

**INVESTMENT PERFORMANCE OF PENSION PLANS**

1. Measurement of performance
  - a) Valuation of assets
  - b) Rates of return
  - c) Standards of comparison
  - d) Volatility and risk measurement
  - e) Potential pitfalls
2. Actuarial responsibilities
  - a) Structure of the stock market as it affects pension fund investments
    - (1) Present structure and recent history
    - (2) Forces for change
    - (3) Elements of a perfect market
  - b) Helping select investment managers
  - c) Setting investment policies and goals
  - d) Relationship between investment policies and valuation techniques and assumptions
  - e) Communications among investment managers, actuaries, and clients
  - f) Other roles of the actuary

**CHAIRMAN MURRAY L. BECKER:** Traditionally, actuaries have concentrated their attention on the liability side of the pension fund balance sheet, paying only limited attention to the other side, namely, the pension fund assets and their rate of growth. While some actuaries may have discussed the potential impact of improved investment results on costs and/or benefits, few would have felt a responsibility to help plan sponsors seek means of improving performance. Nor was there any demand for actuarial assistance in this area. Indeed, until recent years few financial officers of corporations sponsoring pension plans paid attention to pension plan investment performance.

Nowadays all this has changed. Most major corporations monitor investment performance. Many have re-examined investment policies, selected new investment managers, and set performance goals for the future. In response to this awakening of interest, many pension actuaries are actively assisting clients by measuring and appraising investment performance and by helping clients in their efforts to seek improved investment performance.

This discussion will cover two main topics. The first is the measurement of performance, which is largely a mathematical and statistical project clearly within the special expertise of the actuary. The second topic—actuarial responsibilities—covers other assignments, some of which are

less clearly actuarial in nature but perhaps still within the umbrella of our profession because of the interrelationship of investment results and other pension considerations and also because the actuary's training and skills might be important qualifications for a particular project.

MR. MARTIN W. LEVENSON: Over the last six or seven years there has been a growing awareness among those associated with pension plans of the importance of investment earnings. That awareness has coincided with and fed the development of a great variety of investment organizations and funding media. Banks, insurance companies, and advisory firms have developed many investment vehicles, with differing policies and objectives but specifically intended for pension plans.

With availability of these alternatives, and the natural growth of pension plan assets, a developing trend has been the division of pension plan funds into a number of separate portfolios for investment purposes. Sometimes this is done to take advantage of one company's specialized talents; in other cases the intent is to create a competitive climate or increase diversification. Even where only a single investment manager is involved, trustees of a plan or corporate officials are aware of the investment alternatives open to them.

All these factors lead naturally to the use of procedures designed for the comparison and evaluation of investment results produced by the different managers and different types of investments. There is now general agreement on a variety of statistical procedures which may be used to measure various aspects of investment results. The one area in which there is dissatisfaction with available techniques is measurement of risk. In other areas, the statistical tools are generally satisfactory, and I see future progress coming from improvements in the interpretation, communication, and use of the statistics rather than from the development of ever more sophisticated procedures.

The development of appropriate rates of investment return is the foundation of any system of evaluating investment performance. It would be a mistake, however, to think that any single set of rates covering a specific period of time can tell the complete story of the wisdom of policies adopted or of the managers' expertise in implementing those policies.

Rates of return normally are calculated to recognize all types of investment return—dividends, interest, and capital gains and losses, whether realized or not. Since pension funds are tax-exempt entities whose holdings are tradable at any time, there is little reason to prefer one type of earnings to another. Rates of total investment return such as

these are commonly used in making comparisons of investment results among institutions and different classes of assets.

If investment performance studies are to be viewed as working tools for the review of policies and procedures, however, it is also useful to break down the total return rates into component parts. For example, the portfolio manager whose common stock portfolio produces a 5 per cent dividend yield obviously is following an investment strategy very different from that of the manager whose common stocks produce dividends of 2 per cent. This type of detailed analysis of investment performance can help in determining whether the manager is, in fact, following the policies that have been established, and it can provide guidance in determining whether the policies were successful under the specific conditions that existed.

In addition to deciding what elements of investment return should be reflected in rates of return, a decision must be made as to the basic time unit for the calculation and the procedure to be followed in combining, or averaging, rates of return over a series of periods.

If calculations could be carried out recognizing each and every cash flow into or out of the fund at the precise time it occurred, then exact rates of return could be calculated. As a practical matter, such precision is unwarranted, and most existing systems for measuring investment results use a basic time interval of either a month or a quarter-year. Typically, it is assumed that the net new investment during the time interval can be assigned to the midpoint of the period, and an estimated rate is determined. For most pension funds and segments of funds, the new-money flow during a single month or quarter is sufficiently small relative to the assets held at the beginning of the period that the estimate is perfectly adequate.

In combining rates of return over a series of periods, there are two generally accepted procedures, each of which has its uses. Time-weighted rates of return are calculated from the basic rates for uniform time periods by determining a geometric mean over the full period to be studied. Each basic period is given precisely the same weight in determining the average, regardless of the assets actually invested from time to time. Dollar-weighted rates of return, on the other hand, are based on a geometric mean, with each basic period's rate weighted by the cumulative amount of money invested to that time.

Dollar-weighted rates offer the advantage of being a direct measure of the dollars of investment earnings produced. Such rates, however, are influenced by the specific timing of contributions and withdrawals from the fund, and such timing may be outside the control of the organization

managing the plan assets. If the intent is to compare the capabilities of two managers, dollar-weighted rates reflecting cash flows may give a misleading picture.

Time-weighted rates of return, on the other hand, have an artificial character, in that they do not measure the actual dollars of investment earnings. For example, it is possible for a manager to lose money over a period and still come up with a positive time-weighted rate of return, and vice versa. Since the time-weighted rates are immune to differences in the timing of cash flows, however, they are useful in comparing the performance records of portfolio managers working with different cash flows.

The rates of return discussed here are normally calculated with respect to the market value of the security holdings. Theoretically, these values represent the cash that the security could be converted to on sale. That ideal, however, is difficult to achieve in practice.

For common stocks the market values of issues traded on an organized securities exchange are based on the closing prices on the valuation date. Those prices may or may not be achievable if the security is actually sold. With the increased concentration of pension plan stock holdings in a limited number of issues, liquidity is a serious concern. Also, in the event of actual sale, trading costs need to be considered.

For fixed-income assets such as bonds and mortgages, the valuation problems can be even more severe. I have observed that private placement debt, in particular, frequently is assigned an artificial value which may be very different from that which can be realized on actual sale.

Consistency of valuation procedure from year to year can mitigate much of the practical problem. Care should always be taken, however, to investigate the procedures actually followed in carrying out a study of results achieved. The shorter the time period of the study, the more serious the problem of valuation consistency.

The choice of standards of comparison is an important element in evaluating the performance of a portfolio manager. There are, of course, many possibilities. A pension plan's results, in total and for various segments of the assets, may be compared with published market indexes for stocks and bonds; institutional portfolios with public records, such as mutual funds, bank-pooled trusts, and insurance company separate accounts, or with the results achieved by other specific pension plans.

While it is possible that none of these potential yardsticks is ideal, their usefulness sometimes is obscured by slogans. We have all heard claims that two sets of investment results cannot be compared because the plans are like apples and oranges. Well, apples and oranges can be compared. You can compare the calorie content per pound, the price per unit of

vitamin C, and a host of other useful characteristics of the two fruits. Having done so, you may decide not to buy the apples because you don't like the way they taste, but you are surely in a better position to make a reasoned choice than when you started.

Thus it can be very useful indeed to compare the results achieved by institutions managing moneys with different objectives and constraints, provided that one can develop an understanding of how the conditions influenced the performance achieved. In the case of institutional portfolios with public records, and with the use of certain market indexes, it is possible to develop a reasonable understanding. With other individual pension funds the task is more difficult.

Whatever the standard of comparison selected, a key concern is the choice of yardsticks which may be used consistently over an extended period of time. The relative performance of managers can fluctuate widely from time to time with market cycles and other factors. Where a set of yardsticks can be used consistently from period to period, however, concern that there has been bias in the selection of the yardstick group can be much reduced.

MR. ARTHUR W. ANDERSON: I have a two-part question. First, should we not give consideration to the market value adjustment method used on insurance company general accounts? Recently an insurance company actuary complained to me that a member of our firm had asked him for market values of a pension fund held in the company's general account; he said that the market value was equal to the book value because the money was guaranteed. I disagreed with him on the grounds that the book value of such funds is available to the contract holder only if he does not want to take his money out.

Second, in judging investment return on bonds, does one distinguish between long-term and short-term bonds? It seems to me that for very-short-term bonds one could use the yield to maturity as the basis for measuring investment performance on that part of the portfolio, since liquidity is assured, while on long-term bonds it may be necessary to liquidate before maturity and thus yield on current market might be an appropriate measure of total return. If one distinguishes between long-term and short-term bonds, where does one draw the line on maturities—at five years, ten years, twenty years, or where?

MR. JAMES J. DAVIES: Volatility is equated by some with investment risk. The theory is that the more a stock or a portfolio fluctuates, the greater the possibility of loss. A more volatile portfolio will always show

greater losses at the bottom of the market than a less volatile portfolio. This is a tautology for a well-diversified portfolio.

A pension fund whose portfolio has unusually high volatility will need to be particularly careful of market bottoms in case funds should be needed close to that time. The need to liquidate funds in a highly volatile portfolio is certainly an element of risk for a portfolio with cash requirements.

However, this may not be true for the majority of pension plans. Most plans have no foreseeable need for cash liquidity, except to the minor extent that benefit payments need to be financed until the time of the next contribution. Hence the need to be careful of an unusually highly volatile portfolio at the market bottom becomes less critical—in fact, it may not be of any consequence, since few investments will be liquidated at that point in time.

The main investment risk involved in a volatile portfolio is that a stock that dips down may never return. In this case it is only short-term volatility that is high. This kind of risk is usually associated with the nature of the business rather than with the volatility of the stock—that is, it is a business-type risk.

Thus volatility as a measure of risk may have some validity, particularly where a portfolio has emerging cash requirements. For most portfolios, particularly for pension plans, it seems that volatility is not an especially useful measurement of risk. What volatility does measure is one of the characteristics of the investment manager of the portfolio.

It seems appropriate to mention that volatility carries a special kind of problem. Greater degrees of volatility cause results to fluctuate to such an extent that average performance becomes more difficult to measure. For example, two successive periods with performances of +50 per cent and -25 per cent, respectively, might seem to indicate a net 25 per cent increase over the two periods. Actually, a dollar invested for this whole time would have earned only half this return, or 12.5 per cent, as a result of the impact of compounding each period's return. A negative performance figure impacts more strongly on average results than a positive figure—a factor which becomes more important as volatility increases.

One simple measure of volatility of stock market performance would be to take the mean average deviation of individual stock or total portfolio yields over a number of time periods in relation to a market index. For example, the volatility of a portfolio might be computed as the average of the differences in the performance for each calendar month between the stock or portfolio and the Standard and Poor's 500 stock index (to use a well-known yardstick). This would enable the person

measuring volatility to compare the performance of one manager with that of another.

Most monitoring services have adopted more sophisticated approaches to measuring volatility. The most common method involves determining the line of best fit for a number of observed values of portfolio performance, compared with a market index, for different time periods. The slope of this line indicates the extent of the sensitiveness of the portfolio to the market, that is, the volatility of the portfolio. This degree of sensitivity is commonly referred to in the investment industry as the "beta factor."

There are essentially two different approaches to the use of the beta factor. One is to compute the extent to which individual stocks in a portfolio have fluctuated in relation to the market in some prior time period. This method can also be used to measure the relative volatility of the whole portfolio in prior years, without regard to the individual stocks in the portfolio. This type of approach is especially useful in the evaluation of past performance, since it adds a new dimension to comparing different managers' performance instead of looking only at raw performance statistics.

In fact, some services provide comparative performance information, in the form of actual performance figures adjusted for relative volatility. Hence a portfolio with higher than average volatility would have its actual performance figure adjusted downward more than a portfolio with a lower volatility characteristic. The theory behind the adjustment of yields for volatility seems to be that the higher the volatility, the higher a manager's performance should be.

In evaluating different money managers, it is questionable whether a manager whose portfolio has higher than average volatility should be penalized in the evaluation of his performance in prior years. To the contrary, a plan sponsor who is looking only for maximum return without regard to volatility will be more interested in the original performance data without any adjustments. The higher volatility measure only explains why the performance figure was relatively high (if it was) during prior years.

The second use of beta measurements is in forecasting the volatility of a particular portfolio. The usual method is to take each stock in the portfolio on the most recent valuation date and determine its past volatility. Each stock's past volatility is weighted by the amount of money currently invested in that stock, to determine an over-all expected volatility factor for the total portfolio. This method may be helpful to the plan sponsor in estimating what performance he can expect as he

proceeds through the upcoming time period. For example, if he is attempting to judge expected performance for the next quarter, and the market is down for the first six weeks of that quarter, then he can probably expect that his money manager has performed worse than the market if the portfolio is relatively more volatile than the stock market at the beginning of the quarter.

Of course, the theory does not work if the investment manager moves a significant portion of the portfolio during the time period, in other words, if the money manager is particularly active in the management of the portfolio. Further, the reliance on past volatility measurements of individual securities may be suspect because of the changing volatility characteristics of individual securities. To some extent this may be mitigated by the consistent volatility characteristics that have been observed in the portfolios of many managers from one time period to another. In short, volatility characteristics may change only fairly slowly, unless the money manager is unusually active, thus making volatility forecasts reasonably reliable.

As I have indicated above, I feel that volatility is only a small part of the measurement of risk, particularly in the case of pension plans with significant cash inflows. What, then, is a more reasonable measure of the risk involved with a particular portfolio manager? To take an extreme example, is there any way to compare the relative risk levels of a portfolio heavily concentrated in railroad bonds with another portfolio heavily concentrated in the stocks favored by the institutions? Clearly, different factors determine the investment risks in these two portfolios.

In the case of the railroad bond portfolio, the risk is primarily a business risk. The possibility that the failure of the Penn Central might spread to other railroads is clearly the dominant risk factor with this portfolio. Other risks might include those connected with the economy, such as changing interest rates and credit supply, but these might not be as important as the business risk for that industry.

In the case of the portfolio concentrating in the institutionally favored common stocks, the risk is entirely different. Here the primary risk would seem to lie in the questionable ability of these companies to continue growing, at least to the extent forecast by the majority of investment analysts, and the possibility of a downgrading in the price-earnings multiples attached to the stocks in this portfolio. Again, there are other risks, such as economic risks and business risks, but these do not seem to be as significant as the market risk.

To some extent, the different kinds of risks are intertwined within the securities of any portfolio. This makes difficult, if not impossible, the



statistical evaluation of relative risk levels, to say nothing of the possible evaluation of the different individual risks.

It seems, then, that the primary types of risk which can be measured, at least subjectively if not statistically, are those that are "macro," or general in nature, and those that are "micro," or specific in nature. The macro risks would include the risks of the general marketplace, including changes in interest rates and in the money supply; federal regulations (such as monopoly restrictions and wage-price guidelines); the impact of international trade; and the general attitude of investors in the marketplace. The micro risks might include such individual company business risks as degree of management competence; levels of competition within an industry, both inside the country and internationally; and possible changes in the basic methods involved in a trade or business which can quickly cause a company's plant to become outmoded or, conversely, can improve a company's position significantly.

Another element of risk clearly is in the area of trading. Shares in a portfolio that are thinly traded are subject to the significant risk that a portfolio manager may not be able to move out of the stock at an appropriate time and price. Further, even in the case of stocks that are widely held, an institutionally dominated stock market may result in a rapid movement in prices which may force an investment manager to hold onto a stock he would have preferred to sell at the previous price level or to sell a stock at a severe discount from the level of previous trading.

In short, measurement of risk involves many factors. These factors are ones normally considered by economists, investment analysts, and portfolio managers in determining the composition of a portfolio. In evaluating relative risk levels, the person evaluating the performance of the portfolio and its investment manager should be cognizant of the risk levels to which the portfolio is exposed. These risks include the risks of the marketplace as well as the business risks of each company whose shares are in the portfolio.

**CHAIRMAN BECKER:** I have a few comments to make on the applicability of the beta technique to the monitoring of pension fund investment performance. It seems to me that if a mathematical technique is to be used for a particular purpose, the underlying assumptions ought to be examined. The beta technique is based on the following assumptions:

1. That it is appropriate to plot graphically the rates of return of a fund against the market averages.
2. That the points plotted will form a mathematical pattern (that is, a curve) which is characteristic of the particular investment manager's philosophy.

3. That the particular mathematical pattern is, in fact, always a straight line.
4. That the slope of the line (beta) represents properly the volatility of the fund's investment results in comparison with the market.
5. That volatility somehow is representative of the risk taken by the investment manager.
6. That there is a correlation between risk-volatility and anticipated reward.

I have not as yet seen any demonstration of the validity of these assumptions. On the basis of my own experience, I would have severe reservations as to their validity.

I do not believe that there is an underlying mathematical pattern characteristic of an investment manager's philosophy. I have interviewed many investment managers over periods of time, and I find that professionals modify their thinking as conditions change. They may be buying highly volatile stocks under one set of conditions and blue chips under another. Consequently, an investment manager's beta would vary from time to time, and there would be no single representative mathematical pattern.

