the forerunner of additional efforts to make full usage of all the statistical tools of our industry to the mutual benefit of all the companies. This is a thoughtful and stimulating paper devoted, I believe, to a larger purpose than that expressed by the author. Mr. Gill is deserving of our commendation.

DISCUSSION BY PETER B. ZORY

As a representative of a ratemaking organization, I found Mr Gill's paper of particular interest. The essential idea of the paper concerns the calculation of premium at present rates by utilizing a statewide distribution of classification exposures instead of the actual distribution within each rating territory. The standard method of computing premium at present rates, as described in Mr. Stern's paper,[1] requires the use of the actual class exposures within each rating territory. Except for six states, the National Association of Independent Insurers collects automobile experience by territory for all classes combined and only statewide for each classification. Thus, the N.A.I.I.'s compilation of experience does not include the actual classification exposures within each rating territory. Mr. Gill believes an estimate of the exposure by class within each territory, based upon the statewide distribution, would enable small independent companies to use the N.A.I.I.'s compilation of experience to (1) test their rate levels or (2) determine approximate rate levels for a state they are entering for the first time.

In order to demonstrate that his method can closely approximate the actual premium at present rates, Mr. Gill has calculated two rate level changes, for each of four states in which the actual class distributions by territory were available. He calculated one rate level change on the basis of the actual class distribution within each territory and a second based upon the statewide class distribution. The resulting rate level changes were practically identical.

To illustrate further the feasibility of using the statewide class distribution, Mr. Gill performed another test involving six other states. Two sets of premiums at present rates were calculated for each of the six states, using the same exposures but different rates. Both sets of premiums were based upon the N.A.I.I.'s 1961 statewide class exposures, which were distributed by territory using Mr. Gill's approximation method. One set of premiums were calculated at the 1961 N.B.C.U. rates and the second set at the 1960 N.B.C.U. rates, adjusted to reflect the 1958-1959 N.A.I.I.

[1] Current Rate Making Procedures for Automobile Liability Insurance, *PCAS* XLIII.

loss experience. Mr Gill concluded that the second set of premiums, reflecting the N.A.I.I. loss experience, anticipated more closely the premiums indicated by the 1961 N.A.I.I. incurred loss level than did the premiums calculated at the 1961 N.B.C.U. rates. It seems such a result would be inevitable. While Mr. Gill does note that no criticism of N.B.C.U. rates is implied because they were developed from and for a different book of business, it should be pointed out that the 1961 N.B.C.U. rates are those filed and approved and do not necessarily represent a pure statistical formularized approach.

This approximation method however, appears to be a reasonable and useful procedure in helping small independent companies to estimate the adequacy of their rate levels. For example, Company X with insufficient data could check the adequacy of its present rates by utilizing its own present rates in conjunction with the combined N.A.I.I. class exposure and loss experience. Mr. Gill would use the N.A.I.I.'s statewide class distribution in estimating the N.A.I.I.'s class exposures within each territory and these exposures would be multiplied by Company X's rates to produce N.A.I.I. premium at present rates. The standard ratemaking procedures, currently being utilized by the National Bureau, would then be followed to determine indicated rate level changes. If Company X's rates are to be judged on the basis of the combined N.A.I.I. experience, then it would be desirable to have these rates determine originally from a book of business similar to that reported to the N.A.I.I. Also, the Company X's present distribution of business should be fairly representative of the combined N.A.I.I. experience. One possible difficulty in this area is that the N.A.I.I. statistical plan allows the same risks to be reported under different classification codes. For example, companies reporting to the N.A.I.I. may report young driver risks under three class codes, two class codes, or they may combine all of their young drivers under one code.

Considering this approximation method as a precise ratemaking tool, I would have the following comments. Rates must meet statutory requirements that they shall not be excessive, inadequate or unfairly discriminatory. Premium at present rates calculated by utilizing a statewide distribution of class exposure could produce excessive or inadequate premiums both statewide and by territory and also unfair discriminations among territories. The greatest variation between a statewide and a territory distribution cited in this paper produced a difference in bodily injury rates of 3%. In states where there are large differences in classification distribution among territories the resulting rate differences would be larger than 3%. There are numerous examples of states where such differences could result, including states with few rating territories. In one small state, a territory's rates calculated using N.B.C.U. experience and Mr. Gill's approximation method differed by 6.5% from those computed using the actual exposure distribution by class.

Mr. Gill's principal objective however, was to afford small independent companies a reasonable basis for checking and comparing rate levels using the N.A.I.I.'s compilation of experience. It seems to me he has accomplished his purpose and has enabled companies to make more valuable use of the N.A.I.I.'s compilation.

In this connection it might be of interest to consider the National Bureau's compilation of experience. The N.B.C.U. compilation sets forth an experience pure premium and a pure premium underlying the average rate for each rating territory. These average rates have been determined from the actual class exposure within each rating territory and the present rates being used by the members and subscribers of the N.B.C.U. To supplement this information, the National Bureau is now preparing to make available to each of its companies their own experience in the same detail as that shown in the compilation for all companies combined. This will allow each company to compare its own loss experience with that reported for all companies, as well as the pure premium underlying its average rate with the Bureauwide average rate. These pure premium comparisons will facilitate a convenient and precise rate level check for the individual company.