

ABSTRACT

The development of the Indonesian capital market has increased the need for optimal portfolio construction strategies that take downside investment risk into account. This study aims to construct an optimal stock portfolio using the Mean–Semivariance method based on Particle Swarm Optimization with stock selection using PROMETHEE. The research data consist of stocks that were consistently included in the IDX Sharia Growth Index during the period from June 1, 2024, to September 30, 2025, comprising daily closing prices, the Composite Stock Price Index, the BI Rate, and financial statements for the second quarter of 2025. The initial stage involves calculating the expected return of each stock, in which only stocks with positive expected returns are retained as portfolio candidates, while stocks with negative expected returns are eliminated. Stock selection is conducted using PROMETHEE based on five financial ratios, with a preference for minimizing PER, PBV, and DER and maximizing ROE and Dividend Yield. The optimal portfolio is constructed using the Particle Swarm Optimization algorithm with the objective function of minimizing semivariance risk, subject to constraints of a minimum expected return equal to the risk-free rate, no short selling, and a total portfolio weight equal to one. The selection results indicate that three stocks meet the criteria, namely PT Dharma Satya Nusantara Tbk, PT Perusahaan Gas Negara Tbk, and PT Indofood Sukses Makmur Tbk, with portfolio weights of 10.07 percent, 28.21 percent, and 61.72 percent, respectively. The portfolio generates an expected return of 0.0693 percent per day with a risk level of 1.14 percent per day. A Sharpe Ratio of 0.047042 indicates adequate return compensation for the level of risk undertaken. The Value at Risk at the 95 percent confidence level indicates a maximum potential loss of 2.47 percent, equivalent to Rp246,781, for an investment of Rp10,000,000 over one day. The integration of PROMETHEE and Particle Swarm Optimization within the Mean–Semivariance framework results in an efficient portfolio with optimal returns and minimum risk for investors with conservative to moderate risk preferences, or investors with low to medium risk tolerance.

Keywords: Optimal Portfolio, Mean-Semivariance, Particle Swarm Optimization, PROMETHEE, IDX Sharia Growth, Historical Simulation.