

ABSTRACT

Forecasting the Stock Price of PT Unilever Indonesia Using the ARCH-GARCH Model with the Application of Kalman Filter

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One of the problems faced by PT Unilever Indonesia is the volatility of the stock price which is influenced by internal and external factors, such as profit growth, asset growth, cash flow, ROE, inflation, interest rates, and exchange rates. This volatile stock price movement raises the need for accurate forecasting methods to support investment decision making and risk management. This research aims to obtain ARCH-GARCH and ARCH-GARCH models with the application of Kalman Filter in forecasting the stock price of PT Unilever Indonesia and evaluate the accuracy of the forecasting results. The ARCH-GARCH method is used to model variations in market volatility, while the Kalman Filter is used to improve forecasting accuracy. The data used is historical stock price data of PT Unilever Indonesia from January 1, 2014 to December 31, 2024 obtained from yfinance library. The steps in this research include problem identification, literature study, data collection, EDA, data preprocessing, stationarity test, heteroscedasticity test, modeling, evaluation, analysis and results. From various candidates, GARCH(1,2) with skewed student's t (sstd) error distribution was selected as the best model with an AIC value of -5.476981. The initial prediction of the GARCH model resulted in a MAPE of 49.47%, while after the application of the Kalman Filter the MAPE dropped to 6.04% indicating a significant increase in accuracy. The results confirm the effectiveness of the Kalman Filter in filtering out noise and dynamically adjusting estimates, so that predictions are more accurate and responsive to market changes.

Keywords: *ARCH-GARCH, Kalman Filter, Forecasting, Stock Price*