Even if there were a representative mathematical pattern, who is to say that the pattern is as simple as a straight line? Beta practitioners simply draw a line among the points and act as if this proves that the line is representative of the investment manager's volatility inclinations.

Moreover, I cannot accept volatility as a measure of risk in a pension fund. Most pension funds are still in their growth stage, and the contributions plus investment income exceed the cash demands. In any case, most fund managers keep a segment of the fund liquid for unforeseen contingencies, and the balance of the fund is almost never subjected to forced selling.

Under these circumstances, does a high beta mean high risk? Let us take an actual case, assuming a beta of 1.5. The theory states that this portfolio will increase or decrease 50 per cent more than the market. If the market drops sharply, however, the investment manager need not sell at a loss; he can simply wait for the market to recover. Under the beta theory, the portfolio will automatically go up by 50 per cent more than the market when it does recover. Where, then, is the risk?

**MR. DAVIS H. ROENISCH:** Investment performance measurements have great value in giving the investor insight into his own return, although conclusions and comparisons must be made cautiously. For example, in the fixed-income investment sector (bonds and the like), differences in result can arise because of different composition of the portfolios by type of investment (mortgages and other less-used cate-

gories) and differences in quality, maturity date, and coupon rate. Furthermore, different coupon rate issues will react differently to a current change in level of interest rate. The multiplicity of the possible causes of the differential, many of which are not connected with the bond manager's skills, make market-to-market analyses meaningless.

Although the lack of an established index does not seem fatal, since the portfolio performance can be assessed in relation to an artificial standard, it appears that bond performance is best tested by analyzing a random sample of swaps or chained trades, using an appropriate reinvestment rate to equalize maturity dates and coupon rates. Common stock portfolios, on the other hand, can be measured meaningfully on a market-to-market value basis. The significance of the results, however, should be subject to review on the following points.

Has a meaningful period been studied? The range of variation for a single year is very wide and declines sharply with each additional year in the study. After about five years, the range of variability levels off, but it still remains quite wide. Some actuaries have suggested that they feel a period of seven or more years is necessary to develop a valid comparison. This view is subject to the practical drawback that the personnel and investment styles used to manage the portfolios are changing much faster than this. Others have felt that a market cycle, typically taking three to four years, offers a viable alternative period. Investment people have identified at least three different types of cycles favoring different sectors of the market—seasoned growth, cyclical, and speculative issues. Different styles will do best in the cycle favoring their sectors. Certainly, economic conditions and underlying earnings patterns can vary greatly between cycles, supporting the view that the relative success of a given style will vary from one period to another.

At the very least, cognizance should be taken of the fact that different sectors get out of phase. The most notable example of this is the current two-tier market, where the seasoned growth far outpaced the remainder of the market. Some believe this to be a permanent new feature of the market, requiring comparison with a sample of one's institutional peers and rendering index standards suspect. Even if this is not true, allowance must be made for the fact that different sectors of the market may now have different cycles which do not come into phase at the same time as the over-all market cycle.

Other qualifications to the significance of the results arise. As noted, the range is very wide. The cumulative results of a sample of sixty-five bank commingled funds over a seven-year period all fell within *one* standard deviation of the mean. While a few banks had better than average

performance over the two-cycle period, there was no evidence showing that this was not a random result.

This suggests that much of the analysis is too elaborate. While a total portfolio beta factor is useful as a risk adjustment, we have not found it correlated to cumulative performance over a full cycle. Furthermore, the portfolio beta has varied between declining and rising markets, without evidence of the activity that would support a change in the underlying portfolio composition. Finally, the beta factors have not proved consistent between cycles, and they seem to be of little value in predicting future performance.

In this connection, the portfolio alpha seems better correlated to good performance than the beta. A recent Weisenberger study of results over the last five and ten years showed that the high-alpha portfolios generally stood in the top rank. While this confirms our own tentative conclusion, it still remains to be shown that the alpha factor is consistent enough to predict favorable future results.

A final question can be raised as to the usefulness of the results to the investor. If the position is taken that mathematical analysis is useful only insofar as it provides a guide to future action, many of the current studies are wasted. Nobody understands the Becker study, much less the Merrill Lynch report. The articles on portfolios of maximum utility are not comprehended even by astute practitioners.

Thus the greatest pitfall is to make the arithmetic an end in itself, particularly in an era when large companies and banks profess to be content with, and invest to duplicate, the market average. Certainly there is a substantial risk of arriving at erroneous conclusions based on inadequate evidence, particularly in circumstances where the provider of the figures disclaims any responsibility to interpret them. Do these measurements really lead to the often-voiced, bitter sentiment that the worst recent performer should be selected as the adviser, since he has the best chance for future superior performance?

Investment performance results are best, and perhaps only, understood in the context of the basic structure of the market—who is trying to accomplish what, and how is it being accomplished? The shape of the securities business is being drastically changed, with the new structure not yet clear. A working knowledge of the controversies among the New York Stock Exchange, the institutional investor, the regional exchange, the third-marketers, and, last and probably least, the small investor is not only fascinating, but should aid materially in the interpretation of the investment results.

Until recently the stock market was dominated by the New York Stock

Exchange and was geared to serving the needs of upper-class individuals. The New York firms prospered on underwriting fees and brokerage commissions as the middlemen linking entrepreneurs and capital. Some viewed the Exchange as a private club with monopoly privileges.

First the mutual funds and then, in the late 1950's and the 1960's, the pension and profit sharing plans came to dominate the trading. This led to large volumes, the 15-20-million-share days, and surplus commissions. Large volume and brokerage in excess of the value of services rendered permitted multiple offices and expanded sales forces, financed the growth of research and ancillary services (including investment performance measurement), destroyed the ability of the specialist to moderate the market, and encouraged both trading off the exchange (the third market) and consideration of institutional membership on the exchanges.

The 1969-70 market decline triggered a continuing crisis. Low volume and low stock prices combined to lay bare the exchange firms' aging management, inadequate capitalization (temporary and borrowed), and failure to mechanize. Large stock exchange firms disappeared, and a major financial crisis was narrowly averted. The threat remains, and the adaptation of the market to current conditions is far from complete.

What current conditions have to be taken into account? One is the large, centralized holdings of institutional traders. Purchases and sales of these holdings entail the potential of sharply discontinuous prices. Another is electronic technology, which obviates the need for a geographical center. A third lies in keeping ownership records by computer rather than manually. How adaptation is made to these conditions depends on the type of market sought. The historical market centralized trades in New York and maintained price continuity through the specialist. This is no longer being achieved—transactions are high in cost, and sharp breaks in price are frequent.

A perfect market links all buyers and sellers at the lowest cost. A perfect market minimizes the profits to be made through inside (or new) information by adjusting to it quickly—that is, by making a large price change for a large transaction and a small one for a small trade. A perfect market is liquid in that any amount can be bought or sold with an appropriate price adjustment. A perfect market is fair, allowing both small and large buyers equal participation.

The shape of the future looks like a national computer network with an electronic specialist book and negotiated trades. This means that outside services will be performed on a fee basis. It means that common stock values will be sharply discontinuous and that price changes, over the short term, will be more random than ever. In this context, it will be

more important than ever to clarify the style of the professional investor through mathematical techniques, quantifying the results he has achieved and his current risk position.

**MR. LEVENSON:** Assisting clients in the selection of investment managers is not a traditional actuarial role in this country, except to the extent that consulting actuaries have been called upon to review alternative insured pension proposals involving an element of investment management. Many actuarial consulting firms have, nonetheless, been asked by their clients to provide assistance in this area, on the basis of their broad experience with pension plans. I do not intend to get into a detailed discussion of how an investment manager should be selected, but I do want to speak about the advantages of following some sort of systematic and organized procedure for making a choice.

Whenever a new investment manager is retained, it is essential to develop good communications between the principals of the plan and the management organization and to establish a climate of mutual confidence. The company, or trustees of the pension plan, should not focus on short-term experience with a view toward changing managers if developments are not as rosy as had been hoped for. The manager should not feel that he has to carry out his assignment with concern for the rate of return generated over only the next three months. Both should work toward establishing investment policy and procedures for the long-term success of the pension program. This can be accomplished best if the selection process has been a systematic one, wherein the company feels that it has taken care in making its choice and the manager feels that he has been selected on the basis of a good understanding of his capabilities and outlook.

I am persuaded that there is no single correct way of managing a pension fund portfolio, just as there is no single correct way of establishing a funding schedule for pension plans. That does not mean that a systematic approach to the selection process is inappropriate. Rather, it means that judgment must be exercised in weighing the relative significance of the many factors which should be considered. Sometimes people are carried away by some feature of a manager's capabilities that turns out to be irrelevant to the requirements of the particular pension fund. For example, some organizations stress the personalized attention that they give to each individual client. There are pension plans, however, that would be better off without personalized attention. Such plans might best rely on the intensive application of investment policy available from a bank's pooled trust or an insurance company account. Those of you

who are interested in helping clients to select investment managers should be aware that there are other types of companies offering to play the same role. Many provide their services in exchange for the direction of security brokerage commissions after the manager has been selected. There is a potential conflict of interest in that type of compensation, and many companies feel happier paying a fee for assistance in the selection process.

Setting investment policies and goals is likewise not a traditional actuarial function. However, in many cases the actuary can play a useful part by clarifying the relationship between the actuarial assumptions used for valuation purposes and the investment policies and objectives which may be set.

In times when pension funds were invested largely in fixed-income securities, income received in recent years was a reasonable figure to compare with the actuarially assumed interest. Fixed-income yield rates did not change quickly from year to year, and portfolios were not managed with an eye toward capital appreciation. The procedures which were satisfactory under those circumstances simply are not appropriate today. Heavy commitments in common stock investments and the increased volatility of fixed-income rates of return both demand that investment objectives and policies be considered over a longer term and that changes in capital value be recognized.

Portfolio managers should not be expected simply to produce a rate of return each year equal to the actuarially assumed interest rate. In fact, there is something to be said for changing our terminology from "actuarial interest rate" to "actuarial earnings rate," to focus on the significance of capital appreciation to pension funds. Indeed, in many cases pension funds have adopted valuation procedures which systematically recognize unrealized capital appreciation or depreciation rather than the gains or losses which may arise on the actual sale of security holdings.

Actuaries also may be useful in setting policies and goals by preparing cash-flow projections for pension funds. Such studies may reveal periods when the fund will experience a need for cash that may not be readily available from contribution income or current cash investment earnings. Such liquidity requirements can be helpful to a portfolio manager in setting investment policy.

**MR. SHEPHERD M. HOLCOMBE:** I would like to emphasize the importance of assigning appropriate investment responsibilities when setting goals. This relates in some respect to earlier comments by Dave Roenisch, wherein he said that he felt the client should specify how much should be in fixed dollars and how much in inflation-responsive funds. I

feel that too many plans have been operated without clear assignment of responsibility for making this decision in the first place, and that it is extremely important that this be spelled out clearly. Although in some cases it may be desirable for the sponsor of the plan to set a policy in regard to how much should be in fixed dollars and how much in equities, in other situations the sponsor wants nothing to do with this decision, and properly it is treated as a responsibility of the investment adviser.

In setting the investment return, it should be clear how much, if any, of this expected return is due to inflationary factors. This effect should also be spelled out in any salary-scale assumptions. Again, in setting goals for the investment manager, it should be made clear that it is his responsibility to make sure that, as a bare minimum, investment results will exceed the assumed investment return by the extent of any excess inflation. In many circumstances I think it is better if the investment adviser does not even know what the actuarial assumptions are, since he can tend to focus on them too easily. Furthermore, it should be made clear that he cannot hide behind the investment return assumption and feel that his only objective is to exceed assumed return, nor should he be allowed to use the method of valuing assets as an excuse for selling or not selling any particular investments. Is it up to us as actuaries to avoid any aberrations in the cost that might be caused by a large realized gain or loss?

**MR. HAROLD A. LOEB:** I must disagree with something Mr. Levenson said. He stated that a plan sponsor should first select his investment manager and then set investment policies and goals. To me this sounds analogous to first implementing a pension plan and then determining what the benefit objectives should be and how much the sponsor can afford to contribute. I believe that a sponsor should first determine his investment policy and set investment goals and only then select an investment manager whose philosophy and expectations are compatible with those of the sponsor.

**MR. DON M. KEITH:** Mr. Levenson raised a key point with his question as to whether a fund manager ever explains to his client that his leading performance has resulted from his taking a greater risk with the funds and that his risk-adjusted performance was actually below average. It points to the need for the manager not only to outline in advance the investment policy he plans to pursue but also to set down specifically how he wishes his performance, all things considered, to be measured. The client should not be misled, by means of demonstrations that jump



from one criterion to another, into thinking that the performance of his fund is consistently near the top of a group or is better than some reference index. This would seem to be a basic tenet that applies broadly to any managerial relationship.

MR. DAVIES: It probably is true that there are few actuaries who sit down and talk with the investment manager of a pension fund portfolio before deciding what to use as the appropriate rate of assumed investment return in the actuarial cost calculations of a pension plan. It may be true also that there are few actuaries who sit down with the plan sponsor to decide the most appropriate interest rate to use in discounting the plan's future liabilities. Yet the assumed rate of return is probably the most potent factor in determining whether the actuary's cost estimates will, in fact, prove out over the years.

As evidence of this phenomenon, it is of interest to note that the majority of pension plans use a valuation rate of interest of between 4 per cent and 5 per cent per year. Yet most of these pension plans are heavily invested in common stocks. Are actuaries saying that common stock performance in future years will only be about half the performance of common stocks in the last fifty years?

In fact, most actuaries probably are deliberately understating the rate of assumed investment return because they also have deliberately understated the extent to which they expect wages and salaries to increase in the future. Thus there is an anticipated trade-off in terms of excess investment return on the fund helping to pay for excess salary increases on the liabilities side. While they may be expected to balance off when a pension plan is relatively mature, this usually is not the case for a relatively young fund where the amount of assets is small in relation to the total actuarial liabilities.

Even if actuaries were to strip away the conservatism in the actuarial valuation assumptions regarding the interest rate and inflation, the question arises as to how to come up with a reasonable figure for future investment earnings expectations. Should the actuary look at the past investment results for the portfolio manager currently in charge of the fund, the past results of the present money management firm employing the portfolio manager, or the past results of the types of investments in which the portfolio is expected to be concentrated? Or should the actuary look at these factors and make appropriate changes to reflect how he feels past results will change in future? For example, he may feel that the past long-term return on common stocks consisted to some extent of an element of increased interest by institutional investors in this type of investment,

which resulted in an over-all increase in the price-earnings multiple level. If this is not repeated in the future, then investment returns will be less than they have been in prior years, at least for common stocks. Or should the actuary make his own independent evaluation of what the plan sponsor will earn on his fund, without regard to past results or to who is the present fund manager? In other words, is there not enough uncertainty with respect to the reliability of past performance statistics, to say nothing of the uncertainty as to who the money manager will be in future years, to justify the idea that the actuary's independent judgment might be more appropriate?

Whatever criteria the actuary uses in deriving his investment assumption should be discussed carefully with the client and, to the extent appropriate, with the money manager. Further, the plan sponsor should be aware of the impact on the valuation assumptions of a desired change in investment policies in the future. A full discussion should lead to an understanding of the type of investment policies that will need to be followed in the future for the particular interest rate that is chosen by the client. For example, a client with a 15 per cent per year investment performance goal is going to need to take greater degrees of risk in attempting to reach this goal than another client with a 10 per cent goal. The higher goal possibly might be accomplished through increased emphasis on shifts in portfolio structure over time or through portfolio concentration in areas of investment where institutional interest is limited, such as real estate equities.

Another area in which investment policies impact on the valuation techniques is asset valuation. For example, the asset valuation techniques followed for an investment manager who typically moves heavily into and out of different stocks—that is, is a short-term trader—might differ from those used for another manager who holds stocks for long periods of time. In some portfolios turnover may be as high as 100 per cent per year, so that there is a high probability that most of the securities in the portfolio on the valuation date will not be there at the next valuation.

Many of the sophisticated asset valuation techniques developed by actuaries are more appropriate if most of the securities in hand on the valuation date can be expected to be held over a long period of time. For a short-term trader it may be more appropriate to give greater recognition to current market values than for an investor who holds for the long term. The asset valuation method should recognize the portfolio characteristics of the investment manager.

These comments would also be true in the case of bond investments. More aggressive bond investment approaches are becoming more popular. Thus the assumption often used by actuaries that bonds will be held until maturity may become obsolete in the actuarial valuations of those funds following an active bond-trading philosophy.

As mentioned in the previous comments, there seems to be considerable room for improvement in the area of how the actuary determines the most appropriate assumption regarding future investment earnings on the pension fund. Hopefully, the actuary is reflecting the goals of the plan sponsor and the investment philosophy of the portfolio manager.

For example, the actuary with a client who sets percentage limits as to the portions of the fund that can be invested in different types of investments will probably tend to be more cautious than he is with another client whose only goal is optimum investment performance. Another example might be a client whose concern with portfolio volatility is above average. Undue concern with portfolio volatility may cause the investment manager to concentrate on securities with less long-range potential reward than he would select otherwise, thus suggesting to the actuary that lower long-term rates of return can be expected on this portfolio as compared with other portfolios handled by this manager.

