

# COMPARATIVE UNIVARIATE MODEL FOR SHARE PRICE PREDICTION

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## 1. Introduction

Axiata Group Berhad is a Malaysian incorporated telecommunications company that manages the Axiata Group. Prepaid and postpaid mobile services, television and cable television services, internet services, enterprise solutions, digital marketing and e-commerce services, mobile advertising, and machine-to-machine (M2M) solutions are one of the Axiata Group's products and services. The group also provides telecommunications infrastructure services and operates telecommunications towers on a regional scale. Holding an investment, selling telecommunications equipment and related products is one of the Group's other regular activities.

The Covid-19 pandemic has a short-term impact on Axiata Group SDN BHD in profit and loss. In the post-Covid19 world, winners and losers emerge as changes in consumer behavior drive new conditions while balancing health concerns, work responsibilities and lifestyle needs (Mandy, 2020). Axiata Group's net income for the first quarter of 2021 was 75.56 million ringgits, down 60% from 188.11 million ringgit in the year-ago quarter due to higher depreciation and lower one-time profits (Khalid, 2021). Celcom extends its support via digital online services and additional special relief activities for all customers during the Movement Control Order period, as many Malaysians would be working from home, contributing to social distancing efforts (Ullah, 2021). According to Makridakis (2014), forecasting is important to help organizations anticipate major future changes and their implications and better respond to these changes and the opportunities and risks associated with them. Therefore, this study is important for finding the best model for predicting the share price of the Axiata Group in November 2021. Monthly opening prices for shares were taken from the investing.com website from October 2010 to October 2021.

## 2. Methodology

### 2.1 Univariate Modelling Technique

Univariate modelling techniques are the simplest form of analysis for prediction purposes. There is only one variable involved in the data analysis. In this study, single exponential smoothing, and Holt methods were selected to model and forecast the share price per unit for Axiata Group. The estimated forecast value for both models is calculated by using the formula as shown in Table 1.

**Table 1.** Univariate Models.

Single Exponential Smoothing	Holt's Method
$F_{t+m} = \alpha y_t + (1 - \alpha)F_t$	$S_t = \alpha y_t + (1 - \alpha)(S_{t-1} + T_{t-1})$ $T_t = \beta(S_t - S_{t-1}) + (1 - \beta)T_{t-1}$ $F_{t+m} = S_t + T_t(m)$

where,  $\alpha$ ,  $\beta$  are smoothed constant ranges from 0 to 1 and  $m$  is a period to be forecast into future.

Measurement error is important in predictive research to determine the best or most appropriate model for predicting future value. In this study, Excel software was used to analyze the root mean square error (RMSE) and Mean Absolute Percentage Error (MAPE) to determine the best model for prediction. The minimum error measures indicate that it is a good predictive model. This study used more than one error measure to ensure the accuracy and consistency of the outcomes.

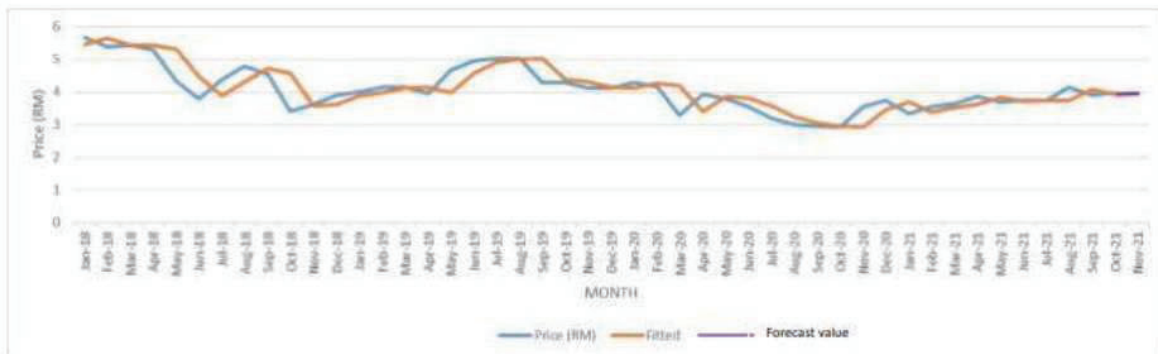
### 3. Results and Discussions

Two univariate models were used to examine the Axiata share price. The purpose of comparing these two models was to discover which model could produce a better forecast. Before the data was analyzed, the undefined smoothing constants alpha and beta were determined using the solver feature in Microsoft Excel. The smoothing constant's alpha, for the single exponential smoothing method was 0.867, while the alpha for the Holt method was 0.866 and the beta was 1.0. The error measurements for both models were compared, as shown in Table 2.

**Table 2.** Comparison between univariate models.

Model	RMSE	MAPE
Single Exponential Smoothing	0.03	6.2384
Holt's Method	0.02	6.2377

From the RMSE and MAPE values in Table 2, the Holt method is proposed as the best model that investors can use to predict future stock prices since both managed to produce minimum errors which are 0.02 and 6.2377, respectively. Therefore, as shown in Figure 1, Holt's method is used to predict the monthly share opening price for November 2021.

**Figure 1.** Graph of stock price prediction (Nov-21).

#### 4. Conclusion

In summary, the best model used to predict future stock prices in Axiata is Holt's method because it has the lowest RMSE and MAPE values. Based on the November 2021 forecast, which is one month ahead, the Axiata Group Berhad share price will rise to RM3.97 per unit. Recommendation for future study is to include more advanced forecasting approaches such as Autoregressive Integrated Moving Average (ARIMA) models. Future researchers can use this study as a reference to improve the accuracy of the model and apply it to other time-series data.

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