

ABSTRACT

Stock investment is in high demand due to its high profit potential, but it also has a large level of risk. Optimal portfolio formation is an important strategy in managing risk to minimize it. Forming an optimal portfolio with a focus on minimizing risk can be done using the Mean-Semivariance method, which is accompanied by stock selection through clustering analysis with Fuzzy C-Means. This method has the advantage of placing cluster centers that are more accurate than other clusters. Fuzzy C-Means approach aims to group stocks based on certain characteristics and select combination of assets that can help reduce the possibility of large losses and provide optimal returns. The data used are financial ratio data, namely *Earning per Share* (EPS), *Price to Earning Ratio* (PER), dan *Return on Equity* (ROE) as criteria in the process of selecting stock securities with cluster analysis, as well as daily return data used for optimal portfolio formation on active stocks included in the LQ45 Index during the period January to December 2024. The results showed that the best number of clusters was 3 clusters with the highest Silhouette Coefficient value of 0.812212. representative stock securities of each cluster are selected based on the highest expected return value and positive value, namely UNTR and BRIS. The optimal portfolio obtained by the Mean-Semivariance method produces a weight value of 63.91% in UNTR stock securities and 36.09% in BRIS stock securities. The result of measuring portfolio performance with the Sharpe index is 0.088966, which shows good portfolio performance results, and the Value at Risk (VaR) value calculated by the Historical Simulation method shows the maximum potential loss that investors may experience. The VaR result show that at a 95% confidence level for holding periods of 1, 7, and 30 days, respectively, it is 0.021543, 0.056998, and 0.117996.

Keywords: *Optimal Portfolio, Fuzzy C-Means, Mean-Semivariance, Silhouette Coefficient, Sharpe Index, Value at Risk, Historical Simulation*