ABSTRACT

The increasing interest in sustainable stock investment, particularly in the SRI-KEHATI index, requires portfolio construction strategies that optimally balance return and risk. This study examines the effect of variations in the number of stocks on portfolio weights and portfolio risk, using stocks with positive expected returns as portfolio constituents. Portfolio weight optimization is performed using a Genetic Algorithm (GA) with the Sharpe Ratio as the objective function, because GA is capable of solving optimization problems without requiring specific distributional assumptions. Portfolio risk is measured using Value at Risk (VaR) with the Cornish–Fisher Expansion approach, based on daily closing price data from March 1, 2023, to August 31, 2025 for 25 stocks. From these 25 stocks, 8 stocks with positive expected returns are selected. The results indicate that increasing the number of stocks leads to a more evenly distributed portfolio weight allocation and a reduction in portfolio risk. In the two-stock portfolio, the fitness value is 0.0527 with a VaR of −0.0323, while in the eight-stock portfolio, the fitness value is 0.0507 and the VaR decreases to −0.0193. The effectiveness of the GA is demonstrated by stable convergence of fitness values and improved risk efficiency. Overall, variations in the number of stocks provide diversification benefits that reduce potential losses without compromising portfolio performance.

Keywords: Genetic Algorithm; Portfolio Optimization; Value at Risk; Cornish–Fisher Expansion; Diversification.