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ORDINARY LIFE INSURANCE LIMITS

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WILMER A. JENKINS:

I found that this paper contains a great deal of food for thought. The author discusses fundamentals in an important field which, at least to my way of thinking, has been the subject of a good deal of confused reasoning and of overtraditional thinking in the past. If you haven't studied this paper, I suggest that you do so. You may not agree with what the author says, but I think you will find it stimulates mental exercise.

The author's main theme, as I understand it, is to develop the reasons for three things: first, retention limits; second, limits of issue; and, third, reinsurance.

As to retention limits, the author concludes that there is really only one reason for such limits, *i.e.*, the control of mortality fluctuations. I doubt that I agree with that conclusion, but perhaps the difference between Mr. Dougherty's thinking and mine is only a matter of definition of terms. Mr. Dougherty would have a company issue and retain insurance up to its limits of issue or its limits of retention, whichever are the smaller; I would have a company do the same thing but call this whole limiting framework the company's "limits of retention."

However, when Mr. Dougherty gets to the question of when a company should reinsure, I clearly disagree with him. I think that I am unbiased, as I formerly worked for a reinsurance company and now work for an original company. Mr. Dougherty says, as I understand it, that a company should never reinsure any amount over and above its limits of issue and that limits of issue are determined solely by underwriting reasons. It seems to me that there is quite a variety of underwriting reasons for limiting risks and that what Mr. Dougherty says is true of some but not of others.

As I see it, the important classes limited for underwriting reasons are, first, classifications in which we don't know what the mortality will be because of insufficient or unsatisfactory statistics and, second, classifications in which the information about the individual applicant is insufficient or unsatisfactory. Examples of these classifications are policies issued at the older ages, at which most companies have lower limits, and policies issued on substandard risks. I do not see any reason why an

original company should not in these circumstances limit the amounts of risks it assumes and, at the same time, attempt to place reinsurance over and above such amounts. This is on the theory that when a company assumes a risk of this kind it is really taking a business risk. It doesn't have too satisfactory information but concludes that, nevertheless, it can itself insure the life for a certain amount.

The size of business risks, as such, is always to a considerable extent determined by the financial structure of the company so that smaller companies assume smaller risks and larger companies larger risks. If that is so, then a reinsuring company in assuming an additional amount is taking on a separate and different business risk on the basis of its own financial structure. It seems to me clear that you can justify a larger business risk on the basis of the finances of two companies than you can on the finances of one of them.

In such circumstances I do not think that the original company can be accused of reinsuring only bad risks. Of course, an original company shouldn't do that, and it shouldn't submit for reinsurance only those risks which it doesn't like. Under the business risk process just described, it seems to me that if the underwriters of the two companies are any good, both companies should make a nice profit out of this kind of business risk. I don't see that mortality under such business necessarily results in a loss or a cost to the original company.

Of course where the original company limits its issuance because of overinsurance or possible speculation, that is a completely different matter. Naturally, reinsurance should not be sought in such circumstances. I agree completely with the author that a company shouldn't reinsure risks because it does not obtain enough cases in a particular subclass to yield it a spread of risk within that subclass. That is a very common fallacy.

Perhaps I have misunderstood the author at some points and, if so, I hope that in his reply to the discussion he will straighten me out.

CHARLES A. ORMSBY:

In his paper covering both issue and retention limits for standard Ordinary business, Mr. Dougherty has singled out a subject which for many years has been intriguing actuaries and others interested in sound as well as enlightened life insurance management. Since there has long been a real need for formal consideration of this subject from a practical standpoint, he is to be congratulated for taking the initiative and mustering the necessary courage to put before the Society his considered views on so controversial a topic. In the belief that the determination of issue

and retention limits for Ordinary insurance can be based on points of view slightly different from or in addition to those presented in the paper, I should like to offer my comments.

