

**ALTERNATIVES IN VARIABLE ANNUITY
BENEFIT DESIGN**

JOHN H. BIGGS

ABSTRACT

This paper discusses alternatives open to an actuary in the writing of a variable annuity contract. The alternatives are discussed in the following five sections.

1. Basic preliminary decisions are reviewed, including the relationships between variable and fixed benefits, premium arrangements, valuation periods, and means of expense assessment.
2. Benefits prior to retirement are discussed, including the methods of describing ownership in separate accounts, possible nonforfeiture and policy loan benefits, investment election alternatives, and the opportunities and problems in supplemental benefits.
3. Benefits after retirement involve questions on the appropriate expression of the annuity unit, the baffling problems of the assumed interest rate (for which the author suggests one solution which uses a participating and increasing fixed annuity unit), and certain settlement option provisions.
4. Options on the nature and level of guarantees and how actual experience can be reflected under variable annuity contracts are then described.
5. Some general accounting choices involving allocation of expenses and valuation of assets for separate accounts are described in the last section.

INTRODUCTION

The purpose of this paper is to survey the design alternatives in variable annuity contracts offered by insurance companies. Such an undertaking runs a risk of rapid obsolescence; the federal and state regulators are still in the process of creating their framework, and each month brings to the market place another actuary's idea of good variable annuity design. Five years from now the variable annuity business will not be so turbulent or so interesting. For this very reason this time of rapid evolution may be the best one for this paper, since there is hope that a detailed description of current patterns will produce a better understanding among actuaries of this complex financial instrument and some fresh thinking about the kinds of benefits which will best serve our public.

A secondary motivation for this paper is one actuary's frustration in finding relatively little written on his profession's special domain within

the variable annuity development.¹ In contrast, we are all aware of the vast outpouring of papers and opinions on the legal and marketing questions.

An attempt has been made to attain generality to the greatest degree possible between variable annuities for qualified pension plans—whether corporate, H.R. 10, or “tax sheltered” annuities—and nonqualified plans and between those based on individual contracts and group contracts.

In many places in the paper observations are made about “most common” and “prevailing” practices. These observations are not the result of any scientific or complete survey of company practices; they come rather from the author’s experience in reading the existing literature on variable annuities and a number of companies’ contracts. The many actuaries who have taken on a new-product design project and have “read everything they can get their hands on” will understand the character and limitations of this experience. Hopefully, discussants of this paper will produce a rounding-out of its prevailing practices aspect.

PRELIMINARY DECISIONS

Relation to fixed-dollar contract.—Many purchasers of variable annuities will want to balance their equity benefits with benefits funded by fixed-dollar investments. Should these benefits be incorporated into one contract with the variable benefits or provided separately? The separate approach is appealing, since it permits the use of existing fixed-dollar products and since it clearly isolates the regulatory responsibility. This separate approach, however, presents many potential conflicts. If sales compensation to the agent varies between the two contracts, an unfair demand is placed on the agent’s objectivity. Assumptions as to interest and mortality underlying the initial payments under the two contracts are more likely to be in conflict than they would be under one contract which co-ordinates the two sets of assumptions. Such a conflict might create a difficult explanation to the annuitant of the apparent discrepancy. In any event, such a difference, even if understood, forces upon him an almost impossible economic decision. As a result, most “variable annuity” contracts that have been offered are really “annuity” contracts with choices within as to allocation to a separate account (a “variable” accumulation or

¹ Two important recent exceptions to this are Harry Walker’s authoritative paper “Actuarial Aspects of State Regulation of Individual Variable Annuities” (*TSA*, XX, 437) and Paul A. Campbell’s comprehensive book *The Variable Annuity, Its Development, Its Environment, and Its Future* (Hartford, Conn.: Connecticut General Life Insurance Company, 1969). An earlier text was coauthored by George Johnson and Donald S. Grubbs, *The Variable Annuity* (Indianapolis: The Research and Review Service of America, 1967).

annuity) and to the company's general account (a "fixed" accumulation or annuity).

Premium flexibility.—The variable annuity contract, like other purely accumulation-type contracts, does not require a rigid premium discipline. As a result, the adaptation of the grace period and reinstatement provisions, when required by states, is somewhat Procrustean, requiring a cutting and stretching of the contract to fit the statutory pattern. Furthermore, many pension plans require broad flexibility in premium payments, with special nine- and ten-month premium modes within each year, with so-called stop-and-go provisions permitting temporary premium suspension and with convenient rules for increasing or decreasing payments without issuing new or canceling old contracts. Complete flexibility leads to two difficulties. First, the conventional higher compensation to the agent in the first year than in renewal years is awkward when a series of precisely determined premiums is not defined. Second, the insurer needs to limit the amount of money that can come in on one set of guarantees, unless those guarantees are so conservative as to permit a totally open-ended commitment to accept money—as is true with the typical mutual fund, which has virtually no performance guarantees.

The usual and ingenious answer to the above problems is to write premium provisions which *appear* on the contract schedule page to be quite similar to a conventional insurance contract. Other provisions then provide almost total flexibility, such as (1) "receipt of an increased or decreased premium shall constitute change in the premium stated on the schedule page" or (2) "this policy shall be reinstated upon payment of a premium." And the contract's "open end" is closed by specifying that the insurer need not accept in any year more than two times the first-year premium specified on the schedule page. When this method is used, first-year commissions are based on the schedule page premium, the sale is probably made on the basis of paying in the regular indicated amount, and in most cases the flexibility of the contract will never be utilized.

Other possible solutions exist. If level sales compensation is paid, there is no clear mechanical reason why any premium needs to be defined. The variable annuity would be simply an "account" during the accumulation phase, and the open end of the guarantee could be closed by stating that the insurer could change the basis of any guarantees for amounts contributed in excess of a certain aggregate amount. Of course, such an approach gives the contract no savings discipline, which may be a serious disadvantage to it from both the insurer's and the annuitant's viewpoints.

Obviously, the grace period and reinstatement provisions must careful-

ly reflect the existence of any supplemental benefits entailing an insurance risk.

Valuation period.—The time period for valuing the assets in a separate account is a management choice, at least for those pension contracts exempt from the Investment Company Act of 1940. Daily valuation of widely marketed common stocks is relatively simple and has appeal to contractholders, since they can pay whenever they wish with immediate investment of their funds. On the other hand, it may produce more speculative interest in the account and works against payment discipline, contrary to the intentions of those favoring a more structured system of premium payments. Weekly, monthly, or even quarterly valuation would seem preferred for the perhaps much more difficult asset valuation process, when assets other than widely marketed common stocks are held in the account.

Expense assessments.—There are three primary sources for assessing expenses against a variable annuity: (1) a percentage of premiums, (2) a constant expense assessment withdrawn from a premium or the contract's accumulation, and (3) a deduction from the separate account expressed as a percentage of the assets in the account.

The percentage of premiums charge can be designed to cover only commissions and sales expense, or it may provide also for the administrative costs of the contracts. Federal law limits the amount that can be charged for "sales" costs (and strong pressures presently exist to reduce this limit), and the term "sales" is stretched by some to include all other costs, including administrative. Additionally, any applicable state premium tax can be deducted as a percentage of premium. Some choice may exist as to when proceeds are considered "premium" for tax purposes—upon initial receipt by the insurance company or upon application at retirement to purchase an annuity (see below). In any event, the insurer's premium accounting procedures must be adapted not only to the job of recording the state from which a premium is received but also to that of calculating immediately the applicable tax and deducting it from the premium.

There is the same great appeal in using constant expense assessments under variable annuities as there is under other financial contracts. Constant expense assessments tend to be more accurately related to the services giving rise to expense. Regulation under the federal statutes may give one pause, however. If expense constants are used, it may be required that sales literature show illustrative results for an individual investing the minimum amount under the company's underwriting rules. This may explain in large part why mutual funds have tended not to include constants in their pricing structure and have relied on fairly high minimum requirements to prevent expense antiselection.

