Conditional copula simulation for systemic risk stress testing

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Abstract:
Since the financial crisis of 2007-2009 there is an active debate of regulators and academic researchers on systemic risk, with the aim of preventing similar crises in the future or at least reducing their impact. A major determinant of systemic risk is the interconnectedness of the international financial market. We propose to analyze interdependencies in the financial market using copulas, in particular using flexible vine copulas, which overcome limitations of the popular elliptical and Archimedean copulas. To investigate contagion effects among financial institutions, we develop methods for stress testing by exploiting the underlying dependence structure. New approaches for Archimedean and, especially, for vine copulas are derived. In a case study of 38 major international institutions, 20 insurers and 18 banks, we then analyze interdependencies of CDS spreads and perform a systemic risk stress test. The specified dependence model and the results from the stress test provide new insights into the interconnectedness of banks and insurers. In particular, the failure of a bank seems to constitute a larger systemic risk than the failure of an insurer.

Stichworte:
multivariate copula, sampling, vine copula, systemic risk, stress testing, CDS spreads