

### **Abstract**

Advantage of diversification could be optimized by categorizing assets into certainty classes. Hierarchical structure between stocks was discovered inside financial markets and could be analyzed by observing series of correlated stocks. Most of the previous studies only focused on the impact of cluster analysis on portfolio's performance and rarely considered the assets selection in their benchmarks. This research propose three alternative scenarios of assets selection for cluster based portfolio construction process as new point of views in forming portfolio construction benchmark. In its realization, ward's method was utilized to clustering stocks based on in-sample data of 606 companies listed on IDX. The research was continued by portfolio construction with tangency portfolio as the optimal portfolio preferences and three alternative scenarios of assets selection. Portfolio's performance measured by implementing both Sharpe ratio and  $\Omega$  ratio on out-sample data. Cluster analysis conducted shows that groups of stocks formed have high quality. Moreover, the portfolio with cluster analysis also provides excellent performance, outperformed the portfolio without cluster analysis.

**Keywords:** assets selection, cluster analysis, portfolio diversification, ward's method.