Under variable annuities, expense constants are easiest to express if they are deducted from premiums—such as a 50 cent charge per payment received or \$10 per year deducted from the payment received on the contract anniversary. If they are withdrawn from the contract itself, accumulation units must be cancelled, with proper allocation of the canceled units between the fixed and variable portions of the contract.

The percentage of the fund is the most significant assessment over the lifetime of a contract, since it is made each year and applies to the accumulation of all payments and all investment income credited. This percentage charge is typically used for three purposes. One part covers the investment expense incurred for selecting the separate account investments. Another part is the "risk premium" for the mortality, expense, and general contractual guarantees. The final segment is used for federal income taxes, if any, assessed directly against the investment earnings of the separate account. Several points may be of importance in choosing the amount of these percentages:

1. The amount charged for the three functions need not relate directly to the functions, and hence the critical design element is the sum of the charges. It remains to be proved that many buyers will be able to (or should even be encouraged to) distinguish between fund "investment" and "actuarial risk" charges. The division may be very important, however, if the charges enter into different phases of the federal income tax return of the company itself.

2. These two charges represent the best source of either earnings for stockholders or needed surplus accumulation. Very little margin exists in most "percentage of premium" loadings. And even a small margin in the "percentage of funds" loading produces large returns because of its great leverage.

3. The level of the risk premium should reflect the nature of the contract guarantees—the annuitant mortality table used, the extent to which the insurance company can change the guarantees, and the level of the expense guarantees.

BENEFITS PRIOR TO RETIREMENT

Definition of policyholder's values.—A policyholder's interest in a separate account prior to his retirement can be stated either as (a) a cash accumulation amount or (b) a number of retirement benefit units. The cash accumulation expression is by far the most usual one, since it is direct and simple and accommodates many kinds of benefit design. It is expressed in terms of ownership of a certain number of "accumulation units." On the other hand, the benefit unit expression works more simply for defined benefit pension plans, under which a defined number of dollars of retirement income are purchased each year for an employee. His variable annuity benefit units are found by dividing the dollars of future benefit credited in each year by the value of an annuity unit at the time of such

credit. This annuity unit reflects an assumed interest rate (see below). During his retirement the dollar amount of each income payment is found by multiplying his benefit units owned by the value of the annuity unit at the time of each payment. For a defined benefit plan this technique has the important advantage of not requiring the awkward conversion of future defined benefits to a present dollar value which can be placed in accumulation units.

The more common cash accumulation expression of a variable annuity contract depends on the accounting technique of the "accumulation unit." The variable annuity accumulation unit is normally found by a fund accounting technique; first, the investment earnings or losses for the period on the separate account are converted into a rate; second, this rate is reduced by the applicable fund percentage charge; and, third, the result is used to accumulate the unit at the end of the previous valuation period forward to the current date.²

A policyholder buys accumulation units after the percentage loading and any premium tax have been removed from his payment. The net payment is then divided by the current accumulation unit value to determine the number of units bought. His accumulated policy value or "cash value" at any time consists then of the number of units previously purchased multiplied by the then-current value of the accumulation unit. (For those contracts including a surrender charge provision this calculation would produce a "gross" cash value before imposition of the contract's surrender charge.)

Most variable annuity contracts that include fixed benefits use a parallel approach for buying fixed-dollar accumulation units within the com-

² It is interesting to observe how this *unit* accounting technique differs from the traditional mutual fund method of calculating a "net asset value." The net asset value is found by dividing the investment company total net assets at the end of any period by the number of shares outstanding at the end of that period. The "unit" has several dimensions of greater flexibility over the "net asset value." The unit method permits the writing of different types of contracts out of the same separate account, adapting the unit to the level of guarantees of the contract. Each contract type has its own unit. Thus one unit might be reduced by only an investment management charge since the underlying contract, issued to a large employer, includes no annuitant mortality guarantees and minimal expense guarantees; another unit might reflect a much larger fund charge reduction, since it is used for contracts with full annuitant mortality guarantees. Yet both units would reflect the investment experience of the same separate account. And funds arising from both series of contracts are pooled for greater diversification.

A second advantage is that the unit method creates no difficulties if insurance company surplus is carried in the separate account, since the method never requires complete allocation of all assets to the policyholders. Rather, it requires in each period a precise determination of the earnings rate on the entire separate account.

pany's general account. The determination of the applicable investment rate varies. Most contracts guarantee that the accumulation unit will grow at a guaranteed interest rate. Sometimes this is graded from a high rate in the early years to a lower rate after five or ten years. Dividends or experience-rating credits may be added by increasing the rate, adding accumulation units, or otherwise (see below).

Nonforfeiture benefits.—The blending of insurance and securities terms is difficult, at best. The compromise in defining cash surrender benefits is to include "nonforfeiture benefits" in the contract, which must satisfy state insurance statutes, and to include "redemption privileges" in the prospectus, which must satisfy federal securities statutes. The usual provisions provide for (1) an automatic "paid-up" option (or "inactive account"), subject perhaps to minimum-size requirements, (2) an option to commence annuities immediately, sometimes subject to a minimum age requirement, and (3) a cash surrender option. The federal laws, if applicable, require a prompt payment of cash if that option is elected. Surrender charges make a great deal of sense and were widely used in the initial variable annuity contracts—usually at a level of 2 per cent if surrender took place within the first two to five years. Contracts subject to the 1940 Investment Company Act may currently be severely restricted as to how this charge can be made, and as a result many contracts now being designed include no surrender charges.

Policy loans.—Many of the first nonspension variable annuity contracts have included a policy or contract "loan" provision. This seems one of the most misleading results of the insurance-securities terminology conflict. The usual variable annuity provision permits the policyholder to draw down an amount not exceeding the lesser of the current market value of his account or the amount he has paid in. The latter limitation prevents taxation of his withdrawal. He can then reapply that dollar amount at any time to repurchase new units at the accumulation unit value *as of the time of repayment*. He pays no percentage of premium charge at the time of repayment. There is, however, an "interest" charge each year, with accrual from the date the "loan" is made, at a rate of $2\frac{1}{2}$ or 3 per cent. Unpaid interest is added to the loan on each contract anniversary.

It is obvious that this is no "loan" at all, not even in the somewhat strained sense that a conventional policy loan on a life insurance policy is called a loan. A perhaps clearer expression of the "loan provision" in a variable annuity contract would be to say that the contract "permits partial withdrawal with the right reserved to buy back accumulation units at a later time at a reduced repurchase sales charge." And, with this phrasing of the provision, it is hard to see why the policyholder buying back one

year later should pay twice the "reduced repurchase sales charge" that he would have paid at the end of six months, which is the net result of defining the amount of the charge as an interest rate. A more logical approach might be to define the "reduced repurchase sales charges" as a certain percentage, say, 2 per cent, of the amount reapplied. If there is concern lest a contract remain dormant for many years with no funds in it, a time period of one or two years for such reapplication might be specified.

Some contracts convert the variable annuity loan into a conventional insurance policy loan by transferring an amount from the separate account into the general account equal to any loan being made against the separate account. The interest rate charged then compensates for the interest rate credited to such accumulations. When the loan is repaid, money is transferred back to the separate account, buying new units at the unit value on the date of repayment.

The statutes of a few states require a policy loan provision. Hopefully, this will not permanently impose on variable annuity contracts the burden of this unnecessarily complex and probably even misleading provision.

Investment elections.—There are many possible levels of flexibility that can be given the policyholder when the choice of whether his money is invested in the separate account or the general account is being made. At the most flexible extreme he could (1) place any elected percentage of each new payment in either account, (2) transfer part or all of his accumulated funds at any time from one account to the other, (3) make a choice at retirement as to the portion in guaranteed or fixed annuities, and (4) switch annuity reserves between accounts after his annuity income has begun. At the other extreme he might be limited to several permissible splits on payments into the accounts with no options thereafter to make any changes. Complete flexibility runs counter to the efforts to sell variable annuities as a retirement income medium rather than as a short-range investment or speculative savings medium. Careful retirement planning does, however, require some flexibility, and hence a good compromise is to permit any allocation desired of new payments between the two accounts and one chance at retirement to make a switch of accumulated funds between accounts. It is hard to conceive of the need to permit changing after retirement—except in the case of a planned, phased-in switching from one account to the other in order to avoid commitment of all of a retiree's funds at one market level.

