Accepted Manuscript

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PII: S0377-0427(17)30635-0
DOI: https://doi.org/10.1016/j.cam.2017.12.015
Reference: CAM 11432

To appear in: *Journal of Computational and Applied Mathematics*

Received date : 15 August 2017

Please cite this article as: A. Goel, A. Sharma, A. Mehra, Index tracking and enhanced indexing using mixed conditional value-at-risk, *Journal of Computational and Applied Mathematics* (2017), https://doi.org/10.1016/j.cam.2017.12.015

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Index Tracking and Enhanced Indexing using Mixed Conditional Value-at-Risk

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Abstract

Index tracking (IT) and enhanced indexing (EI) are two forms of investment strategies which revolve around the movements of the benchmark index. While IT aims to match the performance of the benchmark index, EI intents to outperform the same. In this paper, we seek to design portfolios for IT and EI problems using mixed conditional value at risk (MCVaR). We propose to use the two tail MCVaR (TMCVaR) measure to track the index. Optimizing TMCVaR is a linear program which minimizes the upper deviation and the downside deviation from the benchmark index and hence meets the objective of IT. On the other hand, we propose a two step procedure for EI problem. In step one, we design a discrete Markov chain model to filter a few stocks on the basis of their high probability of gain over the benchmark index. In step two, we assign optimal weights to the filtered assets through maximizing any of the two variants of the STARR ratio with MCVaR or the STARR ratio with deviation MCVaR (DMCVaR). Maximizing the STARR ratio either with MCVaR or DMCVaR is a linear program and hence tractable. We analyze the empirical performance of the proposed models over 17 world-wide indices using the rolling window approach. We consider two IT and four EI models from the literature for a comparative analysis. It is exhibited that the proposed IT model outperforms the other two IT models over several performance measures including higher correlation value with the benchmark index and lower tracking error, and the two proposed EI models outperform the other four EI models in achieving higher excess mean returns from the benchmark index.

Keywords:
Index Tracking, Enhanced Indexing, Mixed CVaR, STARR Ratio, Deviation Measure

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The first author is thankful to Council of Scientific and Industrial Research (CSIR), India, for the financial grant.

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