WWTF Project MA14-031

Stochastic Filtering and Corporate and Sovereign Credit Risk

Abstract

The financial crisis and the following sovereign debt crisis showed that the existing theoretical framework for the modelling of credit and sovereign debt risk is not sufficient to provide empirically sound guidelines for financial decision making: some of the existing models are quite satisfactory from a theoretical perspective, but cannot be directly implemented because of the non-observability of the underlying economic variables. Other models such as the popular credit rating or scoring models are easily applicable, but lack a sound methodology for model validation and empirical testing, essentially because the `true' creditworthiness of a firm is not observable.
In this project we will address these issues by a systematic use of stochastic filtering techniques. Stochastic filtering is a mathematical discipline that deals with signal detection and parameter estimation in partially observed systems and is thus a natural tool for the analysis of credit risk. We want to study applications of stochastic filtering to three related areas: analysis of sovereign credit spreads; statistical methodology for credit rating systems; pricing and hedging of financial assets in structural models. We will consider the entire mathematical "production-chain", ranging from mathematical model development and the extension of filtering techniques to the implementation and testing of models on real data. A particular emphasis will be put on statistical inference.

Scientific disciplines:
101007 - Financial mathematics (40%) | 101018 - Statistics (30%) | 502009 - Corporate finance [Finanzwirtschaft] (30%)

Keywords:
credit risk, sovereign debt, stochastic filtering, hidden Markov models, EM algorithm

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Further links about the involved persons and regarding the project you can find at
https://archiv.wwtf.at/programmes/mathematics/MA14-031