ABSTRACT

The COVID-19 pandemic increased the volatility of the capital markets, creating economic uncertainty that influenced investor behavior. In facing this situation, it is essential for investors to have an effective stock portfolio strategy to manage extreme risks and maximize potential returns. The Mean-Variance-Skewness-Kurtosis (MVSK) approach offers advantages by considering four statistical moments—mean, variance, skewness, and kurtosis—that go beyond conventional volatility assessments. This study aims to determine the optimal stock portfolio weights using the Polynomial Goal Programming (PGP) model while considering these four statistical moments. The data used consists of stocks listed on the IDX SMC Composite index from January 2020 to December 2023, selected based on return statistics criteria. The three selected stocks, APIC.JK, BALI.JK, and JTPE.JK, were optimized using the PGP model. The optimization results show a reduction in the PGP objective function value from Z = 6.11891 to Z = 5.4238, reflecting an improvement in portfolio return distribution. The portfolio's average return increased from 0.00053 to 0.00055, portfolio variance increased from 0.00022 to 0.00038, portfolio skewness changed from negative -0.19200 to positive 0.10344. The portfolio's kurtosis decreased from 6.22959 to 5.79337, indicating a reduction in extreme risk. The optimal portfolio weights consist of 49.93% for BALI.JK, 37.23% for JTPE.JK, and 12.77% for APIC.JK, reflecting a better balance between risk and return. The Sharpe ratio decreased from 2.89% to 2.30%, indicating the success of the PGP model in creating a more stable portfolio with a return distribution approaching normal. This study shows that the PGP model, which integrates the four statistical moments, can be an effective approach to building a more optimal stock portfolio, especially in the midst of high market volatility.

Keywords: IDX SMC Composite, MVSK, PGP, Optimal Portfolio, Volatility, Skewness, Kurtosis, High Moment Portfolio