APPLYING ANALYTIC BOUNDS FOR MULTI-PERIOD RISK MANAGEMENT

Leandro Lyra Braga Dognini[1], **Jorge Passamani Zubelli**[2]

[1,2]Instituto de Matemática Pura e Aplicada
Estrada Dona Castorina 110, Rio de Janeiro, Brazil, 22460-320
llyra@impa.br
zubelli@impa.br

Abstract

Multi-period risk management is a central concern in finance and relies heavily on Monte-Carlo methods and scenario simulation, making its use inadequate for certain applications, like HFT. Inspired on the Multi-period Value-at-Risk (MVaR), we propose a new risk measure called the Multi-period Relative Value-at-Risk (MRVaR), which is sensible only to relative changes in wealth and corrects undesired features of the classic risk metric. Using the MRVaR and GARCH models for the price series, we develop an analytic bound for the risk measure and analyze the consequences of using such bound as a proxy for the risk of a portfolio. We show, for instance, how is the behavior of the error incurred when using the bound as a risk proxy and how the optimal portfolio composition is affected by this approach. We conclude by presenting a case study with stocks from BM&FBOVESPA in order to validate the analytic bound as a consistent alternative, not relying on Monte-Carlo Methods or scenario simulation, for risk management.