Dilip Madan: "Pricing and Hedging Basket Options to Acceptable Levels of Risk"

Abstract:

Stress levels embedded in S&P 500 options are constructed and reported. The stress function used is MINMAXVAR. Seven joint laws for the top 50 stocks in the index are considered. The first time changes a Gaussian one factor copula. The remaining six employ correlated Brownian motion independently time changed in each coordinate. Four models use daily returns, either run as Lévy processes or scaled, to the option maturity. The last two employ risk neutral marginals from the VGSSD and CGMYSSD Sato processes. The smallest stress function uses CGMYSSD risk neutral marginals and Lévy correlation. Running the Lévy process yields a lower stress surface than scaling to the option maturity. Static hedging of basket options to a particular level of acceptability is shown to substantially lower the price at which the basket option may be offered.