

ABSTRACT

Cryptocurrencies, as a fast-growing financial innovation, have been in the spotlight due to their extreme volatility and risk management challenges. The complexity and volatility of cryptocurrencies require more adaptive and accurate risk models for effective estimation, decision-making, and risk management. This research focuses on the top ten cryptocurrencies by market capitalization, namely Bitcoin, Ethereum, XRP, Tether, Solana, BNB, Dogecoin, USDC, Cardano, and TRON. To explore the effectiveness of GARCH, EGARCH, TGARCH, and MS-GARCH models in analyzing volatility. Using Deviance Information Criterion (DIC) and Bayesian Predictive Information Criterion (BPIC) to evaluate model fit, as well as Mean Squared Error (MSE) and Mean Absolute Error (MAE) to assess prediction accuracy, this study also applies Value at Risk (VaR) as a risk measurement tool. VaR prediction accuracy is further tested through Conditional Coverage (CC) and Dynamic Quantile (DQ) tests.

Keywords: Cryptocurrency, Volatility, GARCH, EGARCH, TGARCH,