INTISARI

Perbandingan Pemodelan *Expected Shortfall* dengan Metode Glosten-Jagannathan-Runkle GARCH (GJR-GARCH) dan EGARCH: Studi Kasus pada Aset Kripto Bitcoin

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Studi ini membandingkan pemodelan *Expected Shortfall* (ES) menggunakan metode Glosten-Jagannathan-Runkle *Generalized Autoregressive Conditional Heteroskedasticity* (GJR-GARCH) dan *Exponential* GARCH (EGARCH) pada aset kripto Bitcoin. Analisis awal menunjukkan bahwa data *return* Bitcoin memiliki sifat *fat tail* dan frekuensi nilai ekstrem yang tinggi, menandakan risiko besar akibat distribusi dengan ekor lebih tebal dibandingkan distribusi normal. Pengujian selanjutnya mengidentifikasi adanya efek ARCH/GARCH serta *leverage effect*, di mana volatilitas meningkat ketika harga Bitcoin mengalami penurunan. Model GJR-GARCH(2,1) dan EGARCH(2,1) dipilih untuk mengestimasi ES karena kemampuannya menangkap volatilitas asimetris dan efek *leverage*. Hasil analisis menunjukkan bahwa model EGARCH menghasilkan estimasi risiko ES yang sedikit lebih tinggi dibandingkan GJR-GARCH. Berdasarkan hasil *backtesting*, estimasi VaR dan ES dari kedua model dinilai cukup akurat untuk digunakan dalam mengukur risiko pasar kripto.

ABSTRACT

(Comparison of Expected Shortfall Modeling Using the Glosten-Jagannathan-Runkle GARCH (GJR-GARCH) and EGARCH Methods: A Case Study on Bitcoin Cryptocurrency Assets)

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This study compares the modeling of Expected Shortfall (ES) using the Glosten-Jagannathan-Runkle Generalized Autoregressive Conditional Heteroskedasticity (GJR-GARCH) and Exponential GARCH (EGARCH) methods for the Bitcoin cryptocurrency asset. Preliminary analysis reveals that Bitcoin return data exhibit fat-tailed characteristics and a high frequency of extreme values, indicating substantial risk due to a distribution with heavier tails than the normal distribution. Further testing identifies the presence of ARCH/GARCH effects and the leverage effect, where volatility tends to increase after price declines. The GJR-GARCH(2,1) and EGARCH(2,1) models are selected for ES estimation due to their ability to capture asymmetric volatility and leverage effects. The results indicate that the EGARCH model provides slightly higher ES risk estimates compared to the GJR-GARCH model. Based on backtesting, the VaR and ES estimates from both models are deemed sufficiently accurate for assessing risks in cryptocurrency markets.