

A SUGGESTED MODIFICATION IN THE POLICY YEAR METHOD OF COMPILING EXPERIENCE DATA FOR THE MAKING OF AUTOMOBILE INSURANCE RATES

BY

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With the development of scientific methods for the making of rates for the automobile casualty coverages (liability, property damage and collision), there is noticed an increasing tendency to "refinement" in the utilization of experience data. Consideration is being given to such matters as increasing (or decreasing) cost, credibility of experience and stability of rates, more limited territorial divisions, etc. (See recent papers in the *Proceedings*—"A Suggested Method for Developing Automobile Rates" by Harmon T. Barber, Volume XV, page 191, and "Credibility and Automobile Rate Making" by Roy A. Wheeler, Volume XVI, page 268. Reference should also be made to Mr. Stellwagen's comprehensive paper entitled "Automobile Rate Making," Volume XI, page 276.)

While it is not the intention of the writer to decry such efforts, it would seem appropriate to consider whether it is feasible to "improve" the data before attempting "refinement" in their use. This paper deals with one phase of such improvement: modification in the method of compiling experience data with a view to eliminating certain fundamental weaknesses in the present policy year method.

USE OF INCOMPLETE POLICY YEAR UNDER PRESENT METHOD

Under the present method of compiling the data, the rate maker has available the experience of the incomplete policy year and one or more complete policy years. Rate level may be determined on the basis of the incomplete policy year, a complete policy year, or a combination of policy years; similarly, relativity.

To utilize the data for the incomplete policy year, earned factors must necessarily be applied to the written exposures and

the written premiums for the various divisions of the experience. (The term "division of experience" is intended to indicate type, territory, class, etc., or any combination thereof.) If recourse is had to a tabulation of premiums in force by month and year of expiration, a record maintained by most carriers, it is possible to derive a moderately satisfactory earned factor for the experience as a whole. The factor thus derived, if applied to divisions of the experience, may produce misleading results. Different divisions of the experience require different earned factors, as is recognized in Mr. Barber's paper by the calculation of earned factors for individual states, a procedure, however, which required *special research*.

The method of calculating an earned factor by utilizing the relationship exhibited in the past between "written" and "earned" pure premiums is open to objection. The experience may not develop the same way; increasing (or decreasing) cost must be allowed for, a matter of estimate. Moreover, for any division of the experience the factor may not be constant from year to year, due to the influence of such items as changing climatic conditions, introduction of new models during different periods of the year, etc. While it would be possible to accurately calculate earned factors for divisions of the experience by keeping a record of exposures (or premiums) in force appropriately sub-divided, the clerical labor involved would make the cost of such a procedure almost prohibitive.

On the loss side, due to the fact that the "peak" of exposure is at December 31, the amounts of loss entering into the experience of the incomplete policy year are preponderantly estimates on "immature" claims. (Collision, where losses are rapidly liquidated, is an exception.) Losses for the experience as a whole may be overstated or understated; losses for divisions of the experience may be overstated or understated, without reference to how accurately losses for the experience as a whole are stated.

It would therefore appear that as presently compiled, the data for the incomplete policy year furnishes only a moderately useful indication of the trend of the experience as a whole, dependent in large part on how accurately losses have been stated. For divisions of the experience, due mainly to the necessarily imperfect "denominator," the data seems of questionable value.

POLICY YEAR VS. ACCIDENT YEAR*

The *policy year* is essentially an *exposure unit*, representing all exposures which *originate* during a twelve-month period, to which losses are assigned. The losses (and the exposures to which they are related) represent only a part of the experience of a twenty-four-month period. (In Massachusetts, where all policies expire on December 31, the policy year and the accident year are identical.)

The accident year, on the other hand, is a *loss unit*, representing all losses which *originate* (occur) during a twelve-month period. If, in effect, exposures were assigned to the accident year, the losses (and the exposures to which they are related) would represent the entire experience of a twelve-month period.

The experience of the complete policy year is an admixture of the experience of parts of *two* accident years. For example, the experience of the complete policy year 1929 consists of part of the experience of accident year 1929, plus part of the experience of accident year 1930. The experience of the incomplete policy year consists of the experience of part of *one* accident year. For example, the experience of the incomplete policy year 1930 consists of part of the experience of accident year 1930.

If the identity of the constituent accident years of each policy year is preserved (while still retaining the identity of the policy year) it is possible to obtain pure premium indications for *complete* accident years. In other words, if each policy year is regarded as consisting of two distinct accident year units, and the experience is compiled accordingly, the necessary combinations can be made in order to obtain data for complete accident years.

For divisions of the experience, the advantages of having pure premium indications for consecutive twelve-month periods, rather than for overlapping twenty-four-month periods, seem almost too obvious to require any elaboration.

PROPOSED METHOD OF RECORDING AND COMPILING OF THE DATA

In actual practice, to preserve the identity of the constituent accident years for each policy year would entail relatively little

*The term *accident year* is used in preference to *calendar year*. The latter expression usually indicates that in the place of actual amounts, recorded amounts are modified by reserves at the beginning and end of the year. The *calendar year* may be looked upon as a derived *accident year*.

additional labor, except for premiums. On the latter item, due to its limited utility, it is doubted that the split would be worth the additional expense, particularly if split exposures are recorded.

On the exposure side, an adaptation of the boiler and machinery "object months exposed" could be utilized, so as to furnish the exposure for each accident year. Instead of recording a single exposure (on the punch card or other medium) as at present, two exposures representing the accident year in which the policy was issued and the succeeding accident year, would be recorded (on the *same* punch card or other medium). With more than seventy-five per cent. of the experience recorded in car-year units this split could usually be determined by inspection.

On the loss side, it would only be necessary to record the year in which the accident occurred.

The following illustrations indicate the tabulations for policy years 1929 and 1930 as of December 31, 1930, and policy years 1930 and 1931 as of December 31, 1931.

Policy Year	Accident Year	Exposure Written	Premiums Written	Losses Paid	Losses Outstanding	Losses Incurred	No. of Claims
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As of December 31, 1930

1929	1929		XX				
	1930		XX				
	Totals						
1930	1930		XX				
	1931		XX	XX	XX	XX	XX
	Totals						

As of December 31, 1931

1930	1930		XX				
	1931		XX				
	Totals						
1931	1931		XX				
	1932		XX	XX	XX	XX	XX
	Totals						

It will be noted that the identity of each policy year would still be preserved and that premiums would continue to be compiled by policy year only. In brief, the suggested procedure would furnish exposure and claim information for each accident year with successive revaluations at twelve month intervals.

CONCLUSIONS

Under the present method of compiling the data, the rate maker has available a series of *actual* pure premium indications of the experience of overlapping twenty-four-month periods (complete policy years). There is also available a *derived* pure premium indication of part of the experience of a twelve-month period (incomplete policy year); the remaining part of this experience is included in the experience of the last twenty-four-month period. Under the proposed method, there would be available a series of *actual* pure premium indications of consecutive twelve-month periods.

As was previously pointed out, for the determination of rate level with the inclusion of the incomplete policy year, the problem was largely one of accuracy of loss statement. For the determination of relativity, in addition to accuracy of loss statement, the problem was one of accuracy of exposure for divisions of experience. The proposed method, while not remedying inaccuracy of loss valuation, furnishes a more accurate measure of exposure for divisions of experience. To this extent the accuracy of pure premium determination is improved. As for determination of rate level, the advantages of the proposed method seem to lie in the presentation of a series of experience indications based upon the more homogeneous data of twelve-month periods, giving a more sharply defined and more accurate view of trend.