The actuary can be helpful to the investment manager in several ways. By explaining the long-term nature of the pension plan, he can allay fears of short-term cash needs. In fact, projections of cash flow often are requested by money managers in order to evaluate investment goals. Further, by stressing the need for long-term optimum performance, a proper relationship can be set between the different types of investment risks, whether they are short term or long term. For example, setting long-term goals does not mean that the portfolio manager should not adopt a short-term trading policy whenever this is appropriate, particularly when there are no tax disadvantages to such trading.

Communications among investment managers, actuaries, and clients can be helpful in other ways, too. Today's stress on short-term performance measurements, often performance over one-quarter periods, may not have much applicability in the evaluation of long-term performance potential. A money manager who performs well over a ten-year period may have two or three years of relatively poor performance during that time and still be a performance leader over the total ten-year period. A client who stresses short-term performance results will be disappointed with this manager during the two or three years in which he performs poorly. Here the actuary can be helpful in pointing out longer-term

effects and relating short-term performance to the particular type of investment securities or the investment strategy that is causing this money manager to perform poorly.

Conversely, the actuary may be helpful in pointing out undesirable features of a money manager who is performing well (in fact, too well) in relation to the universe of other managers. For example, a money manager may be taking more risk than is deemed appropriate for a particular client, and it may be doubtful that performance can be satisfactory over a longer time period.

The actuary can also be helpful in pointing out that it is not usually necessary to realize capital gains in order to assist the plan sponsor in reducing actuarial cost levels. A well-designed asset valuation method will be almost neutral between a money manager who realizes all capital gains on the valuation date and another manager who does not do this. In other words, there should be no incentive for a money manager to take capital gains in order to assist the client.

In short, the actuary seems to have a unique role in assisting communications between investment managers and plan sponsors, in that he can relate short-term considerations to the long-term needs of the pension plan.

## NEW INDIVIDUAL ORDINARY PRODUCTS

1. Consumer influence
2. Marketing influence
3. Profitability influence
4. Regulatory influence

CHAIRMAN DAVID R. CARPENTER: We are going to take a slightly different approach to an old topic. I cannot remember the last meeting at which we did not have a session on new individual ordinary products. I am sure that is an exaggeration. This time, instead of looking at the products specifically, I thought we could look at the areas in which changes have occurred, what causes changes in products and the creation of new products, and attack the subject from that standpoint. The first topic has to do with consumer influence.

### 1. CONSUMER INFLUENCE

MR. PAUL J. OVERBERG: I do not believe personally that any of our life insurance products that have been developed in the last century are a direct outgrowth of general consumer demand. The demand for product changes from consumers has been mostly indirect, and I think that this phenomenon can be ascribed to the very nature of personal life insurance. Life insurance must be sold; it is not bought. Very few people ever need life insurance as they need food, auto insurance, or homeowners insurance. The life agent must point out to the consumer what life insurance can do for him. Then he must sell the consumer a life insurance product that will fill his need.

Product innovation in life insurance originates invariably within the industry itself. Most often new products are designed to catch the agent's eye and to make it easier for the agent to convince the consumer that he wants the life insurance protection which we believe the consumer needs. Some of these innovations never quite catch on. Many agents fail to become enthusiastic about them. Two examples of this are the flexible premium and the life-cycle contract. The more complex products seem to fail more often than the simpler ones. On the other hand, by designing a policy which wins the endorsement of their agents, some companies have turned a simple packaged policy into an outstanding vehicle for sales growth.

Some products are designed by the insurance company for its own personal reasons. One example is the practice of making single premium

annuities available at a slight discount as one of the settlement options under the life policy. While this option gives the customer a better deal, it also helps the company retain more of its assets than it would if such a provision were not available.

MR. LARRY R. ROBINSON: I certainly would agree with Paul if, when he talks about simplicity of a policy, he means simplicity of language. We should not forget that product development includes the way in which the contract is written. Regulators and consumerists have been devoting considerable attention to the language that we use in policies. In our company a new portfolio is being developed for introduction January 1, 1974, in which we have made a reduction of some 25 per cent in our policy wording—this in addition to a 30 per cent reduction that we made just a few years ago. So, in less than ten years, we have taken 50 per cent of the language out of our policies, not to the end of simply eliminating words but to the end of making a policy more understandable. I think that we will see a definite trend in that direction, barring interference in the regulatory area.

With respect to the simple product as opposed to the complex product, I have never felt that the life-cycle contract was necessarily a complex product from the standpoint of the consumer. At the Philadelphia meeting in April of this year I was very interested to hear Mort Darrow, the futurist from Prudential, say that the life-cycle policy was “so appealing, rational, and innovative, I give it only a 50 per cent chance of appearing.” I agree with him—it is appealing, rational, and innovative, but we have, thus far at least, considered it too complex from the standpoint of the home office and the field force; yet I question whether in fact it is complex from the standpoint of the policyholder.

MR. KENNETH T. CLARK: I think that it is almost impossible to distinguish between what the consumer demands explicitly and what the life insurance industry develops on its own initiative along the lines of what it thinks the consumer would like. Thus I doubt whether there was any general demand for the modified term policy, and yet it has had good acceptance by the consumer. This was an illustration of the industry's taking the initiative. There is a kind of consumer demand which is expressed through surrogates of the consumer. Government regulators and consumer organizations do voice a so-called consumer demand. But the consumer himself, the member of the general public, is not voicing his wishes. There are other things influencing product design which are probably stronger than general consumer demand.

A few years ago we saw the entry of mutual funds and equity sales into the general public market, and their motto was, "Buy term and invest the difference." They were strong enough to make term insurance respectable in the postwar period. The companies themselves are very strongly influenced in their product design by agent response. They look for things which agents understand and become enthusiastic over and which pay the agents well enough.

On the question of simplicity, this is a relative matter. It seems to me that the nineteenth-century life insurance policy was a simple instrument, and yet it would not be regarded by today's standards as very consumer-oriented. Thus simplicity is not always a good thing for the customer, and frequently complexity is. It is not necessary really to have a simple policy, but we should make our complex policies *seem* simple.

MR. ROBINSON: The term "consumer demand" is one which offends me personally. I think that it can be bandied about to sound as if there were some high ground swell of opinion. We have to look very carefully at who the consumer is. We do have some information, inadequate though it may be, as to who our consumer is and what he thinks. I am referring to the ILI studies, *Monitoring Attitudes of the Public (MAP)*. Some of the information emerging from these studies is helpful in gauging consumer demand for the development of products. Specifically, *MAP* shows that the public does not understand insurance; we have to study that situation and determine whether that means that they *cannot* understand insurance. Is insurance, especially life insurance, such a complex topic that the public cannot possibly understand it? I think that in the area of policy contract drafting, you will agree that there is much that need not be complex. For example, the technical definition of surrender values including nonforfeiture factors has always bothered me; our new contracts eliminate nonforfeiture factors because they are the kind of thing which cannot possibly assist a consumer. This is only one of the more obvious changes which can be made toward enhancing understandability.

Another point observed in looking at the *MAP* studies: the individual may not understand insurance, but he does trust his agent and expects good service. We should look at his demand from the standpoint of the services that we offer as compared with his expectations.

I was involved over the course of the past couple of years in four separate estates in my immediate family involving settlement of insurance claims. I had reason to contact nearly a dozen companies, some small, some large, and I was appalled at the quality of claim service, especially

from some of the larger companies, the ones that I had assumed might be good. In our company, which is a small one, we pride ourselves on our twenty-four-hour claim service. We do not always attain that goal, but I found an inverse correlation with size: the smaller the company, the better the service I received. Perhaps these were isolated instances, but a knowledgeable individual should be able to have a very straightforward, uncomplicated claim, group or ordinary, settled in a reasonable period of time, not six to ten weeks. Service, then, apart from product development, is one form of meeting consumer demand.

**MR. RICHARD S. HESTER, SR.:** I would take issue with some of Mr. Overberg's opening remarks. He stated that no one really has a need for life insurance the way one has a need for food or clothing. Further on, he stated that the agent creates the need in the mind of the individual. To my way of thinking, a definite need does exist, and the agent is simply making the client aware of it.

**MR. OVERBERG:** In my opening comments I was making a distinction between the words "need" and "want." There are many things we all want but can do without. We might want three cars or a swimming pool, but do we really need them? We do need food. The financial responsibility laws, in many states, create a need for automobile liability insurance. Lending institutions often demand that a person's property be insured, whether it is a car or a home, before they will lend him money. So one definitely needs homeowners insurance or auto collision insurance. However, in this context very few people ever need life insurance. This distinction between "need" and "want" emphasizes the challenge the life insurance agent has in selling this product.

I believe that most Americans are underinsured and that they should have more life insurance. I believe that the money spent on life insurance is a good thing—good for the consumer who not only needs life insurance but also wants it.

**MR. ROBINSON:** Although I cannot comment specifically on new products for the female market, there are some interesting recent developments in a related area. Our company was asked to complete a questionnaire for the Senate Subcommittee on Antitrust and Monopoly (the Hart subcommittee), wherein our differential and premium rates for females were indicated. I have heard that California is now proposing legislation to eliminate, as I understand it, the differential in health insurance between males and females. I dare say that in the next few



years there will be increasing scrutiny of the topic of female differentials. Our company recently has introduced fairly consistent disability income underwriting rules for both sexes, where previously there had been a significant variance. So even our current products for females will be changed considerably in a very short time.

## 2. MARKETING INFLUENCE

**MR. ROBINSON:** In addressing the topic of marketing influence, I know that, in our company at least, we no longer can afford the luxury of having policies developed in the actuarial area as though in a vacuum and then wondering later why policies do not sell. Other sectors are vitally concerned with product design and marketing. We now receive a great deal of input from the field force on issues pertaining to product design and marketing, and we know we must also satisfy the questions of the consumer. Not only must we ask the question whether a product will be beneficial to the company from the point of view of sales, but we must also ask whether it will be beneficial from the standpoint of social needs. Is the policy capable of being misrepresented? There are many fine product ideas, especially in the health insurance area, but some of them are very easily misunderstood. Certainly no product will succeed without being sold to the agent. Some of the policies sold in the past cannot be tolerated in today's climate. The consumer must be made more fully aware of the nature of the product he is purchasing. One of the things I run into in conversations with our field force, and I am certain many of you do also, is a statement such as the following: "My job is not to educate the client but to sell him what he wants" (as opposed, presumably, to what he needs). That statement bothers me a great deal. I feel that product development no longer can remain the exclusive province of the actuary—if it ever could have done so in the past. I think that somehow the blending of all conflicting areas of interest requires art of the highest degree. What is needed is much more than simply a technician who is charged with developing a new product which will "give us a 20 per cent increase in sales."

**MR. CLARK:** I do not know whether there is a trend away from product design toward marketing, but if there is not, there should be. Ingenious sales people have always added "a little sizzle to the steak." I remember my early days as an actuarial student when I had the job of answering letters from policyholders. We would receive letters in which people would talk about their veteran's policies or their homeowner's policies. When I looked up the records it was always the same old plain modified

life policy. However, some ingenious agent had put a little sizzle in with that steak and persuaded a prospect to buy it. The trouble is that this sort of ingenuity often is found only in individual agents or in small pockets of agents, and sometimes it is not too well directed. If the home office could organize this talent, then more attractive uses, more real uses, could be found for some existing products that are on the shelf. As you all know, there is an advantage in working with what one has; the cost of developing new products from scratch is high. Sometimes the products do not even come on the market, because a company cannot obtain approval by the state insurance departments. So I think it is a very good thing if there is a trend toward recognition by home offices that they need a little sizzle with the ratebook steak.

**CHAIRMAN CARPENTER:** Basically I have the feeling that there should be a trend toward better marketing. I know of one example in my company where we have increased the production on one particular plan about 40 per cent each year over the last two years. It is exactly the same plan at the same rates and dividends that we had in the ratebook previously, but someone found a way to market it. It may become more obvious, as we progress with this discussion, that our hands are tied or are becoming tied by regulation, by decreasing profit margins, and in other ways. My own personal opinion is that we should take a better look at the marketing side, where I do not think that we have scratched the surface.

**MR. OVERBERG:** The industry has an obligation to be innovative and to implement new methods of making our products more appealing. Variable life insurance is one such product. Mass marketing also demands innovation and ingenuity. It requires a specialized product with specialized features such as simplified applications, broad nonmedical limits, a simple product with simplified ratings, a free-look provision, and a simple, convenient, and painless method for the customer to pay the premiums.

**CHAIRMAN CARPENTER:** Paul, your company, Allstate, sells only nonparticipating contracts, which is rather unusual these days. Have you felt pressure to develop special nonparticipating life insurance plans which appear to compete on the surface with participating plans?

**MR. OVERBERG:** Allstate has no specific nonparticipating policy which is designed for head-on competition with participating. It is my understanding that our agents lose very few sales in competition with par-

ticipating policies. We are, however, concerned about the unfair competition from participating policies which might arise from the NAIC model regulation on life insurance cost disclosure.

The NAIC model regulation discriminates unfairly against non-participating life insurance. If it is adopted in its present form, it could force almost all companies, including Allstate, to sell participating insurance just for competitive reasons. I shall have more to say about this later when we discuss the regulatory influence.

**MR. ROBINSON:** There probably are few representatives of mutual companies present who have not at least considered going to a product which is called by many names—extraordinary life, economical, or enhanced protection. We have given a good deal of thought to this product. It will compete, we think, quite successfully with nonparticipating insurance.

It is interesting to reflect a bit about dividends and how they are used. Since the year one, companies have had the same standard dividend options. I really wonder to what extent the consumers, the policyholders, have ever really needed reducing premium payments and to what extent they have ever really needed the savings through dividend accumulations. Certainly, in today's marketplace, the idea of having dividends utilized toward providing directly for the cost of the insurance protection is a very attractive, evolutionary idea which does fulfill a need. Thus we, like other companies that may be mentioned—Northwestern Mutual, National Life Vermont, and the Equitable—will have a product which applies the dividends toward providing the protection on a guaranteed basis for a limited period of years; under current dividend scales, level protection extends for an indefinite period into the future. Here is a product which not only is competitive but, equally important, fulfills a legitimate need of the consumer.

**MR. PAUL A. CAMPBELL:** On the subject of participating versus nonparticipating products, I would have to say that once in a while an agent does admit that he has lost a policy to a mutual company, and the degree of his loss and the extent to which he reacts often depend upon the agent. One of the things that participating products have led to is the development by stock companies of competing participating products and the subsequent battle between the nonparticipating management philosophy and the sales attractiveness of the participating products. The outcome really is a function of the attitude the agent takes toward the characteristics of the product. He can compete successfully against

a participating product when selling the guaranteed cost product, particularly when he is dealing with a business owner, by stressing the investment of the difference in premiums in the business itself and taking advantage of the higher anticipated return that the business owner feels he can get. I will say that head-to-head competition has increased markedly in the past few years, largely because the small-business owner generally has an accountant who relies on the financial analysis sheet. The participating policy does create many more problems for the agent. Specific developments that have occurred on the nonparticipating front include the more obvious one of a low-price product which, although it is only a short-term answer, gives the agent immediate response to participating competition.

More interesting, however, is the role that variable life insurance will probably play as a participating fighter. We have exposed our agents in depth to variable life insurance during the last month, and one of their most consistent comments is that it gives them a means of competing against the participating product. However, it must be admitted in candor that a variable life insurance product is only a step in that direction.

**CHAIRMAN CARPENTER:** One of the things that bothers me is the manner in which many of us price on a participating basis. We take a look at where we are at the end of twenty years and construct our dividend formula so that we arrive at where we want to be at the end of twenty years. Then we turn right around and use that dividend formula and project dividends all the way out to, say, age 65 for a policyholder at, say, age 25. So we have gone far beyond the twenty-year period, and I believe that, if you take a close look at it, that dividend formula will not work all the way out to age 65. I think you will find that in many cases the surplus will begin to diminish sometime after the twentieth year. If I am correct, then it does make me uneasy, and always has, to project costs out to age 65 in a case like that, even though one can say, "Well, nobody could possibly see beyond twenty years, and, as far as we know, conditions could change enough that our dividend scale could actually go up, once we get out there."

**MR. ERNEST J. MOORHEAD:** I think that the subject of dividends—illustrating what they are and what they mean—has not been worked over enough in actuarial literature. One way of answering Chairman Carpenter's dilemma would be to say that the fortieth dividend on the policy at age 25 is perfectly all right if it is equivalent to the fortieth

dividend that you are now paying on a policy forty years old. I do not know whether Occidental has any participating policies forty years old. I simply think, however, that there is a question about what a dividend illustration really is. This is one of the things that the actuarial profession needs to get at. At the present time I am trying, as a coauthor, to produce a paper on that very subject.

MR. O. DAVID GREEN III: Chairman Carpenter questioned the validity of dividend projections beyond the twentieth year. He further attacked the practice of comparing old dividend estimates with actual dividend payments in order to provide some kind of basis for assessing the reasonableness of the current projected dividends. The reason for the higher actual payments over the original projections is the very favorable experience deviations in mortality and interest.