Mr. Dougherty's statement, "This 'theory of inconvenient fluctuation' goes a long way to explain the over-all limits of retention which exist in most companies" merits emphasis. It is to be noted that his concept of "inconvenient fluctuation" is much broader than the chance fluctuation associated with probability. Although it is true that mathematical theory is helpful in gaining insight into some of the complexities of the problem, one need not engage in prolonged study before it becomes fairly obvious that the solution entails a multiplicity of interdependent factors, many of which cannot be measured objectively, and that, therefore, the approach through mathematics is severely circumscribed. Of the wide variety of influences that give rise to fluctuations in experienced mortality, it appears that only the one attributable to pure chance is susceptible of measurement by the theory of probability. As Mr. Rosenthal brought out in his excellent article "Limits of Retention for Ordinary Life Insurance" (*RAIA XXXVI*, 6), it seems clear that if only chance fluctuations were to be taken into account, retention limits now in effect would be appreciably higher than they are now.

In his treatment of the influence of competition on the retention limit, Mr. Dougherty says: "If it is higher [that is, higher than that of comparable competitors], the company might fear that it would attract an undue proportion of large risks; if it is lower, the company might find its field force critically remarking the fact." Is not this consideration more applicable to issue limits than retention limits? Agents are vitally interested in their company's issue limits but ordinarily are not concerned with the amounts to be retained. As a matter of fact, it is not unusual for an agent to be unaware of the retention schedule of his company.

As evidence of the fact that pressure for a greater retention is likely to result in a higher maximum when there is a reluctance to reinsure, Mr. Dougherty says we can point to a number of companies which do not reinsure at all and which have limits higher than those of other companies of about the same size. While this may be true in the particular case he has in mind, it is possible that the differences in limits under such circumstances could just as well be due to other causes, such as differences in average size of policies, in surplus positions, in underwriting standards, etc.

Mr. Dougherty is to be commended for stressing the point that various mortality classes, such as standard and substandard, need not be segregated in measuring the probable deviations from the expected of a

given volume of business in force. This misconception is still prevalent in some quarters and needs to be uprooted, once and for all, at least among actuaries.

It is Mr. Dougherty's thesis that the issue limits of a particular company are essentially a function of the confidence that company places in its underwriting know-how and that the underlying purpose is to avoid excessive mortality losses over all years, not the chance fluctuations associated with a single year. While the underwriting aspects of issue limits are important and far reaching, I believe there are others which cannot be disregarded. The author's view would be readily understandable if there were only one direct-writing company in existence, but I am inclined to question its general applicability to the conditions under which the life insurance business is being conducted today. Entirely apart from the effect the existence of reinsurance facilities has on issue limits, we cannot ignore the fact that the policyholder who is denied the full amount applied for in a given company, simply because of an issue limit, is usually able to obtain the balance in one or more other companies, where perhaps the underwriters are operating under higher issue limits, possibly partly on account of a more highly developed underwriting technique. If adverse selection by the policyholder is present, then the industry is being selected against, rather than one particular company.

If underwriting limitations were the sole factor in the determination of issue limits, then any company desiring to raise its issue limits could readily do so simply by increasing its payroll in order to improve its underwriting technique or by employing the underwriting services of an outsider. It seems more nearly correct to say that the underwriting aspects—and I believe there are other aspects—of issue limits pertain not only to the underwriting of the company in question but also to the underwriting of competitive companies and of the industry as a whole. Incidentally, it is interesting to note in this connection that a number of companies have no fixed issue limits in the usual sense. As another practical aspect of this matter, there is the conviction among both actuaries and underwriters that many companies are able to underwrite properly amounts of insurance larger than the issue limits under which they are currently operating.

I fully agree with Mr. Dougherty as to the general problems raised by overinsurance and the appreciable increase in mortality accompanying the larger amounts. However, it is not clear to me that these problems are solved to any great extent by forcing the policyholder to resort to more than one company in order to obtain the total amount of insurance he needs.

In addition to underwriting perspicacity, issue limits are in practice appreciably affected also by agency considerations, the cost to reinsure, and other factors.

