ABSTRACT

Stock price movements constitute time series data that are dynamic, nonlinear, and often experience temporal shifts. In addition, the characteristics of each stock tend to be heterogeneous, making segmentation necessary to cluster stocks based on their price levels and similarity in movement patterns. Stock clustering aims to identify groups of stocks with similar prices and movement patterns, thereby assisting investors in making informed decisions. Distance measures such as Euclidean and Manhattan are less capable of accurately capturing pattern similarity because they do not account for temporal shifts between time points. Therefore, this study applies Dynamic Time Warping (DTW) as a distance measure capable of accommodating time misalignment among time series data, along with the K-Medoids algorithm as a clustering method compatible with non-Euclidean distance matrices. The data used in this study consist of the daily closing prices of 45 stocks included in the LQ45 index from August to November 2025, obtained from Yahoo Finance as secondary data. The analysis process includes calculating the DTW distance between stocks, forming clusters using K-Medoids, and evaluating cluster quality using the Davies-Bouldin Index (DBI). The results indicate that the optimal number of clusters is three, with a DBI value of 0.24193, which is the smallest among all tested cluster numbers. The resulting clusters successfully identify groups of stocks with similar price movement patterns and risk characteristics. Overall, the combination of DTW and K-Medoids is effective for clustering stock data characterized as time series data.

Keywords : Dynamic Time Warping (DTW), K-Medoids, Clustering, Time Series, LQ45 Stocks, Davies–Bouldin Index (DBI)