Prospects for similar improvements in currently issued policies are almost nil. Competition has dictated the use of much more reasonable assumptions in all areas of rate and dividend setting. At Great American Reserve we analyzed recently the current-year profits on our ordinary life policy, renewal business only, as issued in different ratebook eras. In terms of additional profit expressed as a percentage of premium income, we found that the increase had dropped from 71 per cent (the mid-1940's ratebook) to just over 2 per cent (current ratebook). We suggest that this is the common result. If so, and if predictions as to probable future improvement in the areas of mortality, interest, expenses, and persistency are greatly reduced over those of thirty or more years ago, then it is totally inappropriate to view today's projected dividends as indicative of the company's performance.

### 3. PROFITABILITY INFLUENCE

MR. ROBINSON: After a great deal of pressure from our marketing people, we have come out finally with a first-year cash-value contract. A dearth of information exists on the persistency of this type of policy. From the Philadelphia meeting we learned—and this confirms some earlier studies that we made in connection with financed business in the student area—that the lapse rate that one might expect under high early-cash-value plans is more nearly level than on the conventional plans, and this has been reflected in our product design. Our commissions will be at the term rate and should serve to confine those sales to the more legitimate areas where first-year cash values can be justified. We have had to assume, in our case, a 1 per cent lower interest rate in the asset shares. We also adopted a higher minimum issue than that which we use

on our conventional products. We have restricted the policy to business sales only. We want to prevent the minimum deposit sales to the extent possible. It is not as competitive as other policies on an interest-adjusted cost basis.

**CHAIRMAN CARPENTER:** I am beginning to form the personal opinion that early-cash-value policies (and really we are talking quite often about minimum deposit business) often are being sold in the wrong situation. I think that we have a job of policing or at least educating our field force.

Moving on to the question of whether there have been any modifications in annual renewal term (ART) which are directed toward achieving better persistency, mortality, or conversion results, I know that there is some interest because fairly frequently I receive telephone calls from actuaries concerning this subject. However, we do not have as many statistics on ART as some people seem to believe. In my own company, Occidental, we have not been aggressive in what is called the ART marketplace, although during the last four or five years one of our subsidiaries has been active. With regard to mortality, I feel that it is still too early to determine in this highly aggressive market what the experience will be. Persistency is a problem, and I think it will continue to be a problem. It follows a pattern quite different and much flatter than that shown for other forms of coverage. Here again I believe that the experience depends on the marketing approach. One needs to decide what the purpose is behind the sale of ART, the market for sales, and how much of the business is converted. Many people ask about conversion costs, and my answer is that, in our opinion, the result will depend upon the decision of each company. Tremendous differences in the mortality on converted business are experienced, depending on the extent to which the company pushes conversions. If a high percentage of term business, ART or otherwise, converts, the antiselection will be much less than if conversion rates are low.

**MR. L. BLAKE FEWSTER:** I am not sure that the comment I am going to make really is related to annual renewable term. It is related to renewable term in general. In Canada, at least, most term insurance sold now is on a renewable basis. I suppose that the five-year plan is the most common. I do not think that the one-year plan is very common. My own company, London Life, has found it increasingly difficult to compete on a five-year renewable basis: the commission rate was fairly high on plans being sold on that basis, the amounts were becoming larger, and we were

concerned with higher than average lapse rates whenever the contractual premium increased. In order to pay the type of commission the agents were demanding, we came up with ten-year, fifteen-year, and twenty-year renewable term plans where we could pay a higher commission rate. It was surprising how well our agents adapted to the longer-term plans and found that they could compete with other companies. It is also surprising to me, however, that with all the term insurance being sold by the industry on a renewable term basis, we do not seem to know what the persistency, mortality, or conversion results are.

**CHAIRMAN CARPENTER:** Let us broaden the question, which originally referred only to what I call ART, to the level term products, such as five-year renewable and five-year convertible. My company does have fairly good statistics on our own experience. The point is that, especially with regard to mortality on conversion and rate of conversion (which also affects persistency), the statistics of one company do not necessarily apply to the next company.

**MR. MELVILLE J. YOUNG:** An ART policy called "high-low one-year term" has been sold rather successfully. It has had some very good persistency experience in your area. This policy has high first-year premiums and something close to a net renewal premium.

**CHAIRMAN CARPENTER:** We have discussed the possibility of introducing that sort of contract in one of our companies, but our marketing people tell us that it will not sell. They seem to feel that the emphasis in that particular market is on low going-in cost.

**MR. YOUNG:** I think that we should listen more to our salesmen and less to our marketing people.

**MR. HAROLD G. INGRAHAM, JR.:** One of the reasons for selling term insurance is to convert the term to permanent coverage at a later date. What do studies show with respect to the persistency of, say, whole life policies resulting from attained-age term conversions as opposed to comparable whole life policies issued directly?

**CHAIRMAN CARPENTER:** Our experience with persistency of term-converted business has been significantly better than comparable whole life policies issued directly, and this should be a consideration in the pricing of the product.

MR. ROBINSON: Harold Ingraham said that we sell term to be able to convert it. Certainly that is true, and, on the basis of the current rates for term insurance, I have felt for quite some time that, as an industry, we may be "hoist with our own petard." "Buy term and invest the difference," for example, might not have occurred if we had priced our term insurance properly.

I am wrestling with the fact that we do not have term insurance that can stand on its own without conversion. At some point we have to rely on the improved persistency of the converted business. Perhaps it is the dipping into the profit margin on the converted business that bothers me. In other words, if we issue term insurance and do not obtain the conversion under the current rate structures, we lose. It bothers me very much to force our ordinary products into comparisons to determine whether an individual should, instead of buying ordinary life, buy term and invest the difference. Related to this dilemma of our own making is the fact that we have had conflicting positions on our commission structure. We pay more for permanent and less for term, and that is a problem that I think may well haunt us.

MR. RODNEY C. WILTON: I wonder whether you have made a study of the rate of interest at which the policyholder breaks even. Have you looked at what happens if he buys term for ten years and then converts it at the end of that time, as opposed to buying whole life at the beginning of the contract? From what I have seen in a fair number of cases, he is better off to buy term and convert later—an anomaly in the rate structure.

CHAIRMAN CARPENTER: Quite possibly there could be that conflict. We have not done a study specifically of that nature, although we are doing related studies. However, I have no results as yet. One of the questions that continues to puzzle me is at what duration should one encourage conversion (through the use of conversion allowances or differing commission scales to the agent for the conversion).

MR. CHARLES W. McMAHON: I have yet to find an agency man who does not think you are out of your head if you do not convert term insurance as soon as you can. They cannot understand why anyone would not want the higher permanent insurance premiums that you get on conversion of term insurance. Higher premiums may not be the answer, because you may still be in deficit on the term insurance, and, if you double up your costs too soon to get more conversions as soon as possible,



you may be in trouble overall. In our own case at Union Central we restrict commissions on conversion in the first year, or before the end of the first year. Thereafter we pay full first-year commissions on new permanent insurance resulting from conversions.

**CHAIRMAN CARPENTER:** I want to add to what was just said. The question is a little more complex than it appears to be. For instance, there are some companies that encourage conversions by saying that, if the policyholder converts in the first policy year, regular commission will be paid on the permanent plan. If conversion occurs in the second policy year, 95 per cent will be paid, in the third year 90 per cent, in the fourth 85 per cent. It varies among companies.

**MR. WALTER N. MILLER:** At New York Life one item that has been of great help in giving our agents the best chance to convert term insurance is a nonrenewable term contract that automatically converts to whole life at the end of the term period. It is written as one continuing contract with both the term and whole life rates shown in the premium schedule on the face page. We are not the only company that has such a contract but it has worked out very well for us. For one thing, our agents usually sell the conversion when they first sell the policy, rather than selling term and then coming back at some future date and saying, "You've got some term insurance, and you ought to do something about converting it." Our experience with this type of policy has been that we get about an 85 per cent conversion rate at the end of the term period.

In pricing this type of policy, we do feel that even if we anticipate a high proportion of conversions, the pricing structure should be such that the term period is self-supporting—that is, so that we are not left with a loss with respect to those who do not convert at the end of the term period. One result of this philosophy was that we felt we had to withdraw two-, three-, and four-year term-whole life contracts which we previously issued, because we could not price these on a basis which would be self-supporting during such short term periods.

**MR. CLARK:** The crux of the matter seems to be this: we have to decide what we are going to do at the time that the term product is being developed. If a vigorous attitude toward early conversion is going to be taken (which I think is a good idea), then the cessation of the term insurance at conversion has to be taken into account in the whole pricing scheme. I would not agree necessarily that it has to be self-supporting over the term period.

MR. EDWIN B. LANCASTER: Metropolitan Life has had five- and ten-year renewable and convertible term plans in its ratebook for decades. In looking at the matter of term conversions, it seems to me that one puts oneself in the position of a high-quality life underwriter who is advising a knowledgeable prospect. You program his insurance, and, after working down to the bottom of the sheet, suggest \$50,000, \$100,000, or whatever is required to fulfill the financial needs of the prospect's survivors in the event of his death. Now comes the \$64 question. How much money does this high-quality, knowledgeable prospect have to spend? You have now reached the point where you must decide whether to advise him to buy term, whole life, or some of each. It is here that the flexibility of the five- or ten-year renewable, convertible term policies becomes apparent and points up why we believe that they are a highly desirable product.

Conversions take place most frequently at the end of a renewal period: at the end of each five- or ten-year period the insured makes the decision as to whether he should renew or convert. For example, at the end of fifteen years his children have probably finished college and thus he is in a position to convert. I repeat, renewable, convertible term is a very flexible product. You can program anyone's insurance with a five- or ten-year term and a whole life policy. From the standpoint of the buying public, we believe that the life insurance industry performs a genuinely worthwhile service when it provides this type of product to the consumer. This is consumerism in the best sense of the word.

MR. WILTON: One problem that we at Dominion Life encountered in the United States was that our brokers' contracts had the commission scale based upon the base policy. We had to restrict the amount of term riders because we could not, with our term rates, support whole life commissions. I think that is indicative of how term rates are set.

MR. ALVIN B. NELSEN: I am really surprised that you make money on conversions, and I wonder whether there is a difference in commission practices on conversion that accounts for such profit. This brings another point to mind. Where the full commission on the new policy is paid on conversion, the agent can expect to receive the commission on conversion if he retains the case. So there is some offset to the lower initial commissions on term insurance, as compared with permanent insurance, which is a factor in setting term insurance commission rates.

MR. McMAHON: As far as I know, all companies except perhaps the Metropolitan (and my knowledge of its rules goes back almost thirty years) are paying full commissions on conversions. Perhaps the Metro-

politan does not receive all the literature that comes from the Occidental and all the other companies with their "low" term rates. We are not that successful. I think one of the reasons that the Occidental has succeeded so well in the term area is that our agents and the agents of many other companies have been selling its term insurance for it. This is good merchandising, and I have no quarrel with it. But it is difficult to match the rates unless you also can find a way to match the sales costs.

**CHAIRMAN CARPENTER:** To obtain an idea of whether or not converted business is as profitable as permanent business, one might give some thought to the philosophy of pricing or the use of money. Let us assume that the present value of profit on the permanent plan at the time of conversion is the same as the present value of profit on a direct new-business permanent plan issued at the same age, and that the present value of profit is taken over the next twenty years. Then determine the profit status on the term plan at the time of conversion. In other words, if you are in deficit on that plan at the time of conversion, you do not have equality. Even if there is enough excess present value of profit in the converted plan to make up the difference and come out the same as the present value of profit on a new direct-issued case, I think that you still have to answer the question about time and use of money. In one case you really may be looking at a twenty-five-year period, and in another case you may have a twenty-year period. Thus it took you twenty-five years to get where you want to be, instead of twenty. Problems in that regard depend upon the type of pricing technique one is using.

**MR. OVERBERG:** Allstate has had no major changes in its decreasing term products for a number of years. We sell a considerable amount of decreasing term. The product is often sold to homeowners to cover the outstanding balance of a mortgage. Most of these customers appreciate and understand the product very well. Our product has level premiums with a limited pay period. We are not thinking about a decreasing premium-decreasing term product.

**CHAIRMAN CARPENTER:** There are some of us in my company who think that decreasing premium-decreasing term should be a solid product, but here again we are told that it will not sell. If that is true, I think that one of the reasons is that regular level premium decreasing term is being sold, say 75 per cent of the time, on the wrong basis. We must face the fact that the real reasons we have a persistency problem with decreasing

term are the basic structure of the contract and also the fact that the consumer is not as naive as we sometimes think he is. It is my opinion that there is a significant amount of decreasing term being rolled over about every two or three years, assuming that the insureds are still in good health. This has been very easy to do in the past, one of the factors being that decreasing term premium rates have been dropping through time. Therefore, it has been easy for an agent or a competitor to show the policyholder, after he has had a decreasing term plan for two or three years, that his actual cost per thousand at that time is higher than that on a brand new contract. I think it is very intriguing that one of our attempts to solve that problem, an attempt which we feel is extremely pro-consumer, has not been received favorably by one of the supposedly most pro-consumer insurance departments.

#### 4. REGULATORY INFLUENCE

MR. ROBINSON: In our new portfolio we will have both high- and low-cash-value contracts. The high-cash-value contract will be one granting values at later policy durations as opposed to the higher first-year cash-value contract that I referred to earlier; the low-cash-value contract will be low throughout. Thus we will have two real policy lines from which our agents and, in effect, our customers can choose.

It would appear that there has been a definite trend toward public acceptance of the low-premium, low-cash-value contracts, but these contracts will not be as attractive on an interest-adjusted cost basis as the late-duration, high-cash-value contracts. This may arrest the trend and move the pendulum back toward high cash values at the later durations. We found in the tests we have made that more can be done with cash values than with dividends on an interest-adjusted cost basis. I have heard of a "position paper" at the regulatory level issued in an attempt to eliminate the so-called actuarial manipulations of cash values, but I do not think that the area of cash values is necessarily an area of manipulation. The point I am making is that the policyholder will obtain high cash values in many instances whether he wants them or not, simply because of the increased focus on the interest-adjusted cost method.

For these reasons I am most interested in Milt Goldberg's equivalent level adjusted premium (ELAP), which those of you who are subscribers to *Probe* have probably seen described in that publication during the last couple of months. I feel that exclusive attention to the interest-adjusted method which takes into account cash values is improper. I feel that equal time should be given to either premiums or premiums less dividends through a method such as ELAP or the interest-adjusted payment.

**MR. OVERBERG:** The point that Larry made is one of the features which I believe should be included in the NAIC model regulation on life insurance cost disclosure. Dividend illustrations—combined with the magic of compound interest—can be, and undoubtedly have been, used to motivate a number of consumers to buy life insurance that otherwise they might not have bought. The end result is commendable. However, such sales presentations have never received “official” sanctioning.

With the adoption of the NAIC model regulation on cost disclosure, we are now faced with a mandatory method of cost comparison that discriminates against nonparticipating insurance in two principal ways. One is that the required cost index measures the cost of the policy only if it is surrendered. The second is that the regulation prescribes the calculation of the index net after deducting the illustrated dividends. The consumer is not told, under this model regulation, what the cost index would be if the insured died, nor is he given any indication of what the gross cost index would be before deducting the illustrated dividends. Both of these shortcomings can be corrected very easily. The deficiency can be eliminated by requiring the interest-adjusted net payment indexes as well as the interest-adjusted surrendered cost indexes. If the customer is given both of these indexes, for both ten and twenty years, he will be in a much better position to make an enlightened decision.

The second deficiency should be highlighted by the studies now being made by Mr. Moorhead and his associates from data extracted from returns on the Hart subcommittee questionnaire. They have asked for the actual dividends paid on policies issued twenty years ago as well as the dividends illustrated at that time. I am sure that the committee will find that the relative rankings of participating policies will change considerably in moving from the illustrated dividends to the actual dividends paid. Their studies should lead them to agree that comparing the probable cost of two or more participating policies is not a simple matter. In fact, it is just about as difficult to compare the probable cost of two participating policies as it is to compare the anticipated investment performance of two mutual funds. Any answer is at best only an educated guess, and only time will prove which of the two life policies or mutual funds was in fact the best buy.

**MR. FEWSTER:** I suppose that it is very dangerous ever to suggest that one might understand Jack Moorhead. I do not intend to say that I do, but I think that perhaps some of his work has been misunderstood; maybe Jack will not admit this. I think that we should pay more attention to cost indexes from an actuarial standpoint and use them more

in our own work—say to measure the effect of changes in dividend scale or the relationship among plans and between participating and non-participating insurance. Perhaps this may lead to some appropriate use of indexes that is justified from an actuarial standpoint.

**CHAIRMAN CARPENTER:** Is the regulatory climate stifling attempts at true product innovation?

**MR. ROBINSON:** My own personal view is that any attempts at standardization would be very dangerous for the industry. We now have the computer capabilities to move toward tailor-made coverages. Our agents for the most part are moving away from package sales in many markets. This is certainly not true of the company that concentrates, let us say, in the lower-income markets; most of us, however, have moved toward computer illustrations, toward an evaluation of needs, and toward some rather sophisticated income replacement analyses. We can blend, as has been suggested, five-year term and ordinary life and come up with any possible product design. In any event, we are moving toward tailor-made coverages, the life-cycle product certainly being, in my view, the best example thus far, and any attempts at the regulatory level to standardize further will stifle development. The stumbling block for the life-cycle product has been the nonforfeiture law. I was pleased to learn earlier this week that there are actuaries on a committee to study the standard nonforfeiture law. The standard nonforfeiture law was fine twenty-five years ago, but it needs a great deal of improvement, not in order to solve company problems but to meet problems of satisfying consumer need in the area of tailor-made coverages.