Although it may be true that the original companies collectively pay for reinsurance facilities in the long run, I would question the correctness of stating categorically that each and every ceding company always pays for the excess amounts of coverage it places with a reinsurer. Those who have been engaged in the reinsurance business since prior to the depression of the early thirties know from firsthand experience that some of their accounts have been unprofitable. In considering whether or not the original company eventually has to pay for unprofitable business passed on to a reinsurer, we cannot overlook the right vouchsafed to the ceding company to transfer his allegiance to another carrier, at least with respect to future cessions. The first reinsurer is then left with the closed group on which the accumulated experience may well continue to be unfavorable. The group-writing companies can readily understand this contingency. This is one of the reasons it is not always true that each ceding company pays, at one time or another, for unprofitable business that is reinsured.

Reinsurance is, and has been, regarded in some quarters as a means of hedging against underwriting losses. This is made possible in part by the fact that underwriting is an art, not an exact science. Cases not infrequently arise where there are varying appraisals by competent underwriters and where, therefore, the original company prefers to have such risks reinsured, either entirely or in part, until there is greater uniformity of opinion as to the proper classification. Hedging by the original company is facilitated by the practice under which the reinsurance company permits the original company to limit its retention or even to reinsure the entire amount after it learns of the reinsurer's underwriting appraisal.

Actuaries have some recent evidence that there are differences of opinion as to the cost to reinsure. To a considerable extent, the cost depends on the point of view of the ceding company as well as a variety of assumptions as to the assessment of expenses, especially those designated general overhead, and the margins in the original company's premiums. It can readily be demonstrated that a given reinsurance price offered by the reinsurer may be profitable to one original company and unprofitable to another, depending on the margins in their respective premiums.

As an illustration of the wide diversity of cost concepts, suppose that the margin in the premium structure for the typical reinsurance cession is \$2 per thousand and that by means of reinsurance the original company

could expect to receive \$.75 per thousand of such anticipated profit and the reinsurer the balance of \$1.25 per thousand. One point of view is that if the original company has no "out-of-pocket" expenses but is merely sharing the profits on its reinsured business with the reinsurer as mentioned, the cost to reinsure is measured by the extent to which such profits are shared with the reinsurer, \$1.25 per thousand in the illustration. A second view is that, provided the original company reinsures only those amounts which it would not issue in the absence of reinsurance facilities, the original company's share of the profit, \$.75 per thousand, which share incidentally accrues to the original company regardless of the mortality actually experienced (for we are here disregarding for the sake of simplicity any reinsurance dividend based on actual experience), is a true profit to the original company on the reinsurance transaction. Any "after the fact" profit sharing permitted by the reinsurer would be in addition to the "before the fact" profit considered here.

One frequently encounters still another and broader view on the subject of reinsurance costs. This view is that any reinsurance facilities needed to handle the larger amounts written by a company's agents are a general service to the field force, the cost for which is to be considered in relation to the entire amount of new business. So long as the total annual volume of reinsurance constitutes a small percentage of the new business, the cost of such services is usually considered nominal and entirely reasonable in view of the over-all benefits to be derived from such a program.

I believe Mr. Dougherty introduces a new concept when he establishes, on the basis of his approach, the possibility that in a given underwriting area the limit of retention may theoretically exceed the corresponding limit of issue. In view of the possible implications of this new concept with respect to the over-all problem of setting retention and issue limits, it is perhaps in order here to describe briefly a general approach that has not only a long tradition behind it but also considerable merit, at least from a practical standpoint. A fairly widespread approach to the problem of determining the extent to which issue limits of a given company should exceed its retention limits entails essentially the following steps:

1. Determine the maximum amounts to be retained on the basis of a variety of factors, such as size of company as measured by insurance in force, surplus position, the total expected annual mortality, average-size policy, underwriting standards and proficiency, etc.
2. In view of the needs of the field force, the growth objectives of the company, considerations relating to its competitive position, an estimate of the cost

to reinsure, confidence in underwriting evaluation, etc., determine the amounts to be issued in excess of the maximum retention limits.

