Paths and indices of maximal tail dependence

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Abstract. I will demonstrate both analytically and numerically that the existing methods for measuring tail dependence in copulas may sometimes underestimate the extent of extreme co-movements of dependent risks and, therefore, may not always comply with the new paradigm of prudent risk management. This phenomenon holds in the context of both symmetric and asymmetric copulas with and without singularities. As a remedy, I will introduce a notion of *paths of maximal (tail) dependence* and utilize the notion to propose several new indices of tail dependence. The suggested new indices are conservative, conform with the basic concepts of modern quantitative risk management, and are capable of differentiating between distinct risky positions in situations when the existing indices fail to do so.

Keywords and phrases: multivariate distribution; copula; tail dependence; maximal dependence; fatal shock; multivariate Pareto; enterprise risk management.

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