A Practical Concept of Tail Correlation

B. John Manistre[1], FSA, FCIA, MAAA

[1] The author is Vice President for Risk Research in the Group Risk Dept. of AEGON NV, 1111 North Charles St., Baltimore, Md.

Abstract[2]

This paper shows how the results of copula based capital aggregation models can always be locally approximated by relatively simple formulas. The paper defines the concepts of diversification factor and tail correlation matrix and describes methods for estimating these quantities from simulated data. We show how these ideas can be put into practice as both computational shortcuts and presentation tools. Some examples are then developed, which suggest that, when copula based models are used to aggregate capital, two new phenomena emerge: a) diversification benefits are reduced because of additional tail dependence in the copula; and b) diversification benefits are increased when aggregating risks that have finite variance and the model does not have too much symmetry. Since few of the risks held by a life insurer are so heavy-tailed that they have infinite variance, the paper concludes by arguing that simple, correlation matrix-based, capital aggregation formulas are more defensible than previously thought.

[2] The views and opinions expressed in this paper are those of the author and not AEGON NV.