**MR. OVERBERG:** A prominent question at present is, "How can the consumer compare costs unless the number of different plans of insurance is severely limited?" The solution is to educate the public. If the buyer wants to make price comparisons, he should buy a standard form such as whole life. I do not believe that it is necessary or desirable to outlaw experimentation with specialized products.

**MR. GREEN:** We believe that the emphasis on cost comparison is of too recent origin to be useful in drawing valid conclusions as to its impact upon policy changes. There will be emphasis on reducing interest-adjusted costs where product comparisons are available. We think that profits are likely to be increased on the nonstandard products and through increased charges for supplemental benefits and modal loading. As the states in which a company is licensed pass the new nonforfeiture and valuation laws, we think that the stock companies will change

quickly the key plans used in industry comparisons. We foresee widespread use of dual interest rates for these plans in an effort to improve the interest-adjusted costs.

MR. ROBINSON: I mentioned earlier that we had eliminated 50 per cent of the language from our life contracts and made them more understandable and more consumer-oriented. Try to do that in the health area, and you run afoul of the standard provisions. You can develop policies which do not use standard provision language, but you have to get them through the state insurance departments. The standard provisions in health insurance are deplorable. They may have been appropriate at the time they were adopted, but today they are almost totally unintelligible even to people who are well versed in health insurance. We needed to get our policies approved in the various states, so we simply went ahead and issued our policies using standard provisions. That is an area where it is not so much the standardization that is bad but the administration. In other words, if standardization is required and there is intelligent, sensitive, and enlightened administration, so that the individuals who are reviewing the policy forms are given the authority to bend, that is one thing. But the experience we have had recently in some states—Pennsylvania being only one of them—has been that regulatory agencies simply will not bend. They say that it is much easier to approve policy forms that would require everybody to do exactly the same thing.

CHAIRMAN CARPENTER: I hope that the consumerism movement and any related investigations will look as fairly at the regulatory side as they do at the industry side of these questions. We have had, and at present are confronted by, real problems, because of archaic regulatory practices, in our attempts to do things that are very pro-consumer. In fact, I recall one thing I wished to do recently which the state finally turned down because the action would be confusing to its examiners.

MR. ALBERT PIKE, JR.: I would say that a good part of our troubles with state insurance departments are derived directly from the industry itself. For example, on the deficiency reserve split-life problem it is our competitors who put the insurance departments up to those possibilities of requirements. The commissioners at present are running scared for fear the federal government will find them failing in not having done something in the way of cracking down on some particular area, thus giving the federal government a chance to impose regulations of its own. I do not think that is a real possibility, but the insurance commissioners think it is, and I predict that the situation is going to get worse.





## DETERMINING THE COST EFFECTIVENESS OF OPERATING PROCEDURES

1. How do you go about measuring the cost effectiveness of both field office and home office procedures?
2. How successful have attempts been to develop appropriate methods?
3. What is the importance of, and what complications are introduced by, the use of computers both in determining and in improving cost effectiveness?
4. What steps are being taken to control costs? What can be expected in the way of cost reductions in the future? Must we provide for inflation in our premium loadings?

CHAIRMAN ALAN E. MORSON: Over the years, decreasing rates of mortality, increasing rates of interest, and inflation have all tended to focus greater attention on expenses. The increasing variety of products which we provide, and the options available with them, have resulted in highly complex administrative systems within our companies. It is fitting, therefore, that more and more of the time of the actuary be spent in the area of expenses and, in particular, in relating them to the loadings in premium rates.

Can we afford all the things that we are doing? Are our procedures the most efficient in providing the services we feel compelled to offer? Do we really understand the full cost of a procedure and know that it is and will continue to be handled properly within our expense loadings? Therefore, we put the question: How does one, in fact, go about measuring the cost effectiveness of both field office and home office procedures? Going one step further, how has it worked? How successful have attempts been to develop appropriate *methods*?

MR. FRANK ZARET: To my way of thinking, all expenses should be considered as investments. Viewed in this manner, spending money represents a very positive company action. What is wanted is a dollar's worth of value for a dollar spent. And this is what we are trying to measure—are the benefits received worth the costs expended? Means are required, therefore, to monitor cost effectiveness progress, especially in the field, where such a large proportion of the expenses occur. Toward this end, as many concrete facts as possible should be available to provide a total, reliable picture.

## PRELIMINARY COMMITMENTS

How does one go about making cost effectiveness measurements? I would start by saying that there are three major commitments to be made before appropriate cost effectiveness measures can be established. First, objectives must be set with regard to what the organization believes is important to accomplish. Second, cost data down to the necessary level of detail must be available. Third, an attitude of flexibility should prevail.

*Setting Objectives*

The importance of planning in relation to measuring cost effectiveness should not be underestimated. You cannot measure properly if you do not know what you are after. Thus, planned objectives should include not only performance items such as sales, in-force, lapse rates, manpower retention, policyholder service, and the like, but also amounts of money that might be spent to attain these goals. It is usually understood implicitly that, when various objectives are established, they are to be attained at a reasonable cost. But what that cost should be is not always clearly stated.

Planning for the future and the setting of standards to measure progress against plan necessarily involve judgments that are subjective in nature. What may be considered satisfactory performance in one company may not be so considered in another. At some point, someone must make a hard decision as to what will or will not be considered satisfactory performance, whether this be for production, lapses, expenses, or other kinds of activities. Decisions of this kind are better made during the planning stage than at the time when an evaluation is due. At measuring time, a lot of emotion tends to be generated, and this both influences and clouds the choice of satisfactory performance levels. It seems best to set the standards when the game plan is worked out and to stick to the plan as closely as possible. Failure to take an objective stand at the outset on what will be considered good or bad results is a major reason many cost effectiveness measures do not achieve satisfactory results.

Absolute amounts of money spent are themselves meaningless in expense management. Expense objectives should be stated in terms of relationship—expenses per dollar of sales, expenses per man increase in sales staff, profit, net costs, section 213 limits—or in whatever other form is considered suitable. Having set proper objectives, including those for expenses, the cost effectiveness measures almost automatically fall into place.

*Obtaining Necessary Cost Data*

Before it is possible to use cost effectiveness measures with any degree of confidence, it is necessary to have appropriately detailed costs available on a timely and accurate basis. If the expense gathering is done mainly to satisfy annual statement requirements, output may not be in a form or in a time frame which is entirely suitable for expense management purposes. In this case the accounting system must be adjusted so that cost effectiveness studies can also be made.

It is important that the accounting be done in enough detail to pinpoint where and by whom the costs are being incurred. Knowing aggregate or composite costs is not enough; broad-brush approaches to expense management are only temporary expedients. Cost effectiveness studies must give specific information to permit zeroing in on those aspects of the operation which need adjustment or correction. In addition, the recorded costs should be accurate and allocated to the proper users. There is nothing that ruins an effectiveness measure more completely than data that prove faulty. There must be confidence by those being measured that an honest count is being given. Also—not to be overlooked—data should be timely. Data that are continually stale permit excuses along lines which say that, while past performance was admittedly poor, it has improved today. Of course, it will be some time until today's performance figures are available for evaluation, and meanwhile the never ending circle continues.

*Maintaining Flexibility*

The search for the one right way to measure—the perfect standard—can cause confusion and delay implementation of methods otherwise very suitable for evaluating performance. Although there are many ways to set objectives and to measure effectiveness, it should be recognized that none of them will be anywhere near perfect. Be that as it may, it is important to go ahead and make choices that can be lived with, minimize their imperfections, and inform those who are to be measured of the reasoning behind the choices.

With this in mind, after trying out a system, if it needs change, be prepared to make it. A large stumbling block in selecting a measurement system appears to be the feeling that once a system is put into operation it will be very difficult to change. An attitude of flexibility therefore is an important attribute of any worthwhile approach. There should not be a feeling that whatever is developed initially is carved in granite.

These are the three major commitments, as I see them, that must be

made before cost effectiveness measures can be established—setting objectives, obtaining the data, and maintaining flexibility.

#### COST MEASUREMENT METHODS

Has there been any success in developing appropriate measurement methods? I would say that the answer is yes. But the degree of success varies from method to method. We are using a number of different kinds of expense measures in both the home office and the field to cover different operating conditions. The usual procedure is to set standards considered appropriate for the situation and to make comparisons of actual results against these various criteria. I will mention a number of approaches that I am aware of, keeping in mind, however, that some overlap exists.

The various approaches include budgets, fixed standards, variable standards, comparisons with company averages, comparisons with industry figures, comparisons with prior years, section 213, profitability, net costs, work measurement, activity evaluation, and review of procedural methods. In many instances it would be preferable to use several of the measures together to round out a picture of what is happening. The use of a single measure can, on occasion, give a distorted or incomplete view.

#### BUDGETS

Budgeting anticipates what will be spent in a future period on the basis of assumptions as to events that are expected to occur. Actual expenses that are under or over budget reflect how well the budget has been planned and how well the plans have been carried out.

We do a substantial amount of budget work. For example, each home office unit must submit an annual employee and compensation budget. Justification of numbers of employees for the budget are made on the basis of activities or assignments scheduled or expected in the following year. For a service organization, such as an insurance company, projecting activities can be difficult, more so than for, say, a manufacturing organization.

We also budget for noncompensation items such as postage, telephone, travel, equipment, and the like, both in the field and in the home office. While home office costs for most noncompensation items are generally budgeted in broad aggregates, we require each district office in the field to develop a rather detailed item-by-item budget. Comparisons are made periodically during the year to indicate how well we are meeting the budget objectives.

The fact that home office and field people must think about costs when developing their individual budgets, and the knowledge that we have an accounting system which permits us to compare the actual expenses during the

## DETERMINING COST EFFECTIVENESS OF PROCEDURES D615

calendar year with the budgeted figures, create a desired atmosphere of expense management. Because many of these budget items reach down to specific individuals, particularly in our field operations, there is a much greater awareness of the matter of expenses than was formerly the case. The questions and remarks we have received from the field are clear indications to us that many of our people are paying close attention to this difficult subject.

### FIXED STANDARDS

An absolute amount is established occasionally as a measure of cost control. For example, expenses for our leaders' conferences are limited to \$275 per qualifier. This indicates, therefore, that we are willing to spend a given sum if we obtain at least a prescribed amount of production. As long as this expense standard is not exceeded, we assume that we are cost efficient. Other examples of fixed standards are mileage allowances and meal allowances. Obviously, the allowances represent a measure of the worth to the company of performing certain functions. Cost effectiveness is inherent in, or built into, the rationale behind the selection of such allowances.

A not-so-obvious item might be space per person in the home office. Such allotment necessarily takes into account the cost to the company of having a person employed and the benefits to be received from such employment.

### VARIABLE STANDARDS

In a number of instances we use standards which vary in accordance with the volume of prescribed functions or activities. For example, in our present recognition formula there is an expense factor which is related to production. Thus the more that is produced, the more that can be spent. Because there are some fixed expenses in the formula which will not vary by production, a low ratio of expenses to production is a favorable indicator. In my opinion, this is one of the best ways to exert cost effectiveness pressure, since costs and benefits are directly related.

Other cases of variable standards involve training allowances for new men. On the basis of the number of new appointments, the costs will vary. The cost per man retained at the end of the financing period is a good gauge of how effective the recruiting and training programs have been.

### COMPARISONS WITH COMPANY AVERAGES

Using company averages as a criterion against which to make certain cost comparisons provides a means to measure relative efficiency of various parts of company operations. For example, one region may have spent considerably more or less than the company average for a prescribed training program. Unfortunately, this relative standard will not tell whether the company as a whole is operating at an efficient or inefficient level.

## COMPARISONS WITH INDUSTRY FIGURES

Comparisons with industry expense standards can be good indicators of whether or not a company is operating at appropriate cost levels or whether it is out of line in comparison with its competitors. Annual statement data or industry association figures can be helpful. Here the problem is that of obtaining comparable costs among companies, each of which tends to employ accounting procedures suitable to its own purposes.

## COMPARISONS WITH PRIOR YEARS

Trends of various costs or indexes are followed for periods of time to see what the patterns are. Inflationary pressures can be noted, and changes in the cost direction of various programs become apparent.

## SECTION 213

A criterion against which to measure costs has been established by legislative definition under section 213 for companies operating in New York State. Whether or not one agrees with the factors used to determine a cost standard, at least something specific is available, and the standard can be considered to be as objective as one might find anywhere. Depending on the size of the expense margins that emerge, a degree of cost effectiveness can be determined.

## PROFITABILITY

A desired level of "profit" should be maintained at various levels of the organization. The definition of "profit" is the difficult part to determine, particularly in a mutual company, where the question is always raised as to whether such a thing as profit exists.

As many of you are aware, a number of agency profitability studies are now under way. Profit, or perhaps to be more accurate, profit index, calculations, should take account of a number of facts about performance, including production, lapses, interest rates, mortality, agent turnover, expenses, and the like. If appropriate formulas can be developed, this might be the ultimate in cost effectiveness measures. In the meantime, however, we have worked out a simplified approach to a profit index calculation and are now running it experimentally. We have defined a simple income formula for each district office and, by subtracting its expenses, have arrived at an index of profit. We recognize that it is not a true profit, but it is a gauge of efficiency.

## NET COSTS

This is a reliable cost indicator which reflects interest and mortality experience in addition to expenses. However, it is a total company standard and one that is not a useful expense management device for recognizing and resolving the everyday cost problems which may exist in various parts of the organization.

## DETERMINING COST EFFECTIVENESS OF PROCEDURES D617

### WORK MEASUREMENT

Various work transactions are studied and given values or weights. Cost effectiveness is determined by the actual number of people necessary or time taken to complete certain jobs, as compared with the standard.

We use work measurement in a number of areas in the home office. We also use it for clerical staffing in our district offices. Interestingly enough, we use two different approaches to determine clerical staffing in the district offices. In one case we relate allowable clerical staffing to the number of business transactions performed in the office; the clerks operate in an administrative capacity. In the second case, we classify our clerks as "sales assistants," and their function is to aid in producing sales as contrasted with administration; this clerical staffing is determined on the basis of sales volume and the number of new salesmen in the district office.

Work measurement provides a clear-cut relationship between jobs performed and the costs of performing such functions.

### ACTIVITY EVALUATION

A subjective determination is made of whether or not various activities should be started, continued, or canceled. Priorities are established with the various activities classified as to importance. After ranking, the least important jobs are considered for postponement or elimination. This is a judgmental method which is especially valuable when few quantitative data are available on which to make decisions.

### REVIEW OF PROCEDURAL METHODS

Studies of how specific jobs are being done are used to improve the efficiency of specific operations. Reductions in time, number of steps, or number of employees necessary to complete a procedure are, of course, improvements in cost effectiveness.

### THE PROBLEM GENERALIZED

One might think that with this list of methods in use at our company we would have most of our cost effectiveness measurement problems solved. Not so. This has made me wonder what our particular difficulties are and, beyond this, why it is that with so many intelligent people in our industry working on the problem it has been so difficult to find a solution once and for all.

There seem to be two major impediments to arriving at permanent and universal solutions on how to measure efficiency. First, the operations of no two companies are alike. Therefore, even if the problems were solved in terms of one company, it probably would not do another one very much good, since the working philosophy and characteristics

of each company are generally different enough to require considerable adjustments to someone else's solution. Second, conditions change continually and today's solution would not necessarily be appropriate for tomorrow's situation. Consequently, it would be necessary for any company that was so fortunate as to have found some answers to continually update such solutions.

These two conditions—differing company characteristics and perpetually changing conditions—make it imperative that studies be continually under way by individual companies to find and maintain appropriate methods for determining cost effectiveness.

MR. JAMES A. MITCHELL, JR.: Frank Zaret has described a variety of cost measurement approaches, including both financial and non-financial techniques. I would like to point out initially that, in addition to such nonfinancial techniques as work measurement and procedural reviews, there is another nonfinancial technique which is probably the one most widely used—the technique of subjective evaluation. In the real world each of us forms opinions based on observations and discussions the primary intent of which is not to measure the cost effectiveness of operating procedures but which combine to form an image of an organization's performance. When your boss walks through your department, and the employees are bombarding one another with paper wads, he obtains an impression about the cost effectiveness of your operation. Although you may have found empirically that providing five minutes a day for employees to throw paper wads has increased your productivity 17 per cent, it might be helpful in such a situation to have some financial measurements which you and your boss agree would reflect properly the level of your cost effectiveness.

Let us concentrate on three of the financial techniques for measuring cost effectiveness which were referred to by Frank. The first is that of the profit center, which is pretty well known to all of us. In an excellent article in the March-April, 1973, issue of the *Harvard Business Review*, entitled "What Kind of Management Control Do You Need?" Professor Richard F. Vancil of the Harvard Business School discusses several principal types of financial responsibility. He defines profit centers as "units where the manager is responsible for the best combination of costs and revenues. His objective is to maximize the bottom line, the profit that results from his decisions. A great many variations on this theme can be achieved by defining profit as including only those elements of cost and revenue for which the manager is responsible."



