

BCP Stability Analytics and Markov Chain Monte Carlo

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Modern Portfolio Theory goes back to Harry Markowitz [1]. When he published his article more than half a century ago, our knowledge of mathematical finance, econometrics, and statistics, as well as computer science, was much less developed than the options and the tools we have available today. We would like to share new ideas based on modern concepts of stability analytics, which allow for an alternative view on performance and risk in funds and portfolios and their impact on indexation techniques and tactical asset management.

The main topics we would like to address are based on statistical methods for the identification of instabilities and vulnerabilities in the dynamics behind financial markets. Our approach (Bayesian Change Point (BCP) Stability Analytics [4]) is based on the work of Barry and Hartigan [2] about Bayesian change point detection and parameter estimation. The method makes use of Bayesian Statistics and a Markov Chain Monte Carlo approach (implemented by Erdman and Emerson [3]).

The analytics can be used to explore financial markets and financial investments before, during and after critical financial and economic periods (e.g. the recent sub-prime or European debt crises). We will demonstrate how such vulnerabilities to external forces can be detected, analyzed and quantified. Thus, we can define figures to measure the structure and strength of instabilities appearing over time.

As a practical example, we assess the fragility of different currencies in spot and forward FX markets. We show ideas on how to construct wealth protected FX indices and how they can be combined in an FX portfolio. As a valuable tool to visualize the results we will additionally demonstrate an *R shiny* web application.

References

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