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MARKET RISK DATA ANALYTICS FOR SELECTED ASIAN STOCK MARKETS DURING THE PANDEMIC COVID-19

(Analitik Data Risiko Pasaran untuk Pasaran Saham Asia Terpilih Semasa Pandemik COVID-19)

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ABSTRACT

This study investigates various conditional mean and variance models to account for the impact of COVID-19 on the selected Asian markets, specifically the Japanese and Singaporean stock markets. The research period (24 August 2012 to 24 August 2022) is split into two periods, from 24 August 2012 to 31 March 2020 and from 24 August 2012 to 24 August 2022, to analyse the effect of COVID-19 on both stock returns. We found that both returns exhibit non-normality. The best-fitted models for the Japanese and Singaporean stock markets are Student-t ARMA(1,1)-EGARCH(1,1) and ARMA(2,1)-GJR(1,1), respectively. The presence of the pandemic period indicates positive shifts in volatility intensity in both the Japanese and Singaporean stock markets. The 5% Value-at-Risk under the GARCH estimations is $3568.20 for Japan and $2050.40 for Singapore. Meanwhile, the 5% expected shortfall based on historical simulation for both countries is $3214.00 for Japan and $2196.26 for Singapore. From the results of Value-at-Risk and expected shortfall, the Japanese stock returns showed more significant maximum losses than Singaporean stock returns, which further indicates that the Japanese stock market was more volatile than the Singaporean stock market before and during the pandemic period.

Keywords: conditional variance; volatility analysis; COVID-19

ABSTRAK

Kajian ini mengkaji pelbagai model min dan varians bersyarat untuk mengambil kira kesan COVID-19 terhadap pasaran Asia terpilih, khususnya pasaran saham Jepun dan Singapura. Tempoh kajian (24 Ogos 2012 hingga 24 Ogos 2022) dibahagikan kepada dua tempoh, dari 24 Ogos 2012 hingga 31 Mac 2020 dan dari 24 Ogos 2012 hingga 24 Ogos 2022, untuk menganalisis kesan COVID-19 terhadap kedua-dua pulangan saham. Kami mendapati bahawa kedua-dua pulangan tidak menurut taburan normal. Model terbaik yang bersesuaian untuk pasaran saham Jepun dan Singapura adalah Student-t ARMA(1,1)-EGARCH(1,1) dan ARMA(2,1)-GJR(1,1) masing-masing. Kehadiran tempoh pandemik menunjukkan pergeseran positif dalam intensiti ketidistabilan dalam kedua-dua pasaran saham Jepun dan Singapura. Nilai Risiko pada 5% di bawah anggaran GARCH adalah $3568.20 untuk Jepun dan $2050.40 untuk Singapura. Sementara itu, kekurangan dijangka pada 5% berdasarkan simulasi sejarah untuk kedua-dua negara adalah $3214.00 untuk Jepun dan $2196.26 untuk Singapura. Daripada hasil Nilai Risiko dan kekurangan dijangka, pulangan saham Jepun menunjukkan kerugian maksimum yang lebih ketara daripada pulangan saham Singapura, yang menunjukkan bahawa pasaran saham Jepun lebih tidak stabil daripada pasaran saham Singapura sebelum dan semasa tempoh pandemik.

Kata kunci: varians bersyarat; analisis kemeruapan; COVID-19

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