# Seminar of Probability and Stochastic Process

Tuesday, 9th July, from 10h30 to 11h30
Room 126, Extranef Building, UNIL Campus, Ecublens

## Prof. Eckhard Platen

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# The affine nature of aggregate wealth dynamics

## Abstract:

The paper derives a parsimonious two-component affine diffusion model for a world stock index to capture the dynamics of aggregate wealth. The observable state variables of the model are the normalized index and the inverse of the stochastic market activity, both modeled as square root processes. The square root process in market activity time for the normalized aggregate wealth emerges from the affine nature of aggregate wealth dynamics, which will be derived under basic assumptions and does not contain any parameters that have to be estimated. The proposed model employs only three well interpretable structural parameters, which determine the market activity dynamics, and three initial parameters. It is driven by the continuous, nondiversifiable uncertainty of the market and no other source of uncertainty. The model, to be valid over long time periods, needs to be formulated in a general financial modeling framework beyond the classical no-arbitrage paradigm. It reproduces a list of major stylized empirical facts, including Student-t distributed log-returns and typical volatility properties. Robust methods for fitting and simulating this model are demonstrated.

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