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Titel des Beitrags: Consistent iterated simulation of multivariate defaults: Markov indicators, lack of memory, extreme-value copulas, and the Marshall-Olkin distribution

Abstract: A current market-practice to incorporate multivariate defaults in global risk-factor simulations is the iteration of (multiplicative) i.i.d. survival indicator increments along a given time-grid, where the indicator distribution is based on a copula ansatz. The underlying assumption is that the behavior of the resulting iterated default distribution is similar to the one-shot distribution. It is shown that in most cases this assumption is not fulfilled and furthermore numerical analysis is presented that shows sizeable differences in probabilities assigned to both "survival of all" and "mixed default/survival" events. Moreover, the classes of distributions for which probabilities from the "terminal one-shot" and "terminal iterated" distribution coincide are derived for problems considering "survival-of-all" events as well as "mixed default/survival" events. For the former problem, distributions must fulfill a lack-of-memory type property, which is, e.g., fulfilled by min-stable-multivariate exponential distributions. These correspond in a copula-framework to exponential margins coupled via extreme value copulas. For the latter problem, while looping default inspired Freund distributions and more generally-phase type distributions could be a solution, under practically relevant and reasonable additional assumptions on portfolio rebalancing and nested distributions, the unique solution is the Marshall-Olkin class.

Stichworte: