnings that level off at the portfolio rate. If that happens, then that business first issued with new money dividends will have become nothing more than a block that was sold with higher dividends for a temporary competitive sales advantage at the expense of existing policyowners.