FITTING NEGATIVE BINOMIAL DISTRIBUTIONS BY THE METHOD OF MAXIMUM LIKELIHOOD

BY

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DISCUSSION BY M. BONDY

LeRoy Simon's paper deals with two statistical concepts which have lain just outside our door for many years but with which most of us Actuaries have not, until recently, been familiar.

The now popular Negative Binomial Distribution brought to us by Frank Harwayne and developed lucidly by Lester Dropkin has been lying around for how many years this reviewer does not know. We now wonder how we have gotten along without it.

LeRoy now brings us, for what I think is the first time in our literature, the method of maximum likelihood. This method was developed in two papers by R. A. Fisher in the early 1920's, and A. M. Mood says of it "Thus Fisher virtually solved the whole problem of point estimation in these two remarkable papers."

Now that this tool is before us it may well turn out to be one of the most useful we have. The author has suggested a use in determining parameters of truncated distributions; for example, those resulting from a study of individual company records of insureds having claims against them. This is applicable to the reviewer whose company maintains policy histories only on those insureds who are not claim free. This has been considered by my company to be the most efficient method of handling the policy history problem.

It may be that common use of this tool by actuaries as well as interchange of findings may take the underwriting function a bit further off the "seat of its pants" and onto a somewhat more scientific basis. Does not the refined classification scheme brought about by our recent Auto Merit Rating Plans work in this direction?

Who knows what other already discovered answers to our problems lie just beyond our rather short grasp? We have, as a professional Society, been, it seems, too preoccupied with the solution of problems within our own area by means familiar and comfortable to us. We have not been willing to venture into the neighborhood camps of Game Theory, Operations Research, or other possibly fruitful kindred fields. Perhaps a permanent "Fishing Expedition" or "Basic Research Committee"—or call it what you will—functioning under the aegis of the C. A. S. would help us collectively to discover what is before our eyes in less than forty years.

Incidentally, LeRoy Simon is to be commended for a thoughtful job which entailed not only the use of some rather advanced mathematical techniques (at least from this worm's-eye point of view) but also a good deal of dull, soporific arithmetical calculation which is the bane of every Actuary.