In connection with the role played by underwriting limitations in a company's reinsurance program, Mr. Dougherty suggests that perhaps "someone should establish an underwriting service . . . to which any company could apply, for a fee, in order to get a sophisticated appraisal of a given risk." Since, apart from the need for underwriting assistance, the typical ceding company needs a reinsurer for excess amounts as well as for other reasons, it may be argued that it is economical for such a company to use the same connection for those cases where it would like an independent underwriting appraisal. Furthermore, there is the consideration that an organization formed merely for the purpose of rendering underwriting service may not have the necessary financial interest in the actual mortality to be experienced. This strong financial interest is obviously operative in the case of a regular commercial reinsurer carrying a portion of the risk.

The subject matter of Mr. Dougherty's paper is, and will continue to be, of vital interest to a high percentage of our membership. He deserves our gratitude for sharing with us his thoughts on some general principles pertaining to the determination of proper retention and issue limits for Ordinary business.

ARCHIBALD H. McAULAY:

Mr. Dougherty has taken a philosophical approach to the question of limits of retention and limits of issue, as well as to the broad question of reinsurance, and in so doing has presented us with a very interesting and provocative paper. In regard to the limits of issue, Mr. Dougherty points out that there have been very few references in actuarial literature to this subject and he is to be commended for his efforts to provide us with a statement as to how the limit of issue should be determined. Mr. Dougherty believes that the limit of issue is dictated by a desire to prevent mortality losses (as distinct from mortality fluctuations) and he believes that the limit of issue is basically the limit of confidence which a company is willing to place in its underwriting techniques. As an interesting corollary to the above, he hints that if all companies had underwriters of equal skill, all companies might arrive at the same limits of issue.

While there is a great deal to be said for Mr. Dougherty's views in regard to limits of issue, it is very interesting to see how these ideas fit in with current practices. The insurance publication *Who Writes What* indi-

cates that the seven largest companies each have a limit of issue in the neighborhood of half a million dollars—a relatively small limit when it is considered that the underwriting techniques and underwriters of the seven largest companies are about as sound as those of any other company in the country. Out of the remaining 111 companies listed in the publication, there are 53 which show no set limit of issue and presumably those companies would be prepared to issue up to half a million or a million dollars on one life. I understand it is possible for a company with a retention of \$25,000 and with relatively little experience in handling large cases to issue an amount of a million dollars on one life. The fact that a relatively small company may have twice the limit of issue of the largest company is not an indication that the smaller company has twice the confidence in its own underwriting techniques and underwriters. If anywhere, confidence is in the techniques of the reinsuring company.

For many companies, I believe it would be more realistic to say that the limit of issue is the retention limit plus such amount of reinsurance as the company is able or perhaps desires to obtain.

Mr. Dougherty states that reinsurance is not a hedge against underwriting losses, and that reinsurance always involves some cost (or reduction in profit) to the ceding company. If the reinsuring companies are on the job, it is reasonable to expect that the first of these statements will prove to be true, but I believe that the second statement deserves further analysis. The question of cost of reinsurance is a very elusive concept.

Let us assume that the reinsurance is on the commonly accepted modified coinsurance method. On this basis, the originating company is little more than the receiving agency for the reinsuring company. The originating company receives the premium and passes it on to the reinsuring company. In return, the originating company receives an expense allowance for commissions, other agency expenses and taxes, as well as amounts sufficient to pay death claims, dividends, surrenders, maturities, and an amount sufficient (after an interest adjustment) to set up the necessary valuation reserve. There may even be some small contribution to Home Office expenses, but in any case the Home Office expenses on a reinsured policy are usually small.

For at least some originating companies, the above might be summed up by saying that reinsurance provides for the payment of all contractual expenses, policy payments and policy obligations. Under such conditions, it might be argued that there is little or no possibility of loss on reinsurance and, as such, reinsurance should be freely used on account of its advantages agencywise.

Of course, the originating company may not regard it as sufficient mere-



ly to avoid a loss—it may feel that it should receive an additional amount to enable it to accumulate satisfactory surplus on the business reinsured. A surplus to the originating company on reinsured business may be desirable, or perhaps even essential because (1) the originating company is investing the assets of the business—we may be coming into a period when a surplus of 5% of assets would be considered essential from the point of view of the protection of the investment, (2) there is a possibility of loss on settlement options on the reinsured policy, (3) the originating company cannot look to the reinsured business to give it the lower operating ratios which frequently come from increase in size, (4) the policy was sold only after the originating company made a heavy investment to develop the agency which sold the business and it may feel that it deserves some return on the business sold by the agency, (5) whether a surplus is earned or not on the reinsured business, the company will want to set up in its statement a surplus of perhaps 5% of the reserve on all policies, including the reinsured policies.

