Market Statistics

Introduction

1.1 Market statistics can be collected for a number of very different reasons, but in this paper we shall be considering the collection and interpretation of market statistics to be used by a company in establishing relative risk premiums. We are less concerned with the fixing of absolute levels of rates, but more with the provision for individual companies, of standard tables of relativities for different risk groups, while at the same time providing a more valid assessment of these relativities for those risks in extreme cells, where an individual company has very little data. There should be other by-products to such a statistical system such as claims distributions by delay and amount and overall trends produced both regularly and ad hoc. These will be of help to the industry and the individual company in calculating such things as technical reserves, levels of reinsurance, I.B.N.R., overall premium movement, market research etc.

1.2 We can compare with the continuous mortality investigation. An actuary has, in those tables a standard table which he can use for either rating or valuation purposes. Any one office may experience heavier or lighter mortality, but this does not detract from the value of the standard table. Should we be aiming to see something similar produced for general insurance while recognising that we do not have in general insurance such a well ordered and single decrement as mortality.

1.3 One of the traditional fears of market statistics in general insurance is that they may reduce competition. This has not been the case in life insurance where one of the largest reasons for varied levels of premiums lies in the subjective assessment of future levels of interest, and to a lesser extent standards of underwriting and expenses. Mortality tables do however provide a firm risk framework upon which the premium can be built. In general insurance there are many subjective elements in the calculation of the premium and amongst the most important is the future rate of inflation and to a lesser extent the future rate of change of frequency, standards of underwriting and levels of expenses. Market statistics will not provide answers to these subjective judgements, they should however form the risk framework and on the basis of this an increasingly responsible market could follow. This would be of value to the industry.

1.4 We want in this session of the seminar, to get down to detail rather than discuss generalities, therefore in looking at market statistics it will be helpful to concentrate on two classes of business, Motor and Fire on which there are some statistics collected for at least a part of the market. Since 1967 the B.I.A. has been collecting data from a number of companies to produce Motor risk statistics. The Fire Offices Committee (F.O.C.) have collected statistics for a number of years from the tariff companies. These two classes of business provide us the examples of market statistics which it is useful to look at in some depth in order to see the general problem. Moreover, if we cannot solve the problems of collection and interpretation of useful market Motor statistics, then we are unlikely to be able to do it with other classes. We shall therefore look at Motor first.

Motor Market Statistics

2.1 The basis of the Motor Risk Statistics Bureau (M.R.S.B.) is as follows:-

Each quarter each participating company provides the Bureau with -

(a) A census of all single vehicle private Motor policies in force together will all their risk factors.

(b) Details of all claims notified within the period.

(c) The total claims payments on all those claims settled within the period.

From this information the Bureau produces quarterly output showing results for the quarter and year to date. The results are shown both for all companies combined and also for individual companies. The output provides frequency of claim and an average cost of settled claims. These two together are used to produce cost per car year. The dangers of using average settled claims in this analysis are known and work is in hand to produce the claims cost using a claim cohort analysis. The individual companies output also provides the average premium for each risk group and claims ratio, i.e. cost of claim per car year divided by the premium. The data is standardised using a method described by Johnson & Hey in their paper to the Institute (JIA 97 page 199). This separately produces a standard for frequency and a standard for average cost per claim but the two are not combined. This standard is a standard based on one set of factors for the whole market. The results are produced some two months after the end of the quarter to which the experience applies.

2.2 Three of the differences between this system and the one set up in Holland shortly afterwards are of interest:

(a) They do not use average settlement as do BIA but instead use a cohort analysis which includes the companies own individual estimates. The results are reviewed after 12 and 24 months.

(b) They standardise the data but with the big difference that they use a different standardising basis for each company; the standardising basis which suits the rating structure of that particular company. These standards are applied both to the company data and the overall data which is shown to that particular company.

(c) They produce one combined standard for frequency and claims cost.

2.3 There are a number of questions which follow from this.

(a) Is anyone aware of what othercountries are doing on this subject, are there developments in the U.S.A. which we could learn from?

(b) Does your Motor Manager and your Motor Research Unit know how to interpret the B.I.A. results in the standardised form? What significant benefits have these statistics produced for your company?

2.4 Exposure

Company files do not get adjusted immediately there is a change in the risk. We believe some companies were experimenting with a census taken after a three month delay so that all adjustments could be allowed for. Did this produce significantly different results?

Do you feel that exposure taken from a census is sufficiently reliable?

Should we accept a system which is not reconcilable?

What is the alternative to using the census method - it appears to be going back to the system used before whereby the exposure was based upon the risks written and renewed plus changes as and when they were advised. This has an advantage in that a reconciliation becomes possible with the accounting of the data.

