UNDERWRITING PROFIT IN FIRE BUREAU RATES

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AN ADEQUATE PROFIT

In reviewing bureau rates for every line of business, it has been customary to interpret the requirement of adequacy to mean that rates should be adequate for the *average* company. There have been suggested departures from this rule. Albert Mowbray, the actuary mainly responsible for workmen's compensation rating procedures, held that rates must be adequate for the marginal or least fortunate companies and the author of this note suggested in 1951 that rates should be adequate for any individual prudent member company. On the other hand, insurance officials have sometimes claimed that the expense assumptions used in the rating formula should be somewhat less than the average actually experienced by all companies. However, these various interpretations of adequacy have never departed to any major extent from the principle that the rates should be adequate for the average company and there can be no doubt that the Commissioners' 1921 profit formula for fire insurance intended to provide an underwriting profit of 5% for the average company.

Until quite recently ratemaking in fire insurance was not particularly scientific. For example, Deputy Superintendent Walter F. Martineau of New York, writing in 1947, said:

> "In the past it was the practice to regard as inevitable that some classes would be extremely profitable, others would provide a smaller margin of profit or no profit, and that some classes would be written at a loss. So long as an overall profit was earned, many companies were willing to let this state of affairs continue. In some respects this condition was brought about by competition. The underwriters were willing to reduce profits or even lose money on some classes in order to keep the business, to secure other lines and to satisfy their producers, if the reduced profits or losses could be offset by gains in other classes where competition was not as keen."

With this state of affairs, it was not surprising that no very great thought was given to the effect on underwriting profit which would result from complying with the demand of the regulatory officials of certain states that mutual as well as stock company loss experience should be used for determining fire rates. This demand usually arose from a mistaken interpretation of the principle of the broadest possible base which is discussed later in this paper. If, at the time this procedure was proposed, the volume of

mutual business were small, the inclusion of these data would have had little effect on rate levels and the advantage of prompt approval to a rate filing often outweighs the advantage of complete technical accuracy. Further, there were even some company and bureau officials who held that the use of stock company experience alone might price these companies out of the market. In one state two rate cases were fought hard to eliminate this requirement without success. Although the use of combined experience is not too prevalent, it is used in a sufficient number of states to cause concern.

To appreciate the effect of this requirement on underwriting profit, we can best use a simple example. If mutual loss experience is the same as stock loss experience (except for chance variation) the use of the combined data creates no problem. But, as I have pointed out on more than one occasion, the mutual companies, as a result of their mode of operation, are able to obtain business which develops statistically credible experience more favorable than the stock insurers and, hence, if the loss experience of stock and mutual companies are combined, the true provision for underwriting profit in the rate for stock companies is not 5% but some appreciably lower figure. A simple numerical example illustrates this. We assume that the mutual companies write one-quarter of the business and that their loss ratio (bureau rates) is 10 percentage points lower than that of stock companies.

	Rating Formula	Mutual Companies	Stock Companies
Proportion of business	100%	25%	75%
Provision for losses	47.5%	40.0%	50.0%
Provision for expenses	46.5%	60.0%	46.5%
Provision for profit	5.0%		2.5%
Provision for catastrophes	1.0%		1.0%
Dividends to policyholders	—		—
	100.0%	100.0%	100.0%

Hence, in this illustration, the underwriting profit margin actually provided for stock companies is only one-half that apparently loaded into the rating formula.

Stock agency companies are limited to the business presented to them through the American Agency system and have no means of writing an average cross section of the fire insurance placed with all writers. A rating procedure which forces them to use experience from policies which they

are quite unable to write does not provide the stock companies with an adequate margin for underwriting profit and forces them to provide a tight market for the more difficult to place business. Thus, a commissioner who calls for this procedure is not complying with the legal requirement that rates shall be adequate and is the cause of public dissatisfaction in areas where insurance is difficult to obtain.

It is desirable to consider what would happen if stock experience were used for overall rate level but stock and mutual experience were used for individual classes. Dwellings are a difficult class at the present time because a large proportion of the better dwellings are covered by Homeowners policies, and, hence, while much of the remaining dwelling business is perfectly satisfactory, there is a high percentage of substandard business, owing to poor maintenance, overcrowding or lack of care by the occupant, who is often a tenant and not the owner. It is not surprising, therefore, that, because of the mutual method of operation, the mutual experience is based largely on the better risks and to force this experience to play a part in determining the rates for the substandard dwellings only makes the problem of providing insurance for these properties increasingly difficult.