Of course if the mortality on reinsured business is appreciably poorer than on retained business, there is little point in expecting that the margins from the premium structure will be sufficient to provide an adequate surplus for the ceding company as well as the reinsuring company. On the other hand if the mortality on reinsured business is very good and if the average size policy is very high, it might be possible, after taking care of all contractual obligations, to provide the originating company, as well as the reinsuring company, with a reasonable surplus on the business reinsured. If so, the reduction in profit on reinsurance as mentioned by Mr. Dougherty might be considered as being kept to a suitable minimum.

The surplus, if any, to the originating company is, I believe, one of the important factors to consider when reviewing a company's reinsurance program.

#### IRVING ROSENTHAL:

Mr. Dougherty's paper represents another step in the development of a mature conception by American actuaries of the complex problem of reinsurance relations.

It is fairly evident to most actuaries that a large company with a strong surplus, a competent and courageous underwriting department and good control of its field force, does not have much need for reinsurance. But for the considerable number of companies which do not enjoy all of these enviable characteristics, the scope and character of reinsurance relations represent a major problem.

Mr. Dougherty has made many helpful contributions in his discussion of this problem, and I am in agreement with most of what he says. However, I feel that in his treatment of risks of "uncertain" classification his analysis is unclear and that as a result he does not properly assess the reinsurance problem which arises in this connection.

Mr. Dougherty in some places treats uncertainty of classification as merely something which increases chance fluctuation. Elsewhere he treats it, correctly I think, as an underwriting problem. Some further clarification seems desirable. If uncertainty of classification were only a matter of chance fluctuation, it would not be of great moment because corresponding to the chance of an adverse fluctuation there would be an equally good chance of a favorable fluctuation and in the long run the fluctuations would cancel each other out. This kind of fluctuation can be embraced by probability theory. As indicated, however, I do not believe that the type of uncertainty of classification we are concerned with in actual practice is one which can be handled by probability theory. I think it is one which adds a justifiable or rational fear of an adverse fluctuation which is not offset by a justifiable or rational hope of a favorable fluctuation. I will attempt to give this matter a more detailed analysis below.

To begin with, it will clarify things if we admit that there is a type of uncertainty of classification which *does* lend itself to treatment by probability theory, as suggested in one place by Mr. Dougherty, and whose significance is merely that it results in a larger chance fluctuation without affecting the expected mortality.

If we have a population  $P$ , all of whose members can be definitely given a mortality rating of  $q$ , then if we take a random sample of  $n$  lives from this population we have expected mortality of  $nq$ , a mean square deviation of  $npq$  and a measure of relative chance fluctuation equal to  $\sqrt{npq}/nq$  or  $\sqrt{p}/\sqrt{nq}$ .

Now suppose that instead of a single homogeneous population  $P$  we have  $r$  different homogeneous subpopulations  $P_1, P_2 \dots P_r$ . Suppose that the inhabitants of these various subpopulations would, if correctly classified, have mortality ratings of  $q_1, q_2, \dots q_r$ , respectively, in ascending magnitude. Assume that the over-all average mortality rating for all the members of all the  $r$  populations combined is still  $q$ . Now suppose that in selecting a sample of  $n$  lives we have two types of randomness: first, a randomness in the selection of the subpopulation, with each subpopulation  $P_1$  to  $P_r$  having an equal probability of being selected and, secondly, a random selection of the  $n$  lives from the subpopulation previously selected. Under these circumstances the expected mortality for a sample

of  $n$  lives will still be  $nq$  but the mean square deviation will be given by the expression\*

$$n\bar{p}q + \frac{n^2 - n}{r} \sum_{i=1}^{i=r} (q_i - q)^2.$$

This expression may have a value several times as large as the familiar  $n\bar{p}q$ . Similarly, the measure of relative chance fluctuation, which would be the square root of the above expression divided by  $nq$ , may also be many times as large as the more familiar relative chance fluctuation measure  $\sqrt{n\bar{p}q/nq}$ .

