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# Tail dependence of the Gaussian copula revisited

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**Abstract.** Tail dependence refers to clustering of extreme events. In the context of financial risk management, the clustering of high-severity risks has a devastating effect on the well-being of firms and is thus of pivotal importance in risk analysis.

When it comes to quantifying the extent of tail dependence, it is generally agreed that measures of tail dependence must be independent of the marginal distributions of the risks but rather solely copula-dependent. Indeed, all classical measures of tail dependence are such, but they investigate the amount of tail dependence along the main diagonal of copulas, which has often little in common with the concentration of extremes in the copulas' domain of definition.

In this paper we urge that the classical measures of tail dependence may underestimate the level of tail dependence in copulas. For the Gaussian copula, however, we prove that the classical measures are maximal. The implication of the result is two-fold: On the one hand, it means that in the Gaussian case, the (weak) measures of tail dependence that have been reported and used are of utmost prudence, which must be a reassuring news for practitioners. On the other hand, it further encourages substitution of the Gaussian copula with other copulas that are more tail dependent.

*JEL Classification:* C02, C51.

*Keywords:* Diagonal, Gaussian copula, maximal tail dependence, tail independence.

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