The profit-center concept in the traditional sense works best for my company at a high level—in our Individual Insurance Organization or in our Group Insurance Organization. However, as Professor Vancil suggests, the profit-center concept can be made very effective for levels of the organization lower than the line of business, by using variations on the theme. We commonly utilize as revenue the “rate allowables” which represent the expense assumptions for that organizational unit that are used in establishing the premium rates.

As an example, the expenses to support our individual agency operation are expressed in our pricing as a percentage of first-year through fourth-year commissions. Thus our agency department becomes what Professor Vancil would call a “revenue center,” which he suggests is “best illustrated by a sales department where the manager does not have authority to lower prices in order to increase volume. The resources at his disposal are reflected in his expense budget. The sales manager’s objective is to spend no more than the budgeted amounts and to produce the maximum amount of sales revenue.” Obviously, our agency department is operated on a budget. However, the department head has the option of spending more than the budgeted amount, provided that he can increase his “revenue” in the form of “rate allowables” so as to make the additional investment a worthwhile one.

Other areas of our operation are more in the form of what Professor Vancil calls “standard cost centers,” which, he says, “are exemplified by a production department in a factory. The standard quantities of direct labor and materials required for each unit of output are specified. The foreman’s objective is to minimize the variance between actual costs and standard costs. He also is usually responsible for a flexible overhead expense budget, and his objective again, is to minimize the variance between budget and actual costs.” You can well imagine how the policy issue and policyholder service areas are operated on this basis, using as their revenue that portion of our “rate allowables” which represents the expenses of their units.

Theoretically, it would be simple to add up the “rate allowables” for all our various lines of business to produce a total corporate “rate allowable,” with which we could compare our actual corporate expenses. Unfortunately, this system does not work as neatly for all lines as it does in our individual insurance operation. However, we have made a rough attempt to approximate this measure by use of a corporate weighted-income computation, which has been useful to us in reviewing corporate expenses and ensuring that our corporate expense growth does not exceed the growth in the business base which supports those expenses.

Turning from the profit-center technique, a second major technique for measuring cost effectiveness is unit cost comparisons, which Frank also mentioned. These unit cost comparisons measure cost effectiveness by comparisons between any of the following unit costs: (1) actual versus plan; (2) actual, over time; (3) similar organizational units in the company; and (4) similar companies. At my company, the Connecticut General Life Insurance Company, our corporate expense system produces actual unit costs by function, and we are introducing the capability to compare actual with plan. Through industry association studies, we do compare unit costs with those for other companies.

The third tool which I would like to mention is our standard cost system. This measures the effectiveness of operations by comparing actual and/or planned costs with standard costs, containing both fixed and variable components. Since late 1971 we have been developing expense standards for each cost center in the company, of which there are approximately two hundred. The system is based on historical actual results, and standards are adjusted annually for such factors as inflation. Because the system is based on history, it is a measure only of whether we are doing better currently than formerly, not of whether we are doing as well as we should. To reiterate another point which Frank made, it is clear that this system must be maintained continuously to be of any value. To the extent that these standards are not updated to reflect new organization and methods of doing business, they are of little value and even may be misleading.

We have found that both unit cost comparisons and the standard cost system are adapted most easily and successfully to units at the lower levels of the organization, especially where similar, repetitive functions are being performed. Although we have not yet extended this system to our field operations, it would seem to have wide applicability there. In general, we have found that these methods have been most successful where we have obtained a real commitment from the using manager. He must be prepared to commit his own resources, and participate actively in the development of these measures, if he is going to use them effectively.

To summarize, the profit-center concept—or a variation of it—works well for the upper organizational levels, and the standard cost system works rather well at the lower organizational levels. One major problem which remains unsolved for us is determining a good measure for such corporate overhead as vice-presidents of performance and expense analysis, and controllers.

## DETERMINING COST EFFECTIVENESS OF PROCEDURES D621

MR. GEORGE F. O'LEARY:\* When we think of improving cost effectiveness, there are two natural divisions of expense to which controlling measures can be applied. These are home office expense and field expense. Although the area of field expense probably offers the greatest opportunity for savings, it must be handled carefully, since negative results which might occur involve the threat of disruption to the field organization. This, in turn, may seriously disturb the company's growth pattern. Hence it is easier to attack and solve home office expense problems prior to delving into agency areas. In most life insurance companies, up to two-thirds of home office expenses will center in salaries paid employees, including related employee benefit programs, and in computer costs. I would like to discuss actions we have taken in my company over a period of years to control these two major areas of internal expense. I will emphasize the importance of computer applications in both determining and improving cost control.

### WORK MANAGEMENT

Control of the salary function centers basically around controls developed over staffing. I shall concentrate on some of the very effective controls which we have implemented through tools provided by a well-managed work measurement program.

In the precomputer, pre-work measurement year of 1960, Northwestern National Life had 660 employees. By 1966, after installation of computer systems and our first system of work measurement, our staff had been reduced to 450 people, and as of September 19, 1973, it was relatively stable at 580. This represents a decrease of 12 per cent over the 1960 level, while at the same time our insurance in force has grown from \$2.4 billion to \$9 billion, almost 400 per cent. I quote these figures for the purpose of illustrating the effectiveness of staff control which is basically the ultimate control over salary costs.

The company's first work measurement system was installed through the use of an outside consultant over a two-year period from 1963 through 1965. Studies were made in all areas of the company, which resulted in our achieving a clerical reduction to the 1965 level of 450 people. The program has been continued since 1965 by maintaining close supervision of staffing and by almost continuous restudy of

\* Mr. O'Leary, not a member of the Society, is senior vice-president, operations, of the Northwestern National Life Insurance Company. He is chairman of the board of directors of the Life Office Management Association and chairman of the administrative committee of LOMA.

changing work functions. All our preliminary work was based on the system of observed standards of work measurement. However, in 1968 it became apparent that many of our clerical operations could be reduced further and simplified by applying pre-engineered work standards. In order to provide proper training for staff analysts in this system, a consultant was again retained. We now use a combination of observed and pre-engineered work measurement systems in almost all our clerical operations. We feel that the use of pre-engineered standards has further improved clerical production by 10 per cent.

With that brief explanation of our system, I want to discuss the operational controls we have installed to maintain an equitable system. Prior to 1968, additions to staff could not be made without the approval of our cost control group. This system, however, provided little or no control over decreasing needs caused by decreasing work or by major systems changes. To correct this problem, a computerized report system was developed to give officers and managers control over their staffing. The new control program provides for informational reports of two types. The first is a weekly volume and trends report for departmental managers, and the second is a monthly departmental summary of clerical productivity and staffing. These reports are based on the daily production record sheets maintained by each position included in the system. Since these work sheets are IBM 1288 Scanner forms, they become input to the computerized system, with the information residing on disk storage. Hence the information is available in the computer system for the production of the weekly and monthly reports. I would like to describe some of the information produced and available from the two reports mentioned above:

1. *Weekly volume and trends report.*—This report gives information to the department manager on various work functions performed by clerks in his department. Some of the information available to him is the weekly volume of work performed in each function, as well as the average daily volume for the current week, the year to date, and the previous year to date. Also illustrated is the trend of volumes, on a ratio basis, compared with a week ago and with the previous year. The manager also has available to him on a weekly basis the time required for covered work for each clerk in his department. A performance ratio and a coverage ratio are also developed on a clerical basis. As a result, a graph can be made illustrating work volumes, the number of people employed, the productivity, the coverage, and the performance of a section of a department or the entire department.

2. *Monthly departmental summary of clerical productivity and staffing.*—

## DETERMINING COST EFFECTIVENESS OF PROCEDURES D623

This report provides information to the department manager, the division head, and company management on the number of people covered in the system, the clerical performance in relation to standards, the percentage of work covered by standards, the departmental productivity on a standard basis for the month and for the year to date, the percentage of attainment of the standard, the paid staff and allowable staff for both the current and previous month, and, finally, the excess of staff for the current month and the previous month over standards. From these reports, management is able to tell at a glance where overstaffing or understaffing is occurring.

These reports provide the department manager and company management with vital information necessary for controlling staffing and, hence, a large part of our salary expense. The major point I want to make is that it would be virtually impossible to obtain the information necessary for these controls without the use of our computerized system.

### COMPUTER OPERATIONS

I would also like to discuss briefly another computerized control system which we have installed recently in our company. The purpose of this system is to provide an equitable, consistent, and accurate tool to allocate computer operational costs and monitor performance of our data processing system. Northwestern National Life uses a mixed installation, partially on third-party lease, consisting of the following: An IBM 360-65 computer with one megabyte of memory, ten 3420 tape drives, an ITEL 7330 eight-pack disk drive, a 1288 Optical Scanner, and the usual configuration of printers and other input-output devices. The system operates under OS-MVT with HASP and multiconsole support. The total monthly cost of this system, including operational personnel and allocated overhead, is approximately \$87,000.

We decided to develop our own accounting system software after looking at several available packages. Like most of these software systems, our package uses the systems management function (SMF) data generated by IBM software as the basic source data (with some modifications). Reports are generated from the system on a daily and on a monthly basis.

Since it is impossible to describe a system of this complexity in great detail, I would merely like to list some of the basic daily and monthly information which comes out of the system:

1. *Daily summary of system utilization.*—The report illustrates the following:

Production hours	Average programs
Test hours	Per cent of core hours used
Rent hours	Per cent of core hours requested
Rerun hours	Central processing unit (CPU) hours
Total hours used	CPU per cent
Total hours available	CPU adjusted

This report gives an overview of twenty-four hours of operation. We use two twelve-hour shifts per day, so the information is displayed by shift and in total. The hour figures shown are total job hours. They add up to more than the elapsed time due to multiprogramming. "Hours available" shows the hours available to OS. Down time, no work, and emulation have been subtracted out. "Average programs" is obtained by dividing "total hours used" by "total hours available," resulting in an over-all average number of programs in the system. The second shift is noticeably lower because of several large-core production jobs run in our daily cycle. The per cent of available core used and the per cent requested differ because more is requested than is actually needed. A separate report shows these jobs so that corrective action may be taken. The CPU utilization is shown in hours used, per cent of available time, and adjusted per cent used. The difference in the two per cents is a measure of the OS and HASP system overhead. The same data are displayed for a full month's experience in the monthly report.

2. *Daily summary of device utilization.*—The report illustrates each device, with hours allocated and dollars billed. The devices shown are disks, tapes, scanner, on-line PRT, HASP PRTR, card reader, special forms, card punch, OS WRTRS, CPU, core, and emulation. The report is used primarily to monitor cost recovery by device class. Our pricing strategy is basically an allocation tool rather than a profit-center concept at this point. In general, we price each device class to recoup its own cost. Again, these data are presented on a total month basis and are used to evaluate our billing strategy. The billing algorithm uses time allocated, data sets used, and executed channel programs, so one can see how these summary data are helpful. Other monthly reports show production runs by allocation center and test runs by unit and programmer of origin. It is impossible to cover the entire system in this short time, but this should convey the basic concept we are now using at Northwestern National Life.

#### CONCLUSION

The message I want to convey from the brief descriptions I have given of these two work management systems is that they provide extremely valuable expense control tools to the company and that these systems probably would not be possible without the use of computers.

CHAIRMAN MORSON: George O'Leary has just outlined the Northwestern National Life approach to allocating computer costs and moni-

## DETERMINING COST EFFECTIVENESS OF PROCEDURES D625

toring these costs in a way that shows their trends, and he has highlighted areas where greater efficiencies can be achieved.

I would like to take a couple of minutes to examine computer efficiency in the area of new products and procedures, with system development and modification that are required to handle them, and the cost items that are involved.

Before the computer era, a system for administering a contract manually was not particularly costly to design but had a relatively high operational cost. The high operational cost was due to the direct involvement of people in handling all transactions. Therefore, it was of no great consequence if an unusual administrative procedure was required. Some small amount of time was involved to work out a manual procedure to handle this administrative wrinkle, but the development cost was not very substantial.

Then the computer arrived, to specialize in doing repetitive tasks very quickly. Computers acting as "superclerks" brought substantial cost reductions to many life insurance companies. One of the prices of this cost reduction, however, was a loss of flexibility in handling procedures. No longer could a new administrative variation be handled easily by the administrative system. The reason for this was the high cost of defining specifically and programming correctly that variation and all its ramifications.

Manual handling involving variable costs primarily was replaced by a cost system that had a high fixed cost and a low variable cost. The high fixed cost was the expense of system design and program design. The low variable cost was the expense of computer operations. With large volume, therefore, substantial cost reductions could be effected. Without large volume, the reverse was true.

If the handling of a new product is to be computerized, cost effectiveness will be achieved only if the product is sold in sufficient volume that the heavy fixed costs of writing the computer programs are covered by the total expense loadings in the premiums collected.

It may be deemed necessary to handle every new product on the computer. The alternative of hand records, manual adjustment to the general ledger and policy exhibit, and the manual calculation of commission payments may have an adverse effect on the service and cost efficiency of the whole operation. It is conceivable that, because of the very existence of the computer for handling most administrative procedures, very few insurance personnel really understand all the functions to be performed and their interplay—thus making manual handling error-prone and disruptive.

It is my belief, therefore, that for cost effectiveness to be realized in operating procedures for new products, it is more important in the computer era to know in advance that a product will have a high degree of acceptability in the marketplace. Moreover, systems administrators must now play a role in product design. To introduce a new product or service that requires different administrative procedures without consulting systems administrators is to invite chaos.

It can be argued that the involvement of a systems administrator in the early stages of product design may well stifle creativity. This possibility, however, should not preclude his involvement soon after the basic design work has been done. There are aspects of the design that may make precious little difference to the marketability of the product but may well have a very significant effect on the cost of handling it.

A balance must be struck ultimately between the needs for nonstandard personalized service and the cost of providing such service. A balance must also be struck between the need to introduce a product tomorrow and the need to be able to handle the first sale of the product effectively and efficiently.

The cost of proper detailed systems work and programming is an insidious one and must be recognized in advance. It now plays a reasonably important role in the profit picture of a life insurance company.

**MR. MITCHELL:** In addition to the three financial measurement techniques I discussed earlier, I believe that the major step which my company is taking to control costs lies in our corporate planning and review process. We have extended the planning process well down into our organization, so that each person who is responsible for one of our cost centers prepares a plan, which includes not only a budget but also a description of the objectives which are expected to be attained with that expenditure of money. These plans are reviewed by line management, with an additional review and challenge by staff. We are attempting to ask ourselves such basic questions as whether it is necessary to perform a particular process or whether it could be performed better in an entirely different way, perhaps by someone else in the organization. There is no substitute for management commitment if one is to accomplish effective expense management. In the area of expense control, our management is committed to the objective that our expenses will increase no faster than the business base which supports those expenses.

I might mention one other step which has been rather successful for us. This has been the establishment of several of our corporate service departments on a "quasi-profit center" basis. Such areas as advertising,



## DETERMINING COST EFFECTIVENESS OF PROCEDURES D627

data processing, printing, stenographic services, and photocopy charge their customer departments for the services which they provide, using a set of unit prices which are established annually. This enables the customers to determine in advance the cost of a job to them and to compare this service with outside competition. Several of the service departments have found the "bottom line" an effective discipline in managing their affairs.

On the subject of what can be expected in the way of cost reductions, the current inflationary environment and psychology tend to lead us in the other direction, toward continuing and substantial cost increases. There are, however, some trends which might result in cost reductions. They include the following:

1. Continuing emphasis on consumerism. Consumerism is likely to result in higher expenses in the short term, as we respond to the various demands placed on us. However, I would think that the longer-term implications are that we must be responsive to these demands and seek more effective and efficient ways of serving our policyholders. If we are successful, improved persistency could more than offset any expense increases.
2. Horizontal economies of scale. As many of our companies grow in the number of financial services they offer, we may experience some economies of scale through the horizontal integration of these services.
3. Increased sophistication of management techniques. It is probably fair to say that our industry has not been notorious for being one of the better-managed businesses in our countries. I think it is likely that our companies present more fertile ground for improvements in expense management than do many of our manufacturing counterparts.

With respect to whether we must consider inflation directly in our premium loadings, I would respond in the affirmative. Simply as an exercise, we took a look at what 10 per cent annual inflation would do to a typical individual policy which we issue. The effect was to decrease the internal rate of return by about 10 per cent, placing that measure at a totally unacceptable level. While a 10 per cent annual rate of inflation is probably greater than most of us have been experiencing, nonetheless the impact of inflation on profitability can be substantial.

Historically, the increase in our unit expenses has been at least offset by the rise in interest rates. However, many of us are now assuming interest rates in our pricing which are at record levels. Unless we expect interest rates to continue to rise over the longer term—a possibility which has other very significant ramifications—I submit that we must consider inflation directly in our premium loadings. At my company we do assume a specific rate of inflation in our pricing and keep close watch on how well this assumption is borne out in practice.



## ACTUARIAL RESEARCH

1. What is actuarial research, and why is it needed?
2. How does an individual go about doing research, and what is the incentive for such activity?
3. What steps have been taken or should be initiated by the Society in order to foster actuarial research?
4. What are some of the principal areas of actuarial research? What are the nature and extent of research activities in those areas? In what areas should additional actuarial research be undertaken, and, specifically, what are some of the problems to which actuarial research should be applied?
5. What techniques have been used or could be used in carrying out actuarial research?
6. What are the various means for communicating research ideas, and how satisfactory are these means? Should additional resources be provided to facilitate the communication of actuarial research?
7. What liaison is maintained with (a) actuarial research in other actuarial organizations and (b) research of interest to actuaries that is developed through nonactuarial organizations? What should be done about strengthening such liaison?

