ASTIN / AFIR-ERM COLLOQUIUM
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SYNOPSIS

TITLE

AUTHOR(S)

Key words: cell-wise dependency, claim array, claim dependency, claim triangle, column-wise dependency, common shock, diagonal-wise dependency, heuristic estimation, row-wise dependency

Purpose of your paper: Construction of large correlation matrices across multiple insurance business segments on the basis of small parameter sets.

Synopsis: The paper is concerned with multiple claim arrays, with observations indexed by array number, accident period, and development period. It constructs a number of models that incorporate dependencies between observations both within arrays and between arrays. Arrays are of general shape (possibly with holes), but include the usual cases of claim triangles and trapezia that appear in the literature.

General forms of dependency are considered, with cell-, row-, column-, diagonal-wise, and other, forms of dependency as special cases. In all cases, dependency is induced by common shock components.

The principal purpose of the paper is the construction of a flexible family of models, rather than the formal estimation of their parameters. However, in recognition of the extensive use by practitioners of large correlation matrices for the estimation of diversification benefits in capital modelling, substantial effort is applied to practical interpretation of such matrices generated by the models constructed here. Indeed, the literature does not document any methodology by which practitioners, who often parameterize those correlation by means of informed guesswork, may do so in a disciplined and parsimonious manner.

Reasonably realistic examples are examined, in which an expression is obtained for the general entry in the correlation matrix in terms of a limited set of parameters, each of which has a straightforward intuitive meaning to the practitioner. This will maximize chance of obtaining a reliable matrix. This construction is illustrated by a numerical example.

The generated correlation matrix is then combined with heuristic estimates of tail dependency to arrive at a t-copula which might be used to construct capital margins dealing with the extreme right tail.

Note: If you are not presenting a paper for this Colloquium, please include as much detail as possible in your Synopsis (maximum three pages) to enable delegates to prepare for your session.

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