

THE FUNCTION OF ADMINISTRATIVE STATISTICS
IN CASUALTY INSURANCE

BY

ROBERT S. HULL

Recent results in casualty insurance have been disappointing. Few companies can boast of an underwriting profit. In the beginning premium rates in various lines were set generally with a sufficient factor of safety to allow for the margin of error due to insufficient statistical bases for rates. These rates resulted frequently in from fair to large profits from underwriting. As experience statistics have accumulated they have been made the basis for future rates. But since from a variety of causes accident frequencies and average claim costs have tended to increase from year to year, since the past experience has included inevitably a large percentage of estimates based often on the hopes rather than the fears of the claim departments, the rates based on past experience have in many cases proven inadequate.

Obviously the making of an underwriting profit in the face of rising claim costs is a matter of extreme difficulty, and the best efforts of the rate makers, hampered as they are by the disinclination of public authorities to approve rate increases and by competitive conditions among the insurance carriers, have failed to provide a dependable underwriting profit to the companies.

It has become a fair question whether the average company can in future expect to make an underwriting profit over a period of years or even to keep underwriting losses down to a figure which will be more than compensated by interest earnings on reserves.

For the individual company the answer is better management and one of the chief guides to better management is better statistics.

The tendency of most companies in the past has been to push for volume and to trust to luck that the volume will produce profits. Companies are now awakening to the sad fact which should have been obvious in the beginning, that a large volume of business conducted at a loss is worse than a small volume conducted at a loss, and infinitely worse than a small volume conducted at a profit.

In spite of the fact that insurance to an unusual extent is dependent on statistics, many company managers look upon their statistical departments as a source of overhead or unproductive expense and narrow them down to the point where they are barely able to supply the bureaus and states with their minimum requirements of statistical information. Such statistical departments are not able to fulfill the equally important function of supplying the management with internal statistics which may guide management to success.

In the succeeding pages an attempt is made to suggest certain methods of statistical study which may place the management in a position to evaluate sources of profit and to recognize the breeders of loss within their organization.

The field briefly outlined herein is a large one. It comprises duties which belong to the statistician, the comptroller, the cost accountant and the budget director. But since the duties described extend beyond any one of these individual fields, except perhaps that of comptroller, as the title is understood in some organizations, the title assigned for the purposes of this paper to the director of the activities described will be that of administrative statistician. He is here conceived of as being a man trained in accounting, statistical and actuarial work and as being responsible for the presentation to the executives of any and all statistical and accounting data which may be useful in the formation of administrative policies.

STANDARD OPERATING STATEMENTS

The presentation of certain standard data is assumed such as monthly or quarterly comparative balance sheets and loss and gain or operating statements, and loss ratios by lines. The balance sheet and loss and gain statement at least will usually be presented to the directors at their monthly or quarterly meetings. It is not safe to assume, however, that the directors, especially those who are not insurance men, will be able to interpret them, nor even that the executives will be able to explain them satisfactorily. It should therefore be the duty of the administrative statistician to furnish explanatory comment bringing out clearly those factors which have resulted in changes in surplus.

One of the dangers to be avoided is the presentation of too

many figures in one statement. If detailed figures are to be given they should be as support to a single summarized statement which can be quickly read and easily understood. This should show figures for the current month or quarter compared with the corresponding period of the previous year and for the period from the beginning of the year to date compared with the corresponding period of the previous year.

It should be sufficient to show in this statement:

- Written premiums
- Earned premiums
- Incurred losses including adjusting expenses
- Commissions
- Other underwriting expenses
- Underwriting adjustment items (e.g., change in past due premiums)
- Underwriting profit or loss
- Investment income accrued
- Gain or loss on sale of securities
- Change in market values *or*
- Change through amortization
- Investment profit or loss
- Total operating profit or loss
- Accrued dividends to stockholders
- Gain or loss to surplus

A supporting statement may give such additional detail as the directors can absorb, including an analysis of expenses by kind showing ratios to earned and to written premiums.