Here the uncertainty of classification is due to a randomness in the selection of the underlying subpopulation from which a sample is drawn. But the expected mortality is still  $nq$ . The reason for the wider theoretical distribution of deaths about the expected number  $nq$  is that in a sample of  $n$  lives all  $n$  may, at one extreme, be drawn from the population  $P_r$  which has the highest expected mortality and, at the other extreme, from the population  $P_1$  which has the lowest expected mortality. This situation corresponds pretty well to Mr. Dougherty's statement: "Instead of measuring the fluctuation plus or minus on each side of a point, we are measuring it plus or minus from each side of a band of uncertain width. The width of the band is added to the range of fluctuation." This means, I take it, that the measure of fluctuation, instead of being  $\sqrt{n\bar{p}q}$  is  $\sqrt{n\bar{p}q} + n(q_r - q_1)$ . This is, of course, larger than  $\sqrt{n\bar{p}q}$  and seems quite comparable with the square root of the expression given above for Lexis sampling.

Although this type of uncertainty or randomness of classification, if it really exists in practice, may lead to a high relative chance fluctuation, it should have little influence on limits of retention because here we are concerned with the fluctuation in our business as a whole and not with just the fluctuation in those specific classes which are infected with the type of classification uncertainty described above. When we combine all our various classes of business, the relatively small number and weight of the classes infected by uncertainty of classification produces little effect in the final outcome. This is all very well explained by Mr. Dougherty and I heartily agree with his views.

Now, having admitted that there is a type of uncertainty of classification which can be embraced by probability theory, I would like to reiterate that the uncertainty we are concerned with in practice is much

\* See formula for Lexis sampling in Wolfenden, *Fundamental Principles of Mathematical Statistics*, p. 31.

more likely to be of a type which is outside the scope of probability theory. Our uncertainty arises largely from the phenomenon of adverse selection by applicants for insurance. We know that there are a number of different subpopulations  $P_1$  to  $P_r$ , underlying the combined population  $P$ , but we are fairly certain that there will be little randomness in the selection of these subpopulations. We fear that an unduly large proportion of our risks will come from a subpopulation  $P_r$ , in which expected mortality  $q_r$  is substantially higher than the over-all average expected mortality  $q$  of the combined population  $P$ . Thus we have reason to fear that our expected mortality is really not  $nq$  but  $n(q + k)$  and we are afraid that  $k$  may be relatively large.

It is true that in setting the premiums for the classes of business where this type of uncertainty exists, say Term insurance or issues of older ages and the higher substandard classes, we put in a safety margin which we hope will cover the  $k$  element referred to. But this safety margin is pretty much a matter of guesswork and besides it is designed to apply to all the risks in the specific class. If we segregated within the class the segment which ought to be labeled "classification uncertain," the safety margin would not be adequate for that segment. Moreover, the "classification uncertain" signs will be concentrated in the larger amount cases in the class.

In other words, if we took the business for a certain issue age, or a certain plan, or a certain rating class, and pulled out the cases where the classification was "uncertain," we would have to conclude that the expected mortality for this group of "uncertain" classification cases was higher than the expected mortality provided for in the premium or net cost structure.

Now consider the position of a reinsurance company which received only cessions of risks of the "uncertain" classification category. Suppose, for example, that the ceding companies all had a very high limit of retention but that they employed this limit of retention only for cases where they were certain that classifications were correct. Whenever they felt uncertain about a classification they would follow the practice of obtaining facultative reinsurance so that on such cases they would have no retention or only a fraction of normal retention.

If we had a reinsurance company accepting reinsurance on such an all-facultative basis, we could not reasonably assume that it would come out all right financially in the long run. The reinsurer would have been subject to a sort of double-barreled adverse selection—first, the adverse selection of the original applicants, and then the compounding of this adversity by the screening process of the ceding company.

