“Analytical Option Pricing under an Asymmetrically Displaced Double Gamma Jump-Diffusion Model” (2013), joint with Matthias Thul

Abstract:
We generalize the Kou (2002) double exponential jump-diffusion model in two directions. First, we independently displace the two tails of the jump size distribution away from the origin. Second, we allow for each of the displaced tails to follow a gamma distribution with an integer-valued shape parameter. Both extensions introduce additional flexibility in the tails of the corresponding return distribution. Our model is supported by an equilibrium economy and we obtain closed-form solutions for European plain vanilla options. Our valuation function is computationally fast to evaluate and robust across the full parameter space. We estimate the physical model parameters through maximum likelihood and for a diverse sample of equities, commodities and exchange rates. For all assets under consideration, the original Kou (2002) model can be rejected in favor of our newly introduced asymmetrically displaced double gamma dynamics.