And now the real work of analysis commences, for the statement which shows the change in the statutory surplus, while necessary, may require a good deal of elaboration and explanation before the true operating results as they would be shown in other lines of business can be known.

INTERNAL OPERATING STATEMENTS

It may be well to present an "internal operating statement" accompanied by a written explanation to bring out the salient facts.

If the company's practice is to figure earned premiums on a

50 per cent. basis, the loss ratio results for the month will be concealed. For the internal statement the monthly pro rata basis should be used. But this in turn will distort the expense results and will show heavy book losses with an increasing premium volume. To meet this condition operating expenses should be credited with commissions on the increase in unearned premium reserves or it may be well to follow the lead of some insurance publications and credit 40 per cent. of the change in unearned premium reserve.

Another source of distortion may be in the use of Schedule P loss reserves. If the past experience of the company shows that the losses indicated by the statutory reserves have generally been realized it may be well to let the statutory reserves stand, but if any considerable saving may be made from this source, it may be better to use case reserves for the purposes of this statement. If this is to be done, however, the company should have a dependable method of valuing reserves on recent losses and should take account of reserves for loss expense and for incurred but not reported losses.

Changes in outstanding premiums over 90 days due are not generally significant in a monthly operating statement, as it is usual to make special drives to bring these outstandings down at the year end while at other times they may show considerable temporary increases. For the internal operating statement these outstandings may be taken at a percentage of total outstandings which the company may reasonably expect to realize at the year end.

For a new or rapidly growing company, purchases of furniture and fixtures may distort the monthly operating statement. Hence, it may be advisable to capitalize such expenditures and to show depreciation as an operating expense, at least for the purposes of the internal operating statement. It is the writer's preference to use the same treatment for annual statement purposes.

For the purpose of the internal statement, organization and special development expenses may be capitalized and charged off over a period of from three to five years. Some companies have succeeded in making worth while estimates of earned premiums accruing on policies subject to audit, and this item is of sufficient importance to merit careful study.

All of this may be too elaborate for presentation to the directors in detail, but it should be available to the executives and may be presented in summary to the directors who would probably be willing to accept the details on faith if the summary is accompanied by a clearly presented written commentary on the results disclosed.

In lieu of such a statement to the directors, the fluctuations in the statutory surplus brought about by seasonal changes in the premium writings may be illustrated by a comparative chart of the monthly surplus fluctuations in the current year compared with those in the previous year. Such a curve will take account also of such items as the year end round-up of past due premiums and of payroll audit premiums.

In addition to the general operating statement, there are many forms of statistical and accounting analysis which should be available to the executives.

FINANCING NEW BUSINESS

For a young or rapidly growing company, one of the first executive decisions to be made is how rapid a growth can the company afford, first from the viewpoint of financing the increase in premium reserves and second from the viewpoint of development costs.

The first factor of loss to surplus arising solely from the increased volume of premium writings, assuming losses and expenses in accordance with the provisions in the rates, is well understood by actuaries and statisticians, but is less familiar to the average executive. Any analytical study of a company's financial results or of its proposed budget should take account of this factor.

DEVELOPMENT COSTS

The size of a new company's budget for development is necessarily dependent on the size of the surplus and the good judgment of the executives, but the budget should be fixed with due regard to the technical or statutory losses produced by increasing premium writings.

On a retrospective view of development costs, the statistician

has more to offer, as he is able to substitute actual results for preliminary estimates.

Development work is carried on through two main channels, the home office agency department with its handmaiden, the advertising department, and the branch offices.

In analyzing the costs and results of the agency department, a division should be made between branch office supervision and agency supervision and agency supervision should be divided if possible between supervision of established agencies and development of new connections. Against these costs should be placed the number of active agencies at the beginning of the year, or other accounting period, the number and size of new agencies appointed, the number and past production of agencies terminated, and the causes of the terminations; also any similar development in the organization or termination of branch offices. The total agency production for the period should be shown with the increase over the prior period, also the branch office production and the increase over the prior period.