If we consider only those reinsured cases which are clear or relatively certain in their classification, then there is no doubt that in the long run the reinsurance company will make a profit. Because this is so, the reinsurer will normally be willing to accept a fair amount of "uncertain" classification business, figuring to make enough on the first type to cover any losses on the second type. A reinsurance company will from a long range point of view make out all right on the combined business, but obviously it must take steps to keep the two proportions in reasonable balance.

If I am correct in asserting that, by and large, "uncertain" classification has very little to do with chance fluctuation, then it follows that it is desirable to reduce both the limits of reinsurance accepted and the limits of retention of the ceding company for those classes of business in which this uncertainty exists to an important extent. I think, in fact, that it is necessary to reduce the whole schedule of limits of retention below what it might be from the standpoint of pure chance fluctuation theory alone. It seems to me that we must conclude that the function of a limit of retention schedule is first to prevent inconvenient fluctuations in surplus and second to provide for a proper balance in the reinsured business between the segments representing relatively certain or clear classification cases on the one hand and "uncertain" classification cases on the other.

From the above discussion the reader may well conclude that all this talk about the proportions of clear and "uncertain" classification cases is beside the point. If the reinsurance company can make money on the whole business combined, and fluctuations in surplus don't bother the ceding company, why have reinsurance at all? I think the answer here is that just because a reinsurance company can make money on the business ceded to it, it doesn't necessarily follow that the ceding company should not have reinsured the business in the first place. The ceding company for one thing may not be able to handle the cases reinsured facultatively with as much skill as the reinsurance company did. Secondly, it might feel it necessary to restrict amounts issued to individuals in the "uncertain" classification category which would lead to highly unfavorable repercussions in its field force. It takes more than a good volume of business in force and a good surplus to eliminate the need for reinsurance. It takes real underwriting competence and intestinal fortitude and good control of the field force. Where these desirable attributes are lacking, a company would do very well to think twice before it decides that it can get along without reinsurance.

(AUTHOR'S REVIEW OF DISCUSSION)

EDWARD A. DOUGHERTY:

These discussions are most interesting to me; they all contain comments which are worthy of consideration. Some of the comments supplement ideas I tried to convey, while others modify them somewhat. None, it seems to me, really strike at the roots of my line of reasoning.

I am not sure that the differences between Mr. Jenkins' thinking and mine are just matters of definition. I still feel that it is important to distinguish between limits of retention which are established to avoid inconvenient mortality fluctuations in any one year and limits of issue which are set to limit possible underwriting losses over all years. We must distinguish between the two if we wish to avoid the "confused reasoning" and "overtraditional thinking" to which he refers.

Mr. Jenkins mentions business risk and states that when part of a policy is reinsured the business risk is shared with the reinsurance company. It seems to me that the phrase "business risk" must be defined just as "limit" must be defined. Does it refer to the risk of inconvenient mortality fluctuation in any one year? If so, I agree with Mr. Jenkins. Or does it refer to the risk of mortality losses over all years—losses due to issuing business at rates based on mortality assumptions that turn out to have been too low? If it means that, and if it is true that the ceding company ordinarily ends up by paying the reinsurance company for the losses on unprofitable business that is reinsured, then I cannot agree that the business risk is shared. You do not share the risk if you end up by paying for it yourself.

I had not intended to imply that business reinsured above a limit of issue is necessarily unprofitable business. It may turn out to be either profitable or not profitable. If it turns out to be profitable, you have certainly gained nothing by reinsuring—you have only shared the profits. If on the other hand it turns out to be unprofitable you have again gained nothing because you end up paying for the losses yourself—usually out of profits on other business ceded. Thus you share the profits and you pay for the losses.