Supplemental benefits.—Any kind of supplemental benefit attached to a life insurance policy could conceivably be added to a variable annuity contract. Little has been done to date, but it is safe to predict that a great

deal of exploration of such benefits will be carried out in the next few years. This paper will touch briefly on some possibilities in two such benefits—a waiver of premium upon disability benefit and a supplemental death benefit.

Disability waiver of premium benefits present several unique problems when added to a variable annuity contract. First, the great degree of premium flexibility required makes it difficult to define the benefit amount. A stated amount on the schedule page can be used, with an agreement premium in dollar amounts specified, or, alternatively, the benefit can be derived from the average of the payments into the contract for several years prior to disability. (This method must include some complicated rules for disability occurring in the early years after the contract's issue date.) The agreement premium for this latter average method could be expressed simply as a percentage of each payment into the contract itself.

Second, the contract must define very carefully how waived premiums are credited to the contract, since the contract's accumulated value will vary, depending upon the precise valuation periods in which such payments are credited. The sum of the monthly premiums waived during the disability probation period can be applied on a specified date after the receipt of proof of disability and subsequent ones can be applied on the first business day of each month. Should the disabled annuitant be permitted to make additional payments from his own funds while "waived" premiums are being added? There seems to be no reason against this, provided the total of the waived and additional payments falls within the contract's guaranteed acceptance of payments limit. (A disabled annuitant will presumably be unable to antiselect at retirement by taking advantage of a liberal mortality table.)

The supplemental death benefit in its most limited form is simply a return of premiums benefit. The basic contract's death benefit might pay the accumulated value of the contract to the beneficiary at the owner's death. The accumulated value of the basic contract could be less than the premiums paid either because the investment income credits have not yet overtaken the percentage of premium loadings withdrawn or because of a decline in the value of the separate account. The supplemental benefit could fill in this difference. This is a small benefit, so a simple premium charge for it should be used. Yet it is difficult to find such a simple basis that is at all equitable. The method of charging a percentage of the payments into the contract has been frequently used, although it does a very inadequate job of matching premium to risk. A somewhat more complex but much more equitable approach is to define a simple procedure for determining a risk amount each year, reflecting premiums paid and current

market value of the accumulation, and then charging an age-related premium for this amount.

An expanded supplemental death benefit added to a variable annuity contract may come close to providing the "life cycle" type of benefit that has received much consideration recently. The protection level for a policyholder could be stated before policy issuance—with perhaps an underwriting commitment to increase automatically or optionally that level in proportion to the subsequent rise in the consumer price index—with a term premium for each period related to the excess of the stated protection level over the then accumulated value of the variable annuity contract. Great flexibility could be given in the amount being paid into the accumulation, along with any desired flexibility in investment options between the separate and general accounts. Protection and accumulation levels could be changed without issuing new policies. In many states such a contract would be deemed to be a "variable life insurance" contract, although in reality its components are simply a variable annuity and a related conventional term benefit fluctuating in amount according to the policyholder's needs and the investment results of his variable annuity.

BENEFITS AFTER RETIREMENT

Annuity unit.—The typical accounting method for determining variable annuity benefits during the payout phase is the annuity unit. Change in the annuity unit for any period reflects the difference between the net credited rate i'' and the assumed investment rate (AIR), i' . The annuity unit at the beginning of the period is multiplied by $(1 + i'')/(1 + i')$ to obtain the value at the end of the period. Ordinarily i'' is the net investment rate found by following a formula set out in the contract, reflecting (a) all investment income on a separate account, including realized and unrealized capital gains, and (b) any charges for investment management and business risks. It can also be defined for fixed annuities as a declared, current rate on the insurance company's general account, or a rate guaranteed in the contract for a few years into the future, or even as the rate produced if certain changes in an external index should occur—say, the consumer price index or a stock exchange index, with the insurance company in effect guaranteeing at least to meet the external index's result. The AIR is the rate used to determine the initial payment and the pattern of subsequent payments; a low AIR tends to produce an increasing schedule of payments, a high one a decreasing series. In the case of a plan with the benefit already defined, the AIR determines the "cost" to fund the benefit; thus the value of the future payments is determined not only by the benefit but by the AIR.

Annuity benefits are determined by converting the initial benefit payable into a number of annuity units; this number of units is then held constant into the future with payments determined by multiplying the number of units by the annuity unit value applicable to the day on which the payment is to be made.

The actuary has several objectives in writing the formula for the annuity unit. First, a practical check-writing process requires the availability of a calculated annuity unit at least a few days in advance of the date to which it is applicable. Second, the formula should provide as much stability in the value as is compatible with the third objective, that of making the annuity payments responsive to the changing values of the underlying investments.

Two methods for achieving the last two objectives have been used. The first is the averaging of the annuity units over a number of valuation periods for either several weeks or a month. This removes instability due to daily fluctuations in the values of the investments but does not obscure the longer-range shifts in investment values. The second is to make changes in the unit less often than each valuation period, limiting adjustment to once a quarter or once a year. This second method was adopted by CREF³ with changes made once a year, reflecting the amounts of the underlying investment fund and the present value of future benefits calculated as of the end of the fund's fiscal period. The once-a-year method has not been followed generally by companies that have recently announced variable annuity contracts, apparently on the belief that annuitants do not particularly care about the budget stability inherent in the method. The administrative expense to the insurer in the every-month change may be somewhat greater, although, once a system is established for creating the new values, there seems to be little difficulty in changing the frequency from once a year to monthly or even to daily. As a result, under the most typical formulas now used, no effort whatsoever is made to achieve stability, and thus the second objective is sacrificed entirely to the third—the value changes daily and depends on the portfolio value for just one day.

Assumed investment rate (AIR).—The choice of an AIR poses one of the

³ See R. M. Duncan, "A Retirement System Granting Unit Annuities and Investing in Equities" (*TSA*, IV, 317). A large part of Mr. Duncan's mathematics deals with the intricate adjustments required in the annual unit determination in order to reflect the interim experience since the last determination. In order to avoid these adjustments a company could transfer once a year one year's discounted monthly payments from the separate account to the general account. Level monthly payments would be made from the general account with the level redetermined at the beginning of each year in accordance with the separate account's experience.

most difficult design questions in a variable annuity benefit. Several considerations must be taken into account.

1. Currently, single-premium immediate annuities on a fixed-dollar basis offer a high income per \$1,000 applied. This is a result of the exceptionally high interest rates at which the underlying reserves can now be invested, much higher than a company can guarantee for purchases in the future.

2. The rate of interest which a company can guarantee for purchases many years into the future must necessarily be very conservative. Thus there may be pressure to *guarantee* a relatively low rate on the fixed annuity portion and to *assume* a higher rate on the variable annuity.

3. Flexibility in the choice of the AIR is very desirable in plans offered to employers, since their financial commitment to the plan varies in inverse proportion to the AIR.

4. A very low AIR tends to produce an increasing series of payments, which might produce a kind of tontine for the survivors.⁴

5. It seems to the author highly desirable to have consistency between the variable and the fixed initial amounts, especially when the annuitant himself at retirement elects the portion of income to arise from the variable or fixed benefit. Distinctions between the investment philosophies of the two portfolios underlying the variable and fixed annuities might justify differences in the initial payments but only to an extraordinarily sophisticated buyer.

6. Regulatory problems exist no matter what choice is made. If the AIR is low, the IRS may impose additional restrictions on integrated pension plans. If it is high, questions may be raised by state insurance authorities, in spite of the clearly demonstrated inapplicability of maximum valuation rates.⁵

7. On tax-benefited plans the company may be able to guarantee and credit higher rates on the fixed annuity because of its tax advantage under the life insurance company tax formula. This may consequently permit a higher AIR for the variable annuity.

