The Art of Seeking Hidden Risks

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Assessing tail risks using the asymptotic models provided by multivariate extreme value theory has the danger that when asymptotic independence is present (as with the Gaussian copula model), the asymptotic model provides estimates of probabilities of joint tail regions that are zero. This may be strong evidence that the wrong asymptotic regime is being used and in applications such as finance, telecommunications, insurance and environmental science, it may be unrealistic to believe in the absence of risk contagion. Hidden regular variation offers a partial solution in that it assumes a lower order asymptotic behavior on a subcone of the state space and this theory can be made more flexible by extensions in the following directions: (i) higher dimensions than two; (ii) where the lower order variation on a subcone is of extreme value type different from regular variation; and (iii) where the concept is extended to searching for lower order behavior on the complement of the support of the limit measure of regular variation. We discuss some challenges and potential applications and a flexible framework for regular variation on metric spaces based on tail regions being bounded away from removed closed sets; the approach was initiated by Hult & Lindskog and used by Das, Mitra & Resnick..

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