CHAIRMAN JOHN A. MEREU: This session on actuarial research is sponsored by the Committee on Research. We shall be examining research, an important aspect of our professional life, to see where we are now and the direction in which we should be heading. I like to think of each generation of a profession as inheriting a pool of knowledge which it, in turn, passes on to the next generation. Research is the activity carried out either to keep the pool relevant to a changing world or to expand the pool. The importance of the activity should not be underestimated, because the nature of the pool determines the role to be played by the profession.

In a letter to the committee shortly before his death, Gordon Shellard observed that it was difficult to get people excited about sponsoring research until the emergence of a crisis, but by then the research effort could be too late to help.

MR. DALE E. LAMPS: I submit that there are three dimensions to actuarial research. The first is emphasis on technique; at one extreme heavy emphasis is on development of new actuarial techniques, and at the other emphasis is on research using established techniques to derive

new facts or update old ones. The second is practicality; at one extreme minimum emphasis is on immediate practical business considerations, while at the other total emphasis is on immediate practical business considerations. The third is communicability, with full communicability at one extreme, represented by research published in the *Transactions*, and minimum communicability at the other, with communications of only a vague and general nature. This is represented by proprietary research which is too valuable to publish or is of no real use to anyone else. Between these two extremes in communicability is an important category of moderate communicability, which is characterized by research which will be exchanged privately and only in return for dollars. For example, we have software available for purchase from consulting firms.

Practical men are most interested in research which I will call "Type A" research. In terms of the dimension of technique, this is characterized by a minimum of time and effort in developing new theories and techniques; in the practicality dimension, there must be a well-defined and practical goal; in the communicability dimension, the research will be tailored to the peculiarities of the company systems and the company way of doing business, thus minimizing communicability.

The opposite of the Type A research favored by practical men is what I will call "Type E" research. It is characterized by heavy emphasis on development of new techniques; it is not characterized by any strong emphasis on practical results that are clearly apparent; it is publishable and communicable, even though at times many of us may find it incomprehensible.

Type E research is what the Society of Actuaries, as a whole, should be concerned about; this is where principles and techniques having long-range impact are most likely to originate. Such research is an endangered species because the future benefits are not clearly visible; practical men have in their sights the more concrete future benefits of Type A research.

What can the Society of Actuaries do to foster Type E research? I am afraid that the Society of Actuaries, as currently structured, is somewhat helpless to do anything substantial to foster specific research efforts. The Society has the critical function of publishing the results of research in the *Transactions* and, more recently, in the *Actuarial Research Clearing House*. But this merely is dissemination of research; these publications provide a medium through which research is communicated and provide a forum for broadly based discussion. The Society of Actuaries can focus some attention of the membership on the general need for research; it does this through the efforts of the Com-

mittee on Research, and more particularly through the Annual Research Conference and through panel discussions such as this. Beyond that there is the proposal that the Society become involved in establishing a foundation for actuarial research.

On a broader scale, what can members of the Society do to foster Type E research? Some basic problems confront actuaries in doing Type E research. Actuaries working for insurance companies or other private firms have their jobs defined, relating directly to company profits or the needs of their clients. How often does a job definition include any real commitment to support actuarial research? The defined jobs necessarily will come first, and any Type E research will be a spare-time occupation if it occurs at all.

Under these conditions, how can Type E research occur in the insurance industry? The research initiative might be taken by an actuary who will fall into either of two categories. The first category consists of younger actuaries, the second of older actuaries.

The younger actuary who might want to do Type E research has some basic difficulties. Being younger, he has a low ranking in his company. His time is planned—or at least controlled—by his superior, so that he has very little flexibility. Of these younger actuaries who have real research capabilities, many may not have had any opportunity for Type E research. Others with the necessary talents may have thought about it but, before they became deeply interested or well under way, discarded it for lack of time. Of all those capable of Type E research, very few will have the drive and find conditions suitable for making real progress.

The older actuary, on the other hand, has a higher rank, with a certain degree of liberty in allocating his own time. However, he is very unlikely to do much worthwhile Type E research unless he had a good start at it years ago, when he was young. This fact has implications for the production of research in the future: the older actuaries of the future will not be productive unless they obtain a good start now, while they are still young. This is the key—we must generate young Type E researchers. Some of the difficulties faced by the younger actuaries must be dealt with.

Can something be done to improve our situation? We have to remember that a young Type E researcher cannot be created by taking someone and cramming research down his throat. But if we can find a person who has the right potential, all he needs really is a little encouragement and the right environment to become a productive and imaginative researcher. Once he is under way, a true Type E researcher will need only

marginal help. He needs an initial push, he needs some encouragement, he may need a few hours from a typist; but he will not need a big title or a big salary. In fact, if he had a big title or a big salary, he would probably lose his direction in trying too hard to justify that title or salary.

What exactly can a company do to encourage Type E research activity in its younger actuaries? I submit that a company—every company—can do something to improve the situation without a substantial outlay of money or resources. One of the senior actuaries of the company—preferably one who already has a strong research orientation—should accept enthusiastically the responsibility to search constantly the actuarial staff of his company for people with an interest in, and a capacity for, research. For example, an important first step might be personal interviews every few months to determine general ability and to obtain a fairly direct response to questions on research. One technique you might try is to open a *Society Year Book* to the section on committees and ask the actuarial student to name three or four committees he would like to be a member of, together with his reasons. If he names the Committee on Research, and gives some good reasons, that may be a clue that you have a person interested in research. The key here is that the responsibility for developing new research talent in young actuaries *rests with the older actuaries*, particularly those interested in research. They are the ones who must make the effort; they cannot rely on the Society of Actuaries, they cannot rely on the senior management in their company to do it—they *must do it themselves*.

What happens when the individual with some possible research potential is located? Once located, he must be treated, figuratively, as a wildflower in the woods. Do not smother him with fertilizer, do not give him a lot of water, do not put him out into the sunshine; put him into an environment where he will be comfortable, where he will not be stimulated in the wrong ways, where he will be allowed to think his own thoughts with some very minor direction from the outside. His primary need, initially, will be some stimulation. If he is already interested in research in general, he must still become interested in specific topics for research. The best source I can think of for general stimulation is the Annual Research Conference, sponsored by the Committee on Research. This is stimulating not only from the point of view of the material presented but because the people who attend these conferences are extremely stimulating and there is a healthy and active working environment. Other sources of ideas and activities which will stimulate him are papers published in the *Transactions*, *ARCH*, and other in-

surance and statistics journals. A secondary need is some time—not a great amount of time, just some time. Once he gets started, if he is really interested, he will make his own time. He might need some support and encouragement in his work and efforts, and he may need some access to data processing facilities. A researcher does not necessarily require a large allocation of resources or support from a foundation. His fundamental need, I think, is a normal sense of security in his regular job plus some tactful encouragement and direction in his specific efforts.

Obviously I am not talking about how to get more research out of the actuaries that we now have. I am talking about how we can help create more actuaries who will do Type E research in the future. All my comments are based on the idea that a true Type E researcher in fundamental actuarial mathematics is very rare. However, when he is discovered and properly stimulated, he will be self-propelled. Once he is well oriented and begins to move, he will continue on his own.

Up to now I have talked about the need to develop a special kind of research talent. I would like to turn briefly to another problem with research. Before we can learn and benefit from the results of new research, two events must occur: (1) the research must be done, and (2) the results of the research must be disseminated. A major problem is that the results of a great deal of the good research that is going on are not being published. Research into new techniques is very often proprietary and for that reason is not published; it tends to be based heavily on proprietary computer programs or systems. One could name any large company represented in this room, and probably it would have a proprietary model office which is very sophisticated. Much research went into it, but few of the details have gone outside their office. Unfortunately, the techniques these companies have developed in their proprietary efforts, even if they could be published, would tend to be usable for one company only. Is there some way of generalizing and publishing these research efforts to make them useful to the industry? The research can be of maximum value to the industry only if it is published in a usable form. Perhaps that should be one of the goals of our efforts to generate more research—not only to stimulate research; but also to stimulate the publication of research results.

Are we heading toward an era of research that is totally proprietary and in which only vague suggestions of general concepts are exchanged among actuaries? It seems to me that this is a question for the large companies; they have the large actuarial staffs and the profit margins of mature business to support their research.

Let me summarize by saying that the outlook is not impossibly bleak;

we do not need a vast new effort. What we do need is an increased consciousness of the needs for research, an increased consciousness of what we have to do in order to find and develop new research talent. Finally, we should be aware of how much of the research we are doing is owned and of no use to anyone outside the world defined by the employer. Would it not be beneficial both to the researcher and to the company supporting the research if intentionally the effort were made more general and publishable? Any research effort that is more generalized will be more flexible and more valuable to its creator, as well as being publishable, stimulating, and informative to the rest of the industry.

DR. JAMES C. HICKMAN: I am a pedagogue—a harmless teacher who is a pedant. For what are probably good and sufficient reasons, practical men have always been a bit suspicious of pedagogues and their rather intangible contributions to the common good. There are few more delightful statements of this feeling than in Washington Irving's description of Sleepy Hollow's schoolmaster, Ichabod Crane. Concerning Crane's employment, Irving wrote: "Thus by little makeshifts in that ingenious way which is commonly denominated 'by hook and by crook,' the worthy pedagogue got on tolerably enough, and was thought, by all who understood nothing of the labor of headwork, to have a wonderfully easy life of it."

In spite of this attitude toward my employment, I cannot shake my heritage, and my contribution to this concurrent session will be stated in pedantic fashion. My thesis may be organized as three propositions:

1. The Society of Actuaries is devoted in part to the advancement of actuarial *science*.
2. Research—the generation of new ideas and the incorporation of new ideas into actuarial practice—is essential to the continued vitality of the actuarial profession.
3. The attainment of the needed flow of new ideas will require a broadly based effort.

Before attempting to establish these three propositions, it appears to be wise to say a few words about the definition of research. Research is now a "buzz" word. Everyone wants to say that he is doing it. At times it appears that some would like to label a casual stroll through a library as "research activity." Unless we spend a moment in making a distinction between research and education and between research and development, our discussion will lack precision.

The difference between research and education is one of degree. Research involves the creation and dissemination of ideas that have previ-



ously been perceived by a few. Education involves transmitting ideas previously more widely known. Development involves taking research ideas and constructing the machinery or institutions needed to employ the ideas in practical affairs. Obviously the three activities, research, education, and development, are interrelated, as any experienced university official or industrial research director knows. Yet to promote clarity of thought, the distinctions among them should be recognized.

I believe that it is easy to support the first two of my propositions. There is constitutional support for the proposition that the Society of Actuaries is in part devoted to scientific advancement. Within Article II of the Constitution of the Society of Actuaries it is stated, "Its objects are to advance the knowledge of actuarial science. . . ." The second proposition, concerning the importance of new ideas, is almost self-evident. The dynamic nature of the North American society and economy and the importance of new ideas in other professions such as engineering, medicine, and pharmacy would seem to argue against the notion that actuarial science can remain singularly devoted to the computation of present expected values of streams of future uncertain payments using rudimentary ideas from probability, statistics, and compound interest.

The third proposition, concerning the necessity for a broadly based research program, may be supported by examining the shifting nature of actuarial employment and the broadened scope of papers published in the world's technical actuarial journals. Perhaps a few examples will reinforce this point.

1. The development of equity-based life insurance and annuity products has brought some actuaries into direct contact with current research in finance.
2. Present-day interest in catastrophic insurance has made some actuaries aware of the theory of extreme-value statistics.
3. The development of comprehensive corporate models has made actuaries practitioners of advanced simulation techniques.

Support for the third proposition may be derived also by examining the diverse research tools used by actuaries. Some actuarial research involves the establishment of theorems using methods shared with mathematics. Other actuarial research projects involve the collection and analysis of numerical data. These activities employ methods also used within the social sciences. Yet other actuarial research projects require the methods of legal and historical research.

If I have succeeded in persuading you to accept my three propositions, I contend that you will also be led to support an expanded program by the Society of Actuaries to promote the creation and dissemination of

new ideas. Let me briefly illustrate the possible elements of such a program.

1. Research on the fundamental mathematical basis of actuarial science will be made by individual actuaries. The support for this research will come primarily from employers, who must be made aware of the necessity to free talented people for this type of work. Modest research grants might at times be made by the actuarial education and research foundation (under consideration by a special Society of Actuaries committee) to encourage this type of activity.
2. Some research topics may involve more analysis of data, and, although such topics might transcend the interest of a single employer, they would be directly relevant to the insurance and pension industries. Such research might be done by teams of actuaries and possibly other experts organized on a task force basis and supported by industry contributions channeled through the proposed actuarial research foundation. Specific topics that might fall within this class include the following:
  - a) Reviewing the results of clinical trials done in medical research for their relevance to life insurance selection.
  - b) Studying the impact of demographic change on private insurance and pension systems.
  - c) Dealing with technical actuarial problems involved in financial accounting systems.
  - d) Developing methods—tabular, graphic, and verbal—for communicating in a meaningful fashion, to potential customers of insurance products and the general public, the results of actuarial projections.
3. There are other research problems within the perimeter of actuarial science that are of public concern and go beyond the interests of traditional employers of actuaries. Such problems might be considered by task forces of actuaries and other experts supported by government and foundation grants through the proposed actuarial research foundation. The following are examples:
  - a) The impact of social security and welfare systems on private insurance systems and on individual savings.
  - b) Economic impact of pension regulation on savings within the private economy.
  - c) Funding requirements for public employees' welfare systems.

Without a steady flow of new ideas, and supporting data, our profession will respond to novel problems with conventional answers, and society may well turn to other professional groups for guidance.

MR. JOSEPH C. SIBIGTROTH: In preparing for this discussion I spent a considerable amount of time looking for a definition of research which fitted my conception of what research is. I finally came up with

this one: "Careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles."

This definition is broad enough to include practically all the work that the actuary does as research. It certainly covers the area upon which I am going to concentrate my discussion, namely, the research done to solve specific problems that arise and that lead to specific decisions or programs in such areas as new products, dividend scales, underwriting rules, and the projection of the company's financial results.

One very important consideration in developing a strong research facility is the organization of the actuarial department. In a large company such as the New York Life it is important that the research activity be kept separate, to the greatest extent possible, from the line operations as well as from other day-to-day repetitive operations. We accomplish this at New York Life by concentrating our research personnel in two divisions (product development and analysis and research) in the actuarial department. These divisions consist of the actuaries, actuarial students, and college graduates who have titles such as research analyst, technical analyst, and the like. Our line operations, which involve mainly repetitive jobs, are concentrated in other divisions of the actuarial department, such as the policy forms and valuation divisions. These divisions are headed by managers who are not actuaries, but designated staff actuaries and actuarial students assist these line divisions in work areas which require actuarial expertise.

As I mentioned before, most of the actuarial research in my company is done for very practical business reasons. Our field force is probably the most important contributor of ideas which lead to changes in our products and improvements in our service to policyholders. We have an Agents Advisory Council consisting of about twenty agents who are elected each year at company sales meetings. These representatives spend a week each year in the home office reviewing some two thousand suggestions which have been submitted to them by our field force. These suggestions cover all aspects of the company's operation except the compensation of agents. At a final meeting with top company officers at the end of the week, a number of specific requests for changes are made by the council, and these suggestions have to be dealt with specifically by home office personnel. While handling these suggestions involves a great deal of time, we find this activity to be very valuable in keeping abreast of the latest thinking in the field and ideas as to how the company's operation can be improved.

Of course, we get ideas for research from other sources. Our own competitive studies lead to many changes in product and pricing. Our actu-

aries are very active in professional associations, which are a good source of new ideas. In recent months we have been bombarded by governmental regulations and changes which have forced us to do extensive research in the life and health areas just to stay in business.

To give you an idea of our research activity, I thought you might be interested in a description of one area of extensive research that we completed recently. This was the development of a loan provision for our new variable life insurance policy. This is an example of a job on which we thought we had completed our research; at one point we had concluded that a loan provision was not feasible for our variable life insurance policy and had decided that the only practical solution was a partial withdrawal provision. Under such a provision the only way a policyholder could get cash out of his policy was to surrender a part of it. We were never happy with this solution, and it took persistent research effort as well as a little luck to come up with a better answer.

During the development of our variable life policy we considered various alternatives for a loan provision: a fixed-dollar loan in the general account, a fixed-dollar loan in the separate account, and a variable loan in the separate account. (We did not spend too much time on the idea of a variable loan in the general account.)

The first possibility—a fixed-dollar loan in the general account, with a “margin” requirement in case the cash value went down—was rejected because we felt that the fixed-dollar policyholders should not be affected by having their assets invested in policy loans coming from another line of business. The situation is bad enough when loans under the fixed-dollar policies themselves depress the portfolio rate. An “invasion” from outside lines of business would be intolerable.

The second possibility—a fixed-dollar loan in the separate account, which also involves a “margin” requirement—was rejected because we felt that it would subvert the expectation of the variable life policyowner that substantially all the separate account assets would be invested in equities. We would have sold him the policy on this basis; how could we explain to him years later that a substantial portion of the variable life insurance assets were invested in this fixed-dollar medium?