Many solutions have been offered in the design of an AIR. One common approach is to use an AIR of 3 or 3½ per cent for both the fixed and variable annuities, with a stipulation that the company will pay a higher

⁴ This tontine effect is unduly exaggerated by hypothetical examples, particularly when the last thirty years' investment experience is used to illustrate bonanza incomes payable to 90-year-olds. This does not mean that money has been *withheld* from annuitants who died earlier, thus increasing their costs. It means only that the infinitesimal percentage surviving to become centenarians reaped the benefit of a remarkable period of economic growth in our country.

⁵ See Walker, *op. cit.*, p. 441.

fixed income at retirement if the then current single-premium rates would produce a higher rate. If this provision is not available or is not used, excess interest is allowed on the fixed portion during any certain period (on either a level- or declining-payment basis).

An approach which may better accommodate the various considerations listed above would be the following. First, guarantee the same interest rate for fixed annuities as the AIR included in the variable, and guarantee the same mortality table. Second, stipulate that a higher benefit will be paid under both if the *mortality table* in use at the time of retirement produces a better return. Third, make the fixed annuity participating and increasing, with the annuity unit increasing each period to the extent the general account rate exceeds the guaranteed rate. Essentially, this approach would use the same accounting method for the fixed annuity unit as it would for the variable, substituting a declared current investment rate on the general account (but never less than the guaranteed rate) for the investment rate on the separate account described in the contract's formula.

Besides complete consistency between the fixed annuity and the variable annuity, this approach makes the fixed annuity a much more effective part of the benefit design. For instance, at current interest rate levels, a rate on the general account of 4.5–5.0 per cent might be allowed, producing a 1.5 per cent excess over a guaranteed rate of 3.0 or 3.5 per cent. Some economists are calling 1–2 per cent the floor of inflation rates. A guaranteed annuity, which cannot decline but which will produce an income rising 1–2 per cent a year, if current interest rates hold, would then be a very attractive annuity design.

Since it is purchased within the framework of concern about inflation and since the complexities of changing payments are already an inherent part of the plan design, it would seem to be an excellent balance to the variable annuity. And at the 3–3½ per cent assumed level for fixed income investments the potential tontine effect would be minimized under normal historical investment conditions. (Even if “normal” conditions do not exist today, it is difficult to draft financial contracts on the long-range assumption that current rates of yield will continue indefinitely.)

The choice of an AIR for an immediate variable annuity does not involve all the problems that a deferred contract includes, but the few remaining difficulties seem to be overcome by the participating fixed annuity solution described above. A projection of future payments, on the basis of the dividend scale or “declared rate” in effect at annuity purchase, would help in selling the reduced first payment under the fixed annuity.

Settlement options.—Most variable annuity contracts make available to

the annuitant or his beneficiary a number of optional annuity modes for any single-sum proceeds being placed into the payout phase. The standard options present no difficulty, such as the life annuity, certain and life, or joint and survivor. One special life form exists, peculiar to the variable annuity. Corresponding to the traditional cash refund annuity form is the variable annuity "unit refund" option. Under this form, the death benefit is expressed by a formula which in effect produces a value equal to the cash amount paid for the annuity less payments received, with all adjusted to the date of death to reflect the excess (or deficit) of the credited rate over the AIR. Or, more precisely, this death benefit, computed as of the date of death, is as follows:

The dollar value of the number of annuity units equal to the excess, if any, of (a) over (b), where (a) is the total amount applied under the option divided by the annuity unit value at the annuity commencement date and (b) is the number of annuity units represented by each installment multiplied by the number of installments made.

One wonders if a compromise should not be made between the actuarial preciseness of this formula and an annuitant's ability to comprehend his benefit. Does not the much simpler cash refund annuity do an adequate job of meeting the rather naïve objective of "guaranteeing at least your money back"? Or has the cash refund form been abandoned because of the actuarial difficulties in calculating the precise cost, since the dollar amount of future payments must be estimated? Surely the uncertainties in the selection of a proper mortality table for the valuation of all the annuity benefits are far greater and more significant in effect on price and reserves than the minor questions that might arise in applying the selected table to the costing of the additional cash refund death benefit.

A second unusual feature of variable annuity design is the provision for options *without* life contingencies. Since the variable annuity's key structural advantage over the mutual fund is its superior payout provision, it is important to offer in settlement options at least all the flexibility of the mutual fund's "withdrawal plans." Hence many variable annuities include options for payments for a fixed amount or for a fixed period. Although the annuity unit method works very well for the payments over a fixed period, a fund accounting approach must be used to describe the fixed payment option. The amount initially paid in is accumulated month by month by the applicable investment factors—for either the separate or general account—and the fixed payments are deducted. Once the payment amount is selected, the remaining balance and the period over which payments can be made depend entirely on the investment results achieved.

NATURE OF GUARANTEES AND ADJUSTMENT
FOR EXPERIENCE

Mortality guarantee.—The feature that most clearly distinguishes the variable annuity from the mutual fund is the mortality guarantee. This feature is difficult to design because of the great potential risks to the insurance company, the difficulty of finding an appropriate risk charge for an appropriate mortality table, and the uncertainty of the possible future regulatory attitude toward the mortality elements.

With regard to this last point, the federal legislative and regulatory agencies have spent a great deal of time in the last few years looking into the proper levels for investment management charges and sales loadings for mutual funds (and, by direct transfer, variable annuities). The SEC has urged that investment management fees be regulated by turning over to the courts the question of whether the investment adviser is guilty of a "breach of fiduciary duty" in setting his fee for service. Also, the SEC has recommended that the sales load be subject to further statutory limitation. The mortality guarantee, with its related risk charge, has far greater impact on the purchaser than do either of these charges. It can surely be expected that actuaries will be called upon to give a detailed defense of the financial structure of the mortality feature, and this, unfortunately, will be done before people much more familiar with investments than with life contingencies.

The mortality guarantee structure breaks into two parts—the table guaranteed and the risk premium charged for that guarantee (which is a probably indistinguishable part of the over-all contract risk premium). If a very conservative table is used, the risk premium could be held very low. This, however, would place most of the cost of the guarantee on those who at retirement use the guarantee (by electing a retirement annuity form with a life contingency) and would assess no cost against those who elect cash or another nonlife contingency option—yet the latter have had a benefit from the guarantee, in that, had the guarantee turned out to be extremely valuable, they would have used it. Thus a balance is needed between the margins in the table itself and the charge made against all contracts for the optional right to use the table in the future.

The terms of the guarantee itself must be carefully defined. The prevailing pattern is an unlimited guarantee for an individual life as to when he applies his funds, although a limitation does usually exist on how much he can build up in funds. He may be allowed to increase his annual payments into the contract, but, if he goes over twice the first year's payment, the company must give its consent. Some group contracts limit the

application of the guarantee to funds contributed in the first three or five years, or, in any event, to participants entering the contract in the first few years. The extent of this guarantee should certainly be reflected in the level of the risk charge.

The expression of the guarantee itself allows a good deal of flexibility. The most common current expression is a projection of the *a-1949* Table, with ages set forward or back, depending on the band of calendar years in which the annuitant was born. Greater conservatism can be introduced by narrowing the bands, thus effectively accelerating the assumed mortality improvement. Obviously, an overconservative table would be uncompetitive unless matched with a much reduced risk charge. An overliberal table would produce high payments but would have to be matched by a very high risk charge, and this could be misleading.⁶

Expense guarantee.—The percentage of premium charge, the constant expense charge, and investment management fee deduction are usually guaranteed for the life of the contract. The premium tax assessment should adjust to reflect the tax rate effective at the time the taxable event occurs. Group contracts sometimes limit the expense guarantee to fewer years. Part of the contract risk premium is assessed to back up the expense guarantee.

