

# MCMC Methods for Parameter Estimation in an HMM-Model for Stock Returns

MARKUS HAHN<sup>1</sup> <markus.hahn@oeaw.ac.at>

We consider a multi-stock model for a financial market where prices satisfy a stochastic differential equation with instantaneous rates of return modeled as a continuous time Markov chain with finitely many states as presented by Sass and Haussmann [1]. We deal with the problem of estimating the occurring parameters for the continuous model from discretely observed data. While such estimations are commonly done with the EM-algorithm, we employ Markov chain Monte Carlo methods. We treat both the case of a discrete time approximation as well as a method for continuous time and compare the results with the EM-algorithm, pointing out some advantages of the MCMC approach.

[1] Jörn Sass and Ulrich G. Haussmann: *Optimizing the terminal wealth under partial information: The drift process as a continuous time Markov chain*, Finance and Stochastics 8 (2004), no. 4, 553–577

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<sup>1</sup>RICAM Austrian Academy of Sciences