EFFICIENT PORTFOLIO OPTIMIZATION WITH SKEWNESS USING THE
MEAN-VARIANCE-SKEWNESS MODEL

A PROJECT SUBMITTED TO THE SCHOOL OF MATHEMATICS, CHIROMO
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ABSTRACT

Portfolio optimization has an important place in the finance industry globally. The Mean Variance Model of Harry Markowitz is the most popular model used to achieve optimization. It expresses a tradeoff between return and risk for a set of assets to determine an efficient portfolio. However, in this model, portfolio selection is based on only the first two moments of asset return distributions. The model assumes that asset returns follow a normal distribution. This is not the case. Various studies that have investigated the validity of these assumptions find evidence against them showing that asset returns have significant skewness. For this reason, the incorporation of skewness in portfolio optimization is explored in this project. In this project, the Mean-Variance Model by Harry Markowitz is used to optimize a portfolio of two stocks from the Nairobi Securities Exchange. Then, this project will demonstrate that the return distributions of the two stocks from the Nairobi Securities Exchange are non-normally distributed. Lastly, the Mean-Variance-Skewness Model is presented and then used to optimize a portfolio of the same two stocks.