The ultimate expense level of the variable annuity business is not yet well known. Almost all companies, including those organized in the 1950's, have experienced rapid recent growth and have not yet reached a level at which reliable functional cost analysis can be carried out. The ultimate regulatory framework is just beginning to emerge. From what we can now see, the potential hazards of this business are much greater than the life insurance business—with complete dual regulation at the state and federal levels and with complexities of independent board of directors and separate voting rights, not to mention dual licensing and regulation of our agents. Will the trended per policy costs that we have used in our life insurance premium rate making bear any relationship to variable annuity costs? Will additional funds out of the narrow percentage of premium loading be necessary to support our field organization in the sale of this complex product? Can the costs of supervision and record keeping of the “principal underwriter” be absorbed within our usual margins? Many companies have been forced for the first time to carry out a CPA audit duplicating in large part the state insurance department examination in order to satisfy

⁶ See D. D. Cody, in a discussion of Walker (*op. cit.*, p. 463). Mr. Cody makes the point that an overliberal table could be misleading and summarizes that “in the deferred variable annuity there is no substitute for a precisely appropriate mortality table with realistic projections for mortality improvement built in.”

SEC prospectus requirements. Can the volume of variable annuity business be high enough to carry this charge? And can it carry all the extra legal and actuarial talent required for this product? Experience in the investment business can give us some hint of what we will encounter.

In any event, adequate margins and risk charges are needed to ensure that the variable annuity business can eventually support itself, without too great a reliance on the mortality risk premium. One significant and sobering test is to run asset share projections on the assumption that the entire mortality risk premium (or a large part of the over-all contract risk charge) is offset by mortality losses.

Risk premium.—The chief source of margins to the insurance company in the variable annuity is the risk premium. This premium is typically expressed as a percentage ranging from 0.25 to 1.25 per cent of the contractholders' share of the separate account. It is a "premium" charged by the insurance company for undertaking the following risks: (a) the risk that the mortality table may overstate the actual mortality rates experienced by the class of variable annuitants, resulting in more payments than anticipated; (b) the risk that the expense margins specified by the contract may understate the actual expenses; and (c) the broad general business risk that the variable annuity business generated may not be adequate to repay the capital initially invested in entering it or that the contracts may produce an unforeseen liability for the issuing company.

Perhaps it is possible to quantify these three risks. The mortality table can be tested against various more rapid increases in mortality. The results of this can be questioned by some, since there are predictions that we may be close to some significant breakthrough in gerontology,⁷ as well as against the primary death causes for our normal life span—heart disease and cancer. Under this view it is very dangerous to predict the future pattern of change in mortality rates for people over 65 on the basis of historical changes. And the potential need for reserve strengthening might go very far indeed beyond the margins provided by the risk premium.

The future pattern of insurance company expenses is equally uncertain, with the vast promise of the computer offsetting the equally vast capacity of labor costs to rise. And all the regulatory uncertainties peculiar to the variable annuity, cited above, give extra reason for caution. And, of

⁷ See Robert W. Prehoda, "Our Children May Live To Be 200 Years Old," in the *Futurist* (III, No. 1, 4). Mr. Prehoda's summary of current research in gerontology and his conclusion that breakthroughs will come in five to ten years, may seem unduly optimistic, but they should give pause to actuaries who must confidently put into contracts rate commitments based on the assumption that the life expectancies for 65-year-olds in 2001 will be a certain number of years.

course, the general business risk of entering the variable annuity business is extremely hard to quantify.

As a result of such difficulties, a great deal of business judgment must be involved in establishing the risk premium and a great diversity can be expected in different companies, even when other contract provisions are similar. Other aspects of the insurer's business will be reflected. It would seem appropriate for a company that sold only variable annuities to have a much higher risk charge than a company with a broad portfolio of other risks—including life insurance risks that would substantially benefit from what might be called a gerontological "disaster" for the annuity business.

One additional question exists now that hopefully will be resolved in the next few years. The precise basis on which the risk premium will enter the life insurance federal income tax formula is not known. And risk premiums taken into income now, when the future is not clearly seen, may be largely paid out in taxes in spite of substantial potential need for later reserve strengthening. Furthermore, if such premiums turn out to be heavily burdened with federal income tax, it will tip the balance sharply toward the use of very low risk charges and extremely conservative mortality tables. This would unfortunately weaken one of the most important and distinguishing features of the variable annuity principle.

The risk premium, although intended as a margin for "risks," is the only available source to pay the after-retirement expense of administering variable annuity payouts. The potential hazards of future mortality losses diminish as the annuitant ages and moves into the payout phase. The corresponding reduction that might then be made in the risk premium can be used instead to cover such expenses.

Returns to contractholders of experience margins.—The variable annuity contract presents some particularly difficult problems in designing the provisions for returning margins to contractholders, either as dividends, excess interest credits, or advance experience credits. These difficulties arise primarily out of the following:

1. Many states require mutual companies to provide traditional annual dividends with a full set of dividend options. This poses special problems for a variable annuity contract with no fixed annuity provisions, since such dividends must arise out of expense charges or risk premiums. It is ironic that a contract which credits the full investment return to the policyholder immediately, and is therefore probably as "participating" as any contract offered by a mutual company, is burdened by letter-of-the-law compliance to create a further artificial dividend quantity out of margins that should probably be nonparticipating.

2. The usual variable annuity contract includes both fixed and variable accumulations and fixed and variable annuities and hence can require four different financial expressions for return of margins.

3. The mortality guarantees on the variable segments of a variable annuity contract are more far reaching and potentially dangerous than traditional insurance company guarantees. The judgment as to an appropriate surplus level is made much more difficult.

The primary source of return margins is the excess interest earned on fixed accumulations and annuities. Many contracts now offered use this as the sole source of dividends prior to retirement or excess interest credits after retirement. Other possible but improbable sources are refunds of portions of the risk premiums charged for mortality and expense guarantees and experience margins arising from mortality higher than expected or expenses less than assumed—the charges assessed may be more than adequate or the losses on lapsing policies less than expected. All such sources are extremely difficult to analyze, and all present great difficulties in working out a desirable surplus distribution plan.

The design alternatives for the excess interest, and possibly the other sources, include the following:

1. *Annual dividend*.—The traditional annual dividend, with the various dividend options, can be used and is probably the best choice if returns in addition to excess interest are to be made.

2. *Additional units*.—Additional accumulation or annuity units can be credited, without disturbing the basic contractual method for determining unit values. This would apply only to the fixed annuity portion. During the accumulation phase a number of additional accumulation units could be credited each year (or, in some contracts, are even guaranteed for a short period of years to be credited at a rate higher than the long-term guarantee). During the annuity phase, an extra number of units could be granted on the annuity commencement date to run for the annuitant's (and his joint annuitant's, if any) lifetime, during only the certain period under an n -years certain and life contract, or for only a fixed number of years. This method produces level income payments and reflects the insurer's judgment of investment conditions at the time of the annuitant's retirement.

3. *Increased unit values*.—A third method is to increase unit values, both accumulation and annuity, to reflect each year's investment experience as it develops. This method is a very simple way to return excess interest earnings on the fixed-dollar contract portions but usually not an equitable way to distribute other sources of earnings. In combination with this approach, it would be consistent to specify contractually *maximum* expense charges and risk premiums, with the only *actual* charges needed in each year deducted from the contract.

The greatest problem with methods 2 and 3 is that state policy-form examiners will find no dividend paragraphs in the contract and will question whether a mutual company has complied with that state's insurance statutes. Method 3 seems to be the clearest and simplest way to write the

provision, keeping a strict parallelism between the fixed and variable segments of the contract.

GENERAL ACCOUNTING QUESTIONS

General approach.—Although it may not seem necessary to have all the details of accounting arrangements established before designing a variable annuity contract, it is helpful to have a clear concept of what the separate account is to be. And this concept is an elusive one.

