INTISARI

Estimasi *Conditional Value at Risk* (CVaR) Menggunakan Model *Hybrid Generalized Autoregressive Conditional Heteroskedasticity* dan *Long Short-Term Memory*: Studi Kasus pada Indeks Harga Saham Gabungan

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Studi ini bertujuan untuk mengestimasi risiko pasar saham Indonesia menggunakan *Conditional Value at Risk* (CVaR) dengan pendekatan model *hybrid Generalized Autoregressive Conditional Heteroskedasticity* (GARCH) dan *Long Short-Term Memory* (LSTM) guna meningkatkan akurasi pengukuran risiko terhadap potensi kerugian ekstrem. Data yang digunakan berupa data *return* harian Indeks Harga Saham Gabungan (IHSG) dari tahun 2020 hingga 2025. Model GARCH dengan distribusi *Student-t* digunakan untuk menangkap karakteristik volatilitas dan fenomena *volatility clustering*, sedangkan LSTM dimanfaatkan untuk memodelkan pola nonlinier dan ketergantungan temporal jangka panjang pada volatilitas. Hasil volatilitas dari model GARCH$(1, 1)$ digunakan sebagai *input* tambahan pada model LSTM untuk membentuk model *hybrid*. Selanjutnya, estimasi *Value at Risk* (VaR) dan *Conditional Value at Risk* (CVaR) dilakukan berdasarkan hasil peramalan volatilitas dari masing-masing model. Evaluasi kinerja peramalan dilakukan menggunakan ukuran kesalahan prediksi, sedangkan validitas estimasi risiko diuji melalui prosedur *backtesting* VaR dan CVaR. Hasil analisis menunjukkan bahwa model *hybrid* GARCH-LSTM mampu memberikan estimasi volatilitas dan CVaR yang lebih akurat dibandingkan model tunggal, serta memenuhi kriteria *backtesting* pada tingkat kepercayaan yang digunakan, sehingga dapat menjadi alternatif yang efektif dalam pengukuran risiko pasar saham di Indonesia.

ABSTRACT

Conditional Value at Risk (CVaR) Estimation Using Hybrid Generalized Autoregressive Conditional Heteroskedasticity and Long Short-Term Memory Model: Case Study on IDX Composite

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This study aims to estimate market risk in the Indonesian stock market using Conditional Value at Risk (CVaR) through a hybrid Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and Long Short-Term Memory (LSTM) model to improve the accuracy of risk measurement for potential extreme losses. The data consist of daily return data of the IDX Composite from 2020 to 2025. The GARCH model with a Student-t distribution is employed to capture volatility characteristics and the volatility clustering phenomenon, while the LSTM model is used to model nonlinear patterns and long-term temporal dependencies in volatility. The volatility estimates obtained from the GARCH(1,1) model are incorporated as additional inputs to the LSTM model to construct the hybrid framework. Subsequently, Value at Risk (VaR) and Conditional Value at Risk (CVaR) are estimated based on the volatility forecasts generated by each model. Forecasting performance is evaluated using prediction error measures, while the validity of risk estimates is assessed through VaR and CVaR backtesting procedures. The results indicate that the hybrid GARCH-LSTM model provides more accurate volatility and CVaR estimates than the individual models and satisfies the backtesting criteria at the specified confidence levels, demonstrating its effectiveness as an alternative approach for measuring stock market risk in Indonesia.