

ABSTRACT

Stocks are one of the most popular financial market instrument and understanding the level of risk is important for investor. Financial time series often exhibit high volatility, leading to heteroskedasticity. ARCH/GARCH models are widely employed to address heteroskedasticity issue. In this study, the GARCH model is integrated with an Archimedean Copula to estimate Value at Risk (VaR) as a measure of portfolio risk. Copulas provide a flexible approach for modeling the dependence structure between assets through a joint distribution function. The portfolio is constructed using daily return data of BBNI and ITMG stocks over the period from January 3, 2022, to November 10, 2025. Based on the model identification and estimation procedures, the optimal specification for BBNI returns is ARMA([7],0)–GARCH(1,1), while ITMG returns are best described by an ARMA([6],0)–GARCH(1,1) model. Dependence modeling using copulas reveals that the Frank copula provides the best representation of the dependence structure between the returns of the two stocks. The portfolio VaR estimated using the GARCH-Copula model at 95% confidence level with portofolio weights of 50% for each stock is -0.02552. The adequacy of the VaR estimates is further assessed through Backtesting using the Kupiec test, and the results confirm that the proposed GARCH-Copula model produces valid portfolio risk estimates.

Keywords: GARCH, Value at Risk, Copula Archimedean, Backtesting, Kupiec Test.