The analysis of advertising results is not easy, as it is impossible to tell whether the increase in writings is due more to good advertising or to better work by the agency department or to general business conditions, or whether a slump in business might have been more pronounced but for the advertising. In some cases the results of special advertising campaigns can be partly evaluated, but on the whole the returns received from the advertising appropriation generally remain in the realm of conjecture. However, the advertising costs, excluding advertising required by statute, are a part of the development costs which in total should not be allowed to exceed a reasonable percentage of the business produced. The development costs from year to year should be compared with the growth of the business and an increased ratio of such expenses to premium income may call for executive attention.

If the executives have decided upon a policy of increased development activity, the statistician may be able to indicate what results must be produced if the expenditure is to be justified or at least to evaluate the results as they develop.

The value of the results will be indicated by the value of increased new business produced during the period above the

normal increases of the past and by the impetus given to production which may result in future increases. The value of the new business consists of the profit which it may produce, including the interest factor, with due consideration given to the amount of existing overhead costs which the new business will absorb. The impetus given to future production in established agencies may be measured by the expected persistency of the new business produced during the current period. In the case of newly appointed agencies the measure is the value of the agency based on the expected volume of production by line of business times the percentage of profit to be expected from the business. The average persistency of business may be estimated by line of business and by agency by segregating new from renewal business and determining what per cent. the renewals in one year bear to the business written in the preceding year. If the volume of business is increasing rapidly, this method will indicate too low a rate of persistency. The calculation of actual persistency rates would be a more elaborate process, the description of which would be outside the purpose of the present paper, and it is perhaps questionable whether the results of such a study would justify the expense involved.

ANALYSIS OF BRANCH OFFICE RESULTS

Akin to the study of the results produced by the home office agency department is the study of results obtained by branch offices.

The production of business through branch offices is generally more expensive to the companies than production through agencies. The justification for branch offices must lie in better organization of the territory, better service to the policyholders, relieving the home office of a part of the clerical detail work and some of the agency supervision, and lower loss ratios reflecting more careful underwriting in the field and superior claim, inspection and payroll audit work.

Adequate records should be maintained to show for each branch office the loss ratio by lines on an "earned-incurred" basis, commissions, expenses of operating the branch less an allowance for home office functions assumed by it and the profit or loss on the

business after charging it with its share of the home office expenses.

In addition it will be well to know the margin between the commissions paid through the branch and general agency commissions on a like volume of business, and the difference between such commission margins and the "other acquisition" expense incurred by the branch. From this can be computed the additional volume of business which must be written by the branch at present rates to absorb the other acquisition expense, or it may be found that the branch should make a drive to increase its volume of low commission business.

A further check on the value of the branch will be a comparison of the loss ratios shown on its business with the loss ratios on the company's business produced by agencies, and a comparison of the amount of the saving, if any, with the extra cost of maintaining the branch.

AGENCY AND BRANCH OFFICE LOSS RATIO EXPERIENCE

It is assumed that all well organized statistical departments are prepared to furnish to the executives and the underwriters loss ratio experience by kind of insurance, by state and by classification. A less usual record is that of loss ratio experience by agencies based on a policy year experience of earned premiums and incurred losses. Such a record for the larger agencies has been found worth while by some of the companies. Naturally, the question of the credibility of the experience arises in the case of an agency showing a bad record. It is well in such cases to consider the number of accidents reported and to segregate the exceptionally large claims. In some cases, on the other hand, an agency which shows only a normal loss ratio may develop an abnormal accident frequency indicating poor underwriting, but owing to good luck in avoiding severe accidents, the condition may not be apparent from consideration of the loss ratio alone. A rough check on this condition may be made by multiplying the number of accidents reported by a standard cost per accident and comparing the results with the actual amount of the incurred losses. This is, of course, unscientific, but it may serve to call attention to the agencies which need watching.

