ABSTRACT

Investment in the capital market offers high-profit opportunities but also carries risks that need to be managed effectively. The Capital Asset Pricing Model (CAPM) measures the relationship between risk and expected return. To form an optimal portfolio, an optimization approach is required to determine the best asset combination while minimizing risk. The Constrained Newton-Raphson method is used to optimize the CAPM portfolio while ensuring that the stock weights remain positive and avoiding short selling risks. This study aims to construct an optimal portfolio using CAPM with Constrained Newton-Raphson optimization for IDX High Dividend 20 stocks. The dataset consists of monthly closing prices from January 1, 2020, to August 31, 2024. Stocks are selected based on return data fulfilling the univariate normality test, beta between 0 and 1, positive expected return, smallest standard deviation, and lowest correlation coefficient, resulting in BBCA, ICBP, and UNTR as the final portfolio components. The optimization yields an optimal weight distribution of BBCA 34.42%, ICBP 34.43%, and UNTR 31.15%. Portfolio performance, measured by the Sharpe Index, results in a positive value of 0.00929, indicating good portfolio performance. Portfolio risk, measured using Value at Risk (VaR) Historical Simulation at a 95% confidence level, shows a maximum potential loss of Rp8.582.924 (8.58% of Rp100,000,000) over a one-month investment period. The Constrained Newton-Raphson method optimizes the CAPM portfolio by preventing short-selling, ensuring an optimal stock weight distribution, and maintaining a favorable risk-return balance.

Keywords: Portfolio Optimization, Non-Short Selling, CAPM, Constrained Newton-Raphson, Sharpe Index, VaR.