2.5 Average Claims Settlement

The dangers of using this statistic for the future were made very apparent a few years ago when the B.I.A. were embarrassed to find their average claims settlement had gone down at a time when inflation had obviously pushed the real figure upwards. What had happened was that due to the influx of the ex V & G. business to the contributing companies a disproportionately larger number of small earlier settled claims were being advised to the M.R.S.B. When these were aggregated with the settled claims which arose from an earlier period when the exposure was smaller the effect was to reduce the average cost of the settled claims. The alternative cohort system if it is to provide an early indication of relative costs requires the use of the latest estimated cost of the outstanding element of a particular claim. These figures have however a doubtful value particularly where liability claims are concerned, because they depend on the accuracy of the individual estimates. These must necessarily be somewhat arbitary at early durations.

If we are not to include estimates how long should we delay analysing the cohort to obtain reasonable relativities?

If estimates are to be included what is the earliest point of time that we can include them?

What do other companies use in their own statistics?

2.6 Large Claims

The B.I.A. spread the cost of large liability claims over all liability costs. We suspect intuitively that the effect of this is to transfer claims costs away from younger drivers to the older ones and possibly to transfer costs between other categories. Has anyone got any statistics to justify this statistically? What alternatives can you suggest?

2.7 Basis of Standardising

While this basis gives some immediate sign of changes in frequency and cost, because it does not combine the two, it leaves one with a degree of uncertainty. Is it not essential to find a basis which combines the two

(as in the Dutch statistics)?   Has   anyone here done so?

We question the value of using one standardised basis for all companies.

Has anyone information on whether an additive (as used by M.R.S.B.) or a multiplicative model is more suitable?

2.8 Premium

At a time when the B.I.A. system was set up it was decided not to input premiums.   It is suggested that in some quarters that they are a measure of exposure, albeit a changing measure and that there is value in seeing the results related to premiums.   The facility of being able to compare an individual company's average premium with the market average premium for various different risk factors is of value especially at this time when so much is changing;   it also provides a standard and a basis of reconciliation.

2.9 Frequency of Results

While there is a clear case for some quarterly information in the form of overall trends or movements, the big analysis should surely be a yearly one.

An impressive feature of the Dutch Bureau is the fact that it is equipped to do one off jobs for individual companies at a charge.   This seems to be a basic requirement of any computer based statistical set-up especially as a Bureau should be able to provide the analysis more competitively than the individual company.

3.1 Industrial Fire Insurance

There is still an industrial Fire insurance tariff and the statistical system is based upon this tariff and collected from the tariff companies alone.   This means that the experience is less heterogeneous and also that the premium income for one company or another is comparatively a more meaningfull figure for exposure.

3.2 The F.O.C. statistics rely upon written premiums and paid claims.   It seems very crude but they are aware of its shortcomings and adjust suitably for the earning of premiums and the incurring of claims.   It is also reconcilable with audited data.   It is not at all clear that the additional cost of sophisticating the system for a subject which is so subjective is worthwhile. Have we any knowledge of other systems in other parts of the world and their practical value?

3.3 It would appear to be a requirement of the statistical system that we keep the statistical information by type of industry.   This is because each industry or sub-industry attempts to put pressure on insurers if the amount paid to the insurance companies does not compare favourably to the amount that they receive back in the way of claims.   The system therefore needs to be able to show each sub-industry that it is in fact standing on its own feet over the period.   This the F.O.C. does.

3.4 There has been less detailed statistical work on this particular class. There are significant variances between Fire and Motor. Claims are traditionally over reserved and there is a faster run-off (except in consequential loss); Fire distributions are very skew with a small proportion of policies providing a large proportion of the exposure and a few claims producing a large proportion of the claims cost. An example is the Flixborough fire explosion where the total cost represents approximately 15% of the 1974 U.K. Fire wastage.

3.5 Exposure

Is the census method likely to be valid in view of the number of short-period policies which are written, the time it takes to place new business on the books, and the repeated alterations which are made to the sum insured some of which are retrospective. Has anyone any information to support this supposition?

3.6 There is no unit such as a motor car which is really applicable here. Sum insured appears obvious, but do we mean sum insured per each individual peril and should we be equating one enormous building with 100 smaller ones which are of the same total sum insured. The tariff system relies on premiums but there is a intuitive wish for information coupled with sum insured. In Australia a system has been set up using sum insured and statistics have begun to emerge over the past two to three years. It is not at all clear that the initial sum insured information is such that it can be readily used. There is a view that the claims cost per sum insured should vary according to the size of the building. This is another reason for looking sceptically at statistics per sum insured unless they are by bands of size of risk. Has anyone any experience of Fire statistics with sum insured?

3.7 Large Claims

The impact of large claims is even more a problem in industrial Fire than in Motor due to the skewness of the claims distribution. Has anybody any useful data? How do we treat these large claims? The U.S.A. has done quite a lot of work on this subject.

4.1 Closing Remarks

These notes have been written around two classes of business Motor and Fire and have asked many specific questions. It is hoped that many of these questions can be answered with the use of examples using real data.

4.2 If sufficient time is available consideration should be given to the problem of accuracy of data and the reconciliation of data with the company's own internal statistics. It is true to say that this is not an insignificant part of the problem of collecting market statistics.

T. G. CLARKE
CPT/TGC/JP
11.10.74