From a narrow, state insurance department, financial bookkeeping viewpoint, the “separate account” is a reporting form separate from the “general account” reporting form. This limited “theory” along with the instructions sent by the state departments offers little help in answering all kinds of questions about what items to show in each of the two blanks. As a result, there is no consistency whatsoever in the way companies report to the insurance departments. For example, some blanks show only one entry in Exhibit 5 for investment expenses; others have a full array of insurance and investment expense allocations.

From another viewpoint, the investment one, the separate account is simply an accounting method for segregating assets for a particular class of business in order to facilitate allocation of investment income back to that class. Under this view the purposes of the account would not include any accounting for the insurance company’s managerial function. The SEC usually takes this view, since it is fairly close to the accounting concepts used for mutual funds.

A third view of the separate account is that it is an entirely distinct business enterprise or “profit center” and that its financial reports should detail all the operating income and expenses of that entity. This third view may produce better management information and direction and control for the enterprise, but the resulting combination of accounting objectives makes much more difficult the financial reporting to contract-holders and to regulatory officials.

The following considerations may be helpful in determining the appropriate concept for the kinds of variable annuity contracts a company plans of offer:

1. If both fixed and variable provisions are included in one contract, is it possible or desirable to split the contract for general expense allocation purposes? If the contract offers any investment flexibility between the two accounts, can expenses be allocated to the two accounts in a reasonable way? Should different surplus objectives exist for each segment of the contract? In short, can the accounting for the company’s managerial function be split between the two?

2. Considering only the separate account, is it appropriate to distinguish dif-

ferent income and expense sources and report part as separate account operations and part as general account operations? For instance, only investment management fees and expenses might be treated as separate account items, while all percentage of premium loadings along with expenses, commissions, and taxes would be carried through the general account.

3. How should surplus funds arising from separate account business be invested? What are the federal income tax consequences of investing surplus as part of the separate account? or general account?⁸

4. What accounting methods will permit the clearest and most easily understood communication of the results obtained for the class of contracts to contractholders and to regulatory officials?

The resulting alternatives in accounting can be ranged on the following spectrum, from (1) the strict investment account theory to (4) the distinct, separate business enterprise:

1. *Investment account theory.*—Only assets and investment income are carried through the separate account. At the end of any period all the assets are allocable to contractholders, and there is no surplus. All expense charges, tax assessments, investment management fees, and risk premiums are kept in the general account or transferred to it, and all expense items are charged against the general account. Thus the financial reports reflecting the insurance company's managerial function are carried entirely in the general account; the results in the separate account affect only contractholders. The prospectus or other financial report of the separate account details only asset change and investment income items. Surplus on both segments of the variable annuity contract is carried as part of the general account surplus.

2. *Risk premium surplus invested in separate account.*—All asset items, as is true in method (1), are carried in the separate account, plus any surplus arising from the excess of risk premiums over mortality losses. All other items are treated as those in method (1). The theory that surplus should grow with the separate account unit values might lead to this method.

⁸ The argument has been made that, since surplus is primarily needed to offset possible future mortality losses, surplus should be carried in the separate account so that its growth can match the unit value's growth. This argument seems questionable on several counts. The surplus is needed for many purposes other than possible mortality losses; for example, one major need is to offset risks to the general account policyholders for the initial entry into the variable annuity business. Second, some federal tax is assessed on the surplus earnings wherever they are invested, so that an extremely precise matching of surplus accumulation to the tax-benefited unit income growth is impossible. And, finally, most companies entering the variable annuity business expect the line to be in a negative surplus position for a number of years, with recoveries hoped for in later years. It is hard to see, under these conditions, much direct parallelism between the resulting surplus levels and one specific risk element in the contract.

See Mr. Walker's paper (*op. cit.*) and discussions thereon. Mr. Walker argues that state laws should not *prohibit* the carrying of surplus in separate accounts. Several of his discussants attempt to demonstrate the positive need for such an arrangement.

3. *Risk premium and investment management fee surplus invested in separate account.*—A widely adopted variant to method (2) is to add into the separate account the investment management fee less expenses.

4. *Separate enterprise theory.*—All operating income and contra expenses are reported through the separate account, along with assets and investment income. Early drains on surplus from excess start-up expenses and early-year high costs are funded by transferring general account surplus into the separate account. This approach would seem appropriate only for types of variable annuity business which can be validly isolated from the balance of the insurer's operations.

Premium taxes.—A survey of company practices in charging for and paying state premium taxes leads to the conclusion that the statutory definition of variable annuity "premium" is very unclear. Some charge and pay the tax at the time a contribution is received; others upon the annuity commencement date on the amount of the purchase price for the annuity; still others pay the tax only on the sales loadings deducted from contributions upon receipt (and presumably on the balance of the purchase price upon the annuity commencement date). It would seem expedient to provide great flexibility in the contract provisions for assessing the tax so that the insurance company could administratively seek out the most liberal interpretation of "premium" in each state.

Several other premium tax questions need to be faced. The contract should provide for tax assessments based on the tax law in effect at the time the taxable event occurs—whether it be receipt of a payment or application of proceeds to buy an annuity. Also, some difficult questions regarding retaliatory taxes must be answered, if the insurer's state of domicile taxes variable annuity premiums. Should a uniform tax applicable to all contracts wherever written be used, as is the usual practice with individual insurance? Or must each state's tax rate be used if the annuity contract is to be competitive? This may have a strong bearing on whether a mutual fund or a variable annuity should be marketed, especially in markets other than pensions.

SUMMARY

The future of the variable annuity principle is still unclear. It would appear to have a firm and certain place in pension plans, and one can confidently predict that few pension plans in the late 1970's will fail to have some variable annuity feature, whether it be only for accumulating employer funds, an option at retirement for employees, or a comprehensive, completely integrated funding over an employee's lifetime of his pension benefit.

One predicts with much less confidence the future of the nonpension variable annuity. Will it be a complicated, interesting museum piece of the insurance industry, designed by an actuarial Rube Goldberg? Or will it gain an equal footing with the mutual fund and even supplant it because of the much greater capability of the annuity in distributing assets and investment income?

It is the author's view that strenuous efforts should be made to purge variable annuity contracts of unnecessary complications, particularly in those aspects which must be communicated to the public. The design features herein discussed may well have an important influence on the variable annuity's ultimate place in providing personal financial security.

DISCUSSION OF PRECEDING PAPER

JAMES L. CLARE:

I would like to comment on the following claim of Mr. Biggs: "The future of the variable annuity principle is still unclear. It would appear to have a firm and certain place in pension plans."

In pension arrangements for individuals, the variable annuity principle does indeed open the door to a considerably greater measure of investment freedom, and there will be times when such greater investment freedom will make possible greater investment profitability.

At times, when the investment advantage promises to be sufficiently great, many individuals will be better off selecting a variable annuity in spite of the certainty of fluctuations during their retired lifetimes.

At other times, however, the prospective yield for investments in bonds and mortgages during their retired lifetimes may be about as good as the prospective yield for more variable investments. In such a case, they may be better advised to select conventional guaranteed annuities with guaranteed compounded built-in annual increases (e.g., 4 per cent a year) rather than to run the risk of selecting variable annuities with their inevitable fluctuations.

I consider group money-purchase plans to be essentially individual pension plans, at least for benefit distribution purposes. Hence the variable annuity will no doubt continue to have considerable popularity, from time to time, among participants in the College Retirement Equities Fund (CREF), in other money-purchase pension plans, and in profit-sharing plans.

In group pension plans with unit benefits, however, a variable annuity is totally unnecessary. I am already on record to this effect in my 1962 paper on "A 'Smoothed' Equity Unit Annuity" (*TSA*, XIV, 340-47; see especially p. 344) and in my panel remarks at Society of Actuaries meetings in 1967 and 1969. My reasons include the following: (1) a group pension plan with unit benefits can invest more profitably than any group variable annuity pension plan that I have so far encountered and (2) a group pension plan with unit benefits can provide an immensely more effective pattern of benefits than the "uncontrolled" results of group variable annuities.

It is interesting that a survey of major employers, as reported in *Financial Executive* magazine for February, 1969, showed that the re-

spondents were for the most part turning their backs on group variable annuities.

