

ABSTRACT

Stock prices are time series data that have fluctuating patterns and may be fluctuated by values from previous periods. In time series modelling, violations of model assumptions are often found, so a more flexible and appropriate method is needed to capture intertemporal relationships. This study aims to apply a multivariable kernel nonparametric time series model with Generalized Cross-Validation (GCV) optimization criteria in forecasting BBKA stock prices. The data used are daily closing prices of BBKA stock from November 01, 2021 to October 30, 2025, consisting of 961 observations, divided into the first 85% as training data and the next 15% as testing data. The analysis stages include Box-Cox transformation, first-order differencing, determination of predictor lags using the Partial Autocorrelation Function (PACF) plot, and kernel regression modelling with the Nadaraya-Watson estimator using the Gaussian Kernel. The results show that the first and second lags are used as predictor variables. The optimal bandwidth is obtained from the combination with the smallest GCV value, namely $h_1 = 0.5$ and $h_2 = 1.4$. The model produces Adjusted R^2 of 98.36% on the training data and a Mean Absolute Percentage Error (MAPE) of 1.39% on the testing data. These results indicate that the multivariable kernel nonparametric time series regression model with GCV optimization criteria has very good forecasting ability in modelling BBKA stock prices.

Keyword: BBKA stock prices, time series, multivariable kernel nonparametric regression, Generalized Cross-Validation, Nadaraya-Watson.