To justify the use of combined stock and mutual fire insurance loss experience, or as is sometimes suggested experience including independents and direct writers as well, three fallacious arguments are frequently put forward, and these must be reviewed briefly. The first is usually referred to as the "broadest possible base" and the second, less frequently used, I will call "a house is a house." The third argument is that combined stock and mutual experience is used for workmen's compensation insurance which, it is generally admitted, is rated on actuarially sound methods.

BROADEST POSSIBLE BASE

The problem of the Broadest Possible Base is particularly fascinating because there are so many cross threads of truth and falsehood, with the occasional blending of business expediency to produce a weave of rare complexity. What is more obvious than to say that we should use the broadest possible statistical base for ratemaking? The germ of the idea can be seen in the Merritt Report of 1911, "It therefore recommends to the Superintendent of Insurance that he take up this question with the Commissioners of other states and with the companies, in an endeavor to work out a practical plan which will eventually result in producing a classification of loss experience of such an extent and volume as will

furnish a basis upon which the true burning-ratio in the various classes of risks throughout the country can be determined." The need for a broad base becomes clearer with the introduction of Workmen's Compensation insurance, as we can show from a quotation from the first paper in the first volume of the *Proceedings* of the Casualty Actuarial Society: ". . . the possible exposure in one classification will be insufficient in one state to produce an average, except in so many years, that meanwhile conditions may entirely change, and make the accumulated experience entirely useless." The need for the broadest possible base becomes more definitely stated when Clarence Hobbs writes in his text on *Workmen's Compensation Insurance,* "Compensation-insurance statistics, however, increase in value with their volume . . . in obtaining a sound statistical basis for rates. For such a basis, the experience of all carriers is none too great."

The idea of the broadest possible base comes from a statistical principle, usually referred to as the law of large numbers, which states that the larger the volume of a sample of homogeneous data, the closer the experience is likely to be to the expected value for the universe from which the sample is taken. It must be noted that the existence of homogeneous data is an essential requirement for the law of large numbers to apply and when statistics show that year after year the loss ratio of the mutuals is more favorable than that of the stock companies, no statistician would say that the combined data were homogeneous. The addition of mutual loss experience to the stock loss experience does not produce more credible loss data but rather less credible data, since the two classes of data are not homogeneous one with the other.

In order to resolve the paradox of the need for a greater volume of statistics and the statistical truth that the combining of non-homogeneous data produces less rather than more credibility, we must consider more carefully the ratemaking procedure. The well-known actuary and teacher, Clarence Arthur Kulp, has explained this procedure most clearly: "The rate has essentially only two functions. It should produce total funds sufficient to cover the insurer's obligation; it should distribute the cost of insurance fairly among insured persons." These two functions are really quite distinct and much of the fallacy of the broadest possible base arises from a misunderstanding of this separation. Kulp goes on to say, "Some of the limits on the effectiveness of the rate-making process . . . lie in the nature of the rate itself. As long, for example, as rates for most risks are made of historical data and for exposures so slight they require combination with other exposures, so long will it be necessary to accept the actuary's results for precisely what they are—broad averages. One corollary of this

is that rate adequacy must come before rate equity." The process of establishing overall rate adequacy is normally separate from the process of determining the rate for an individual risk, which provides rate equity, although the two are often procedurally intertwined. For rate adequacy we must limit the data to the experience of stock companies, as otherwise they will not, on the average experience the underwriting profit assumed in the rating formula. These data can be increased only by the addition of data which it is reasonable to believe are homogeneous with the stock company data. (This procedure is necessary in the case of an individual company's rate filing.) For rate equity we need to use the largest possible volume of data to establish *rate relativities* between various subclasses, as for example between the various grades of protection when these data are available under the new personal lines statistical plan of the National Insurance Actuarial and Statistical Association. In fact, for such rate equity considerations, data should not be limited to any one state but area data can be used to provide a broader base.

