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Networks structure and entropy of stocks in the Stock Exchange of Thailand (SET)

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In this article, we investigate the network structure of stocks in the Thai stock market from 2008 to 2020, applying the correlation distance as weights and the average of correlations as a criterion for deciding whether two stocks are connected. We can access and filter strongly correlated and weakly correlated stocks in a financial network using different average correlation thresholds ($\mu - 5\sigma$, $\mu - 3\sigma$, μ , $\mu + 3\sigma$, $\mu + 5\sigma$). The results indicate that during high volatility situations, such as the global financial crisis in 2008 and the COVID pandemic in early 2020, the network's characteristic path length decreases, whereas the clustering coefficient increases. These findings suggest that the network structure has shrunk in size, and stocks are now tightly linked, resulting in a similar trend of price and return behaviors observed in many stocks during financial crises. Also, the minimal level of network entropy implies that the complexity decreases, and each node of the network has lost its ability to perform independently across stock sectors. Furthermore, we discover that the banking and utility sectors have the highest probability of being a hub of the network clusters. This research can contribute to the explanation of stock clustering in terms of entropy and network topology.

Keywords: stock network measurement, network entropy, financial market, econophysics

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