I would like to ask whether, in this day and age, (a) actuaries should be careful to avoid enthusiastically imposing technical solutions on employers (as could happen with group variable annuities) and (b) it would not be preferable and perhaps more "professional" for actuaries first to ascertain the needs and the wants of employers and then to devise solutions to meet their actual problems? To my knowledge, the most economical and most satisfying solutions developed to date have not been group variable annuities but group pension plans in which the assets have been invested very aggressively and the unit benefits have been designed to do precisely the jobs required of them by the employers.

J. ROSS HANSON:

First of all, I wish to thank Mr. Biggs for preparing this fine paper for us. It comes at an excellent time for us who are interested in variable annuities, but I am sure that it also comes at considerable expense in time to Mr. Biggs. His suggestions and commentary are very well considered; my discussion is only meant to add my thoughts to the author's.

I will title my comments with the headings used by Mr. Biggs in his paper.

Premium Flexibility

One reason that a premium may need to be defined is to establish a minimum for loading purposes. If part of the loading for sales expense is a per contract charge, it will have to be expressed as a percentage of the minimum to see whether the regulatory limit on sales load has been exceeded. There is, perhaps, an element of sham about this in some situations, when we will accept payments less than the stipulated minimum without penalty. It would seem preferable to make a charge against each premium only for sales expenses; these are usually expressible as a percentage of premium (commissions and other distribution costs). Another charge should be made for per contract expenses which are in the nature of continuing administration or maintenance; this charge should not be included when determining compliance with the restriction on sales load.

Valuation Period

The determination of the annuity unit value used to fix a variable annuity payment is usually made well in advance of the payment date—sometimes a fixed number of days and sometimes the value is determined on a fixed day to apply to all payments in the next calendar month—so

that the payment check can be mailed to reach the payee by the payment-due date. This is permitted because annuities in the payment period when life contingencies are involved are exempt redeemable securities (or, more understandably, not redeemable); so the daily valuation requirement for redeemable securities does not apply. This technique brings up a great deal of administrative difficulty at the time payments commence. I wonder whether it would be acceptable to the public to determine the payment on the day it is due and pay it (i.e., mail it) within seven days thereafter—just as we do redemptions. I am sure the systems people would like to try this.

Expense Assessments

Under most variable annuities each premium purchases a paid-up annuity. I think, therefore, that the premium tax should be paid at the time the premium is paid. If it is paid only when the annuity commences, no premium taxes are paid on redeemed contracts. A redemption charge equal to a percentage of the redemption value, when the percentage equals the premium tax rate, might be proper in such cases, but I doubt whether this would get SEC sanction. Premium tax is merely a general state tax on life insurance companies figured with the use of premium income as a base. Therefore, unless all pay it as premiums are paid, there will be an inequitable assessment among policyholders of this part of the insurer's expenses. Further, there has been the opinion expressed at the IRS that tax deferral (the 403[b] type of deferral) is only available if an annuity is purchased when the premium is paid. If failure to assess the tax when the premium is paid leads to the conclusion that an annuity has not yet been purchased, tax deferral might be in jeopardy.

I do not think that Mr. Biggs is correct in saying that the "percentage of the fund" charge is typically meant to cover income taxes. I know of only two companies which do this, and I personally think it is a very dangerous practice; the tax would be far in excess of the charge whenever capital gains represented a substantial percentage of growth. Usually these taxes, or reserves for them, are assessed directly to investment income in the determination of the unit values in the separate account.

The level of the risk charge is a very strange animal. It came into being in one early company and has been more or less copied since without any empirical backup that I know of. The new concept offered by Prudential seems to indicate that in that company, at least, they feel typical current charges are excessive. My own feeling, based on a very limited calculation, is that one-half of 1 per cent of assets would be sufficient in the typical case to offset a 10 per cent increase in the annuity purchase price.

Obviously, the choice of mortality table bears directly on the likelihood of the purchase price being affected as much as 10 per cent by mortality improvement alone.

Much closer attention should be given to the cost of increasing expenses; one technique might be to allow for increasing expense in asset share calculations and then to choose a charge to accommodate chosen profit bench marks. I do not know of any company which holds a contingency reserve for the increasing expense risk; in actual fact, I think the risk charge is used for current expenses until it is redundant and then shows up as profit—a faulty representation both to the consumer and to the management of the company. The SEC is concerned with this point.

So far, in the development of this very important new product, we have had our hands full coping with the legal and administrative aspects. Now it is time to sharpen our pencils and see what really goes on here actuarially.

Nonforfeiture Benefits

There is a view at the SEC that surrender charges ought to inure to the benefit of the persisting contractholders. At least one company says that the charges will stay in the separate account, but it is not revealed what will become of them. If this view becomes the rule, surrender charges will probably disappear unless a company feels they are a good deterrent to lapse.

If surrender charges are meant to cover unamortized expenses, they ought to be about 15 per cent of the redemption value in the first year and to drop off rapidly to zero around the sixth year—but this would never be allowed, I am sure. I cannot see the justification for a surrender charge of 2 per cent for several years if its purpose is to cover unamortized expenses.

Policy Loans

I agree with Mr. Biggs that the loans provision is an undesirable provision. Even repayment of partial withdrawals is difficult to administer, because the fee to do so is usually different from the loading on current purchase payments. So, if a partial withdrawal has been made and repayment is offered within the time limit allotted for repayment, we have to be careful to identify it as such; this repayment should only be allowed on a form of request satisfactory to the company. I personally consider the repayment privilege a desirable contract feature from the annuitant's point of view (tax considerations aside), but it is an administrative headache.

Supplemental Benefits

The supplemental death benefit is one area in this field where a lot of nonsense has gone on. If the benefit is the excess of premiums paid over the redemption value at the date of death, the premium for it should be trivial—perhaps as little as 4¢ for each \$100 of premium. Yet some jurisdictions require 75¢ or \$1.50 be held in reserve. This does not affect ultimate profitability, but it does have an important effect on its incidence. It is a difficult risk to reserve for, admittedly, but no company is going to become insolvent if a reserve is not established, and I feel that the states should not require a reserve for this benefit. I cannot see the justification of charging 75¢ out of each \$100 of premium long after there is even a remote possibility of death benefit. If the benefit is to be provided at all, it ought to be regarded as an additional administrative expense and no specific charge made for it.

The supplemental disability benefit does present some interesting aspects, and Mr. Biggs has covered them well. My own inclination is to treat it as a disability income benefit, because I expect that the disability experience will resemble income rather than waiver experience and because it is hard to conceive of waiving a premium when none is due and payable.

Assumed Interest Rate

Mr. Biggs has given us an excellent and penetrating discussion of this very elusive subject. I think his suggested approach is excellent; I do hope, however, that varying the fixed-dollar payments according to the investment experience of the general account does not imply that the fixed-dollar annuity is also a nonexempt security.

I would like to suggest that more flexibility in the choice of AIR by the contractholder should be permitted than state regulation now permits. This might be accomplished by requiring that the mortality table on which annuity rates are based be not more conservative (from the company's viewpoint) than a specified statutory table. This would avoid the abuse of showing a high first payment based on a high AIR and a very conservative mortality assumption. I do not know how practicable such a requirement would be; but it does seem too bad that flexibility in the choice of an AIR is limited because of a potential abuse.

Settlement Options

I prefer to use an installment refund life annuity rather than a unit refund option. It is better for the company, since the company keeps the related assets, and it is simpler, since it is merely a life annuity with a

special period certain. This period certain is equal to the net amount applied under the option divided by the first monthly payment, any fraction of a month being counted as a full month.

If the option does not involve life contingencies, it is doubtful whether a mortality risk charge should be made unless some valuable conversion feature to an option involving life contingencies is available. Under options involving varying degrees of mortality risk (typically from 0 to 20 years), it is logical to suggest a risk charge which is smaller for options involving less mortality risk. This does present administrative complexity, since there has to be a different annuity unit value for each variance in the risk charge.

