

Intraday Diversified World Stock Indices: Dynamics, Return Distributions, Dependence Structure

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Abstract

An approach to the intraday analysis of diversified world accumulation indices is presented. The growth optimal portfolio (GOP) is used as reference frame or benchmark in a continuous financial market model. Diversified global portfolios, covering the world financial market, are constructed and shown to approximate the GOP. Dynamics, return distributions, and dependence structure of the indices are analysed.

Dynamics: The normalized GOP is modeled as a time transformed square root process of dimension four in market activity time. The dynamics is empirically verified in a robust manner. Furthermore, the long-term evolution of the transformed time is modeled via a constant net growth rate of the drift of the discounted GOP and a quickly evolving market activity, which takes into account seasonalities. The empirical findings identify a simple and realistic model for a world stock index that reflects its historical evolution reasonably well by using only a few constant parameters.

Return distributions and dependence structure: Return distributions and dependence structure of the WSI denominated in different currencies are analysed at different frequencies. The return distribution are fitted with multidimensional symmetric generalised hyperbolic distributions, and their evolution as a function of the time horizon is studied. In addition, the dependence structure of deseasonalised returns at different time horizons is analysed through different copulas.

Altogether, these elements give a coherent picture. Possible applications are outlined.