The third possibility was a variable loan in the separate account. We seriously considered this approach for some time, and some companies may decide to follow it. However, we felt that it would be difficult to explain to the policyowner how his loan amount could change so rapidly up or down, that there were serious tax problems under this approach, and that we might run afoul of someone’s interpretation of the usury laws.

So this is where we were until a few months ago—resigned to the conclusion that the best we could have was a partial withdrawal provision. Then, in the early part of this year, one of our actuaries, along with other industry representatives, attended a Michigan Insurance Department hearing on the regulation of variable life insurance. We explained our reluctance to have a fixed-dollar loan in the separate account because the policy would be sold on the basis that substantially all the assets would be invested in equities. The department's reaction was to ask why we could not handle the fixed-dollar loan in such a way that it would affect only the benefits of a policy with a loan and not any other policy. In other words, the variable face amount of a policy with a loan would be adjusted in such a way that it reflected the blend of investment experience on the loan and the investment experience on the balance of the assets under the policy (if any) in the separate account. Our initial reaction was negative; the administrative problems associated with having different investment experience factors for each policy might be formidable. However, on further reflection, it appeared that this approach might be sound and practical after all. Under our variable life design, we plan to adjust the face amount of a policy on a daily basis. Thus, since we are already committed to a seriatim adjustment of face amounts, it might be feasible to base the adjustment on the policy's own investment experience, reflecting the portion of assets invested in loans.

There was still a great deal of research to be done before we were convinced that this kind of loan provision was sound. We had extensive tests run on the computer showing the results under a \$10,000 policy with no loan compared with those for a policy with a maximum loan taken out after a given number of years. Various levels of investment experience were assumed for the separate account, including simulations of stock market experience that fluctuated realistically around a given underlying trend. The gross loan interest rate was fixed at 5 or 6 per cent. We ran the results for the case where loan interest was paid in cash and where it was added to the loan each year. Several programmers were involved in this research project, some of whom were actuarial students.

Our extensive tests convinced us that it was feasible under this approach to use generally the same limitations on loan values relative to cash values that we use in our current fixed-dollar policies. However, another complication was introduced: the New York Insurance Department felt that if the variable face amount of a policy with a loan becomes less than it would have been if there had been no loan, the

policyowner should be given the option of increasing the face amount to the higher amount. This would involve an appropriate premium payment by the policyowner and evidence of insurability under certain circumstances. This seemed to be a reasonable provision, and we were off and running again on our computer. The proposed option added a new dimension to the problem and raised questions such as, "What happens if the policyowner pays the option amount by means of an additional policy loan, so that he has no cash outlay, as opposed to a cash payment of the option amount?" and "How do results compare if the policyowner pays the option amount in cash instead of using the same cash outlay to reduce the loan?" We had to answer these and other questions using various assumed investment experience for the separate account, assuming policy loan interest paid in cash or added to the loan, and so on. Without the rapid production of results we were able to obtain from the computer, we might still be working on this problem.

There is no doubt in our minds that the new loan provision is a big improvement over our first solution—the partial withdrawal provision—and it should be an important asset in the attractiveness of our valuable life insurance policy in the marketplace.

I will turn now to some general observations on research. I think it is important not to overuse the term "research." It may suggest to top management that a lot of time is being spent on nonproductive "pie in the sky" activities. In this connection it is very important to promote the research activity continually and keep top management informed constantly on the benefits to the company resulting from research.

As a second observation, in any research activity there is a need for the cross-fertilization of ideas. We accomplish this within the department by rotating technical people into different areas at periodic intervals. We also maintain close contact with other areas in the company—marketing, investment, legal, and public relations. In addition, we participate actively in industry activities.

As a third observation, I would like to stress the need in research for a proper balance between the practical and the theoretical in checking on a research activity. We have had a number of experiences, particularly in the product area, where we have developed what appeared to be an excellent product, only to have it fail because it proved to be too complicated. We have found, much to our sorrow in some cases, that if an agent does not understand a product, he will not make any effort to sell it.

As a final observation, I would like to make the point that the research activity appears to be more important than ever at the present time. The

business is becoming more complicated. State and federal governments continually are proposing regulations which require substantial changes in product lines and methods of doing business. There is no doubt that the tempo of research activities in the life insurance business will continue to increase.

MR. RUSSELL M. COLLINS, JR.: I would like to approach the subject of actuarial research from two points of view: first, as a member of the Committee on Research and, second, as a life insurance company executive. Putting on my first hat, I would like to review briefly the activities of the Committee on Research. This committee was organized in 1964 for the purpose of accomplishing the objectives implied in the questions on the agenda of this discussion. I quote the *1973 Year Book* on the Committee on Research:

This committee develops continuing education and research activities within its area of interest, including literature search and revelation, encouragement of new literature, and the planning of appropriate seminars and meetings.

The Committee fosters research and maintains contact with current thinking in (a) the theory of risks, (b) the application of various operations research techniques, (c) new methods of statistical analysis, and (d) such other scientific disciplines as may lead to new and better methods of performing the work of the actuary. It maintains liaison with the Conference Board of Mathematical Science, the Operations Research Society of America, and the Committee of Presidents of Statistical Societies.

In the area of literature research and revelation the committee provides reading lists on subjects within its area of interest, arranged by topic. Examples of topics are operations research, multivariate analysis, simulation, Bayesian statistics, and several others.

In order to encourage new literature and research by actuaries, the Committee inaugurated *ARCH*, an informal research publication, in 1972. Unlike most professional journals, *ARCH* has as its primary goal the speedy dissemination of current thinking and aids to research rather than the publication of thoroughly edited and polished papers. It is intended as a means for the sharing among actuaries of current research, quickly and informally. It also acts as a clearinghouse for such things as items embodied in letters between researchers, useful computer programs, and translations of appropriate material from foreign languages. To avoid typesetting and printing costs, the format is a Xeroxed reproduction of individual items with a covering index for each issue and an editorial page. Since the material is unbound, the subscribers can file

material according to individual preference. *ARCH* is distributed on a nonperiodical basis at such times as sufficient material has been collected for publication. Editing is held to a minimum. The service is provided to subscribers at cost.

The following are examples of subjects on which papers have appeared in *ARCH*:

- “Accumulation of Risk in Life Assurance” (translated from German)
- “The Solvency Problem in Term Life Insurance” (translated from German)
- “Asset Shares and Anderson’s Method”
- “Statistical Treatment of Round-off Error”
- “Direct-Dial or Person-to-Person” (a short paper on a decision which we all make many times)
- “Insurance Sales Forecasting”
- “Forecasting Canadian Stock Price Movements”
- “Relevance to Actuaries of Research on Long Term Interest Rates”
- “Risk Theory”

This new publication has been very successful. Currently there are 287 subscribers to *ARCH*, 67 of whom reside outside the United States, and the number of subscribers is growing rapidly.

In the area of seminars and meetings, the Committee on Research inaugurated annual research conferences in 1966. So far, seven such conferences have been held, with another one scheduled next month. They are sponsored jointly with the Casualty Actuarial Society and various institutions (primarily universities) at which the conferences have been held. These conferences have been very successful in providing actuaries with a forum in which they can interact with each other and with other professionals working in areas closely related to actuarial science, and also in helping actuaries learn how to apply these disciplines to actuarial problems. Conferences have been held at the University of Michigan, Yale University, Duke University, New England Mutual Life, the Wharton School of Finance and Commerce, the University of Wisconsin, the University of Waterloo, and one will be held next month at Harvard.

Topics for the conferences have been the following:

1. Risk Theory and Multivariate Analysis
2. Mathematical and Statistical Techniques Applicable to Actuarial Problems
3. Simulation
4. Analysis of Decisions under Uncertainty
5. Quantitative Methods in Management
6. Capitalization of Risk Ventures
7. Time Series Analysis and Actuarial Applications
8. Demographic Projections and Related Actuarial Topics (next month)



Speakers at these conferences have included Leonard Savage, Martin Shubick, Sidney Benjamin, John Hogan, Tom Naylor, Howard Raiffa, Robert Schlaifer, Karl Borch, Russell Ackoff, Julius Aronofsky, and Bernard Benjamin, to mention only a few.

The committee has sponsored several sessions at meetings of the Society of Actuaries; for example, at two of the spring meetings this year the committee sponsored a concurrent session on "Time Series Analysis and Forecasting." The committee has also made presentations at meetings of other professional societies, including the American Statistical Association.

Liaison has been maintained with the groups mentioned in the *Year Book* as well as with the Casualty Actuarial Society, through such means as the joint sponsorship of the research conferences and the Joint Committee on the Theory of Risk. Some members of the committee are also members of other research-oriented groups. More activities of this type would strengthen the Society's relationships with other groups.

What additional things should the committee be doing? Two suggestions have been made:

1. Sponsor textbooks or monographs on research subjects within the committee's area of interest.
2. Co-operate with other Society committees to sponsor literature or seminars and meetings on appropriate subjects. For example, the Committee on Research and the Committee on Computer Science might sponsor a meeting on the impact of the computer on the actuary, or the Committee on Research and the Committee on Economics and Finance might sponsor a meeting on econometric models and models of the firm.

Undoubtedly there are other activities which would be valuable. If you have any ideas on how the Committee on Research could be of more help to actuaries, the committee would like to have them; we hope that some ideas will come out in the discussion.

Now I would like to put on the hat of a life insurance executive. He might very possibly look at the subject this way:

I need to be sold on the merits of spending hard-earned dollars on actuarial research, especially in a period of inflation and rising costs, increasing competition, and pressures on profits.

I am running a business and am concerned not so much with the problems of the actuarial profession as with the problems of assuring the success of my enterprise.

I can't seem to find the time to attend Society research conferences to explore for myself to find ways in which actuarial research can help me.

So you actuaries are going to have to explain to me why I should support actuarial research, and, by the way, I hope it won't take you too long.

Despite how we may feel about these statements, I submit that these are the realities of the situation in today's fast-moving, high-pressure environment. So what do we do? I have a few suggestions—no panacea, but a few things that have worked for me.

1. We make the effort to acquire the knowledge (most of which is not covered by the examinations) which will enable us to answer these questions for ourselves. We acquire this knowledge through attendance at research conferences, reading, or whatever means may work the best for us.
2. We acquire the tools (also for the most part not covered by the examinations) which equip us to use this knowledge to solve some of our company's problems.
3. Recalling the old adage "Actions speak louder than words," we demonstrate through action how research can help us to do a better job for our company, whether it be in pricing variable life insurance, in determining group insurance contingency reserves, or in carrying out other tasks at hand.
4. We communicate what we have done to our management. In some cases we might explain how additional actuarial research could enable us to do an even better job and thereby demonstrate why our company should support such research.

Incidentally, the Society of Actuaries, through its Committee on Actuarial Education and Research Foundation, is in the process of investigating what more might be done specifically in the way of actuarial research and methods of obtaining funds for such research.

As I say, all this is nothing new. This procedure has been repeated over and over again by countless actuaries. Indeed, much of our research has been done by company actuaries, and much of that has been done in connection with work on company projects. I would like to give a few examples of actuarial research that has been and can be useful to company actuaries.

1. Forecasting is an increasingly important and difficult actuarial task. There is a great deal of research material available on corporate modeling and simulation—some of it developed through insurance industry groups, and in particular by actuaries.
2. The development of measures and tests of insurance company solvency is attracting an increasing amount of attention these days. Insurance regulators are involved currently in attempting to develop an "early warning system" for insurance company insolvencies. Much of the risk-theory analysis contained in actuarial literature both here and abroad would appear to be applicable to this problem.
3. The pricing of our products is becoming an increasingly complex task.

Actuaries can no longer settle for conservative calculations based on expected values. Catastrophe-type coverages, such as stop-loss reinsurance and airline liability insurance (which a few life insurance companies are offering now), require the use of methods grounded in risk theory and/or simulation. Pricing and reserving for variable life insurance involve us in stock market analysis and consideration of the financial effects of variations from assumptions.

4. The Joint Committee on the Theory of Risk has been hard at work developing actuarial methods for determining the "margins for adverse fluctuations" in GAAP accounting for life insurance.

As our world becomes more complex, we need additional tools more advanced than those that have served us so well in the past if we are to continue to practice our profession in a competent manner. Actuarial research coupled with research in related disciplines can provide us with these tools.

DR. HICKMAN: Gordon Shellard made an enormous contribution to the research thrust of the Society. He was our entry point into operations research. In his final letter to me, he made the point that the excuse we often give for not doing research is time pressure; the problems that require research efforts suddenly loom upon us, and we lack time for sophisticated research. He himself hinted at the answer. Often such developments should not be unexpected. We live and operate in an industry and a profession that serve people, and certain fundamental demographic facts define our problems. These facts do not change overnight. There is plenty of evidence as to what are the developing problems, but we have to be perceptive enough to recognize them.

MRS. ANNA MARIA RAPPAPORT: I have a suggestion for a future research committee conference. Russ talked about the company viewpoint from the management end. How about having a conference to assist the research actuary in dealing with management and the managing of his research? I believe that such a conference could assist the actuary in dealing with the following types of questions:

1. How to identify problems on which profitable research can be conducted.
2. How to select techniques for the particular project.
3. How to prepare a proposal to sell the project to management.
4. How to present the results in such a way that they will be utilized effectively by the companies.

The research-oriented actuary working in a company is faced with these problems, and often he may lack sophistication in dealing with manage-

ment. Such a conference would be designed to assist this type of actuary in being more effective in doing his job.

**CHAIRMAN MEREU:** The Institute of Actuaries promotes research among new Fellows by assigning to them projects which have been suggested by company presidents. They have some research grant money available for this purpose, if required.

**MR. RICHARD A. BURR:** I would like to be able to apply probabilistic theories to pensions and pension funding. At the present time we are using deterministic models, but our clients may want more realistic methods.

**DR. HICKMAN:** We know that the degree of precision with which we can measure factors entering pension calculations varies widely from case to case. The questions of how to carry the degree of uncertainty of each of the factors through the calculations and how to communicate the results to the client are still open. One answer is to do as Robert Myers has suggested and perform a range analysis. I hope that one day we can improve on that.

The next generation of managers should be familiar with the measurement of uncertainty on a 0–1 scale, and, if we can elicit from these managers the degree of uncertainty they attach to the assumptions they have suggested, these can be carried through the calculations. We will report the mean or the mode of the resultant numbers, and the distribution will also be available to give us an idea of the degree of certainty which we can attach to the results. We are unable to do this today, not for technical reasons but because the people who must assimilate this information are not ready for it.

The real world is impossibly complex. We perceive only a small part of it, and any perception we have is but a crude approximation to it. For example, the life contingencies model with which most actuaries grew up captures part of the real-world situation but is a gross simplification of the truth.

**MR. WILLIAM H. SCHMIDT:** The Institute of Actuaries has three routes to Fellowship, one of which is based on statistics. Has the Society given any consideration to a similar route?

**MR. PETER W. PLUMLEY:** This has been given some consideration. I believe that it might be more appropriate at the Associateship level.

MR. LAMPS: I know of several companies which offer an alternate route to high salaries and prestige. A top researcher does not need to become a manager. He can concentrate on his research, and, if he performs well, and effectively, he can reach a high degree of independence, with some small degree of direction from top management. I believe that the same concept could be applied profitably to our own profession.

DR. CECIL J. NESBITT: I would like to review briefly the questions before the panel and the panelists' comments thereon. In answer to the first question, actuarial research was variously defined as the generation of new ideas and their incorporation into actuarial practice; a careful, systematic investigation into some field of knowledge; and (by Dale Lamps) as a range extending from Type A research to his Type E research. I would argue against too absolute a separation of Type A and Type E research, since each can encourage and stimulate the other.

How an individual goes about doing research is not easy to say. As Dale indicated, the researcher may visualize and adopt new goals, or he may become excited about an idea and follow where it leads. Systematic group effort should not be ignored; such effort put men on the moon—although there were strokes of individual genius, such as some of the concepts for the lunar lander.

To the panelists' remarks on what steps the Society has taken or should take to initiate research, I would like to add that the Society should devote effort to defining actuarial problems and research goals. This may come about naturally if an actuarial education and research foundation is established.

Areas for current and potential actuarial research have been indicated by various speakers in the session. I will add two remarks: (1) The continuous mortality and morbidity studies are important areas of actuarial research, and I am glad to hear of the possibility of continuous studies of impaired lives. There is need for more study of the mortality of the aged and of mortality and morbidity under various systems of health services. (2) The continuous adjustment of actuarial models to experience, through gain and loss analysis, is one of the hallmarks of our applied science and is receiving increasing attention.

James Hickman, on the basis of his academic background, and Joseph Sibigroth, in terms of a specific and practical research problem, have indicated some of the techniques for actuarial research. Russell Collins has outlined various means for communicating such research. In regard to liaison, it may be added that the Society co-operates with the Casualty Actuarial Society in arranging research conferences and in the work

of the Joint Committee on Theory of Risk. The Committee on Research maintains liaison with the Committee of Presidents of Statistical Societies, the Conference Board of Mathematical Science, and the Operations Research Society of America, although through some inadvertence the *1973 Year Book* did not designate our representatives with these responsibilities.

The present time offers an unusual opportunity to develop some of Dale Lamp's Type E researchers, but I would not want to see them become isolated from practical actuarial developments.