Options not involving life contingencies are redeemable securities; thus it may eventually be necessary to treat payments under the "fixed period" option in the same fashion as payment from a mutual fund over a fixed period. This is not a serious matter, but it is one more administrative wrinkle to be paid for.

Variable annuities and variable settlement options are, I think, here to stay, because they do fill a real product need, that is, a way in which to provide now at guaranteed rates against the vicissitude of living too long in an economy where both prices and standard of living seem to be continuously rising.

HERBERT W. HICKMAN:

I am definitely in agreement with Mr. Biggs that we live in exciting times for variable annuity benefit designs. There is a great deal of room for innovation in this field. We are likely to see many new conceptions that will make the variable annuity an increasingly desirable and useful product for the public. In both design and regulation it should be more important to have the variable annuity meet the needs of the public rather than to have it merely fit the mold of traditional approaches.

As a supplement to Mr. Biggs's outline of preliminary decisions, some of Prudential's decisions preliminary to entering the individual variable annuity market may be of interest.

One of our most important decisions was in an area that Mr. Biggs does not cover—taxation. For the middle-income market which Prudential serves, the taxation accorded the typical variable annuity is more severe than the taxation of a mutual fund; this is especially true if the annuity is terminated during the accumulation period. As a result, we designed our nonqualified variable annuity program to be eligible for taxation as a regulated investment company during the accumulation period, by separating the accumulation and payout provisions of the

annuity into two contracts and by using two separate accounts. Both separate accounts are invested in shares of the same underlying mutual fund. During the accumulation period, annual dividend and capital gains distributions are made. The annuity rate guarantee provisions for the accumulation period are in a third contract in the form of annuity rate protection rights; each purchase during the accumulation period also purchases these annuity rate protection rights. These three contracts are always issued together as a combined program and in combination provide a deferred variable annuity.

Another important decision was the degree of premium flexibility permitted. We decided to go for maximum flexibility by permitting the planholder to make either scheduled or nonscheduled purchases. Nonscheduled purchases may be made at any time; scheduled purchases may be made monthly, quarterly, semiannually, or annually. The planholder may modify his purchase schedule whenever he wishes—increasing it, decreasing it, or eliminating future payments altogether. In many ways we have the same flexibility as would exist by use of a series of single-payment deferred annuities. The initial purchase minimum is \$300; subsequent purchases must be at least \$100. Amounts down to \$25 may be deposited in what we call a “transfer account.” These deposits are in the nature of advance payments and are accumulated at interest until the necessary amount for a purchase is available.

As Mr. Biggs points out, complete flexibility leads to two difficulties—it is hard to charge a front-end load and the annuity rate guarantees may become very expensive if the amount invested under them is not limited. We avoided the first difficulty by charging a level load. We reduced the second difficulty by retaining the right upon notice to change the annuity rates guaranteed on future purchases, just as could be done if a single-payment deferred annuity were being purchased each time.

Because of the wide degree of premium flexibility offered, we felt that it was especially important to impose expense charges which accurately reflected the incidence of expenses. Consequently, we use constant expense assessments for each purchase, surrender, or change in schedule of purchases.

The relationship of the variable annuity to a fixed-dollar annuity was also an important consideration. We decided to design a separate fixed-dollar annuity contract which would serve as a companion to the variable annuity during the payout period. The fixed-dollar annuity is similar to the variable annuity in commissions and in guaranteed annuity rates. The fixed-dollar annuity is participating, and we expect to bring it into sub-

stantial equality with other fixed-dollar annuities through dividends that increase the monthly annuity payments.

(AUTHOR'S REVIEW OF DISCUSSION)

JOHN H. BIGGS:

In my paper I had expressed the hope that discussants would round out the "prevailing practices" aspect in current variable annuity design. In doing precisely that, Messrs. Hanson and Hickman have added greatly to the interest of the paper, and Mr. Clare has raised an interesting question about the future appropriate place for variable annuities in pension plans.

Mr. Clare takes exception to my statement that "the variable annuity principle would appear to have a firm and certain place in pension plans." He argues that the variable annuity has little appeal or necessary use in "group pension plans with unit benefits." He may very well be right in the limited sense of its use in such plans *prior* to retirement, where an employee's equity or benefit at retirement is based on investment results prior to his retirement. For many good and valid reasons employers are reluctant to design such benefits for their employees. I would, however, predict a rather broad use by employers of a variable annuity option upon retirement under which an employee could convert part or all of his defined unit benefit pension from a fixed annuity to a variable annuity. A further use of the variable annuity principle prior to retirement is the accumulation by the employer at his own risk of the funds underlying an employee's pension reserve. I believe that Mr. Clare acknowledges this form of "profitable investment" by the employer. This can be done under a conventional, unallocated separate account fund agreement for a group-type contract or under the allocated accumulation feature of an individual pension contract—with the employer, under the latter, adjusting his annual pay-in as investment results emerge. These two uses of the variable annuity principle are suggested in the next clause of the sentence which Mr. Clare quoted from my paper: "whether it [the variable annuity principle] only be for accumulating employer funds, an option at retirement for employees, or a comprehensive, completely integrated funding over an employee's lifetime of his pension benefit."

Mr. Hanson's broad experience in designing variable annuity contracts makes his discussion especially interesting. I am particularly intrigued by his recommendation of the installment refund life annuity rather than a unit refund option. Presumably, the installment guarantee period is determined by the initial payment, and thereafter the normal

variable annuity mechanism operates. The annuitant is reasonably assured of "getting his money back," the investment results are reflected in the death benefit, and the complicated unit refund formula is avoided.

It seems to me that Mr. Hanson's position on premium taxes might be more suitable for a state legislature to consider when it is setting the statutory basis for tax assessment than for an insurance company designing a variable annuity offering. The companies must accept the legislature's statutory framework, and, if a state permits redemption to escape the tax, the companies should properly reflect that "loophole" in their charging procedures. Of course, a very desirable trend in state laws is toward removing taxes on annuity considerations, on the basis that such considerations are very similar to other purely savings-type payments, such as mutual fund purchases or savings and loan deposits. The widespread sale of variable annuities will make this taxing inequity still more obvious.

The usual modern practice in charging federal income taxes on non-tax-benefited reserves is to adjust the net investment factor directly for the tax paid and any reserve set up. This is done by the same contractual mechanism under which the conventional risk premium and the investment management charge are made, and a percentage-of-the-fund assessment arises, varying from day to day (sometimes negative) as the tax reserve is adjusted. Mr. Hanson questions this as a percentage-of-the-fund charge, having in mind the original contracts which included the tax assessment as a fixed, predefined percentage of the fund. I believe he is correct in pointing out that this fixed, predefined approach can lead to a very poor matching of charge to tax.

As Mr. Hanson points out, there will be a trend, with encouragement from the SEC, toward more clearly identifying portions of the percentage of the fund "risk" charge as actually an administrative charge. This will also help to resolve the difficult question he raises concerning the appropriate unit values for settlement options not involving life contingencies.

Mr. Hickman describes the interesting "troika contract" that the Prudential has devised for the variable annuity. It seems to me that this complicated approach does succeed in placing their contract in a more favorable position to some buyers in some states because of its avoidance of unfavorable federal income taxes and state premium taxes. It should highlight the anomalies that now exist in the tax statutes that lead actuaries to consider such complex "alternatives in variable annuity benefit design."

The highly structured means used to permit premium flexibility in the

Prudential's contract perhaps reflect the smaller, average-size contract that they expect to administer. My impression is that most variable annuity contracts simply let the contractholder vary his payments, make extra payments, or omit a payment within very broad limitations. The Prudential's approach presumably will lead to more payment discipline and an easier machine-based administrative system.

Mr. Hickman and I agree on the desirability of constant expense assessments and the need for a well-thought-out relationship between the fixed-dollar and variable annuity. Because of the latter, perhaps the participating fixed annuity will experience a renaissance under the protective shelter of the variable annuity.