Seminar

MODELING VOLATILE MARKETS

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Abstract
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MODELING VOLATILE MARKETS

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Abstract

It has long been known that all classes of asset returns have fat-tailed, skewed non-normal distributions to various degrees. Yet all existing risk management and portfolio optimization systems, based on distributional models, use multivariate normal distributions. This leaves unaddressed the challenge to use multivariate non-normal distributions that can model the co-dependent extreme movements of asset returns. In this talk we discuss the application of skewed fat-tailed multivariate distributions -- stable and tempered stable distributions -- to portfolio risk calculations, modeling volatile markets, forecasting market crashes and portfolio optimization. Stable and tempered stable distributions accurately reflect the varying degrees of tail fatness and skewness of the individual portfolio assets. Additionally, this modeling framework accounts for volatility clustering and the co-dependency structure among the assets in a portfolio. Use of these stable and tempered stable distributions to compute value-at-risk and expected tail loss realizes more accurate and informative risk measures, and portfolios that yield higher risk adjusted returns.

This talk discusses and demonstrates commercial applications of stable and tempered stable distributional models in risk management, modeling volatile markets, forecasting market crashes, option pricing and portfolio optimization.

The talk is based on my joint work with Aaron Kim, Boryana Racheva-Iotova, Stoyan Stoyanov, Michele-Leonardo Bianchi, Ivan Mitov, and Frank Fabozzi