ANALYSIS OF HOME OFFICE COSTS

Home office administrative expense offers another fertile field for the administrative statistician, especially if he can include in his field that of budget director, and there is no one who should be better qualified to undertake this work. Anyone who is familiar with office work knows that the ratio of efficiency in most offices is appallingly low. This is due largely to a lack of standards of possible output per clerk for various classes of work and to a consequent lack of method in determining when and where additional help is needed. If the work of a given department is falling behind, the usual answer is to employ additional clerks rather than to make sure that the present staff is functioning at the maximum degree of efficiency.

It should be the duty of the administrative statistician to see that standards of clerical output are established and that such controls of cost and output are created as will ensure the maintenance of such standards.

Having once set up standards of performance the next logical and useful step is the establishment of a budget and the analysis of expenses by departments or operating units in terms of the budget.

In order to budget intelligently for increasing volume, a careful study should be made of expenses which may be expected to fluctuate in approximately direct ratio to increased production and those which should increase slightly if at all as business increases. It is easy to look over a schedule of expenses by departments and to be satisfied if the ratio of expense to premium volume in each department has not increased as compared with the previous period. In fact, if the benefits of increased production are to be fully realized, the ratio of expenses to premium volume in the "overhead" departments should decrease with increased volume.

If, as frequently happens, a new company is launched with a high-grade executive personnel, the burden on a small volume of business is excessive. In such a case the fact must not be lost sight of that a certain volume of business must be produced to absorb the executive overhead which must not be permitted to increase materially until such a volume is produced.

In comparing departmental expenses with those of prior

periods or with the budget allotments, it should be borne in mind that premium volume is not always an adequate criterion of the volume of work done, as marked fluctuations occur in the average size of premium per policy and other conditions arise at intervals which may cause marked increases in the volume of work to be performed but which do not reflect changes in the premium volume. Hence the statistician should have among his tools records of number of policies written, number cancelled, number of endorsements, number of payroll audits, number of accident notices, number of claims incurred involving payments, number of inspections made, number of agency accounts, number of Hollerith cards punched, etc.

CONTROL OF RECORDS

When additional records are called for it should be the administrative statistician's responsibility to see that the cost of the record does not exceed its value and that the same or equivalent information is not being furnished in some other way or that some similar record may not be modified to provide the data required. In short, he should be familiar with all records furnished by all departments and should see that they are so coordinated as to avoid duplications or wasted effort in producing in one department records which can be made more economically in some other place. It may be found, for example, that the agency department is making up for its own use records which can be furnished more easily by the accounting or statistical divisions, or which duplicate in whole or in part records which one of these departments is keeping.

ANALYSIS OF CLAIM DATA

Some excellent papers have been presented before this Society dealing with the testing of claim reserves so that it is not necessary to enter into a discussion of methods. It is assumed that the statistician is alive to his responsibilities in this regard.

It may be suggested, however, that there is considerable scope for his work in analyzing and comparing the results of the work

of the company's various claim offices and in comparing the results produced by those offices as a whole with the results obtained by the employment of independent claim adjusters.

Among the data which would be useful for each adjusting office and for each line of insurance would be number of accident notices, number of claims, average cost per notice, average cost per claim, average expense per notice, average expense per claim.

One or two of the large companies have made comprehensive studies of the cost of claim settlements by line of insurance which have considerable value, both in the proper allocation of loss expense and in judging the relative efficiency of adjusting offices.

Other duties of the administrative statistician which require no elaboration here are the allocation of expenses by line of insurance, including acquisition, administration, adjusting, inspection and payroll audit; the testing of the adequacy of current loss reserves, the analysis of investment results by type of investment; the comparison of company results with the published statements of other companies.

The administrative statistician should not be content to provide the executives with such records as they ask for. He should give them the records that they ought to have and be prepared to convince them of the need for them. His attitude of mind should be that of an executive who knows, as many active executives do not know, what facts are available in the records and what are the implications of those facts in judging the progress and present financial condition of the business. It may not be within his power to dictate executive action, but he should be able to indicate pretty clearly what that action should be.

Moreover, he should not be apologetic regarding the cost of the department. At a cost which should be represented by a small fraction of one per cent. of the premium volume he will be providing data upon which the success of the company may largely depend.