It seems to me that if this line of reasoning is to be successfully attacked, its basic hypothesis must be discredited. The basic hypothesis is that "the ceding company ends up by paying for unprofitable business that is ceded to a reinsurance company." It is here that Mr. Ormsby makes a pertinent point. He states that a ceding company may escape paying for unprofitable business that is reinsured by switching reinsurers, leaving the first reinsurer with the account in the red. I feel that this sug-

gestion does not discredit the hypothesis quoted; it merely modifies it. It would have been more precise if I had said that the ceding company *ordinarily* ends up by paying. However, even in the case mentioned, where a ceding company changes to a new reinsurance outlet, it may still end up by paying at least something for the unprofitable business ceded to the original reinsurer, because the new reinsurer may charge a higher rate than it otherwise would have, in view of that bad experience. It cannot be assumed that they would not know about it. Moreover, this switching from one reinsurer to another has its limitations. I do not think it is a concept that we should adopt as a permanent basis for doing business.

A number of Mr. Ormsby's points are well taken. I particularly like his remark about retention limits: ". . . one need not engage in prolonged study before it becomes fairly obvious that the solution entails a multiplicity of interdependent factors, many of which cannot be measured objectively." Mr. Rosenthal apparently agrees with this. Also Mr. Ormsby's third and fourth paragraphs are valuable and my own remarks should be modified accordingly.

Further on he states, "If adverse selection by the policyholder is present, then the industry is being selected against, rather than one particular company." While this is true, it does seem to assume that my main reason for an issue limit is to cut down on the *degree* of antiselection. Rather, I feel that the primary reason for such a limit is to cut down on the *amount* of business issued where antiselection is liable to be a factor. The originating company does not want a disproportionate amount of uncertain business on its books; it desires to limit the risk of mortality loss. But how can it do this? Reinsurance is no help if the originating company ordinarily ultimately pays for the mortality losses on that portion of its reinsured business that turns out to be unprofitable. The only answer is to limit the amount of "uncertain" business that is issued—hence, limits of issue, beyond which we do not reinsure. In areas where underwriting uncertainty is greater and the danger of antiselection is consequently more imminent, we should lower our limits of issue accordingly. This not only would keep our business risk (meaning risk of mortality losses) within reasonable, pre-determined limits, but might also reduce the degree of antiselection, if the degree varies by size of policy.

I can see no solution to this problem through reinsurance unless, by reinsuring, we are sharing the risk of mortality losses. And this we are not doing if we ordinarily end up by paying for those losses ourselves.

"But," it was said to me, "what do you (the originating company) do if you have your limits of issue all established and a case comes along for an amount above such limits, and 'for business reasons' you just have to issue

it, and suppose that case is in an underwriting area where the limit of issue is *less* than the limit of retention? You just *have* to reinsure the excess. Suppose you do share some of the profits? At least you may get *some* contribution to surplus which you would not otherwise have gotten, and you have kept the agent happy." I mention this line of reasoning because it was presented to me so many times in private discussions and perhaps lies behind some of the public discussions that were given.

The answer, I think, is: "Why reinsure that excess? You are basing your argument on a choice of two alternatives—either reinsure the excess or decline it. But you started out by saying you *had* to issue the business. So those are *not* the two alternatives. The two alternatives are—should you keep the excess or reinsure it? And what do you gain by reinsuring it? If it is good business and you reinsure it, you share the profits. If it is bad business and you reinsure it, you ordinarily end up by paying for the mortality losses. Why reinsure? You should make an exception and keep that excess, up to your limit of retention."

Mr. Ormsby lists two steps which he says are entailed in determining the extent to which a company's issue limits should exceed its retention limits. The whole purpose of my paper is to suggest what seems to me a more logical approach.

Mr. McAulay points out that my reasoning leads to conclusions which are different from the practice of many companies. I certainly agree. Then in his remarks on the cost of reinsurance he seems to feel that if the originating company and the reinsuring company can each end up with at least some contribution to surplus, from business that is reinsured, we should all be happy. My own feeling is that the ceding company should not be happy if it is *needlessly* sharing its profits. There are circumstances, as I pointed out, where that is a good thing, but it should never be done unnecessarily.

The first portion of Mr. Rosenthal's discussion is a valuable supplement, done with his usual precision, to my rather vague remarks about accidental fluctuations. In reading the latter part of his discussion, however, I wondered if I had failed to make clear to him the reasoning and the conclusions which I had hoped to convey. The subject is, at best, a difficult one.