A BENCHMARK APPROACH TO FINANCIAL MARKET MODELLING BEYOND SEMIMARTINGALES

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Abstract

This lecture introduces a general financial market modelling framework that allows to accommodate dynamics of asset prices that are not of semimartingale type, for instance, fractional Brownian motion driven models. The central building block of the framework is the best performing, strictly positive, tradable portfolio of the investment universe, the so called benchmark. This portfolio plays the role of the numeraire portfolio for derivative pricing and other risk management tasks. Important is the fact that the approach is assuming discrete trading and does not aim for reconciling continuous time limits for gains from trade as is possible in a semimartingale setting. A Diversification Theorem will be derived that allows to identify proxies of the benchmark in the real market. Empirical results show mono scaling properties for benchmarked securities but no multi-scaling is has been reported for various asset classes. A fractional minimal market model will be described that allows to model parsimoniously various stylized empirical facts of index securities.

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