"A HOUSE IS A HOUSE"

A well-known actuary said a few years ago:

"A certain house has a certain risk of burning. This risk of burning will be different from that of other kinds of houses burning due to many factors. But the difference in risk will not be due to where the insurance is placed. The house's risk of burning was generated when the house itself was built and it is entirely related to the existence of the house. The risk of burning would be there whether there was or whether there was not the insurance. Using the proper sort of yardstick, a measurement of that risk can be made and two different people making that measurement properly will come up with the same quantity of risk as being one of the inherent characteristics of that house. While the methods may be more difficult to apply, this is no more difficult a concept than that a pound of butter is a pound of butter no matter who weighs it."

This simplified example, as it was called, was used in connection with private passenger automobile insurance where the classification incorporated not only details of the automobile and its location but also details concerning the driver including his accident record. The risk of a house burning depends on many features which do not enter into the rate classification, particularly those related to the occupants of the house. Some are careless by nature, smoke in bed and contribute in numerous other ways

to causes of loss; others are most careful. All houses with the same classification are not the same risk. If we could design a classification system which would reflect not only the size, construction and protection features associated with the house but also the hazard features associated with the occupants, it would then be possible to say that all houses in a particular classification had the same risk of burning and, ignoring differences in expense loadings, there was one correct rate for each house regardless of the insurer. Since such a classification system is not practical, we must realize that the risks in a classification are not homogeneous and that there are a number of correct rates for the various risks in any class. If the better risks in the class are insured by organizations which return any profit on the business to their insureds, the rate should be fixed at a level that provides an adequate profit on the business that remains and not at the arithmetic mean of the experience of all houses in the class.

COMBINED EXPERIENCE IS USED FOR WORKMEN'S COMPENSATION INSURANCE

There seems little reason to suppose that the loss experience of stock and mutual companies should be different for workmen's compensation insurance, because a great volume of this business is largely self rating owing to the high loss frequency. The following table shows the loss ratios of stock and mutual companies for fire and for workmen's compensation (nationwide) as reported in the New York Department's booklet of Loss and Expense Ratios.

	Fire		Workmen's Compensation	
	Stock	Mutual	Stock	Mutual
1961	52.1	41.7	65.7	62.5
1962	54.6	43.0	63.1	61.4
1963	61.6	51.6	63.8	65.8
1964	55.8	47.9	63.5	63.7
1965	56.0	48.2	64.2	62.0

This suggests that while the fire experience of stock and mutuals is not homogeneous one with the other, the compensation experience is probably homogeneous and the combined experience is appropriate for rate-making for this class of business.

NON-TARIFF RATE FILINGS

In the foregoing we have ignored the problem of rate deviations by stock companies and how the data in respect thereof should be handled

for ratemaking. The simplest procedure is to exclude the experience of deviated companies from both the loss data and the expense data, so that they are treated in the same way as we have pointed out is correct for mutual companies. The procedure, sometimes advocated, of restoring the premiums to manual rates in the development of loss ratios is not normally correct and can seriously reduce the true underwriting profit provided by the rating formula.

RATEMAKING AND COMPETITION

The ratemaking procedures used for fire insurance were designed for an era when competition was virtually non-existent, and much development is still necessary before we have a system designed to suit the competitive age. It must not be thought that the exclusion of mutual business from the ratemaking technique will in itself enable the stock companies to show an actual average underwriting profit of 5%. A couple of examples will illustrate this.

First, there is a continuing drain of the better fire business to the commercial package field. This drain will cause the residual business to deteriorate much faster than any trend factors based on cost of repair indices and, hence, even when the recommended trend factors are used unsatisfactory underwriting results are most likely. Second, some companies have been transmitting as fire insurance data to the National Board and its successor, NIASA, bureau premiums on preferred business which have been actually written at substantial discounts. Hence, the premiums reported to the ratemaker are greater than those actually collected.

It is hoped that as NIASA develops better statistical techniques these and other difficulties will be overcome, but state regulation of insurance will become increasingly difficult to justify if the Insurance Commissioners and their staffs do not accept changes in rating techniques advocated by the rating bureaus to meet the problem of competitive rates but instead continue to strive to preserve old and quite inappropriate procedures.